

Democratic Socialist Republic of Sri Lanka



Civil Aviation Authority of Sri Lanka

Implementing Standards

(Issued under Sec. 120, Civil Aviation Act No. 14 of 2010)

Title: Instrument Flight Procedure Design service in Sri Lanka

Reference No: IS-11-2.34 & App.07

S.N: SLCAIS 099

Date: 25th February 2021

Pursuant to Sec 120 of the Civil Aviation Act No.14 of 2010, Director General of Civil Aviation shall have the power to issue, whenever he considers it necessary or appropriate to do so, such Implementing Standards for the purpose of giving effect to any provision of the Civil Aviation Act, any regulations or Rules made thereunder including the Articles of the Convention on International Civil Aviation specified in the Schedule to the CA Act.

Accordingly, I, the undersigned being the Director General of Civil Aviation do hereby issue the Implementing Standards as mentioned in the Attachment hereto (Ref: IS-11-2.34 & App.07), for the purpose of giving effect to the aforementioned Act and standards and procedures described in Annex 11 and Doc. 8168, Volume II “Construction of Visual and Instrument Flight Procedures” issued under Article 37 of the Convention, which are specified in the attachment.

This Implementing Standard shall come into force with immediate effect and remain in force unless revoked.

Attention is also drawn to sec. 103 of the Act, which states inter alia that failure to comply with Implementing Standard is an offence.

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Enclosure: Attachment No. IS-11-2.34 & App.07-Att.

Implementing Standards

SLCAIS-099: Instrument Flight Procedure Design service in Sri Lanka

1. Notice to the Recipient

- 1.1. The requirements in this Implementing Standard are based on the Standards and Recommended Practices (SARPs) adopted by the International Civil Aviation Organization (ICAO) and incorporated in the Amendment No. 51 to Annex 11 and the requirements contained in Amendment 8 to ICAO Doc. 8168, Volume II - Aircraft Operations / Construction of Visual and Instrument Flight Procedures.
- 1.2. In pursuance of the obligation cast under Article 38 of the Convention which requires the Contracting States to notify the ICAO of any differences between the national regulations of the States and practices and the International Standards contained in the respective Annex and any amendments thereto, the CAASL will be taking steps to notify ICAO of such differences relating to either a Standard or a Recommended Practice, if any. The CAASL will also keep the ICAO currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. Furthermore, the CAASL will take steps for the publication of differences between the national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, which is published in accordance with the provisions in the Annex-15 to the Convention.
- 1.3. Taking into account of the ICAO council resolution dated 13 April 1948 which invited the attention of Contracting States of the desirability of using in the State's national regulations, as far as is practicable, the precise language of those ICAO Standards that are of a regulatory character, to the greatest extent possible the CAASL has attempted to retain the ICAO texts in the Annex in drafting this Implementing Standard.
- 1.4. The requirements contained in this document are applicable to Air Traffic Service Provider and any Instrument Flight Procedure Design Service providers contracted by the Air Traffic Service provider in Sri Lanka and all users of Sri Lanka airspace.
- 1.5. ATS Provider and All users of Sri Lanka airspace shall strictly comply with the requirements published in this document when operating within Sri Lanka airspace.
- 1.6. This document may be amended from time to time and the amendments will be issued in the form of new pages to replace the relevant pages of this document.
- 1.7. Status of ICAO Annex components in the Implementing Standard
Some of the components in an ICAO Annex are as follows and they have the status as indicated:
 - 1.7.1 **Standard:** Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38. The Standards are reflected in the Implementing Standards if they are locally implemented using the normal fonts and recipients are required to conform to such requirements invariably and the DGCA will take appropriate enforcement action when those requirements are not complied with.

- 1.7.2 **Recommended Practice:** Any specification for physical characteristics, configuration, materiel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity, efficiency or environmentally responsiveness of international air navigation, and to which Contracting States will endeavor to conform in accordance with the Convention. The Recommended Practices are reflected in the Implementing Standards in *italic fonts* and the Recipients are encouraged to implement them to the greatest extent possible. However, DGCA will not take enforcement action when a Recommended Practice is not satisfied by the recipient.
- 1.7.3 **Appendices:** Comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council. Enforcement action on such matters will be as in the case of Standards or Recommended Practices.
- 1.7.4 **Definitions:** A definition does not have independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.
- 1.7.5 **Tables and Figures:** add to or illustrate a Standard or Recommended Practice, and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Chapter 01 – Definitions & Abbreviations

1.1 Definitions

When the following terms are used in this manual, they have the following meanings:

Competency. A dimension of human performance that is used to reliably predict successful performance on the job.

Flight inspection. 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).

Flight procedure designer. A person responsible for flight procedure design who meets the competency requirements as laid down by the State.

Flight procedure design process. The process which is specific to the design of instrument flight procedures leading to the creation or modification of an instrument flight procedure.

Flight procedure inspectorate (FPI). A State entity designated to carry out the safety oversight activities in the area of development and maintenance of visual and instrument flight procedures.

Flight procedure inspectorate staff. A person or persons responsible for the oversight of the process of development and maintenance of visual and instrument flight procedures.

Flight validation pilot. A person performing flight validation who meets the competency requirements as laid down by the State.

