

# International Flight Inspection Symposium

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## Identifying the Achilles' Heels of Instrument Flight Procedures

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# Overview

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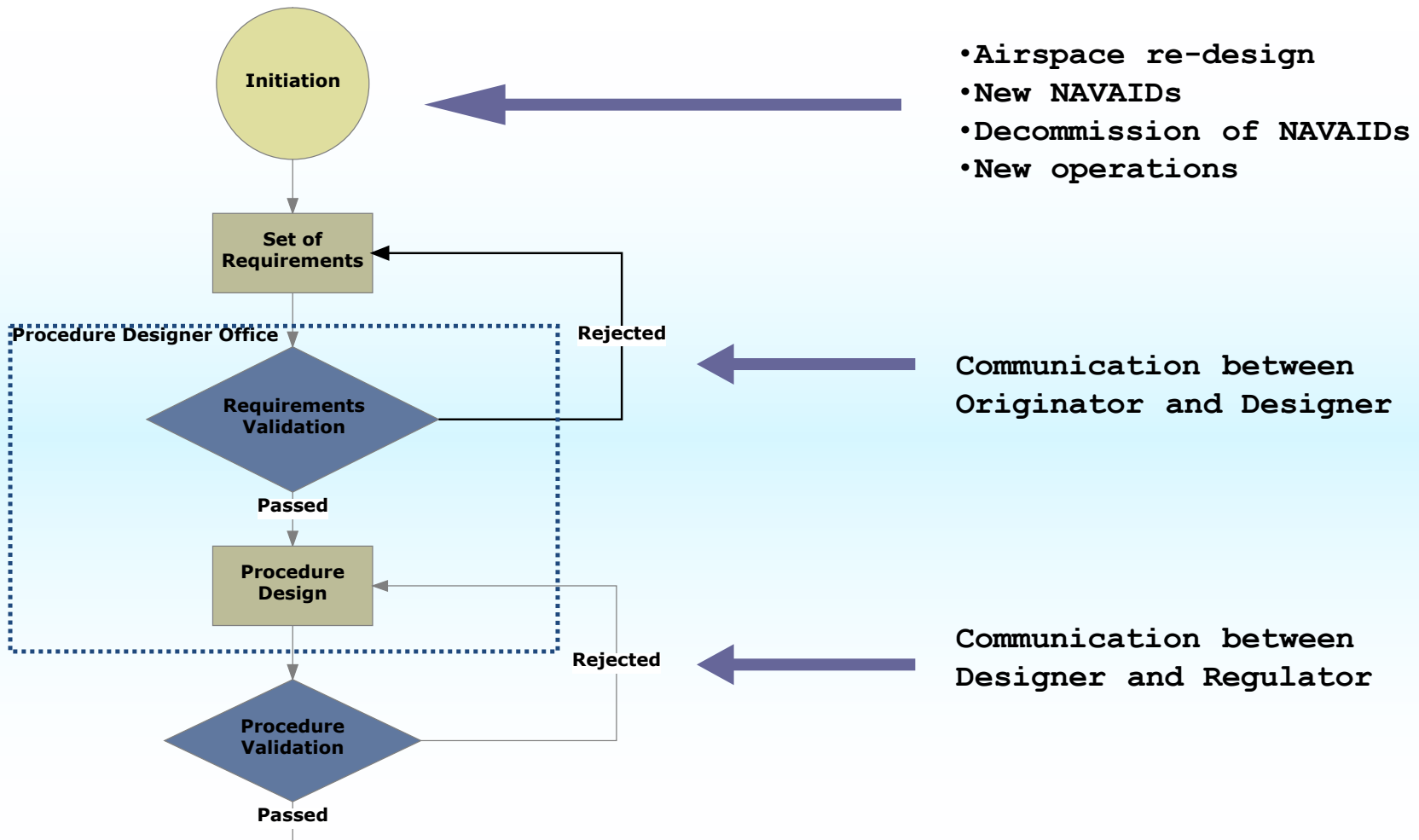
- Introduction
- Procedure Lifecycle
- Design as a process
- Factors affecting the design
- Known issues
- Conclusions

