International Civil Aviation Organization

Performance Based Navigation / Global Navigation Satellite System Task Force (PBN/GNSS/TF/4)

Fourth Meeting
(Cairo, Egypt, 02 – 04 October 2011)

Agenda Item 6: GNSS Specific Issues.

GUIDELINES FOR THE DESIGN OFINSTRUMENT APPROACH PROCEDURES (IAPs) IN HOT CLIMATE CONDITIONS

(Presented by Oman)

SUMMARY

This Working Paper presents considerations for the adaptation of NPA (PBN) design procedures in hot climate conditions.

Action by the meeting is at paragraph 4.

REFERENCES

– PANSOPS Doc 8168

1. INTRODUCTION

1.1 The proposed means of compliance with ICAO Doc 8168 (PANSOPS) to **achieve** 3^0 Vertical Path Angles (VPA) approaches is to allow for taking into account hot climate conditions in the design phase of the Instrument Approach Procedure (IAP).

1.2 In practice this can be accomplished by allowing for lowering of the nominal design VPA by taking into consideration higher than standard International Standard Atmosphere (ISA) temperatures.

2. DISCUSSION

2.1 The policy for IFP (Instrument Flight Procedure) design has been developed for the Sultanate of Oman Organizations involved with IFP-/AIRSPACE design for the Sultanate of Oman shall comply with the requirements as reflected in CAR 173 ―Instrument Flight Procedure Service Organization - Certification and Operation as at **Appendix A** to this working paper, and need approval/acceptance/validation from DGSAS/ANS prior to being appointed.

2.2 The following considerations for IFP design are proposed for adoption by MID States.

a) All NPA procedures shall in principal be based on a nominal VPA of 3.0^0.
b) Where daily mean annual temperatures in excess of ISA + 15^0 are applicable the procedure shall be designed with a nominal VPA of 2.8^0 or lower.

2.3 Unless temperature compensation is applied in the aircraft, the actual VPA will vary according to the temperature on the day. As a general guideline deviations of 0.2^0 VPA per 15^0C difference from ISA and 4% per 1000' of altitude for every 10^0C deviation from ISA, can be assumed.

PANS-OPS REFERENCE TABLE

AD Temp	**VPA**
$+30^0$C (ISA + 15)	3.15□
$+15^0$C (ISA)	3.00□
0^0C (ISA – 15)	2.83□
-15^0C (ISA – 30)	2.65□
-30^0C (ISA -45)	2.44□

Investigation and calculations regarding the PANS-OPS reference table, produced a table for a **sea-level** aerodrome that gives a good indication of the actual VPA values achieved. A procedure commencement height of 3000ft above aerodrome level, a TCH of 50ft (increasing this has little effect) and a distance to threshold based on 2.8° glide path/VPA were assumed.

AD Temp (°C)	Alt. Error at 3000ft (ft)	VPA achieved without correction
30 (ISA + 15)	167	2.96°
35 (ISA + 20)	228	3.02°
40 (ISA + 25)	289	3.07°
45 (ISA + 30)	355	3.14°
50 (ISA + 35)	421	3.20°

2.3 If the VPA is left unadjusted in the design phase for hot climate conditions this can produce operationally undesirable results, e.g.;

a) Unexpected high rates of descend, especially with Maximum Landing Weights in tailwind conditions (A 3.5^0 VPA limit for category C,D and E aircraft will result in a ROD of 370 ft/NM for 0 tailwind conditions).
b) Mismatch with PAPI guidance information because of higher actual VPAs.

3. ADDITIONAL CONSIDERATIONS

3.1 The vertical part of a NPA flight procedure should be executed using the CDFA flight technique. In FMS equipped aircraft this is accomplished by making use of the VNAV function of the FMC. FMC Navigation Database providers provide for FMC procedures based on AIP data. This data covers published conventional IAPs (VOR/DME, NDB etc.) as well as space based (GNS) IAPs as a minimum (FMC database providers will not go below a published VPA). Flying of conventional NPA procedures s is facilitated by FMC overlay's of which the vertical (VNAV) part can be compared to

flying a Baro-NVAV approach. In hot climate conditions, allowing for lowering of the nominal design VPA shall therefore also be considered for conventional IAPs.