Flyability. The ability to keep an aircraft within the predefined tolerances of the designed lateral and vertical flight track

Instrument flight procedure. A description of a series of predetermined flight manoeuvres by reference to flight instruments, published by electronic and/or printed means.

Instrument flight procedure process. The overarching process from data origination to the publication of an instrument flight procedure.

Instrument flight procedure design service (IFPDS). A service established for the design, documentation, validation, continuous maintenance and periodic review of instrument flight procedures necessary for the safety, regularity and efficiency of air navigation.

Instrument flight procedure design service provider. A service provider responsible for the development and maintenance of PANS OPS Visual and Instrument Flight Procedures.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

- a) are located on an area intended for the surface movement of aircraft; or
- b) extend above a defined surface intended to protect aircraft in flight; or

- c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Validation. Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled (ISO 9000: Quality Management Systems — Fundamentals and Vocabulary).

Verification. Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled.

1.2 Abbreviations

ANS	Air Navigation Services
ASN	Aviation Safety Notice
ATS	Air Traffic Service
CAASL	Civil Aviation Authority of Sri Lanka
DGCA	Director General of Civil Aviation
FDP	Flight Procedure Design
FVP	Flight Validation Pilot
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
IFPDS	Instrument Flight Procedure-Design Service
IFPDSP	Instrument Flight Procedure Design Service Provider
PBN	Performance Based Navigation
IS	Implementing Standards
QM	Quality Manual
QMS	Quality Management System
RNAV	Area Navigation
SLCAP	Sri Lanka Civil Aviation Publication
SMS	Safety Management System
SSP	State Safety Programme

Chapter 2 – Introduction

2.1 General

- 2.1.1 This Implementing Standards specifies the requirements governing the design and maintenance of instrument flight procedures (IFP). This is to ensure that all published IFP intended to be used by aircraft operating under Instrument Flight Rules (IFR) in Sri Lankan airspace meets ICAO requirements for instrument flight procedures. IFP Design Service Providers shall ensure that the quality and safety of the procedure design product are assured through the review, verification, coordination and validation at appropriate points in the process, so that corrections could be made at the earliest opportunity in the process.
- 2.1.2 In the interest of safety, IFP Design Service Providers shall implement the provisions in the Implementing Standards in a consistent manner, using processes that will minimize the possibility of errors, identify errors that do occur before they impact safety, and provide for continuous improvement of the procedure design process in order to eliminate or reduce future errors.

2.2 Review & Amendment of Implementing Standards

- 2.2.1 This Implementing Standards shall be reviewed and amended time to time either when source documents of ICAO are amended or when DGCA decides on such. The amendments shall be reflected with a vertical line on the right side of the text as well as amendments shall be communicated to appropriate recipients.

- 2.2.2 This Implementing Standards should be read in conjunction with:

1. ICAO Annexes

- a. ICAO Annex 4 – Aeronautical Charts
- b. ICAO Annex 5 – Units of Measurement
- c. ICAO Annex 6 – Aircraft Operations
- d. ICAO Annex 11 – Air Traffic Services
- e. ICAO Annex 14 Vol. I – Aerodromes
- f. ICAO Annex 14 Vol. II – Heliports
- g. ICAO Annex 15 – Aeronautical Information Services

2. ICAO Docs

- a. ICAO Doc 10068 – Manual on the Development of a Regulatory Framework for Instrument Flight Procedure Design Service
- b. ICAO Doc 8168 Volumes I and II - Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)
- c. ICAO Doc 9368 – IFP Construction Manual
- d. ICAO Doc 9371 – Template Manual
- e. ICAO Doc 9724 – AN/904-Manual on the Use of the Collision Risk Model (CRM) for ILS Operations
- f. ICAO Doc 9613 – Performance Based Manual
- g. ICAO Doc 9906–AN/472 Vol. 1-6 : Quality Assurance Manual for Flight Procedure Design
- h. ICAO Doc 8697 – Aeronautical Chart Manual
- i. ICAO Doc 9905–AN/ - RNP-AR Flight Procedure Design

3. CAASL documents

- a. IS 031 – CAASL standards on Aeronautical Charts
- b. IS 003 – Units of measurements to be used in the Air and Ground operations
- c. IS 013, 014, 015, 016 – Compliance to Annex 06, Part I
- d. IS 025 – Compliance to Annex 11 – Air Traffic Services
- e. IS 030 – Aerodrome Standards in Sri Lanka
- f. IS 041 – Heliport Standards in Sri Lanka
- g. IS 028 – Compliance to Annex 15 – AIS

