Roadmap for the Transition from AIS to AIM

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TO/AIM

ICAO AFI Region Seminar on Transition to AIM: Phase 1 to 3.

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Outline

- AIS to AIM Transition Roadmap: when everything started

- AIS to AIM Transition Roadmap: key-points

- AIS to AIM Transition Roadmap: phases and steps

- Consolidation Phase

- AIRAC Adherence Monitoring

- Annex 4, 15 difference monitoring

- WGS84 Implementation

- Quality Management System

- Summary

AIS to AIM Transition Roadmap

- Developed and published in 2009

- Expresses the transition from AIS to AIM in 21 steps organized on 3 phases
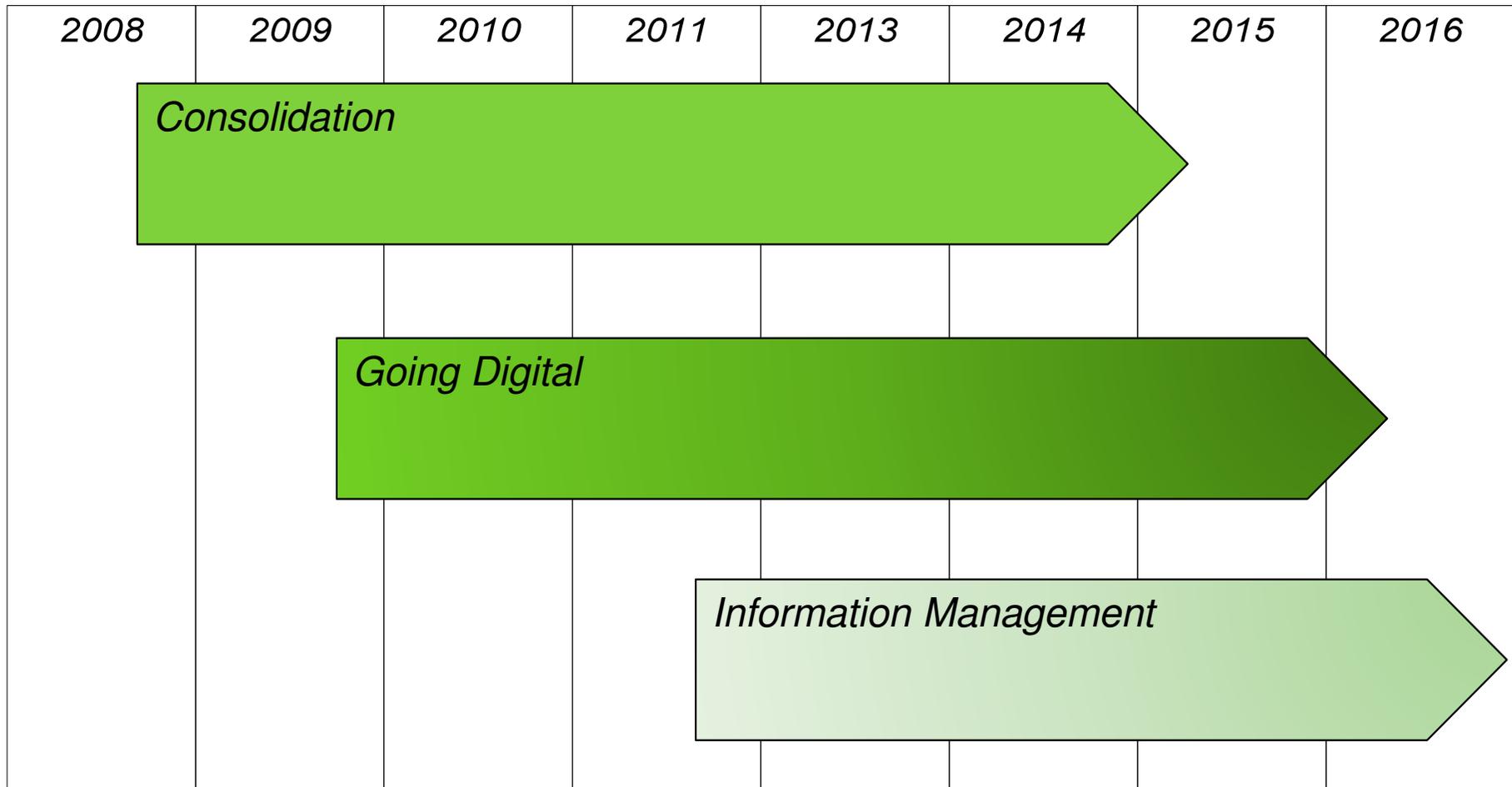
AIS to AIM Transition Roadmap

The transition from AIS to AIM will..