3.2 In order to enhance pilot's awareness on the effects of high temperatures with regard to flying NPA procedures with vertical guidance inputs based on barometric inputs (Baro-VNAV, FMC overlay etc), consideration should be given to including a VPA table on the approach procedure plates showing the effects of actual VPAs that will occur in systems that do not compensate for temperature at different actual temperatures

3.3 The same RDH (Reference Datum Height) as for an ILS or MEHT (Minimum Eye Height above Threshold) for the PAPI shall be applied for the VPA initiation point (also referred to as runway termination point).

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) Note the contents of this working paper and its appendix; and
b) Provide views to the considerations for adoption and advise if amendments are required

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CAR 173

Instrument Flight Procedure Service Organisation - Certification and Operation

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FOREWORD

(a) CAR 173 has been issued by the Civil Aviation Affairs of Oman (hereinafter called the AUTHORITY) under the provisions of the Civil Aviation Law of the Sultanate of Oman.

(b).ICAO Annex 4 has been selected to provide the basic structure of CAR 173, but with additional sub-division where considered appropriate

(c) CAR 173 prescribes ruless 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.
The CAR does not apply to the design of aircraft performance operating limitations or flight paths for critical engine inoperative emergency procedures.
CAR 173 aims to ensure that the design, maintenance, and promulgation of instrument flight procedures intended for use by aircraft operating under instrument flight rules (IFR) in the Oman Flight Information Region) meet or exceed the International Civil Aviation Organisation (ICAO) standards and recommended practices for instrument flight procedures.

(d) Amendments to the text in CAR 173 are issued as amendment pages containing revised paragraphs.
New, amended and corrected text will be enclosed within brackets until a subsequent 'Change' is issued

(e) 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 the industry or the applicant, as appropriate.
(4) 'Will' indicates a mandatory requirement and is used to advise engineers of action incumbent on the Authority.

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

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CAR 173

Subpart A — General

173.1 Purpose

(a) This CAR prescribes—

(1) the rules governing the certification and operation of an organisation that provides services for the design and maintenance of instrument flight procedures; and

(2) the technical standards for the design of instrument flight procedures.

(b)This CAR does not apply to the design of aircraft performance operating limitations or flight paths, for critical engine inoperative emergency procedures.

173.3 (Reserved)

173.5 Requirement for certificate

(a) Except as provided for in paragraph (b) a person must not provide an instrument flight procedure service for the Oman FIR; except under the authority of an instrument flight procedure service certificate issued in accordance with this CAR.

173.7 Application for certificate

An applicant for the grant of an instrument flight procedure service certificate must complete form CAA ANS 001, and submit it to the Authority with—

(1) the applicant's exposition required by CAR 173.71; and

(2) if applicable, a payment of the appropriate fee prescribed by regulations made under the Law.

173.9 Issue of certificate

An applicant is granted an instrument flight procedure service certificate if the Authority is satisfied that—

(1) the applicant meets the requirements of Subpart B; and

(2) the applicant and the senior persons required by CAR 173.51(a) are fit and proper persons; and

(3) the granting of the certificate is not contrary to the interests of aviation safety.

173.11 Privileges of certificate

An instrument flight procedure service certificate—

(1) authorises the holder of the certificate to—

(i) design, flight validate, certify, and maintain an instrument flight procedure; and

(ii) Make aeronautical information including aeronautical data relating to an instrument flight procedure that has been certified by the certificate holder available for publication and operational use by an aircraft; and

(2) specifies the types of instrument flight procedure that the certificate holder is authorised to design, flight validate, certify and maintain.

173.13 Duration of certificate

(a)An instrument flight procedure service certificate is granted or renewed for a maximum period of 5 years.

