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Workshop on quality assurance for the implementation of an instrument flight procedure

29 March -2 April 2021



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Quality assurance introduction

29 March -2 April 2021





1. Need for quality assurance
2. General on State responsibilities
3. State safety oversight function
4. The quality assurance Manual (Doc. 9906)
5. Participants in the development of an IFP
6. The Flight Procedure Design chain
7. The IFP process



Need for quality assurance

African Flight Procedure Programme (AFPP)

- ❑ The quality of an instrument flight procedure (IFP) is flight critical;
- ❑ With the implementation of the new navigation systems:
 - ☞ IFPs and process and related products are now key parts of the ATM system;
 - ☞ Aeronautical information and data become an essential part of the overall safety of air navigation
 - ☞ The navigation systems are data-driven; corrupt or erroneous information/data can affect significantly the safety of the flight.
- ❑ It is therefore necessary to ensure that both IFP and Flight Procedure Design (FPD) process are quality-driven.



General on State responsibilities

African Flight Procedure Programme (AFPP)

- The instrument flight procedure (IFP) is an essential component of the aviation system.
- Every State's Air Navigation Services Safety Management System must give consideration to this critical element of the system.
- 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.



General on State responsibilities

African Flight Procedure Programme (AFPP)

- Establish a Quality Management System (QMS) for the entire IFP process :
 - ☞ From origination to final publication, as well as a more focused quality assurance process for the design of procedures;
 - ☞ State to ensure that IFPDs follows established QMS a each stage of the IFPD process.
- Safety oversight:
 - ☞ Ensure that Instrument Flight Procedure Design Services (IFPDS) intending to design IFPs for national aerodromes meet States established regulation;
 - ☞ When a state conducts IFPDs itself, safety oversight function to be separated from the service provision
- Safety risk assessment:
 - ☞ Is completed if the IFP is compliant with State regulatory framework;
 - ☞ Safety risk assessment to be conducted generally.



State safety oversight function

African Flight Procedure Programme (AFPP)

- ❑ A State Safety Oversight System consists of eight Critical Elements (CE) as described in the Safety Oversight Manual (Doc 9734):
 - ☞ CE-1: Primary aviation legislation
 - ☞ CE-2: Specific operating regulations
 - ☞ CE-3: State system and functions
 - ☞ CE-4: Qualified technical personnel
 - ☞ CE-5: Technical guidance, tools and provision of safety-critical information
 - ☞ CE-6: Licensing, certification, authorization and approval obligation
 - ☞ CE-7: Surveillance obligations
 - ☞ CE-8: Resolution of safety issues
- ❑ Specific PANS-OPS safety oversight functions will be developed in next presentation.

CE-1: Primary aviation legislation

- ❑ States must promulgate a comprehensive and effective aviation law consistent with the requirements contained in the Chicago Convention to enable the oversight and management of civil aviation safety and the enforcement of :

☞ Hence, State should provide a high-level statement in its legislation clearly establishing its responsibility for the safety of the IFPs for its aerodrome and airspace .





☐ CE-2: Specific operating regulations

☐ From the primary legislation, States to derive operating regulations addressing at a minimum standardized ops procedures, products, services, equipment and infrastructures compliant with the Chicago conventions and its annexes:

☞ For IFPDSs, these regulations should include:

1. Transposition of the relevant provisions of Annex 11, PANS-OPS vol. II, Annex4, Annex 15 and PANS-AIM;
2. Administrative arrangements on the respective roles of the IFPDS and State, including the process of IFP approval for publication;
3. State-approved design criteria;
4. General criteria to develop procedures for the establishment of the aerodrome operating minima;



☐ CE-2: Specific operating regulations

☐ From the primary legislation, States to derive operating regulations addressing at a minimum standardized ops procedures, products, services, equipment and infrastructures compliant with the Chicago conventions and its annexes:

☞ For IFPDSs, these regulations should include (cont'd):

5. Quality Management System as per PANS-OPS and Doc. 9906;
6. Qualifications and competencies for IFPDS and the flight procedure inspectorate (FPI)
7. Requirements for periodic reviews and continuous maintenance of the IFPs;
8. Requirements for ground and flight validation of IFPs
9. State surveillance processes (planning inspections, audits and monitoring activities) of IFPDS.



