

Airbus Prosky
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Quality Assurance

ICAO 9906

ICAO AFPP Workshop
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Nairobi



Quality Assurance Introduction

Need for quality assurance

Overall presentation of Doc 9906 volumes

Conclusion

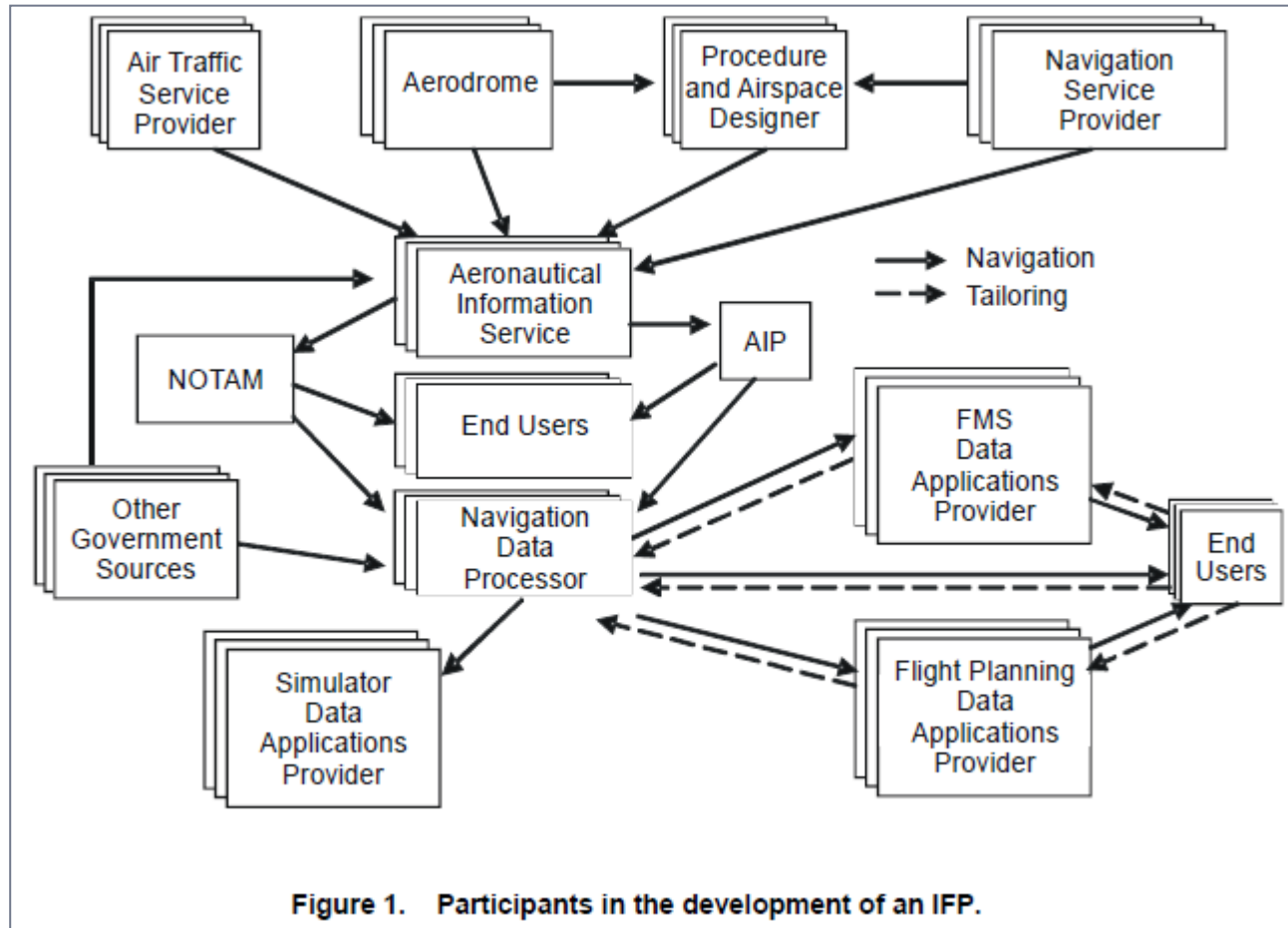
Need for Quality Assurance



PBN Concept – Involve all stakeholders



Need for quality assurance - Stakeholders



ICAO DOC 9906 vol I

Need for quality assurance - Responsibility

« The implementation of procedures is the responsibility of Contracting States. This means that the State authorities have the final responsibility for the procedures published within their territory »

