

Advisory Circular

Subject: Instrument Flight Procedure Service Provider Authorization Guidance for Spacebased Instrument Flight Procedures Date: 03/20/2019 Initiated By: AFS-400 AC No: 90-110B

This advisory circular (AC) provides guidance for non-FAA Instrument Flight Procedure (IFP) developers, hereinafter referred to as "service providers," to become authorized by the Federal Aviation Administration (FAA) (Flight Standards' Flight Technologies and Procedures Division) to develop public, space-based IFPs. This version evolves public approach authorization from a specific-named type of approach [Required Navigation Performance (RNP) with Authorization Required (AR)] to a general category (space-based). This enables service providers to develop and maintain public, space-based instrument flight procedures and other future capabilities.

The primary audience for this AC is service providers, who desire FAA authorization to develop public, space-based IFPs. The secondary audience for this AC is FAA Flight Standards personnel, directly associated with the procedure development process and/or charged with the responsibility to authorize and provide oversight of service providers.

Service providers may elect to use guidance in this AC or an alternative method provided the method is approved by the FAA. In this AC, terms such as "must" denote compliance and are the only means authorized when applying this AC. This AC does not change, add, or delete regulatory requirements or authorize deviations from regulatory requirements.

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CHAPTER 1. INSTRUMENT FLIGHT PROCEDURE SERVICE PROVIDER REQUIREMENTS

1.1 General.

This chapter provides a list of requirements and identifies reference materials for service providers applying for FAA authorization to develop public space-based IFPs. This version evolves public approach authorization from a specific named type of approach (RNP AR) to a general category (space-based). This enables service providers to develop and maintain public, space-based instrument flight procedures and other future capabilities.

1.2 Organization.

The service provider must meet the following requirements:

1.2.1 Operations Manual.

The organization must have a FAA-accepted (Flight Technologies and Procedures Division's representative) Operations Manual. The Operations Manual must contain the following:

- 1. Organizational structure relevant to IFP design and maintenance;
- 2. Functions, limitations, and product(s) authorized by the FAA (Flight Technologies and Procedures Division's representative);
- 3. Process for performing authorized functions;
- 4. Process for periodic internal audits;
- 5. Process for communicating and coordinating with appropriate FAA offices;
- 6. Process for acquiring and maintaining regulatory guidance material associated with each authorized function;
- 7. Process for maintaining the currency of all reference material;
- 8. Training program, included recurrent training;
- 9. Process for records management;
- 10. Process for IFP maintenance;
- 11. Document how IFP development and support software performs intended functions;
- 12. Process for transferring and transmitting aeronautical data information electronically, including forms and documents;
- 13. Procedures for revising the Operations Manual;

14. Notices to Airmen (NOTAM) plan;

15. Aeronautical data obtained from an FAA-approved data source(s); and

16. Environmental issues, review, and processing through the FAA service centers.

1.2.2 Safety Management System (SMS).

Establish a Safety Management System and document in the approved Operations Manual. AC 120-92, Safety Management Systems for Aviation Service Providers, may be used to develop the SMS. The SMS must define the safety policies, processes, and practices for managing all aspects of IFP design. The SMS must include the following elements:

- 1. Definition of the organization's safety objectives;
- 2. Ability to present the safety situation in respect to compliance with all relevant FAA, internal, and other safety related standards;
- 3. Definition of the safety accountabilities of all personnel;
- 4. Continual review process for effectiveness by all personnel;
- 5. A process for staff to identify safety hazards or concerns and suggest methods for enhancement of safety;
- 6. Establish internal procedures for the communication and processing of safety concerns within the organization;
- 7. Definition of the interface arrangements between internal groups of the organization;
- 8. A compliance process applicable to all personnel of the organization;
- 9. A safety hazard/risk analysis and risk control/mitigation assessment in accordance with an established methodology endorsed by the FAA; and

10. An oversight and audit program.

- 1.2.3 Chief Designer.
 - 1.2.3.1 The organization will appoint a Chief Designer, who is responsible for the service providers' IFP development operations.
 - 1.2.3.2 The Chief Designer must certify in writing that each IFP meets FAA requirements.

1.2.4 Library.

Maintain a current library of all relevant FAA and service provider publications and correspondence pertinent to IFP development. Libraries may be maintained in electronic format. The library must be accessible to all procedure designers.