CE-3: State system and functions

- State to establish formal entities driven by sufficient and qualified personnel with adequate financial resources for the management of safety of flight operations. Respective functions and objectives shall be clearly stated;
- However, this can be delegated to another State or group of States;
- Oversight function to be performed by State approved FPI;



☐ CE-3: State system and functions

☐ Functions & responsibility of FPI personnel:

- ☞ In general, FPI is responsible for the oversight of the development, maintenance and approval process for the flight procedures of and IFPDS provider;
- ☞ FPI functions and responsibility should be clearly defined and documented;
- ☞ FPI should be provided with a job description reflecting its duties;
- ☞ FPI could be assigned other regulatory tasks: Functions often merged with the inspectorate for Annex 4 and 15 (AIM)

☐ Resources: Human and financial.



☐ CE-4: Qualifications of technical personnel

☐ State must:

- ☞ Establish minimum qualification requirements for FPI personnel and provide for appropriate training to maintain and enhance their competence;
- ☞ Ensure that the established qualifications and experience requirements are met by all FPI staff;
- ☞ Have a training programme for FPI staff within an established period. For initial, advanced, recurrent, refresher and on-the-job training (OJT);
- ☞ Ensure that the FPI has a system to maintain training records

☐ The training programme to be appropriately implemented in accordance with detailed periodic training plans.



☐ CE-4: Qualifications of technical personnel

☐ All FPI staff must complete OJT prior to assignment of tasks and responsibilities;

☐ FPI staff competencies:

- ☞ Technical expertise as a civil aviation safety inspector which requires the capability to apply and improve technical knowledge and skills to perform safety oversight duties for IFPDS; and
- ☞ Expertise in instrument flight procedure design to optimize the quality of the safety oversight duties for IFPDS.



CE-5: Technical guidance, tools and provision of safety-critical information

States must provide :

-  Appropriate facilities, comprehensive and up-to-date technical guidance material and procedures, safety-critical information, tools and equipment, and transportation means to inspectors;
-  Technical guidance to the aviation industry on the implementation of relevant regulations.

The FPI should be provided with adequate tools: transportation as applicable, adequate offices, telephones and other communication facilities, access to the Internet to supplement a technical library, etc.



- ❑ **CE-6: Licensing, certification, authorization and approval obligations**
- ❑ States must implement documented processes and procedures to ensure that individuals and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges.
- ❑ There is no ICAO provisions for certification of FPDS providers; however, con-compliance with national regulations should be resolved prior to issuing a license, certificate, authorization and/or approval to conduct any activity;
- ❑ Therefore, State should:
 - ☞ Establish standards for the required competency level for flight procedure designers, flight validation, etc.
 - ☞ Ensure that an IFPDS provider develops a job description, training programme and training plan, and maintains training records for its flight procedure designers and flight validation pilots



☐ CE-7: Surveillance obligations

☐ States CE-7 duties:

- ☞ Implement documented surveillance processes, by defining and planning inspections, audits and monitoring activities on a continuous basis;
- ☞ Ensure that an IFPDS provider retains all procedure design documentation for all IFPS for their life-cycle.

☐ The surveillance activities should use standardized procedures and checklists.

☐ CE-7: Surveillance obligations

☐ Procedures and checklists should focus on:

- ☞ Design criteria;
- ☞ Quality management system;
- ☞ Continuous maintenance and periodic review;
- ☞ Oversight of the validation process.





☐ CE-8: Resolution of safety issues

☐ State duties:

- ☞ States must use a documented process to take appropriate actions, up to and including enforcement;
- ☞ Ensure timely resolution of identified safety issues through a system which monitors and records progress, including actions taken;
- ☞ Establish within the regulatory framework:
 - a mechanism/system with a time frame for elimination of any deficiency identified by the FPI;
 - The authority and responsibility to suspend or revoke the IFP design privileges.

