



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

**Subject: Authorization Guidance for
Development of Required Navigation
Performance Procedures with Authorization
Required by Third Party Instrument Flight
Procedure Service Providers**

Date: 06/21/2011

AC No: 90-110

Initiated by: AFS-460 **Change:**

1. Purpose. This advisory circular (AC) provides guidance material for third party Instrument Flight Procedure (IFP) developers, hereafter referred to as “IFP Service Providers,” to become authorized by the Federal Aviation Administration (FAA) to develop Title 14 of the Code of Federal Regulations (14 CFR) part 97 Required Navigation Performance (RNP) IFPs with Authorization Required (AR). Hereafter, these IFPs will be referred to as “RNP AR.”

2. Applicability.

a. Instrument Flight Procedure Service Providers may elect to use the guidance in this Advisory Circular or follow an alternative method, provided that the method is approved by the FAA.

b. Mandatory terms used in this AC such as “must” are used to denote that the particular means of compliance described herein 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.

3. Audience. The primary audience for this Advisory Circular is prospective Instrument Flight Procedure Service Providers, who desire FAA authorization to develop 14 CFR part 97 RNP AR IFPs. The secondary audience for this Advisory Circular is FAA Flight Standards Service (AFS) personnel, who are directly associated with the procedure development process and/or charged with the responsibility to qualify and provide oversight of non-governmental IFP Service Providers.

4. Background. Historically the FAA has relied on internal resources to design and develop Instrument Flight Procedures. This AC will provide guidance for IFP Service Providers to gain FAA authorization to design and develop Public RNP AR IFPs.

5. Definitions.

a. Aviation System Standards Information System (AVNIS) is the working database that stores all of FAA's data relating to airport and facility surveys and pertinent flight inspection reference data.

b. Area Navigation (RNAV) is a method of navigation, which permits aircraft operation on any desired flight path, within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

c. Global Positioning System (GPS) is the United States satellite-based radio navigation system that provides a positioning service anywhere in the world. The service provided by GPS for civil use is defined in the GPS Standard Positioning System Signal Specification. The GPS meets the International Civil Aviation Organization Global Navigation Satellite System (GNSS) requirements.

d. Instrument Flight Procedure (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 point from which a landing can be completed, and if a landing cannot be completed, then continuing on to a position and altitude at which either holding or en route flight can be continued.

e. National Airspace System Resources (NASR) is the FAA's aeronautical database of record and is a client-server system employing a graphical user interface (GUI) for aeronautical information specialists (AIS) 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.

f. Obstacle Evaluation/Airport Airspace Analysis (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 at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

g. Required Navigation Performance (RNP) is a statement of the navigation performance necessary for operation within a defined airspace. On board monitoring and alerting is required. See RTCA DO-236B, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.

h. Authorization Required (AR) is special, required authorization by the FAA to conduct RNP approaches designated as "Authorization Required." Standards and criteria for development of RNP AR IFPs are based on a higher level of aircraft equipage and additional aircrew requirements.

i. Third Party, for the purpose of this AC, is a non-governmental individual or organization who develops or intends to develop RNP AR IFPs.

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

k. Working Group refers to a cadre of personnel representing affected Lines of Business (LOB) within a particular FAA Regional Office. This group includes a facilitator as spokesperson for the group.

6. Related Publications.

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

b. Reading Material (current editions). Copies of the following ACs and Orders may be obtained from the U.S. Department of Transportation, Publications Department, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD, 20785. These publications address IFPs development and implementation.

(1) FAA Advisory Circular (AC) 90-101, Approval Guidance for RNP Procedures with AR;

(2) FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts;

(3) FAA Order 7100.9, Standard Terminal Arrival Program and Procedures;

(4) FAA Order 7400.2, Procedures for Handling Airspace Matters;

(5) FAA Order 8000.368, Flight Standards Service Oversight;

(6) FAA Order 8200.1, United States Standard Flight Inspection Manual;

(7) FAA Order 8260.3, United States Standard for Terminal Instrument Procedures;

(8) FAA Order 8260.19, Flight Procedures and Airspace;

(9) FAA Order 8260.26, Establishing and Scheduling Civil Public-Use Standard Instrument Procedure Effective Dates

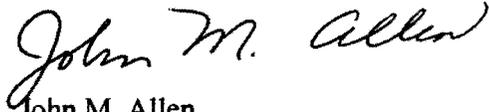
(10) FAA Order 8260.42, United States Standard for Helicopter Area Navigation;

(11) FAA Order 8260.43, Flight Procedures Management Program;

(12) FAA Order 8260.46, Department Procedure (DP) Program;

(13) FAA Order 8260.52, United States Standard for Required Navigation Performance (RNP) Approach Procedures with Authorization Required (AR);

- (14) FAA Order 8260.54, United States Standard for Area Navigation;
- (15) FAA Order 8900.1, Flight Standards Information Management System (FSIMS),
- (16) RTCA DO-236B Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.



