U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Instrument Flight Procedure Validation (IFPV) of Performance Based Navigation (PBN) Instrument Flight Procedures (IFP)

Date: 07/06/2023 **AC No:** 90-113C
Initiated By: AFS-400

1. Purpose.

This advisory circular (AC) provides the means for conducting IFPV of satellite-enabled PBN instrument flight procedures for both fixed-wing and helicopter aircraft. It also addresses validation of helicopter Wide Area Augmentation System (WAAS) special IFPs. This AC describes ground validation, pre-flight validation (including simulator evaluation and obstacle assessment), and flight validation.

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies. Please note that, non-FAA service providers are not required to perform IFPV of PBN IFPs. If a non-FAA service provider chooses to perform IFPV of PBN IFPs, however, this AC provides the directions for doing so.

2. Applicability.

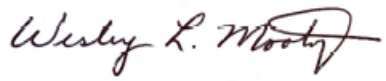
The primary audience for this AC is non-FAA Service Providers performing IFPV of PBN IFPs. The secondary audience is Flight Standards (FS) Aviation Safety Inspectors (ASIs) and Air Traffic Organization (ATO) personnel within the FAA who are directly associated with the FAA IFPV process or charged with the responsibility to authorize and provide oversight of non-FAA IFPV Service Providers.

3. Cancellation.

This AC cancels FAA AC 90-113B, Instrument Flight Procedure Validation (IFPV) of Performance Based Navigation (PBN) Instrument Flight Procedures (IFP), dated 03/20/2019.

4. Principal Changes.

This AC includes administrative and editorial changes as well as aligned Safety Management System (SMS) requirements to AC 120-92, Safety Management for Aviation Service Providers.



Wesley L Mooty
Acting Deputy Executive Director, Flight Standards Service

CHAPTER 1. INSTRUMENT FLIGHT PROCEDURE VALIDATION (IFPV) OVERVIEW

1.1 General.

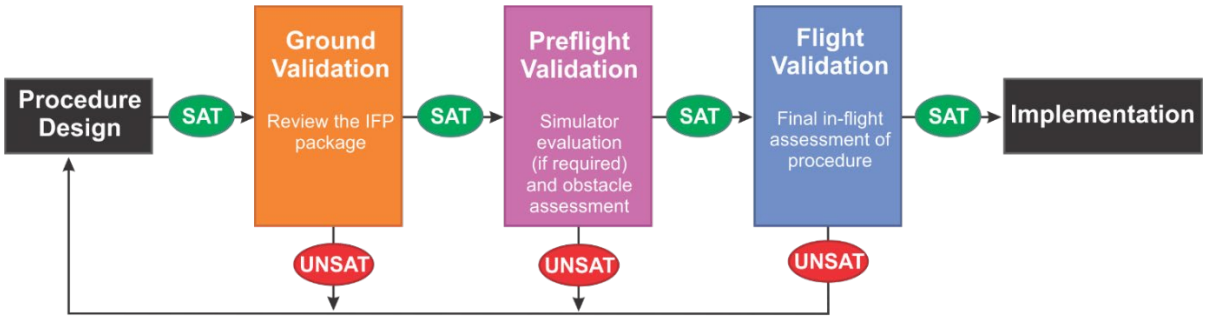
This AC describes the process for safely and efficiently adding a new or revised, non-part 97, satellite based PBN IFP [e.g., area navigation (RNAV) SID/STAR/Route and approach procedures titled RNAV (GPS) or RNAV (RNP)] through the Instrument Flight Procedures Validation (IFPV) process. The term "Flight Validation" is part of the Procedure Validation process and is concerned with factors other than the performance of the navigation aid or system that may affect the suitability of the procedure for publication. Flight Validation is a flight assessment of a new or revised instrument flight procedure to confirm that the procedure is operationally acceptable for safety, including required obstacle clearance, flyability, navigation database ARINC-424 coding, design accuracy, and required infrastructure (i.e., runway markings, approach lights, communications, runway lights, charting, etc.) with all supporting documentation.

1.2 Process.

IFPV is a series of actions involving several distinct elements including:

- Ground Validation,
- Pre-flight Validation, and
- Flight Validation.

Figure 1-1. IFPV Overview



1.3 Authorization.

Non-FAA service providers must be authorized by the FAA prior to conducting IFPV activities. Approval to conduct IFPV activities consists of approved training and surveillance, by a Flight Procedures Airspace Group (FPAG) Oversight Unit approved ASI, of IFPV activities completed in accordance with the company's IFPV manual. Specific Flight Procedures Airspace Group's authorization is required for Ground

Obstacle Assessment (GOA), Simulator Validation (SV), Airborne Obstacle Assessment (AOA), and Flight Validation (FV). See FAA Order 8900.1, Flight Standards Information Management System (FSIMS), Volume 11, Chapter 12 for examples of IFPV Letters of Authorization (LOAs).

1.4 Notification of Planned IFPV Activity.

Non-FAA service providers must notify the Flight Technologies and Procedures Division's representative by Knowledge Services Network (KSN) Activity Tracker or email 9-amc-fsifp-oversight@faa.gov 14 calendar days prior to conducting any IFPV activity. Upon receipt of the entry/email, an FPAG Oversight Unit approved ASI will notify the non-FAA service provider of the level of oversight for that activity.