The quality assurance Manual (Doc. 9906)

African Flight Procedure Programme (AFPP)

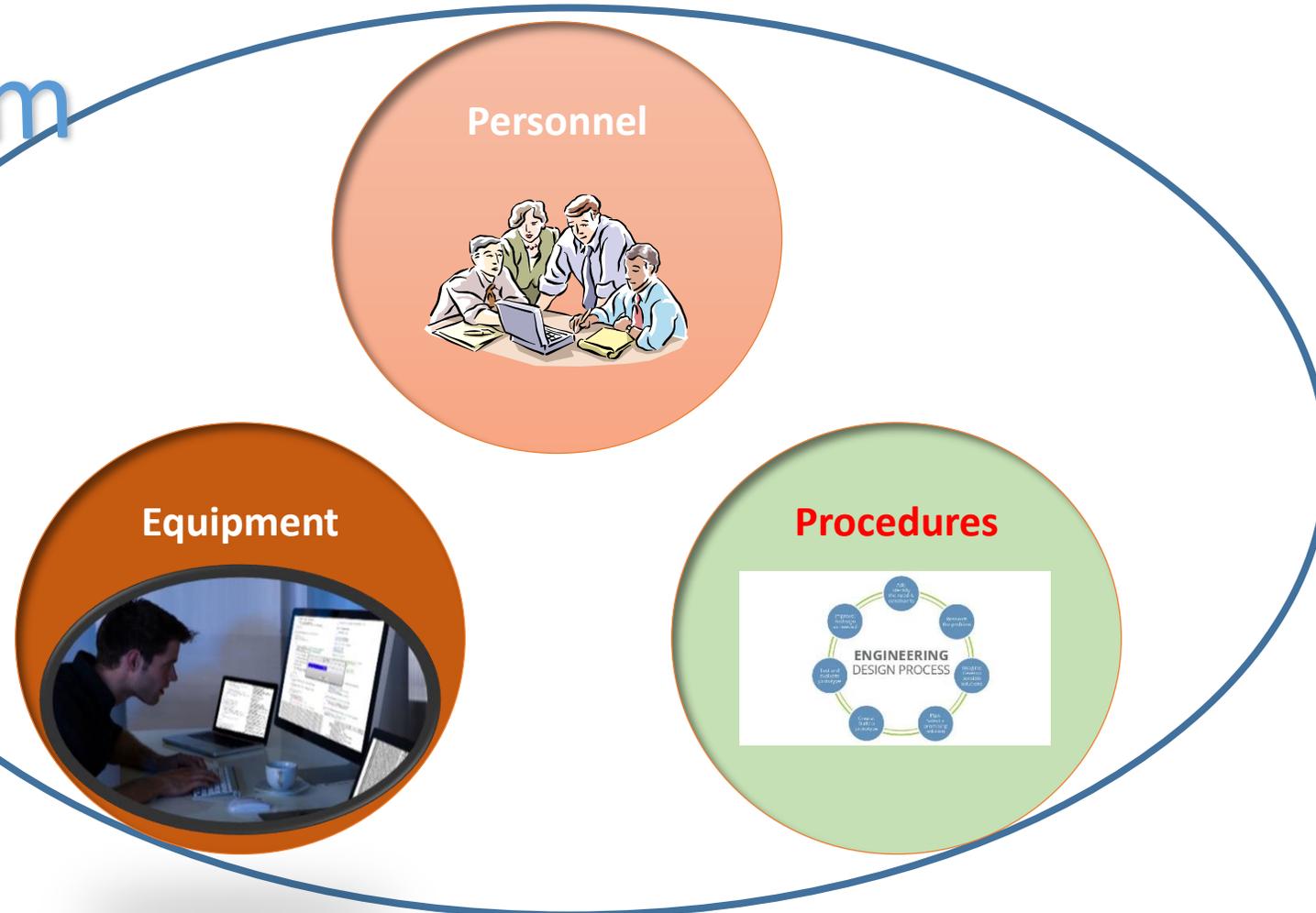
- ❑ Issued in 2009;
- ❑ 6 volumes planned:
 - ☞ Volume 1 - Flight Procedure Design Quality Assurance System;
 - ☞ Volume 2 - Flight Procedure Designer Training;
 - ☞ Volume 3 - Flight Procedure Design Software Validation;
 - ☞ Volume 4 - Flight Procedures Design Construction;
 - ☞ Volume 5 - Validation of Instrument Flight Procedures;
 - ☞ Volume 6 - Flight Validation Pilot Training and Evaluation.
- ❑ Volume 4 not yet issued.



