
GACAR PART 172 – INSTRUMENT FLIGHT PROCEDURE SERVICES

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SUBPART A – GENERAL

§ 172.1 Purpose.

- (a) This Part of General Authority of Civil Aviation Regulation (GACAR) prescribes rules governing—
 - (1) The design, development, validation, approval, registration, promulgation, continuous maintenance and periodic review of Instrument Flight Procedures (IFPs) that are intended for use by aircraft operating under Instrument Flight Rules (IFR) within civil certified or authorized aerodromes and heliports in the territorial limits of the Kingdom of Saudi Arabia (KSA).
 - (2) The flight validation of Instrument Flight Procedures.
- (b) All approved IFPs intended for public use are identified in GACAR Part 97 and published in the KSA Aeronautical Information Publication (AIP).

§ 172.3 Applicability.

- (a) Except as provided in paragraphs (b) and (c) of this section, this Part prescribes rules governing:
 - (1) Instrument Flight Procedure Design Service (IFPDS) provided by an IFPDS Provider (IFPDSP) that holds or is required to hold an Air Navigation Service Certificate (ANSC) under GACAR Part 170;
 - (2) Flight validation of Instrument Flight Procedures provided by a Flight Validation Service Provider (FVSP) that holds or is required to hold an Air Navigation Service Certificate (ANSC) under GACAR Part 170;
 - (3) Each person employed or contracted by an IFPDSP when developing and maintaining IFP under this Part;
 - (4) Each person employed or contracted by an IFP Flight Validation Service Provider (FVSP) who is involved in the flight validation of IFPs under this Part; and
 - (5) Each Aeronautical Information Service (AIS) Provider supplying aeronautical data in support of IFP design, development, maintenance, periodic review, and promulgation.
- (b) This Part does not apply to IFPS Providers who are developing and maintaining IFP exclusively for military flight operations.
- (c) This Part does not apply to the design of aircraft performance operating limitations or flight paths, for critical engine inoperative emergency procedures.
- (d) Additional requirements applicable to the establishment of airspace, routes, points and minimum altitudes are prescribed under GACAR Part 171.

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- (e) Additional requirements applicable to the publication and distribution of the aeronautical charts associated with IFPs are prescribed under GACAR Part 175.

§ 172.5 Audits and Inspections.

Each certificate holder of an IFPDSP or FVSP must grant the President full and unrestricted access to all facilities, records, personnel, equipment, design tools, operational data, and flight validation activities, at any time, for the purpose of conducting inspections and audits to verify continued compliance with the requirements of this Part.

§ 172.7 Instrument Flight Procedure (IFP) Sponsor.

- (a) Except as provided in paragraph (e), no person may request the development or withdrawal of an Instrument Flight Procedure (IFP) unless that person is an IFP sponsor.
- (b) For the purposes of this Part, an IFP sponsor is:
- (1) The aerodrome or heliport operator — for an IFP serving that aerodrome or heliport; or
 - (2) The Air Navigation Service Provider (ANSP) certificated under GACAR Part 171— for an IFP related to en-route or terminal area operations.
- (c) Each IFP sponsor must —
- (1) Provide the IFPDSP with all operational requirements, aeronautical data, and supporting information necessary for the design or amendment of the IFP;
 - (2) Coordinate with the IFPDSP to ensure that the IFP is submitted for approval by the President in accordance with this Part;
 - (3) Ensure, through coordination with the IFP custodian, that each approved IFP is subject to maintenance and periodic review in accordance with this Part; and
 - (4) Coordinate with the IFP custodian to support timely publication of the approved IFP in the KSA AIP.
- (d) The IFP sponsor must not assume technical responsibility for the design, verification, validation, promulgation, or maintenance of IFPs. The IFP sponsor's role is limited to initiating requests, providing operational requirements and supporting data, and coordinating with the IFP custodian and the President regarding approval, publication timelines, and withdrawals.
- (e) Safety-critical withdrawals — Notwithstanding paragraph (a), where the IFPDSP, through the chief designer, determines that continued use of an IFP presents a safety hazard or fails to meet regulatory requirements, the IFPDSP must recommend withdrawal directly to the President. In such cases, the IFPDSP must notify the IFP sponsor without delay and coordinate subsequent actions. IFP sponsors may request withdrawal for operational

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reasons. The President's decision will be based on the IFP custodian's compliance assessment and safety findings.

§ 172.9 Instrument Flight Procedure (IFP) Custodian.

The IFP custodian is the certificated organization responsible for the safeguarding, accuracy, and lifecycle management of the IFP. Specifically, the custodian must—

- (a) Be an IFP Design Service Provider (IFPDSP) certificated under GACAR Parts 170 and 172 and authorized in their operations specifications;
- (b) Ensure that the IFP is designed, validated, approved, registered, promulgated, maintained, and withdrawn in full compliance with the requirements of this Part, ICAO Doc 8168 (PANS-OPS) criteria, and related GACA and ICAO guidelines;
- (c) Maintain adequate resources, including qualified personnel and appropriate design/validation tools;
- (d) Oversee continuous quality assurance and error reporting, working in coordination with AIS and aeronautical charts provider in accordance with GACAR Part 175 to ensure data integrity and timely publication of approved procedures;
- (e) Act as the accountable entity for the procedure's ongoing validity, ensuring errors are corrected, periodic reviews are performed, and procedures are withdrawn if they no longer meet safety or operational requirements;
- (f) Establish and maintain a formal arrangement and ensure notification and coordination with the AIS and aeronautical charts provider concerning IFP publication, amendments, and withdrawals, including maintenance of the IFP register; and
- (g) Establish and maintain a formal arrangement with the IFP sponsor defining roles and responsibilities for the initiation of requests, approval submissions, maintenance reviews, and withdrawal, in order to prevent duplication or conflict of responsibilities.

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**SUBPART B – INSTRUMENT FLIGHT PROCEDURE DESIGN SERVICE
PROVIDER (IFPDSP) REQUIREMENTS**

§ 172.11 Requirement for a Custodian and Restrictions on IFPDSPs.

- (a) Each IFP intended for use by aircraft operating under instrument flight rules within certified or authorized civil aerodromes and heliports in the territorial limits of the KSA must have a custodian who —
- (1) Meets the applicable requirements of this Part; and
 - (2) Is certificated by the President under GACAR Parts 170 and 172 to be an IFPDSP.
- (b) No person may provide an Instrument Flight Procedure Design Service in the Kingdom of Saudi Arabia unless the person complies with the requirements of this Part and they have been certificated by the President under GACAR Parts 170 and 172 to provide such service.
- (c) Except as provided in GACAR Part 170, each IFPDSP must comply with the limitations and provide service in accordance with the scope of their certificate, operations specifications, and their operations manual prepared under Subpart D to this Part.

§ 172.13 Resource Requirements.

Each IFPDSP must—

- (a) Have available equipment that is appropriate for the design, design verification, declaration, periodic review and maintenance of the types of IFPs that they wish to manage;
- (b) Have access to relevant and current data including, but not limited to, aeronautical data, land contour data, and obstacle data for the design, design verification, periodic review and maintenance of their IFPs; and
- (c) Hold or have ready access to copies of relevant documentation comprising technical standards, practices, and instructions, and any other documentation that may be necessary for the design, design verification, declaration, periodic review and maintenance of the types of IFPs they wish to manage.

§ 172.15 Aeronautical Data Integrity.

- (a) Each IFPDSP must ensure that all aeronautical data used in the design, maintenance, amendment, and periodic review of IFPs complies with the applicable accuracy, resolution, integrity, timeliness, and traceability requirements prescribed in GACAR Part 175 – Aeronautical Information Services & Aeronautical Charts, including those specified in the Aeronautical Data Catalogue.

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- (b) When aerodrome or heliport data are required for an IFP, the IFPDSP must also comply with any additional data specifications prescribed in GACAR Part 139 (aerodromes) or any other applicable GACAR Part regulating the facility concerned.
- (c) Aeronautical data must be traceable to an authoritative source, with documented originator, date of origination, and a complete record of any processing or manipulation, as required under GACAR Part 175's traceability provisions.
- (d) Verification and validation processes must confirm that aeronautical data meet all required quality specifications prior to use in IFP design or amendment, in accordance with GACAR Part 175 requirements for data verification and validation.
- (e) Aeronautical data transmitted or stored electronically must be protected against corruption, loss, or unauthorized alteration using data integrity and protection measures acceptable under GACAR Part 175. Acceptable means of compliance may include Cyclic Redundancy Checks (CRC).