(b)An instrument flight procedure service certificate remains in force until it expires, or is suspended or revoked.

173.15 Renewal of certificate

An application for the renewal of an instrument flight procedure service certificate must be made using form CAA-ANS 002 and be submitted to the Authority not less than 90 days before the certificate expires.

Subpart B — Certification Requirements

173.51 Personnel requirements

(a) An applicant for the grant of an instrument flight procedure service certificate must employ, contract, or otherwise engage—

(1) a senior person identified as the Chief Executive who must—

(i) have the authority within the applicant's organisation to ensure that the organisation's instrument flight procedure services can be financed and provided in accordance with the requirements and standards prescribed by this CAR; and

(ii) be responsible for ensuring that the organisation complies with the requirements of this CAR; and

(2) a senior person or persons, responsible to the Chief Executive for—

(i) ensuring that the applicant's organisation complies with the organisation's exposition; and

(ii) the certification of every instrument flight procedure provided by the applicant's organisation and made available for publication and operational use; and

(3) sufficient personnel to plan, design, verify, and maintain the instrument flight procedures provided by the applicant's organisation.

(b) An applicant for the grant of an instrument flight procedure service certificate must establish a procedure for initially assessing, training, and maintaining, the competence of

(1) those personnel involved in the planning, design, verification, and maintenance of instrument flight procedures; and

(2) those senior personnel who are authorised to certify instrument flight procedures.

(c) The senior person or persons responsible for the certification of instrument flight procedures must be authorised in accordance with CAR 173.57 to certify the procedures.

(d) The qualifications and experience for a senior person required by paragraph (a)(2) are specified in Appendix A.

173.53 Resource requirements

(a) An applicant for the grant of an instrument flight procedure service certificate must—

(1) have available equipment that is appropriate for the design, design verification, certification, flight validation, and maintenance of the types of instrument flight procedure that are specified in the applicant's exposition; and

(2) 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, flight validation, and

maintenance of the instrument flight procedures certified by, and maintained by, the applicant's organisation; and

(3) 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, certification, flight validation, and maintenance of the types of instrument flight procedure that are specified in the applicant's exposition.

(b) An applicant for the grant of an instrument flight procedure service certificate must establish a procedure for ensuring that—

(1) personnel have access to the data referred to in paragraph (a)(2) for the types of instrument flight procedure specified in the applicant's exposition; and

(2) the data referred to in paragraph (a)(2) is current, traceable, and meets the required level of verifiable accuracy for the design, design verification, flight validation, and maintenance of instrument flight procedures specified in the applicant's exposition.

(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)(3) 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.

173.55 Design of instrument flight procedures

(a) An applicant for the grant of an instrument flight procedure service certificate must establish procedures for ensuring that every instrument flight procedure certified under the authority of the applicant's certificate in accordance with CAR 173.59, is—

(1) designed or amended using methods ensuring that the procedure meets the applicable requirements and standards prescribed in Subpart D; and

(2) independently verified, before certification, by a qualified person who is independent of the person directly responsible for the design; and

(3) except as provided in paragraph (b), flight validated in accordance with the procedures required under paragraph (c), to ensure that—

(i) the instrument flight procedure allows aircraft using the procedure to manoeuvre consistently within safe operating practices and pilot workloads for the categories of aircraft that the procedure is intended for; and

(ii) the instrument flight procedure provides azimuth and distance information, and vertical guidance information for a precision approach, in accordance with ICAO or other standards for the operation of aircraft to ensure that an aircraft using the procedure remains clear of obstacles; and

(iii) the instrument flight procedure is not affected by any radio frequency interference; and

(iv) visual guidance systems and cues for the runway are appropriate for the instrument flight procedure and are not confused by lighting, laser sky displays, or any other visual distraction.

(b) The following instrument flight procedures 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.

(c) An applicant for the grant of an instrument flight procedure service certificate must establish procedures for conducting the flight validation of an instrument flight procedure as required by paragraph (a)(3).