# Introduction

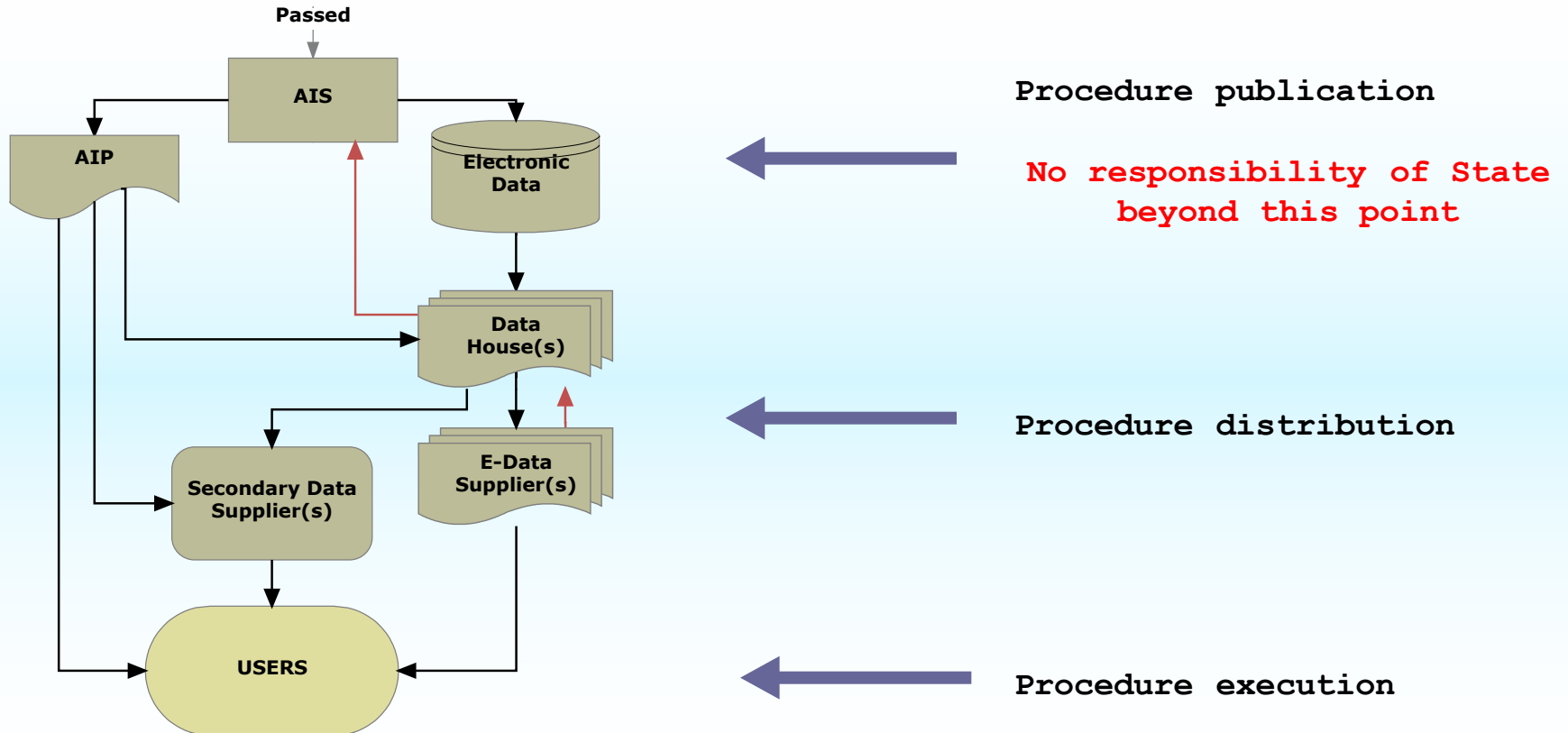
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- Conventional Procedures
  - navigation systems are periodically flight-tested and eventual defect of the procedure is discovered as a part of such tests
- RNAV Procedures
  - No direct link to particular navigation system
  - Data related
  - Risk mitigation effect of physical presence of signal in space is inhibited