- Comply with ICAO processes for amendments to the Annexes
- **Support or facilitate the generation and distribution of Aeronautical Information**
- **Provide a foundation for measuring performance and outcomes**
- **Assist States in implementation**
- **Use an evolutionary approach building on the work of States, Organizations, and industry**
- Provide a framework of Standards
- Be guided by the Global Air Navigation Plan And ATM Operational Concept
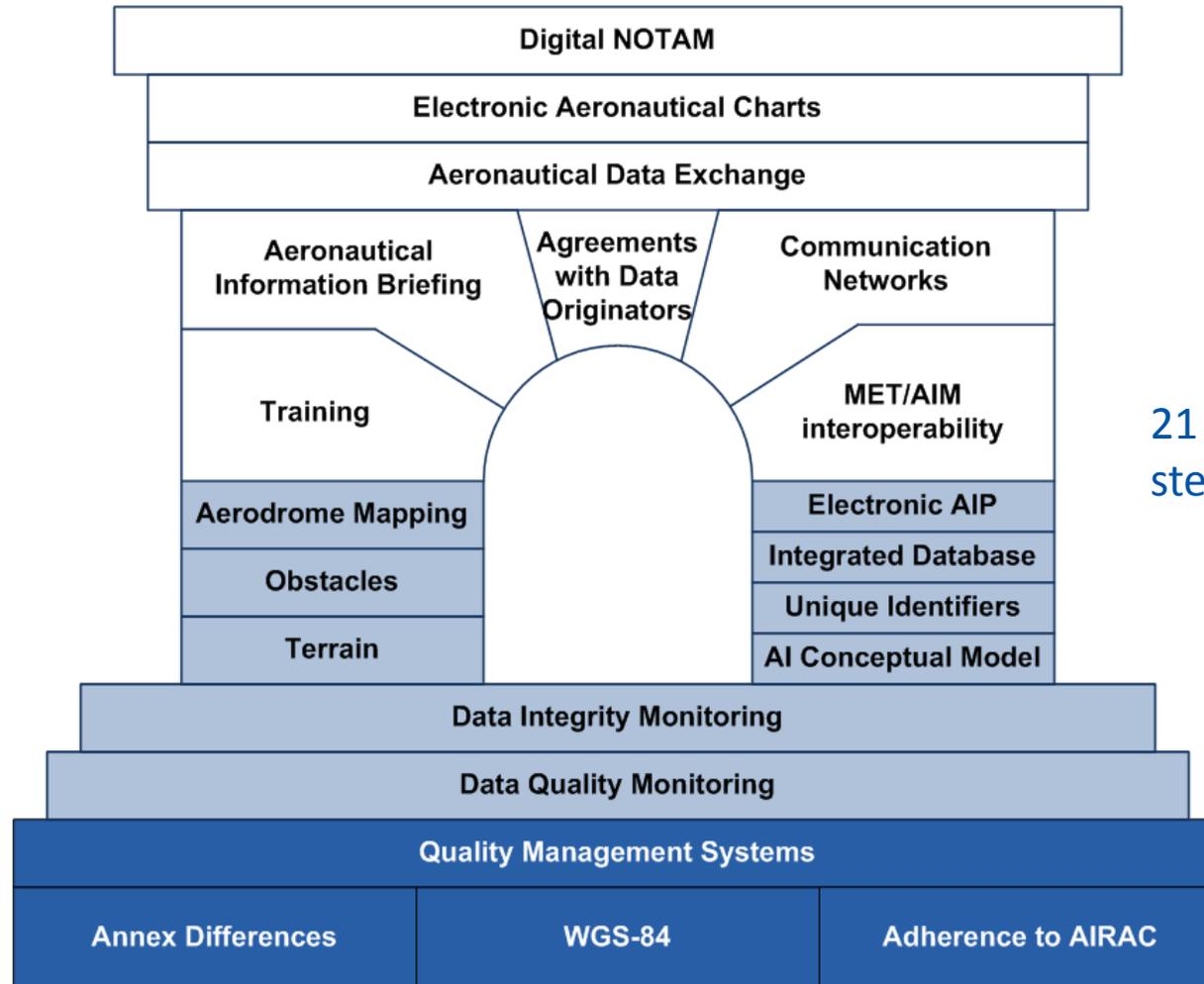- Ensure that solutions are internationally harmonized and integrated

Phases

2008	2009	2010	2011	2013	2014	2015	2016

Consolidation

Going Digital

Information Management

AIS to AIM Transition Roadmap

3 phases

21 inter-related steps

AIS to AIM Transition Roadmap

- Through the AIS to AIM Transition Roadmap, a DIGITAL AIS has been facilitated but an AIM Concept is missing

- An AIM OPERATIONAL CONCEPT will follow, leading beyond 2016. But the AIS to AIM Transition Roadmap is fundamental for proceeding forward
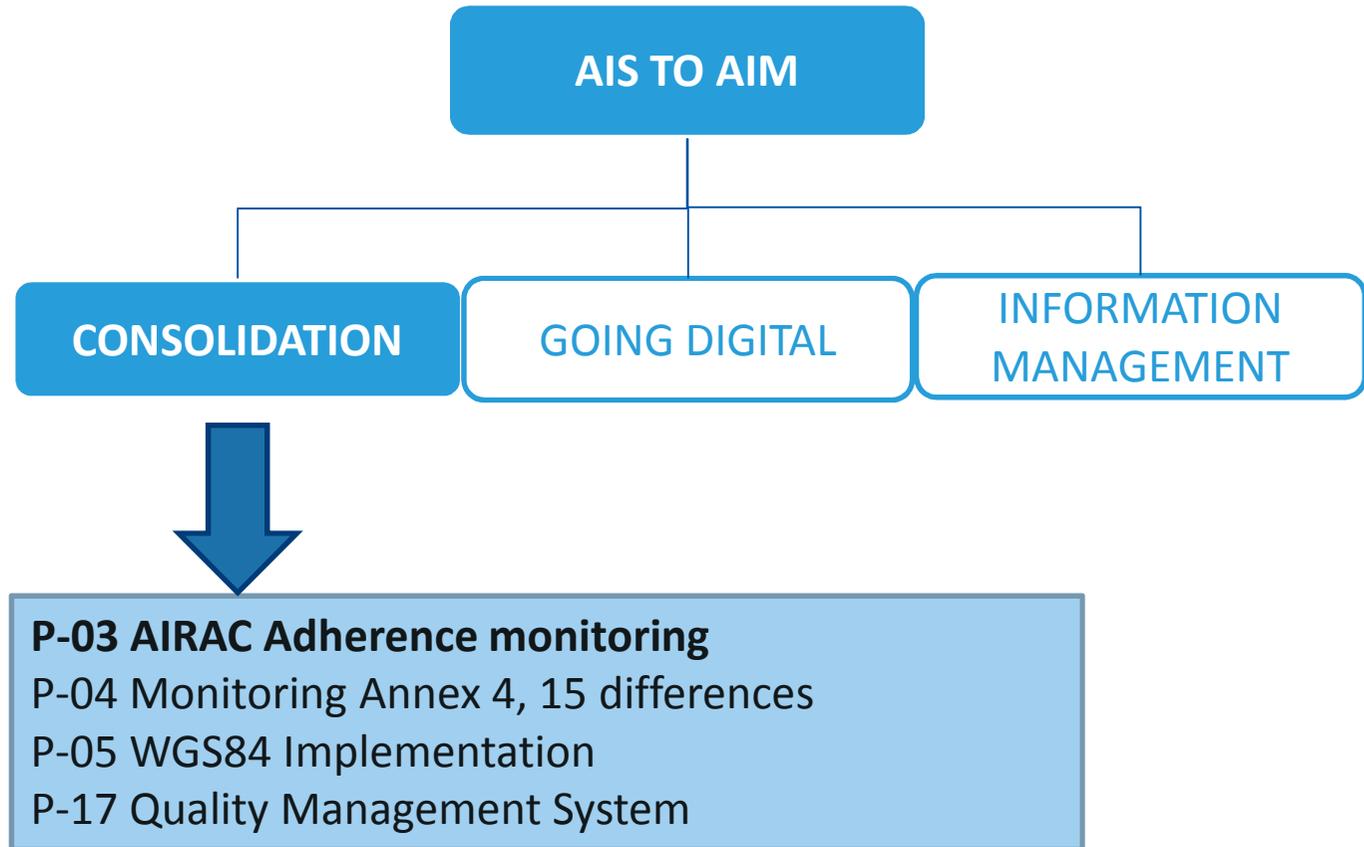
Phase I - Consolidation

