Transition from AIS to AIM Roadmap Phase 2 – Data quality monitoring

Alexandre Petrovsky
Technical Assistant
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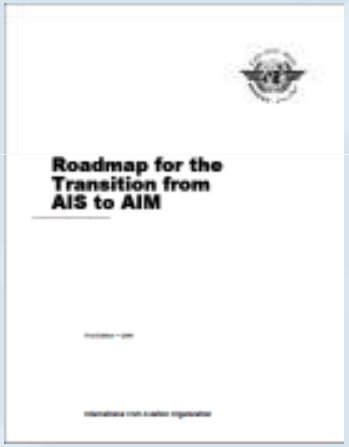
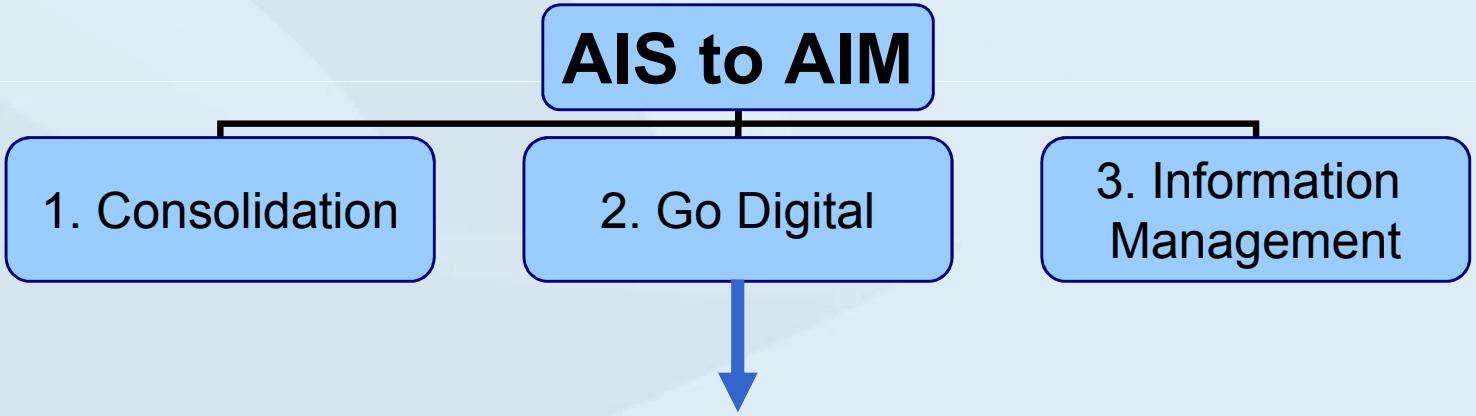
Roadmap for Transition from AIS to AIM Phase2





2. Go Digital

P-01 — Data quality monitoring
P-02 — Data integrity monitoring
P-06 — Integrated aeronautical information database
P-07 — Unique identifiers
P-08 — Aeronautical information conceptual model
P-11 — Electronic AIP
P-13 — Terrain
P-14 — Obstacles
P-15 — Aerodrome mapping

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What is Data Quality?

A degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity

(ICAO Annex 15)

Accuracy: a degree of conformance between the estimated or measured value and the true value.	How close to reality
Resolution: a number of units or digits to which a measured or calculated value is expressed and used	How many digits after comma
Integrity: a degree of assurance that aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.	How good is the data

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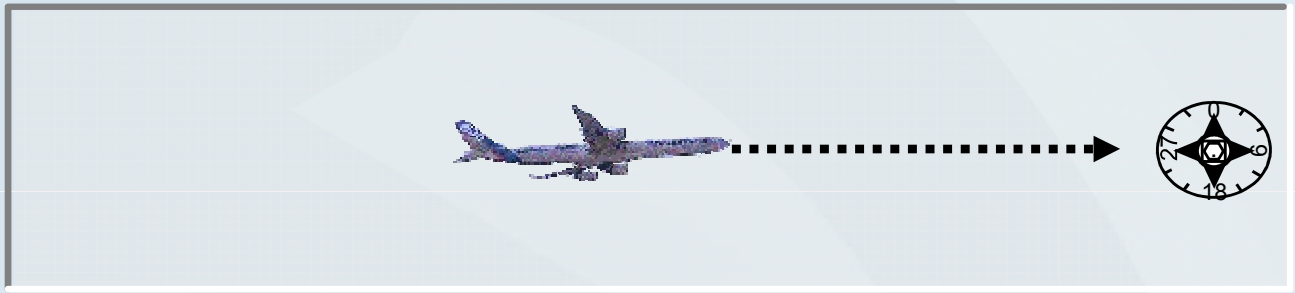
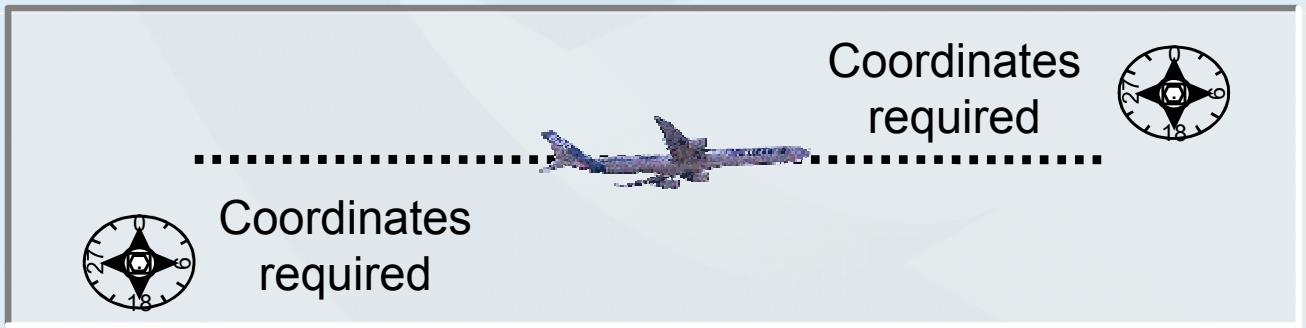
Data Quality – **Why?**