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SUBPART C – IFPDSP PERSONNEL REQUIREMENTS

§ 172.25 IFPDSP Personnel Requirements.

- (a) Each IFPDSP must employ and designate post holders who are accountable for the management and oversight of their respective functions, as follows:
- (1) A person, identified for the purposes of this Part as the director of instrument flight procedure services, who must —
 - (i) Have the authority within the custodian’s organization to ensure that the organization’s IFPDSP services can be financed and provided in accordance with the requirements and standards prescribed by this Part; and
 - (ii) Be responsible for ensuring that the organization complies with the requirements of this Part.
 - (2) A chief designer, responsible for—
 - (i) Ensuring that the custodian’s organization complies with the organization’s procedures for the development, validation, periodic review and maintenance of IFPs; and
 - (ii) Making the declaration of compliance required for every IFP provided by the custodian’s organization for publication in the KSA AIP and otherwise made available for publication and operational use.
- (b) The appointment of the chief designer is subject to acceptance by the President. The IFPDSP must ensure that nominated individuals possess the qualifications, competency, and experience deemed acceptable by the President in accordance with the qualification and experience requirements specified in Appendix A to this Part.
- (c) Each IFPDSP must employ, contract, or otherwise engage a sufficient number of qualified personnel, proportionate with the size, scope and complexity of the organization, to effectively plan, design, verify, and maintain the IFP provided by the custodian’s organization.
- (d) Each IFPDSP must establish and maintain documented procedures for initially assessing, training, and maintaining, the competence of those personnel involved in the planning, design, verification, periodic review and maintenance of IFPs. These procedures must comply with GACAR § 172.29.

§ 172.27 Declarations Concerning Instrument Flight Procedures.

Each IFPDSP must establish a documented procedure requiring the chief designer to formally declare that each IFP has been designed in compliance with all applicable standards and requirements prescribed by this Part.

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§ 172.29 Qualification and Training requirements for Procedure Designers.

- (a) Each IFPDSP must ensure that IFP designers have acquired and maintain the necessary competency through a combination of formal training and supervised on-the-job training (OJT).
- (b) Training for IFP designers must include:
 - (1) Initial training — prior to independent performance of any design duties; and
 - (2) Recurrent training — at intervals not exceeding three (3) years, or sooner if required by regulatory changes, organizational procedures, or safety considerations.
- (c) The initial training must ensure that the IFP designer is able to demonstrate a basic level of competency that includes at least the following elements:
 - (1) Theoretical Knowledge of IFP design criteria prescribed in Subpart E to this Part;
 - (2) Practical skills in the design of instrument flight procedures including the use of design tools; and
 - (3) Applicable regulatory requirements for the design, validation, periodic review and maintenance of IFPs.
- (d) The recurrent training must ensure that the IFP designer is able to demonstrate a basic level of competency that includes at least the following elements:
 - (1) Knowledge about updates in ICAO provisions and other provisions pertaining to IFP Design; and
 - (2) Maintenance and enhancement of knowledge and skills in the design of IFP including lessons learned from operational experience and safety reports.
- (e) Each IFPDSP must ensure that flight procedure designers have undergone an adequate, supervised OJT and meet the qualification and experience requirements specified in Appendix A to this Part before performing independent design functions.

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**SUBPART D – FLIGHT PROCEDURES DESIGN OPERATIONS MANUAL
(FPDOM) REQUIREMENTS**

§ 172.31 General.

- (a) This subpart prescribes requirements for each IFPDSP to prepare and maintain a Flight Procedures Design Operations Manual (FPDOM).
- (b) Each FPDOM, and all its revisions, must be acceptable to the President.
- (c) Each IFPDSP must—
 - (1) Ensure that its FPDOM is amended, as required, to remain a current description of the organization structure, personnel and procedures of the IFPDSP;
 - (2) Ensure that any amendments made to its FPDOM meet the applicable requirements of this Part;
 - (3) Ensure that the FPDOM describes all processes related to design, development, validation, approval, registration, promulgation, maintenance and periodic review of Instrument Flight Procedures.
 - (4) Comply with the manual amendment procedure contained in its FPDOM;
 - (5) Provide the President with a copy of each amendment to its FPDOM, immediately after the amendment is incorporated into the FPDOM; and
 - (6) Make such amendments to its FPDOM as the President may consider necessary in the interests of aviation safety.

§ 172.33 Flight Procedures Design Operations Manual (FPDOM) Contents.

- (a) Each IFPDSP must provide the President with a FPDOM containing—
 - (1) A statement signed by the director of instrument flight procedure services, on behalf of the organization, confirming that—
 - (i) The FPDOM describes the organization structure, available tools and equipment, personnel resources allocated to perform specialized functions, and the procedural methodology employed by the organization; and
 - (ii) The FPDOM, and all associated procedure manuals, operating, and maintenance instructions, must be complied with by the organization's personnel at all times
 - (2) The name and title of the director of instrument flight procedure services, as required under GACAR § 172.25(a)(1).

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- (3) The name and title of the chief designer, as required under GACAR § 172.25(a)(2).
 - (4) The duties and responsibilities of the director of instrument flight procedure services, the chief designer and all IFP designers.
 - (5) An organization chart showing lines of responsibility of the senior persons in paragraphs (a)(2) and (a)(3) of this section.
 - (6) A summary of the organization's staffing structure.
 - (7) The detailed procedures required under Subpart E regarding IFP development.
 - (8) The detailed procedures required under Subpart E regarding IFP validation.
 - (9) The detailed procedures required under Subpart F regarding IFP design submissions and declarations.
 - (10) The detailed procedures required under Subpart G regarding IFP promulgation.
 - (11) The detailed procedures required under Subpart H regarding IFP maintenance.
 - (12) The IFP register required under GACAR § 172.85.
 - (13) The detailed procedures required under Subpart J regarding quality assurance.
 - (14) The detailed procedures, or an outline of those procedures, including references to the documentation where the complete procedures are maintained, as required under—
 - (i) GACAR § 172.15 regarding aeronautical data integrity; and
 - (ii) GACAR § 172.141 regarding the identification, collection, indexing, storage, maintenance, and disposal of records.
 - (15) Detailed procedures to control, amend, and distribute the FPDOM.
- (b) The policies and procedures contained in the FPDOM must not be contrary to any applicable GACAR.

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SUBPART E – DEVELOPMENT OF INSTRUMENT FLIGHT PROCEDURES

§ 172.41 General.

- (a) In the interest of safety, efficiency, regularity and economy, every effort must be made to ensure that instrument flight procedures (IFP) are evolved so as to keep to the minimum consistent with safety, both the time taken in executing an instrument flight procedure and the airspace necessary for the associated manoeuvres.
- (b) Except as provided in (c), only one instrument approach procedure (IAP) may be promulgated for each type of radio aid in relation to a particular runway.
- (c) More than one IAP may be promulgated for each type of radio aid in relation to a particular runway if authorized by the President and only after joint consideration by the operators concerned.
- (d) IFPDSPs must ensure measures are implemented during the development of IFP to minimize the disturbance to the local population caused by aircraft noise. When directed by the President, the IFP sponsor, in coordination with IFPDSP, must consult local noise abatement committees or similar bodies representing the population of local communities/towns, local authorities, aerodrome and airspace users. The President may prescribe other requirements addressing how local noise abatement committees are included in the planning and introduction of new departure routes.
- (e) The specifications contained in this subpart are based on both conventional and performance-based navigation (PBN) systems and operating practices and are formulated to achieve a reasonable degree of standardization. Exceptions may be permitted only after consideration by the President.

§ 172.43 Design of Instrument Flight Procedures.

- (a) Each IFPDSP must establish detailed procedures for ensuring that every IFP developed is—
 - (1) Designed or amended by a qualified designer, or an unqualified designer under supervision of a qualified designer, using methods ensuring that the procedure meets the applicable design criteria prescribed in GACAR § 172.45;
 - (2) Independently verified by a qualified designer who is independent of the person directly responsible for the design; and
 - (3) Validated as prescribed in Subpart E of this Part.
- (b) Each IFPDSP must establish detailed procedures for ensuring that during the processes of design, maintenance, periodic review or transfer of data of an IFP—

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- (1) The applicable aeronautical data and aeronautical information, as well as the manipulation or processing of aeronautical data complies with the standards specified in GACAR Part 175; and
- (2) Any transfer of aeronautical information within the organization, or to or from external entities, complies with the standards specified in the Aeronautical Information Exchange Model (AIXM-5 or latest version of AIXM).