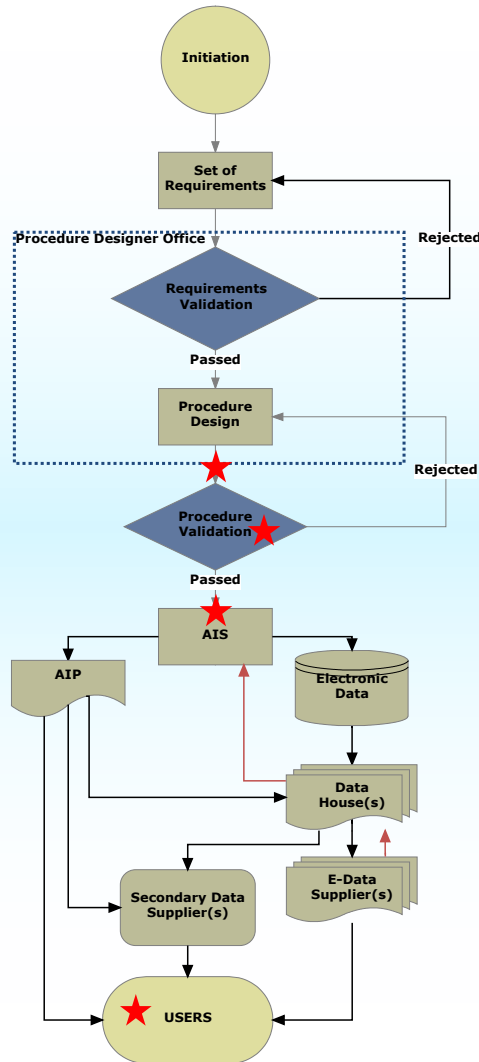
# Procedure Lifecycle (1)