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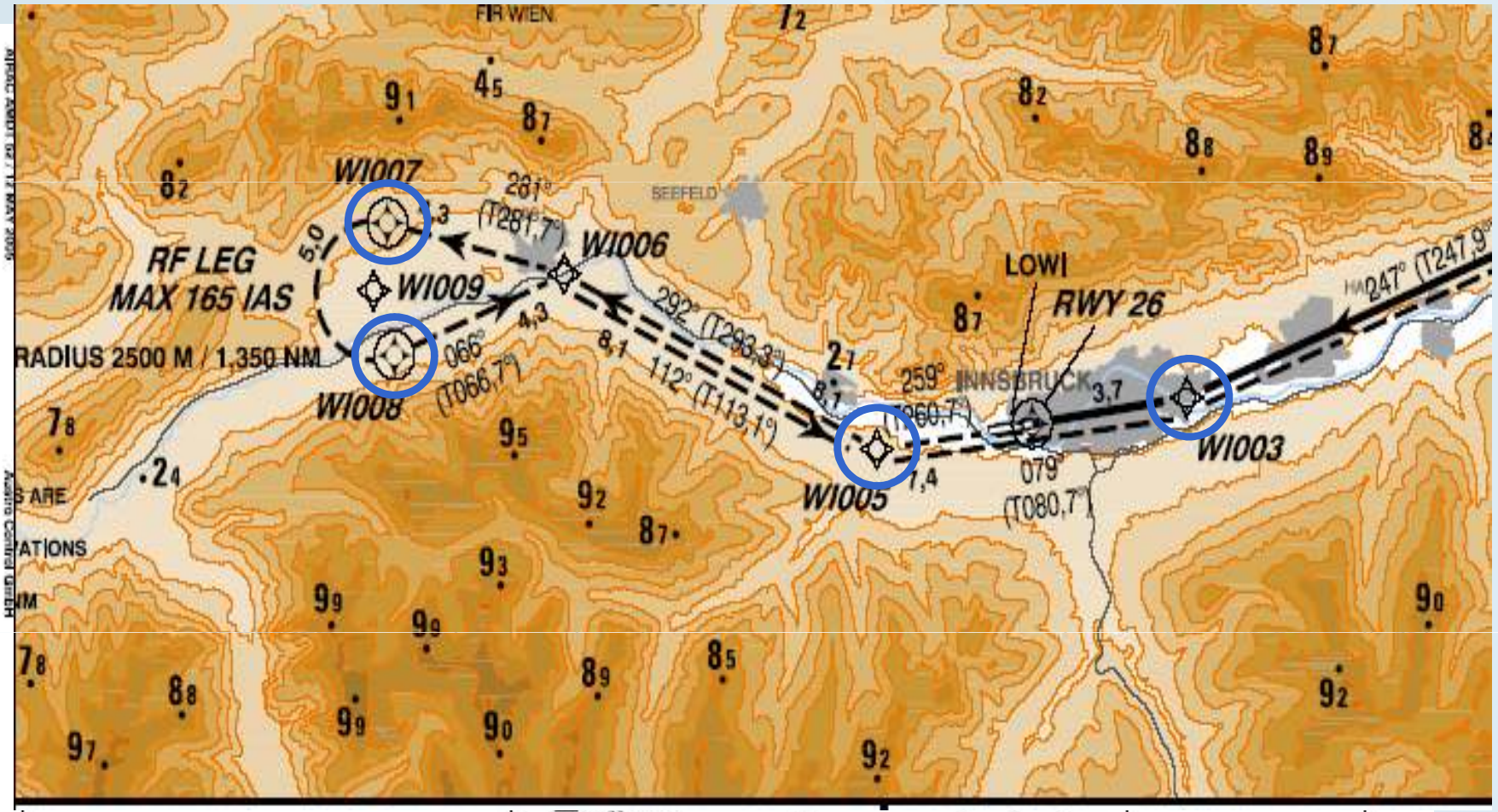
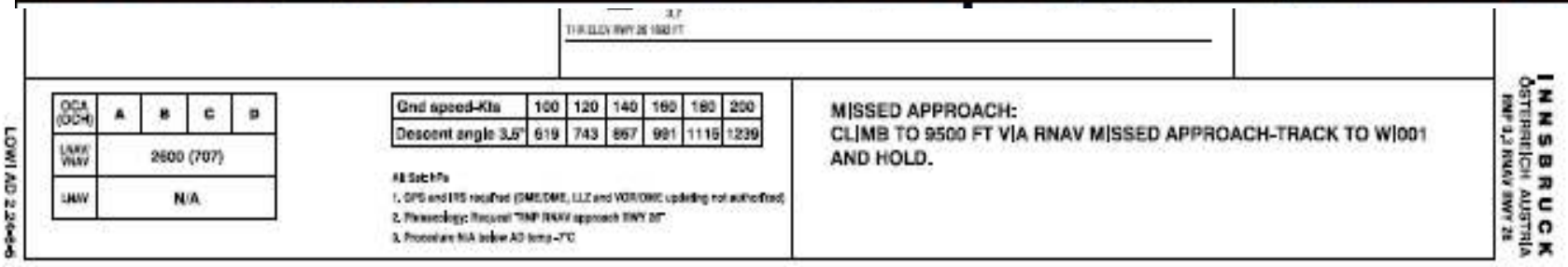
Why high integrity data counts?
Innsbruck, RNP 0,3 approach, RNAV RWY 26