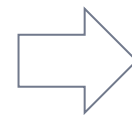
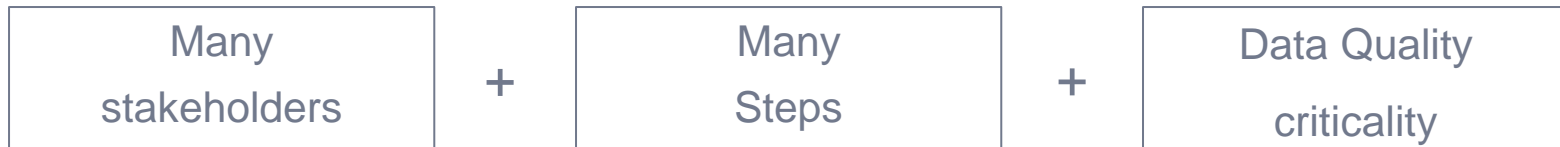
ICAO Doc 9906, § 5.1

- Whatever the state provides the procedures design or subcontract to a 3rd party, the ICAO Doc 8168 (PANS-OPS) requires that each state puts in place a process to control the quality and criteria used in the IFP achievements

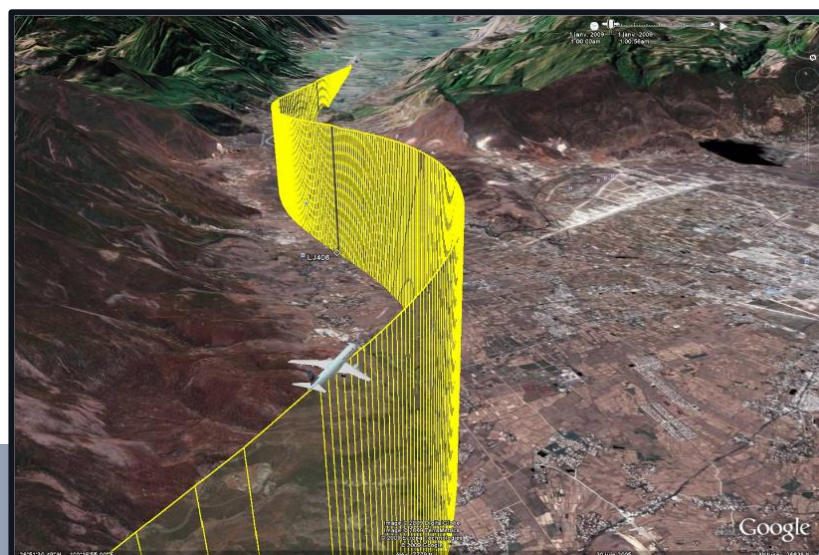
Need for quality assurance - Data

□ «The implementation of area navigation and associated airborne database navigation systems, however, means that even small errors in data can lead to catastrophic results. This significant change in data quality requirements (accuracy, resolution and integrity) has led to the need for a systemic quality assurance process (*often part of a State Safety Management System*) »

(ICAO Doc 9906 preface)



Quality assurance requirements



How to address the Need for Quality Assurance



How to address the Need for Quality Assurance

- ❑ ICAO Doc 9906 (Quality Assurance Manual in the process of IFP design) provides recommendations to meet the Quality objective
- **Volume 1** — *Flight Procedure Design Quality Assurance System*
- **Volume 2** — *Flight Procedure Designer Training*
- **Volume 3** — *Flight Procedure Design Software Validation*
- **Volume 4** — *Flight Procedures Design Construction* (to be incorporated later)
- **Volume 5** — *Validation of Instrument Flight Procedures*
- **Volume 6** — *Flight Validation Pilot Training and Evaluation*

Overall presentation of Doc 9906 volumes



Doc 9906, Volume 1

Volume 1 - Quality Assurance Manual for Flight Procedure Design

- This Doc provides guidance for quality assurance in the elements of procedure design
- It also provides a generic **process flow diagram** for the design and implementation of flight procedures.