(d) The flight validation procedures required under paragraph (c) must include the use of equipment that—

(1) has the precision, and accuracy traceable to appropriate standards, that are necessary for the validation being performed; and

(2) has known measurement uncertainties including, but not limited to, the software, firmware and crosswind uncertainties; and

(3) records the actual flight path of the validation aircraft, and

(4) is checked before being released for use, and at intervals not exceeding the calibration intervals recommended by the manufacturer, to establish that the system is capable of verifying the integrity of the instrument flight procedure, and

(5) is operated in accordance with flight validation system procedures and criteria by persons who are competent and current on the system used.

(e) An applicant for the grant of an instrument flight procedure service certificate must establish procedures for justifying the application of paragraph (b) to an instrument flight procedure.

(f) An applicant for the grant of an instrument flight procedure service certificate must establish procedures for ensuring that during the processes of design, maintenance, or transfer of data of an instrument flight procedure—

(1) the applicable aeronautical data and aeronautical information complies with the standards specified in RTCA Inc. document number RTCA/DO-201A Standards for Aeronautical Information; and

(2) manipulation or processing of aeronautical data complies with the standards specified in RTCA Inc. document number RTCA/DO-200A Standards for Processing Aeronautical Data; and

(3) any transfer of aeronautical information within the certificate holder's organisation, or to or from external entities, complies with the standards specified in the Aeronautical Information Transfer Model

(g) An applicant for the grant of an instrument flight procedure service certificate may use alternative standards equivalent to the standards specified in paragraph (f).

173.57 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 senior person or persons to certify that an instrument flight procedure has been designed in accordance with and meets, every 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.

173.59 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 Aeronautical Information Publication Oman.

(b) The procedure required by paragraph (a) must include—

(1) details of the checks to be carried out by a senior person, 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

(2) the means for providing the Authority with the information specified in CAR 173.61(c) for the entry of the instrument flight procedure.

(c) A person who is authorised in accordance with CAR 173.57 to certify an instrument flight procedure must not certify an instrument flight procedure that the person has designed.

173.61 Promulgation of instrument flight procedures

(a) In accordance with CAR 95.51, an applicant for the grant of an instrument flight procedure service certificate must establish a procedure ensuring that—

(1) the information required in paragraph (c) is provided to the Authority; and

(2) an instrument flight procedure is not published or made available for operational use unless the Authority has notified the holder of the instrument flight procedure service certificate that the instrument flight procedure has been entered into the AIR NAVIGATION REGISTER, and the date for operational use of the instrument flight procedure has been notified in the Gazette in accordance with CAR 95.55.

(b) The procedure required by paragraph (a) must include—

(1) details of the means for coordinating with the aeronautical information service provider the publishing of the instrument flight procedure in the AIP; and

(2) details of the means to check that the initial publication of, or any change to, an instrument flight procedure published under paragraph (a) has been accurately published in the AIP.

(c) The following information is required by the Authority for every entry of an instrument flight procedure into the AIR NAVIGATION REGISTER:

(1) the name or other appropriate identifier that is acceptable to the Authority to uniquely identify the instrument flight procedure:

(2) aeronautical data that is acceptable to the Authority to define and describe the instrument flight procedure:

(3) the date that the instrument flight procedure is intended to come into effect:

(4) a statement signed by the senior person referred to in CAR 173.59(b)(1), certifying that the instrument flight procedure meets the applicable standards and requirements prescribed by this CAR:

(5) a statement signed by a senior person, of an appropriate instrument flight procedure service organisation certifying that the instrument flight procedure is to be maintained in accordance with the organisation's procedures required by CAR 173.63.

(d) For the purpose of paragraph (c)(5), an appropriate instrument flight procedure organisation is an organisation that is certificated in accordance with CAR 173 and whose certificate authorises

the design, flight validation, certification, and maintenance of the particular type of instrument flight procedure.

173.63 Maintenance of instrument flight procedures

(a) An applicant for the grant of an instrument flight procedure service certificate must establish a procedure for maintaining, in accordance with the requirements of this CAR, every instrument accordance with the statement required under CAR 173.61(c)(5), is maintained under the authority of the certificate.