1.5 Record Data Format.

Records submitted pursuant to this AC must be in an electronic format.

1.6 Data Accuracy and Sources.

Satellite-based PBN IFP [e.g., RNAV SID/STAR and approach procedures titled RNAV (GPS) or RNAV (RNP)] require highly accurate data based on the World Geodetic System 1984 (WGS84). This requires all survey data used in the flight procedure meet FAA Order 8260.19, Flight Procedures and Airspace, standards. It is mandatory that the non-FAA service provider must maintain a quality assurance system covering all domains of data collection (surveys), processing, publication, and navigation database development. Terrain, obstacle, and aeronautical data, including the source, type, date, version, and resolution of the data must be documented in accordance with FAA Order 8260.19.

1.7 Library.

A current copy of all relevant FAA documents (print or electronic), FAA-accepted IFPV operations manuals, publications, and correspondence pertinent to IFPV must be maintained by the non-FAA service provider. At a minimum, this library must contain the publications listed in Appendix A, paragraph A.2.

1.8 Records.

The non-FAA service provider must maintain records of the items listed below for two years after an IFP is canceled and must make them available to the FAA for audit purposes upon request. The non-FAA service provider must maintain the records for five years in cases where the IFP was involved in any mishap.

1.8.1 Obstacle assessment records.

1.8.2 Detailed survey reports.

1.8.3 Autonomous Global Positioning System Recording System (AGRS) recordings from GOA and/or AOA and FV activities.

1.8.3.1 Furnish the AGRS electronic file (compatible with FAA computer systems) from both the obstacle assessment and the FV to FS.

1.8.3.2 Submit the report in conjunction with the procedure package. The report must contain, at a minimum, the following elements:

- Processing data and time;
- Maximum number of satellites;
- Minimum number of satellites;
- Average Position Dilution Of Precision (PDOP);
- Vertical Protection Level (VPL) [WAAS procedures only];
- Maximum Observed Horizontal DOP (HDOP) [WAAS procedures only];
- Horizontal Protection Level (HPL) [WAAS procedures only];
- Maximum observed Vertical DOP (VDOP) [WAAS procedures only];
- For each segment, the maximum and minimum altitude, ground speed, climb rate, and climb gradient; and
- A printed graphic of sufficient detail that depicts the flight track flown referenced to the desired track of the approach procedure, including procedure fixes.

1.8.4 Helicopter IFP utilizing Final Approach Segment (FAS) data block SBAS/GBAS (WAAS). A documented analysis of the FAS data in relation to the landing threshold point or desired Point-in-Space (PinS) for lateral and vertical path, and the Cyclic Redundancy Code (CRC).

1.8.5 All IFPV activities. Use FAA Forms 8260-30.1, Simulator Validation Checklist; 8260-30.2, Obstacle Assessment Checklist, and 8260-30.3, Flight Validation Checklist.

1. The IFPV evaluator will use FAA Forms 8260-30.1, 8260-30.2, and 8260-30.3 for SV, obstacle assessment, and FV respectively.
2. Include all the original forms in the initial procedure package submitted to FS.

3. Forward signed copies of FAA Form 8260-30.2 to FS upon the completion of a periodic (540-day) obstacle assessment in the inspection window. Digital signatures will be accepted.