- 2.2.3 Where there is a difference between a standard/requirement in this document and that of the above-mentioned ICAO documents, the standard/requirement in this Implementing Standards shall prevail.
- 2.2.4 In this Implementing Standards, standards are preceded by the word “shall”, whereas recommended practices are preceded by the word “should”. The IFP Design Service Providers shall comply with all standards at all times and should endeavour to comply with all recommended practices
- 2.2.5 When the IFP Design Service Providers is not able to comply with any standards/Requirements specified or referenced in this Implementing Standards, the IFP-Design Service Providers shall apply to the DGCA for an exemption or for the deviation from the relevant standard/requirement. Applications shall be supported in writing with the reasons for such exemption or deviation including a proposal for an alternate means of compliance with equivalent or greater in character to the Standard/ requirement referred any safety assessment or other studies undertaken and where appropriate, an indication of when compliance with the current standards can be expected.
- 2.2.6 Any exemption or deviation granted to the IFP Design Service Providers shall also be recorded in the operations manual. The operation manual shall also contain the details of the exemption or deviation, such as the reason that the exemption or deviation was requested and any resultant limitations or conditions imposed.
- 2.2.7 The IFP Design Service Providers shall ensure that the units of measurement as specified in the Implementing Standards – Units of Measurement to be used in Air and Ground Operations are used in the design of instrument flight procedures where applicable.
- 2.2.8 In addition to this document, IFP Design Service Providers shall also comply with the following publication as appropriate;
- (a) Implementing Standards 087 (IS 087) – It is published in order to provide requirements to be satisfied for the Certification of Air Navigation Service Providers in compliance with Aeronautical Service Provider Licensing Regulations No.01 of 2018. The service provider responsible ATSS (also responsible for IFP design service) in a subject of IFP Design Service within Colombo FIR, shall be in comply with requirements given in IS 087, Chapter 4, Sec. 4.1 (J) and same chapter Sec. 4.1 (H) (e).
 - (b) Guidance Manual for IFP Design service in Sri Lanka

- (c) Implementing Standards 070 (Framework for a Safety Management System) – It specifies the framework for the implementation and maintenance of a SMS by the respective organizations which are required to have a SMS in accordance with the Civil Aviation Safety Management Regulations of 2018 and ICAO Annex 19 on Safety Management. The IS 087, Chap. 4, Sec. 4.1 (H) (e) mentioned above, requires that a service provider responsible for the provision of Air Traffic Services shall establish procedures to ensure that the safety assessments are carried out.
- (d) Sri Lanka Civil Aviation Publication 2300 (SLCAP-2300) - ANS Inspector Handbook contains guidance material intended to assist Flight Procedure Inspector(s) in the Civil Aviation Authority of Sri Lanka in carrying out their regulatory responsibilities with regard to their Safety Oversight duties, functions and responsibilities.

Chapter 3 – IFP Design Service Provider (IFP-DSP)

3.1 IFP Design Service Provider

- 3.1.1 The IFP Design Service Providers shall maintain an appropriate Instrument Design office to enable the IFP Designers to carry on design work in Instrument Flight Procedures in accordance with the requirements set out in this Implementing Standards.
- 3.1.2 The IFP Design Service Providers shall ensure that the designs of Instrument Flight Procedure are in accordance with:
- (a) applicable standards set out or referred to in ICAO Doc 8168, Volume II and associated guidance materials; and
 - (b) applicable standards as set out in this Implementing Standards.
- 3.1.3 The IFP Design Service Providers shall make provisions for a person(s) trained in IFP design to check and verify independently the plans of each Instrument Flight Procedure designed.
- 3.1.4 IFP Design Service providers shall develop job descriptions for its Instrument Flight Procedure Designers and Flight Validation Pilots.
- 3.1.5 IFP Design Service providers shall develop training programmes and training plans and execute them to train its Instrument Flight Procedure Designers and Flight Validation Pilots and shall maintain training records in respect of aforementioned.
- 3.1.6 The IFP Design Service Providers shall establish criterion to determine the required number of Instrument Flight Procedure designers to be approved by DGCA in accordance with requirements stipulated in the Guidance Manual for IFP Design service in Sri Lanka.

3.2 Instrument Flight Procedure Design Operations Manual

- 3.2.1 The IFP Design Service Providers shall develop and maintain an operations manual which serves to demonstrate how the service provider complies with the requirements set out in this Implementing Standards.
- 3.2.2 The contents of the Operation Manual shall include but not limited to the following:
- (a) the administrative information required of the IFP Design Service Providers; and
 - (b) a description of the IFP design office that shows the role and responsibilities and job functions of the IFP design office personnel who are responsible for ensuring the compliance of the IFP-design service provider with the requirements in this Implementing Standards.
- 3.2.3 The IFP Design Service Providers shall:
- (a) keep the Operation Manual in a readily accessible form;
 - (b) ensure that the operation manual is readily available to all designing personnel; and

(c) amend the operation manual whenever necessary to keep its contents up to date.

3.2.4 The IFP Design Service Providers shall submit a copy of the most current operation manual to the DGCA.

3.2.5 It is recommended that IFP Design Service Providers shall use the sample contents of an Operations Manual given in the ICAO Doc. 10068, Chapter 3, Table 3-1.

3.3 Resource Requirements

3.3.1 The IFP Design Service Providers shall provide and maintain facilities for the design work on instrument flight procedures. This would include:

(a) having available equipment appropriate for the design, design verification, flight validation, and maintenance of the types of instrument flight procedures;

(b) 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 verification, and maintenance of the instrument flight procedures; and

(c) 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, flight validation, and maintenance of the types of instrument flight procedure.

Recommendation- The requirement for equipment and selection of appropriate MAPs for Instrument Flight Procedure design given in the ICAO Doc. 9368 (Instrument Flight Procedure Construction Manual), Chap. 2, sec. 2.2 and 2.4 respectively, shall be recommended to be taken into concern as appropriate.

3.3.2 If an aeronautical database and aeronautical data is required for designing an instrument flight procedure, the IFP Design Service Providers shall ensure the integrity of the database and the data. The data used shall be current, traceable, and meets the required level of verifiable accuracy for the design.

