

Public Authority for Civil Aviation

CAR-173

Civil Aviation Regulation INSTRUMENT FLIGHT PROCEDURE DESIGN REQUIREMENTS

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Glossary of Terms or Abbreviations

The following terms or acronyms may be used in any manual or document published by PACA. Reproduction in part or whole is allowed without prior approval. The Document Control Office reserves the rights to include such a listing in any PACA manual or document prior to publishing.

ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACCID	Accident
ADREP	Accident/Incident Reporting System
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
A/C	Aircraft
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
APP	Approach Control Office
ARO	Air Traffic Services Reporting Office
ATC	Air Traffic Control
ATS	Air Traffic Service
CAR	Civil Aviation Regulation
CFMU	Central Flow Management Unit
СОМ	Communications/Equipment
FIC	Flight Information Centre
FIS	Flight Information Service
GM	Guidance Material
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IIC	Investigator in Charge
INCID	Serious Incident
ISA	International standard atmosphere
Minister	Minister of Transport and Communications
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
OTSB	Oman Transport Safety Bureau
PL	Policy Lead
RCC	Rescue Co-ordination Centre of the Sultanate
RNAV	Area Navigation
SAR	Search and Rescue
SIGMET	Significant Meteorological Report
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
TCAS	Traffic Alert and Collision Avoidance System
TL	Technical Lead
UTC	Universal Time Coordinated
VHF	Very High Frequency
WX	Weather

FOREWORD

- (a) Enforcement Procedures ensuring compliance against Civil Aviation Regulation have been issued by the Public Authority for Civil Aviation of Oman (hereinafter referred as PACA or "the Authority") under the provisions of the Civil Aviation Law of the Sultanate of Oman.
- (b) This CAR has been modelled upon similar regulations implemented by other member states and includes the subject matter endorsed within ICAO Annex 11 (Air Traffic Services) to the Chicago Convention and ICAO DOC 8168, Procedures for Air Navigation Services – Aircraft Operations — Volume I Flight Procedures, and Volume II, Construction of Visual and Instrument Flight Procedures.
- (c) CAR-173 prescribes the requirements for:
 - (1) The rules governing the certification and operation of organisations that provide services for the design and maintenance of instrument flight procedures, and the technical standards for the design of instrument flight procedures.
 - (2) Punitive actions can and will be enforced by the Authority against recognised actions of non-compliance.
- (d) This CAR does not apply to the design of aircraft performance operating limitations or flight paths for critical engine inoperative emergency procedures.
- (e) Amendments to the text in CAR-173 in revised editions are issued as a complete amendment of pages contained within.
- (f) The editing practices used in this document are as follows:
 - (1) 'Shall' is used to indicate a mandatory requirement and may appear in CARs.
 - (2) 'Should' is used to indicate a recommendation
 - (3) 'May' is used to indicate discretion by the Authority, or the industry as appropriate.
 - (4) 'Will' indicates a mandatory requirement and is used to advise of action incumbent on the Authority.

Note: The use of the male gender implies the female gender and vice versa.

SUBPART A - GENERAL

CAR 173.001 Scope

- (a) CAR-173 contains the Rules governing: -
 - (1) The certification of an Organisation who want to become an Instrument Procedure Design Service Provider (IPDSP);
 - (2) Instrument Flight Procedure Submission and approval;
 - (3) Validation of IFP;
 - (4) Maintenance of IFP, and
 - (5) Training Requirements for instrument flight procedures design staff.
- (b) The aim of this CAR is: -
 - (1) to ensure that Instrument Flight Procedures (IFPs):
 - i Are designed in accordance with the required standard as stipulated in Subpart D and applicable parts of this CAR;
 - ii Are safe and flyable;
 - iii Meet Air Traffic Management requirements; and
 - iv Are environmentally acceptable.
 - (2) to describe how the responsibilities and accountabilities may be borne throughout the design process between the Instrument Procedure Design Service Provider (IPDSP), the sponsor and the Authority.

CAR 173.005 Definitions

Definitions existing in ICAO Documents shall form part of this regulation, supplemented by the definitions contained in CAR-1. Where there are differences between the definitions in the two sources, CAR-1 has precedence.

CAR 173.010 IFP Roles and Responsibilities

- (a) Provided that the requirements laid down in this Regulation are met, the sponsor shall:
 - (1) provide an instrument flight procedure design service; and/or
 - (2) agree with one or more other Member State(s) to provide a joint service; and/or
 - (3) delegate the provision of the service or a part of service to an Instrument Procedure Design Service Provider (IPDSP),
- (b) In all cases, the sponsor remains responsible for all instrument flight procedures for aerodromes, heliports and airspace under its responsibility.
- (c) The authority is responsible for overall regulatory oversight of IFPs including approval of all instrument flight procedures for aerodromes, heliports and airspace within Muscat FIR.

