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SUBMISSION AND APPROVAL OF INSTRUMENT FLIGHT PROCEDURES

1. ICAO Doc 8168 Vol 2 (Construction of Visual and Instrument Flight Procedures) Part I Section 2 Chapter 4 (Quality Assurance) states that:

"4.1.2 The State is responsible to ensure that all published instrument flight procedures in their airspace can be flown safely by the relevant aircraft. Safety is not only accomplished by application of the technical criteria in PANS-OPS and associated ICAO provisions, but also requires measures that control the quality of the process used to apply that criteria, which may include regulation, air traffic monitoring, ground validation and flight validation. These measures shall ensure the quality and safety of the procedure design product through review, verification, coordination, and validation at appropriate points in the process, so that corrections can be made at the earliest opportunity in the process."

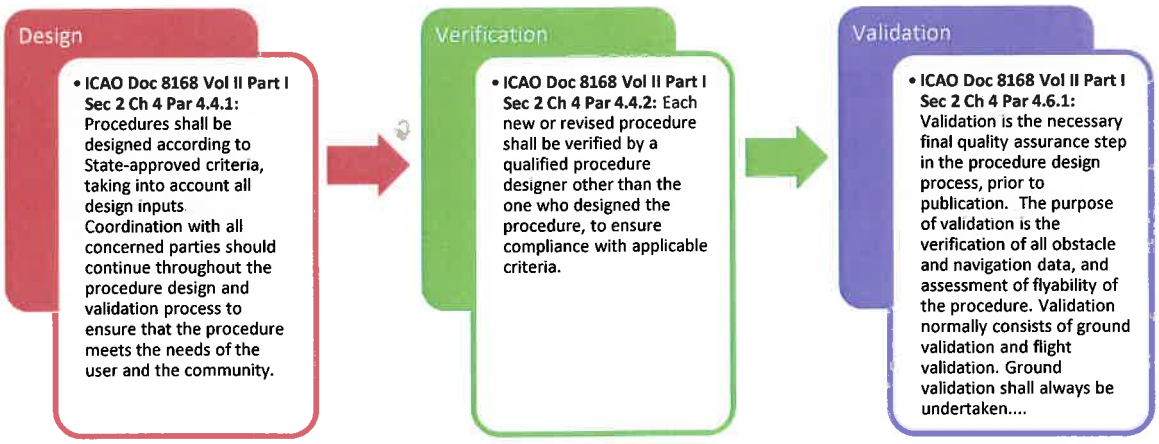
.....

"4.4.1 Procedures shall be designed according to State-approved criteria, taking into account all design inputs. Coordination with all concerned parties should continue throughout the procedure design and validation process to ensure that the procedure meets the needs of the user and the community."

2. In order to comply with the ICAO requirements, South African Civil Aviation Regulation (CAR) Part 173 (Flight Procedure Design) has been promulgated to regulate Flight Procedure Design (FPD) and Flight Procedure Design Organisations (FPDO).

3. CAR Part 173.02.4(2)(c) requires that the holder of a FPDO certificate "submit flight procedures designed and verified as referred to in paragraphs (a) and (b) to the Director for ground and flight validation as prescribed in Document SA-CATS-173". Only FPDOs certified by the SACAA under Part 173 as a FPDO are permitted to design IFPs for validation/review and approval by the SACAA.

4. The development of an IFP follows a series of steps from the origination of data through survey to the final publication of the procedure and subsequent coding of it for use in an airborne navigation database. ICAO Doc 9906 Vol 1 (Quality Assurance Manual for Flight Procedure Design - Flight Procedure Design Quality Assurance System) defines a 17-step quality assurance process. This 17-step process can be summarised into the following 3 key processes:



5. ICAO Doc 8168 Vol 2 Part I Section 2 Chapter 4 Par 4.6.2 defines Ground Validation as follow:

"4.6.2 Ground validation is a 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 catch 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. The ground validation will also determine if flight validation is needed for modifications and amendments to previously published procedures."