§ 172.45 IFP Design Criteria.

- (a) Every IFP must be designed in accordance with this Part and in accordance with the appropriate design processes, standards, guidelines, and aeronautical data quality requirements contained in the following:

- (1) ICAO Documents as last amended—

- (i) Doc. 8168, Procedures for Air Navigation Services – Aircraft Operations — Volume I Flight Procedures, and Volume II — Construction of Visual and Instrument Flight Procedures;
- (ii) Doc. 8697 — Aeronautical Chart Manual;
- (iii) Doc. 9365 — Manual of All-Weather Operations;
- (iv) Doc. 9613 — Performance-based Navigation (PBN) Manual;
- (v) Doc. 9905 — Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual;
- (vi) Doc. 9906 — Quality Assurance Manual for Flight Procedure Design Volumes 1, 2, 3, 5 and 6;
- (vii) Doc. 9931 — Continuous Descent Operations (CDO) Manual;
- (viii) Doc 9993 — Continuous Climb Operations (CCO) Manual;
- (ix) Doc 9849 — Global Navigation Satellite System (GNSS) Manual;
- (x) Doc 9643 — Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR); and
- (xi) Doc 9368 — Instrument Flight Procedures Construction Manual;

- (2) Any other guideline or standard that is applicable to a particular type of instrument flight procedure and that is acceptable to the President.

- (b) For the purposes of paragraph (a), if there is a conflicting difference between any of the applicable design processes, standards, guidelines, or aeronautical data quality

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requirements, the particular design process, standard or guideline to be used must be acceptable to, or specified by, the President.

- (c) The design of an IFP must—
- (1) Be coordinated with all appropriate air traffic service (ATS) providers, aerodrome operators, airspace users and other involved stakeholders;
 - (2) Be compatible with any air traffic service and associated procedure that is provided within the area or areas of airspace where the IFP is intended to be established; and
 - (3) Take into account—
 - (i) Any special air traffic rules prescribed by GACAR Part 93;
 - (ii) Any local noise abatement requirements or any noise abatement procedure prescribed by the President;
 - (iii) Any other regulation restricting aircraft operations;
 - (iv) The classification and any associated designation of the airspace in which the IFP is to be established and any adjacent airspace that may be affected by the procedure; and
 - (v) The effect that the proposed IFP may have on any other IFP established in the airspace.
- (d) An IFP must not be designed on or use a ground based aeronautical facility unless the aeronautical facility is operated under the authority of an aeronautical telecommunication service operated in accordance with GACAR Part 173.

§ 172.47 Terrain Data to be Used in Instrument Flight Procedures Design.

- (a) Terrain data and associated criteria relating to electronic terrain, obstacle and aerodrome mapping information must comply with GACAR Part 175 requirements.
- (b) When designing IFP, an IFPDSP may:
- (1) Utilize the authorized Digital Elevation Model (DEM) which represents digital elevation data. DEMs may be derived from a Digital Terrain Model (DTM), a Digital Surface Model (DSM) or the Space Shuttle Radar Topography Mission (SRTM), provided the data meet the applicable accuracy and resolution requirements set out in GACAR Part 175; and/or
 - (2) Apply such vertical and horizontal tolerances as are required based on the accuracy of available obstacle data, provided that the tolerances applied meet or

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exceed the most restrictive values specified in the applicable GACAR or ICAO provisions for that obstacle type.

§ 172.49 Determination of Visibility Minima Required to be Published in Instrument Flight Procedure.

Each IFPDSP must establish and publish visibility minima for each instrument approach procedure and circling procedure in accordance with the criteria in documents identified in GACAR § 172.45 (a) (1), or other criteria approved by the President.

§ 172.51 Use of Flight Procedure Design Automation Tools.

- (a) Each IFPDSP must develop, implement, and maintain a Flight Procedure Design Software Validation Methodology document acceptable to the President. This document must define the processes, responsibilities, and evidence required to demonstrate that each design automation tool performs its intended functions accurately and reliably according to the latest amendment of ICAO Doc. 8168, Procedures for Air Navigation Services – Aircraft Operations — Volume II, Construction of Visual and Instrument Flight Procedures.

Note: ICAO Document 9906, Quality Assurance Manual for Flight Procedure Design, Volume 3, provides guidance for the Flight Procedure Design Software Validation.

- (b) Each IFPDSP must utilize design automation tools to the maximum extent practicable in the design of each IFP in order to improve efficiency and minimize the potential for human error in the design process.
- (c) Each IFPDSP must ensure that all design automation tools are validated before operational use, in accordance with the accepted validation methodology, and revalidated whenever software changes, updates, or configuration changes could affect their performance.

§ 172.53 Validation Package.

- (a) Each IFPDSP must compile an IFP validation package for use in the ground/flight validation process. Each validation package must include the following:
- (1) The minimum content of an IFP design submission as described in Appendix C of this Part.
 - (2) A plan view of the obstacle evaluation template, drawn on an appropriate topographical map or on an equivalent geo-referenced electronic topographical display in a format acceptable to the President, to safely accommodate use for navigation, elevated terrain analysis, obstacles and obstructions evaluation;
 - (3) Completed documents that identify associated terrain, obstacles and obstructions as applicable to the procedure. The controlling terrain/obstacle must be identified and highlighted on the appropriate chart;

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- (4) Minimum altitudes determined to be applicable from map studies and database information for each segment of the procedure;
 - (5) A narrative description of the IFP;
 - (6) Plan and profile pictorial views of the IFP;
 - (7) Documented data as applicable for each fix, intersection, and/or holding pattern; and
 - (8) The output from the NAVAID coverage analysis together with any supporting data and design assumptions.
- (b) Each IFPDSP is responsible for all elements of the validation and must document their proposed validation activities in a plan and submit as early as possible to the President for acceptance.
- (c) The following IFPs do not require flight validation if it can be shown that current obstacle data meets the design requirements of the IFP:
- (1) En-route or instrument arrival procedures, unless—
 - (i) There is doubt regarding navigation system coverage supporting the requirements of the procedure; or
 - (ii) The procedure imposes limitations on the flyability or performance characteristics of the intended aircraft category.
 - (2) Instrument departure procedures, unless they impose limitations on the flyability or performance characteristics of the intended aircraft category;
 - (3) Amendments to a previously flight validated instrument approach procedure (IAP), if—
 - (i) The design change can be verified during the design process; and
 - (ii) A safety assessment of the proposed amendment has been completed and confirms that no additional operational risks to the safety of the procedure are introduced by the amendment.
- (d) Each IFP custodian must establish documented procedures for applying paragraph (c) to justify when flight validation is not required.

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§ 172.55 Ground Validation.

- (a) Each IFPDSP must establish detailed procedures for conducting the ground validation of an IFP. The aim of ground validation is to detect any errors in criteria application and documentation and assess the flyability of the IFP.
- (b) Ground validation must comprise the following elements:
 - (1) Aerodrome assessment - Verification that the infrastructure and facilities at a certified or authorized civil aerodrome are in place and compliant with the applicable requirements of GACAR Part 139, and where relevant, GACAR Part 137, together with supporting services required under GACAR Part 171, Part 173, and Part 175;
 - (2) Heliport assessment - Verification that the infrastructure and facilities required for the provision of instrument operations at a certified or authorized heliport are in place and compliant with the applicable requirements of GACAR Part 138, together with supporting services required under GACAR Part 171, Part 173, and Part 175;
 - (3) Navigational aid coverage – Verification that the navigational aid coverage infrastructure required for the IFP as required by GACAR Part 173 and ICAO Doc. 8071 is in place;
 - (4) Obstacle clearance review – A review conducted by an authorized designer who has not involved in the design of the considered IFP which is to be validated for each segment;
 - (5) Coding review – A review of the coding of PBN procedures conducted by an authorized designer who has not been involved in the design to be validated; and
 - (6) Fly-ability assessment – Verification that the IFP can actually be flown. The use of software tools is preferred, (e.g. PC-based to full flight simulator), in order to evaluate a range of aircraft types in various weights, speed and center of gravity configurations, and in various weather conditions (temperature, wind effects and visibility).
- (c) Where a flyability assessment is conducted using a full flight simulator the following elements must be evaluated:
 - (1) All segments of the IFP must be assessed;
 - (2) In the case of departures, all segments of the procedure from the departure end of the runway (DER) to joining the en-route structure or termination point must be assessed; and