Doc 9906
AN/472

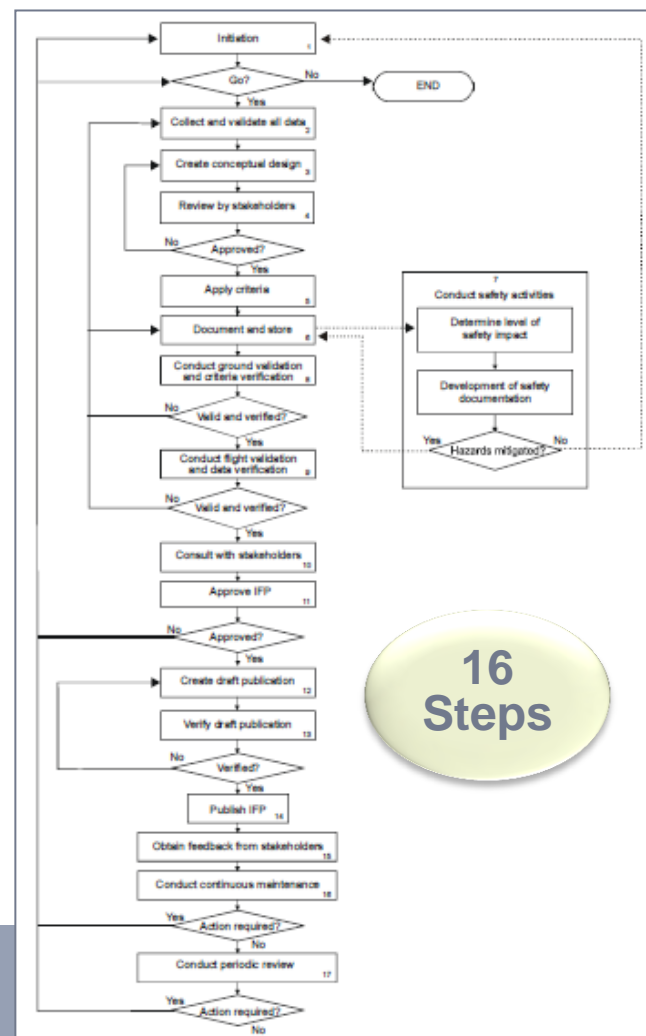
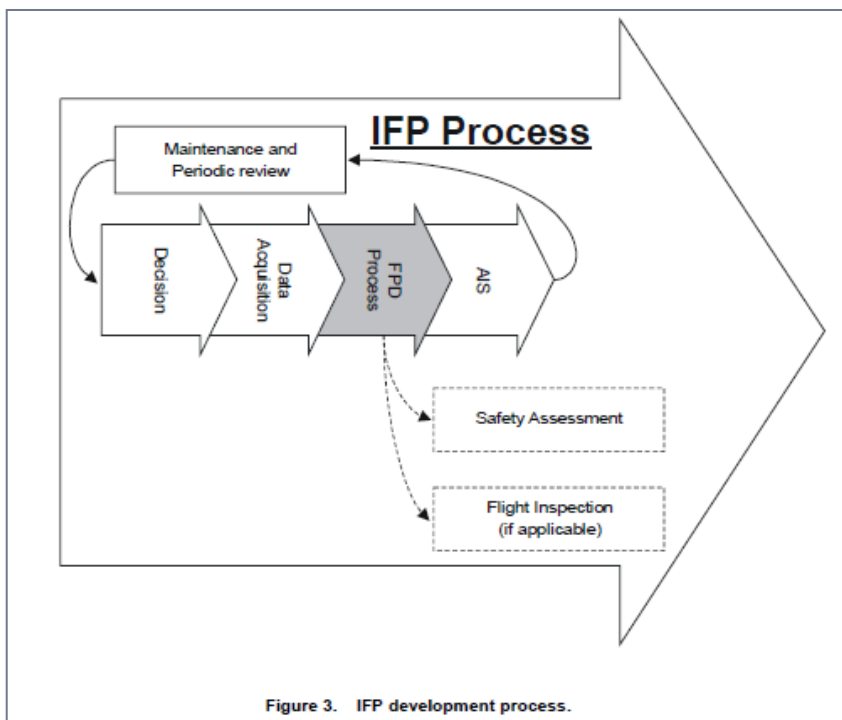