6. Due to the current demand for the approval and implementation of Instrument Flight Procedures (IFP) in accordance with the ICAO PBN Roadmap, the following measures have been instituted:

   a. All Procedure Design Package (PDP) submitted to the SACAA for approval shall be accompanied by a Ground Validation Package (GVP) conducted by an Approved Procedure Validator (APV).

   b. For IFPs already submitted to the SACAA for validation, FPDOs may have a ground validation conducted by an APV and submit the GVP to the SACAA for review and approval.

   c. IFPs submitted to the SACAA without a GVP will be subject to prioritisation in accordance with the PBN priority list.

   d. The PDP and GVP will be subject to review and approval by the SACAA.

   e. The requirements for the ground validation and GVP are contained in Appendix A.

7. ICAO, and thereby the SACAA, requires that IFPs be designed in accordance with applicable design criteria & quality assurance processes, are adequately verified & validated with the assurance that it is safe and efficient and that it can be implemented without any safety risk. The SACAA therefore requires that that the ground validation be conducted by an Approved Procedure Validator (APV) with appropriate aviation and PANS-OPS knowledge, skill and experience to identify design, operational and safety risks. The APV shall either be:

   a. An Approved Procedure Validator - FPDO (APV-F):

      A FPDO which is independent from the FPDO responsible for the design of the IFP, certified by the SACAA under CAR Part 173 and specifically approved as an APV. The requirements for the application and approval of an APV-F are contained in Appendix B.

      or

   b. An Approved Procedure Validator - Organisation (APV-O):

      A FPDO certified by a Civil Aviation Authority (or equivalent authority) other than the SACAA, AND approved by the SACAA, to conduct ground validations as an APV. The requirements for the application and approval of an APV-O are contained in Appendix C.

      or

   c. An Approved Procedure Validator - Individual (APV-i):

      An independent and suitably qualified and experienced Flight Procedure Designer, approved by the SACAA, to conduct ground validations as an APV. The requirements for the application and approval of an APV-i are contained in Appendix D.

8. The SACAA reserves the right to impose any additional requirements or restrictions, issue, suspend or revoke the certification or approval provided for in this document.

9. The SACAA reserves the right to request any additional information, data, documents, files, etc, that would assist with the validation or review and approval of IFPs. Attention is drawn to the fact that an Instrument Approach Chart (IAC), compliant with the SACAA chart specifications and chart template, is required. Refer to Appendix E for more information.

10. The SACAA will act as the mediator and arbitrator should a dispute between the FPDO and the APV arise. The decision of the SACAA will be final.

11. The SACAA will, in accordance with the guidelines contained in ICAO Doc 9906 Vol 1 and the Manual of Procedures and Standards for Procedure Design & Cartography (MOPS), determine if simulator and/or flight validation will be required. The simulator and/or flight validation will be overseen or conducted by a SACAA PANS-OPS Inspector.

12. The cost for the design, verification, validation (ground and/or simulator and/or flight validation) and approval is for the account of the aerodrome license holder, procedure owner or procedure sponsor (organisation or individual acting on behalf of the aerodrome license holder or procedure owner).

13. The fees for the approval of APVs or IFPs submitted with a GVP will be charged in accordance with the hourly rate as defined in CAR Part 187.

14. Any queries regarding this matter can be directed to Executive: Aviation Infrastructure or Manager: PANS-OPS. The contact details are

Executive: Aviation Infrastructure
Email: bestbierg@caa.co.za
Tel: +27 11 545 1265/1097

Manager: PANS-OPS
Email: pd&c@caa.co.za
Tel: +27 11 545 1468/1375/1315

GH BESTBIER
Executive: Aviation Infrastructure

16/02/2016
Date

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Appendix A:	Ground Validation Requirements
Appendix B:	Application and Approval of an Approved Procedure Validator - Organisation (APV-F)
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APPENDIX A

