



DP-7

The need for QMS controlled processes in AIS/AIM

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The „good old days“

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For decades operational requirements and the provision of Aeronautical Information by State AIS offices was going hand in hand and did not create problems



WHY ?

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The „good old days“

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Reasons:

- Navigation was based on conventional navaids on the ground. Relative accuracy was in most cases sufficient for pilots.
- The primary medium for aeronautical information in the cockpit was charts.
- AI published by AIS offices met the charting requirements.
- The amount of AI and the number of changes was large but still manageable with manual processes.
- Impact of late information was less significant.
- Data quality and integrity could be achieved with manual processes along the entire data chain.
- Data resolution was of lesser importance.

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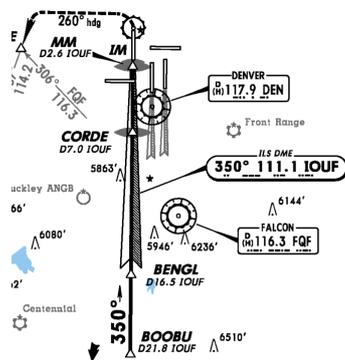
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In the 1980s aviation is starting to change

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The aviation world changed with the first FMS systems on board of aircraft



For FMS operation navigation databases became important

But relative Accuracy was still OK without GNSS

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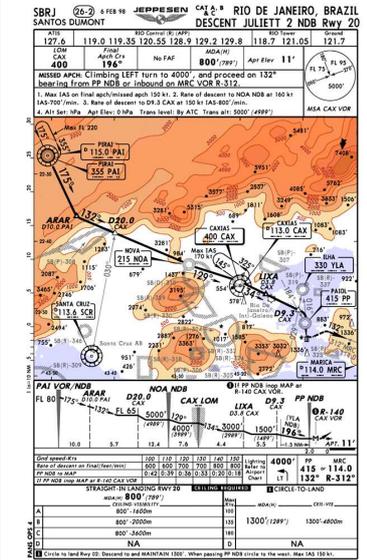
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.... and the change continues

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Today virtually all worldwide procedures are available in the FMS. Charts are no longer the only tool for navigation. Pilots rely on their on-board navigation databases.




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New technologies enter the cockpit

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Aviation is changing to Performance Based Navigation (PBN) which requires data in much higher quality. Relative accuracy is no longer sufficient.




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New technologies enter the cockpit

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Cockpit technology over the past 40 years changed from self-contained instruments to software and data-driven, integrated, graphical situational awareness.



B-737-200, First flight 9 April 1967



A-380, First flight 27 April 2005

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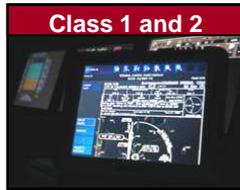
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New technologies enter the cockpit

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Paper charts are being replaced by EFB



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New technologies enter the cockpit

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EFB is database driven and it is much more than just an electronic Chart Viewer



Taxi Situation Awareness



Charts



Weather & NOTAMS



Airport Familiarization



Technical Documents



Logbook & Fault Reporting



Aircraft Performance

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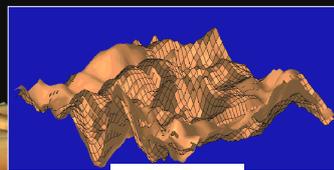
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New technologies enter the cockpit

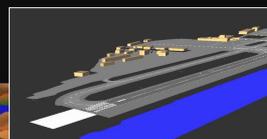
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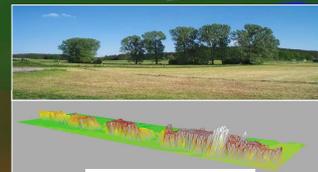
Aeronautical Databases are used for Terrain, Obstacles, and Airport Mapping



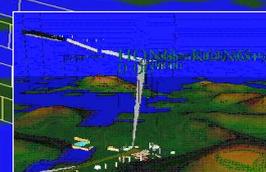
Terrain



Airports



Obstacles



NavData

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AIS/AIM cannot stand aside

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What do these revolutionary changes in our aviation world mean for aeronautical information and for AIS/AIM ?

The role and importance of aeronautical information changed significantly with the implementation of RNAV, RNP and more precise airborne computer systems. Aircraft are becoming database driven and their operation requires access to aeronautical information of a significantly higher quality than is currently available.