During Phase 1 of the transition to AIM, steps will be taken to strengthen a solid base by enhancing the quality of the existing products. Fine-tuning and improvement of SARPs for existing products will continue to be conducted in the usual manner in order to respond to near-term user requirements

- States have to make every effort to issue their aeronautical information as specified in Annex 15 (**AIP**);
- The **NOTAM** system as it exists today requires ongoing upgrades to cope with new types of information (e.g. GNSS navigation) and to respond to the difficulties being reported by the users;
- States must comply with the existing **Annex 4 SARPs**.
- A **common horizontal, vertical and temporal reference system** remains essential to facilitate the exchange of data between different systems.
- **Quality requirements** on information are covered by current SARPs in terms of accuracy and integrity. The steps in Phase 1 aim to meet these requirements;
- The requirement for States to adhere to the aeronautical information regulation and control (**AIRAC**) process must be emphasized.
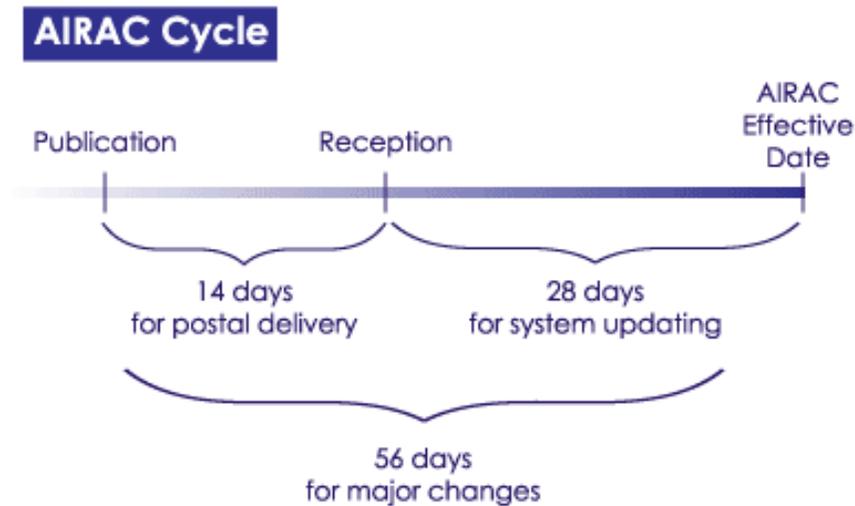
AIS to AIM : Consolidation

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P-03 AIRAC Adherence monitoring
P-04 Monitoring Annex 4, 15 differences
P-05 WGS84 Implementation
P-17 Quality Management System

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2008	2009	2010	2011	2013	2014	2015	2016

P-03 : AIRAC Adherence monitoring

- common dates will remain
- verification, monitoring and correction before releasing new data
- shorter cycles will become possible

The future ATM system will be free to identify a better cycle that will adequately balance the need for improved reactivity with the need for advance planning

P-03 : AIRAC Adherence monitoring
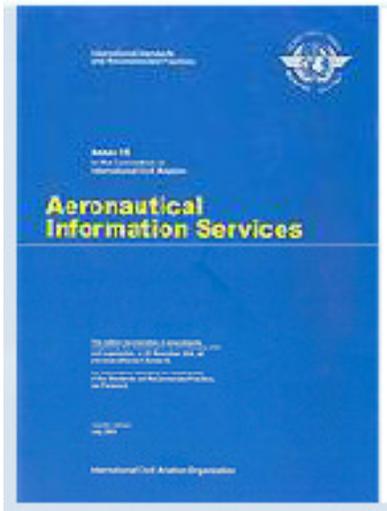
2.1.4 Each Contracting State shall ensure that the aeronautical data and aeronautical information provided is complete, **timely** and of required [...]

The standard regulation and control mechanisms for the distribution of aeronautical information is an essential element ensuring that **each person involved makes decisions based on the same information.**

Need for timeliness

To update a heterogeneous set of systems...

Commercial Data Providers

Airline operators:

- Charts
- Flight Management Systems
- Aircraft Performance DB
- Flight Planning
- Simulators

ATC Centres:

- Flight planning
- Simulators
- ATC screens

Flow Management Centres:

- Simulators/Flight planning

P-03 : AIRAC Adherence monitoring

ICAO DOC 8126, 2.6.17

"If, due to postal (or other) delays, AIRAC AIP Amendments or Supplements are not received at least 28 days in advance of the AIRAC effective date, _the recipient will report this to the originating AIS_. **It is the duty of the originating AIS to investigate the reason for the delay and take remedial action as required**."
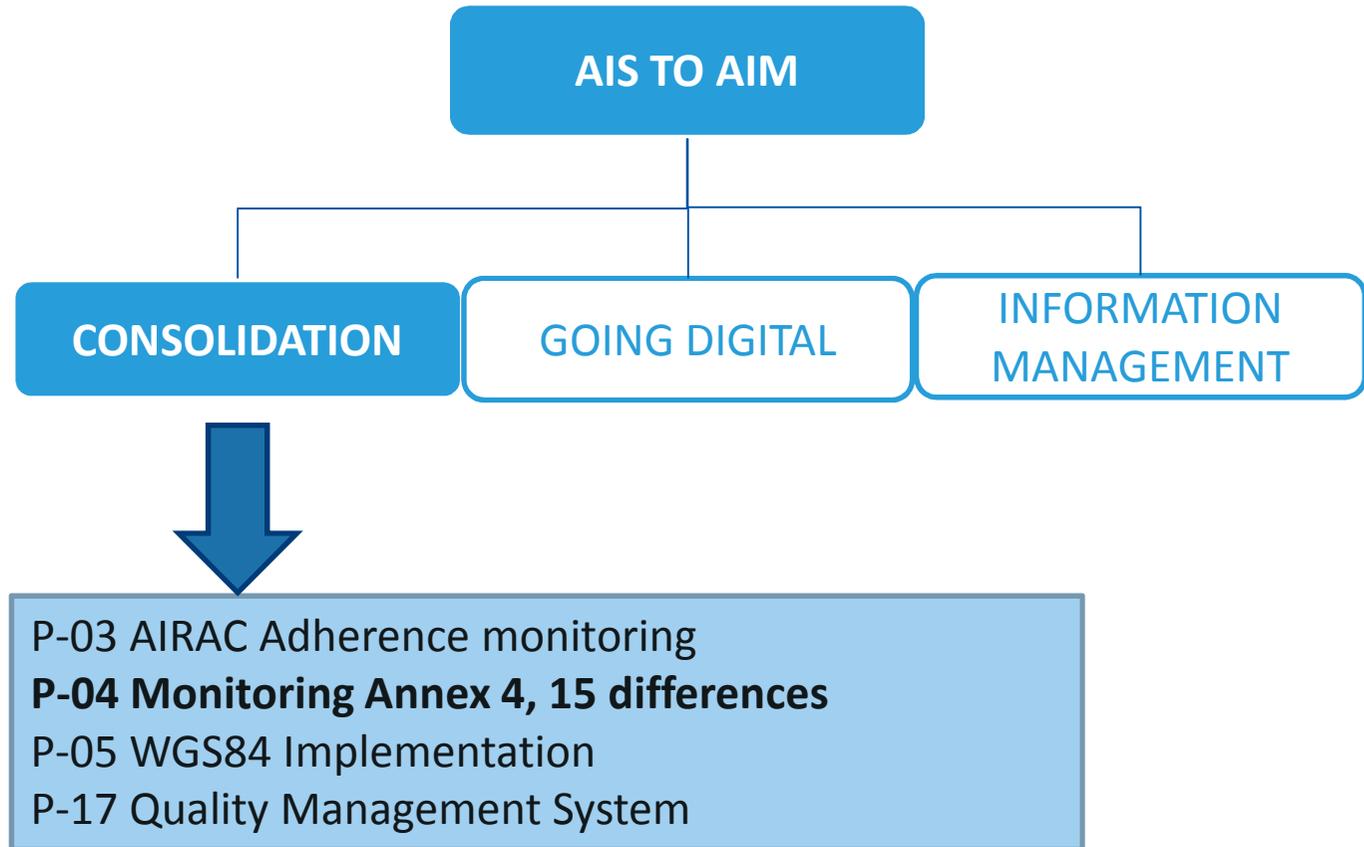
Customer Satisfaction

8.2.1 As one of the measurements of the performance of the quality management system, **the organisation shall monitor information relating to customer perception as to whether the organization has met customer requirements**. _The methods for obtaining and using this information shall be determined._
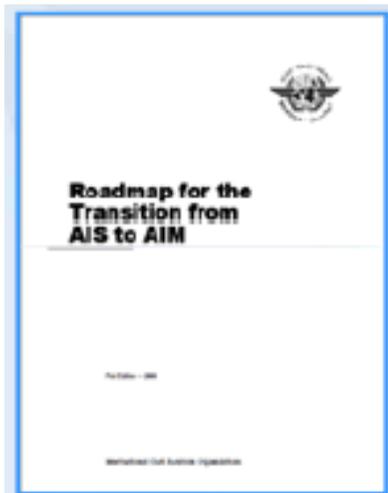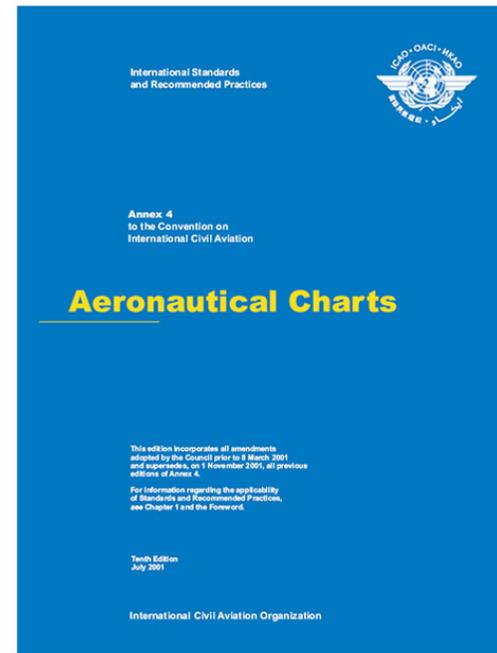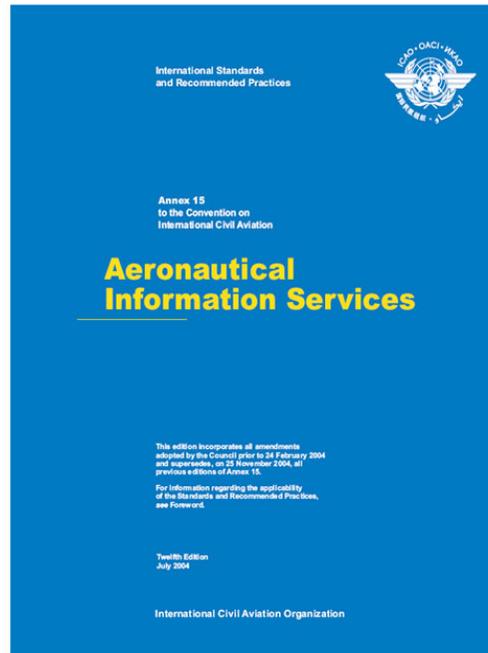
AIS to AIM : Consolidation

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P-03 AIRAC Adherence monitoring
P-04 Monitoring Annex 4, 15 differences
P-05 WGS84 Implementation
P-17 Quality Management System

2008	2009	2010	2011	2013	2014	2015	2016

P-04 : Monitoring Annex 4, 15 differences

Adherence to Standards is an ongoing effort. The transition to AIM offers an opportunity **to increase the focus on implementation and on reviewing differences in the application of the Standards by States.**

Chicago Convention:

CHAPTER VI

INTERNATIONAL STANDARDS AND
RECOMMENDED PRACTICES

Article 37

*Adoption of international standards
and procedures*

Each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation.