CAR 173.015 Requirement for certificate

- (a) For the purpose of this CAR, an Instrument Procedure Design Service Provider (IPDSP) is an organisation employing one or more suitably qualified individuals for the provision of an instrument flight procedure design service (IFPDS);
- (b) For the purpose of this CAR, a Proponent is defined as an aerodrome certificate holder, or a representative there-of, or an ANSP, who proposes a new IFP, or a change to or withdrawal of, an IFP.
- (c) An Instrument Procedure Design Service Provider (IPDSP) must not provide an instrument flight procedure design service for aerodromes, heliports and airspace within the Muscat FIR; except under the authority of an instrument flight procedure service certificate issued in accordance with this CAR.
- (d) For the purpose of this CAR, an Instrument Flight Procedure (IFP) is: -
 - (1) A Standard Instrument Arrival (STAR), or
 - (2) A Standard Instrument Departure (SID), or
 - (3) An Instrument Approach Procedure (IAP), or
 - (4) An MSA or TAA, or
 - (5) Holding procedure, or
 - (6) A visual flight procedure, or
 - (7) An ATS route.

CAR 173.020 Application for certificate

An applicant for the grant of an instrument flight procedure service certificate must complete form CAA-ANS-FPD, and submit it to the Authority with: —

- (1) The applicant's exposition required by CAR-173.160; and
- (2) A payment of the appropriate fee prescribed by regulations made under the Civil Aviation Law.

CAR 173.025 Issue of certificate

An applicant is entitled to a certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace if:

- (a) the Authority is satisfied that the applicant meets the requirements of Subpart B and applicable subpart of this CAR; and
- (b) The applicant and persons listed in CAR-173.100 paragraphs (a) (2) to (5) are acceptable to the Authority; and
- (c) The organisations exposition as required by CAR-173.160 is acceptable to the Authority; and
- (d) The Authority is satisfied that the granting of the certificate is not contrary to the interests of aviation safety.

CAR 173.030 Privileges of certificate

The Certificate for the design of instrument flight procedures (IFP) for aerodromes, heliports and airspace shall specify the Instrument Procedure Design Services that the certificate holder is authorised to provide.

Rev: 02

CAR 173.035 Duration of certificate

- (a) An instrument flight procedure design services certificate is granted or renewed for a maximum period of 3 years.
- (b) An instrument flight procedure service certificate remains in force until it expires, or is suspended or revoked.
- (c) Upon revocation, suspension, or surrender, the service certificate shall be returned to the Authority without delay.
- (d) The holder of a Certificate for the design of instrument flight procedures (IFP) that expires or is revoked shall surrender the certificate to the Authority.
- (e) The holder of a Certificate for the design of instrument flight procedures (IFP) that is suspended shall immediately return the certificate to the Authority for appropriate endorsement.
- (f) The validity of the Certificate is based upon the continued operation in accordance with Civil Aviation Regulations.
- (g) The Certificate shall remain valid subject to periodic surveillance audits conducted at the discretion of the Authority confirming ongoing compliance with the Civil Aviation Regulations.

CAR 173.040 Renewal of certificate

- (a) An application for the renewal of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall be made using form CAA-ANS- FPD.
- (b) The application shall be submitted to the Authority before the application renewal date specified on the certificate or, if no such date is specified, not less than thirty (30) days before the certificate expires.

CAR 173.045 Safety Inspections and Audits

- (a) The Authority shall conduct an initial certification audit and thereafter audits at intervals not exceeding 2 years (24 months) at the certificate holder's office/facility.
- (b) The Authority may require the certificate holder's to provide such information as the Authority considers relevant to the inspection or audit.
- (c) The Authority shall be granted unrestricted access to the certificate holder's facilities and shall be permitted to carry its own equipment (e.g. computers, cameras and recording devices) under all conditions while carrying out its oversight functions.

CAR 173.050 Resolution of Safety Issues

- (a) When objective evidence is found showing non-compliance of the holder of a Certificate with the requirements, the finding shall be set out as follows:
 - (1) A level one finding is any non-compliance with these regulations, which could
 - (2) lead to uncontrolled non-compliances with applicable requirements and could affect the safety of aircraft.
 - (3) A level two finding is any non-compliance with these regulations, which is not classified as level one.
 - (4) A level three finding is any opportunity of improvement.
- (b) After a receipt of notification of findings: -
 - (1) A level one finding must be rectified immediately or within the short timescale specified;
 - (2) In case of level two findings, the corrective action period granted by the authority shall

- (3) be appropriate to the nature of the finding but in any case shall not be more than 90 days. In certain circumstances the Authority may extend the 90 days period subject to a satisfactory corrective action plan.
- (4) the certificate holders shall:
 - i. Identify the root cause of the non-compliance;
 - ii. Define a corrective action plan; and
 - iii. Demonstrate corrective action implementation to the satisfaction of the Authority within a period agreed with the Authority.
- (c) In the case of level one or level two findings, the Certificate may be subject to a partial or full suspension or revocation. The holder of the certificate shall provide confirmation of receipt of the notice of suspension or revocation of the certificate in a timely manner.

CAR 173.055 Transferability

A Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace, granted in accordance with the requirements of this CAR, is not transferable.

CAR 173.060 Non-Compliance

Non-compliance with this regulation may require the AUTHORITY to restrict, suspend or revoke the IFPD certificate.