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- (3) In the case of IAPs all segments of the procedure from the Arrival/ Initial Fix through to the Missed Approach must be assessed.
- (d) Where procedures share the same segment of flight (e.g. initial, intermediate, etc.), the shared segment needs only to be validated once.
- (e) In the case of PBN procedures, a test navigation database coded in accordance with ARINC 424 standards must be used in the full flight simulator for integration into the flight management system (FMS). The database must be validated to ensure that the coding of the procedure does not compromise the flyability, safety, or operational intent of the instrument flight procedure.
- (f) Where an IFP ground validation has been conducted, the ground validation report must be reviewed by the chief designer of the IFPDSP.
- (g) Where a ground validation cannot fully verify the accuracy and completeness of all obstacle and navigation data considered in the procedure design or the flyability of the IFP, a flight validation must be conducted. The responsibility for determining if flight validation is required lies with the IFPDSP. In determining whether flight validation is required the custodian must consider a number of factors. These include, but are not limited to the following:
- (1) Deviation from design criteria prescribed in Subpart E;
 - (2) Speed restrictions applied in the design;
 - (3) Any segment length less than minimum prescribed length;
 - (4) A descent gradient used in the design greater than 6.1% for a non-precision approach and 3.5° for a precision approach;
 - (5) Procedures designed for use in a challenging terrain area and/or dense obstacle environment;
 - (6) Use of a Step-Down Fix (SDF) in the final approach segment;
 - (7) A track change of greater than 90° at a waypoint has been used within a PBN procedure;
 - (8) The introduction of new procedures at an aerodrome;
 - (9) A procedure type that is new; and
 - (10) Special crew procedures and/or operational techniques likely to be necessary to fly the procedures.

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SUBPART F – APPROVAL OF INSTRUMENT FLIGHT PROCEDURES

§ 172.61 General.

This subpart prescribes the requirements for—

- (a) The design submission that must be submitted by the IFPDSP to the President prior to the approval of each IFP;
- (b) Formal declarations required to be made by the IFPDSP’s chief designer; and
- (c) IFP approval by the President.

§ 172.63 Requirement for Approval.

Each IFP, including each terminal flight procedure, intended for use by aircraft operating under IFR within certified or authorized civil aerodromes and heliports in the territorial limits of the KSA must be approved by the President.

§ 172.65 Design Submission: General.

- (a) The IFPDSP must prepare and submit to the President a design submission for each IFP for which approval is sought. The submission must conform to the design submission template prescribed in GACAR § 172.67 and Appendix C to this Part.
- (b) Each IFPDSP must establish detailed procedures for preparing IFP design submissions as required by this section.

§ 172.67 Design Submission Format and Content.

Each IFP design submission must include the following items in the prescribed format—

- (a) Procedure Designator: Each IFP must be assigned a unique designator in accordance with procedures prescribed in ICAO Doc 8168 Volume II.
- (b) Data and Information:
 - (1) All data used in the design process must be submitted in source format as well as any modified formats created during the design process. The data handling process used by the designer must be documented including any quality assurance and quality control processes, procedures and documentation.
 - (2) All IFPs drawings must be included in the submission. It is the responsibility of the IFPDSP to ensure that all relevant data and information is submitted, and data handling techniques and routines are subject to appropriate quality assurance and quality control measures.
 - (3) Data and information must be subdivided into the following main groups:

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- (i) Aerodrome or heliport data and information;
 - (ii) Aeronautical Survey data (thresholds, RWY centerline, elevations, etc.);
 - (iii) Aerodrome or heliport layout plan;
 - (iv) GACAR Part 139 or Part 138 obstacle surfaces applicable;
 - (v) Aerodrome or heliport operating certificate including any restrictions and/or conditions;
 - (vi) Obstacle data;
 - (A) Surveyed obstacles package
 - (B) Additional obstacles identified if required
 - (vii) Digital Terrain Models (DTM), if used;
 - (viii) Any other overlay data used;
 - (ix) Nav aids data and information;
 - (A) Survey data of all NAVAIDs
 - (B) Calibration and/or commissioning reports
 - (C) NAVAID information
 - (x) Airspace data and information;
 - (xi) Reference to any/all Digital Elevation Model (DEM) referring to either a DTM or a Digital Surface Model (DSM) used in design;
 - (xii) Related information published in the last amendment of the KSA AIP.
- (c) Drawings:
- (1) All procedure design drawings must be included in the submission. The drawings must be electronic drawing files generated using an automated tool or drawing format acceptable to the President.
 - (2) Drawings must be structured in such a way that each segment of the procedure can easily be identified and isolated on the drawing.
 - (3) Obstacles and navigation aids must maintain same numbering and naming convention as used in the survey report.
 - (4) The dominant obstacle for each segment must be clearly marked, identified and referenced to the survey report or other data source.

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- (5) Drawing must be set-up in WGS 84 as a transverse Mercator projection and all set-up parameters must be declared.
- (d) Calculations:
- (1) All calculations and results of calculations must be presented in a manner that enables the President to follow and trace the logic and resultant output. A record of all relevant calculations must be kept in order to prove compliance to or variation from the standard criteria.
 - (2) The calculation record must be completed enough to prove and substantiate all the elements as required in the content prescribed in Appendix C to this Part. Formulae used during calculation must be the standard formulae as declared in ICAO Doc. 8168 Volume II and related ICAO publications
 - (3) Units of measurement and conversion factors must be as prescribed in GACAR Part 2.
 - (4) Rounding of results must follow the standard guidelines in ICAO Doc. 8168 Volume II and related ICAO publications. Rounding must only be made at the publication stage to facilitate usable figures on maps and charts. Where rounding is required at earlier stages rounding must be made to the pessimistic consideration i.e. Obstacle heights rounded up, speeds rounded up, turn altitudes rounded down etc.
 - (5) Calculation records must be accompanied by an index and be cross-referenced to the procedures they apply.
- (e) Narratives: A narrative which describes the IFP in textual format.
- (f) Written statement from the aerodrome or heliport operator agrees that this aerodrome or heliport may be used for IFR operations using the intended IFP.
- (g) Writing statement from the holder of the aeronautical telecommunication service agrees that the aeronautical facility can be used for the intended IFP.
- (h) Charts: A draft chart must reflect in graphic form the content of the narrative provided.
- (i) Design Reports: A design report giving details of how the requirement has been satisfied and why the eventual procedure has evolved in its proposed form.
- (j) Validation Reports: All validation reports as required under this Part.
- (k) Declarations: The chief designer must formally declare using procedures established under GACAR § 172.69 that:

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- (1) The IFP has been developed, designed, and validated in accordance with the requirements of this Part, and the custodian's procedures prescribed in the operations manual.
- (2) The IFP is to be maintained by the IFPDSP in accordance with the custodian's procedures required by Subpart H.

The chief designer must not make declarations concerning an IFP that the person has designed unless the checks required under GACAR § 172.69 have been verified by a qualified designer in the certificate holder's organization that has not been involved in the design.

§ 172.69 Declaration of Compliance of Instrument Flight Procedures.

- (a) Each IFPDSP must establish a detailed procedure for the making of a declaration of compliance of every IFP that the custodian's organization proposes to promulgate.
- (b) The procedure required by paragraph (a) must include details of the checks to be carried out by the chief designer concerning the particular type of IFP, to ensure that the IFP meets the applicable requirements and standards prescribed by this Part.

§ 172.71 Approval of Instrument Flight Procedures.

- (a) Except as provided in paragraph (b) of this section, before approving an IFP, the President must be satisfied that—
 - (1) The IFP has been developed and validated in compliance with the applicable requirements and standards of this Part;
 - (2) The IFPDSP has made a valid declaration of compliance as required under GACAR § 172.69;
 - (3) The IFP is safe and in the public interest; and
 - (4) The IFP will be maintained and periodically reviewed by an authorized IFPDSP.
- (b) The President will indicate approval of each IFP in writing.

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SUBPART G – PROMULGATION AND WITHDRAWAL OF INSTRUMENT FLIGHT PROCEDURES

§ 172.81 General.

- (a) This subpart prescribes the requirements for the promulgation and withdrawal of IFP.
- (b) Each IFPDSP must establish detailed procedures for promulgating and withdrawing IFP as required by this section.

§ 172.83 Promulgation of Instrument Flight Procedures.