GROUND VALIDATION REQUIREMENTS

1. The ground validation shall be conducted by an Approved Procedure Validator (APV).

2. On receipt of the Procedure Design Package (PDP) from the Flight Procedure Design Organisation, the APV shall:

    a. Verify that the PDP is complete and complies with the requirements specified in:

        i. Appendix C (Procedure Design Package (PDP)) of the Manual of Procedures and Standards for Procedure Design & Cartography (MOPS).

        ii. PD&C Notice 1/2014: Additional requirements for the submission of Flight Procedures for validation.

        iii. SACAA compliant Instrument Approach Chart (IAC) in electronic and PDF format.

    b. Return the PDP to the FPDO for corrective action if the PDP is found to be incomplete or does not comply with the PDP requirements.

3. Obtain the latest obstacle dataset from the SACAA's PANS-OPS section (pd&c@caa.co.za).

4. Conduct the ground validation in accordance with guidelines provided in Part II Section 14.1 (Ground validation) of the MOPS and ICAO Doc 9906 Vol 5.

5. The ground validator shall check & verify *inter alia*:

    a. Supplied data.

    b. Parameters used.

    c. Calculations.

    d. Protection areas.

    e. Obstacle clearance.

    f. Compliance with *inter alia*:

        i. The MOPS, specifically Part III (Flight Procedure Design Standards) and Appendix C (Procedure Design Package (PDP)).

        ii. PD&C Notice 1/2014: Additional requirements for the submission of Flight Procedures for validation.

        iii. ICAO Reference Documents for Flight Procedure Design (FPD) (ICAO Doc 8168 Vol 1 & 2, Doc 9613, Doc 9931, Doc 9993, Doc 9905, etc).

        iv. Quality assurance processes contained in ICAO Doc 9906 Vol 1 & 5.

        v. Compliance with User Requirement Specifications (URS).

        vi. Environmental requirements.

        vii. That proper verification was conducted by a second qualified designer.

        viii. Any additional requirements deemed necessary by the SACAA.

6. The ground validator shall check & verify all the information, data, calculations, etc contained in the design report against the information, data, calculations, etc in the design files, IAC, textual page and/or tabulation page.

7. The design report and design files shall be marked up and annotated in red as follow:

   a. Information, data, calculations, etc checked and found to be correct or compliant shall be indicated with a tick mark (✓).

   b. Information, data, calculations, etc checked and found to be incorrect shall be circled and the correct parameters and/or calculations/values be noted.

   c. Non-compliances shall be marked and suitably annotated with the finding and the applicable reference.

   d. Information, data, calculations, etc that were not checked shall be clearly indicated and reasons provided.

   e. Each page shall be initialled by the ground validator. The last page shall include a statement "Ground Validated By:", full signature, name and surname of the ground validator and date of signature.

   f. Where the ground validator is not the Chief Designer, the Chief Designer shall review the ground validation report and initial each page. The last page shall include a statement "Verified By:", full signature, name and surname of the Chief Designer and date of signature.

   g. Mark ups can also be done electronically.

8. A Ground Validation Package (GVP) shall be compiled and submitted to the SACAA for review. This GVP shall consist of:

   a. The Procedure Design Package submitted by the FPDO.

   b. A Ground Validation Report:

      i. Listing and describing all non-compliances, including the applicable reference.

      ii. Any safety concerns.

      iii. Any observations or comments.

      iv. Recommendations for approval/non-approval and any conditions or restrictions that should be imposed.

      v. Signature of the ground validator, and Chief Designer, if applicable.

      vi. Space for comments and signature by the SACAA Manager: PANS-OPS.

   c. Marked up and annotated design report and design files.

   d. All supporting information, data, calculations, files, etc used in the ground validation or derived as part of the ground validation.

   e. All correspondence between the FPDO and the APV with regards to the IFP, or any matter related to it, to maintain traceability and transparency in accordance with ICAO doc 8168 Vol II and Doc 9906 Vol 1.

f. Any additional information, data, calculations, files, etc that will support the approval/non-approval of the IFP.