Subpart B — Certification Requirements

CAR 173.100 Personnel requirements

- (a) An applicant for the grant of Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace must employ, contract, or otherwise engage:
 - (1) A senior person identified as the Chief Executive who:
 - i. has the authority within the organisation to ensure that every activity undertaken by the organisation under the authority of the certificate can be financed and carried out in accordance with this CAR; and
 - ii. is responsible for ensuring that the organisation complies with this CAR;
 - (2) A "Chief Designer" who is responsible for ensuring that the organisation complies with the design criteria requirements of this CAR and for the certification of every instrument flight procedure provided by the applicant's organisation and made available for publication and operational use;
 - (3) A safety Manager post holder responsible for the provision of a safety management system according to the requirements of CAR-173.145;
 - (4) A quality management post holder responsible for the provision of a quality management system according to the requirements of CAR-173.140; and
 - (5) Suitably Qualified Flight procedure designers to plan, design, validate, and maintain the instrument flight procedures provided by the applicant's organisation.

NOTE: Some of the positions may be combined.

- (b) The Chief Designer responsible for the certification of instrument flight procedures must be authorised in accordance with CAR-173.125 to certify the IFPs.
- (c) Qualifications and experience details for the persons nominated by the applicant for the positions listed in (a) (1), (2) and (5) above shall be forwarded to the Authority for acceptance. The authority retains the right to reject any person appointed and who has been found unsuitable.
- (d) The minimum qualifications and experience requirements for the Chief Designer and the Qualified Flight procedure Designers are specified in Appendix A.

CAR 173.105 Training

The applicant for the grant of Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall:

- (a) develop an overall training policy and training programme for its staff. The training policy and programme shall lay down the training necessary for staff to perform their duties;
- (b) establish procedures acceptable to the Authority and follow the approved training programs for PANS-OPS personnel as follows, as appropriate:
 - (1) initial training;
 - (2) advanced training;
 - (3) on-job-training;
 - (4) recurrent training; and
 - (5) refresher training.
- (c) ensure that the training programs is appropriately implemented in accordance with periodic training plans detailing and prioritizing the type of training needed over a specified time frame;
- (d) establish a procedure for initially assessing and for maintaining the competence of:
 - (1) those personnel involved in the planning, design, verification, and maintenance of instrument flight procedures; and

- (2) those senior persons who are authorised to certify instrument flight procedures.
- (e) provide those authorised personnel with written evidence of the scope of their Authorisation.
- (f) develop job descriptions for its IFPD personnel, containing safety responsibilities.
- (g) establish procedures acceptable to the AUTHORITY for keeping training record for all technical staff and to be maintained up to date.
- NOTE: ICAO DOC9906 Quality Assurance Manual for Flight Procedure Design Volume 2, Flight Procedure Designer Training manual provided a guideline to develop FPD training courses/programmes.

CAR 173.110 Facility Requirements

Each applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall establish offices and facilities that are appropriate for the Instrument Flight Procedure Design service/s listed in their exposition.

CAR 173.115 Documentation

- (a) Each applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall:
 - (1) Document the format and standards for the IFP designed under the authority of their certificate; and
 - (2) Hold copies of relevant reference materials, standards, practices and procedures, and any other documentation that is necessary for the IFP service listed in their exposition.
- (b) These documents shall include, but not be limited to:
 - (1) Annex 2,
 - (2) Annex 4,
 - (3) Annex 5,
 - (4) Annex 6,
 - (5) Annex 10,
 - (6) Annex 14,
 - (7) Annex 15,
 - (8) ICAO DOC 4444,
 - (9) ICAO DOC 7030,
 - (10) ICAO Doc 8071,
 - (11) ICAO Doc 8126,
 - (12) ICAO Doc 8168 VOL I, ICAO Doc 8168 VOL II,
 - (13) ICAO Doc 8697,
 - (14) ICAO Doc 9274,
 - (15) ICAO Doc 9365
 - (16) ICAO Doc 9368,
 - (17) ICAO Doc 9371,
 - (18) ICAO DOC9501,
 - (19) ICAO DOC 9613,
 - (20) ICAO DOC 9643,
 - (21) ICAO DOC 9674,
 - (22) ICAO DOC 9708
 - (23) ICAO DOC 9849,
 - (24) ICAO DOC 9905,

- (25) ICAO DOC 9906 volumes I, II, III, IV, V and VI,
- (26) ICAO DOC 9931,
- (27) CAR 1,
- (28) CAR100,
- (29) CAR 173,
- (30) CAR 175,
- (31) CAR177,
- (32) CAR OPS 1.
- (c) An applicant for the grant of an instrument flight procedure service certificate must establish a procedure for controlling all documentation required by paragraph (a) to ensure that:
 - (1) the documentation is reviewed and authorised by an appropriate person before issue and use; and
 - (2) current issues of relevant documentation are available to personnel at every location if they need access to the documentation; and
 - (3) every obsolete document is promptly removed from every point of issue and use; and
 - (4) a change to documentation is reviewed and authorised by an appropriate person before issue and use; and
 - (5) the current version of every item of documentation can be identified to prevent the use of superseded material.