To this end the International Civil Aviation Organization shall adopt and amend from time to time, as may be necessary,

Article 38

*Departures from international standards
and procedures*

Any State which finds it impracticable to comply in all respects with any such international standard or procedure, or to bring its own regulations or practices into full accord with any international standard or procedure after amendment of the latter, or which deems it necessary to adopt regulations or practices differing in any particular respect from those established by an international standard, shall give immediate notification to the International Civil Aviation Organization of the differences between its own practice and that established by the international standard. In the case of amendments to international standards, any State which does not make the appropriate amendments to its own regulations or practices shall give notice to the Council within sixty days of the adoption of the amendment to the international standard, or
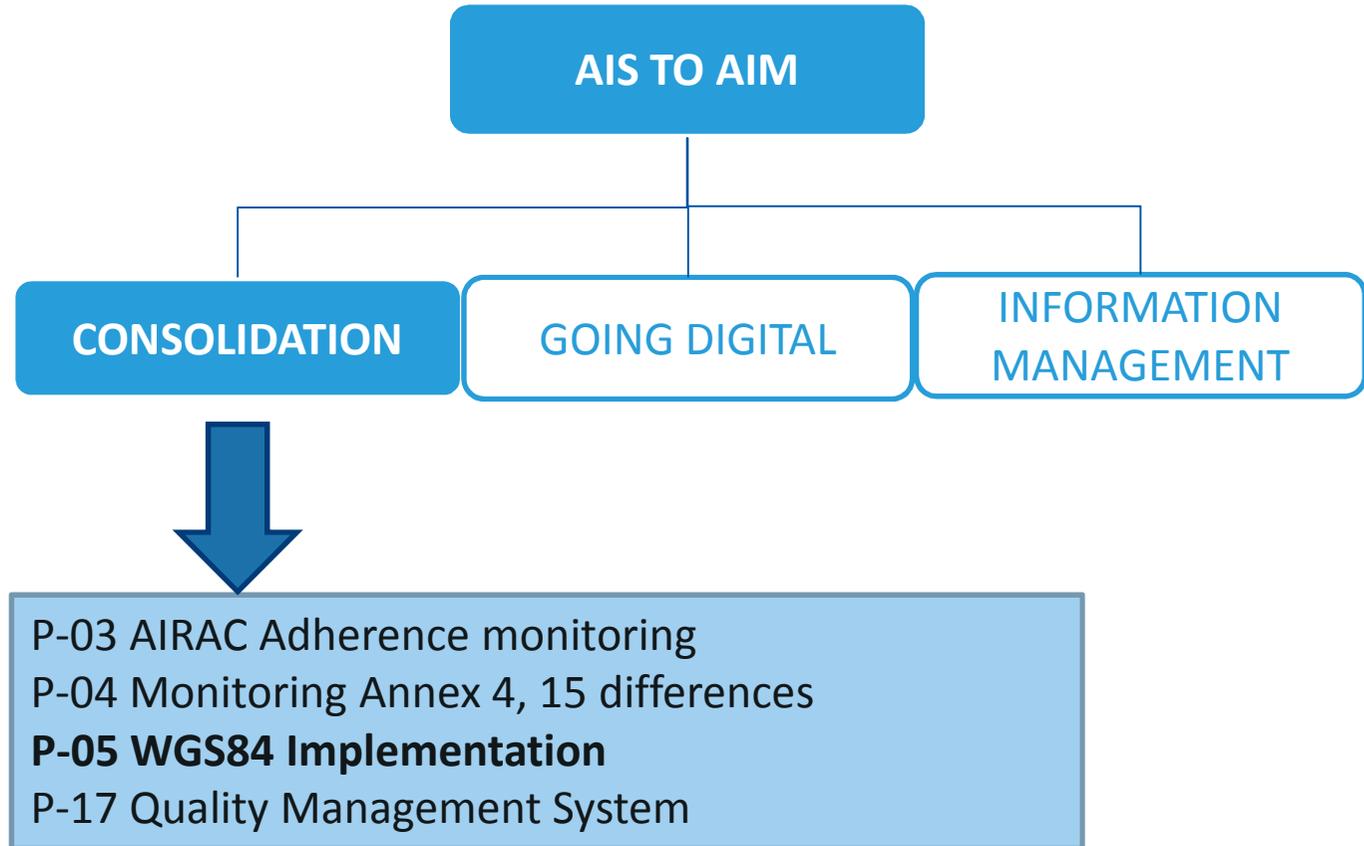
Annex 15   →   Differences to Annexes 4 & 15 published in:
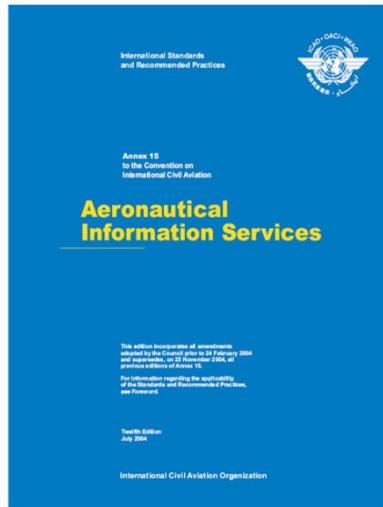- National AIP GEN 1.7
- ICAO Supplements to Annexes 4 & 15

AIS to AIM : Consolidation

P05- WGS84 Implementation

1.2.1.1 World Geodetic System — 1984 (WGS-84) **shall be used** as the horizontal (geodetic) reference system for international air navigation. Consequently, published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