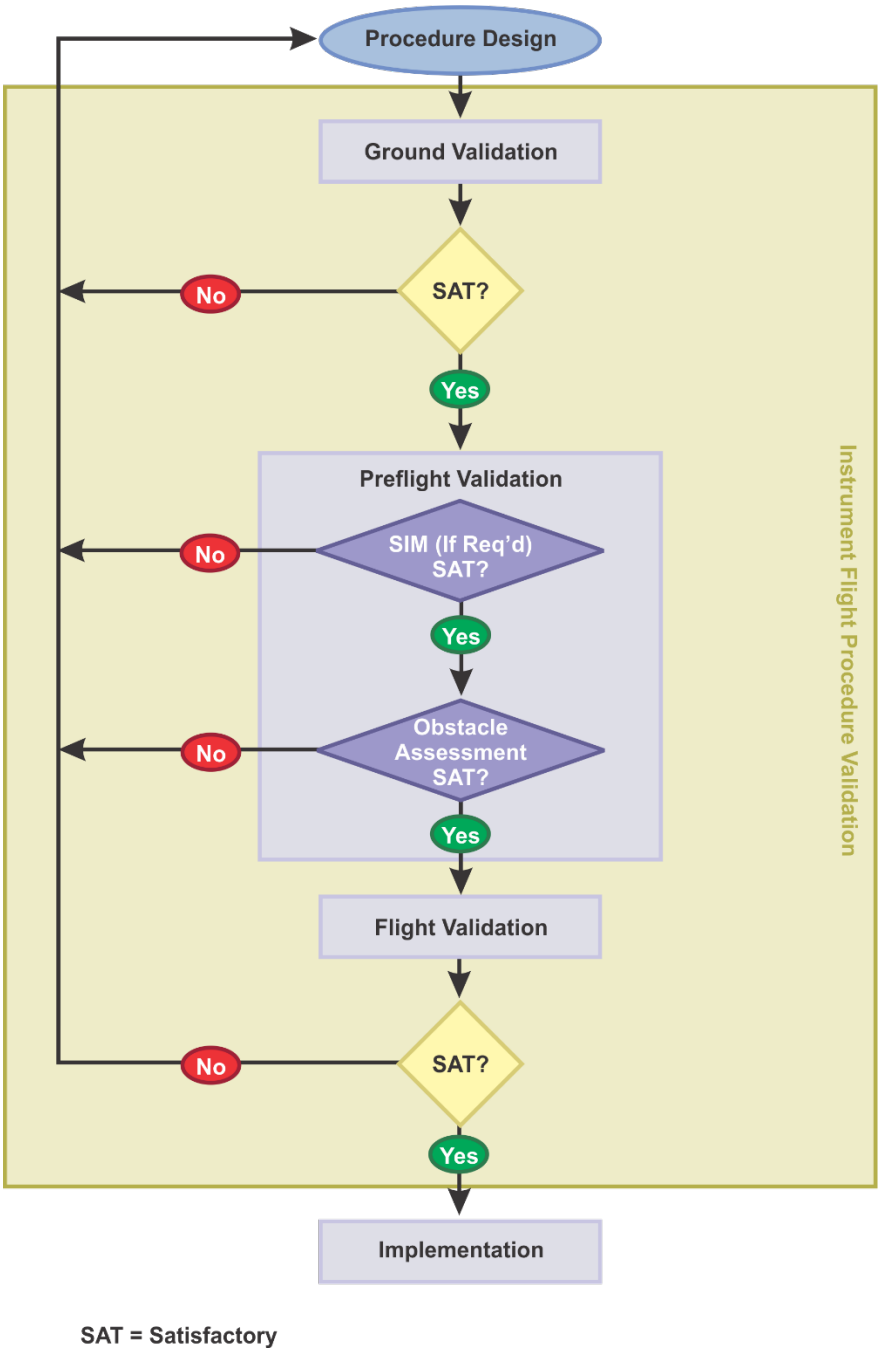
4. Forms are in FAA Order 8900.1, Flight Standards Information Management System (FSIMS), Volume 11, Chapter 12, Section 1, Table 11-1, and Figures 11-30 through 11-32. Additionally, you can contact FS for current editions.

1.8.6 Personnel training records including initial, recurrent, and supplemental training documentation related to IFPV.

1.8.7 Individual and company IFPV LOAs.

1.8.8 Any additional items listed in the non-FAA Service Provider's Operation Manual.

Figure 1-2. IFPV Process Flow



Note: Some of the steps may not be required or may be accomplished in a different order.

CHAPTER 2. SERVICE PROVIDER REQUIREMENTS

2.1 Operational Documentation.

The non-FAA service provider must submit documentation describing the processes and policies followed for the Administrator's acceptance documentation describing the processes and policies followed when conducting IFPV activities. FPAG will review the documentation and coordinate Administrator's acceptance the non-FAA service provider must follow when conducting IFPV activities. The documentation must, at a minimum, contain the following:

2.1.1 General information containing:

1. Contact person(s) in charge of all saved records and method of accessing those records.

2. List of individuals authorized to conduct IFPV and person(s) able to access their relevant endorsements (simulator evaluation, GOA, AOA, and FV).

3. Process for periodic internal audits.

4. Process for communicating and coordinating with appropriate FAA offices to include the transfer of data, forms, and documents.

5. Process for acquiring and maintaining regulatory guidance material associated with each authorized function, to include processes for maintaining the currency of all reference material.

6. Process to ensure all personnel authorized to perform IFPV activities are current and trained in accordance with current IFPV guidance.

7. Training attendance, including initial, and recurrent and supplemental training documentation.

8. Process for ensuring that all IFPV processes have been accepted and remain current.

9. Procedures for revising the operations manual including a revision tracking system.

2.1.2 Ground Validation information. PBN IFP Quality Assurance (QA) review process (describe the formal internal review process).

2.1.3 Pre-flight Validation information containing:

2.1.3.1 SV process (if applicable).

2.1.3.1.1 QA review process of the Flight Management System (FMS) navigation database for correct coding of the PBN IFP (describe the formal internal review process used to compare and ensure matching data).

2.1.3.1.2 Simulator use requirements (i.e., methodology as to when a simulator check would be completed or required).

2.1.3.2 Obstacle assessment process, to include accuracy codes, achievable using company-specific equipment, and process.

2.1.3.2.1 GOA information (if applicable) containing:

1. Complete equipment list (hardware) to include type, make, model, software version, and revision if applicable.

2. Complete equipment list (software) used to post-process recorded GPS data, to include software manufacturer, title, version, and purpose.

3. Step-by-step process for obstacle verification.

4. Process for ensuring any new or different obstacles identified during GOA are documented and IFP re-evaluated, if necessary.

2.1.3.2.2 AOA information (if applicable) containing:

1. Complete equipment list (hardware) to include type, make, model, software version, and revision if applicable.

2. Complete equipment list (software) used for in-flight referencing of controlling obstacles and recording obstacle assessment tracks, to include software manufacturer, title, version, and purpose.

3. Step-by-step process for obstacle verification.

4. Company-specific Obstacle Evaluation Area (OEA) evaluation processes, if applicable.

5. Process for ensuring any new or different obstacles identified during an AOA are documented and IFP re-evaluated, if necessary.