CAR 173.116 Criteria for the Approval of IFP Designers

- (a) Each applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall provide evidence of the following:
 - Specialist procedure design training in accordance with a competency based approach. (One such an approach is described in ICAO Document 9906, Volume II, Flight Procedure designer Training);
 - (2) Proof of successful completion of a PANS-OPS training course based on ICAO PANS OPS Document 8168, given by an organisation acceptable to the authority.
 - (3) Evidence of recent (within last 12 months) IFP design work which should include evidence of specific designs which have been approved for use;
 - (4) Aviation experience, including a working knowledge of ATM, ATC, ATFM and ASM.
- (b) Each application for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall include a copy of:
 - (1) An acceptable Operations Manual in accordance with CAR 173.150;
 - (2) An acceptable Quality management system (QMS) in accordance with and in compliance with ICAO PANS-OPS DOC 8168 Volume II, Chapter 4, Quality Assurance; and ICAO Document 9906, Volume 1, Quality Assurance Manual for Flight Procedure Design;
 - (3) An acceptable Safety Management System (SMS) in accordance with CAR 173.145
 - (4) The applicant's exposition in accordance with CAR 173.160.

CAR 173.120 Authorisation of persons to certify instrument flight procedures

- (a) Subject to paragraphs (b), (c), and (d), an applicant for the grant of an instrument flight procedure service certificate must establish a procedure for authorising a Chief designer (s) to certify that an instrument flight procedure has been designed in accordance with and meets, the applicable standard and requirement prescribed by Subpart D.
- (b) An authorisation must not be issued to a person unless the person meets the applicable training and experience requirements specified in Appendix A.1.
- (c) Every authorisation that is issued to a person must be in writing and must specify the types of instrument flight procedure that the person is authorised to certify.
- (d) An instrument flight procedure type that is specified on an authorisation must not be inconsistent with the types of instrument flight procedures specified on the instrument flight procedure service certificate.

CAR 173.125 Certification of instrument flight procedures

- (a) Subject to paragraphs (b) and (c) an applicant for the grant of an instrument flight procedure service certificate must establish a procedure for the certification of every instrument flight procedure that the applicant's organisation proposes to design, make available for operational use, and publish in the Oman AIP.
- (b) The procedure required by paragraph (a) must include details of the checks to be carried out by a Chief designer, who is authorised to certify the particular type of instrument flight procedure, to ensure that the instrument flight procedure meets the applicable requirements and standards prescribed by this CAR; and
- (c) A person who is authorised in accordance with CAR-173.120 to certify an instrument flight procedure must not certify an instrument flight procedure that the person has designed.

CAR 173.130 Errors in published instrument flight procedures

- (a) The holder of an instrument flight procedure service certificate must establish a procedure for recording, investigating, correcting, and reporting any identified error, and any identified non-conformance with the standards and requirements of this CAR, in an instrument flight procedure that is certified or maintained under the authority of the certificate.
- (b) The procedure required by paragraph (a) must require that: -
 - (1) an instrument flight procedure is immediately withdrawn from operational use if the error or non-conformance affects, or may affect, the safety of an aircraft operation; and
 - (2) the error or non-conformance is corrected, and certified by a Chief designer who is appropriately authorised in accordance with CAR-173.120; and
 - (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 non-conformance; and
 - (4) the source of the error or non-conformance 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 instrument flight procedure; and
 - (5) the Authority is notified, of a promulgated information incident relating to an error or non- conformance referred to in paragraph (a).

CAR 173.135 Management of records

- (a) An applicant for the grant of an instrument flight procedure service certificate must establish a procedure for the management of records that are required for the applicant organization's functions relating to the design, certification and maintenance of instrument flight procedures.
- (b) The management of records includes the identification, collection, indexing, storage, safekeeping, accessibility, maintenance and disposal of records.
- (c) The procedure required by paragraph (a) must provide for the following to be recorded for every instrument flight procedure (IFP Package):
 - (1) A statement of compliance with PANS-OPS from a Chief designer;
 - (2) A complete record of the design process including copies of all source data (Aerodrome survey report, Electronic Terrain, airport infrastructure information, ...etc.), information, calculations and drawings used in the project;
 - (3) An IFP summary;
 - (4) Proposed IFP chart/depiction of sufficient detail to safely navigate and identify significant terrain, obstacles and obstructions;
 - (5) proposed ARINC 424 path terminators (for PBN procedures only);
 - (6) list of relevant obstacles, identification and description of controlling obstacles and obstacles otherwise influencing the design of the procedure, waypoint fix latitude/longitude, procedural tracks/course, distances and altitudes;
 - (7) any special local operational procedure (e.g. noise abatement, non-standard traffic patterns, lighting activation);
 - (8) detailed listing of deviations from design criteria and proposed mitigation;
 - (9) Relevant signed Validation reports, including stakeholder endorsement;
 - (10) Instrument flight procedure data sets, as AIXM5.1, containing the digital representation of instrument flight procedures.
 - (11) Draft AIP submission.
- (d) The documentation in (c) above becomes the property and hence the responsibility of the Sponsor once the IPDSP has officially signed over the IFP Package to the sponsor. Thereafter the IPDSP is responsible to only store a record of the official handover form signed by both parties.
- (e) The IFP Package shall be retained for a period of one year beyond the date at which the IFP is replaced or withdrawn from use.