# Procedure Lifecycle (2)



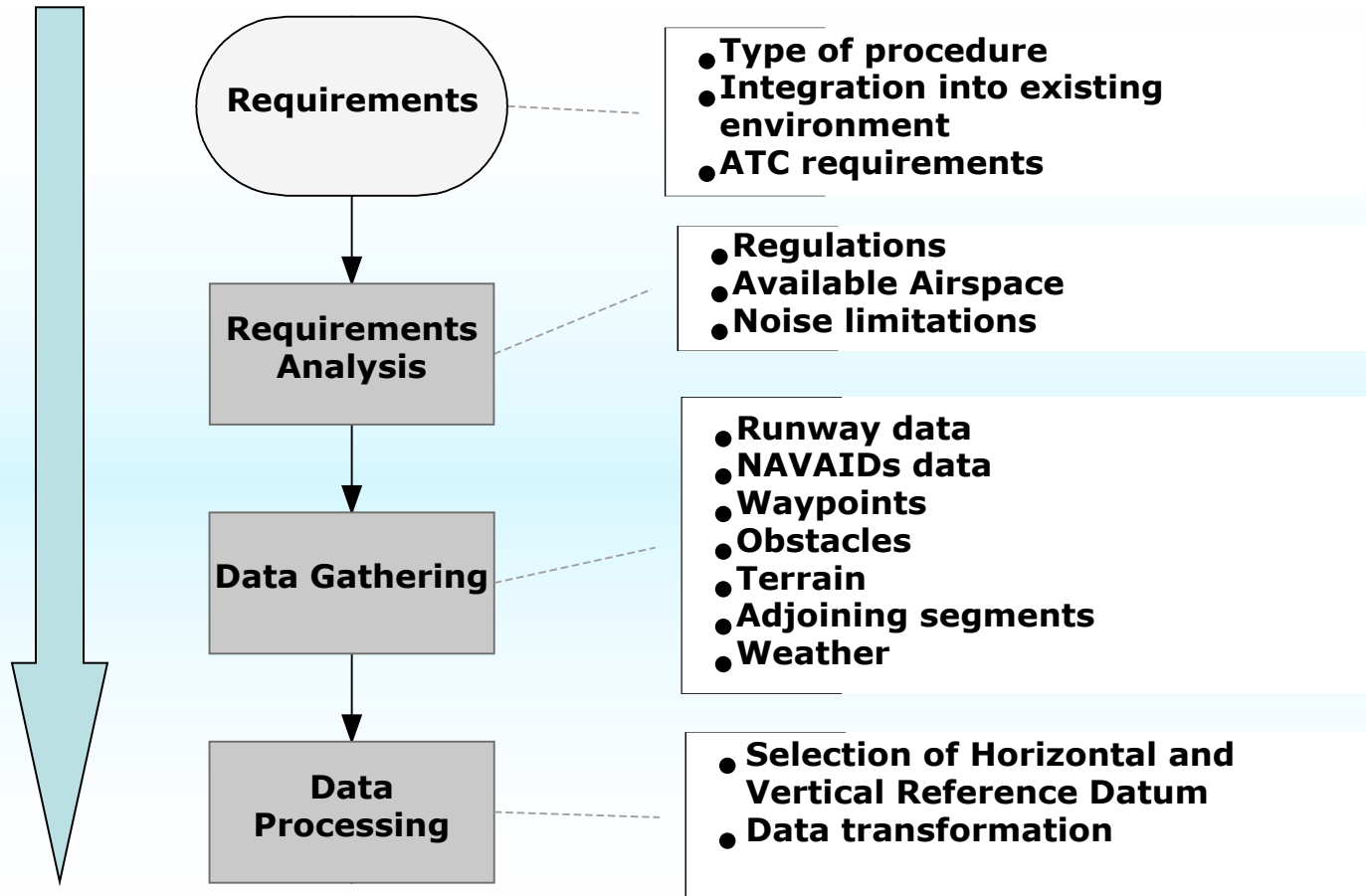
# Procedure Lifecycle (3)