(b) The procedure required by paragraph (a) must include details for every instrument flight procedure to be reviewed, and flight validated if necessary,—

(1) on a periodic basis ensuring that the instrument flight procedure continues to meet the applicable standards and requirements of this CAR; and

(2) if there is a change in any of the data referred to in CAR 173.53(a)(2) that may affect the integrity of the instrument flight procedure.

(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 instrument flight procedure.

173.65 Errors in published instrument flight procedures

(a) An applicant for the grant 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 or suspected 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 referred to in paragraph (a) affects, or may affect, the safety of an aircraft operation; and

(2) the error or non-conformance is corrected, and certified by a senior person who is appropriately authorised in accordance with CAR 173.57; 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 non-conformance 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).

173.67 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 organisation's functions relating to the design, certification and maintenance of instrument flight procedures.

(b)The management of records under paragraph (a) 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 that is certified in accordance with CAR 173.59 and every instrument flight procedure that is maintained in accordance with CAR 173.63—

(1) the details required by CAR 173.61(c) for the instrument flight procedure; and

(2) details of the instrument procedure design carried out in accordance with CAR 173.55, including but not limited to design verification, amendment, validation, justification for not validating, and certification activities; and

(3) details of the promulgation and checking activities; and

(4) details of any actions taken under CAR 173.65 regarding errors and non-conformances in an instrument flight procedure; and

(5) details of every maintenance review and flight validation carried out, in accordance with the procedures required by CAR 173.63.

(d) The procedure required by paragraph (a) must also provide for the following—

(1) a record, that includes details of the qualifications, experience, training, assessments, and authorisations if applicable, for—

(i) every senior person required by CAR 173.51(a)(2); and

(ii) personnel required by CAR 173.51(a)(3); and

(2) a record of every internal safety management review carried out under CAR 173.69; and

(3) the records required by paragraphs (c) and (d) to be legible, accurate, permanent, and retrievable in a legible format; and

(4) the records required by paragraph (c) to be retained for at least 5 years after the associated instrument flight procedure is withdrawn from use.

173.69 Safety management system requirements

(a) An applicant for the grant of an instrument flight procedure service certificate must establish a safety management system for ensuring compliance with, and the adequacy of, the procedures required by this CAR.

(b) The safety management system must include—

(1) a safety policy incorporating the development of a safety culture and safety procedures, including a procedure for reporting and investigating an occurrence conducted; and

(2) a procedure for establishing and monitoring safety indicators; and

(3) a procedure for identifying an existing or potential problem within the organisation's systems and processes; and

(4) a procedure for controlling and mitigating risks within the organisation that may affect the integrity of instrument flight procedures; and

(5) a procedure for corrective action to ensure that an identified problem is investigated and analysed, and the cause of the problem is remedied; and

(6) a procedure for preventive action to ensure that a cause of an identified potential problem is remedied; and

(7) an internal audit programme to audit the applicant's organisation for conformity with its exposition, safety policy, and procedures; and

(8) a management review procedure that may, if appropriate, include the use of statistical analysis ensuring the continuing suitability and effectiveness of the safety management system in satisfying the requirements of this CAR; and

(9) a safety management manual documenting the operation of the safety management system and providing relevant information on the risks and how they are managed (including the procedures required in paragraphs (b)(1) to (b)(8)), and a register of significant hazards for the organisation and how those hazards are controlled.

(c) The safety management procedures must include a means for ensuring that the safety policy is understood, implemented and maintained at every level within the applicant's organisation.

(d) The procedure required by paragraph (b)(5) for corrective action must provide for the following—

(1) how to correct an existing problem; and

(2) how to ascertain whether or not the problem has affected or potentially affected the integrity of any instrument flight procedure; and

(3) how to follow up a corrective action to ensure that the action is effective; and

(4) how to amend any procedure that is required by this Part as a result of a corrective action; and

(5) how management is to measure the effectiveness of any corrective action taken.