The quality assurance Manual (Doc. 9906)

African Flight Procedure Programme (AFPP)

ATM System

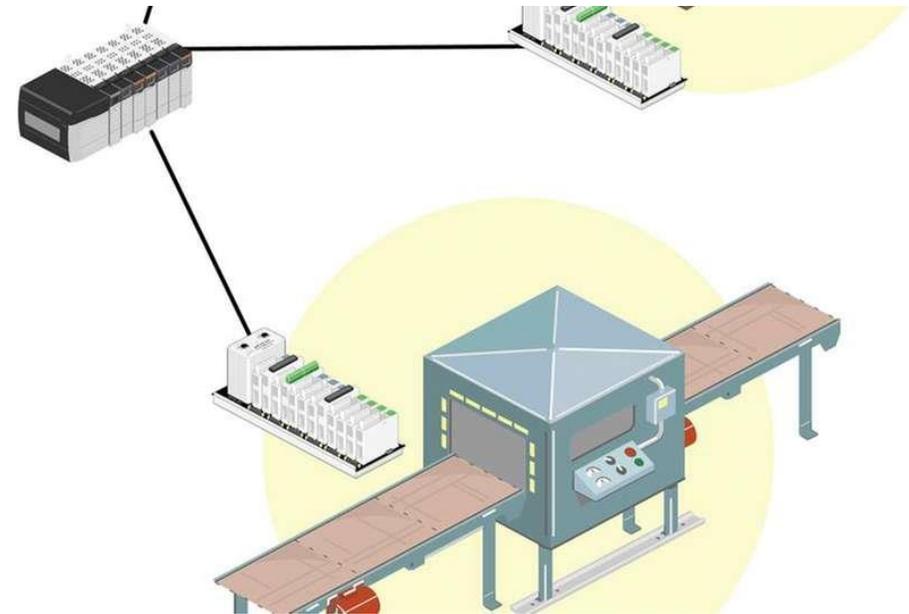


Doc. 9906. Vol 1 - Flight Procedure Design Quality Assurance System

❑ First Edition in 2009;

❑ Deals with:

- ➡ Guidance for implementation quality assurance in the procedure design (procedure design documentation, verification and validation methods, etc.);
- ➡ Guideline on data acquisition/processing;
- ➡ Provision of a generic process flow diagram for the design and implementation of flight procedures.



Doc. 9906. Vol 2 - Flight Procedure Designer Training



- ❑ First edition in 2010;
- ❑ Training is the starting point for any quality assurance programme.
- ❑ Vol 2 provides:
 - 👉 Guidance for Competency-Based Training and assessment;
 - Training programme;
 - Designing curriculum;
 - Instructors competencies;
 - Validation and post-training evaluation of flight procedure designer training.

Doc. 9906. Vol 3 - Flight Procedure Design software validation



❑ First edition in 2010;

❑ Vol 3 provides:

☞ Guidance for the validation (not certification) of procedure design tools, notably with regard to criteria.

Doc. 9906. Vol 4 - Flight Procedures Design Construction

Not yet released!!!



Doc. 9906. Vol 5 - Validation of instrument flight procedures



- First Edition in 2012;
- Provides guidance for conducting validation of flight procedures;
- Includes:
 - ☞ Safety;
 - ☞ Flyability and
 - ☞ Design accuracy.