An IFPDSP must not promulgate an IFP for use by aircraft operating under IFR within certified or authorized civil aerodromes and heliports in the territorial limits of the KSA unless—

- (a) The IFP has been approved by the President in accordance with Subpart F; and
- (b) The details of the IFP are entered in the IFP register in accordance with GACAR § 172.85.

§ 172.85 Instrument Flight Procedure Register.

- (a) Each IFPDSP must establish and maintain an IFP register.
- (b) The custodian must ensure that each IFP that is approved by the President in accordance with Subpart F will be entered into the IFP register. The IFP register must contain the following minimum information:
 - (1) The name or other appropriate identifier for the IFP;
 - (2) Aeronautical data to define and describe the IFP;
 - (3) The date that the IFP comes into effect; and
 - (4) For private use only IFP, the names of the private persons or organizations for whom the IFP is intended to be used.
- (c) Each custodian must notify the President and each AIS provider authorized under GACAR Part 175 of each amendment to the IFP register. When authorized by the President, an approved IFP intended solely for private use does not need to be published in the KSA AIP.
- (d) Each custodian must ensure that any transfer of aeronautical data associated with an IFP, from or to the IFP register complies with the standards specified in the Aeronautical Information Exchange Model (AIXM-5) document or other standards accepted by the President as an equivalent.

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- (e) When requested, the President may authorize the IFPDSP to integrate the IFP register into the air navigation register that is required to be established and maintained under GACAR Part 171.

§ 172.87 Withdrawal of Instrument Flight Procedure from Use.

- (a) The President must approve, in advance, all withdrawals of an IFP from the IFP register.
- (b) Except as provided in (d), an IFP Sponsor must apply through the custodian to the President for a withdrawal of an IFP from the IFP register at least 90 days before the intended withdrawal.
- (c) If the President approves the withdrawal, the custodian of the IFP must withdraw the IFP from use by—
- (1) Issuing a notice to AIS provider authorized under GACAR Part 175 which will identify the IFP and specify the date that the procedure is to be withdrawn from use;
 - (2) For private use only IFP, issuing a notice to each authorized user of the IFP which will identify the IFP and specify the date that the procedure is to be withdrawn from use;
 - (3) On the date of withdrawal, remove the details of the IFP from the IFP register;
 - (4) Notify the President that the IFP has been withdrawn.
- (d) Notwithstanding (b), the President may, by the most appropriate means, withdraw an IFP from use if the President has reasonable grounds to believe that—
- (1) The IFP may be unsafe for use by aircraft operating under IFR; or
 - (2) The IFP is not being maintained in accordance with the applicable requirements of Subpart H.

Note: See also §172.7(e) regarding the IFPDSP chief designer’s responsibilities for initiating safety-critical IFP withdrawals.

- (e) If the President approves the withdrawal of an IFP from use under paragraphs (c), the President will—
- (1) Confirm in writing the withdrawal of the IFP; and
 - (2) Take appropriate action to ensure that the IFP is removed from the KSA AIP and from operational use.

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SUBPART H – CONTINUOUS MAINTENANCE AND PERIODIC REVIEW OF INSTRUMENT FLIGHT PROCEDURES

§ 172.91 General.

This subpart prescribes the requirements for continuous maintenance and periodic review of IFP.

Note: Guidance on continuous maintenance and periodic review is provided in ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906), Volume 1 — Flight Procedure Design Quality Assurance System.

§ 172.93 Continuous Maintenance and Periodic Review of Instrument Flight Procedures.

- (a) Each IFPDSP must establish detailed procedures for the continuous maintenance and periodic review of every IFP that, in accordance with the statement required under GACAR § 172.67(i)(2), is maintained under the authority of the custodian.
- (b) The procedure required by paragraph (a) must include details for every IFP to be reviewed, and flight validated, if necessary, —
 - (1) On a periodic basis, not to exceed five (5) years, ensuring that the IFP continues to meet the applicable standards and requirements of this Part; and
 - (2) If there is a change in any of the data referred to in GACAR § 172.13 (b) that may affect the integrity of the IFP.
- (c) The procedure required under paragraph (a) must include and document the grounds and criteria for establishing or changing the interval between the periodic maintenance reviews for each IFP.

§ 172.95 Errors in Published Instrument Flight Procedures.

- (a) Each IFPDSP must establish a procedure for recording, investigating, correcting, and reporting to the President any identified error, and any identified or suspected nonconformance with the standards and requirements of this Part, in an IFP that is maintained under the authority of the custodian.
- (b) The procedure required by paragraph (a) must require that—
 - (1) An IFP is immediately withdrawn from operational use if the error or nonconformance referred to in paragraph (a) affects, or may affect, the safety of an aircraft operation; and
 - (2) The error or nonconformance is corrected, and declared as compliant with this Part by a senior person who is appropriately authorized in accordance with GACAR § 172.27; and

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- (3) The correction required by paragraph (2) is clearly identified and promulgated by the most appropriate means relative to the operational significance of the error or nonconformance; and
- (4) The source of the error or nonconformance is identified, and—
 - (i) If possible, eliminated to prevent a recurrence; and
 - (ii) Preventive action is taken to ensure that the source of the error or nonconformance has not affected the integrity of any other IFP; and
- (5) The President is notified, of a promulgated information incident relating to an error or nonconformance referred to in paragraph (a).

§ 172.97 Cessation of Maintenance of an Instrument Flight Procedure.

- (a) The discontinuation of maintenance of an IFP that will result in the procedure's withdrawal from use must be approved in advance by the President, as prescribed in GACAR § 172.87.
- (b) If an Instrument Flight Procedure Design Service Provider (IFPDSP), in its role as custodian of an IFP, intends to cease maintenance of that IFP, the IFP custodian must, before discontinuing maintenance:
 - (1) Notify the IFP sponsor in writing of the intent to discontinue maintenance, and
 - (2) Coordinate with the IFP sponsor to prepare a proposal for the transfer of the IFP to an alternate IFP custodian. The notification must include the IFP identifier, the proposed effective date of cessation, and the reasons for discontinuing maintenance.
- (c) The proposal to discontinue maintenance of an IFP under paragraph (b)(1) must include supporting documentation and information, including:
 - (1) The justification for ceasing maintenance of the IFP;
 - (2) An assessment of the safety implications and operational impact;
 - (3) Any pertinent maintenance or review records under process.
- (d) If the IFP sponsor proposes to continue the IFP maintenance with a different IFPDSP assuming custodianship, the proposal must include the identity of the proposed new custodian and documentation of that provider's willingness and ability to take over maintenance of the IFP, including confirmation that the provider is certificated under GACAR Parts 170 and 172 to design and maintain IFPs.
- (e) The IFP sponsor must notify the President in writing of the proposed change of IFP custodian as part of the submission under paragraph (d).

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- (f) The current custodian must continue to maintain the IFP in compliance with this Part until the President authorizes a transfer of custodianship to a new IFPDSP. The IFP must not be left unmaintained while it remains in operational use.
- (g) If an alternate certificated IFPDSP is designated by the IFP sponsor to assume custodianship and maintenance responsibility, the current custodian must coordinate with the IFP sponsor to ensure a safe and orderly transfer. This includes facilitating the handover of all relevant IFP documentation and data to the new custodian and updating the IFP register to reflect the change in custodianship.
- (h) The current custodian must notify the President and the AIS provider of the change in the IFP register as required under GACAR § 172.85. The IFP must continue to meet all applicable requirements during and after the transition, with no interruption in its maintenance.

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**SUBPART I – IFP FLIGHT VALIDATION SERVICE PROVIDER (FVSP)
REQUIREMENTS**

§ 172.101 General

Validation of an Instrument Flight Procedure (IFP) comprises—

- (a) Ground validation — as prescribed in § 172.55;
- (b) Flight validation — as required for the procedure type and operational environment;
and
- (c) Navigation database validation — in the case of PBN procedures, to confirm correct coding of the procedure in the navigation database.

§ 172.103 Requirement for a Flight Validation Service Provider.

- (a) No person may provide IFP flight validation services in the Kingdom of Saudi Arabia (KSA) unless that person:
 - (1) Complies with the requirements of this Part; and
 - (2) Is certificated by the President under GACAR Part 170 to provide such services.
- (b) Except as provided in GACAR Part 170, each FVSP must operate within the limitations of, and provide services in accordance with:
 - (1) The scope of their certificate;
 - (2) Their approved operations specifications; and
 - (3) Their operations manual prepared in accordance with § 172.107.
- (c) Flight validation pilots must meet the qualification and competency requirements specified in Appendix B to this Part.