6. Process for briefing pilots, without IFPV authorization, on AOA mission (e.g., briefing the helicopter operator's pilot) [see Appendix B].

2.1.4 FV information containing:

1. QA review process of IFP chart, FAA Order 8260-series forms comparison with navigation database (describe the formal internal review process used to compare and ensure matching data).

2. Complete FV equipment list (hardware) and software version and revision if applicable.

3. Complete equipment list (software) used for recording flight tracks, to include software manufacturer, title, version, and purpose.

4. Process for addressing issues concerning obstacles or flyability discovered during flight validation.

5. Process for assessing airport/heliport infrastructure.

2.2 Safety Management System (SMS).

Service providers should define the safety policies, processes, and practices for all aspects of IFPV design, validation, and maintenance. Service providers should have technical processes and procedures in place to identify hazards and to mitigate risk. AC 120-92 (as amended), Safety Management Systems for Aviation Service Providers, may be used as guidance.

CHAPTER 3. INSTRUMENT FLIGHT PROCEDURE VALIDATION (IFPV)

3.1 Process.

IFPV consists of three elements: Ground Validation, Pre-flight Validation, and Flight Validation.

3.1.1 Ground Validation is a quality assurance review of the entire IFP package. The purpose is to identify areas with the potential to negatively affect the flyability and safety of the IFP (e.g., ARINC 424 coding errors, obstacles, Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) and charting). The IFPV evaluator should address issues identified during the ground validation phase prior to the Pre-flight Validation phase.

3.1.2 Pre-flight Validation must include an obstacle assessment and may include a simulator evaluation. Address any issue identified during the Pre-flight Validation phase prior to Flight Validation.

3.1.2.1 Determine any special operational issues specific to the IFP (e.g., climb gradients, proximity to restricted areas, speed restrictions, etc.).

3.1.2.2 Although encouraged for all fixed wing procedures, simulator evaluations are required whenever there is a request for a waiver or request for FS-approval for deviations from standard criteria for Special RNAV (RNP) Authorization Required (AR) Instrument Approach Procedures (IAPs). Simulator evaluations are a valuable tool to test the procedure flyability and to compare database coding. They can test the procedure at the design limit and should be used where factors such as challenging terrain or specific operational considerations exist. All areas listed on FAA Form 8260-30.1 should be evaluated. Provide feedback to the procedure designer who, if feasible, should be involved in the simulator evaluation. The simulator evaluation must be conducted in a FAA-qualified Level “C” or Level “D” flight simulator capable of flying the procedure. Information on simulator capabilities is available in 14 CFR part 60 and from the FAA National Simulator Program.

Note: For Special PBN IFP designed for a specific make/model/series and specific FMS, software part number, software version, and revision, the simulator evaluation must be flown in an FAA-qualified Level “C” or Level “D” simulator with the exact configuration specified.

3.1.2.2.1 Verify the navigation database for correct coding of the PBN IFP.

3.1.2.2.2 Comparisons must be made between the area navigation (RNAV) or FMS navigation data as displayed on the control display unit and the applicable FAA 8260-series forms, and the Flight Inspection Graphic (FIG). Additionally, any notes and/or charted requirements and restrictions such as altitudes, speeds, and courses must be validated.

3.1.2.3 Conduct an obstacle assessment verifying the height and location of the documented controlling obstacle for each segment of the IFP. Perform a visual inspection of the OEA to determine the presence of undocumented or inaccurately documented obstacles. Obstacle assessment must be performed in accordance with FAA Order 8200.1 and must be documented on FAA Form 8260-30.2.

3.1.2.3.1 A GOA may produce the most accurate results; however, circumstances may prevent ground obstacle access.

3.1.2.3.2 GOA may be used to satisfy the requirement of periodic (540-day) inspections.

3.1.2.3.3 An AOA provides easier access to obstacles and OEA boundaries. Airborne obstacle assessments can be flown in any type of approved aircraft; however, assessments performed in helicopters or slow moving/small category aircraft are preferred. Obstacle-assessment flight activities must comply with the flight rules contained in 14 CFR part 91. Any deviation from a 14 CFR rule during an obstacle assessment must be authorized by the geographically respective Flight Standards District Office. Consistent with FAA Order 8260.19, an AOA will result in an accuracy code of 4D being assigned to that obstacle.

3.1.2.3.4 Document incorrect obstacle data such as obstacles that no longer exist or obstacle data that is inaccurate or is missing from the FAA obstacle databases. This information must be documented on the FAA Forms 8260-30.2 and 8260-9 and provided to the IFP designer so that complete, accurate data is used for IFP evaluation. All supporting information including photos and survey data must be retained by the organization. Obstacle data inaccuracies, of any type, must be documented and accuracy codes assigned in accordance with FAA Order 8260.19.

3.1.2.3.5 If desired, a lower accuracy code specific to the process used by the IFPV provider may be coordinated with FS. This authorization is specific to both the company and the individual performing the obstacle assessment. This accuracy code determination will be based upon the type of equipment used, its specifications, and a determination of process effectiveness.