**Quality Assurance Manual
for Flight Procedure Design**

**Volume 1
Flight Procedure Design
Quality Assurance System**

Doc 9906, Volume 1

- The Vol. 1 is the main 9906 document that covers the entire life of the IFP, as described in 16 steps in the process flow diagram:



Last ICAO 9906 Vol. 1 contains 16 steps
 Previous version was including 17 Steps (validation
 process now provided in Vol. 5)

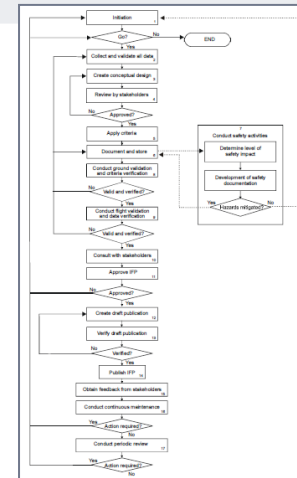
Doc 9906, Volume 1 - Content

The Vol. 1 is mainly divided in 3 parts:

□ 16 steps defined in the flow diagram

□ Process Description (§6.3)

- *Description of the step*
- *Inputs*
- *Outputs*
- *Parties involved (stakeholders)*
- *Ref. documents*



6.3 PROCESS DESCRIPTION

Step	Description	Input	Output	Parties involved	Quality records	References
1	INITIATION At the starting point a "pre-design" request is made for a new FPD or a "modification" request to an existing	• Request from a stakeholder for a new or a modified procedure.	• Managerial decision to set up the procedure design process or	• Stakeholders		• ISO 9001:2000: section 7.2.1 "Determination of requirements related

□ Step-by-Step Description of Activities within the Process (§7)

- Detailed description of each step

Doc 9906, Volume 2

Volume 2 - *Flight Procedure Designer Training*

- This Doc provides guidance for the establishment of flight procedure designer training.

- Training is the starting point for any quality assurance programme.

Doc 9906, Volume 2

- To ensure quality it is essential to provide competency-based training and assessment to all contributors to the flight procedure development process
- The activities of flight procedure designers are considered critical to the safety of aviation. The provision of erroneous, incomplete or badly designed flight procedures and associated minima has direct consequences for the users (*safety issue*)
- Recently, procedure design work has become more critical due to:
 - Increasing complexity;
 - Increased importance of data integrity, especially for modern area navigation (RNAV) and satellite based navigation; and
 - Introduction of new avionics.

Doc 9906, Volume 3

Volume 3 - *Flight Procedure Design Software Validation*

- This Doc provides guidance for the validation (not certification) of procedure design tools

Doc 9906, Volume 3

- When automation is used during the procedure design process, States must ensure that automation functions have been validated to ensure compliance of the final results with applicable criteria
- Implementation of the validation can be carried out by States themselves or by delegation to any recognized 3rd party (such as another State, an ATS provider or a private company)
- The term “procedure design tool” stands for any numerical automation system that provides calculations and/or designs and layouts in the field of procedure design. *This encompasses products ranging from automated formulas included in spreadsheets to dedicated software packages*
- Procedure design tools are increasingly being used by designers with the goal of **quality** control and **integrity** enhancement in the procedure design domain.