§ 172.105 Flight Validation Resource Requirements.

Each FVSP must:

- (a) Have available aircraft, crew, equipment, and systems appropriate for the type of IFP flight validation being conducted, meeting the applicable performance and accuracy standards as required by GACA Regulations;
- (b) Have access to all relevant and current data necessary for the flight validation; and

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- (c) Hold or have immediate access to all relevant documentation, including technical standards, practices, and instructions, and any other documentation necessary for the flight validation of the types of IFPs within their scope of approval.

§ 172.107 Flight Validation Manual (FVM)

- (a) Each Flight Validation Manual (FVM), and all subsequent amendments, must be acceptable to the President.
- (b) This section prescribes the requirements for each Flight Validation Service Provider (FVSP) to prepare, maintain, and control FVM.
- (c) Each FVSP must:
- (1) Ensure the FVM is kept up to date and reflects the current organization structure, personnel, resources, and procedures;
 - (2) Ensure that any amendments to the FVM meet the applicable requirements of this Part and other relevant GACAR provisions;
 - (3) Ensure that the FVM contains a complete description of all processes related to the flight validation of instrument flight procedures;
 - (4) Follow the manual amendment control procedure specified in the FVM;
 - (5) Provide the President with a copy of each amendment immediately after incorporation; and
 - (6) Implement any amendments to the FVM that the President may require in the interest of aviation safety.
- (d) The FVSP must provide the President with a FVM containing, at a minimum:
- (1) A statement, signed by the accountable person for flight validation services, confirming that—
 - (i) The FVM accurately describes the organization structure, tools and equipment, personnel resources assigned to specialized functions, and the procedural methodology employed by the organization; and
 - (ii) The FVM, associated procedure manuals, operating instructions, and maintenance instructions are mandatory for compliance by all organization personnel.
 - (2) The name of the IFP flight validation pilot(s) and any observers assisting in the validation, along with the names of other pilots and operators engaged in IFP flight validation for the organization;

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- (3) The qualifications, experience, duties, and responsibilities of the flight validation pilot(s) and observer(s);
- (4) An organization chart showing the reporting lines for senior personnel and staffing requirements, along with a summary of the staffing structure and flight validation crew;
- (5) The training and qualification requirements for all personnel involved in flight validation;
- (6) A description of aircraft capabilities and details of the flight validation fleet;
- (7) A list of facilities, resources, and equipment used for flight validation and flight path recording;
- (8) List of agreements or formal arrangements with other organizations, including the IFPDSP;
- (9) Detailed procedures as required in § 172.109, instructions, and descriptions of the IFP flight validation process, tasks, documentation, and record-keeping, including a description of the flight validation services to be provided;
- (10) The compliance checklist for flight validation procedures as required by ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906), Volume 5 — Validation of Instrument Flight Procedures;
- (11) Detailed procedures for pre-flight validation and post-flight validation activities;
- (12) Detailed procedures for data acquisition, obstacle data collection, and navigation database coding verification and validation;
- (13) A standard template for the IFP flight validation report and associated checklist;
- (14) Detailed procedures for quality assurance, including consideration of human factors; and
- (15) Detailed procedures for ensuring compliance with GACA regulations related to IFP flight validation.

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- (e) The policies and procedures contained in the FVM must not conflict with any applicable GACAR provision.

§ 172.109 Flight Validation Procedures.

- (a) Each Flight Validation Service Provider (FVSP) must establish and maintain detailed and documented procedures for conducting the flight validation of an instrument flight procedure (IFP) as required by this section. The flight validation procedures must include the use of flight validation equipment that—
- (1) Provides precision and accuracy traceable to recognized standards appropriate for the validation being performed;
 - (2) Has defined and documented measurement uncertainties, including but not limited to those related to software, firmware, and crosswind uncertainties;
 - (3) Records the actual flight path of the validation aircraft;
 - (4) Is function-checked before being released for use, and at intervals not exceeding the manufacturer's recommended calibration intervals, to establish that the system is capable of verifying the integrity of the IFP; and
 - (5) Is operated in accordance with flight validation system procedures and criteria by personnel who are qualified, competent, and current on the specific system in use.
- (b) Except as provided in paragraph § 172.53(c), each IFP must be flight validated in accordance with the procedures required under paragraph (a) to ensure that—
- (1) The IFP enables aircraft using the procedure to manoeuvre consistently within safe operating practices and acceptable pilot workloads for the categories of aircraft that the procedure is intended for;
 - (2) The IFP provides azimuth and distance information, and vertical guidance information for a precision approach to ensure that an aircraft using the procedure remains clear of obstacles;
 - (3) The IFP is not affected by any radio frequency interference; and
 - (4) Visual guidance systems and cues for the runway are appropriate for the IFP and are not confused by lighting, pyrotechnic or laser displays, or any other visual distraction.
- (c) Where flight validation is conducted, the following must be evaluated:

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- (1) All segments of the IFP must be flown;
 - (2) In the case of SIDs, all segments of the procedure from the departure end of the runway (DER) to joining the en-route structure or termination point must be flown;
 - (3) In the case of IAPs all segments of the procedure from the Arrival/Initial Fix through to the end of the Missed Approach must be flown; and
 - (4) Flight validation of the visual manoeuvring area must also be carried out.
- (d) When procedures share identical flight segments (e.g., common initial segments), that segment needs only be validated once.
- (e) For Performance-Based Navigation (PBN) procedures, the IFP must be validated using a navigation database that accurately reflects the final coded data of the procedure. The flight validation service provider (FVSP) must verify that the procedure is correctly interpreted and executed by the intended RNAV/RNP system, using a test navigation database to ensure consistency between the designed and coded procedure.
- (f) For RNP instrument approach procedures (IAP) of T-bar or Y-bar design, manual entry of the procedure into the RNAV/RNP system is acceptable, provided that the validating pilot manually applies and verifies the appropriate Course Deviation Indicator (CDI) scaling during each phase of flight, in accordance with the design requirements.
- (g) The FVSP must have a formal arrangement with the IFP Design Service Provider (IFPDSP) covering all coordination aspects of the IFP flight validation process.

§ 172.111 Crew Requirements.

- (a) All flight validations must be conducted by qualified and experienced flight validation pilots. The qualifications and experience requirements for flight validation pilots are specified in Appendix B to this Part.
- (b) The minimum flight validation crew must consist of:
- (1) One pilot responsible for conducting the validation; and
 - (2) One observer to assist the pilot by monitoring the “out of cockpit” environment and supporting the validation process.

In the case of an aircraft requiring two pilots, one pilot may perform the observer role. The observer must have successfully completed an ICAO PANS-OPS training course, or an equivalent course acceptable to the President, covering IFP design and validation principles.

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- (c) For PBN procedures of a T-bar or Y-bar design that require manual loading into the RNAV/RNP system, the flight validation pilot must ensure the observer is fully competent in operating the specific RNAV/RNP system used for the flight.

§ 172.113 Aircraft Requirements

The aircraft used for flight validation of an IFP must have performance capabilities that meet or exceed those required for the categories of aircraft for which the IFP has been designed and must be suitably equipped for the intended validation tasks.

§ 172.115 Meteorological Conditions.

All IFP flight validations must be conducted:

- (a) During daylight hours;
- (b) In visual meteorological conditions (VMC) with a flight visibility of not less than 8 km; and
- (c) In sight of the surface for the entire duration of the validation.

§ 172.117 Navigation Database Validation.

- (a) Navigation database validation is required for all PBN procedures. Such procedures must be coded in accordance with ARINC 424 path terminator standards, including waypoint location, waypoint type, path terminator, and, where applicable, speed constraints, altitude constraints, and course requirements.
- (b) The purpose of navigation database validation is to confirm that the coding of the procedure in the RNAV/RNP FMS does not adversely affect the flyability, safety, or operational intent of the procedure.

§ 172.119 Flight and/or navigation database Validation Report.

Where flight validation and/or navigation database validation has been conducted, the responsible flight validation pilot or database validation lead, where applicable, must complete a validation report. The report must:

- (a) Document the scope, conditions, and results of the validation;
- (b) Identify any deviations, hazards, or operational issues observed;
- (c) Contain recommendations for corrective actions, if required; and
- (d) Be submitted to the IFPDSP and retained in accordance with the record-keeping requirements of this Part.

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SUBPART J – QUALITY ASSURANCE

§ 172.131 Quality Assurance.