Efforts of all States must be aimed at significantly improving their AIM systems to assure that aeronautical information will be available in the right quality, the right form, at the right time, for the right user and it must be available without restriction.

Improvements are needed without further delays because the future has already started.

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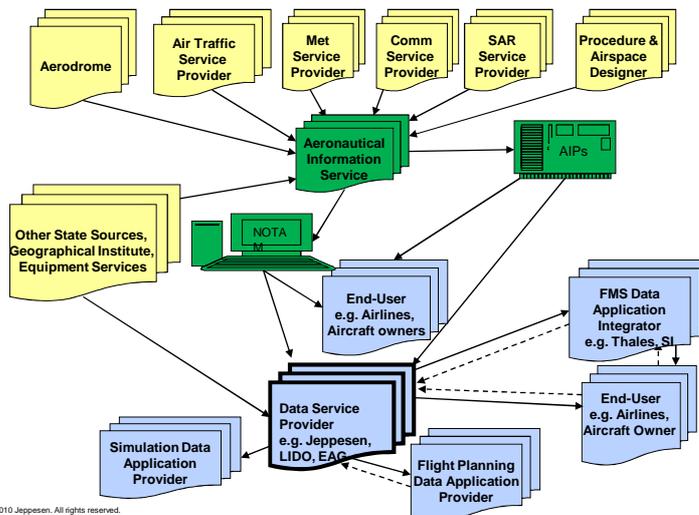
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The aeronautical data chain

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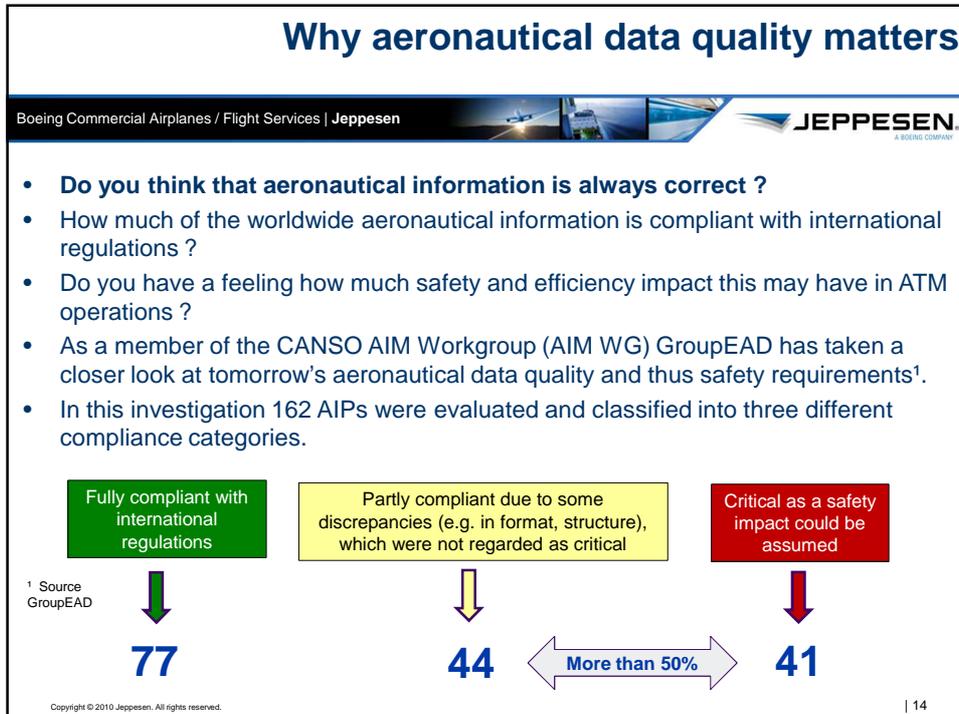
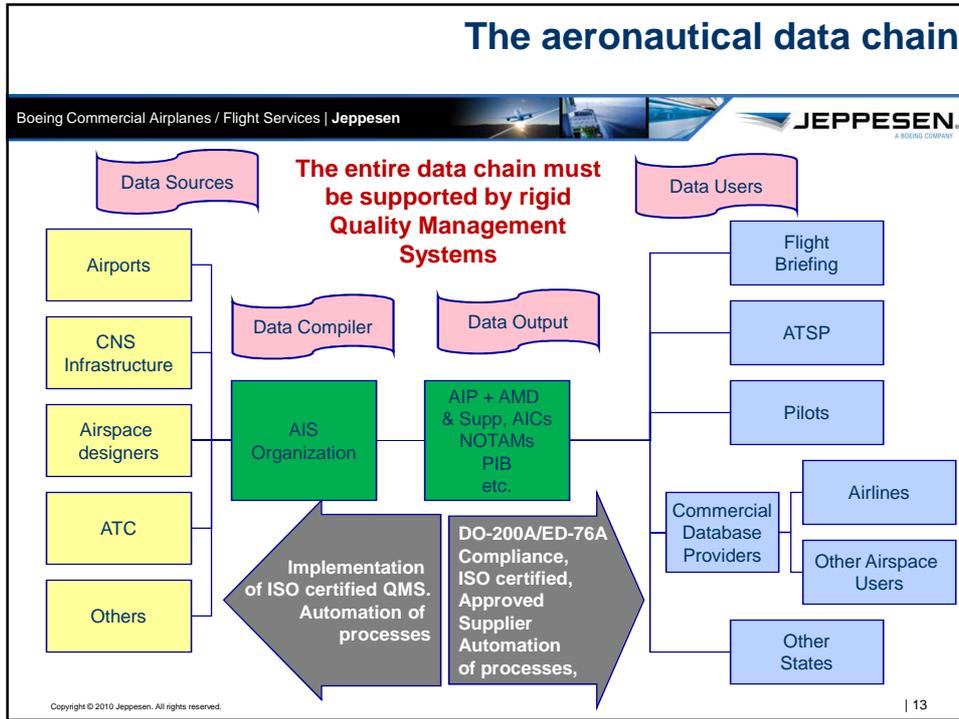