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Director, Flight Standards Service

Appendix A. Instrument Flight Procedure Service Provider Requirements

1. General. This appendix provides a list of requirements and identifies required reference material for any IFP Service Providers applying for FAA authorization to develop Title 14 of the Code of Federal Regulations (14 CFR) Part 97 Area Navigation (RNAV) Required Navigation Performance (RNP) instrument flight procedures (IFP) with Authorization Required (AR).

2. Organization. The IFP Service Provider must meet the following requirements.

a. Operations Manual. The organization must have an FAA Flight Procedure Implementation and Oversight Branch (AFS-460) accepted Operations Manual that will be available to each staff member. The Operations Manual must contain the following:

- (1) Organizational Structure relevant to IFP design;
- (2) Functions, limitations, and product(s) authorized by the FAA (AFS-460);
- (3) Process for performing the authorized functions;
- (4) Locations at which authorized functions are performed;
- (5) Process for periodic internal audits;
- (6) Process for communicating and coordinating with appropriate FAA offices;
- (7) Process for acquiring and maintaining regulatory guidance material associated with each authorized function;
- (8) Process for maintaining the currency of all reference material;
- (9) Training program, including recurrent training;
- (10) Processes and requirements related to maintaining records and submitting reports;
- (11) Process for IFPs' maintenance;
- (12) Process for ensuring that all IFP development software is approved by the FAA;
- (13) Process for transfer of data, including forms and documents, to the FAA National Flight Data Center (NFDC);
- (14) Method for ensuring environmental requirements are met, and
- (15) Procedures for revising the operations manual,
- (16) Notice to Airman (NOTAM) plan.

(17) Aeronautical data obtained from an FAA approved data source.

(18) Environmental issues, review, and processing through the FAA service centers.

b. Safety Management System (SMS). A Safety Management System (as contained in the approved Operations Manual) established and authorized by appropriate IFP Service Provider authority must define the safety policies, processes, and practices for managing all aspects of all 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) Established 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;
- (10) A quality management system based on those elements of ISO 9001 relevant to IFP design, and
- (11) An Oversight and audit program.

c. Chief Designer.

(1) The organization will appoint a Chief Designer, who is responsible for the IFP Service Providers IFP development operations.

(2) The Chief Designer must certify in writing that each IFP submitted to the National Flight Data Center (NFDC) meets FAA (AFS-460) requirements.

d. Library. Maintain a current library of all relevant FAA and IFP 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.

e. Training. The IFP 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 (AFS-460) and must include:

- (1) Initial Training;
- (2) Recurrent Training, and
- (3) A suitable training syllabus as outlined in appendix C.

f. Record Keeping. IFP Service Providers must maintain the following records:

(1) A file containing all documents required by FAA Order 8260.19 and the IFP 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 to the FAA for audit.

3. Required Functional Positions.

a. 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 and/or RNP design experience;
- (4) Thorough knowledge of applicable design regulations, and
- (5) A knowledge of the principles of Quality Assurance.

b. 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;

(2) Satisfactory completion of on-the-job training, consistent with the requirements outlined in the IFP Service Providers operations manual;

(3) Knowledge of applicable design regulations, and

(4) Written approval by the Chief Designer.

c. Quality Assurance (QA) Specialist. The IFP 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 IFP Quality Assurance as outlined in the IFP Service Providers operations manual.

d. Flight Validation. The IFP Service Provider is responsible for ensuring all IFPs are flight validated in accordance with FAA Order 8900.1 Flight Validation requirements;

(1) A person may be appointed within the IFP Service Provider organization to fulfill this function, or;

(2) The IFP Service Provider may enter into an agreement with an FAA-approved flight validation provider.