9. Any technical queries can be directed to Manager: PANS-OPS. The contact details are

Manager: PANS-OPS
Email: pd&c@caa.co.za
Tel: +27 11 545 1468/1375/1315

APPENDIX B

APPLICATION AND APPROVAL OF AN APPROVED PROCEDURE VALIDATOR - FPDO (APV-F):

1. Certified FPDOs wishing to apply to become an Approved Procedure Validator – FPDO (APV-F) shall submit an official letter to the SACAA requesting consideration for approval as an APV-F. The letter shall contain the following information:

    a. Registered company name.

    b. Registered company address.

    c. Company contact details.

    d. The name and surname of the Chief Designer, Safety Manager, Quality Manager and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

    e. The following information, in tabular form, for the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures:

        i. Name and surname

        ii. Basic PANS-OPS Training:

            1. Training Institution
            2. Course Name
            3. Course Date

        iii. Advanced PANS-OPS Training:

            1. Training Institution
            2. Course Name
            3. Course Date

        iv. PANS-OPS Refresher/Recurrent Training:

            1. Institution
            2. Course Name
            3. Date

        v. Aviation Related Qualifications & Experience:

            1. Qualification
            2. Hours/Years' experience

        vi. If applicable, validation experience:

            1. Organisation
            2. Years of experience
            3. Contact person and contact details of organisation.

        vii. If applicable, oversight experience:

            1. Oversight Organisation
            2. Years of experience
            3. Contact person and contact details of organisation.

viii. If a member of ICAO IFPP:

1. Country represented
2. Years of representation

2. The following documents shall be attached to the abovementioned letter:

a. Copy of the Flight Procedure Design Organisation's Quality Management System (QMS) relating to Flight Procedure Design, detailing ground validation processes and procedures.

b. Copy of the Flight Procedure Design Organisation's Flight Procedure Design Manual or Procedures/Standards, detailing ground validation processes and procedures.

c. Curriculum Vitae of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

d. Copies of PANS-OPS training certificates of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

e. Copies of the aviation related qualifications & experience of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

f. Evidence of the two most recent design, verification or ground validation reports approved by the Chief Designer.

3. The Chief Designer of an organisation wishing to apply to become an APV-F:

a. Shall have a minimum of four years Flight Procedure Design experience.

b. Shall have successfully completed an ICAO accredited Safety Management Systems (SMS) and Human Factors in Aviation course.

c. Last recurrent/refresher training shall not exceed three years.

d. Shall have appropriate aviation related knowledge, skill and experience in:

i. Aircraft Operations & Performance: Fundamental knowledge of the basics of flying, aerodynamics & aircraft performance to the level of any pilot's license with instrument rating (IR).

ii. Air Traffic Management (ATM): Fundamental knowledge of Air Traffic Management (ATM) as contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) as well as an understanding of the broad concept of ATM which consists of Air Traffic Services including Air Traffic Control, air traffic flow management, airspace management and other fields related to ATM such as route spacing, ATC separation and aviation weather.

iii. Navigation, Navigation Systems & Geography: Fundamental knowledge of navigation, navigation systems and geography to the level of any pilot's licence with instrument rating (IR).

iv. Aeronautical Cartography: Fundamental knowledge of ICAO Annex 4 charting requirements.

e. Or in lieu of 3d above, shall have at least three years validation and/or regulatory oversight experience in FPD.