1.2.5 Training.

The service provider must establish a training program with specified minimum qualification standards for personnel involved in IFP development. The training program must be approved by the FAA (Flight Technologies and Procedures Division's representative) and must include:

- 1. Initial training;
- 2. Recurrent training; and
- 3. A suitable training syllabus as outlined in appendix A.

1.2.6 Record Keeping.

Service providers must maintain the following records electronically:

- 1. A file containing all documents required by FAA Order 8260.19, Flight Procedures and Airspace, FAA Order 8260.46, Departure Procedure (DP) Program, and the service providers' Operations Manual. The file must be retained for a period of two years after an IFP is canceled;
- 2. Personnel training records; and
- 3. All records must be available electronically to the FAA. Also, a file containing all documents required by applicable FAA orders (there are many more FAA requirements; i.e., waivers, NOTAMs, approval letters, etc.).

1.3 Required Functional Positions.

1.3.1 Chief Designer.

Must be approved by the FAA and meet the following minimum standards:

- 1. The qualification and experience requirements of a Qualified Designer or equivalent;
- 2. Experience in the development of IFPs;
- 3. RNAV (GPS) and/or RNAV (RNP) design experience;
- 4. Knowledge of applicable design regulations in 8260-series FAA orders; and
- 5. Knowledge of the principles of Quality Assurance (QA).

1.3.2 Qualified Designer.

The minimum standards for the qualifications and experience of a Qualified Designer are:

- 1. Satisfactory completion of a formal course of training approved by the FAA (Flight Technologies and Procedures Division's representative);
- 2. Satisfactory completion of on-the-job training, consistent with the requirements outlined in the service providers' Operation Manual;
- 3. Knowledge of applicable design regulations; and
- 4. Written approval by the Chief Designer.

1.3.3 Quality Assurance Specialist.

The service provider will appoint a person responsible for performing QA activities. The minimum standards for the qualifications and experience of a QA Specialist are:

- 1. Meet or have met the qualification for a Qualified Designer; and
- 2. Knowledge and experience in Quality Assurance as outlined in the service providers' Operation Manual.
- 1.3.4 Flight Validation.

The service provider is responsible for ensuring all IFPs are flight validated in accordance with AC 90-113, Instrument Flight Procedure Validation (IFPV) of Satellite-based Instrument Flight Procedures (IFP); FAA Order 8900.1, Flight Standards Information Management System (FSIMS); FAA Order 8200.1, United States Standard Flight Inspection Manual (USSFIM). Regarding flight validation:

- 1. A person may be appointed within the service provider's organization to fulfill this function upon completion of a Flight Validation course approved by the FAA (Flight Technologies and Procedures Division's representative), or;
- 2. The service provider may enter into an agreement with an FAA-authorized flight validation provider, or;
- 3. The service provider may enter into an agreement with the FAA for flight validation services.

1.4 IFP Design and Development Process.

- 1.4.1 An outline of this process is included in chapter 2. Guidance for IFP development and administration are found in:
 - Aeronautical Radio Incorporated (ARINC) specification 424;
 - FAA Order JO 7400.2, Procedures for Handling Airspace Matters;

- FAA Order JO 7930.2, Notices to Airmen (NOTAM);
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS);
- FAA Order 8260.19, Flight Procedures and Airspace;
- FAA Order 8260.26, Establishing Submission Cutoff Dates for Civil Instrument Flight Procedures;
- FAA Order 8260.46, Departure Procedure (DP) Program; and
- FAA Order 8260.58, United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design.
- 1.4.2 Additional elements of the development process are found in:
 - FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts; and
 - FAA Order 8260.43, Flight Procedures Management Program.

1.5 Procedure Maintenance.

Procedure must be maintained per FAA Order 8260.19 and the service provider's manual.

1.6 Application.

The service provider will submit a letter of application to the FAA (Flight Technologies and Procedures Division's representative), including a detailed proposal of compliance with this AC to the address listed below. The FAA will review the letter of application and provide guidance on how to proceed with the authorization process.