CAR 173.140 Quality management system requirements

An applicant for the grant of an instrument flight procedure service certificate shall establish and implement an acceptable Quality management system (QMS) in accordance with ICAO PANS-OPS DOC 8168 Volume II, Chapter 4, Quality Assurance; and ICAO Document 9906, Volume 1, Quality Assurance Manual for Flight Procedure Design.

Note— An ISO 9000 certificate issued by an accredited certification body would be considered an acceptable means of compliance.

CAR 173.145 Safety management system requirements

An applicant must establish, implement, and maintain a system for safety management in accordance with CAR100.

CAR 173.150 Operations Manual

- (a) An applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall provide and keep up to date its operations manual or system of manuals relating to the provision of the services listed in its exposition for the use and guidance of operations personnel.
- (b) It shall ensure:
 - (1) operations manuals contain the instructions and information required by the operations personnel to perform their duties;
 - (2) relevant parts of the operations manuals are accessible to the personnel concerned; and
 - (3) the operations personnel are informed of amendments to the operations manual applying to their duties in a manner that enables their application as of their entry into force.

CAR 173.155 Flight Procedure Design Software Validation

Each applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall:

- (a) Validate Design Software in compliance with ICAO DOC 9906 Volume III;
- (b) Document non-compliances and differences identified;
- (c) Include in the operations manual what risks they have identified in these noncompliances/differences and how they will mitigate them; and
- (d) As part of the training in CAR-173.105 show a process whereby users of the software are trained on these non-compliances/differences and mitigation techniques.

CAR 173.160 Flight Procedure Service Organisation Exposition

- (a) Each applicant for the grant of a Certificate for the design of instrument flight procedures (IFPs) for aerodromes, heliports and airspace shall provide an exposition containing:
 - (1) A statement signed by the by the chief executive on behalf of the applicant's organisation confirming that:
 - i. the exposition and any included manuals define the organisation and demonstrate its means and methods for ensuring ongoing compliance with this CAR; and
 - ii. the organisation has sufficient financial strength to provide the services contained within the organisation's exposition; and
 - (2) the titles and names of the person or persons required by CAR-173.100 (a); and
 - (3) The duties and responsibilities of the person or persons specified in the above CAR-173.100 (a), including matters for which they have responsibility to deal directly with the Authority on behalf of the organisation; and
 - (4) An organisation chart showing lines of responsibility of the persons specified in CAR-173.100 (a); and
 - (5) Details of the applicant's staffing structure; and
 - (6) A document matrix detailing where the requirements of applicable part of this CAR, are contained within the organisations operational manuals.
 - (7) list of the types of instrument flight procedure to be designed and certified by the applicant's organisation; and
 - (8) Procedures to control amend and distribute the exposition.
- (b) The applicant's exposition must be acceptable to the Authority.

Subpart C — Operating Requirements

CAR 173.200 Continued compliance

The holder of an instrument flight procedure service certificate must:-

- (a) hold at least one complete and current copy of the certificate holder's exposition required by CAR-173.160 at the certificate holder's principal location; and
- (b) comply with every procedure and standard detailed in the exposition; and
- (c) make each applicable part of the exposition available to personnel who require the applicable part to carry out their duties; and
- (d) continue to meet the standards and comply with the requirements of Subpart B prescribed for certification under this CAR; and
- (e) notify the Authority of any change of the certificate holder's postal address, address for service, telephone number, or facsimile number within 28 days of the change.

CAR 173.205 Changes to certificate holder's organisation

- (a) A holder of an instrument flight procedure service certificate must: -
 - (1) subject to paragraph (b), ensure that the holder's organisation's exposition is amended so that it remains a current description of the holder's organisation; and
 - (2) ensure that any amendment made to its exposition meets the applicable requirements of this CAR; and
 - (3) comply with the amendment procedures contained in its exposition; and
 - (4) forward to the Authority for retention a copy of each amendment that the certificate holder makes to its exposition as soon as practicable after the amendment is incorporated into its exposition; and
 - (5) amend its exposition as the Authority considers necessary in the interests of aviation safety.
- (b) Before a holder of an instrument flight procedure service certificate changes any of the following, prior acceptance by the Authority is required:
 - (1) the person identified as the chief executive:
 - (2) the title or name of any person specified in the exposition required by rule CAR-173.145 (a)(2) to (5):
 - (3) the types of instrument flight procedure specified on the holder's certificate:
 - (4) the system for safety management, if the change is a material change.
- (c) The Authority may impose conditions under which the holder of the instrument flight procedure certificate must operate during or following any of the changes specified in paragraph (b).
- (d) The holder of an instrument flight procedure certificate must comply with any condition imposed by the Authority under paragraph (c).
- (e) If any of the changes under paragraph (b) requires an amendment to the instrument flight procedure certificate, the holder of the certificate must forward the certificate to the Authority for endorsement of the change as soon as practicable.