APPENDIX C

APPLICATION AND APPROVAL OF AN APPROVED PROCEDURE VALIDATOR - ORGANISATION (APV-O):

1. Flight Procedure Design Organisations wishing to apply to become an Approved Procedure Validator – Organisation (APV-O) shall submit an official letter to the SACAA requesting consideration for approval as an APV-O. The letter shall contain the following information:

    a. Registered company name.

    b. Registered company address.

    c. Company contact details.

    d. List of certifications/approvals held by any other Civil Aviation Authority (or equivalent authority).

    e. Contact details of abovementioned Civil Aviation Authority (or equivalent authority).

    f. The name and surname of the Chief Designer, Safety Manager, Quality Manager and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

    g. The following information, in tabular form, for the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures:

        i. Name and surname

        ii. Basic PANS-OPS Training:

            1. Training Institution
            2. Course Name
            3. Course Date

        iii. Advanced PANS-OPS Training:

            1. Training Institution
            2. Course Name
            3. Course Date

        iv. PANS-OPS Refresher/Recurrent Training:

            1. Institution
            2. Course Name
            3. Date

        v. Aviation Related Qualification & Experience:

            1. Qualification
            2. Hours/Years' experience

        vi. If applicable, validation experience:

            1. Organisation
            2. Years of experience
            3. Contact person and contact details of organisation.

vii. If applicable, oversight experience:

1. Oversight Organisation
2. Years of experience
3. Contact person and contact details of organisation.

viii. If a member of ICAO IFPP:

1. Country represented
2. Years of representation

2. The following documents shall be attached to the abovementioned letter:

a. Copy of the Flight Procedure Design Organisation's Quality Management System (QMS) relating to Flight Procedure Design, detailing ground validation processes and procedures.

b. Copy of the Flight Procedure Design Organisation's Flight Procedure Design Manual or Procedures/Standards, detailing ground validation processes and procedures.

c. Curriculum Vitae of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

d. Copies of PANS-OPS training certificates of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

e. Copies of the aviation related qualifications & experience of the Chief Designer and the Flight Procedure Designers who will be directly involved with the ground validation of procedures.

f. Evidence of the two most recent design, verification or ground validation reports approved by the Chief Designer.

3. The Chief Designer of an organisation wishing to apply to become an APV-O:

a. Shall have a minimum of four years Flight Procedure Design experience.

b. Shall have successfully completed an ICAO accredited Safety Management Systems (SMS) and Human Factors in Aviation course.

c. Last recurrent/refresher training shall not exceed three years.

d. Shall have appropriate aviation related knowledge, skill and experience in:

i. Aircraft Operations & Performance: Fundamental knowledge of the basics of flying, aerodynamics & aircraft performance to the level of any pilot's license with instrument rating (IR).

ii. Air Traffic Management (ATM): Fundamental knowledge of Air Traffic Management (ATM) as contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) as well as an understanding of the broad concept of ATM which consists of Air Traffic Services including Air Traffic Control, air traffic flow management, airspace management and other fields related to ATM such as route spacing, ATC separation and aviation weather.

iii. Navigation, Navigation Systems & Geography: Fundamental knowledge of navigation, navigation systems and geography to the level of any pilot's licence with instrument rating (IR).

iv. Aeronautical Cartography: Fundamental knowledge of ICAO Annex 4 charting requirements.

e. Or in lieu of 3d above, shall have at least three years validation and/or regulatory oversight experience in FPD.

APPENDIX D

APPLICATION AND APPROVAL OF AN APPROVED PROCEDURE VALIDATOR - INDIVIDUAL (APV-i):

1. Applicants shall submit a letter to the SACAA requesting consideration for approval as an APV-i. The letter shall containing the following information in tabular form:

   a. Name of the applicant.

   b. Address of the applicant.

   c. Contact details of the applicant.

   d. Passport number and country of issue.

   e. Basic PANS-OPS Training:

      i. Training Institution
      ii. Course Name
      i. Course Date

   f. Advanced PANS-OPS Training:

      i. Training Institution
      ii. Course Name
      iii. Course Date

   g. PANS-OPS Refresher/Recurrent Training:

      i. Institution
      ii. Date

   h. Aviation Related Qualification & Experience:

      i. Qualification
      ii. Hours/Years' experience

   i. If applicable, validation experience:

      i. Organisation
      ii. Years of experience
      iii. Contact person and contact details of organisation.

   j. If applicable, oversight experience:

      i. Oversight Organisation
      ii. Years of experience
      iii. Contact person and contact details of organisation.

   k. If a member of IFPP:

      i. Country represented
      ii. Years of representation

   l. List of three Flight Procedure Design related references, including contact details.