FAA Mike Monroney Aeronautical Center Flight Technologies and Procedures Division 6500 S. MacArthur Boulevard Building 29, Room 104 Oklahoma City, OK 73169

1.7 FAA Authorization Process and Program.

The FAA (Flight Technologies and Procedures Division's representative) will:

1.7.1 Applicant's compliance.

Verify the applicant's compliance with this AC, which will include, but not limited to:

- 1. Audit(s) of the applicant's facilities (including any subcontractor facilities);
- 2. Interview(s) of applicant's staff;
- 3. Examination of relevant documentation;

- 4. Evaluation of the development process; and
- 5. Evaluation of compliance with applicable orders.
- 1.7.2 IFP Quality Review.

Perform an IFP Quality Review (see table 1-1 for a sample quality review checklist used for airports with approaches for fixed-wing aircraft (if applicable).

1.7.3 Oversight Process.

Oversight and compliance will be performed by a Flight Technologies and Procedures Division's representative, as outlined in FAA Order 8000.368, Flight Standards Service Oversight; and FAA Order FS 8260.57, Oversight of Third Party Instrument Flight Procedure Service Providers.

1.7.4 Letter of Authorization (LOA).

Upon determination of compliance with this AC, issue a LOA to develop public spacebased IFPs.

1.8 Notification.

The service provider will provide Flight Technologies and Procedures Division's representative (in writing) a 14-day advance notice for any proposed change, which may affect compliance with this AC.

Airport:			
Designer:			
Reviewer:			
Date:			
IEP Name			
Requirement Phase and Data Collection:	Yes	No	NA
Existing IFPs and obstacles reviewed?			
Airport name			
Airports geographic location			
Runway characteristics (TDZE, THLD, profile)			
Runway Threshold Latitude/Longitude			
Departure End Threshold Latitude/Longitude			
Touchdown Zone Elevations - All runways			
Landing Threshold Elevations - All runways			
Navigational aids			
Airport lighting			
Weather reporting and forecasting capabilities			
Airspace limitations and restrictions			
ATC contacted - Approach?			
ATC contacted - Center?			
Categorical Exclusion Letter included?			
Mountainous terrain?			
Assumed tree/vegetation heights per the ground obstacle assessment			
Obstacle data			
Five year average LOW temperature analysis			
Design Phase	Yes	No	NA
Bearings, headings, courses, and radials are magnetic and documented to the			
closest hundredth of a degree			
Elevations and altitudes are in feet			
Distances are in nautical mile (NM)			
Waypoints are named and have completed FAA Form 8260-2			
Minimum Altitudes are at or rounded up to the nearest 100-foot increment			
(i.e., 1,701 feet and 1,751 feet both round up to 1,800 feet)			
Missed approach design must match the missed approach instructions			
Feeder, Initial and Intermediate Segment documented			
Holding Patterns evaluated and documented			
All bank angles evaluated			
Form 8260-3 per FAA Order 8260.19			
Form 8260-9 per the FAA Order 8260.19			
Form 8260-2 for all waypoints and NAVAIDs per			
FAA Order 8260.19 to include turn centers			
ARINC 424 coding			

Table 1-1. IFP Quality Review Sample Checklist(airports with approaches for fixed-wing aircraft (if applicable)

CHAPTER 2. PROCESS FOR IFP DESIGN AND DEVELOPMENT

2.1 General.

This chapter provides guidance on the coordination process to design/develop public space-based IFPs.





2.2 Preliminary Activities.

Prior to design of a spaced-based IFP, several tasks must be completed.

2.2.1 Initial Coordination.

Requirements are found in FAA Orders 8260.19 and 8260.43. In addition, obtain concurrence from the airport sponsor/owner and Flight Technologies and Procedures Division prior to coordination with the IFP Validation Team. Procedure development at National Plan of Integrated Airport Systems (NPIAS) airports should be coordinated early with the Office of Airports, in the event the Airport Layout Plan needs to be updated.

2.2.2 Validation Team.

Submit the proposed procedure for validation.

2.2.3 Kickoff Meeting (if desired).

For complex projects, a kickoff meeting may provide a forum to reach consensus on the objectives; finalize the initial design concept; and establish a timeline for the proposed IFP.

2.3 Procedure Design.

2.3.1 Develop IFP Concept.

IFP development is the detailed definition of the lateral and vertical path. The service provider must review the IFP throughout the development process.

2.3.2 Environmental Review.

Ensure that an environmental review will be conducted per FAA Order 1050.1.

2.3.3 Document IFP.

Document the IFP and airspace requirements, as specified in FAA Orders 8260.19 and 8260.46, prior to submission to Aeronautical Information Services. Include ARINC code file.