4. IFP Design and Development Process. An outline of this process is included in appendix B. This process includes the following coordination functions:

a. Required Coordination. IFP Service Providers are responsible for IFP coordination and design with all stakeholders per FAA Orders 8260.19 and 8260.43;

b. Data Sources. The IFP Service Provider must use FAA databases for Obstacle, Terrain, Airport, NAVAID, and Fix information. Any other data that is used must be coordinated with the appropriate FAA office;

c. Environmental. The IFP Service Provider is responsible for coordinating environmental determinations in accordance with FAA Order 1050.1 and 7400.2;

d. Airspace. Determine airspace requirements in accordance with FAA Order 8260.19;

e. Software. Any IFP design software must be approved by Flight Procedure Implementation and Oversight Branch, AFS-460;

f. Flight Validation (FV). Complete Flight Validation in accordance with Flight Validation requirements (see FAA Order 8900.1), and

g. Maintenance. The IFP Service Provider must maintain each IFP until maintenance is assumed by the FAA or the IFP is canceled. Maintenance of IFPs must include;

(1) Periodic Review. A plan must be in place for the periodic review and amendment process of IFPs as required by FAA Order 8260.19;

(2) OE/AAA. The IFP Service Provider must conduct Obstacle Evaluation Studies in accordance with FAA Order 7400.2 and the process outlined in their operations manual;

(3) Safety of flight information. A plan must be established for monitoring and disseminating relevant safety of flight information [i.e., Notices to Airmen (NOTAMs)]. Establish a plan to notify Mission Support Services (AJV) when a NOTAM is sent. This plan should also include details how AJV will notify the IFP Service Providers.

5. Application. The prospective IFP Service Provider will submit a letter of application to AFS-460, including a detailed proposal of compliance with this AC.

FAA Mike Monroney Aeronautical Center
Flight Procedure Implementation and Oversight Branch, AFS-460
6500 S. MacArthur Boulevard
Building 29, Room 104
Oklahoma City, OK 73169

The FAA will review the letter of application and provide guidance on how to proceed with the authorization process.

6. FAA Authorization Process and Program. The FAA (AFS-460) will:

a. Verify the applicant's compliance with this AC, which will include:

- (1) Audit(s) of the applicant's facilities (including any subcontractor facilities);
- (2) Interview(s) of applicant's staff;
- (3) Examination of relevant documentation, and
- (4) On site evaluation of the development process for an RNP AR procedure(s).

b. Perform an IFP Quality Review (see figure A-1 for a sample quality review checklist).

c. Upon determination of compliance with this AC, issue a letter of authorization (LOA) to produce 14 CFR RNP AR IFPs.