The Aeronautical Data Chain



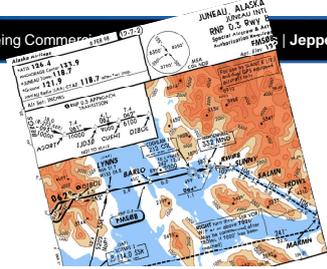
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Why aeronautical data quality matters

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Data Quality - The “dark side” of PBN ?

- Most actors in the data supply chain achieve data integrity no better than 10^{-3} (routine)
- Most data for PBN operations requires integrity levels of 10^{-5} (essential) or 10^{-8} (critical).
- PBN is extremely data-dependent requiring timely Aeronautical Information of considerably higher quality than is generally available today.



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Why aeronautical data quality matters

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In principle, aeronautical data of poor or insufficient quality may compromise the safety of air traffic operations which can lead to an airspace user hazard resulting in an incident or accident.

Providers of aeronautical information are facing new challenges in having to serve computer-based navigation applications and decision support tools, all of which are data reliant. This requires that more attention must be given to the importance of the aeronautical data quality to mitigate a substantial portion of identified risks.

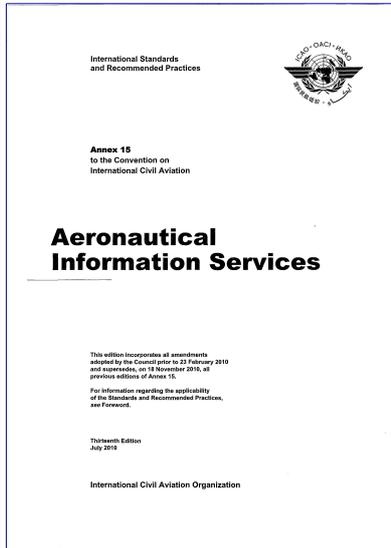
Why are aeronautical data requirements not met today ?

Without a doubt the reasons are complex and manifold but the lack of an effective **Quality Management System** is one of them.

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Quality in ICAO Annex 15

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ICAO Annex 15 defines International Standards and Recommended Practices for Aeronautical Information Services. Amendment 36 to Annex 15, issued 18 November 2010, contained new and revised provisions for the implementation and execution of Quality Management Systems.

3.2 Quality management system

3.2.1 Quality Management Systems shall be implemented and maintained encompassing all functions of an aeronautical information service as outlined in 3.1.7. The execution of such quality management systems shall be made demonstrable for each function stage, when required.

IMPORTANT !!!!