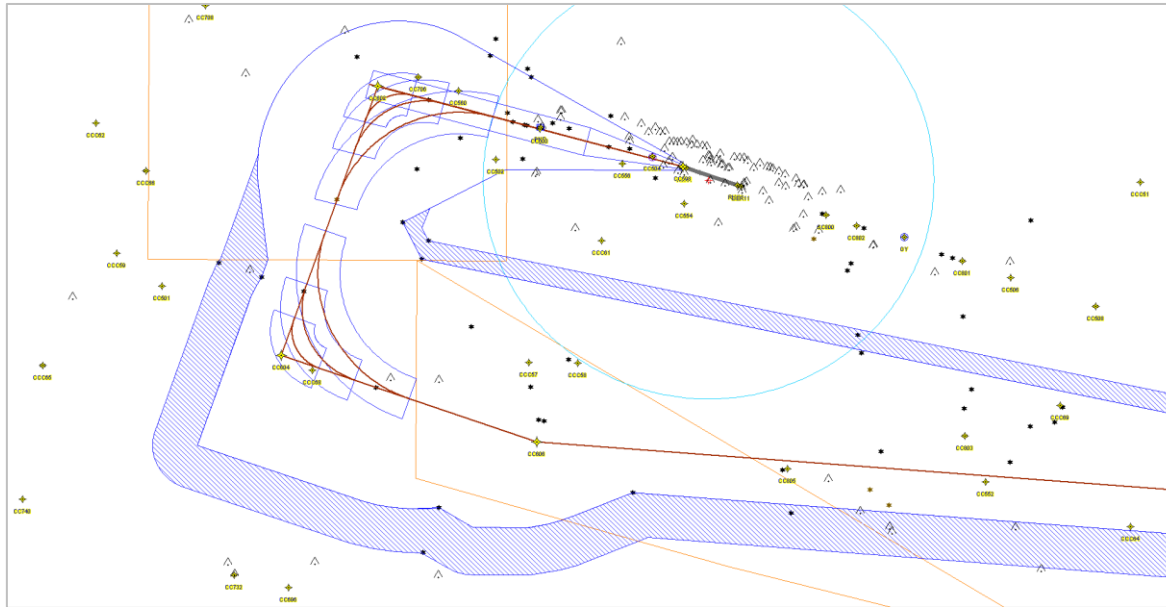
Reduce
human errors

Improve Data
Quality &
Integrity

Doc 9906, Volume 3



Whatever the Proc Designer is using simple calculation sheets or more sophisticated software, the tools must be validated



Automation in calculations contributes to the improvement of data integrity

Use of automation **is not intended** to replace the procedure designer's expertise

Store

Integrity

Data
Management

Design Criteria

Efficiency

Doc 9906, Volume 4

Volume 4 - *Flight Procedures Design Construction*

- To be incorporated later

Doc 9906, Volume 5

Volume 5 - *Validation of Instrument Flight Procedures*

- This Doc provides guidance for conducting validation of instrument flight procedures, including safety, flyability and design accuracy

Doc 9906, Volume 5

- The objective of conducting validation is to ensure safety, data accuracy and integrity and flyability of the instrument flight procedure, through a qualitative validation of the procedure
- The validation is the final step of the Quality Assurance in the process of IFP procedure design

