SCAA

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Approval of Instrument Flight Procedures Designs

November 2022

Issued and Published under the Authority of the Director General

SUDAN CIVIL AVIATION AUTHORITY
THE REPUBLIC OF SUDAN
NOVEMBER 2022

	Sudan Civil Aviation Authority ADVISORY CIRCULAR AC-011-003
ISSUED AND PUBLISHED UNDER THE AUTHORITY OF THE DIRECTOR GENERAL OF CIVIL AVIATION	

Title: Approval of Instrument Flight Procedures Designs

1.0 Purpose

This Advisory Circular provides guidance material to be used by ANRD Inspectors in evaluating the instrument flight procedures for approval. It covers the evaluation and approval of Instrument Approach Procedures intended for public use.

2.0 References

2.1 ICAO Annex 11.
2.2 Doc 8168 – OPS/611 Aircraft Operations
2.3 Doc 9274 – AN/904 Manual on the Use of the Collision Risk Model (CRM) for ILS operations
2.4 Doc 9368 – AN/911 Instrument Flight Procedure Construction Manual
2.5 Doc 9674 – AN/946 World Geodetic System 1984 (WGS-84) Manual
2.6 Doc 9906 – AN/472 Quality Assurance Manual for Flight Procedure Design
2.7 Doc 8697 – Aeronautical Chart Manual
2.8 ICAO Annex 4

3.0 Guidance Information

3.1 Scope

Flight Procedures considered in this document include conventional and RNAV departure, arrival and approach including non-precision and precision approaches.

3.2 Requirements for approval

3.2.1 Ensure the procedure(s) submitted for evaluation and approval are designed and developed by person(s) suitably qualified procedure designers.

3.2.2 The procedures must be suitable for the purpose and the NAVAIDS used shall be adequate to provide the required guidance.

3.3 Supporting documents

The documentation required in the evaluation and approval process will include;

a) obstacle survey data including dates of last full and update surveys;

b) airfield and navigation facility data;

c) diagrams of each segment and holding areas showing all dominant obstacles and the controlling obstacle;

d) procedural and minimum altitudes for each segment;

e) track guidance;

f) chart depicting the procedure;

g) textual or abbreviated description and path terminators where applicable;

h) associated positional data e.g., co-ordinates, bearings, distances;

i) description of methodology and options considered;

j) sufficient detail of significant calculation and design data to enable the proposal to be validated;

k) report of flight check for all NAVAIDS supporting the procedures

l) other information considered relevant in support of the request for approval

3.4 IAP design requirements

3.4.1 The methodology for the construction and the design is detailed in ICAO Doc 8168Ops/611, Volume2, to ensure protection from obstacles is assured. All instrument approach procedures shall conform to the ICAO Doc 8168-OPS criteria.

3.4.2 The design and format for IAP charts shall be in accordance with ICAO Annex 4 and ICAO Doc 8697.

3.4.3 The quality requirements for the procedures shall conform to ICAO Doc 9906 – AN/472 Quality Assurance Manual for Flight Procedure Design .

3.5 IAP survey requirements

3.5.1 The inspector shall check whether, prior to the design, the relevant survey of obstacles was completed.

3.5.2 The area(s) covered by the survey(s) shall meet the relevant charting areas required in ICAO Annex 4.

3.5.3 The standards and accuracy requirements of the survey shall be in accordance with ICAO Doc 9674 - World Geodetic System 1984 (WGS 84).

3.6 NAVAIDS flight check requirements

Prior to approval for publication and use of any IAP, the ANSP shall ensure that any NAVAID relied upon for the IAP has been flight checked and approved by the Authority.

3.7 Flight check requirements

3.7.1 During the approval process the Authority will determine the extent of flight checking required and advise the ANSP.

3.7.2 If a procedure is determined to be checked, it shall be checked by an appropriately trained and qualified pilot prior to publication and use in order to determine if;

a) Operationally safe and flyable by a minimally qualified solo pilot flying in an aircraft with basic Instrument Flight Rule (IFR) instrumentation in Instrument Meteorological Conditions (IMC) and using standard navigation charts.
b) As simple as possible to avoid any unnecessary pilot workload.
c) Supported by relevant, clear and concise charts.
d) Compliant with the required/minimum obstacle clearance - OCA and MSA as appropriate
e) Supported by the required runway lights and markings.
f) Suitable for the safe maneuvering of each category of aircraft approved to use the procedure.

3.7.3 The flight check report form shall be completed and signed by the flight checking pilot and submitted as part of the application for approval. Since the IAPs are supported by visual aids including aerodrome lighting and marking, a separate report on serviceability and suitability of appropriate visual aids shall be required.