3.4 Documents and Records Control System

3.4.1 The IFP Design Service Providers shall establish and put into effect, a system for controlling documents and records relating to the Instrument Flight procedures on which the IFP Designers carries on design work, including the policies and procedures for making, amending, preserving and disposing of those documents and records.

3.4.2 The IFP Design Service Providers shall make the documents and records, or copies of them or extracts from them, available for inspection by the designated representatives of DGCA.

Chapter 4 – Flight Procedure Designer Qualifications and Training

4.1 IFP Designer Qualifications

- 4.1.1 The IFP Design Service Providers shall ensure that a person designing or amending a flight instrument procedure demonstrates required competency level for flight procedure design.
- 4.1.2 IFP Designers shall acquire and maintain this competency level through training and supervised on-the-job training (OJT). This is to ensure that the quality assurance in the procedure design process and its output, including the quality of aeronautical information/data, meets the requirements of CAASL IS031– CAASL standards on Aeronautical Charts and IS 028- compliance to Annex 15 – Aeronautical Information Services.
- 4.1.3 The IFP-Design Service Providers shall use the criteria for qualifying IFP designers specified in the Guidance Manual for IFP Design service in Sri Lanka

4.2 Training for IFP Designers

- 4.2.1 The training for Flight Procedure Designers shall include an initial training and recurrent training at periodic intervals as prescribed in the ICAO Doc. 9906, Volume 2.
- 4.2.2 The IFP design service providers shall ensure that the IFP designer is able to demonstrate a basic level of competency through initial training that includes at least the following elements:
- a) overview of ICAO Standards and Recommended Practices (SARPs) relating to IFP design and promulgation;
 - b) knowledge of information contained in ICAO Doc 8168, Vol. II – PANS-OPS, and other related ICAO provisions relevant to procedure designs;
 - c) general criteria in IFP designing;
 - d) non-precision approach design;
 - e) precision approach design;
 - f) instrument departure designs;
 - g) criteria for RNAV, GNSS and RNP; and
 - h) practical exercises in the design of procedures
- 4.2.3 The IFP Design Service Providers shall ensure that the IFP designer is able to demonstrate required level of competency through recurrent training that includes at least the following elements:
- a) knowledge about updates in ICAO provisions and other provisions pertaining to procedure design; and
 - b) maintenance and enhancement of knowledge and skills in the design of procedures.

- 4.2.4 The IFP design service providers shall ensure that new IFP designers undergo an adequate, supervised OJT and IFP Design supervisor/OJT instructor shall record OJT training process on a prescribed Performa, and shall ensure that new / trainee IFP Designer has;
- a) designed at least one Instrument Flight Procedure conforming with the requirements of Ground Validation.
 - b) developed and completed IFP Design Report which describes all IFP Design segments in detail.
 - c) qualified the requirements of ground validation performed at least one IFP design review.
 - d) shown satisfactory performance in all aspects of IFP Design including the promulgation process.
- 4.2.5 The competency of new IFP designer applying for IFP Designer approval shall be subject to verification by DGCA to ensure compliance with the requirements as mentioned in Para above (4.2.2), stipulated in the Implementing Standards and Guidance Manual for IFP Design service in Sri Lanka.
- 4.2.6. Competency of the IFP designer shall be evaluated by IFP Design supervisor annually and records shall be presented to DGCA.
- 4.2.7 The IFP Design Service Providers shall maintain training records for IFP designers.

Chapter 5 – Procedure Design Information Acquisition

5.1 Information Acquisition

5.1.1 Current and complete survey data and information is crucial to the designing of a safe IFP. The IFP- Design Service Providers shall ensure that the survey and subsequent IFP design activities are controlled and monitored by an IFP Designer who is trained in procedure design.

5.1.2 Obstacle data for procedure design purposes shall be obtained from Sri Lanka Survey Department which is the authentic entity for such. Additionally, updated survey data available in the ETOD module of AIM systems are also considered acceptable.

In the obstacle survey for procedure design, IFP Design Service Providers shall consider that data provided by Sri Lanka Survey Department shall be an authenticated one.

5.1.3 The procedure design information shall be coordinated with all relevant stakeholders. As input for the procedure design process the following aspects need to be assessed:

- (a) airport, navigation aid, obstacle, terrain coordinate and elevation data, based on verified surveys and complying with ICAO Annex 11, 14 and 15 requirements promulgated as IS 25, IS 30/ IS041 and IS 028 respectively;
- (b) airspace requirements;
- (c) user requirements – the needs of Air Traffic Service provider and Aircraft operators who will use this procedure;
- (d) airport infrastructure such as runway classification, lighting, communications, runway markings, and availability of local altimeter setting;
- (e) environmental considerations; and
- (f) any other potential issues associated with the procedure.

Chapter 6 - IFP Design Process

6.1 Introduction

- 6.1.1 The Instrument Flight Procedure Design process encompasses the acquisition of data, design and promulgation of procedures. It starts with compilation and verification of the many design inputs and ends with ground and/or flight validation of the finished product, and documentation for publication.
- 6.1.2 The IFP shall be accompanied by a narrative, which describes the procedure in textual format.