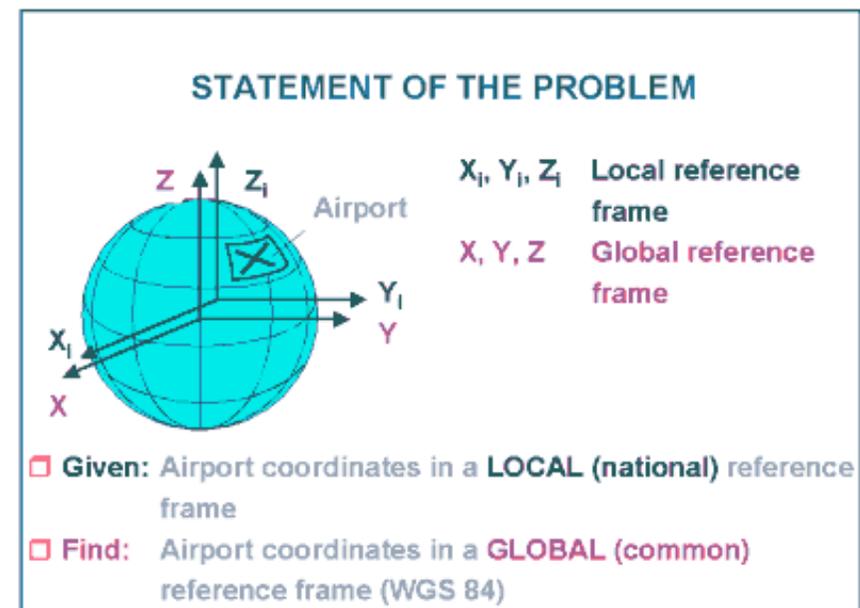**WGS84 was introduced in Annex 15 through Amendment 28 (1994)**

The target of expressing 100 per cent of coordinates in the WGS-84 reference system is achievable. This is one of the first steps to achieve in the transition to AIM.

The requirement to use a common horizontal, vertical and temporal reference system remains essential to facilitate **the exchange of data between different systems**. Therefore, the expression of all coordinates in the AIP and charts using WGS-84 is important and should be pursued during the first phase of the transition to AIM.
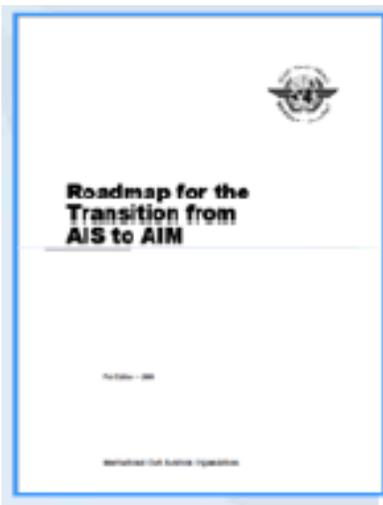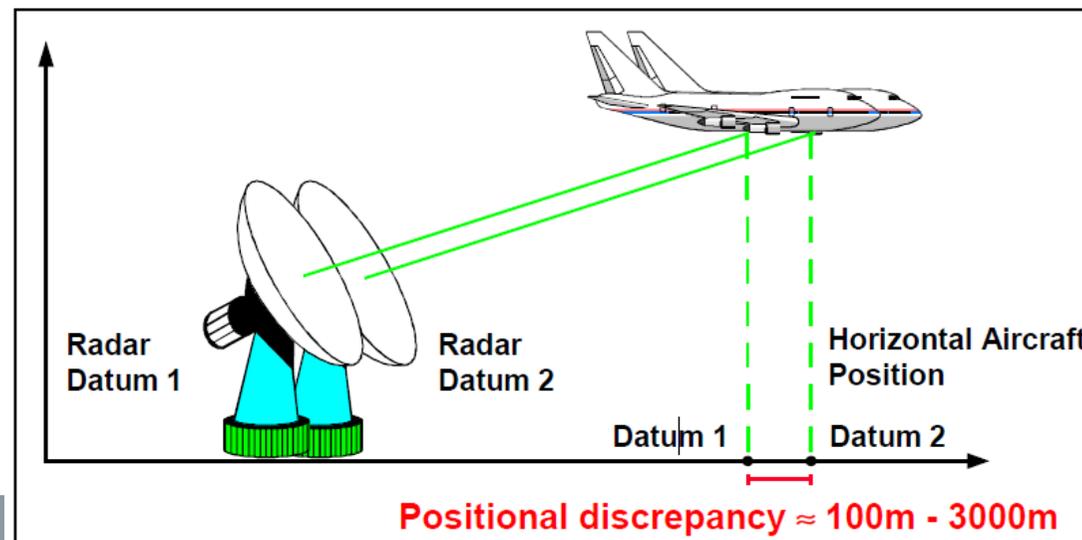
Why the need for a common Reference System?

➢ For historical reasons each country has its own geodetic network and national geodetic reference frame.

➢ For practical reasons navigation facilities, e.g. DME's, are surveyed and coordinated with respect to the national reference frame.

➢ Aircrafts require a system which locates them on a global basis

➢ The basic problem is to transform the national coordinates to WGS 84 and express all coordinates in this global system.

STATEMENT OF THE PROBLEM

X_i, Y_i, Z_i Local reference frame

X, Y, Z Global reference frame

☐ **Given:** Airport coordinates in a **LOCAL (national)** reference frame

☐ **Find:** Airport coordinates in a **GLOBAL (common)** reference frame (WGS 84)

Why the need for a common Reference System?

If a ground-based radar navigation aid is coordinated in two or more different reference frames, aircraft horizontal position determination will have two or more different sets of latitude and longitude values. In metric units the two aircraft locations could show a discrepancy of up to several hundred meters when simultaneously located and tracked by two radars: Radar 1 and Radar 2. This could lead to a situation where an aircraft, close to a border between two countries with different reference frames, could be seen by radars in the two countries as having different positions with the potential for misinterpreting inter-aircraft separations and clearances from restricted areas etc.