2.4 Instrument Flight Procedure Validation (IFPV).

Conduct IFPV in accordance with AC 90-113; FAA Order 8900.1, Volume 11 chapter 12; and FAA Order 8200.1.

2.5 **Pre-Implementation.**

The service provider will ensure the final design is coordinated with all stakeholders.

2.6 **Post-Implementation.**

The service provider will conduct an implementation review, consistent with SMS principles, to ensure continual process improvement and feedback.

I

APPENDIX A. TRAINING SYLLABUS EXAMPLE

A.1 General.

This appendix provides an example for a training syllabus. Training (including specialized training) and establishment of minimum qualification standards of personnel actively involved in IFP development are the responsibility of each service provider. In order to meet the requirements of this AC, the service provider will be required to have a training program approved by the FAA to ensure the proficiency of all staff IFP designers. The training program will address both initial and recurrent training, and will include skill and knowledge requirements for all aspects of IFP design.

A.2 Training Syllabus.

The training syllabus will include, but not be limited to, the following general and specific knowledge areas to ensure continuity of IFP development expertise:

A.2.1 <u>General Areas</u>.

- A.2.1.1 Title 14, Code of Federal Regulations (14 CFR).
 - 1. Part 71-designation of Class A, B, C, D, and E Airspace Areas; Air Traffic Service Routes; Reporting Points;
 - 2. Part 73-Special Use Airspace;
 - 3. Part 77-Objects Affecting Navigable Airspace;
 - 4. Part 91-Air Traffic and General Operating Rules;
 - 5. Part 93-Specific Air Traffic Rules;
 - 6. Part 95-IFR (Instrument Flight Rules) Altitudes;
 - 7. Part 97-Standard Instrument Procedures;
 - 8. Part 121-Operating Requirements: Domestic, Flag, and Supplemental Operations; and
 - 9. Part 135-Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons On Board Such Aircraft.
- A.2.1.2 Flight Procedures Management Program (see FAA Order 8260.43).
- A.2.1.3 8260-series FAA orders applicable to Instrument Procedure Development.
- A.2.1.4 Service providers' Operating Procedures.
- A.2.1.5 FAA Safety Management System.

- A.2.1.6 Navigation systems and aircraft performance.
- A.2.1.7 Air Traffic Control (ATC) procedures.
- A.2.1.8 Airspace design.
- A.2.1.9 Environmental regulations.

A.2.2 Specific Areas.

- A.2.2.1 Security as it pertains to protecting FAA-provided data, software, and/or equipment.
- A.2.2.2 Maintenance of FAA-provided references and resources.
- A.2.2.3 Data submission and accuracy requirements.
- A.2.2.4 Process Environmental Assessments and Impact Statements.
- A.2.2.5 Prepare the IFP packages for submission to the FAA.
- A.2.2.6 The IFP Approval Process.

APPENDIX B. ADMINISTRATIVE INFORMATION

B.1 General.

This appendix provides an alphabetical listing of frequently used acronyms and abbreviations (see table B.1-1) and definitions.

14 CFR	Title 14, Code of Federal Regulations
AC	Advisory Circular
FS	Flight Standards
AIRNAV	Airports and Navigation Aids Database System
ARINC	Aeronautical Radio Incorporated
AOA	airborne obstacle assessment
ATC	Air Traffic Control
AVS	Aviation Safety
DP	departure procedure
FAA	Federal Aviation Administration
FSIMS	Flight Standards Information Management System
FV	flight validation
GOA	ground obstacle assessment
GUI	Graphic User Interface
IAP	instrument approach procedure
IFP	instrument flight procedure

Table B.1-1. Acronyms and Abbreviations

IFPV	Instrument Flight Procedure Validation
IFR	instrument flight rule
LOA	letter of authorization
LOB	line of business
NAS	National Airspace System
NASR	National Airspace System Resources
NOTAM	Notices to Airmen
OE/AAA	Obstruction Evaluation/Airport Airspace Analysis
PBN	Performance Based Navigation
QA	quality assurance
RNAV	area navigation
RNP	required navigation performance
RNP AR	required navigation performance authorization required
SMS	Safety Management System
STAR	Standard Terminal Arrival Routes
TERPS	Terminal Instrument Procedures
USSFIM	United States Standard Flight Inspection Manual

B.2 Definitions.