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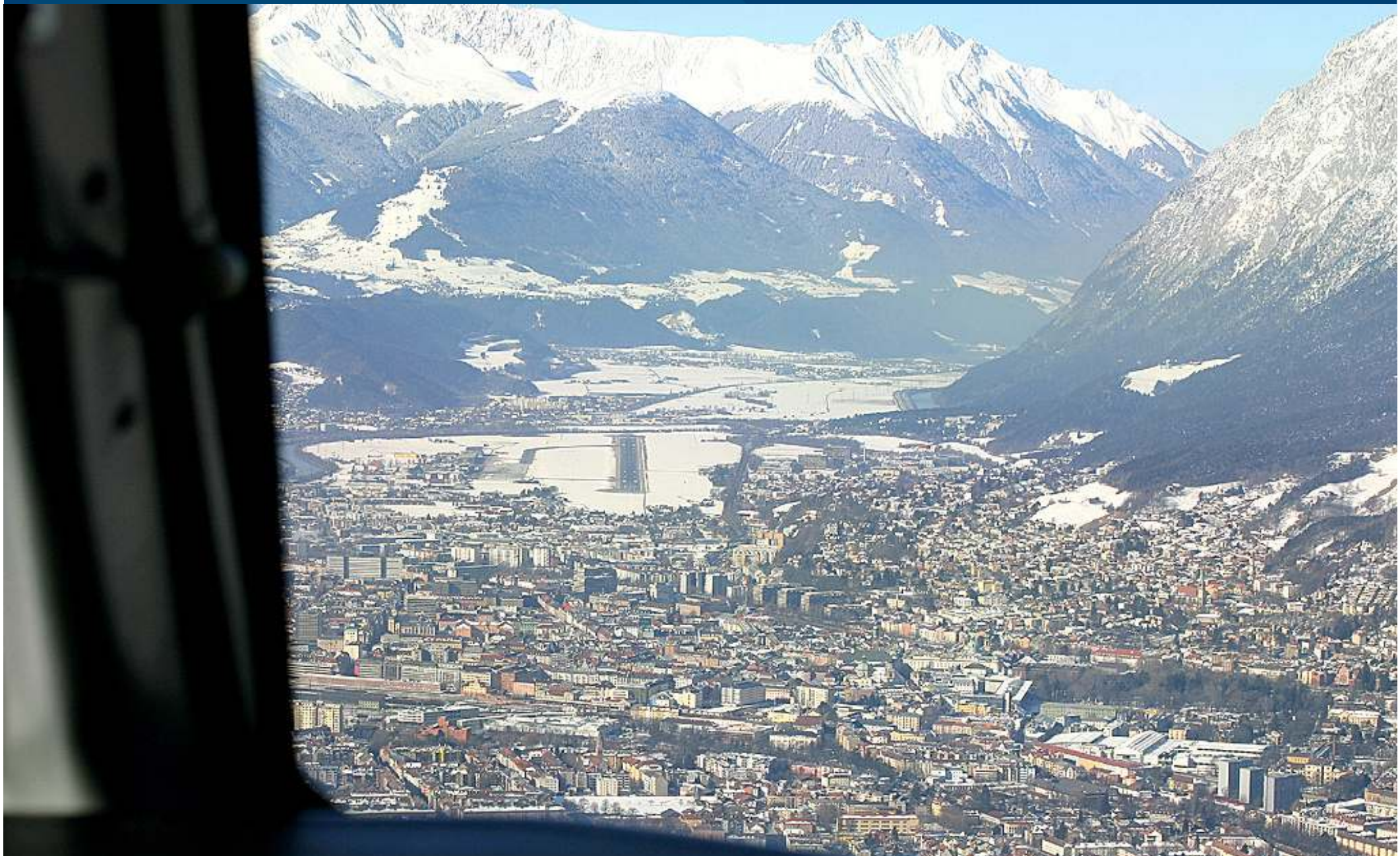
Innsbruck, VFR



transavia.com

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Monitoring Data Accuracy

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ICAO Annex 15 - required Integrity Levels

… a degree of assurance that an aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.

CRITICAL

Runway threshold, runway holding position etc.

Require an integrity value of **10^{-8}** **1 error in 100 M**

ESSENTIAL

Coordinates of en-route navaids, aerodrome elevation, etc.

Require an integrity value of **10^{-5}** **1 error in 100 K**

ROUTINE

FIR points, Aircraft stands, Airway segments etc.

Require an integrity value of **10^{-3}** **1 error in 1000**

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Do we achieve Data Quality requirements?

- Optimum 'human processes' achieves an error rate, at best 1 in 1000 or 1×10^{-3}
- Best case: achieve criteria for ROUTINE data, if:
  - Quality controlled environment e.g. QMS
  - Multiple input/control

APPENDIX 7. AERONAUTICAL DATA QUALITY REQUIREMENTS

Table A7-1. Latitude and longitude

Latitude and longitude	Publication resolution	Integrity Classification
Flight information region boundary points	1 min	1×10^{-3} routine
P, R, D area boundary points (outside CTA/CTZ boundaries)	1 min	1×10^{-3} routine
P, R, D area boundary points (inside CTA/CTZ boundaries)	1 sec	1×10^{-5} essential
CTA/CTZ boundary points	1 sec	1×10^{-5} essential
En-route NAVAIDS and fixes, holding, STAR/SID points	1 sec	1×10^{-5} essential
Obstacles in Area 1 (the entire State territory)	1 sec	1×10^{-3} routine
Aerodrome/heliport reference point	1 sec	1×10^{-3} routine
NAVAIDS located at the aerodrome/heliport	1/10 sec	1×10^{-5} essential
Obstacles in Area 3	1/10 sec	1×10^{-5} essential
Obstacles in Area 2	1/10 sec	1×10^{-5} essential

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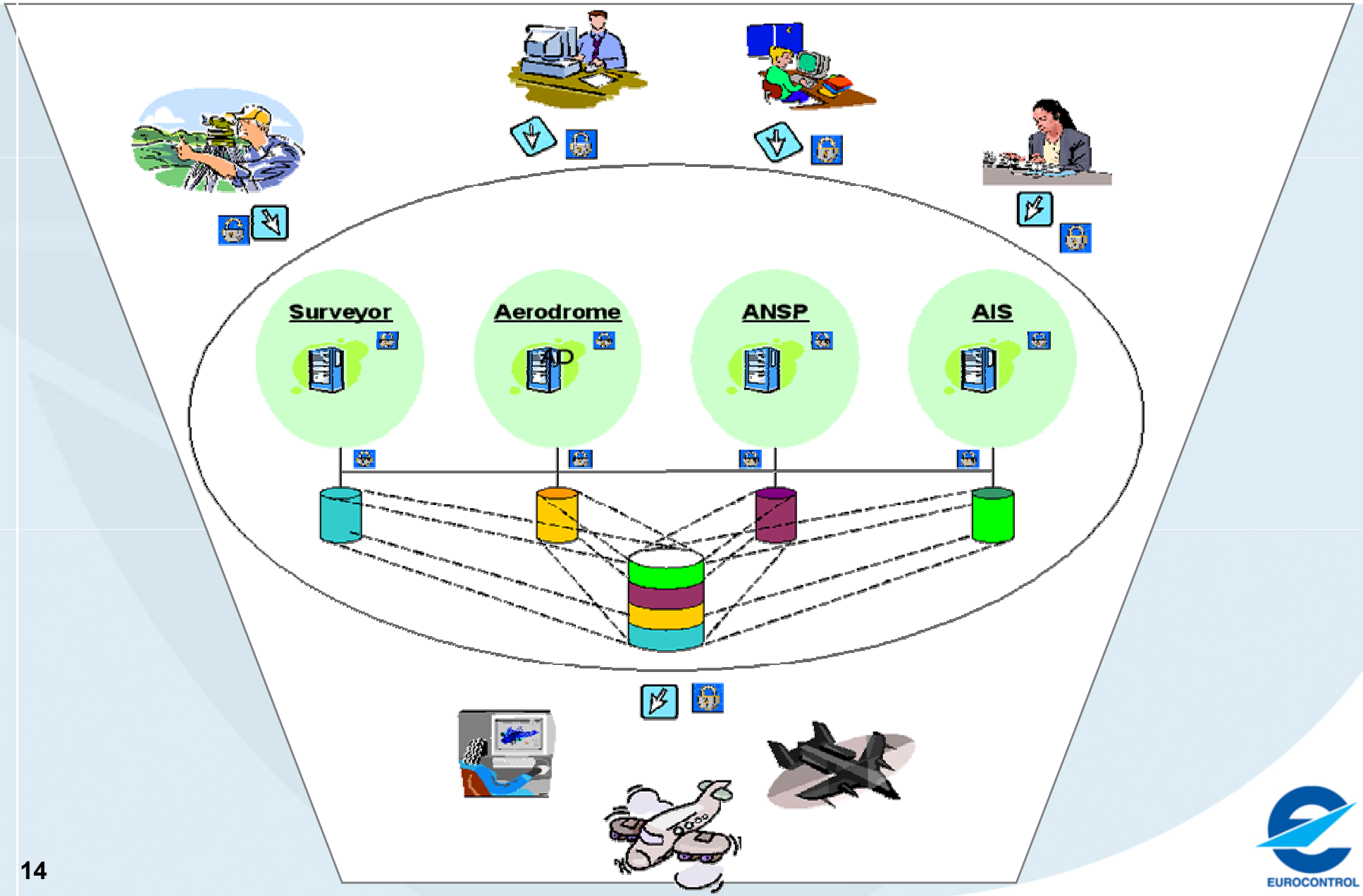
Monitoring Data Integrity