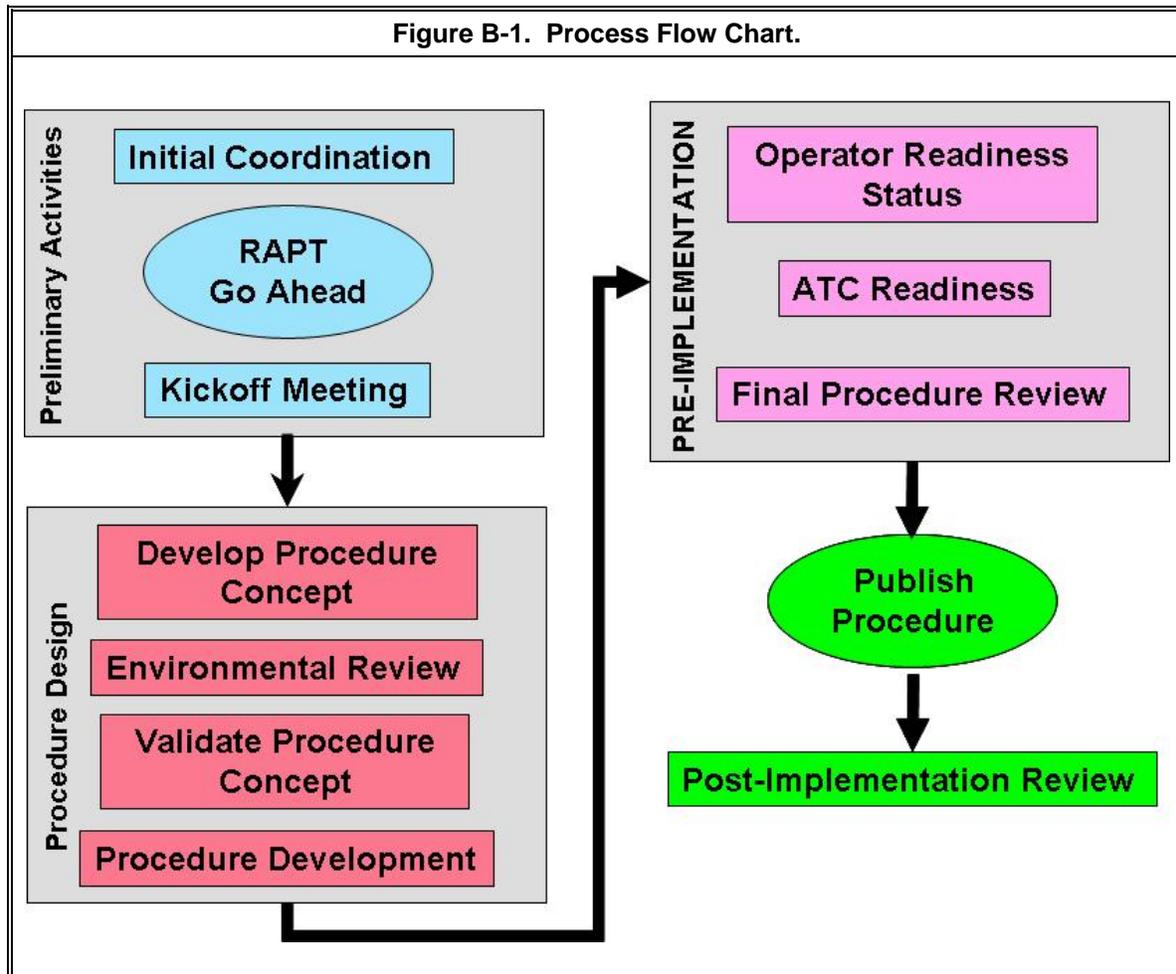
7. Oversight Process. Oversight and compliance will be performed by AFS-460 as outlined in FAA Order 8000.368.

8. Notification of Change. The IFP Service Provider will notify AFS-460 (in writing) within 14 days of any change, which may affect compliance with this AC.

Figure A-1. IFP Quality Review Checklist.				
Airport:				
Designer:				
Reviewer:				
Date:				
IFP 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?				
Category Exclusion Letter included?				
Mountainous Terrain?				
Assumed Tree/Vegetation heights per the region FPO				
Obstacle Data				
5 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				
Waypoints are Named and have completed 8260-2				
Minimum Altitudes are AT or Rounded Up the nearest 100 ft increment (i.e., 1701 ft and 1751 ft both round up to 1800 ft)				
Missed Approach Design must match the Missed Approach Instructions				
Feeder, Initial and Intermediate Segment Documented				
Holding Patterns Evaluated and Documented				
All Bank Angles Evaluated				
8260-3 fill out per FAAO 8260.19				
8260-9 fill out per the FAAO 8260.19				
8260-2 for all Waypoints and NAVAIDs are fill out per FAAO 8260.19 to include turn centers				
8260-10 fill out per the FAAO 8260.19				
ARINC 424 Coding				

Appendix B. Process for RNP IFP Design and Development

1. General. This appendix provides guidance on the coordination process to design/develop public RNP approach IFPs.



2. Preliminary Activities. Prior to design of a 14 CFR RNP AR IFP, several tasks must be completed.

a. Initial Coordination (air traffic facilities, airport, operator(s), IFP Service Provider).

- (1) Discuss objective for designing the IFP.
- (2) Facilitator should provide briefing on RNP AR capabilities, benefits, and limitations.
- (3) Discuss the environmental impact of the IFP. This may require obtaining radar track data of existing flight paths.

(4) Coordinate with the airport and air traffic facility on projects under development or issues that could impact IFP implementation.

(5) Determine the status of the airport survey and runway instrument markings.

(6) Research airport equipage levels and determine intent of operators to fly particular type of approach.

(7) Produce an evaluation of all obstacles considered pertinent to the proposed IFP development project and recommendation for resolving conflicts.

(8) Submit an IFP preliminary design concept to the Regional Airspace and Procedures Team (RAPT).

b. RAPT. Submit the proposed procedure for RAPT coordination.

c. Kickoff Meeting. This step begins when the RAPT determines that a requested IFP is feasible. The purpose of the kickoff meeting is to provide a forum in which the Working Group can reach a consensus on the objectives, finalize the initial design concept, and establish a timeline for the proposed IFP.