This is an essential step before the effective publication of the procedure



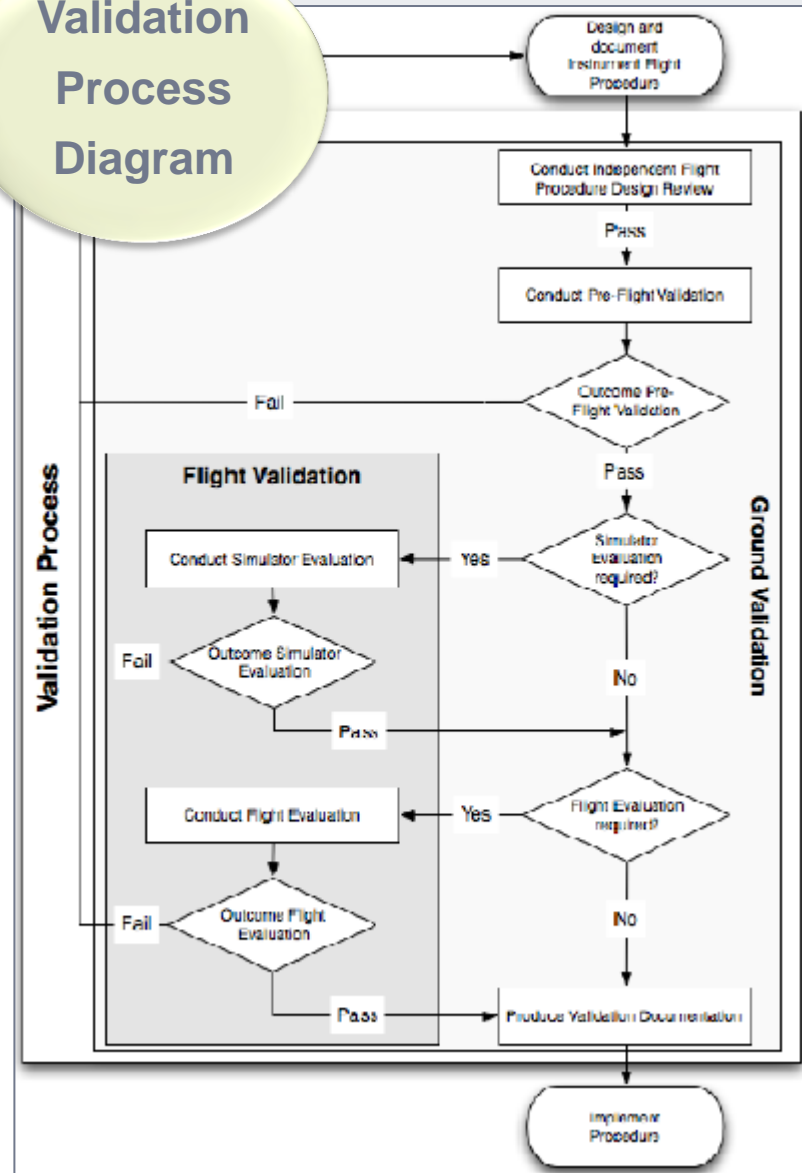
Doc 9906, Volume 5

The full validation process includes
“Ground Validation” and
“Flight Validation”

- ❑ **Ground validation** consists of an independent IFP design review and a pre-flight validation
- ❑ **Flight validation** consists of a flight simulator evaluation and/or an evaluation flown in an aircraft (if required!)



Validation Process Diagram



Doc 9906, Volume 6

Volume 6 - *Flight Validation Pilot Training and Evaluation*

- This Doc provides guidance for the establishment of flight procedure validation pilot training

Doc 9906, Volume 6

- ❖ Each State should:
 - Establish standards for the required competency level for flight validation pilots
 - Ensure that flight validation pilots acquire and maintain this competency level through initial training, recurrent/refresher training and supervised on-the-job training

- ❖ As for procedure designers, it is essential to provide **competency-based training** and assessment to flight validation pilots

Conclusion





Conclusion

Quality is an
enabler of Safety

Quality Assurance Manual
for Flight Procedure Design

Volume 1
Flight Procedure Design
Quality Assurance System

□ ICAO Doc 9906 offers 6 volumes (*Volume 4 still to be developed*) to answer the need of implementing a Quality Assurance process.

→ It covers the complete lifecycle of an IFP

PBN
Implementation
requires high
Quality

This workshop mainly focuses on :

- **Volume 1** — *Flight Procedure Design Quality Assurance System*
- **Volume 5** — *Validation of Instrument Flight Procedures*

Quality Assurance Introduction

Any Questions?