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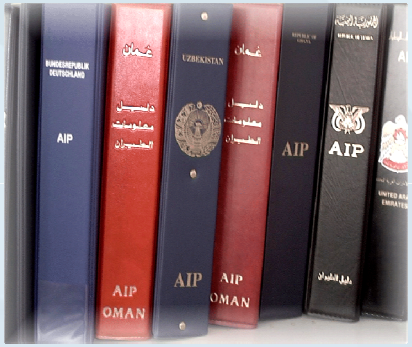
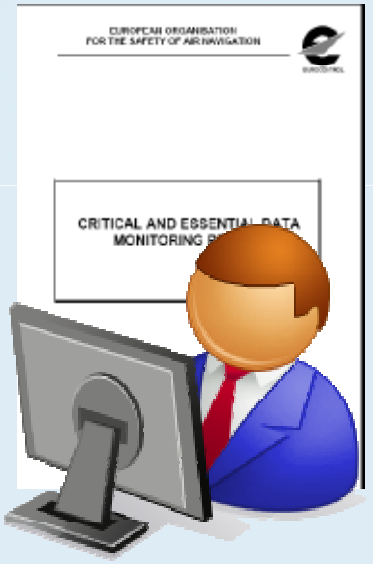
AMMON – Aeronautical Information Measurement and Monitoring





Identify inconsistencies
Inform the States
Follow up
Remedial action
Monitor progress

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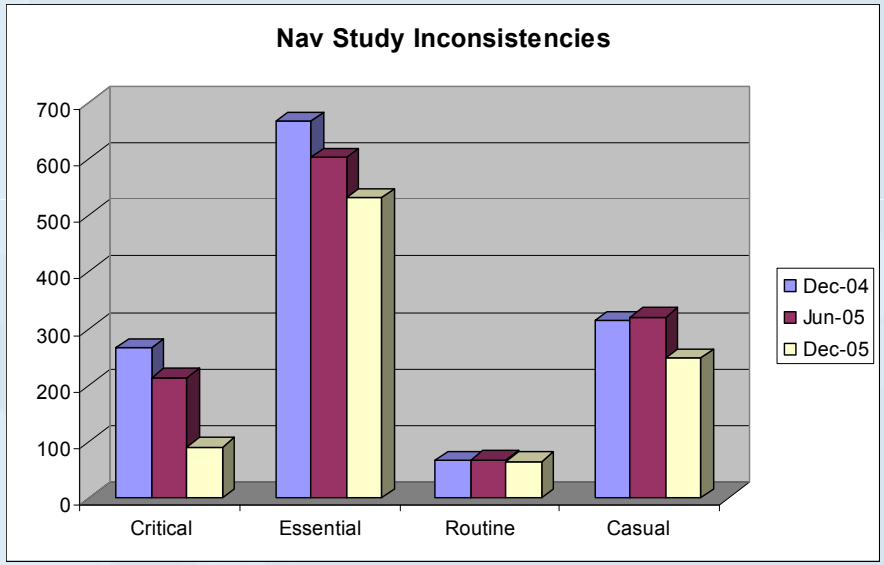
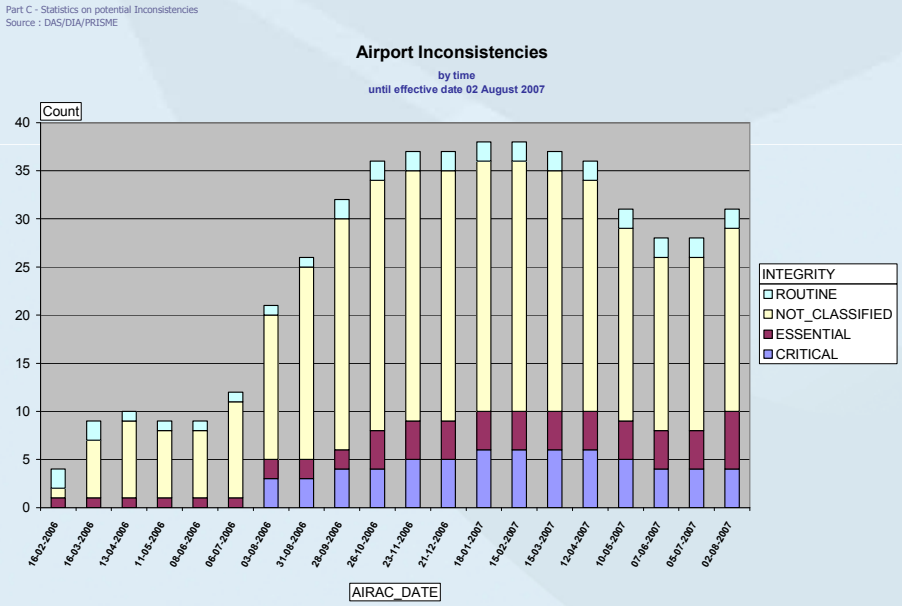
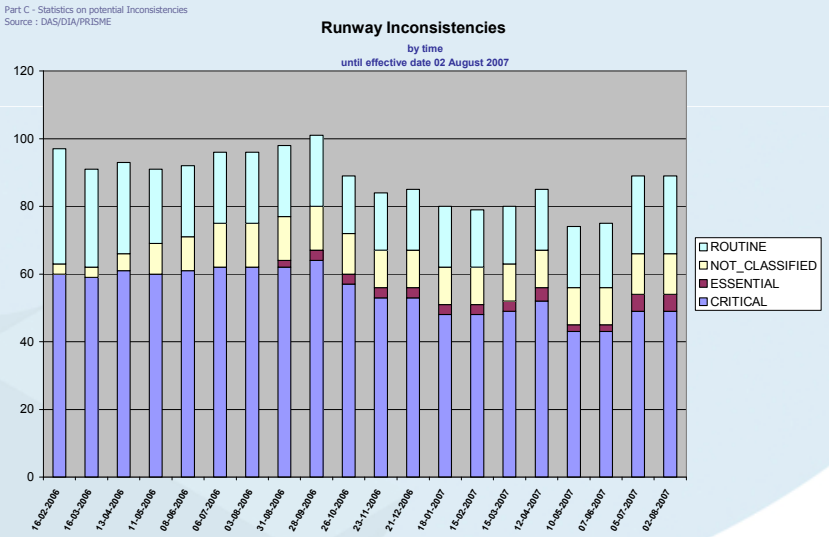
Monitoring aspect