(1) Arrange meeting with all interested stakeholders per FAA Order 8260.43.

(2) Introduce the Process and emphasize the Working Group concept by highlighting the roles and responsibilities of the various members.

(3) Review objective for designing the IFP.

(4) Consider RAPT assigned publication date to determine a project timeline.

(5) Facilitator should provide briefing on capabilities, benefits, and limitations.

(6) IFP's proponent (lead carrier) should present an IFP design concept to the group for comment and act as the facilitator.

(7) Environmental impact of the IFP should be addressed.

(8) Adjoining facility coordination should begin discussion on revising (if needed) their letter of agreement.

(9) Identify, discuss, and track other projects that may impact the proposed IFP.

(10) Identify operator RNAV IFPs (critical for RNAV IFP naming convention, when more than one RNAV IFP designed to the same runway).

(11) Review action items and responsible person/organization.

(12) Establish Working Group roster.

(13) Subsequent meetings of the Working Group will typically be held by an Air Traffic Service Area teleconference as needed.

(14) Task Output:

- (a) Agreed upon draft IFP design concept;
- (b) Establish meeting schedule;
- (c) Track action items.

3. IFP Design. IFP design is a complex process that requires a detailed understanding of criteria, air traffic operational needs, and aircraft capabilities. Successful design and implementation depends on collaboration between industry and the FAA across all relevant lines of business. Additionally, the consistent and active participation of all Working Group members is required throughout all phases of the project.

a. Develop IFP Concept. IFP development primarily consists of the further detailed definition of the lateral and vertical path first discussed during the kickoff meeting. The Working Group must review the IFP throughout the development process to verify several key elements listed below.

(1) For approach IFPs that will not be wholly contained within terminal airspace ensure coordination between all affected facilities as work proceeds. These must include any bordering TRACON and ARTCC facilities that may be impacted by the IFP.

(a) The coordination process must address the IFP's compatibility with other existing/planned IFPs, airspace borders, and controller sectors.

(b) Coordination must also include consideration of the NFDC charting and publication cycles.

(2) Terminal Facility Management will obtain a list of waypoint names for the project from ARTCC Facility Management. The waypoint list should be verified using available FAA databases, including AVNIS and NASR.

(3) IFP service provider must perform an initial airspace assessment to ensure that the proposed IFP is wholly contained within controlled airspace.

(4) IFP development must include identification of ATC operational requirements.

(5) A timeline must be established that includes consideration of implementation and ATC training requirements as appropriate.

(6) Final IFP Design.

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

c. Document IFP. Document the IFP and airspace requirements as specified in FAA Order 8260.19 prior to submission to NFDC.

4. Pre-Implementation. The IFP Service Provider will ensure the final design is coordinated with all stakeholders as required.

5. Post-Implementation. IFP Service Provider will conduct an implementation review consistent with SMS principles to ensure continual process improvement and feedback.

Appendix C. Training Example

1. Training. Training (including specialized training) and establishment of minimum qualification standards of personnel actively involved in IFP development is the responsibility of each IFP Service Provider. In order to meet the requirements of this advisory circular, the IFP 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.

2. Training Syllabus. The training syllabus will include, but not be limited to the following general and specific knowledge areas to ensure continuity of instrument IFP development expertise;

3. General Areas.

a. 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 Altitudes;

(7) Part 97-Standard Instrument Approach Procedures;

(8) Part 121-Operating Requirements: Domestic, Flag, and Supplemental Operations;

(9) Part 135-Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons On Board Such Aircraft.

b. Flight Procedures Management Program (FAA Order 8260.43).

c. 8260-series orders applicable to Instrument Procedure Development.

d. IFP Service Providers' Operating Procedures.

e. FAA Safety Management System.

f. Navigation systems and aircraft performance.

- g. ATC procedures.**
 - h. Airspace design.**
 - i. Environmental regulations.**
- 3. Specific Areas.**
- a. Security as it pertains** to protecting FAA provided data, software, and/or equipment.
 - b. Maintenance of FAA** provided references and resources.
 - c. Data submission** and accuracy requirements.
 - d. Processing Environmental Assessments** and Impact Statements.
 - e. Preparing the IFP package for** submission to the FAA.
 - f. The IFP Approval Process.**