2. The following documents shall be attached to the abovementioned letter:

a. Copy of passport of applicant.

b. Curriculum Vitae of the applicant.

c. Copy of Quality Management System (QMS).

d. Copies of PANS-OPS training certificates.

e. Copy of operational aviation related qualifications & experience.

f. Copies of SMS & Human Factors course certificates.

g. Evidence of the two most recent IFP design work which should include evidence of specific designs and design documentation/reports, verification reports and ground validation reports.

3. Individuals wishing to apply to become an Approved Procedure Validator - Individual (APV-i):

a. Shall have a minimum of four years Flight Procedure Design experience.

b. Shall have successfully completed an ICAO accredited Safety Management Systems (SMS) and Human Factors in Aviation course.

c. Last recurrent/refresher training shall not exceed three years.

d. Shall have appropriate aviation related knowledge, skill and experience in:

i. Aircraft Operations & Performance: Fundamental knowledge of the basics of flying, aerodynamics & aircraft performance to the level of any pilot's license with instrument rating (IR).

ii. Air Traffic Management (ATM): Fundamental knowledge of Air Traffic Management (ATM) as contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) as well as an understanding of the broad concept of ATM which consists of Air Traffic Services including Air Traffic Control, air traffic flow management, airspace management and other fields related to ATM such as route spacing, ATC separation and aviation weather.

iii. Navigation, Navigation Systems & Geography: Fundamental knowledge of navigation, navigation systems and geography to the level of any pilot's licence with instrument rating (IR).

iv. Aeronautical Cartography: Fundamental knowledge of ICAO Annex 4 charting requirements.

e. Or in lieu of 3d above, shall have at least three years validation and/or regulatory oversight experience in FPD.

APPENDIX E

DUTIES OF THE FLIGHT PROCEDURE DESIGN ORGANISATION (FPDO)

1. The FPDO shall ensure that ALL IFPs submitted for validation/review and approval shall comply with the requirements as specified in:

   a. SA CAR Part 173.

   b. SA-CATS-173.

   c. ICAO Reference Documents for Flight Procedure Design (FPD) (ICAO Doc 8168 Vol 1 & 2, Doc 9906 Vol 1 & 5, Doc 9613, Doc 9931, Doc 9993, Doc 9905, etc)

   d. Manual of Procedures and Standards for Procedure Design & Cartography (MOPS).

   e. Any additional requirements deemed necessary by the SACAA.

2. In addition, the PDP shall include an Instrument Approach Chart (IAC) compliant with the SACAA chart specifications and chart template. The chart shall be supplied in PDF format as well as in an electronic format, including supporting data files (standard GIS or CAD formats preferred). The chart can be produced by the FPDO or it may be subcontracted to a party capable of producing such an IAC. The FPDO shall however remain accountable for the compliance with the SACAA chart specifications and chart template.

APPENDIX F

LIST OF ABBREVIATIONS

APV	Approved Procedure Validator
APV-F	Approved Procedure Validator - FPDO
APV-i	Approved Procedure Validator - Individual
APV-O	Approved Procedure Validator – Organisation
CAD	Computer Aided Design
CAR	Civil Aviation Regulations
CATS	Civil Aviation Technical Standards
FPD	Flight Procedure Design
FPDO	Flight Procedure Design Organisation
GIS	Geographic Information System
GVP	Ground Validation Package
IAC	Instrument Approach Chart
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedure
IFPP	Instrument Flight Procedure Panel
MOPS	Manual of Procedures and Standards for Procedure Design & Cartography
PANS-OPS	Procedures for Air Navigation Services - Operations
PBN	Performance Based Navigation
PDP	Procedure Design Package
SACAA	South African Civil Aviation Authority