- **Despite Automatic and semi-automatic procedures and QMS**
- **Main Causes of inconsistencies**
  - Non-complete data supplied by the originators
  - AIS errors
  - Ambiguities in ICAO SARPs





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AMMON Overview

State AIP

Reporting

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AMMON Scope

ECAC Area

Critical and Essential Data

Availability, completeness and publication resolution

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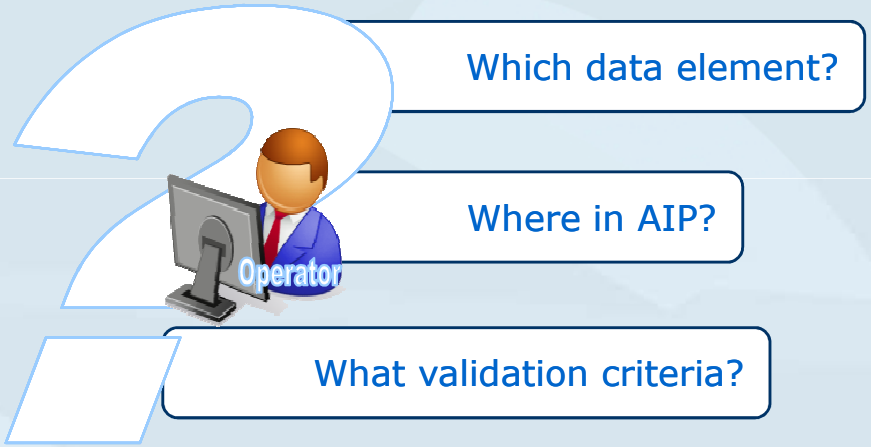
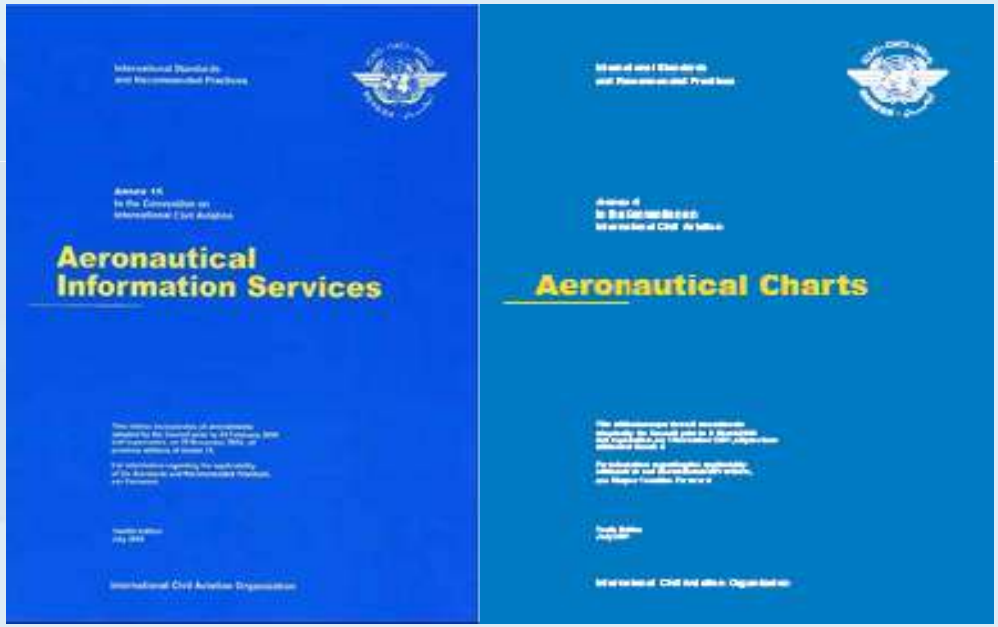
Publication & Data Quality Requirements





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CRITICAL AND ESSENTIAL DATA ATTRIBUTES ICAO ANNEX 4/15, APPENDIX 6/7

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What to look for?

Where to look?