- (a) Each IFPDSP and FVSP must establish a quality assurance system to ensure compliance with, and the adequacy of, the procedures required under this Part.
- (b) The quality system must incorporate the elements of a flight procedure design quality assurance system as described in ICAO Doc. ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906), Volume 1 — Flight Procedure Design Quality Assurance System and be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards.
- (c) The quality assurance system must include—
 - (1) A safety policy and safety policy procedures, including the procedure required under GACAR § 172.95 for investigating errors in promulgated instrument flight procedures;
 - (2) A procedure to ensure quality indicators, including personnel and customer feedback, are monitored to identify existing problems or potential causes of problems within the quality assurance system;
 - (3) A procedure for corrective action to ensure existing problems that have been identified within the quality assurance system are corrected;
 - (4) A procedure for preventive action to ensure that potential causes of problems that have been identified within the quality assurance system are remedied;
 - (5) An internal audit program for the organization to ensure conformity with the procedures in the manual and to achieve the goals set in the safety policy; and
 - (6) Management review procedures, that should include the use of statistical analysis if appropriate, to ensure the continuing suitability and effectiveness of the quality assurance system in satisfying the requirements of this Part.
- (d) The procedure required under paragraph (c)(3) for corrective action must specify how—
 - (1) To correct an existing quality problem;
 - (2) To follow up a corrective action to ensure the action is effective;

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- (3) To amend any procedure required under this Part as a result of a corrective action; and
 - (4) Management will measure the effectiveness of any corrective action taken.
- (e) The procedure required under paragraph (c)(4) for preventive action must specify how—
- (1) To correct a potential quality problem;
 - (2) To follow-up a preventive action to ensure the action is effective;
 - (3) To amend any procedure required under this Part as a result of a preventive action; and
 - (4) Management will measure the effectiveness of any preventive action taken.
- (f) The internal audit program required under paragraph (c)(5) must—
- (1) Specify the frequency and location of the audits taking into account the nature of the activity to be audited;
 - (2) Measure the effectiveness of any preventative or corrective action taken by the personnel responsible for the activity being audited since the last audit; and
 - (3) Require preventative or corrective action to be taken by the personnel responsible for the activity being audited if problems are found by the audit.
- (g) The procedure for management review required under paragraph (c)(6) must—
- (1) Specify the frequency of management reviews of the quality assurance system taking into account the need for the continuing effectiveness of the system; and
 - (2) Identify the senior person responsible for the management reviews referred to in paragraph (g)(1).
- (h) The senior person responsible for the quality assurance system must—
- (1) Ensure that the safety policy and the safety policy procedures are understood, implemented, and maintained at all levels of the custodian's organization;

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- (2) Ensure that the audits are performed by trained auditing personnel who are independent of those having direct responsibility for the activity being audited;
- (3) Ensure that the results of the audits are reported to the personnel responsible for the activity being audited;
- (4) Ensure that all corrective and preventative actions are followed up to review the effectiveness of those actions;
- (5) Ensure that the results of the management review are evaluated and recorded;
and
- (6) Have direct access to the director of instrument flight procedure services on matters affecting the quality of IFP developed, validated, approved, promulgated and maintained under this Part.

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SUBPART K – RECORDS AND REPORTS

§ 172.141 Management of Records

(a) IFPDSP Record Management —

- (1) Each Instrument Flight Procedure Design Service Provider (IFPDSP) must establish and maintain documented procedures for the management of all records relating to:
 - (i) The design, verification, declaration, registration, publication, periodic review and maintenance of instrument flight procedures (IFPs); and
 - (ii) The identification, collection, indexing, storage, safekeeping, accessibility, and disposal of such records.
- (2) The record management system must ensure that, for every IFP developed under Subpart E, validated under Subpart F, registered under Subpart F, and maintained under Subpart H, the following are recorded:
 - (i) The details required by GACAR § 172.85 for the IFP register;
 - (ii) Design verification, amendment, validation, justification for non-validation, and declaration activities;
 - (iii) Promulgation and post-publication checking activities;
 - (iv) Actions taken under GACAR § 172.95 regarding errors or nonconformances in an IFP; and
 - (v) Records of every maintenance review conducted in accordance with GACAR § 172.93.
- (3) The system must also include records of the qualifications, experience, training, assessments, and authorizations, where applicable, for:
 - (i) The chief designer (GACAR § 172.25(a)(2)); and
 - (ii) Other personnel involved in the design, verification, periodic review, or maintenance of IFPs (GACAR § 172.25(c)).
- (4) Records must be legible, accurate, permanent, and retrievable in a legible format, and must be retained for at least one year after the associated IFP has been withdrawn from operational use.

(b) FVSP Record Management—

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- (1) Each Flight Validation Service Provider (FVSP) must establish and maintain documented procedures for the management of all records relating to:
 - (i) The conduct of IFP flight validation; and
 - (ii) The preparation, submission, and retention of flight validation reports.
- (2) The record management system must ensure that the following are recorded for each IFP flight validation:
 - (i) Pre-flight briefings, post-flight debriefings and operational conditions;
 - (ii) Flight validation data, including actual flight path recordings and relevant environmental data;
 - (iii) Completed flight validation reports in accordance with GACAR § 172.119;
 - (iv) Navigation database validation records where applicable; and
 - (v) Any identified hazards, deviations, or recommendations arising from the validation.
- (3) The system must also maintain records of qualifications, experience, training, assessments, and authorizations for:
 - (i) Flight validation pilots (Appendix B to this Part); and
 - (ii) Observers and other personnel directly supporting flight validation activities.

Records must be legible, accurate, permanent, and retrievable in a legible format, and must be retained for at least one year after the associated IFP has been withdrawn from operational use.

§ 172.143 Promulgated Information Incident Reports.

- (a) Each IFPDSP must submit a promulgated information incident report to the President within 24 hours of the promulgated information incident.
- (b) The report must include the following information:
 - (1) Date and time of the incident;
 - (2) Brief description of events;
 - (3) Details to identify the publication, map, chart, or other means by which the information or aeronautical data was promulgated;

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- (4) Details relating to the information or aeronautical data that gave rise to the incident;
- (5) Name, organization, and contact details of the person notifying the incident.

APPENDIX A TO GACAR PART 172 – IFPDSP PERSONNEL QUALIFICATIONS AND EXPERIENCE REQUIREMENTS

I. Chief Designer.

(a) Minimum qualifications and experience

The minimum standard for the qualifications and experience of a chief designer is:

- (1) Meeting the qualification and experience requirements of a qualified IFP designer as defined in the provider's approved Flight Procedures Design Operations Manual;
- (2) Extensive, demonstrable experience in the design of the type(s) of procedures to be designed and maintained by the certificate holder;
- (3) Satisfactory Successful completion of an advanced course in ICAO PANS-OPS procedure design course, or an equivalent course acceptable to the President;
- (4) A Thorough knowledge of current procedure design practices, GACA regulatory requirements, and ICAO SARPS standards relating to flight procedure design;
- (5) A Thorough knowledge of the principles of operation of relevant ground-based and space-based navigation systems used in IFP design;
- (6) A thorough comprehensive understanding of the provider's operations manual (FPDOM) and related systems, including the application of the organization's quality management and safety management systems.

(b) Recency of experience

The minimum standard of recent experience for acceptance as a chief designer is:

- (1) Relevant design experience within the previous 12 months; or
- (2) Successful completion, within the previous 24 months of an approved PANS-OPS procedures design course or advanced PANS-OPS refresher course.

(c) General experience

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In addition, a chief designer must have at least ten (10) years of general experience in the application of IFPs, gained through one or more of the following:

- (1) Air traffic control duties involving IFR operations;
- (2) Flight crew duties on IFR operations;
- (3) Operational control of IFR operations;
- (4) IFP design work; or
- (5) Other relevant experience accepted by the President as equivalent.

Experience may include cumulative time in more than one of the above categories.

(d) Appointment process

All prerequisites and the process for the appointment of a chief designer are described in the applicable GACA regulatory framework.

II. Qualified Designers.

(a) Minimum qualifications and experience

The minimum standard for the qualifications and experience of a qualified designer is:

- (1) Successful completion of an approved ICAO PANS-OPS procedures design course, or a training course accepted to the President as equivalent;
- (2) Successful completion of a course of in-service training in procedures design, as detailed in the provider's accepted designer's operations manual;
- (3) Meeting the required minimum design experience requirements in accordance with paragraph (c) of this section; and
- (4) A written approval issued by the chief designer in accordance with paragraph (d) of this section.