6.2 Procedure Design

- 6.2.1 Procedures shall be designed according to ICAO Doc 8168, Volume II – PANS OPS criteria. Coordination with all concerned parties shall continue throughout the procedure design and validation process to ensure that the procedure meets the needs of the user and the community.
- 6.2.2 If deviation from criteria is required, IFP-Design Service Provider shall consult DGCA prior to applying deviation and seek approval needed for such from DGCA.
- 6.2.3 Each new or revised procedure shall be verified by a qualified IFP Designer other than the one who designed the procedure, to ensure compliance with applicable criteria.
- 6.2.4 Published procedures shall be subject to periodic review to ensure that they continue to comply with changing criteria, and meets user requirements. Unless there is imminent requirement to review and modify, maximum interval for this review is five years.

6.3 Procedure Design Documentation

- 6.3.1 The documentation provided by the IFP Design Service Providers, shall be divided into three categories and includes:
- (a) documentation required for publication in the AIP in accordance with CAASL – IS 003, IS 028 and IS 031 issued by DGCA.
 - (b) documentation required to maintain transparency concerning the details and assumptions used by the approved service provider, which shall include supporting information/data used in the design, such as:
 - i. controlling obstacle for each segment of the procedure
 - ii. effect of environmental considerations on the design of the procedure
 - iii. infrastructure assessment

- iv. airspace constraints
- v. ATM operations requirement
- vi. for modifications or amendments to existing procedures, the reasons for any changes; and
- vii. for any deviation from existing standards, the reasons for such a deviation and details of the mitigations applied to assure continued safe operations.

(c) additional documentation required to facilitate ground and flight validation of the procedure.

6.3.2 All calculations and results of calculations shall be presented in a manner that enables the evaluator to follow and trace the logic and resultant output. A record of all calculations shall be kept in order to prove compliance to or variation from the standard criteria.

6.3.3 Formulae used during calculation shall be the standard formulae as stated in ICAO Doc 8168, Vol. II and related ICAO publications. Units of measurement and conversion factors between such units shall be in accordance to IS003, IS 028 and IS 031 issued by DGCA.

6.3.4 Rounding of results shall follow the standard guidelines in ICAO Doc 8168, Vol. II and related ICAO publications. Rounding shall only be made at the publication stage to facilitate usable figures on maps and charts.

6.3.5 All documentation shall undergo a final verification by IFP designer for accuracy and completeness prior to validation and publication.

6.3.6 All documentation shall be retained to assist in recreating the procedure in the future in the case of incidents and for periodic review and maintenance. The periodic retention shall not be less than the operational life time of the procedure.