The quality assurance Manual (Doc. 9906)

African Flight Procedure Programme (AFPP)

Doc. 9906. Vol 6 - Flight Validation Pilot Training and Evaluation

- First Edition in 2012;
- Training is the starting point for any quality assurance system;
- Volume 6 provides guidance for the establishment of a training and evaluation programme.



Participants in the development of an IFP

African Flight Procedure Programme (AFPP)

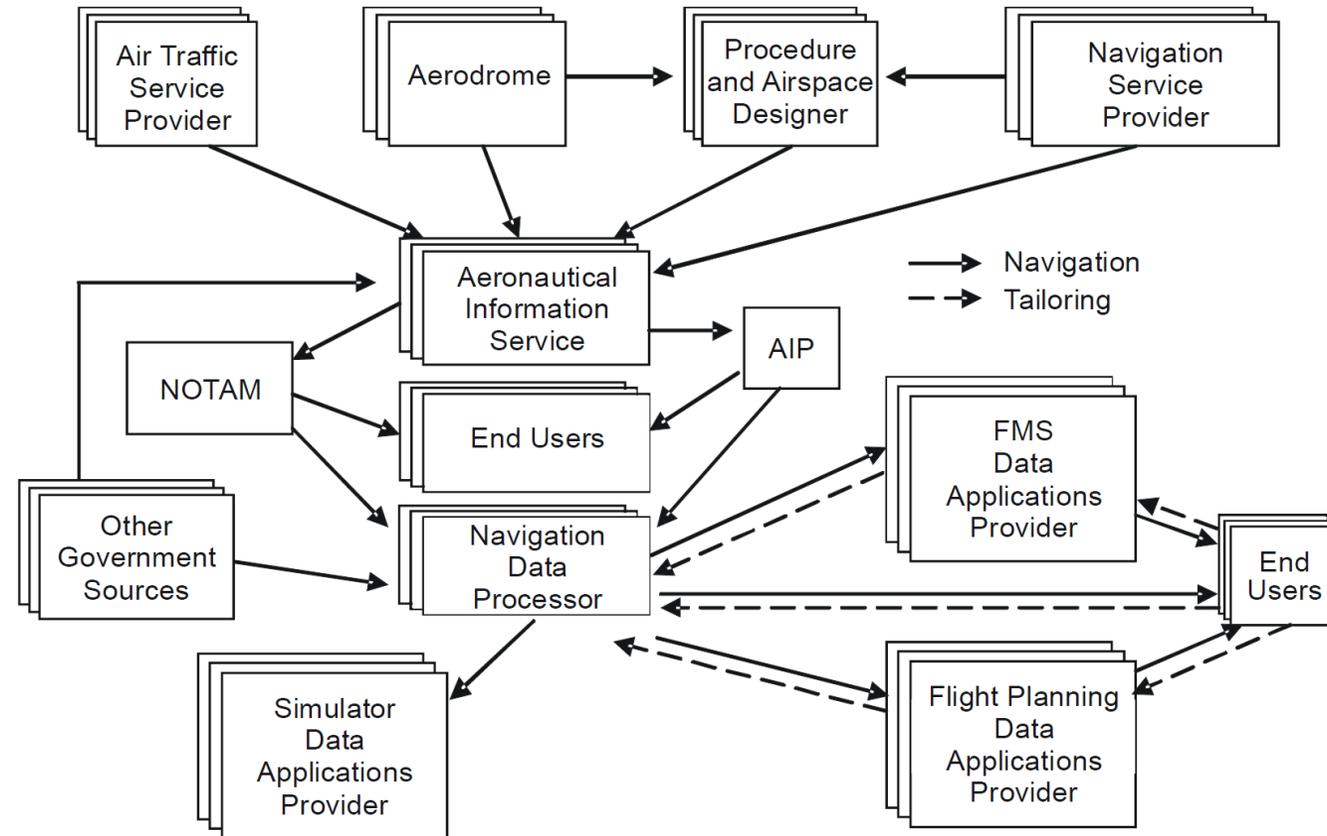
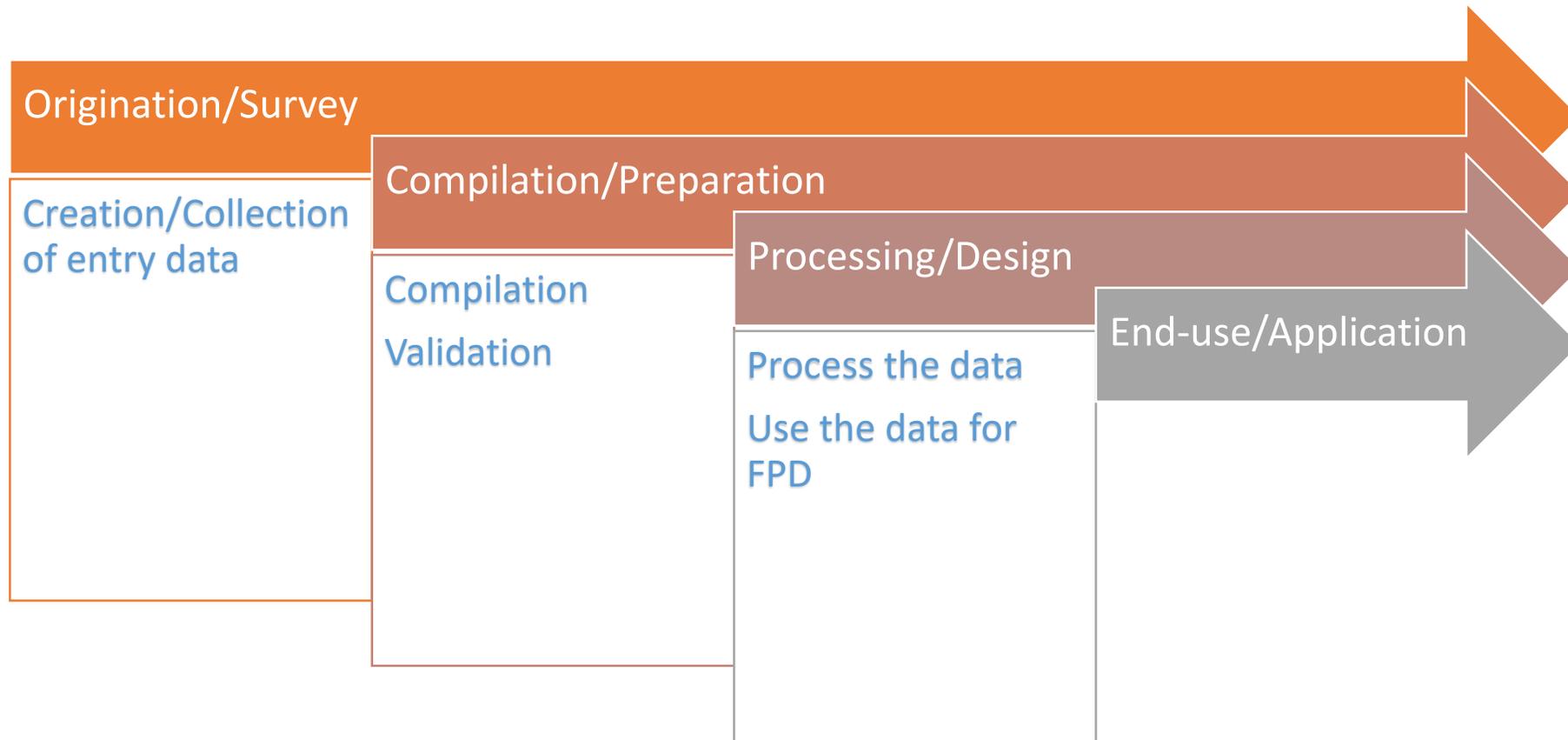


Figure 1. Participants in the development of an IFP.