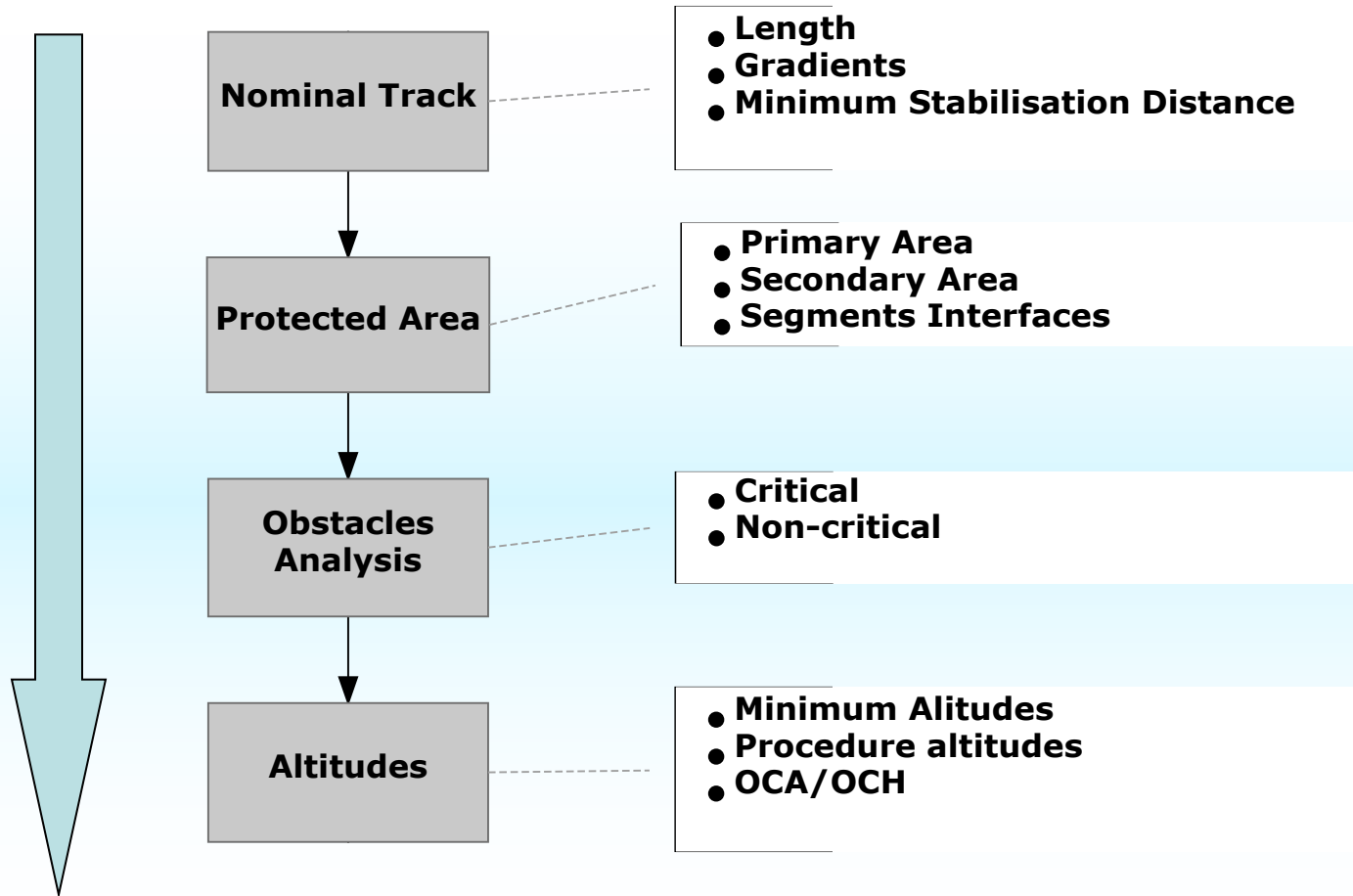
When to perform Flight inspection:

- After Design  
Flight Inspection Report is used as one of inputs of Validation
- During Validation  
Flight Inspection is used as one of validation tools
- Before Publication  
Flight inspection is used to obtain approval of AIP Amendment
- At the user level  
Flight inspection is used to confirm usability of procedure
  - standard FMS Database
  - customized FMS Database