3.1.3 Flight Validation (FV).

1. Review the results of the simulator and obstacle evaluations, and review any specific training, operational, or equipment requirements. Review the PBN IFP package per guidelines established in FAA Order 8200.1.

2. Compare the aircraft navigation database, appropriate FAA Order 8260-series forms, and the FIGs.

3. Assess flyability to determine that all segments of the procedure can be safely flown considering required speeds, climb gradients, descent gradients, coded flight path/glide path angles, and bank angles. Conduct FV per guidelines established in FAA Order 8200.1 and company operations manual and flown at or below the maximum intended speed on the developed lateral and vertical flight path. FV must be accomplished in an aircraft capable of flying the complete (instrument and visual portions) procedure as designed.

4. Conduct a controlling obstacle verification to provide the final assurance that the controlling obstacle has been correctly identified for each segment.

5. Verify that all airport/heliport infrastructures, such as markings, lighting, and communications are in place and operative, except locations without lighting (such as NA at night and Proceed Visual).

6. Evaluate other operational factors, such as aircraft equipment (e.g., TAWS/EGPWS), performance limitations such as minimum and maximum temperature limits, and human factors/flight deck workload.

7. Document the FV on the FAA Form 8260-30.3.

8. Conduct FV in an aircraft during non-revenue operations.

3.2 Requirements.

3.2.1 Pre-flight Validation.

3.2.1.1 Personnel.

3.2.1.1.1 Simulator evaluation (fixed wing only). In order to conduct a simulator evaluation, the designated IFPV evaluator must hold an LOA for simulator evaluation. To receive an LOA, simulator evaluation pilots must have similar qualifications as those required of an FV evaluator as specified in paragraph 3.2.2.1.2. For Special IFPs designed for a particular airframe, FMS, software part number, software version, and revision, the pilot assisting in that evaluation must have experience in that particular aircraft and its flight guidance and navigation system.

3.2.1.1.2 Ground Obstacle Assessment (GOA). In order to conduct a GOA, the designated evaluator must hold an LOA for GOA. Use of a remotely operated system for obstacle assessment that meets the requirements of AC 150/5300-17 (General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey) will be considered a GOA and must be documented in an accepted operation manual.

3.2.1.1.3 Airborne Obstacle Assessment (AOA). In order to conduct an AOA, the designated evaluator must hold an LOA for AOA. If the designated

evaluator is not also the pilot-in-command (PIC), the evaluator must provide an FS-approved mission brief to the PIC. AOA must be conducted in an aircraft during non-revenue operations.

3.2.1.2 Weather. AOA must be conducted during day Visual Meteorological Conditions (VMC) with sufficient in-flight ceiling and visibility to accomplish the assessment of obstacles. AOA must not be conducted at night or in Instrument Meteorological Conditions (IMC). *Night* means the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the Air Almanac, converted to local time.

3.2.2 Flight Validation.

3.2.2.1 Personnel. The minimum crew complement required by the aircraft type certification and the nature of operation.

3.2.2.1.1 All Required Crewmembers must be:

1. Current and qualified in the appropriate type of aircraft (fixed wing or helicopter) and appropriate category (maneuver/speed capability for helicopters) and proficient with the specific FMS and associated software part number, software version, and revision.

2. Approved by the Flight Technologies and Procedures Division or has received an FS-approved brief.

3.2.2.1.2 IFPV Evaluator. Although not required to be a crewmember, the FV evaluator may act as the PIC or SIC in accordance with the requirements above. The FV evaluator must be:

1. An FAA ASI (Operations) approved by FS, or

2. An individual with similar pilot qualifications who has completed FS-approved training (see Chapter 4) and received an LOA from the Flight Technologies and Procedures Division, or

3. A current and qualified Airspace System Inspection Pilot (ASIP).

3.2.2.1.3 Procedure Evaluation Pilot (PEP). A PEP conducts a procedure specific onsite evaluation of the landing location for certain helicopter IFP. Non-FAA Service Providers with similar experience as a rotorcraft Aviation Safety Inspector, who has completed FS-approved training (see Chapter 4), and received a PEP LOA from the Flight Technologies and Procedures Division may conduct onsite procedure specific evaluations.

3.2.2.2 Weather. Flight Validation must not be conducted at night or IMC (except as noted in paragraph 3.2.2.2.1 and 3.2.2.2.2). Ensure sufficient in-flight

ceiling and visibility to accomplish the assessment of obstacles and determine that the procedure flight track reflects the IFP design.

3.2.2.2.1 Portions of the procedure above a published minimum IFR altitude (e.g., high-level portions of Standard Instrument Departures or Standard Terminal Arrival Routes) may be flown at night and/or in IMC.

3.2.2.2.2 Approval of night minimums. A night evaluation is required when an IFR procedure is developed for airports, heliports or landing areas with no prior IFR service, a newly constructed runway, heliport or landing area, or to a runway, heliport, or landing area, which has been lengthened, shortened, or relocated.

1. The purpose of the night evaluation is to determine the adequacy of airport/heliport/landing area lighting systems prior to authorizing night minimums. Each procedure with a “Fly visual” or “Proceed Visually” segment proposed for night use must be evaluated at night prior to commissioning or must be restricted from night use until the evaluation is completed. A night evaluation to landing surfaces serviced by PinS procedures (approach and departure) with a “Proceed VFR” segment(s) is not required.