6.4 Ground and Flight Validation

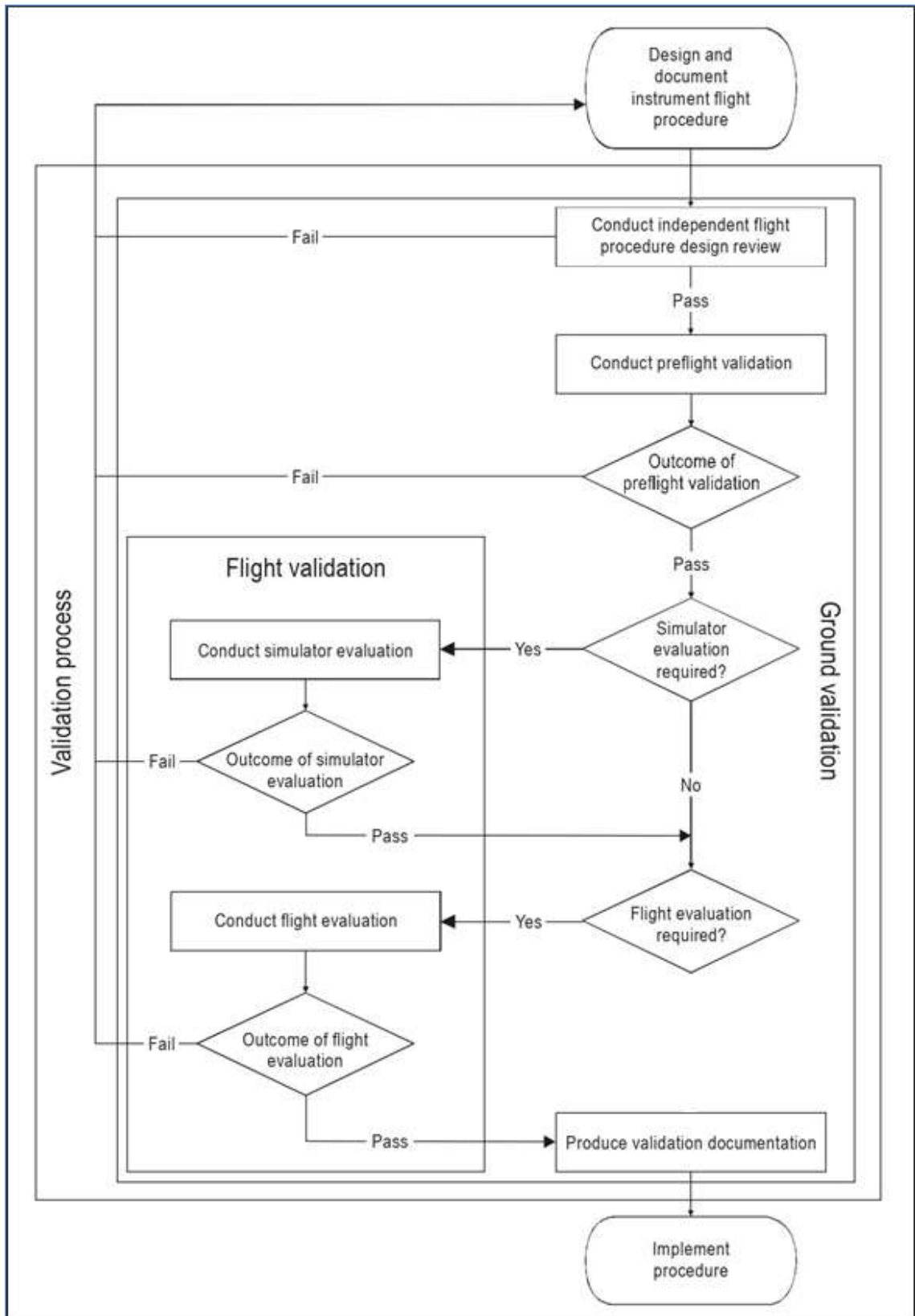
6.4.1 The Need for Validation

6.4.1.1 The purpose of validation shall be to obtain a qualitative assessment of the procedure design including obstacle, terrain and navigation data, and provide an assessment of the flyability of the procedure.

6.4.1.2 Validation is the necessary final quality assurance step in the procedure design process for instrument flight procedures before the procedure design documentation is issued as part of the integrated Aeronautical Information package.

6.4.1.3 The full Validation process shall include both Ground Validation and Flight Validation where Ground Validation shall consist of an independent IFP design review and a pre-flight validation as well as Flight Validation shall consist of a Flight Simulator evaluation and/or an evaluation flown in an aircraft as required.

Note: An overview of the necessary steps in the validation shall be found in Figure 1-1.



6.4.2 Ground Validation

6.4.2.1 Ground Validation is a systematic review of the entire Instrument Flight Procedure package by a person(s) trained in procedure design and with appropriate knowledge of flight validation issues. It is meant to arrest errors in criteria and documentation, and evaluate on the ground, to the extent possible, those elements that will be evaluated in a Flight Validation. Issues identified in the Ground Validation should be addressed prior to any Flight Validation.

6.4.3 Preflight validation

6.4.3.1 Preflight validation shall be carried out as a joint activity by flight procedure designers and flight validation pilots.

6.4.3.2 Preflight validation should identify the impact of a flight procedure on flight operations, and any issues identified should be addressed prior to flight validation.

6.4.3.3 Conduct inventory and review of the IFP package

Persons performing preflight validation shall ensure that the IFP documentation is complete and that all necessary charts, data and forms are available. As a minimum, the following tasks shall be performed:

- a) Ensure the completeness of the IFP package (i.e. that all forms, files and data are included) as described in Guidance manual for IFP design service in Sri Lanka.
- b) Ensure that charts and maps are available in sufficient detail for assessment of the IFP during the FV.
- c) Familiarize with the target population of the procedure (e.g. aircraft categories, type of operation).
- d) Discuss the IFP package with the procedure designer, as necessary.
- e) Verify that the IFP procedure graphics and data match.
- f) Compare the IFP design, coding and relevant charting information against the navigation database used for flight validation.
- g) Verify that controlling obstacles and obstacles otherwise influencing the design of the procedure are properly identified.
- h) Review the airport infrastructure and special airport regulations
- i) Review the navigation infrastructure used by the procedure.
- j) Review pertinent flight inspection documentation, if required.

6.4.4 Flight Validation

- I. Flight Validation comprises of two components namely Simulator Evaluation and Flight Evaluation.
- II. Flight Validation of instrument flight procedures shall be carried out as part of the initial certification and shall also be included as part of the periodic quality assurance programme established to ensure that the procedure design process and its output, including the quality of aeronautical information/data meet the requirements of IS 028.
- III. A Flight Validation is required in the following cases:

- a) if the flyability of a procedure cannot be determined by other means;
- b) if the procedure contains non-standard design elements (deviations from criteria, e.g. non-standard approach angles/gradients, non-standard segment lengths, speeds, bank angles);
- c) if the accuracy and/or integrity of obstacle and terrain data cannot be determined by other means;
- d) if new procedures differ significantly from existing procedures;

6.4.4.1 Flight Evaluation

The objectives of Flight Evaluation are to validate the intended use of the IFP as defined by stakeholders and described in the conceptual design and to evaluate other operational factors, such as charting, required infrastructure, visibility and intended aircraft category.

6.4.4.1.1 The Flight Evaluation shall be performed in following conditions:

- a) For procedures where runway or landing location infrastructure has not been previously assessed in flight for instrument operations.
- b) The introduction of new IFP designed, for the runway of newly build airport.
- c) The introduction of new IFP designed, for the runway for which the IFP already exist.
- d) The new IFP is being implemented for the first time for a runway where no other IFP exist.
- e) If modified/amended IFP differ significantly from existing IFP, where the result of obstacle assessment is deviated from previous.
- f) Any other cases as determined by DGCA.

6.4.4.2 Simulator Evaluation

6.4.4.2.1 To provide an initial evaluation of database coding, flyability and to provide feedback to the procedure designers, simulator assessment shall be necessary.

6.4.4.2.2 Simulator Evaluation shall be accomplished by a qualified and experienced Flight Validation Pilot (FVP), certified or approved by the DGCA.