# Design as a Process (1)



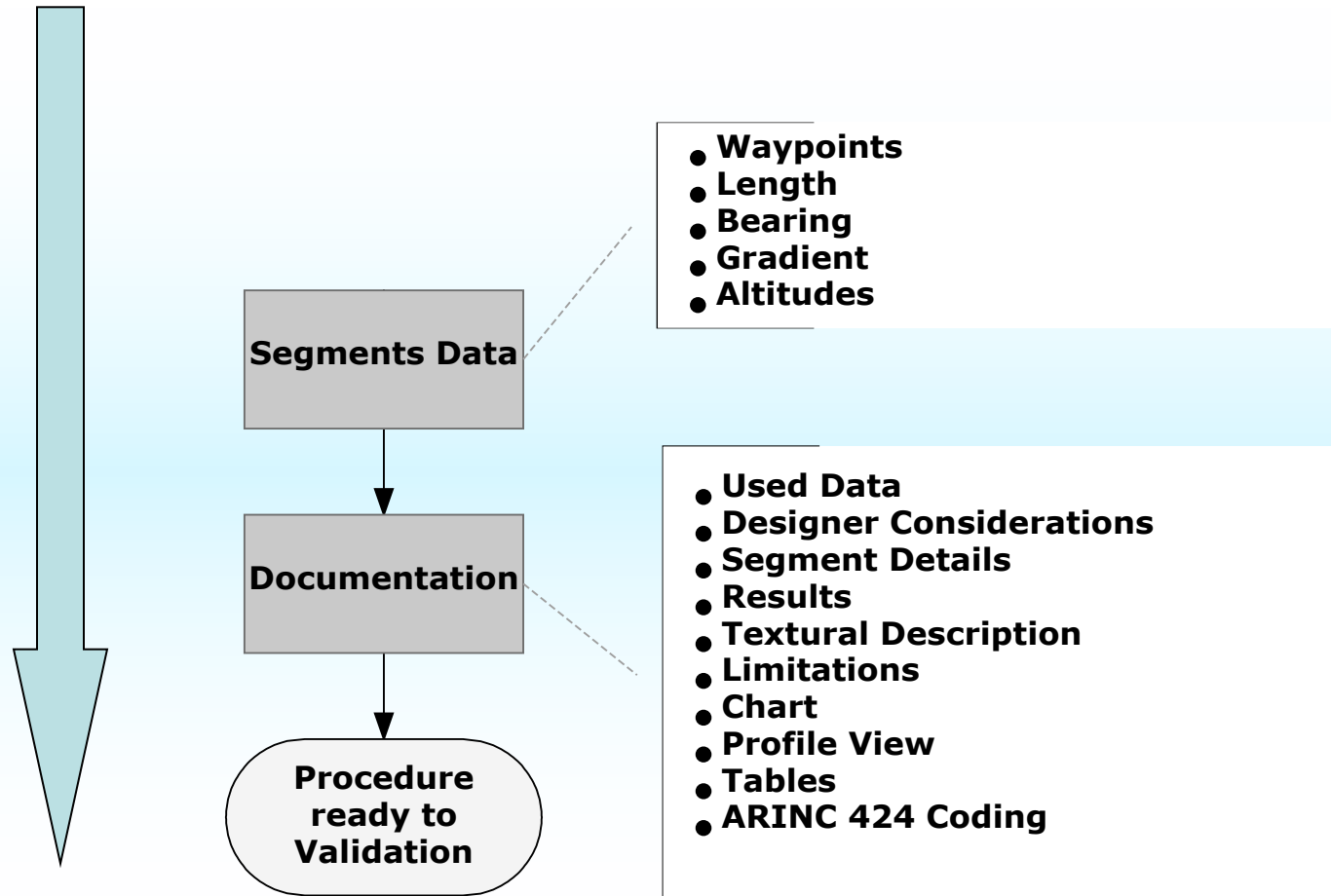
# Design as a Process (2)