The quality management system established in accordance with 3.2.1 should follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and be certified by an approved organization. An ISO 9000 certificate, issued by an accredited certification body would be considered an acceptable means of compliance.

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ISO 9001 QMS for AIS/AIM

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Quality at every point !!

In the end-to-end environment between the data originators and AIS, data is originated at its sources, assembled, processed and formatted to meet the requirements of its end applications.

A Quality Management Process is that which provides the framework upon which the procedures for doing the job are developed, managed, controlled, assessed, and changed.

This leads to the necessity to implement techniques and procedures throughout the entire process to ensure the aeronautical data meets quality requirements

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ISO 9001 QMS for AIS/AIM

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The processes defined by a Quality Management System in AIS/AIM must assure that the following data quality characteristics will be met.

The data shall have the agreed data quality, characterized by:

1. the accuracy of the data;
2. the resolution of the data;
3. the confidence that the data is not corrupted while manipulated, stored or in transit (data integrity assurance level);
4. the ability to determine the origin of the data (traceability and meta-data);
5. the level of confidence that the data is applicable to the period of intended use and the assurance that it is provided to the users according to the AIRAC requirements (timeliness);
6. the assurance that all of the data needed to support the function is provided (completeness);
7. the format of the data meets the user requirements.

Above characteristics are derived from ICAO Annex 15 and related documents and from RTCA Industry Standards DO-200A and DO-201A which are cross-referenced in Annex 15.

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ISO 9001 QMS for AIS/AIM

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ISO 9000
Standardization
brings many benefits
for AIS/AIM

Remember when people only used paper blueprints? Now all files are electronic. Implementing a QMS like ISO is a similar situation - a little work up front, but after a short time you'll see the benefits in your organization.

When ISO 9001 is implemented in an organization:

1. Well defined and documented procedures improve the consistency of output
2. Quality is constantly measured
3. Procedures ensure corrective action is taken whenever defects occur
4. Defect rates decrease
5. Defects are caught earlier and are corrected at a lower cost
6. Definition of procedures identifies current practices that are obsolete or inefficient
7. Documented procedures are easier for new employees to follow
8. Operational efficiency is increased
9. Customer satisfaction rises

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Quality standards in the Industry

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DO-200A / ED-76A
Standards for Processing Aeronautical Data

QUALITY AT EVERY LEVEL



We are committed to continuously improving our products, services and processes to meet and exceed our customers' requirements and quality objectives by integrating Jeppesen's vision into our daily work.

To achieve this we:

- Proactively pursue quality
- Make training for quality a first-priority
- Do it right the first time
- Lead the market in quality
- Build quality into everything we do

Quality is Everyone's Responsibility!

Mark W. ...
Head, Quality and ISO

www.jepesen.com/quality

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ISO 9001:2000
International Organization for Standardization



Letters of Acceptance (LoA)
Issued by FAA & EASA

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DO-200A / ED-76A
Standards for Processing Aeronautical Data

Developed by RTCA SC-181 & EUROCAE
WG-13 to document **data processing**
requirements



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"Requirements and Technical Concepts for Aviation" | 22

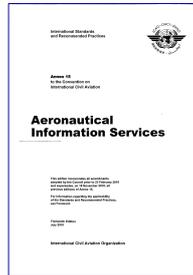
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New cross reference note in **Amendment 36** to ICAO Annex 15:

Note - Supporting material in respect to the processing of aeronautical data is contained in RTCA Document DO-200A and EUROCAE Document ED-76A — Standards for Processing Aeronautical Data. These standards support the development and application of aeronautical databases.



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DO-200A Letter of Acceptance Type 1 and Type 2



Type 1 LoA for ARINC 424 data process

Type 2 LoA for aircraft loadable database process



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Some wise words at the end

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"The beginning is the most important part of the work"

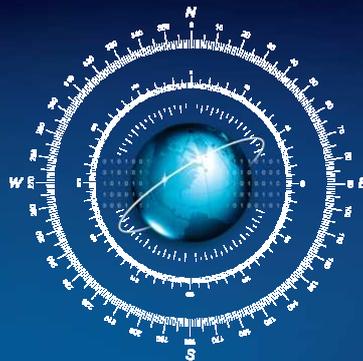
Plato

In fact, this beginning is done now...

...the best start is worth nothing, without full buy-in & continued cooperation

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THANK YOU

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