Radar Datum 1   Radar Datum 2   Horizontal Aircraft Position

Datum 1   Datum 2

Positional discrepancy ≈ 100m - 3000m

The objective of the WGS 84

- FMS refers to WGS84

- AMDB and eTOD data must be in WGS84 to be usable by the aircraft

- **PBN is based on WGS84 (PBN mostly based on GNSS)**

The objective of the WGS 84 Implementation is to:

- produce coordinate data referenced to a common datum in which a high degree of confidence can be placed on the accuracy and integrity of the data.
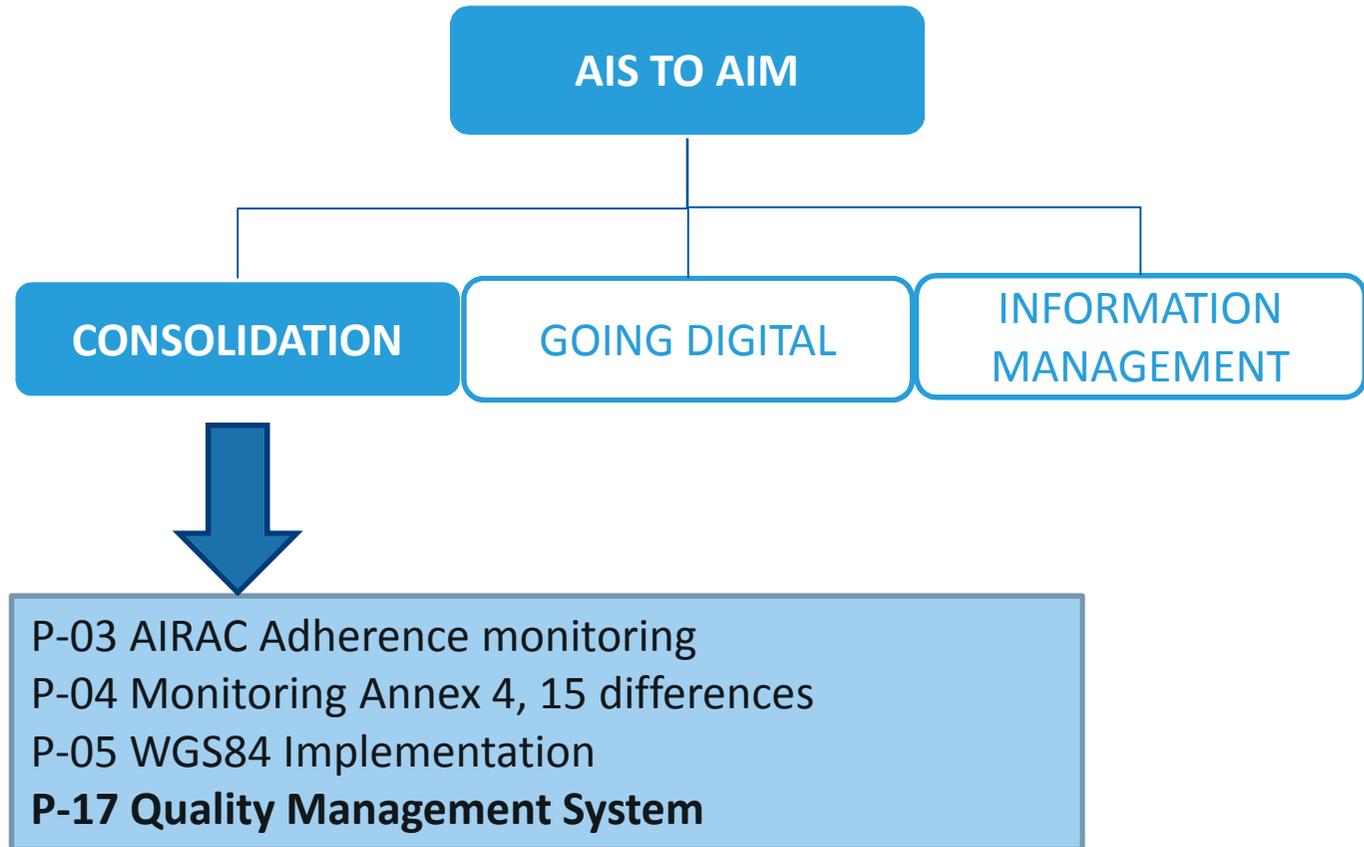
Main issues reported
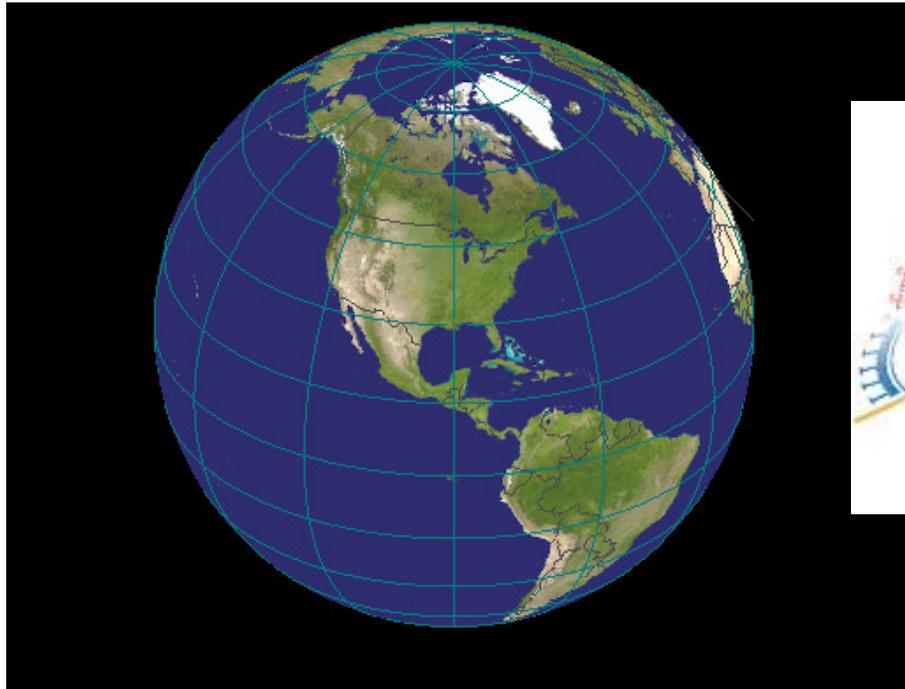
- Legal limitations in publication accuracy
- Obsolete national regulations
- Lack of understanding of importance of WGS-84
- Poor financial policy

AIS to AIM : Consolidation

AIS TO AIM

CONSOLIDATION | GOING DIGITAL | INFORMATION MANAGEMENT

P-03 AIRAC Adherence monitoring
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| 2008 | 2009 | 2010 | 2011 | 2013 | 2014 | 2015 | 2016 |

P17 – Quality Management system

Roadmap for the Transition from AIS to AIM

P-17 — Quality

Quality management measures will be re-enforced to ensure the required level of quality of the aeronautical information. In order to assist States in the implementation of an efficient quality management system, guidance material for the development of a quality manual will be developed.