2. Determine the adequacy of infrastructure to include lighting systems prior to authorizing night minimums (e.g., photocell; radio control; local lighting patterns in the area surrounding the airport, heliport, or landing area do not distract, confuse, or incorrectly identify the runway, heliport, or landing area environment).

3. Conduct all night evaluations during VMC (or visual guidance for navigation in the "visual" segment of a helicopter approach) with sufficient in-flight ceiling and visibility to assess the airport, heliport, or landing area infrastructure.

3.3 Flight Validation of Space Based Augmentation System (SBAS)/Ground Based Augmentation System (GBAS) IFP.

When conducting FV of augmented IFP (e.g., using WAAS/SBAS or GBAS) utilize an in-flight data collection system that enables in-flight or post-flight analysis to validate that FAS data elements provide navigation guidance, as designed, to the physical runway threshold or PinS. The system must be capable of performing the necessary evaluations in a documented, quantitative fashion.

CHAPTER 4. IFPV EVALUATOR TRAINING REQUIREMENTS

Note: This chapter describes the initial and recurring training requirements for an evaluator to obtain an LOA to conduct an IFPV. See FAA Order 8900.1, Volume 11, Chapter 12, Sections 1 and 2 for a description of the entire authorization process.

4.1 Initial Training Requirements for IFPV Authorization.

To receive an LOA for any IFPV activity, an evaluator applicant must first attend an FS-approved training program that includes the following:

4.1.1 Familiarity with the PBN IFP design process and requirements for PBN operations. The requirements for PBN operations are outlined in the following FAA documents (use the latest editions):

- AC 90-100, U.S. Terminal and En Route Area Navigation Operations
- AC 90-101, Approval Guidance for RNP Procedures with AR
- AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace
- AC 90-107, Guidance for Localizer Performance with Vertical Guidance and Localizer Performance without Vertical Guidance Approach Operations in the U.S. National Airspace System
- AC 90-110, Authorization Guidance for Development of Required Navigation Performance Procedures with Authorization Required by Third Party Instrument Flight Procedure Service Providers
- AC 90-112, Development and Submission of Special Procedures to the Federal Aviation Administration
- AC 120-40, Airplane Simulator Qualification
- AC 150/5300-13, Airport Design
- AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey
- AC 150/5300-17, General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey
- AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collections and Geographic Information System Standards

- AC 150/5390-2, Heliport Design

4.1.2 Knowledge of the procedure design criteria relevant to the type of IFP for which the individual is authorized to conduct as either PIC or evaluator. IFP design criteria are outlined in the following FAA documents:

- FAA Order JO 7100.41, Performance Based Navigation Implementation Process
- FAA Order 8200.1, United States Standard Flight Inspection Manual
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures
- FAA Order 8260.19, Flight Procedures and Airspace
- FAA Order 8260.42, United States Standard for Helicopter Area Navigation
- FAA Order 8260.46, Departure Procedure Program
- FAA Order 8260.58, United States Standard for Performance Based Navigation Instrument Procedure Design
- FAA Order 8260.60, Special Instrument Procedures

4.1.3 Training in the operation and post processing of data.

4.1.4 Process for completing FAA forms. FAA Forms 8260-30.1, 8260-30.2, and 8260-30.3; and the process for providing feedback to the procedure designer. For FAA Order 8260-30 series forms, see FAA Order 8900.1, Volume 11, Chapter 12.

4.1.5 Familiarity and demonstration of flight validation requirements for both day and night operations.

4.1.6 Procedure package review.

4.1.7 Requirements, techniques, and considerations for verifying that the navigation data to be published, as well as that used in the design of the procedure, is correct.

4.1.8 Techniques and considerations for validation of obstacle data.

4.1.9 Airport/heliport/landing area requirements infrastructure assessment.

4.1.10 Communications coverage.

4.1.11 Flyability/human factors assessment.

4.1.12 Use of automation tools and simulators or ground validation.

4.1.13 Charting considerations.

4.1.14 Operational factors.

4.1.15 Supervised on-the-job training (OJT) adequate to achieve the required level of competency in obstacle assessment techniques, simulator evaluation, and flight validation.

4.2 Recurrent Training Requirements.

In order to exercise the privileges of the IFPV LOA, each evaluator must have performed an evaluation with an approved ASI during the previous 24 calendar-months. If the 24 calendar-months has been exceeded, an FPAG Oversight Unit approved ASI must observe the evaluator on their next scheduled activity. The ASI will ensure that the evaluator is:

4.2.1 Aware of updates on relevant changes to design criteria.

4.2.2 Applying current IFPV policy.

4.2.3 Proficient in conducting the specific IFPV activity (i.e., SV, GOA, AOA, and/or FV for day and night operations).

4.2.4 The approved ASI will document the recurrent training as complete on the IFPV Evaluator Check Record.

APPENDIX A. ADMINISTRATION INFORMATION

A.1 **Definitions.**

A.1.1 Accuracy codes. Standards for horizontal and vertical obstacle measurements are outlined in FAA Order 8260.19.