3.7.4 The flight check shall be undertaken in Visual Meteorological Conditions (VMC) only.

4.0 Procedure for Approval and/or Acceptance

Steps to be followed by PANS OPS inspectors for the approval of IFPD documents.

4.1 Qualification of IFP Designer and ground validation personnel

Qualifications of IFP Designers along with the ground validation personnel are the prerequisites for the design and validation of flight procedures. So, IFPDSP must submit the certificate and document that justify the qualification of the IFP designer and ground validation personnel. For this, PANS OPS inspector shall check the evidences for the following:

a) Basic training qualification.
b) OJT completion.
c) Other qualifications as required by SCAA.

4.2 IFP design process components

PANS OPS inspector during the time of approval the IFP design documents shall ensure that the all-essential components of IFP design process are followed by the (Instrument Flight Procedure Design Service Provider) IFPDSP. So, to verify this, PANS OPS inspector shall check whether the IFPDSP have followed the following steps as part of quality assurance process:

a. Collection, validation and approval of Data

a) As the quality of IFP mainly depends on the data used for design of such IFP, PANS OPS inspector must confirm whether the surveyed data based on which the IFP is designed has been approved by the appropriate authority or not. For this, inspector shall check the evidences of the following:

- Data survey agency's qualification for survey of aerodrome and obstacle data.
- Data approving authority's acceptance/approval.

b. Conceptual design and stakeholder's consultation

Conceptual design of the IFP demand is basic document that confines design activities within a desirable limit, which also helps in having fruitful consultation and interaction with the stakeholders to attain the constructive feedback. So, to ascertain whether the stakeholders are consulted about the conceptual design, PANS OPS inspector shall check the agreements reached with stakeholder. For this, the inspector shall check the evidences of the following:

- Minutes of stakeholder's meeting with agreements/understandings, and/or
- Stakeholder's written feedback

c. Application of design criteria and draft design

Design criteria used in the IFP design are the essential factors that need to be minutely verified to ensure that regulatory requirements are complied with. So, PANS OPS inspector shall check if applied criteria meet the SCAA and/or ICAO requirements.

Check randomly the criteria used in the design of:

a. En-route,
b. MSA,
c. STAR,
d. Holding,
e. Initial Approach, Intermediate Approach, Final Approach, Missed Approach and
f. SID.

Check randomly the calculations for:

a. Turn Protection
b. Area-width/Semi-area width
c. PDG
d. MOCA/OCA
e. VSS
f. MSD
g. TRD/TID, etc.

d. Safety activities

As per Requirement 2.29 of ICAO Annex 11, any new flight procedures or significant safety- related change in the existing flight procedures shall only be affected after a safety risk assessment has demonstrated that an acceptable level of safety will be met. In order to ensure IFPD Service Provider has complied this requirement, PANS OPS inspector shall check the evidences of the conduct of safety risk assessment activities before the implementation of new flight procedures or significantly modified flight procedures. A safety risk assessment of an IFP is considered completed when the IFPD is in compliance with the SCAA requirements. However, a safety risk assessment must be conducted when there is a deviation from such regulatory framework.

e. Ground validation

Ground validation is a mandatory step of IFP design process. It is a review of the entire IFP package by an independent person(s) trained in IFP design which is intended to capture flaws in the design criteria and design documentation, and evaluate IFPs on the ground, to the extent possible, those elements that will be evaluated in a flight validation. So, to ensure the ground validation activities are properly conducted, PANS OPS inspector shall check the following:

- evidence of ground validation as part of design document
- ground validation personnel are not the part of IFP design team.

f. Flight validation

Except when the flight procedures and obstacles used in the IFPs can not be verified by ground validation, a flight validation of IFPs shall be carried out as part of the

initial approval and shall also be included as part of the periodic quality assurance activities.

If the flight validation activity has been conducted during the design process, PANS OPS inspector shall check the evidence of the conduct of flight validation such as:

- Approved flight validation report.

Check if the alternate means are applied in lieu of flight validations such as conduct of

- demonstration flight, use of flight training device, etc.
- Fly-ability check report by online operators
- Flight training device report, etc.

g. Stakeholder consultation and endorsement

All stakeholders should be consulted to get their opinion on the proposed procedure. This will help in understanding the fulfilment of the initially agreed requirements between the stakeholders and help in getting stakeholder endorsement about the procedure. So, PANS OPS inspector shall check whether the stakeholders are consulted about the final design product and stakeholder endorsement is taken.

h. Meeting minutes, and/or Stakeholder's written feedback

4.3 Acceptance **and/or approval of the design document**

a. Satisfactory to the PANS OPS inspector, he shall endorse his acceptance to the design document and forward for necessary approval.

b. Not satisfactory to the PANS OPS inspector, he shall return back the design document with necessary feedback for further refinement and resubmission of the document for necessary acceptance and/or approval.