Subpart D — Design criteria—instrument flight procedure

CAR 173.250 Design Criteria

- (a) IFPs for aerodromes, heliports and airspace within Muscat FIR shall be designed in accordance with the guidance contained within ICAO PANS-OPS DOC 8168 Volume II and or ICAO DOC 9905 as appropriate, ensuring in particular that required obstacle clearances are achieved.
- (b) When the IFP being developed is an RNAV based procedure, then the additional requirements from ICAO Doc 9613 (Performance Based Navigation (PBN) Manual) Volumes 1 and 2 shall also apply.
- (c) As applicable, the provisions from ICAO Doc 9906 (The Quality Assurance Manual for Flight Procedure Design) in the construction of flight procedures shall apply.
- (d) The design of an instrument flight procedure must: -
 - (1) be coordinated with all appropriate air traffic service providers; and
 - (2) be compatible with any air traffic service and associated procedure that is provided within the area or areas of airspace where the instrument flight procedure is intended to be established; and
 - (3) take into account:
 - i. any prescribed noise abatement procedure; and
 - ii. any legislation restricting aircraft operations; and
 - iii. the classification and any associated designation of the airspace in which the instrument flight procedure is to be established and any adjacent airspace that may be affected by the procedure; and
 - iv. the effect that the proposed instrument flight procedure may have on any other instrument flight procedure established in the airspace.
- (e) An instrument flight procedure must not be designed on or use a ground based aeronautical facility unless—
 - (1) the aeronautical facility is operated under the authority of an aeronautical telecommunication service certificate issued in accordance with CAR-171; and
 - (2) the holder of the aeronautical telecommunication service certificate agrees in writing that the aeronautical facility can be used for the intended instrument flight procedure.
- (f) Consideration shall be given in the design of IFPs to the effect of the design on the environment, and also to the Omani environmental and regulations as well as international standards and best practices.
- (g) All terminal IFP shall be, to the extent possible, designed to consider continuous climb and descent operations.

CAR 173.255 Aerodrome Operating Minima to be Published in Instrument approach charts

The holder of an instrument flight procedure service certificate must establish Aerodrome Operating Minima to be published in the Oman AIP for each instrument approach procedure and circling procedure designed and/or maintained under the authority of their certificate for aerodromes and heliports in accordance with the design criteria referred to in CAR-173.250 and CAR-OPS 1.430 Aerodrome Operating Minima.

NOTE: Manual 7202 On Determination of Aerodrome Operating Minima provides a guideline for development and determination of AOM.

Subpart E — Instrument Flight Procedure Process

NOTE: The instrument flight procedure process (See flowchart at Appendix B) encompasses: the initiation and collection of requirements and constraints, the acquisition of data, the FPD, ground validation, flight validation and flight inspection (when required), approval and publication.

CAR 173.300 FPD Initiation

- (a) The design process for a new or change to an existing IFP shall be initiated by the Sponsor.
- (b) The Sponsor shall notify the Authority of his intention to establish or amend an IFP.
- (c) The request shall be submitted to a formal review by the Authority.

CAR 173.305 Collection and Validation of the Data

- (a) The holder of a Certificate for the design of instrument flight procedures (IFP) must collect the following data from recognized sources, validate for accuracy, resolution, integrity, reference geodetic datum and effective dates, and incorporate them into the design documentation:
 - (1) airport, navigation aid, obstacle, and terrain coordinate and elevation data, based on verified surveys and complying with ICAO Annex 11, 14 and 15 requirements;
 - (2) airspace requirements;
 - (3) user requirements: needs of Air Traffic Service provider and operators who will use this procedure;
 - (4) airport infrastructure such as runway classification, lighting, communications, runway markings, and availability of local altimeter setting;
 - (5) environmental considerations; and
 - (6) any other potential issue associated with the procedure.
- (b) The acquisition of data for the FPD process must ensure that the acquired data's quality characteristics are known and adequate, or that, in the case where the data's quality characteristics are unknown or inadequate (invalid), that appropriate data verification occurs prior to use.

CAR 173.310 Flight Procedure Design (FPD)

The holder of a Certificate for the design of instrument flight procedures (IFP) must establish procedures for ensuring that every instrument flight procedure certified under its authority is:

- (a) designed or amended using methods ensuring that the procedure meets the applicable requirements and standards prescribed in Subpart D; and
- (b) independently verified, before certification, by a qualified procedure designer who is independent of the person directly responsible for the design to ensure compliance with applicable criteria; and
- (c) certified by Chief designer in accordance with CAR-173.125.

CAR 173.315 FPD Documentation

- (a) The flight procedure designer shall prepare an IFP validation package to enable an Independent procedure designer to carry out a Ground validation of the IFP.
- (b) The package shall include:
 - (1) A plan view of the final approach obstacle evaluation,
 - (2) Complete documentation identifying obstacles, obstructions and terrain relevant to the IFP, including identifying the controlling obstacle/terrain,
 - (3) Narrative description of the IFP, segment by segment.
 - (4) Plan and profile views of the IFP.
 - (5) Data relating to each fix and/or holding pattern involved in the IFP,
 - (6) ARINC424 compliant coding for PBN trajectories,

- (7) Confirmation that Navigation aid coverage, if applicable, is satisfactory,
- (8) Draft chart of the procedure suitable for use by the flight validation crew.
- (c) All documentation shall undergo a final verification for accuracy and completeness prior to validation and publication.