A.1.2 Airborne Obstacle Assessment (AOA). An airborne assessment of obstacles to determine impact to the IFP conducted in accordance with FAA Order 8200.1. This assessment may involve the verification of the controlling obstacle, the evaluation of obstacles, or the identification of obstacles that are missing from (or not included in) the IFP. IFPV service providers conduct AOA during the preflight validation phase of the IFPV process and may conduct reassessment during the periodic (540-day) obstacle assessment. AOA must not be conducted at night or in IMC. Night means the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the Air Almanac, converted to local time.

A.1.3 Area navigation (RNAV). A method of navigation that permits aircraft operation on any desired flightpath within the coverage of ground-based or space-based navigational aids (NAVAIDs) or within the limits of the capability of self-contained aids, or a combination of these.

Note: RNAV includes PBN as well as other operations that do not meet the definition of PBN.

A.1.4 ARINC 424. This is an international standard file format for the preparation and transmission of data for assembly of airborne navigation system databases.

A.1.5 Authorization required (AR). An authorization by the FAA to conduct Required Navigation Performance (RNP) approaches designated as "Authorization Required." Standards and criteria for the development of RNP AR IFPs necessitates a higher level of aircraft equipage and additional aircrew training.

A.1.6 Autonomous Global Positioning System Recording System (AGRS). A positioning and recording system that is independent from (and does not interfere with) an aircraft navigation system. The AGRS must be capable of the following: IFP storage, moving map display depicting the IFP course, and FV records including time and three-dimensional (3D) positions in space with a sampling rate of not less than one hertz (Hz). The AGRS must also comply with the applicable Minimum Operational Performance Specifications (MOPS) for the Global Navigation Satellite System (GNSS) equipment or system intended for route of flight or procedure. The AGRS system can be one stand-alone unit, or a series of components connected together (e.g., laptop, GNSS receiver, etc.), as long as it meets the minimum specifications outlined in current IFPV guidance.

A.1.7 Flight Inspection System. The position recording and analysis system used by the FAA, which is independent from the primary aircraft navigation system, used in flight

inspection aircraft. The FAA Automated Inspection System (AFIS) provides sufficient assessment and recording capabilities for FV.

A.1.8 Flight Inspection (Flight Check). In-flight investigation and evaluation of air navigation aids and instrument flight procedures to ascertain or verify that they meet established tolerances and provide safe operations for intended use. It involves the operation of a suitably equipped aircraft for the purpose of calibrating ground-based NAVAIDs or monitoring the performance of navigation systems.

A.1.9 Flight Validation (FV). The flight assessment of a new or revised IFP to confirm that the procedure is operationally acceptable for safety, flyability, and design accuracy, (including obstacle and database verification), with all supporting documentation. FV is the final step in the IFPV process.

A.1.10 Flyability. A check or system of checks that ensure safe design of the procedure. These checks may include, but are not limited to; acceptability of any deviations to standards, bank angles, airspeeds, descent gradients, roll rates, track lengths, workload issues, procedure complexity, runway alignment, etc.

A.1.11 Global Positioning System (GPS). GPS refers to the worldwide positioning, navigation, and timing determination capability available from the U.S. satellite constellation. The GPS Standard Positioning System (SPS) signal specification defines the service provided by GPS for civil use. The GPS meets the International Civil Aviation Organization (ICAO) GNSS requirements.

A.1.12 Ground Obstacle Assessment (GOA). An assessment of obstacles performed from the ground. This assessment involves the verification of the controlling obstacle, the evaluation of obstacles or the identification of obstacles that are missing from (or not included in) the IFP. IFPV Service Providers conduct GOA during the preflight validation phase of the IFPV process and may be used in lieu of FV to satisfy the periodic (540-day) obstacle assessment.

A.1.13 Ground Validation (GV). An in-depth QA review of the development criteria and documentation of a PBN IFP. GV is the first step in the IFPV process.

A.1.14 Instrument Flight Procedure (IFP). A charted flight path defined by a series of navigation fixes, altitudes, and courses provided with lateral and vertical protection from obstacles from the beginning of the path to a termination point.

A.1.15 Instrument Flight Procedure Service Provider. An entity that provides IFP development and maintenance services.

A.1.16 Instrument Flight Procedure Validation (IFPV). The required QA steps in the procedure development process for satellite-enabled PBN IFP. The purpose of IFPV is the verification of pertinent obstacle and procedural data, as well as an assessment of the flyability of the procedure. IFPV is a series of actions involving several distinct elements including Pre-flight Validation, simulator evaluation, GOA, AOA, and FV.

A.1.17 IFPV Evaluator. The evaluator is the individual responsible for conducting the IFPV activity and signing the respective FAA Order 8260-series form(s). Each IFPV activity requires a specific designation on the LOA. Evaluators must complete the FAA Academy FV of Satellite-enabled Performance-Based IFPs course or equivalent, satisfactorily demonstrate evaluation to an FAA ASI, and have authorization from the Flight Technologies and Procedures Division.

A.1.18 Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

A.1.19 Pre-Flight Validation. An operational review of the PBN IFP. The Pre-flight Validation step of the IFPV process consists of a simulator evaluation (if required) to test the flyability of the procedure and an obstacle assessment (either ground-based or airborne) to validate obstacle data. The Pre-flight Validation provides a preliminary review of the elements evaluated during the FV.

A.1.20 Public IFP. An IFP published in 14 CFR part 97 and available to the public.