Fakhreldein Osman Ahmed
Director General
Sudan Civil Aviation Authority
November 2022

Attachment: Checklist for acceptance and/or approval of IFP Design Documents

Name of IFP Designer:

Name of Ground Validation Personnel:

1. Designed procedures (check as applicable):

   En-route ☐

   STARs ☐

   SIDs ☐

   APCHs ☐

   Comments:

2. Does the IFP designer meets the qualification requirement mentioned in this procedure and SCAA IFPD regulations?

   Yes ☐

   No ☐

   Comments:

3. Does the IFPDSP received initiation document to start the design/maintenance of the procedure?

   Yes ☐

   No ☐

   Comments

4. Does the data survey agency submitted the qualification document for the survey of aerodrome and obstacle data?

   Yes ☐

   No ☐

   Comments:

5. Are the stakeholders consulted about the conceptual design of IFPs?

   Yes ☐

   No ☐

   Comments:

   If yes, has the IFPDSP retained the minutes of stakeholder's meeting or stakeholder's written feedback?

   Yes ☐

   No ☐

   Comments:

6. Does the IFPDSP meet the applicable design criteria?

   a. En-route

      Yes ☐

      No ☐

   Comments:

   b. MSA

      Yes ☐

      No ☐

      Comments:

   c. STAR

      Yes ☐

      No ☐

      Comments:

d. Holding

Yes ☐

No ☐

Comments

e. Initial Approach

Yes ☐

No ☐

Comments:

f. Intermediate Approach

Yes ☐

No ☐

Comments:

g. Final Approach

Yes ☐

No ☐

Comments:

h. Missed Approach

Yes ☐

No ☐

Comments:

i. SID

Yes ☐

No ☐

Comments:

7. Has the IFPDSP conducted safety risk assessment activities prior to implementing the new or significantly modified flight procedures?

   Yes ☐

   No ☐

   Comments:

   If no, is there proper justification for not conducting SRA activities?

   Yes ☐

   No ☐

   Comments

8. Has the IFPDSP conducted the ground validation of newly designed or significantly modified flight procedures?

   Yes ☐

   No ☐

   Comments:

9. If yes in 9 above, has the IFPDSP submitted ground validation report as part of or separate design document?

   Yes ☐

   No ☐

   Comments:

10. Is the ground validation personnel independent of IFP design activities?

    Yes ☐

    No ☐

    Comments:

11. Has the IFPDSP conducted a flight validation of newly designed or significantly modified flight procedures?

Yes ☐

No ☐

Comments:

If yes, has the IFPDSP submitted flight validation report?

Yes ☐

No ☐

Comments:

12. Has the IFPDSP applied alternative means in lieu of flight validation?

Yes ☐

No ☐

Comments:

If yes, what alternative means has been applied?

Conduct of Demo flight ☐

Use of flight training device ☐

Others ☐

Comments:

13. If no in 11 above, is there proper justification for not conducting flight validation activities?

Yes ☐

No ☐

Comments:

14. Is there stakeholder consultation and endorsement of IFP design that was initially conceptualized?

Yes ☐

No ☐

Comments:

If yes, has the IFPDSP retained the minutes of stakeholder's meeting or stakeholder's written feedback as an endorsement from stakeholder's side?

Yes ☐

No ☐

Comments:

15. Overall comment.

16. Name and signature of PANS OPS inspector

a. Name:

b. Signature:

c.

17. Date\

Attachment 2: APPLICATION FOR INSTRUMENT FLIGHT PROCEDURE DESIGN APPROVAL - NEW DESIGN/CHANGE

Notes: i) Read the form thoroughly and complete the appropriate sections only.

ii) Complete the form in BLOCK CAPITALS or tick boxes ☑ unless otherwise indicated.

SCAA use only

SECTION 1) CONTACT DETAILS

Aerodrome Name:

…….... ICAO

Designator: ……Primary Point of Contact: ……

Appointment: …….. Telephone Number:

…….... Fax Number: …….. Email:

……

Secondary Point of Contact: ……Appointment: ……

SECTION 2) DESCRIPTION OF NEW DESIGN/CHANGE (including details of any Navigation facilities being repositioned, if any)

SECTION 3) DETAILS OF PROCEDURE(S):

Procedure(s) required to Runway …….. or general alignment if Aerodrome Approach …….. Procedure required for the following Categories of Aircraft A ☐ B ☐ C

Type of Procedure Required	Ident	Frequency	GP Angle/Nominal GS	Commissioned/Calibrated YES	NO	If no what is the planned calibration date?
☐ ILS				☐	☐	
☐ ILS/DME				☐	☐	
☐ LOC/DME				☐	☐	
☐ VOR				☐	☐	
☐ VOR/DME				☐	☐	
☐ RNAV (GNSS)				☐	☐	
☐ APV BAROVNAV				☐	☐	
☐ SID				☐	☐	
☐ STAR				☐	☐	