CAR 173.320 Validation of IFP

- (a) The IFP validation process must be carried out as part of the initial IFP design as well as for any amendment to an existing IFP. An overview of the necessary steps in the validation process can be found in Appendix C.
- (b) The validation of conventional and PBN IFPs is required under:
 - (1) ICAO PANS-OPS Document 8168, Volume II,
 - (2) ICAO Document 8071, Volumes I and II,
 - (3) ICAO Document 9906, Volume I
- (c) The IFP design process starts with the collection of relevant data, proceeds through the design phase then ground and/or flight validation prior to publication.
- (d) Therefore, validation shall occur at the collection of data phase, the ground and/or flight validation stage and, in the case of PBN IFP, the validation of the navigation database ARINC 424 coding instructions.

CAR 173.325 Ground Validation

- (a) The holder of a Certificate for the design of instrument flight procedures (IFP) must establish procedures to ensure:
 - (1) That ground validation is undertaken of any new or amended IFP's. Ground validation consists of an independent IFP design review and preflight validation
 - (2) That ground validation is conducted by an Independent procedure designer.
 - (3) That any concerns or changes required by the Independent procedure designer is communicated to the procedure designer who shall determine whether or not the IFP should be revised. Such concerns or changes shall be included in the IFP documentation.
 - (4) That any issues identified in the ground validation is addressed prior to any flight validation.
 - (5) Whether flight validation is needed for modifications and amendments to previously published procedures.
- (b) The holder of a Certificate for the design of instrument flight procedures (IFP) must establish procedures for justifying the application of paragraph (a) (5) to an instrument flight procedure.

CAR 173.330 Flight Validation

- (a) Flight validation is the responsibility of the Sponsor.
- (b) A flight validation shall be carried out for the initial certification of an IFP based on ground navigation aids and in other IFP's when the ground validation determines it is necessary or when determined necessary by the Authority.
- (c) The following IFPs do not require flight validation if it can be shown that current obstacle data meets the design requirements of the instrument flight procedure: -
 - (1) an en-route or an instrument arrival procedure unless:
 - i. there is doubt about the coverage of the navigation system supporting the requirements of the procedure; or
 - ii. the procedure limits the flyability and performance characteristics of the class of aircraft the procedure is designed for.
 - (2) an instrument departure procedure unless the procedure limits the flyability and performance characteristics of the class of aircraft the procedure is designed for.
 - (3) an amendment of a previously flight validated instrument approach procedure 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 risks to the safety of the procedure are introduced by the amendment.
- (d) The objective of a flight validation is to
 - (1) Verify the obstacle that is determined as the controlling obstacle for each segment and to check that no new obstacles have been erected since the IFP was created, or that no obstacle details are grossly inaccurate, to the extent that it may affect the IFP.
 - (2) Prove the fly-ability of an IFP whose ground validation caused some concern about track adherence or crew workload.
- (e) The Sponsor shall establish procedures to ensure that flight validation is carried out in compliance with ICAO DOC 9906 Volume V by an organisation that can demonstrate compliance with ICAO DOC 9906 Volume VI.
- (f) The final approach segment shall be flown at an altitude 30 m (100 ft) below the proposed minimum descent altitude. Approaches with precision vertical guidance shall be evaluated according to the proposed decision or missed approach altitude.
- (g) All segments of an instrument approach procedure that is below the Minimum Sector Altitude (MSA) shall be flown.
- (h) The flight validation of an instrument flight procedure and verification of the obstacle data may be conducted during the associated navigation aid inspection if it is taken place in daylight and when visual meteorological conditions (VMC) prevail throughout each segment.

CAR 173.335 Flight inspection

- (a) Flight inspection is defined as the operation of a suitably equipped aircraft for the purpose of calibrating ground-based NAVAIDS or monitoring/evaluating the performance of the global navigation satellite system (GNSS).
- (b) Flight inspection is the responsibility of the Sponsor.
- (c) Flight inspection of instrument flight procedures is required to assure that the appropriate radio navigation aids adequately support the procedure, in accordance with the Standards in Annex 10 and the guidance in Doc 8071.
- (d) Personnel performing flight inspection duties shall be qualified in accordance with Doc 8071, Volume I.
- (e) Flight inspection of instrument flight procedures is required when introducing new ground based navigation facilities to be incorporated in an IFP.
- (f) For GNSS-based RNAV procedures, a Flight Inspection aiming at verifying the absence of permanent interference shall be performed, systematically, before commissioning of the procedure:
 - (1) along the Intermediate Segment, Final Approach segment, and the Missed Approach;
 - (2) on SIDs, in an area of 10 NM around the DER.
- (g) In the case of RNAV procedures based on DME, if the DME infrastructure study using a simulation tool concluded to its necessity, a Flight Inspection along the flight path shall be performed prior to the commissioning of the procedure, to verify the appropriate reception of the DME beacons.