Example ‘RWY THR’

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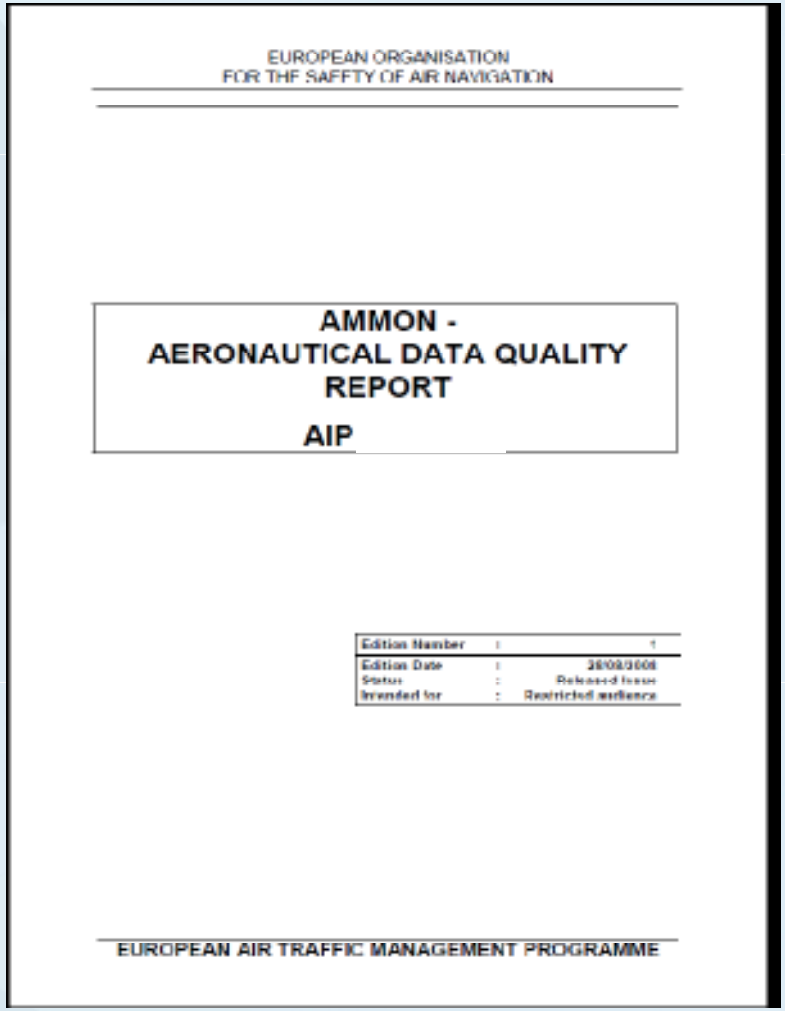
AMMON Report structure

- Part I: General
  - AMMON Overview, Report structure & Recommendations,
- Part II: Data Analysis
  - Compliance with Timeliness
  - Inconsistencies in AIP relating to critical and essential data
  - Trends and Statistics


EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

AMMON -
AERONAUTICAL DATA QUALITY
REPORT

AIP

Edition Number	:	1
Edition Date	:	28/08/2008
Status	:	Released Issue
Intended for	:	Restricted audience