SECTION 4) ADDITIONAL INFORMATION

(Please provide details of factors which may affect procedure design e.g. noise sensitive areas, local restricted airspace, other airspace users etc)

SECTION 5) SUBMISSION DETAILS

Please submit the completed form to the below mail Address:

ANRD Inspector (PANS OPS)

Air Navigation Regulatory Directorate

Aviation Safety
Department,

Sudan Civil Aviation
Authority,

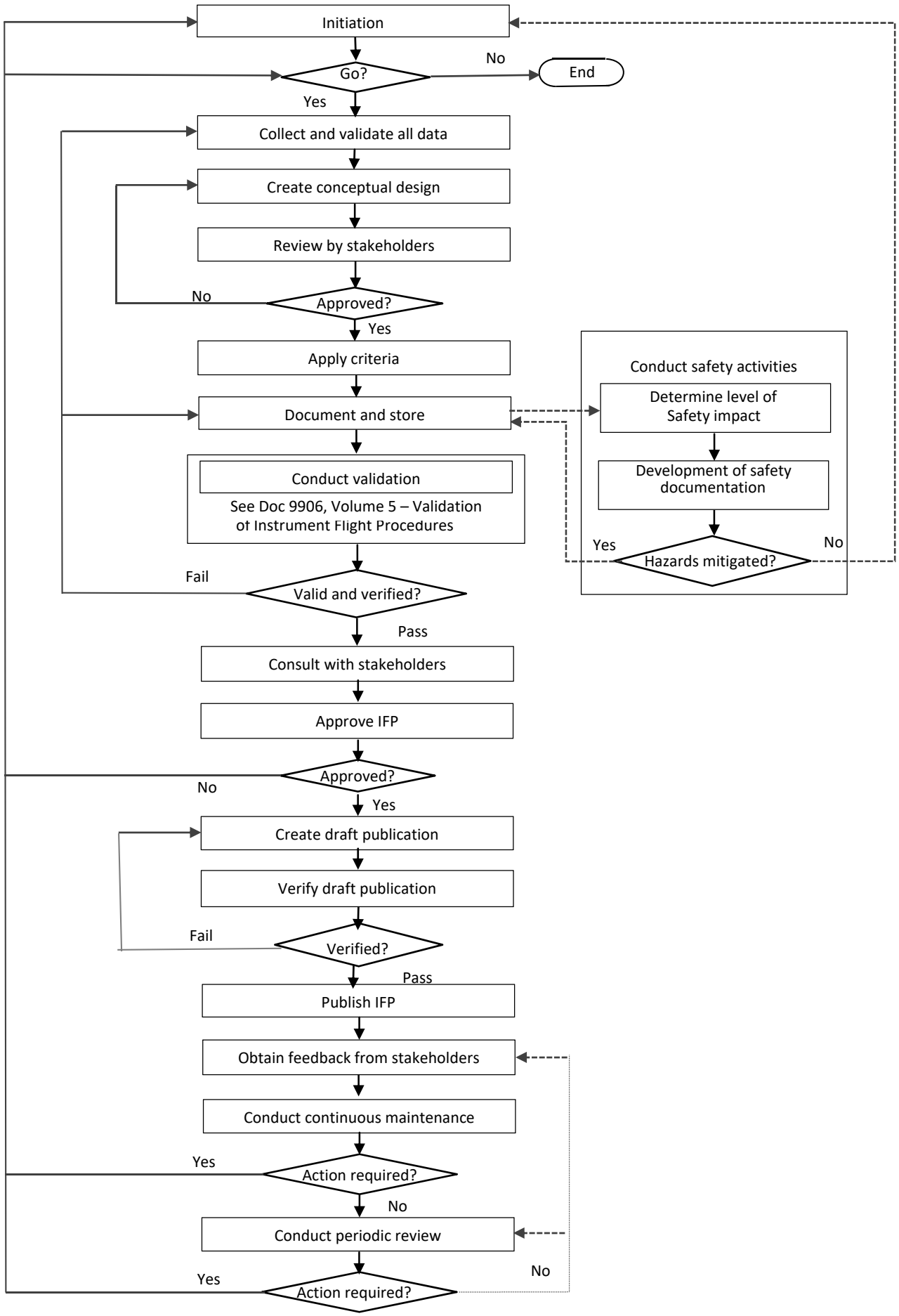
SECTION 6) DECLARATION

I confirm that the information provided is correct and I will inform SCAA of any changes thereto.

Name..... Position in Company:

..... Signature.....Date:

Attachment 3: IFP process flow diagram



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