6.4.4.2.3 The Simulator Evaluation shall be performed if the modified/amended IFP differ significantly from existing IFP, where the result of obstacle assessment has not deviated from previous.

6.4.4.2.4 Simulator Evaluation shall not be used for obstacle assessment.

6.4.4.2.5 Preparation for Simulator Evaluation should include a comprehensive plan with a description of the conditions to be evaluated, profiles to be flown and objectives to be

achieved. A review of the results of Simulator Evaluation should be completed before Flight Evaluation.

- 6.4.4.2.6 The Simulator used should be suitable for the validation tasks to be performed. For complex or special procedures such as IFPs with complex turning missed approach procedure, RNP-APCH (LNAV, LNAV/VNAV) where simulator evaluation is desired, the evaluation should be flown in a simulator which matches the procedure requirements. When the procedure is designed for a specific aircraft model or series and specific FMS and software, simulator evaluation should be flown in a simulator with the same configuration used by the operator in daily operations.
- 6.4.4.2.7 Required Navigation Performance Authorization Required (RNP AR) IFP(s) shall always undergo Simulator Evaluation.
- 6.4.4.2.8 A detailed written report of the results of Simulator Evaluation shall be provided.
- 6.4.4.3 Flight Validation shall be a separate activity from Flight Inspection. Flight Inspection of instrument flight procedures is required to assure that radio navigation aids are adequately supporting the procedure. This is carried out as part of a formal flight inspection programme and is performed by a qualified Flight Inspector using an appropriately equipped aircraft.
- 6.4.4.4 The IFP Designer shall be the originator of all data applicable to conduct a flight validation. The IFP Designer should provide comprehensive briefings on designed IFP to the FVP.
- 6.4.4.5 The IFP Designer shall participate in the validation flights to assist in its evaluation and obtain direct knowledge of issues related to the design of the procedure from the FVP.
- 6.4.4.6 All completed Flight Validation reports shall be submitted to DGCA during the submission of IFP Designs for approval.
- 6.4.5 Qualification for Flight Validation Pilot
- 6.4.5.1 Flight Validation Pilots performing a Flight Validation of IFP designs shall be qualified in term of minimum qualifications and trainings and competent for flight validations and flight inspection work.
- 6.4.5.2 The qualifications for FVPs shall include:
- (a) At least a Commercial Pilot Licence with Instrument Rating.
 - (b) The licence held by the FVP should be for the aircraft category (e.g. aeroplane or helicopter) appropriate for the procedure to be validated.
 - (c) FVPs shall meet all the experience requirements for the Airline Transport Pilot Licence in the relevant category of aircraft (e.g. aeroplane or helicopter).
 - (d) The FVP does not have to be the pilot-in-command of the validation flight nor is he required to have the type rating on the aircraft used for the validation flight.
 - (e) A thorough knowledge of ICAO PANS-OPS and PBN procedures design principles and methods;

(f) Satisfactory completion of a Flight Validation course designed according to ICAO Doc 9906 Volume 6.

- 6.4.5.3 Helicopter procedures shall be validated by pilots who, in addition to the above qualifications, are familiar with helicopter procedure design and operations.
- 6.4.5.4 If the FVP should not be qualified as pilot-in-command of an aeroplane or a helicopter to be used for a validation flight, another pilot may be assigned to be the Pilot-in-Command provided the FVP occupies a control seat and directs the conduct of the validation.
- 6.4.5.5 The FVP shall ensure that the Pilot-in-Command or an observer is fully competent in the use of the RNAV system to be used for the flight.

Chapter 7 – Environmental requirements

7. Guidance on Environmental Issue

- 7.1 In addition to obstacle clearance criteria, attention shall be given to other important elements in procedure design, namely airspace requirements, ATS operational requirements, community requirements and environmental requirements imposed by governmental organizations.

Note: - The details on Prohibited areas, Restricted areas, Danger areas above which the flying is constrained, are available in Sri Lanka AIP. The constraints shall be taken into concern for IFP design.

Chapter 8 – Safety Assessment

8.1 Safety Assessment

- 8.1.1 The IFP Design Service Providers shall carry out a safety assessment in respect of proposals for new flight procedure designs or any significant changes in a revised procedure. Proposals shall be implemented only when the assessment has shown that an acceptable level of safety will be met.
- 8.1.2 A safety risk assessment shall be conducted when there is a deviation from the criterion outlined in this implementing standard.
- 8.1.3 The safety assessment shall consider relevant factors determined to be safety-significant, including but not limited to:
- (a) types of aircraft and their performance characteristics, including navigation capabilities and navigation performance;
 - (b) traffic density and distribution;
 - (c) airspace complexity, ATS route structure and classification of the airspace;
 - (d) aerodrome layout;
 - (e) type and capabilities of ground navigation systems; and
 - (f) any significant local or regional data (e.g. obstacles, infrastructures, operational factors, etc).
- 8.1.4 The following reference documents are recommended to be considered in order to carry-out safety assessment process & documentation,
- **ICAO Documents**
 - 1. Annex 19 – Safety Management
 - 2. Doc 9859 – Safety Management Manual
 - **CAASL Documents**
 - 1. Civil Aviation Safety Management Regulations No. 01 of 2018
 - 2. SLCAP 2600 – State Safety Programme Policy & Procedure Manual
 - 3. IS 087
 - 4. IS 070 - Framework for a Safety Management System (SMS)
- 8.1.5 Safety risk control/mitigation process shall include hazard/consequence identification and safety risk assessment. Once hazards and consequences have been identified and safety risks assessed, the effectiveness and efficiency of existing defences relative to the hazards and consequences should be evaluated. As a consequence of this evaluation, existing defences shall be reinforced, new ones are to be introduced, or both.
- 8.1.6 As part of the safety assurance, the risk control/ mitigation process shall include a system of feedback. This is to ensure integrity, efficiency and effectiveness of the defences under the new operational conditions.