EUROPEAN AIR TRAFFIC MANAGEMENT PROGRAMME

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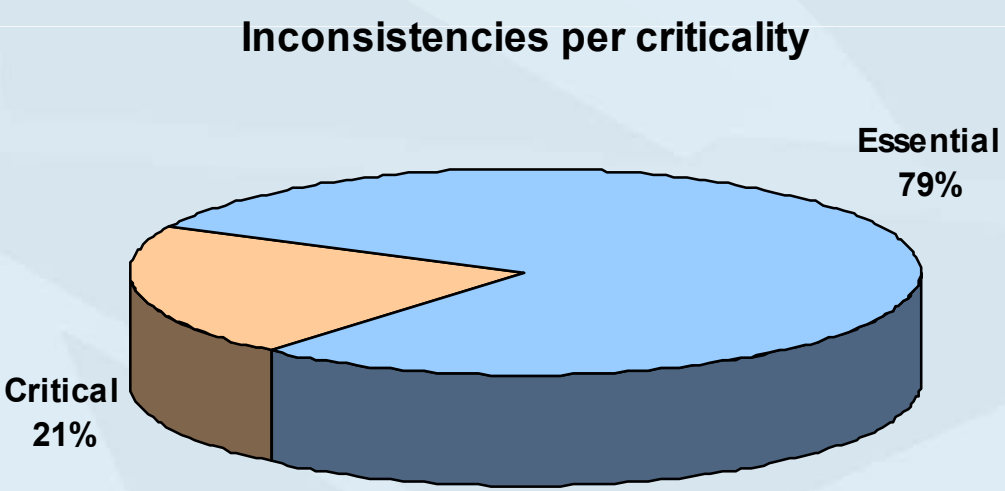
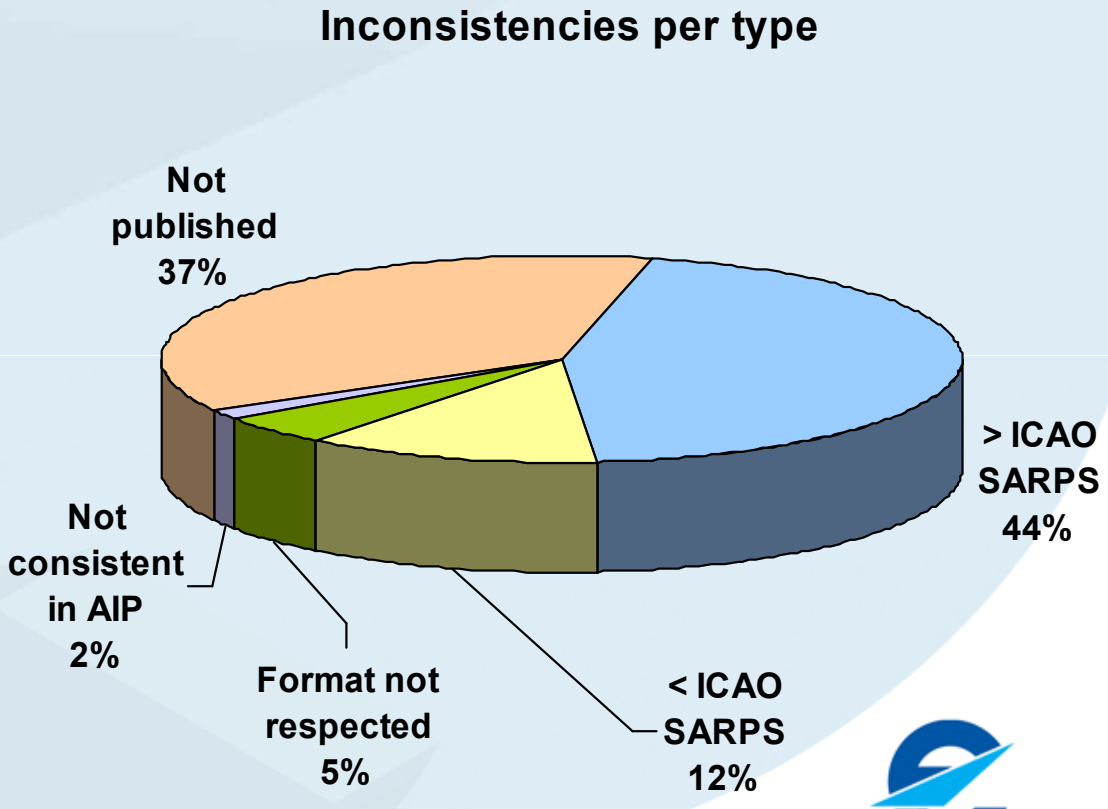
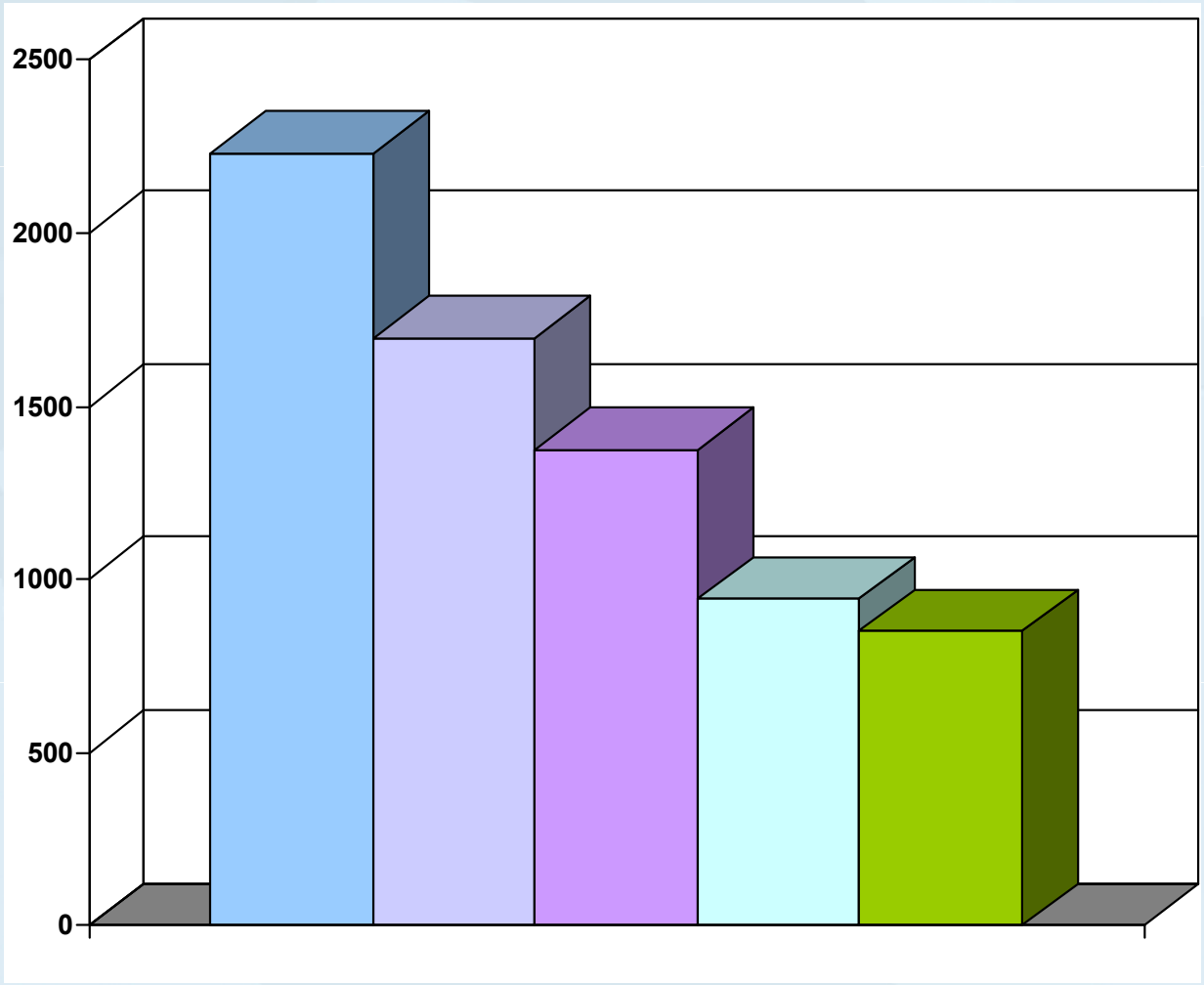
AMMON results

Based on the analysis of 41 ECAC AIP





Top 5 - not published



- Final approach descent angle (Non-precision approach or approach with vertical guidance)
- Instrument approach procedure fix formations
- Final approach fixes/points and other essential fixes/points comprising the instrument approach procedure
- Distance measuring equipment (DME)
- Runway end (flight path alignment point)

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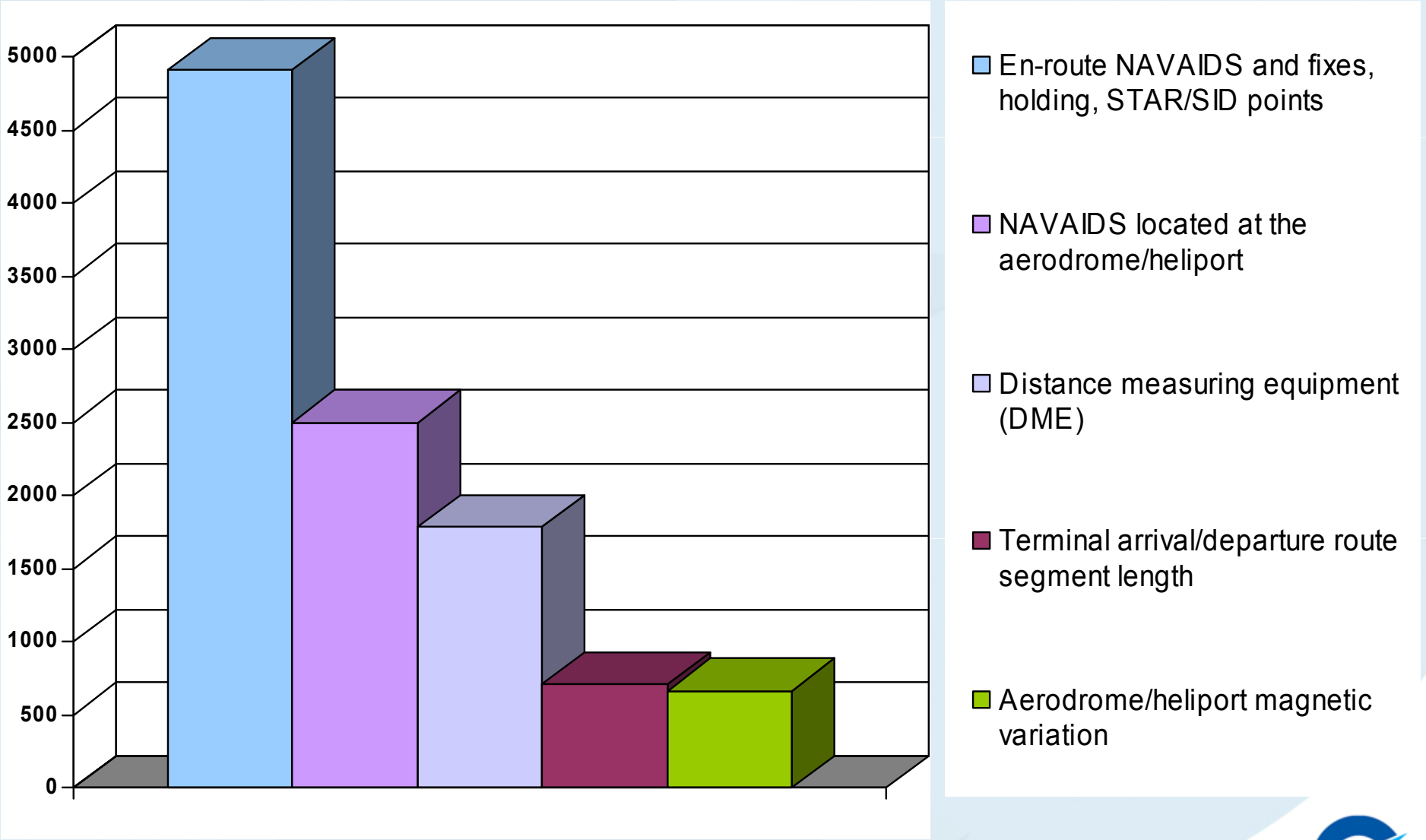
Top 5 > ICAO SARPS