CAR 173.340 Submission of IFP Designs for Approval

- (a) Submission of IFP Designs for Approval is the responsibility of the Sponsor.
- (b) The Authority will only accept IFP designed by a Certified IPDSP for the type of IFP shown in the scope section of their certificate.
- (c) IFP designs submitted for evaluation and approval by the Authority shall include:
 - (1) A complete record of the design process including copies of all source data, information, calculations and drawings used in the IFPD;

- (2) A statement of compliance with PANS-OPS from a Chief designer;
- (3) A report demonstrating how the original requirement has been satisfied;
- (4) A narrative, which unambiguously describes the procedure in textual format and table showing all tracks in degrees True to 1/100th degree;
- (5) A graphical representation which accurately reflects the content of the narrative provided;
- (6) Relevant signed Validation reports;
- (7) A comprehensive design rationale in text format, including references to PANS-OPS Volume II.
- (d) Proposed new routes or amendments to existing routes shall be submitted according to Airspace Change Proposal process.

CAR 173.345 IFP dissemination

- (a) The Sponsor shall be responsible for dissemination of the IFP and associated documentation to the Aeronautical Information Service (AIS) for publication following approval of the IFP by the Authority.
- (b) The Sponsor shall ensure that:
 - (1) the design and format of the IFP charts are in a standardized format in accordance with the requirements of CAR-177; and
 - (2) where the IFP is a PBN procedure, it is described in a clear and unambiguous fashion as detailed in ICAO Doc 8168 (Procedures for Air Navigation Services – Aircraft Operations) Volume 2 and ICAO Annex 15 (Aeronautical Information Services); and
 - (3) where the IFP is a PBN procedure, prior to publication, it is validated to ensure that the dataset is complete, coherent and correct; and
 - (4) the IPDSP performs a final check of the draft AIP/chart amendment before publication to ensure that no errors have been introduced during the data transfer process.

CAR 173.350 Continuous Maintenance and Periodic Review of IFP

- (a) Published IFP shall be subjected to a continuous maintenance and periodic review to ensure that they continue to comply with changing criteria, and meet user requirements.
- (b) The Sponsor must establish a procedure to ensure that each instrument flight procedures for aerodromes, heliports and airspace under its responsibility is reviewed whenever:
 - (1) There is a change to the obstacle environment which may affect the IFP,
 - (2) Procedures based on newly installed or relocated navigational aids (excluding visual aids), or airport runway addition/change, Magnetic Variation,
 - (3) There is a change in airspace structure that may affect the IFP,
 - (4) There is a change to user requirements that may affect the IFP,
 - (5) There are changes in design criteria which have safety impact,
- NOTE: The existing IFP can be maintained even upon the amendment of design criteria and/or depiction standards if it is determined that these amendments are not safety-related issues.
 - (6) A period of 5 years has lapsed since the IFP was designed or last reviewed.

Appendix A — Qualifications and experience for Chief Designer and Qualified Flight procedure designer

This appendix specifies the qualifications and experience for the persons referred to in CAR-173.100 paragraphs (a) (2) and (5).

A1. Chief Designer:

- (a) Training have successfully completed an ICAO PANS-OPS training course, or a training course accepted by the Authority. Where no formal training course has been completed, the Authority may accept evidence of a comprehensive "in–house" training and development program under the supervision of a procedure designer whose qualifications are accepted by the Authority.
- (b) Experience in application of instrument flight procedures have at least 10 years' experience in the application of instrument flight procedures through experience gained in air traffic control, as a flight crew member on IFR operations, in operational control of IFR operations, or other experience accepted by the Authority as equivalent.
- (c) Experience in design of instrument flight procedures at least 5 years' experience designing instrument flight procedures which must include
 - (1) under supervision by a procedure designer whose qualifications are accepted by the Authority, the design of at least 3 instrument flight procedures of the type that the person is to be authorised to certify; or
 - (2) for a new instrument flight procedure type, experience accepted by the Authority in designing or certifying similar instrument flight procedure types.

A.2 Qualified Flight Procedure Designer

- (a) Training have successfully completed an ICAO PANS-OPS training course, or a training course accepted by the Authority. Where no formal training course has been completed, the Authority may accept evidence of a comprehensive "in–house" training and development program under the supervision of a procedure designer whose qualifications are accepted by the Authority.
- (b) Experience in application of instrument flight procedures have at least 5 years' experience in the application of instrument flight procedures through experience gained in air traffic control, as a flight crew member on IFR operations, in operational control of IFR operations, or other experience accepted by the Authority as equivalent.
- (c) Experience in design of instrument flight procedures at least 2 years' experience designing instrument flight procedures which must include
 - (1) under supervision by a procedure designer whose qualifications are accepted by the Authority, the design of at least 3 instrument flight procedures of the type that the person is to be authorised to design; or
 - (2) for a new instrument flight procedure type, experience accepted by the Authority in designing similar instrument flight procedure types.



Appendix B — Instrument Flight Procedure Process Flowchart.

Appendix C — Overview of the Necessary Steps in the Validation Process.