8.1.7 The IFP Design Service Providers shall ensure that the results and conclusions of the safety assessment and mitigation process of a new or changed procedure are specifically documented, and that this documentation is maintained throughout the life of the IFP.

Chapter 9 – Quality Management System

9.1 IFP Design Service Providers shall implement a Quality Management System (QMS) at each stage of the Instrument Flight Procedure design process.

9.2 Quality Assurance Methodology

The IFP Design Service Providers shall establish and comply with an appropriate Quality Assurance Methodology acceptable to DGCA as prescribed in the ICAO Doc. 9906, volume 01.

9.3 Quality Manual

The IFP Design Service Providers with Quality Management System shall have their own Quality Management Manual (QM). That Quality Manual could be a part of IFP-DS Operational Manual.

Note:- Considering the characteristics of an IFP-Design Service, implementation of a Quality Management System shall be achieved by implementing specific safety assurance methodologies developed for this service.

Note:- The following list of ICAO guidance materials are recommended to be taken into consideration to implement an effective Quality Management System.

1. Provisions to establish a quality assurance methodology – Doc. 8168, Volume II, Part I, Section 2, Chapter 4 — Quality Assurance.
2. Guidance on implementing a quality assurance system - Doc 9906, Vol. I

9.4 IFP Design Service providers shall retain all procedure design documentation for which it is responsible of designing, so as to allow any data anomalies or errors found during the production, maintenance or operational use of the procedure to be corrected in accordance with the Guidance Manual for IFP Design service in Sri Lanka.

9.5 A documented process shall be established to take appropriate actions, to resolve identified safety issues in regards to IFP. IFP Design Service Providers should ensure that identified safety issues are resolved in a timely manner through a system which monitors and records progress.

9.6 A mechanism/ System shall be established with a time frame applicable depending on the characteristics of procedure design, for elimination of any deficiencies identified by the Flight Procedure Inspectors.

9.7 The DGCA shall be the authority responsible to suspend or revoke the IFP design privileges, if a deficiency is not corrected within the established time frame.

Chapter 10 – Design Publication

10.1 Publication of Instrument Flight Procedures

10.1.1 The IFP Design Service Providers shall ensure that IFP designs with required details are provided to the Aeronautical Information Service (AIS) provider for publication in the AIP with the necessary approval from DGCA.

10.1.2 The intended effective date for operational use of the IFP designs shall be included in the document narrative.

10.1.3 The designs/charts published in the AIP shall be produced in accordance with the provisions contained in the documents listed below:

- (a) CAASL IS 031 issued by DGCA – CAASL standards on Aeronautical Charts
- (b) ICAO Doc 8168 Volumes I and II - Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)
- (c) ICAO Doc 8697 – Aeronautical Chart Manual
- (d) ICAO Doc 8126 AN/872 Aeronautical Information Services Manual

10.1.4 The aeronautical charts included in the Sri Lanka AIP shall be kept up-to-date by means of replacement sheets where necessary. Significant amendments or revisions in the IFP Designs shall be clearly indicated in the revised charts.

10.2 IFP Design Service Provider shall ensure that all published Instrument Flight Procedure Designs are to be subjected to a periodic review. Upon periodic review, the following tasks are to be conducted:

- a) Assessment of the impact of all changes to obstacle data.
- b) Assessment of the impact of all changes to aerodrome, aeronautical and navaid data.
- c) Assessment of the impact of all criteria amendments and changes to depiction standards.
- d) Assessment of the impact of all changes to user requirements. Such changes to user requirements include, but are not limited to:
 - fleet type (performance)
 - scheduled service route
 - ATM procedures
 - Airspace

Note: - Even if the user requirements are not a safety-related issue, IFP amendments and/or new IFPs may be needed to satisfy current user requirements.

Chapter 11 – Procedure Design Automation

11.1 General

- 11.1.1 The IFP Design Service Providers are encouraged to use automation tools which have the potential to reduce errors in the procedure design process, as well as to standardize the application of the PANS-OPS criteria.
- 11.1.2 The recognized ICAO tools such as PANS-OPS Obstacle Assessment Surface (OAS) Software and the PANS-OPS Software (CD-101), shall be recommended to be used by IFP Design service provider.

11.2 Validation of Procedural Design Automation & Approval

- 11.2.1 IFP Design service providers shall ensure that the software packages used in the design of procedures are validated according to guidelines given in ICAO Doc. 9906, Vol. III and the DGCA approval for the usage of such in IFP designing, shall be obtained.
- 11.2.2 The other procedure design automation tools intended to be used by IFP Design Service Providers, shall be subject to DGCA prior approval. The DGCA shall be the final authority on any other decisions in this regard.