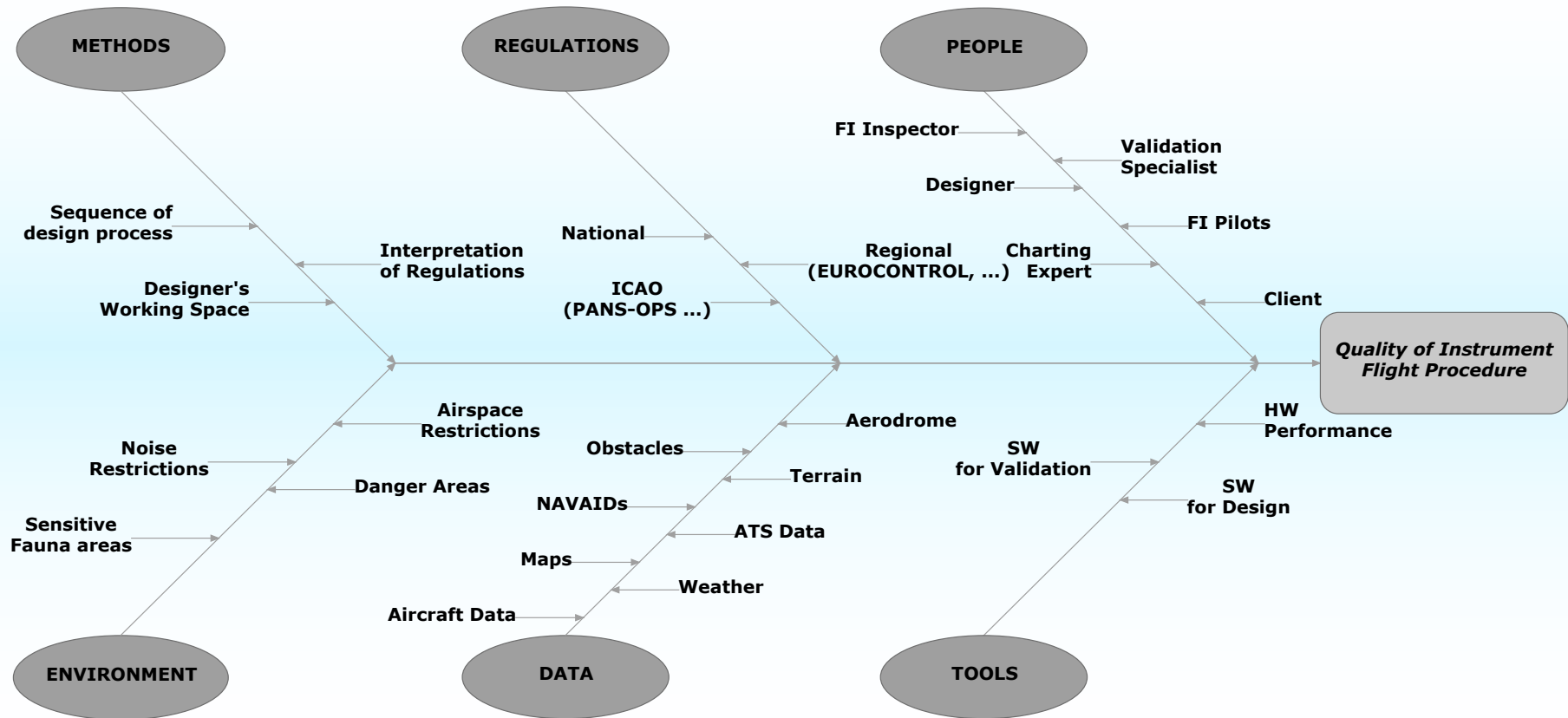


# Design as a Process (3)

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# Factors affecting the Design



# Known Issues (1)

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- Height above THR
  - 15.0m versus RDH
- Length of Segments
  - Minimum Stabilisation Distance
  - Optimum length T-Bar (Y-Bar)
- Descent and Climb Gradients
  - Boundaries of the design
  - Application of the Earth curvature
  - FAF location