A.1.21 Required Navigation Performance (RNP). A statement of the 95 percent navigation accuracy performance that meets a specified value for a particular phase of flight or flight segment. This includes and incorporates associated on-board performance monitoring and alerting features to notify the pilot when the RNP for a particular phase or segment of a flight is not performing at the correct accuracy level. Refer to the current edition of RTCA DO-236, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.

A.1.22 Special IFP. An IFP approved by the FAA in accordance with specific guidelines but not published in 14 CFR part 97 for public-use.

A.1.23 Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS). A software tool used to generate and evaluate terminal routes and conduct simulation and analysis.

A.1.24 Validation. The evaluator verifies whether a data element or a set of data elements is acceptable for its purpose.

A.1.25 Verification. The activity whereby the evaluator checks the current value of a data element against the value originally supplied.

A.2 **Related Publications (Current Editions).**

A.2.1 Regulations. Title 14 Code of Federal Regulations (14 CFR) part 97.

A.2.2 Reference Material.

These publications address IFP development and implementation:

- FAA AC 90-100, U.S. Terminal and En Route Area Navigation Operations
- FAA AC 90-101, Approval Guidance for RNP Procedures with AR
- FAA AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace
- AC 90-107, Guidance for Localizer Performance with Vertical Guidance and Localizer Performance without Vertical Guidance Approach Operations in the U.S. National Airspace System
- FAA AC 90-110, Authorization Guidance for Development of Required Navigation Performance Procedures with Authorization Required by Third Party Instrument Flight Procedure Service Providers
- FAA AC 90-112, Development and Submission of Special Procedures to the Federal Aviation Administration
- FAA AC 120-40, Airplane Simulator Qualification
- FAA AC 150/5300-13, Airport Design
- FAA AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey
- FAA AC 150/5300-17, General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey
- FAA AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collections and Geographic Information System Standards
- FAA AC 150/5390-2, Heliport Design
- FAA Order JO 7100.41, Performance Based Navigation Implementation Process
- FAA Order 8200.1, United States Standard Flight Inspection Manual

- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures
- FAA Order 8260.19, Flight Procedures and Airspace
- FAA Order 8260.42, United States Standard for Helicopter Area Navigation
- FAA Order 8260.46, Departure Procedure Program
- FAA Order 8260.58, United States Standard for Performance Based Navigation Instrument Procedure Design
- FAA Order 8260.60, Special Instrument Procedures
- FAA Order 8900.1, Flight Standards Information Management System, Volume 11, Chapter 12, Instrument Flight Procedure Validation
- RTCA DO-236, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

A.3 **Forms.**

- FAA Form 8260-30.1, Simulator Validation Checklist
- FAA Form 8260-30.2, Obstacle Assessment Checklist
- FAA Form 8260-30.3, Flight Validation Checklist
- FAA Form 8260-30.4, IFPV Evaluator Check Record

APPENDIX B. EXAMPLE OF A BRIEFING FOR NON-IFPV AUTHORIZED PILOTS

B.1 **Introduction.**

B.1.1 Operator's PIC is responsible for all aspects of the flight.

B.1.2 IFPV personnel will not ask or require them to do anything outside the regulations or their operations specifications.

B.1.3 Comply with operator policies and procedures.

B.2 **Mission.**

B.2.1 IFP locations. Cover all scheduled validation locations and intentions.

B.2.2 Discuss procedure legs, altitudes, and airspeeds to be flown (i.e., initial, intermediate, final, missed approach, and holding).

B.2.3 Discuss, if the OEAs are to be flown, how they will be flown, who will define the track to be flown, etc.

B.2.4 If an AOA is to be flown, discuss how it will be flown.

B.2.5 Discuss a proposed route for efficiency, air traffic control, weather, fuel locations, and other operational needs.

B.3 **Operating Rules.**

B.3.1 Title 14 CFR part 91.

B.3.2 Flight plan type. Visual flight rules (VFR) and/or IFR operations are authorized during IFPV activities. However, the weather at the location of the IFPV activity must meet the requirements of this AC. Visual meteorological conditions are *mandatory* during obstacle evaluation, night evaluation, VFR area evaluation, visual segment evaluation, and departure procedure (DP) evaluations.

B.3.3 Weather – VFR / IFR, departure, en route, destination, alternate.

B.3.4 NOTAMs – departure, en route, destination, alternate.

B.3.5 Temporary Flight Restrictions.

B.3.6 Emergencies. During an emergency, the FV will terminate immediately.

B.4 **Company/Operator Requirements.**

B.4.1 PIC will follow all company/operator requirements.

B.4.2 There will be no pressure to operate outside the company/operator's rules.

B.4.3 PIC follows company/operators flight following rules.

B.5 **IFPV Requirements.**

B.5.1 Will comply with FAA IFPV requirements.

B.5.2 Brief the crew to ensure understanding and comfort with the mission requirements.

B.6 **Post Mission.**

Obtain/verify contact information for the Chief Pilot, Director of Operations, and Principal Operations Inspector (POI).

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by emailing this form to [9-AWA-AFS400-COORD@faa.gov].

Subject: Date:

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph on page.

☐ Recommend paragraph on page be changed as follows:

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

☐ Other comments:

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____