(b) General experience

In addition, a qualified designer must have at least five (5) years of general experience in the application of instrument flight procedures, gained through one or more of the following:

- (1) Air traffic control duties involving IFR operations;

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- (2) Flight crew duties on IFR operations;
- (3) Operational control of IFR operations;
- (4) IFP design work; or
- (5) Other relevant experience accepted by the President as equivalent.

Experience may include cumulative time in more than one of the above categories.

(c) Minimum Design Experience.

- (1) Minimum design experience is required for each type of procedure to be designed.
- (2) For the purposes of paragraph (a)(3) of this section, the minimum practical design experience required is three (3) designs of the specific procedure type, each checked and approved by the chief designer, and completed within any twelve (12) consecutive months.

Note: Once a designer has completed the above requirement and met all other qualifications, they may act as a qualified designer – but only for the IFP types for which he has met the minimum design experience, and only without supervision for those types.

(d) Approvals.

The chief designer must provide each designer who is approved as a qualified designer with a written statement specifying:

- (1) That the person is a qualified designer;
- (2) The types of procedures that the person is approved to design;
- (3) Any limitations or supervision requirements that apply; and
- (4) Any approval to supervise other design staff.

(e) Maintenance of qualifications

Once qualified, a designer must maintain his competency through ongoing training and professional development under the supervision of the chief designer. This recurrent training must follow the competency maintenance principles in ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906), Volume 2 — Flight Procedure Designer

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Training (Development of a Flight Procedure Designer Training Programme) and be documented in the provider's training records.

III. Apprentice Designers.

Personnel who are not qualified under Section II must not:

- (1) Design an IFP requiring approval under GACAR Part 172, except under direct supervision of a qualified designer or chief designer; or
- (2) Verify or check any IFP requiring approval under GACAR Part 172.

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**APPENDIX B TO GACAR PART 172 – REQUIREMENTS FOR FLIGHT
VALIDATION PILOTS**

(a) Qualifications

Each IFP flight validation pilot must:

- (1) Hold an Airline Transport Pilot Licence (ATPL) issued in accordance with GACAR Part 61; or
- (2) Hold an equivalent pilot licence acceptable to the President.

(b) Training

Each IFP flight validation pilot must have successfully completed:

- (1) An ICAO PANS-OPS training course, or a training course acceptable to the President, that provides a thorough knowledge of ICAO PANS-OPS procedure design principles and methods relevant to the design and validation of instrument flight procedures.
- (2) A flight validation course.
- (3) A course in aerodrome lighting and visual approach slope guidance systems.

(c) Experience

Each IFP flight validation pilot must have completed at least fifteen (15) IFP flight validation flights within the previous twenty-four (24) months to maintain currency.

(d) Rotorcraft and powered-lift aircraft

Rotorcraft IFP procedures must be flight validated by pilots who, in addition to meeting the above qualifications:

- (1) Hold a rotorcraft category and helicopter class rating, or hold a pilot certificate in the powered-lift category/class and with an applicable powered-lift type rating; and
- (2) Are familiar with rotorcraft procedure design and operations.

If the validation pilot is not qualified as pilot-in-command (PIC) of the helicopter (or other aircraft type) used for the validation flight, another qualified pilot may act as PIC, provided that:

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- (1) The validation pilot occupies a control seat or a seat in close proximity to the PIC;
and
- (2) The validation pilot directs the conduct of the validation.

(e) Additional requirements

Where required by the President, flight validation pilots must also meet any additional applicable requirements contained in the ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906), Volume 5 — Validation of Instrument Flight Procedures, and Volume 6 — Flight Validation Pilot Training and Evaluation (Development of a Flight Validation Pilot Training Programme).

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APPENDIX C TO GACAR PART 172 – DESIGN SUBMISSION TEMPLATE

I. Purpose

- (a) This Appendix prescribes the minimum information and supporting material that an Instrument Flight Procedure Design Service Provider (IFPDSP) must submit to the President in support of an application for approval of an Instrument Flight Procedure (IFP) in accordance with § 172.63, 172.65, 172.67, and 172.69;
- (b) The submission must be sufficient to allow the President to determine compliance with applicable GACAR Parts, ICAO PANS-OPS criteria, and other related regulatory requirements;
- (c) The IFPDSP remains responsible for the accuracy, integrity, traceability, and completeness of the submitted information in accordance with § 172.15;
- (d) The President will not re-design the IFP but will review the submission for adequacy, and regulatory compliance;
- (e) The President may prescribe additional or alternative requirements where necessary in the interest of safety.

II. General Section – Common to All IFPs

(a) Aerodrome Data

- (1) Runway parameters including magnetic and true direction, WGS-84 threshold coordinates, elevation, declared distances, and variation used;
- (2) Aerodrome Reference Point (ARP) and elevation;
- (3) Airspace structure (CTR, CTA, ATZ) relevant to the procedure, consistent with GACAR Part 171.

Note: For helicopter instrument flight procedures, the IFPDSP must include the applicable heliport operational and physical characteristics in accordance with GACAR Part 138 and ICAO Doc 8168 (PANS-OPS).

(b) Navigation and Surveillance Aids

- (1) Type, identifier, frequency or channel, and WGS-84 coordinates;
- (2) Magnetic variation or declination used;
- (3) Indication of DME zeroing or collocation;

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(4) Designated operational coverage (DOC);

(5) Redundancy arrangements.

(c) Communications

(1) ATC frequencies and backup means associated with the procedure.

(d) Purpose of the Procedure

(1) Type of operation (arrival, departure, approach, RNP AR, etc.);

(2) Expected aircraft categories and principal entry and exit routes;

(3) Minimum aircraft equipment requirements.

III. Procedure-Specific Section

For each IFP, the design submission must include:

(a) Design Rationale

(1) Reference to applicable criteria in Part 172, ICAO Doc 8168, and other applicable guidance;

(2) Explanation of design choices including justification of the selected IFP path terminators (e.g., track-to-fix, course-to-fix, etc.), climb gradient assumptions and obstacle clearance.

(b) Segment Data

(1) Reference points for start and end of each segment (IAF, IF, FAF, MAPt, holding, etc.);

(2) Path definition;

(3) Segment length, descent gradient, speeds, bank angle, wind velocity, altitudes (maximum and minimum), timings, fixes including step down fixes, and the applicable tolerances;

(4) Parameters of the minimum stabilization distance (MSD) and start of climb (SOC) and calculation of track distance (TRD) between two consecutive waypoints;

(5) Requirements for each segment and specific type of flight procedures;

(6) Tracks, radials, QDRs and QDMs.

(c) Obstacle and Terrain Data

(1) Source of terrain and obstacle data;

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- (2) Identification of controlling obstacles for each segment including WGS-84 coordinates and elevations in EGM96, and obstacle clearance analysis.

(d) Minima and Limitations

- (1) OCA/H and visibility/RVR requirements.
- (2) Minimum obstacle clearance (MOC) values applied (primary and secondary areas), including adjustments for excessive segment length;
- (3) Allowances used for vegetation and buildings;
- (4) Aircraft category limitations;
- (5) Any special authorizations required (e.g., RNP AR approval under Part 91).

(e) Charts and Coding

- (1) Draft charts.
- (2) ARINC 424 coding tables for PBN-based procedures (RNAV/RNP), where applicable.

IV. Quality and Safety Section

(a) Design Process Assurance

- (1) Confirmation that the design was carried out under a Quality Management System;
- (2) Names and authorizations (provided by the chief designer). of designers involved;
- (3) Signed declaration by the chief designer in accordance with § 172.27 and § 172.69.

(b) Verification and Validation

- (1) Results of internal verification (independent design check);
- (2) Safety risk assessment summary, in accordance with the provider's SMS;
- (3) Indication of the requirement for flight validation.

V. Submission Requirements

- (a) Official Request. An official request for approval identifying the procedure, its purpose, and the request for approval under § 172.67;
- (b) Electronic Files. A complete IFP data package including—

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- (1) IFP XML file;
 - (2) Draft charts;
 - (3) ARINC 424 coding (PBN) tables, as applicable;
 - (4) Design report;
 - (5) Verification and validation reports;
 - (6) All other information required under this Part.
- (c) Data Source References. Complete metadata on terrain, obstacle, aeronautical, CNS, and MET data used;
- (d) Signatures. The submission must be signed and dated by—
- (1) The director of instrument flight procedure services; and
 - (2) The chief designer.