Instrument Flight Procedure Design chain

African Flight Procedure Programme (AFPP)

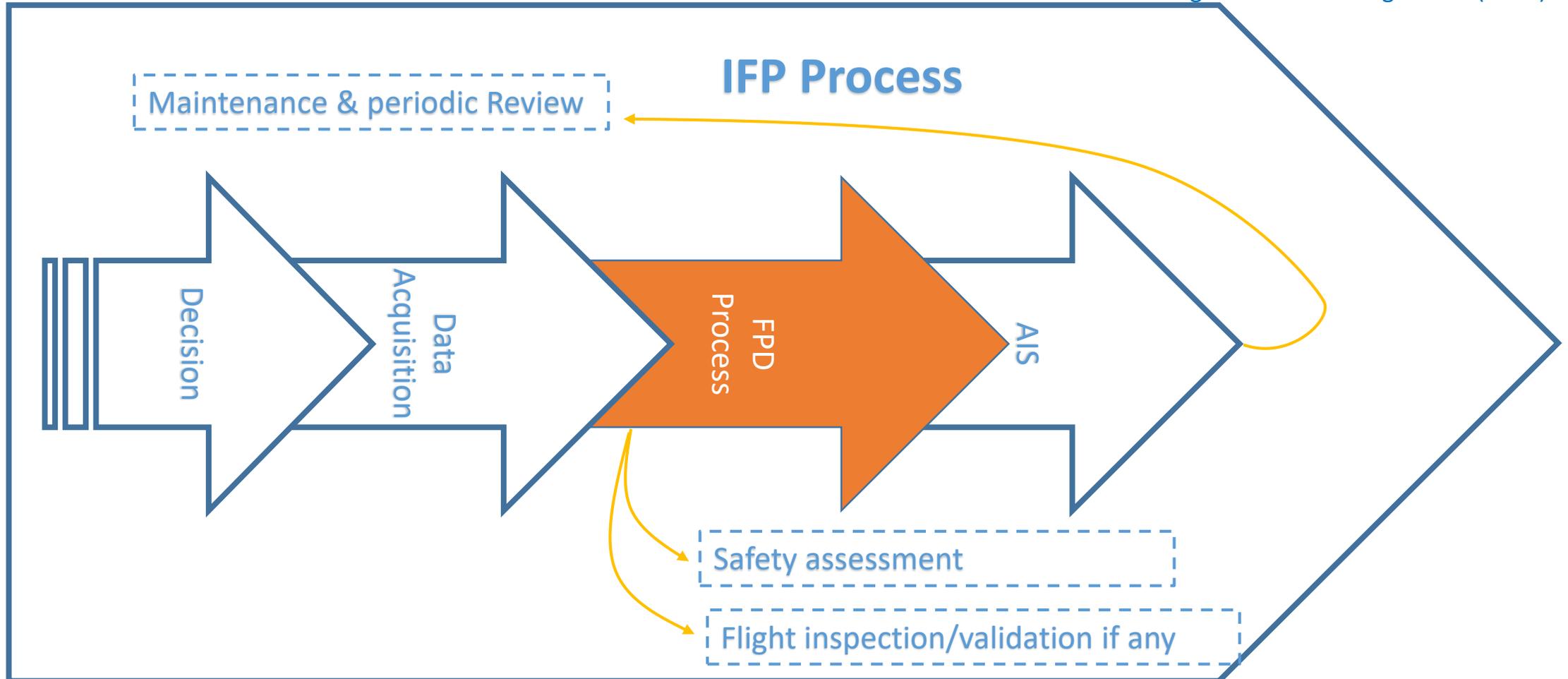


Note: Checks must be carried out throughout the whole chain by each "participant" to ensure that the final procedure meets quality requirements (accuracy, resolution and integrity).



The IFP process

African Flight Procedure Programme (AFPP)





Questions:

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Comprehension questions

African Flight Procedure Programme (AFPP)

What are the States responsibilities regarding flight procedures implementation?

☞ The implementation of procedures is the responsibility of Contracting States.

How many Steps for the IFP process?

☞ 4 steps:

- Decision;
- Data acquisition;
- FPD;
- AIS.