(e) The procedure required by paragraph (b)(6) for preventive action must provide for the following—

(1) how to correct a potential problem; and

(2) how to ascertain what other effects the cause of an identified potential problem may have; and

(3) how to follow up a preventive action to ensure the action is effective; and

(4) how to amend any procedure, required by this CAR, as a result of a preventive action; and

(5) how management measures the effectiveness of any preventive action taken.

(f) The internal audit programme required by paragraph (b)(7) must—

(1) specify the frequency and location of the audits, taking into account the nature of the activity to be audited; and

(2) require audits to be performed by trained personnel who are independent of those with direct responsibility for the activity being audited; and

(3) require the results of audits to be reported to the personnel responsible for the activity being audited and to the manager responsible for internal audits; and

(4) measure the effectiveness of any preventive or corrective action taken by the personnel responsible for the activity being audited since the last audit; and

(5) require preventive or corrective action to be taken by the personnel responsible for the activity being audited if problems are found by the audit; and

(6) provide for follow-up audits to be undertaken to review the effectiveness of any preventive or corrective action taken.

(g) The procedure for management review required by paragraph (b)(8) must—

(1) specify the frequency of management reviews of the safety management system, taking into account the need for the continuing effectiveness of the system; and

(2) identify the senior person responsible for the management review; and

(3) require the results of the review to be evaluated and recorded.

(h) The senior person who is responsible for the safety management system must have direct access to the Chief Executive on matters affecting the integrity of any instrument flight procedure for which the organisation is responsible.

173.71 Exposition requirements

(a) An applicant for the grant of an instrument flight procedure service certificate must provide the Authority with an exposition that must contain—

(1) a statement signed by the Chief Executive on behalf of the applicant's organisation confirming that the exposition and any included documentation—

(i) define the organisation and demonstrate its means and methods for ensuring ongoing compliance with this CAR; and

(ii) are required to be complied with by the organisation's personnel at all times; and

(2) the titles and names of the senior person or persons required by CAR 173.51(a)(2); and

(3) details of the duties and responsibilities of the senior person or persons referred to in paragraph (2) including matters for which they have responsibility to deal directly with the Authority on behalf of the organisation; and

(4) if there is more than one senior person listed under paragraph (2), an organisation chart showing the lines of responsibility of those persons; and

(5) the name of every senior person who is authorised in accordance with CAR 173.57 to certify instrument flight procedures; and

(6) details of the scope of the authorisation issued to every person listed under paragraph (5); and

(7) a list of the types of instrument flight procedure to be designed, certified, or maintained by the applicant's organisation; and

(8) details of the applicant's means of meeting the requirements of CAR 173.53(a) regarding—

(i) equipment; and

(ii) access to relevant and current data; and

(iii) access to copies of relevant documentation; and

(9) details of the applicant's means of meeting the requirements of CAR 173.53(b) regarding instrument flight procedures not requiring flight validation; and

(10) details of the applicant's procedures as required by—

(i) CAR 173.51(b) regarding assessment and competence of personnel; and

(ii) CAR 173.53(b)(1) regarding access to data; and

(iii) CAR 173.53(b)(2) regarding currency and accuracy of data; and

(iv)CAR 173.53(c) regarding control of documentation; and

(v) CAR 173.55(a) regarding design, verification and flight validation of instrument flight procedures; and

(vi) CAR 173.55(c) regarding flight validation of instrument flight procedures; and

(vii) CAR 173.55(e) regarding the justification for instrument flight procedures not requiring flight validation; and

(viii) CAR 173.55(f) or (g) regarding the compliance with standards; and

(ix) CAR 173.57 regarding authorisation of senior persons; and

(x) CAR 173.59 regarding certification of instrument flight procedures; and

(xi) CAR 173.61 regarding promulgation of instrument flight procedures and the means to provide details of each procedure to the Authority; and

(xii) CAR 173.63 regarding maintenance of instrument flight procedures; and

(xiii) CAR 173.65 regarding errors in published instrument flight procedures; and

(xiv) CAR 173.67 regarding management of records; and

(xv) CAR 173.69 regarding safety management system; and

(11) procedures for controlling, amending, and distributing the exposition.