Quality requirements on information are covered by current SARPs in terms of **accuracy, resolution and integrity.** The steps in Phase 1 aim to meet these requirements. Should the requirements prove difficult to implement, they would have to be reassessed to verify that the risk of harm to persons or damage to property for not achieving the requirements is reduced to, and maintained at or below, an acceptable level (definition of safety). In addition, States will implement and continuously improve their quality management system in view of its increasing importance for future products and services.

P17 – Quality Management system
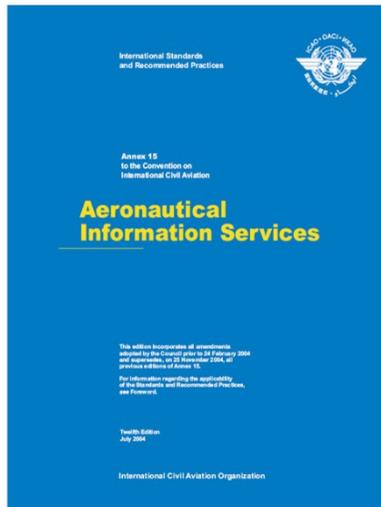
3.7 Quality management system

3.7.1 Quality management systems shall be implemented and maintained encompassing all functions of an aeronautical information service, as outlined in 2.2. The execution of such quality management systems shall be made demonstrable **for each function stage.**

3.7.3 **Recommendation.—** *The quality management system established in accordance with 3.7.1 3.2.1 should follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and be certified by an approved organization.*

- **With AMD36 to ICAO Annex 15 – ISO9001 has become a standard**

- **Manual of the Quality Management System for Aeronautical Information Management has been developed by ICAO**

Eurocontrol Checklist

DATA ORIGINATION		Yes ✓
1	Have you identified a complete list of authorised originators of AIS information (static and dynamic) ? *(It is possible that several organisations may feel they have the responsibility to supply information to the AIS organisation. Receiving the same information from several sources can cause confusion and errors. There should be one designated originator for each type of information)*	☐
2	Have you arranged with your data originators the format in which you would prefer to receive the data ? *(To ensure consistency in the data received, use of templates or pro-formas could be used. For examples the format of co-ordinates in latitude and longitude should be expressed in a consistent way)*	☐
3	Are the originators aware of the importance of supplying information in accordance with AIRAC procedures ? *(It may be that some information could be obtained in better alignment with the AIRAC if the originators were aware of the dates and the consequent of late provision of information)*	☐
4	Do your data originators attend training courses in the provision of aeronautical information ? *(Some originators are unaware of the AIS provision chain and the importance of their role)*	☐
5	Do you host a forum to meet the data originators regularly (at least once a year) ? *(Do you meet the data originators to discuss issues they have had over the last year and possible future activities in the year ahead?)*	☐
COMPILING THE IAIP		Yes ✓
6	Have you defined a quality management system for producing your AIS ? *(ECAC states are required to implement procedures in accordance with ISO 9000:2000 by the end of 2003.)*	☐
7	Do you regularly review (at least once a year) the entire IAIP document set to ensure that it is consistent and accurate ? *(The IAIP document set is updated at regular intervals and those sections that are being modified are checked carefully however a complete review of the entire IAIP once a year could identify inconsistencies)*	☐
8	Do you check the consistency between the same data that occurs in different parts of the AIP ? *(Some information occurs in several places in the IAIP – it is important to check that every occurrence of that information is correct)*	☐
9	Do you routinely co-ordinate with neighbouring States prior to publishing Aeronautical information ? *(For example, the IAIP contains definitions of routes which terminate at state boundaries and these should be aligned with those in neighbouring states)*	☐
10	Do you routinely co-ordinate with military organisations prior to issuing AIS ? *(There is some military information that may be of interest to civil users and vice versa)*	☐
11	Do you proof read or peer review the amended parts of the AIP before publishing them ? *(Typographical and other simple mistakes can easy be detected by an independent reviewer and be removed prior to publication saving time and effort later)*	☐
12	Do you apply the OPADD for compiling NOTAMS ? *(ICAO Annex 15 and ICAO Doc. 8126 describe how NOTAMS containing AIS dynamic data should be completed. This may not be sufficient to achieve consistent and concise NOTAMS. The EUROCONTROL Operating Procedures for AIS Dynamic Data (OPADD) complements the ICAO documents.)*	☐
PUBLISHING THE IAIP		Yes ✓
13	Do you check that your users receive AIP amendments in accordance with the AIRAC ? *(Providing the AIS products to your distributor should not be the end of the process – when the users receive the AIS products is important. Distribution could take a long time and must be taken into account)*	☐
14	Do you have a process for handling users queries on the IAIP ? *(Despite your best endeavours errors will get into IAIP amendments. You should have a*	☐

An alternative to ISO 9000

The Role of Process Approach in Quality Management

(a) Process approach. A desired result is achieved more efficiently when activities and related resources are managed as a process. A process is a set of interrelated or interacting activities that transform inputs into outputs. A quality management system can be thought of as a single large process that uses many inputs to generate many outputs. In turn, this large process is made up of many smaller processes. All activities and resources related to aeronautical information management, including operational and administrative, have to be managed as processes.

- **Define the process to achieve the needed results**
- **Identify and quantify the inputs and outputs of the process (data accuracy, resolution, integrity)**
- **Identify where the process interacts with the various organizational functions**
- **Estimate potential risks, outcomes and impact**
- **Set key responsibility**
- **Determine key stakeholders of the process**
- **Process resources**

Summary

AIRAC, QMS, WGS84 and Annex 4,15 inventory – pre-requisites for transition from AIS to AIM

- **AIRAC Adherence** – an essential element ensuring that each person involved makes decisions based on the same information
- **SARPS compliance** – users should know if anything is different from Annex 4,15 – publication of differences
- **WGS84** – use of a common horizontal, vertical and temporal reference system remains essential to facilitate the exchange of data between different systems
- **QMS** - customers can have confidence in a product in terms of its performance and safety

Thank You

North American Central American and Caribbean (NACC) Office MexicoCity

South American (SAM) Office Lima

ICAO Headquarters Montreal

Western and Central African (WACAF) Office Dakar

European and North Atlantic (EUR/NAT) Office Paris

Middle East (MID) Office Cairo

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