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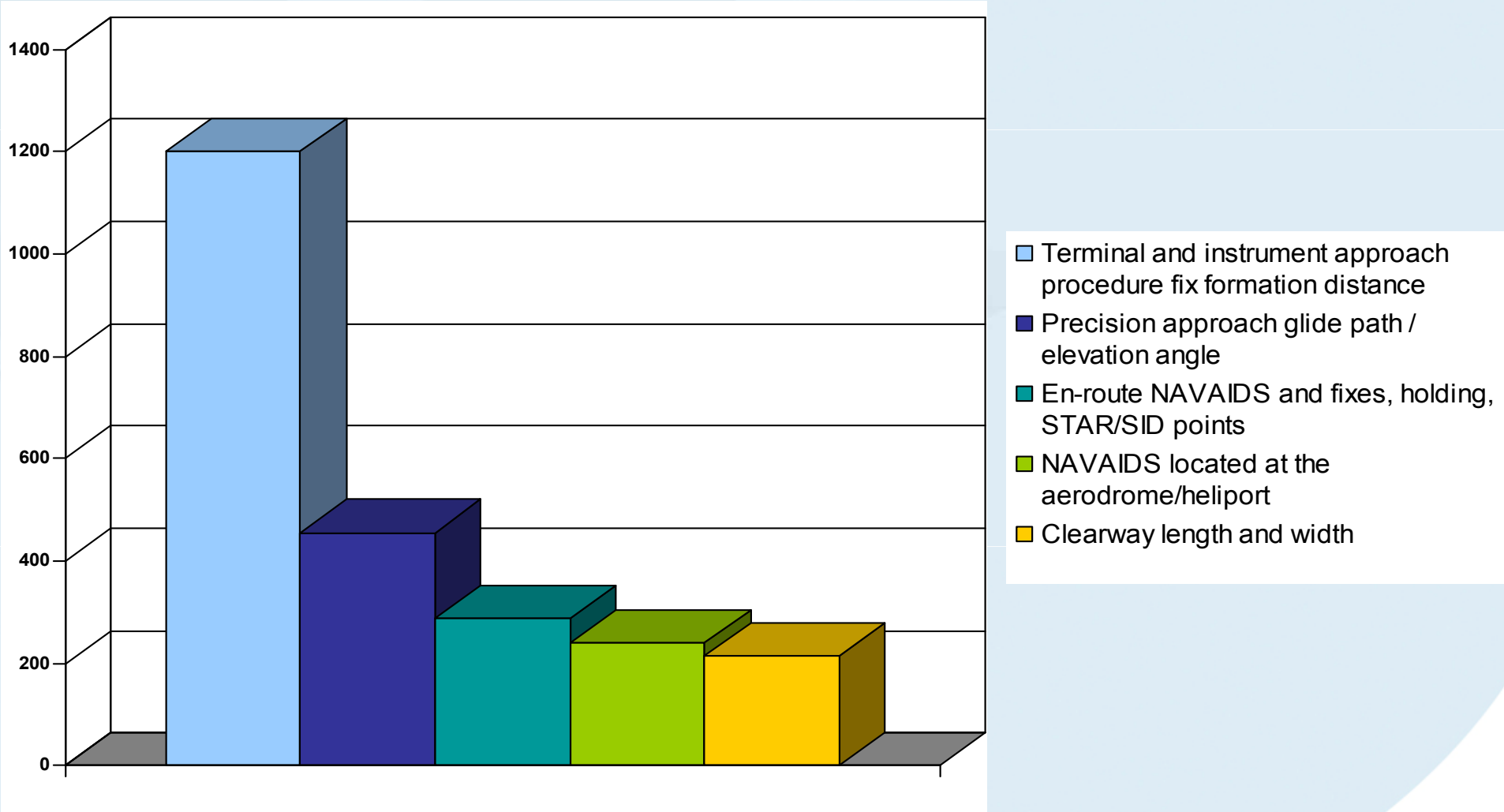

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Initial findings: SARPS ambiguities

- App1 : 1 m or 1 ft

- App7: 0.1m or 0.1ft

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Monitoring - Benefits

- States
  - Comprehensive view of data issues
  - Clarification of ambiguities in ICAO requirements
- ICAO
  - Proposal for changes

- Publication End–Users
  - Quality of data

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Summary

- Aeronautical Data Quality – key foundation for present and future ATM data-dependent systems
- Quality of information provided by AIS falls far short of the required values
- There is a need for monitoring data quality – to bring up to ICAO SARPS and maintain in order to support ATM target levels of safety.

www.eurocontrol.int/aim/public/standard_page/qm_ammon.html

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