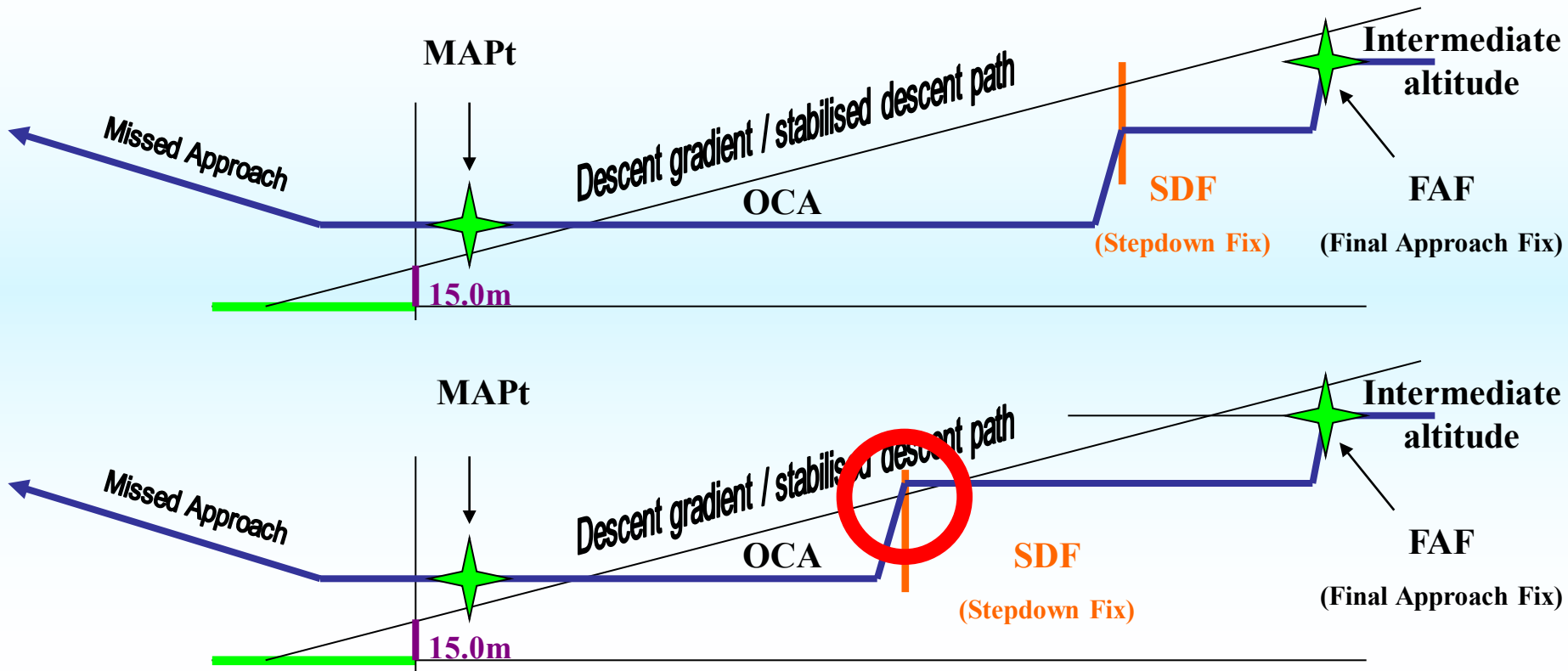
# Known Issues (2)

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- Segments Overlap
  - Interfaces between segments
- FAF in precision procedure
  - FAP versus FAF
- GP verification point
  - Missing data
  - Distinction from the Stepdown Fix

# Known Issues (3)

- Stepdown Fix Altitude



# Known Issues (4)

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- NAVAIDs Performance
  - ILS Coverage
    - 17/25NM versus 10/18NM, GP coverage
  - Early phases of Departures
- Minimum Equipment List
  - Intersections
  - Number of waypoints
- Slow Aircraft
  - Track discontinuity after turns

# Known Issues (5)

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- Missed Approach Text
  - More than one missed approach in procedure
- Speed restrictions
  - Speed limitations below PANS-Ops Margins
  - Lower speed / higher bank combination
- ARINC 424 Coding
  - Coding Advice versus Real Database

# Known Issues (6)

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- Departure End of Runway
  - End of Runway used instead of End of Clearway
- Environmental Aspects
  - Procedure might generates noise problem
- Magnetic Variation
  - Magnetic Variation is not accommodated
  - Rounding to the nearest whole degree



# Conclusions (1)

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- Huge amount of safety sensitive work lies on shoulders of sole person - instrument procedure designer
- flight inspection of procedures represents a barrier, which mitigates risks associated with the instrument procedures design
- Effectiveness of such risk mitigation strongly depends on skills of flight inspectors

# Conclusions (2)

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- Having in mind continuous transformation of flight inspection from flight inspection of systems to flight inspection of procedures, flight inspectors should become experts in instrument procedures design

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**Thank you for your attention.**