(b) The exposition required by paragraph (a) must remain acceptable to the Authority.

Subpart C — Operating Requirements

173.101 Continued compliance

The holder of an instrument flight procedure service certificate must—

(1) hold at least one complete and current copy of the certificate holder's exposition required by CAR 173.71 at the certificate holder's principal location; and

(2) comply with every procedure and standard detailed in the exposition; and

(3) make each applicable part of the exposition available to personnel who require the applicable part to carry out their duties; and

(4) continue to meet the standards and comply with the requirements of Subpart B prescribed for certification under this CAR; and

(5) 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.

173.103 Changes to certificate holder's organisation

(a) The holder of an instrument flight procedure service certificate must–

(1) subject to paragraph (b), ensure that the organisation's exposition is amended so as to remain a current description of the certificate holder's organisation; and

(2) ensure that any amendment made to the exposition meets the applicable requirements of this Part; and

(3) comply with the exposition amendment procedures contained in the exposition; and (4) provide the Authority with a copy of each amendment that the certificate holder makes to the exposition as soon as practicable after the amendment is incorporated into the exposition; and

(5) amend the exposition as the Authority considers necessary in the interests of aviation safety.

(b) If the holder of an instrument flight procedure service certificate changes, or proposes to change, any of the following, the certificate holder must notify the Authority prior to the change or as soon as practicable if prior notification is not possible, and the change must be accepted by the Authority, including applicable fit and proper person criteria under section 10 of the Act, before being incorporated into the certificate holder's exposition:

(1) the person identified as the chief executive:

(2) the title or name of any senior person specified in the exposition required by CAR 173.71(a)(2):

(3) the types of instrument flight procedure specified on the certificate holder's certificate.

(c) The Authority may impose conditions under which the holder of the instrument flight procedure certificate may 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) require an amendment to the instrument flight procedure certificate, the holder of the certificate must forward the certificate to the Authority as soon as practicable for endorsement of the amendment.

173.105 Cessation of maintenance of an instrument flight procedure

If the holder of an instrument flight procedure service certificate proposes to discontinue the maintenance of an instrument flight procedure as required by CAR 173.63, the certificate holder must notify the Authority in writing of the proposal to discontinue the maintenance at least 90 days before the maintenance ceases.

Subpart D — Design criteria—instrument flight procedure

173.201 Design

(a) Every instrument flight procedure must be designed in accordance with the requirements of this CAR and in accordance with the appropriate design processes, standards, guidelines, and aeronautical data quality requirements contained in the following:

(1) ICAO Documents—

(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 Manual — Volume I Concept and Implementation Guidance, and Volume II Implementing RNAV and RNP:

(v) Doc 9881, Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information:

(2) ICAO Annexes—

(i) Annex 4, Aeronautical Charts:

(ii) Annex 6, Operation of Aircraft:

(iii) Annex 11, Air Traffic Services:

(iv) Annex 14, Volumes I & II Aerodromes:

(v) Annex 15, Aeronautical Information Services:

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

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

(c) 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 bylaws or other 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.

(d) An instrument flight procedure must not be designed for an aerodrome or heliport unless the operator of the aerodrome or heliport agrees in writing that the aerodrome or heliport may be used for IFR operations using the intended instrument flight procedure.

(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.

Appendix A — Qualifications and experience for senior person

This appendix specifies the qualifications and experience for a senior person required by CAR 173.51(a)(2).

Senior person to certify instrument flight procedures:

(a) *Training* — have successfully completed an ICAO PANS-OPS training course, or a training course accepted by the Authority as an equivalent, for the design of instrument flight procedures.

(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 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 certify; or

(2) for a new instrument flight procedure type, experience accepted by the Authority in designing or certifying similar instrument flight procedure types.