- B.2.1 <u>Airports and Navigation Aids Database System (AIRNAV)</u>. AIRNAV is the working database that stores all of FAA's data relating to airport and facility surveys and pertinent flight inspection reference data.
- B.2.2 Instrument Flight Procedure (IFP).

IFP is 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. IFPs can be DPs, Airways, STARs, and IAPs.

B.2.3 IFP Service Provider.

IFP Service Provider is an entity that provides IFP development services to the public.

B.2.4 National Airspace System (NAS) Resources (NASR).

NASR is the FAA's aeronautical database of record and is a client-server system employing a GUI for Aeronautical Information Services' specialists accessing NAS data. This system provides the FAA with the means for storing and maintaining a reference database with descriptive details of the NAS infrastructure and the operational status of all components.

B.2.5 <u>Obstacle Evaluation/Airport Airspace Analysis (OE/AAA)</u>.

OE/AAA is the conduct of aeronautical studies of existing or proposed objects based on information provided by proponents on an FAA Form 7460-1, Notice of Proposed Construction or Alteration, as prescribed by FAA Order 7400.2, Procedures for Handling Airspace Matters. Sign up as a new user <u>online</u>.

B.2.6 <u>Working Group</u>.

Working Group refers to a cadre of personnel representing affected lines of business. This group includes a facilitator as spokesperson for the group.

B.3 Related Publications.

B.3.1 <u>Regulations</u>.

Title 14, Code of Federal Regulations (14 CFR), Part 97.

B.3.2 Reading Material (current editions).

These publications address IFPs development and implementation:

- FAA AC 90-101, Approval Guidance for RNP Procedures with AR;
- FAA AC 90-113, Instrument Flight Procedure Validation (IFPV) of Satellite-based Instrument Flight Procedures (IFP);
- FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts;

- FAA Order JO 7100.9, Standard Terminal Arrival Program and Procedures;
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters;
- FAA Order 7930.2, Notices to Airmen (NOTAM);
- FAA Order 8000.367, Aviation Safety (AVS) Safety Management System Requirements;
- FAA Order 8000.368, Flight Standards Service Oversight;
- FAA Order 8000.369, Safety Management System;
- FAA Order 8200.1, United States Standard Flight Inspection Manual (USSFIM);
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures;
- FAA Order 8260.19, Flight Procedures and Airspace;
- FAA Order 8260.26, Establishing and Scheduling Civil Public-Use Standard Instrument Procedure Effective Dates;
- FAA Order 8260.43, Flight Procedures Management Program;
- FAA Order 8260.46, Department Procedure (DP) Program;
- FAA Order FS 8260.57, Oversight of Third Party Instrument Flight Procedure Service Providers;
- FAA Order 8260.58, United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design;
- FAA Order 8260.60; Special Instrument Procedures;
- FAA Order 8900.1, Flight Standards Information Management System (FSIMS), and
- RTCA DO-236B Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.

B.4 Forms.

The following forms were referred to within the document and are available in electronic form for use:

- FAA Form 7460-1, Notice of Proposed Construction or Alteration;
- FAA Form 8260-2, Radio Fix and Holding Data Record;
- FAA Form 8260-3, ILS-Standard Instrument Approach Procedure;
- FAA Form 8260-9, Standard Instrument Approach Procedure Data Record;
- FAA Form 8260-30.1, Simulator Validation Checklist;
- FAA Form 8260-30.2, Obstacle Assessment Checklist;
- FAA Form 8260-30.3, Flight Validation Checklist, and
- FAA Form 8260-30.4, IFPV Evaluator Check Record.

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 (1) emailing this form to [insert email address] or (2) faxing it to the attention of the [insert FAA line of business or staff office] at (XX) XXX-XXXX.

Subject: [insert AC title/number here] Date: Click here to enter text. *Please check all appropriate line items:* An error (procedural or typographical) has been noted in paragraph Click here to enter text. on page Click here to enter text.. Recommend paragraph Click here to enter text. on page Click here to enter text. be changed as follows: Click here to enter text. In a future change to this AC, please cover the following subject: (Briefly describe what you want added.) Click here to enter text. Other comments: Click here to enter text. I would like to discuss the above. Please contact me. Submitted by: Date: