INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

REPORT OF THE FOURTH MEETING OF ICAO AERONAUTICAL INFORMATION SERVICES – AERONAUTICAL INFORMATION MANAGEMENT IMPLEMENTATION TASK FORCE (AAITF/4)

NARITA, JAPAN, 25 – 27 FEBRUARY 2009

The views expressed in this report should be taken as those of the Task Force and not of ICAO

Adopted by the Task Force
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PART I - HISTORY OF THE MEETING

1. Introduction

1.1 The Fourth Meeting of ICAO AIS-AIM Implementation Task Force (AAITF/4) was held at the ANA Crowne Plaza Hotel in Narita, Japan from 25 to 27 February 2009.

1.2 The meeting was attended by 62 experts from Australia, Bangladesh, China, Hong Kong China, Fiji, India, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, Sri Lanka, Viet Nam, Thailand, United States, IFALPA and Jeppesen. The list of participants is attached at **Appendix A** to this Report.

2. Officer and Secretariat

2.1 Mr. Peter Hobson, AIS Manager, Airservices Australia continued as the Chairperson of the Task Force. Mr. Kyotaro Harano, Regional Officer Air Traffic Management (ATM), ICAO Asia and Pacific Office, was the Secretary for the meeting.

3. Language and Documentation

3.1 All discussions were conducted in English. Documentation was issued in English with a total of eight working papers and twelve information papers considered by the meeting. The list of working and information papers is attached at **Appendix B** to this Report.

4. Opening of the Meeting

4.1 Mr. Peter Hobson welcomed all delegates. He thanked Japan Civil Aviation Bureau (JCAB) and ICAO Asia and Pacific Office for providing the conference facilities and the secretarial work, and all the delegates for their contributions.

4.2 On behalf of Mr. Mokhtar A. Awan, Regional Director of ICAO Asia and Pacific Office, Mr. Kyotaro Harano welcomed all the delegates to AAITF/4. From this meeting, another “A” (AIM) was added to the name of the Task Force to be AAITF (AIS-AIM Implementation Task Force). This reflected the global transition from AIS to data-centric AIM, and the 18th meeting of the ATM/AIS/SAR Sub-group (ATM/AIS/SAR/SG/18, June 2008) approved the change of the name together with the revised terms of reference (TOR).

4.3 Mr. Harano expressed his appreciation to Japan for hosting this significant meeting. Japan also very successfully hosted the AIS Automation/eTOD Seminar/Workshop under ICAO Special Implementation Project on preceding two days. In the same token, he thanked all the delegates for staying on in Narita for the meeting. Mr. Harano also thanked Mr. Peter Hobson, the Chairman of the Task Force, who makes strong contributions to every meeting. He wished the meeting a successful outcome.

PART II - REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

1.1 The Secretariat proposed the agenda, and the meeting agreed and adopted the agenda as follows:

Agenda Item 1	Adoption of Agenda
Agenda Item 2	Review of AITF/3
Agenda Item 3	Review of AAITF Terms of Reference
Agenda Item 4	Review of APANPIRG/19
Agenda Item 5	Review of Recent ICAO Developments and Deliberations in regard to the work of the Aeronautical Information Services - Aeronautical Information Management Study Group (AIS-AIMSG)
Agenda Item 6	Review of Air Navigation Deficiencies in the AIS Field and Proposed Action
Agenda Item 7	Outcomes of the Global AIS Congress – Singapore
Agenda Item 8	Latest Developments in AIS Fields
Agenda Item 9	Any Other Business
Agenda Item 10	Review of the Task List
Agenda Item 11	Date and Venue for the Next Meeting

Agenda Item 2: Review of AITF/3

2.1 The meeting noted a summary of activities of ICAO Aeronautical Information Services Implementation Task Force (AITF/3, June 2008) as reported to ATM/AIS/SAR/SG/18 as follows:

> ***Review of AIS Implementation Task Force (AITF/3)***
>
> 4.8 *The meeting reviewed the report of the third meeting of the AIS Implementation Task Force (AITF/3, June 20008) and agreed that the Terms of Reference of the Task Force be amended as follows and the name of the Task Force be changed to the Aeronautical Information Services – Aeronautical Information Management (AIM) Implementation Task Force (AAITF).*

4.10 …. ATM/AIS/SAR/SG/18 agreed with the AITF/3 recommendation and requested that the Secretariat take action to update Chapter 3 (OPADD) of the Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region with the Edition 2.1.

Agenda Item 3: Review of AAITF Terms of Reference

3.1 The meeting noted that ATM/AIS/SAR/SG/18 reviewed the report of AITF/3, and agreed that the TOR of the Task Force be amended as follows, and the name of the Task Force be changed to the Aeronautical Information Services - Aeronautical Information Management Implementation Task Force:

TERMS OF REFERENCE OF THE AIS-AIM IMPLEMENTATION TASK FORCE (AAITF)

The objectives of the Task Force are to:

a) study means of aeronautical data management by civil aviation authorities and/or ATS providers in other regions including the aeronautical information exchange model (AIXM) and the electronic AIP (eAIP), and consider the feasibility in making use of these methods/models in the Asia/Pacific Region;

b) examine the means of aeronautical data exchange used in other regions and application in the Asia/Pacific Region, and based on a), develop guidance material for operation of data management systems;

c) assist States to implement Quality Systems for aeronautical information in an expeditious manner;

d) develop training material and conduct workshops on the Guidance Manual for AIS in the Asia/Pacific Region;

e) develop guidance material for Static Data Procedures and the AIS Automation Plan;

f) review and update the Guidance Manual taking into account amendments to ICAO SARPs, guidance material; ~~and~~

g) monitor and review technical and operating developments in the AIS field especially in the area of automation and database management~~.~~;and

h) monitor the transition from AIS to Aeronautical Information Management (AIM), and in particular monitor development of the replacement Annexes 4 & 15 and guidance documents under development by ICAO.

To achieve the above objectives, the Task Force shall consider:

a) results of the ICAO ~~Aeronautical Data Model Study Group (ADMSG)~~ Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG);

b) amendments to Annex 4, Annex 15, the AIS Manual (Doc 8126), and the Aeronautical Chart Manual (Doc 8697); and

c) revisions to the EUROCONTROL Operating Procedures for AIS Dynamic Data (OPADD)~~;~~.

The Task Force will report to the ATM/AIS/SAR Sub-Group of APANPIRG.

Agenda Item 4: Review of APANPIRG/19

Review of the Report of APANPIRG/19, and Follow-up on Decisions and Conclusions Relevant to the AIS Field

4.1 The meeting reviewed the outcomes of the 19th meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/19, September 2008) in regard to AIS-related matters. The meeting noted the most significant items from APANPIRG/19 discussion which relate to AIS-AIM domain as in **Appendix C** to this Report.

4.2 APANPIRG/19 noted that AITF/3 had reviewed the recent amendment (Edition 2.1) to the Eurocontrol OPADD and recommended that the edition be adopted. In considering this matter, APANPIRG/19 recognized that Euro OPADD Edition 2.0 had been previously adopted as regional guidance material under the terms of APANPIRG Conclusion 18/13 and that the Edition 2.1 was an updating amendment to the Edition 2.0. ATM/AIS/SAR/SG/18 agreed with the AITF/3 recommendation and requested that the Secretariat take action to update Chapter 3 of the *Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region* with Edition 2.1 of the OPADD.

Future Effective Date/Time in NOTAMC and NOTAMR

4.3 APANPIRG/19 noted that the Air Navigation Commission (ANC) had supported the proposal in APANPIRG Conclusion 18/14 that the use of future effective date/time in NOTAMC and NOTAMR be reviewed to determine appropriate provisions for Annex 15 – *Aeronautical Information Services* and requested the Secretariat to process the issue as a priority with target date of 2010. However, as the relevant Annex 15 amendment enabling use of future date-time already became effective in November 2007, AITF/3, ATM/AIS/SAR/SG/18 and APANPIRG/19 noted concerns from States as to what actions should be taken in the intervening period 2007 to 2010, specifically whether or not the future date/time should be used for NOTAMC and NOTAMR. Accordingly, APANPIRG/19 agreed to a conclusion as follows:

Conclusion 19/10 – Future Date-time for NOTAMC and NOTAMR

Recognizing that the concerns raised in APANPIRG Conclusion 18/14 relating to use of future date-time in NOTAMC and NOTAMR have been included in the Air Navigation Commission work programme for formal resolution by 2010, States be encouraged to use relevant guidance material in the Aeronautical Information Services Manual (Doc 8126) and the Asia/Pacific Operating Procedures for AIS Dynamic Data (OPADD) in the application of Annex 15 SARPs.

4.4 In this regard, the Regional Office issued the State letter Ref.: T 3/10.0, T3/10.1.6 – AP001/09 (ATM) on 5 January 2009 transmitting APANPIRG Conclusion 19/10. More recently, the first meeting of the AIS-AIM Study Group (AIS-AIMSG/1, December 2008) was held in Montreal, Canada and the issue of the future effective date/time in NOTAMC and NOTAMR was raised at the meeting. The Group noted that this created a situation in which the recipient could not discern whether the NOTAM to be replaced must be replaced immediately or if it remained valid until the date/time that appears in Item B). Accordingly, the Group agreed that a simple solution to the issue was as proposed in the *Action agreed 1/10 — Draft Amendment 36 to Annex 15: NOTAM date and time*, which is in line with APANPIRG Conclusions 18/4 and 19/10.

Agenda Item 5: Review of Recent ICAO Developments and Deliberations in regard to the work of the Aeronautical Information Services - Aeronautical Information Management Study Group (AIS-AIMSG)

Report on AIS-AIMSG/1

5.1 Japan reported the outcomes of AIS-AIMSG which was established by the ANC, at the eleventh meeting of its 177th Session on 20 March 2008, in order to assist the Secretariat in the transition from AIS to AIM. Timelines for tasks to be undertaken with the assistance of the study group would need to be developed to meet target dates for upcoming and future amendments to Annex 15 — *Aeronautical Information Services* and Annex 4 — *Aeronautical Charts* in 2010 and 2013. The list of the Follow-up of AIS-AIMSG/1 Action Agreed (AC) is found in **Appendix D** to this Report.

AIS-AIM Transition Roadmap

5.2 The proposed roadmap by the ICAO secretary can be found in **Appendix E** to this Report. The meeting recognized that three phases of action were envisaged for States to complete the transition to AIM as follows:

Phase 1 – Consolidate.

Phase 2 – Migration to digital databases.

Phase 3 – Manage Information for the ATM Process Model

5.3 Roadmap Timeline is defined in the Part 3 of the Roadmap.

5.4 The group then agreed to the following actions:

AIS-AIMSG Action agreed 1/1 — Draft Roadmap for the Transition from AIS to AIM

AIS-AIMSG Action agreed 1/2 — Finalization of the Roadmap for the Transition from AIS to AIM

AIS-AIMSG Action agreed 1/3 — Consideration of the ATM Operational Concept

Annex Amendment —Terrain and Obstacle Data and Airport Mapping Data Bases

5.5 The group considered that it is appropriate to tie the recommendations for the generation of aerodrome mapping data base (AMDB) data to provisions related to electronic Terrain and Database (eTOD) in Chapter 10 of Annex 15, especially since Area 3 requirements are closely linked to the AMDB requirements. It was proposed to make the provision of AMDB non-mandatory.

AIS-AIMSG Action agreed 1/4 — Aerodrome mapping databases

5.6 The meeting was informed that Amendment 33 to Annex 15 introduced requirements for States to provide terrain and obstacle data. AIS-AIMSG/1 had noted that given constraining timeframes (2008-2010), the lack of resources and survey equipment, fragmented responsibilities, ambiguities in requirements and the costs for compliance, the requirements had caused significant concern in States and raised the possibility of a lack of compliance.

5.7 The group agreed to create an ad-hoc group to develop a proposal for inclusion in Amendment 36 to Annex 15 based on information that would have become available through the European consultation process. The State letter that would accompany Amendment 36 would mention this ongoing consultation process, and indicate that changes to Area 2 are anticipated and would likely be reflected on States' comments.

AIS-AIMSG Action agreed 1/5 — Draft Amendment 36 to Annex 15: Electronic Terrain and Obstacle Data

Annex Amendment – AICM/AIXM

5.8 It was noted that the group had agreed to the following action:

AIS-AIMSG Action agreed 1/6 — Draft Amendment 36 to Annex 15: Automation enabling digital data exchange

Annex Amendment - eAIP

AIS-AIMSG Action agreed 1/7 — Draft Amendment 36 to Annex 15: Electronic AIP (eAIP)

Annex Amendment — Quality

5.9 The group agreed to maintain the wording proposed in Action agreed 1/6 for inclusion in Amendment 36 to Annex 15 and to the following actions:

AIS-AIMSG Action agreed 1/8 — Draft Amendment 36 to Annex 15: Quality

AIS-AIMSG Action agreed 1/9 — Draft Amendment 36 to Annex 15: Reference to guidance material related to Chain solutions

Annex Amendment — Miscellaneous

5.10 The group agreed the proposed amendment 36 to Annex 15 in the following actions agreed.

AIS-AIMSG Action agreed 1/10 — Draft Amendment 36 to Annex 15: NOTAM Date and Time

AIS-AIMSG Action agreed 1/11 — Draft Amendment 36 to Annex 15: Reference to guidance material on NOTAM

AIS-AIMSG Action agreed 1/12 — Draft Amendment 36 to Annex 15: AIRAC late postponement

5.11 It was further noted that a joint Committee EUROCAE WG 76/RTCA SC 206 had been established with the purpose of identifying the AIS and MET data link services that are envisaged to be implemented within the next decade and developing the necessary documentation (standards). The group considered that a further high-level amendment to provisions in Chapter 9 of Annex 15 may be appropriate. The Secretariat would provide coordination between the AIS-AIMSG and the OPLINKP. The group acknowledged that individual members should undertake to coordinate with their national counterparts on the OPLINK Panel.

AIS-AIMSG Action agreed 1/13 — AIS-MET Datalink services

Guidance material — Terrain and Obstacle Data and Airport Mapping Data Bases

5.12 Also the meeting noted that the *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information* (Doc 9881) provided guidance on AMDBs. The group discussed whether it was preferable to develop a new ICAO document or amend the Guidelines. It was considered that an evaluation of the available material was necessary to make a decision. Accordingly the group agreed to:

AIS-AIMSG Action agreed 1/14 — Guidance Material for Aerodrome Mapping Data Bases.

Guidance Material — AICM/AIXM

5.13 Some of the guidance material to support the implementation of AIXM as a standard data exchange model was already well advanced, in particular on issues related to the data catalogue. The group agreed to:

AIS-AIMSG Action agreed 1/15 — Guidance Material on AIXM.

AIS-AIMSG Action agreed 1/16 — Ad-hoc group on including AIM in Annex 15 SARPs

AIS-AIMSG Action agreed 1/17 — Future evolution of the data exchange model

Guidance Material — eAIP

5.14 The group discussed the importance of providing States with appropriate guidance material that would ensure a harmonized approach to development of electronic AIPs (eAIPs), particularly with respect to the use of databases to derive the eAIP content. The group agreed that such material should be included in the *Aeronautical Information Services Manual* (Doc 8126) and aligned with the existing guidance on AIP. The group agreed to:

AIS-AIMSG Action agreed 1/18 — Guidance Material on electronic AIP (eAIP).

Guidance Material — Training

5.15 Furthermore, it was recognized that ICAO guidance material on training was necessary and the group had agreed to:

AIS-AIMSG Action agreed 1/19 — Guidance Material on AIS Training

Guidance Material — Quality

5.16 It was considered that inclusion of "AIM" in the title of this document would be premature. The group noted that the fundamental structure of the *Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation* (Doc 9873) was suitable as a framework for development, since it was based on ISO 9000.

AIS-AIMSG Action agreed 1/20 — AIS quality manual

AIS-AIMSG Action agreed 1/21 — Guidance material on CHAIN solutions

Miscellaneous

OPADD

5.17 The meeting confirmed that the EUROCONTROL OPADD contained European Civil Aviation Conference (ECAC) States' approved guidelines for the handling of dynamic data. These guidelines complemented SARPs as defined by Annex 15 and guidance material in the AIS Manual. With respect to the chapter on specific European arrangements, it may need to be amended to reflect a global applicability. The scope of the OPADD details were mainly procedures related to NOTAM. It also covered examples of SNOWTAM and ASHTAM as well as specific guidance for harmonization of these messages. The group learned that a new version of this document was under preparation as OPADD 3.0 which would, for the first time, contain a chapter presenting guidelines covering the retrieval and provision of pre-flight information bulletins (PIB). The group considered that this represented valuable guidance material for States.

AIS-AIMSG Action agreed 1/22 — Guidance material on NOTAM

Integrated Briefing

5.18 The group considered the inclusion of the service of integrated briefing into Annex 15 and the AIS Manual to assist States in the definition and the provision of enhanced briefing services. Note was taken of information on the ICAO EUR Doc 010 — *Harmonized access to AIS and MET services relating to pre-flight planning* (Second edition — 2003) as published by ICAO European and North Atlantic Regional Office. As a review of the available material was necessary to develop further proposals, the group agreed to:

AIS-AIMSG Action agreed 1/23 — Integrated Briefing.

5.19 The group discussed possible improvements to guidance material related to the timely provision of aeronautical information and other methods to improve the adherence with AIRAC in States' AIS.

AIS-AIMSG Action agreed 1/24 — Frequently Asked Questions (FAQ) on AIRAC Adherence

AIS-AIMSG Action agreed 1/25 — Evaluation of pTracker Tool

AIS-AIMSG Action agreed 1/26 — Guidance Material on AIRAC Adherence

NOTAM Selection Criteria

5.20 The meeting was advised that the group agreed to:

AIS-AIMSG Action agreed 1/27 — Update of NOTAM Selection Criteria

AIS-AIMSG Action agreed 1/28 — Progress report on Amendment No.2 to Doc 8126

AIS Data Process (ADP) and Static Data Procedures (SDP)

5.21 The group was briefed on the availability of EUROCONTROL documentation related to AIS Data Process and Static Data Procedures. The group agreed to the following actions:

AIS-AIMSG Action agreed 1/29 — Data Process and Procedures in the AIS Quality Manual

AIS-AIMSG Action agreed 1/30 — Identify data process and procedures that would be required for the provision of new datasets

Aeronautical Chart Manual (Doc 8697)

5.22 The group considered that the Aeronautical Chart Manual required updating, particularly with respect to cartographic techniques, reproduction and the preparation of en-route and instrument procedure charts to reflect the latest performance based navigation (PBN) requirements. A chapter was also required to provide guidance on the new Aerodrome Terrain and Obstacle Chart-ICAO (Electronic) which becomes applicable in November 2010.

AIS-AIMSG Action agreed 1/31 — *Aeronautical Chart Manual* (Doc 8697)

Legal and Institutional Issues

5.23 The meeting noted that it was important to establish the minimum regulatory requirements for data provision by States, and that these requirements should be clearly distinguishable from commercial value-added products or services. The group discussed that it may be valuable to develop a checklist of issues to be verified whenever new provisions were included for the definition of AIM. One of the important issues to consider for the transition to AIM was that the evolution to data provision implies investments that would need to be funded. The group agreed to the following actions:

AIS-AIMSG Action agreed 1/32 — Legal and Institutional Issues

AIS-AIMSG Action agreed 1/33 — Expertise on the inclusion of meteorological information in the data-centric environment

Agenda Item 6: Review of Air Navigation Deficiencies in the AIS Field & Proposed Action

Development for Review of Air Navigation Deficiencies in the AIS Field

6.1 The meeting recognized that several papers presented to AIS-AIMSG provided mitigation strategies to many of global and regional AIS deficiencies, some of which are available at http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/. Asia/Pacific States were encouraged to implement the list of AIS improvement options as in **Appendix F** to this Report.

Agenda Item 7: Outcomes of Global AIS Congress – Singapore

Transition from AIS to AIM

7.1 Singapore presented the outcomes of the Global AIM Congress - Singapore as in **Appendix G** to this Report and the global initiatives in transforming the existing AIS to AIM. The meeting thanked Singapore for hosting the AIS Congress and reporting the outcomes to the Task Force.

Agenda Item 8: Latest Developments in AIS Fields

Review of the Proposal for the Amendment of Annex 15, 4, 11 and 14, and the PANS-ABC

8.1 The meeting noted that the ANC considered a work programme to enable the global transition from AIS to AIM in March 2008. A number of issues relating to Annex 15, Annex 4 and associated guidance material were identified including the need for a global strategy/roadmap for the transition from AIS to AIM. An ANC working paper to propose amendments to ICAO documents was presented to the meeting.

Electronic AIP

8.2 The meeting was informed that the proposal to amend Annex 15 would include a recommendation to allow for the provision of an eAIP. The proposal supports the new digital environment where end users will increasingly visualize AIS information on computer screens with improved consistency, integrity, timeliness and usability.

Electronic Terrain and Obstacle Data

8.3 The Commission may wish to agree that the State letter that would accompany draft Amendment 36 would indicate that changes to Area 2 are anticipated. Due to expected implementation issues, it is proposed that the applicability date for Areas 2 and 3 be extended to 15 November 2012 (proposed Annex 15, paragraph 10.6.1.2 refers). As the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is based on Annex 15 specifications for Area 2 and 3 electronic terrain and obstacle data, a consequential amendment is proposed to Annex 4, paragraph 5.2.1.

The Eurocontrol Sponsored xNOTAM Trial

8.4 Australia informed the meeting that Eurocontrol issued a report on the 2008 xNOTAM trial in December 2008. The report contains an overview of the trial, some technical and statistical information and concluding remarks.

8.5 The full report is annexed to this Report as **Appendix H**, which, together with other presentations, is also available to all registered on the Eurocontrol website. Other presentations of interest include “Next Steps for Implementation Options of the xNOTAM” can be found at:

https://extranet.eurocontrol.int/http://beid.eurocontrol.be:8980/Members/irc/eurocontrol/aim/library?l=/stakeholder_consultation/xnotam_workshops/10-11_december_xnotam&vm=detailed&sb=Title

Data-exchange between EAD and JCAB AIS DB

8.6 Japan informed the meeting that JCAB and Eurocontrol began the coordination of the data exchange in 2006. After continuing the coordination of interface control document (ICD), EUROCONTROL and JCAB agreed to plan the static data exchange in two stages by the Data-exchange between EAD and JCAB DB Meeting in November, 2008.

8.7 EUROCONTROL and JCAB will investigate the connection between their databases via a recognized standard interface for the international data exchange. This will be realized as the second stage. On this stage, the timely exchange of the update AIXM data becomes available with the online connection. JCAB also continues to coordinate with its users regarding the online connection to provide static data to them.

Implementation of Graphic NOTAM

8.8 Japan reported that JCAB had begun officially Graphic NOTAM distribution since 27 August 2008 after the trial run.

Demand for Visualization

8.9 The meeting also noted that maintenance and construction works took place almost everyday, especially at large scale airports. In proportion to the works, NOTAMs related to closure and restriction of runway, taxiway and apron are increasing. It becomes hard to handle these massive NOTAMs manually.

Graphic NOTAM

8.10 Graphic NOTAM is graphic information providing as Scalable Vector Graphic (SVG) format. SVG is an XML specification and file format for describing two dimensional vector graphics. SVG has an advantage over bitmapped graphics. It retains the resolution at any size and with any change of the viewing device. (Compare Figures 1 and 2)

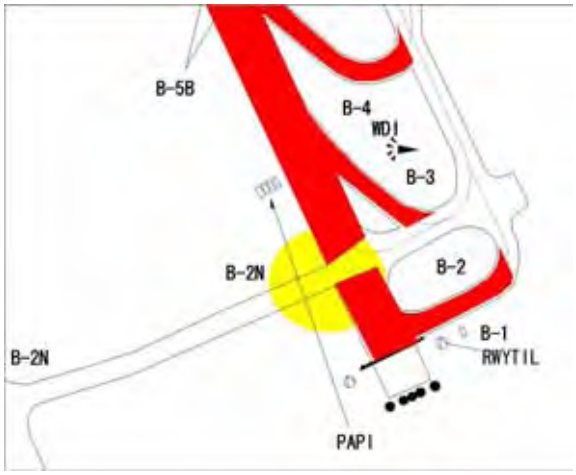

Figure 1: SVG

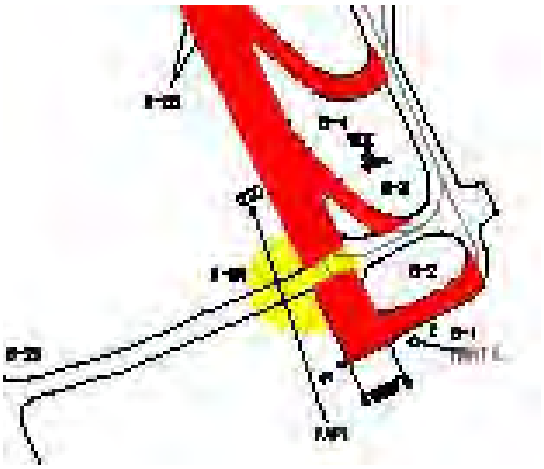

Figure 2: Bitmapped graphic

8.11 Graphic indicates a status of closure or restriction in different colors on an electronic airport map. Graphic NOTAM is provided both via the intranet and the Internet.

User Registration

8.12 It was noted that registration was accepted at AIS JAPAN website at anytime at https://aisjapan.mlit.go.jp. Registration and usage of all contents in AIS JAPAN website are free.

How to Browse Graphic NOTAM

8.13 To display the Graphic NOTAM in Web Browser, SVG viewer has to be installed as a plug-in. It was further noted that the Graphic NOTAM was available on the AIS JAPAN website contents “Key Selection”, “Map Selection” and “Overlay” in the menu bar of “NOTAM”.

Agenda Item 9: Any Other Business

AIRAC Effective Time Difference in Asia and Pacific Regions

9.1 The meeting recalled that this matter of the AIRAC effective time difference and associated problems were first raised by Japan at AITF/3. Also, the meeting noted that Japan had remarked the problems in Asia/Pacific Regions caused by the different AIRAC effective times. Especially between Japan and the Republic of Korea, problems had been experienced by Japanese airline companies in the operation between the two States.

9.2 Accordingly, the Republic of Korea had agreed to prepare a working paper for the meeting regarding AIRAC effective time and its application in Asia/Pacific Regions. Republic of Korea informed the meeting that ICAO Annex 15 required States to distribute the information concerning the circumstances that necessitate significant changes in operating practices under the regulated system, AIRAC. In addition, the AIS Manual specifies that 00:01 UTC must be used to indicate the time when the AIRAC-based information will become effective.

The AIRAC Effective Time Difference in the APAC Regions

9.3 The meeting noted that the Republic of Korea carried out a survey from 23 January to 5 February 2009 for the purpose of collecting information regarding the AIRAC effective time applied by 17 States within APAC Regions, which had attended AITF/3. Sixteen States excluding the United States were covered by seven different time zones producing maximum 6 hours and 30 minutes difference. Eleven States apply 00:01 UTC as the AIRAC effective time while four States apply other specific time with less traffic. One State replied that the AIRAC effective time was coordinated with neighbouring State(s) case by case. Among nine responded States, six States answered that they had to coordinate with a neighbouring State to decide a common effective time which was suitable for both States considering mainly the traffic volume of both States.

9.4 Eleven States, which meet the requirement of 00:01 UTC, are located within the time zone from UTC+5.30hr to UTC+8hr. Therefore, 00:01 UTC is between 5:30 AM and 8:00 AM of the AIRAC effective date in the local time with comparatively less traffic.

9.5 Four States, i.e. Australia, Japan, New Zealand and the Republic of Korea, which do not apply 00:01 UTC, are located within the time zones of UTC+9hr, UTC+10hr or UTC+12hr. Therefore, 00:01 UTC is between 9:00 AM and 12:00 PM of the AIRAC effective date in the local time with more traffic. Those States explained that this period of time was not practical to apply changes considering the heavier traffic loadings and the possible disruptions.

9.6 However, it was recognized that some States had difficulties in implementing the AIRAC effective time requirement because 00:01 UTC is the time when their airports or airways are congested, or start to be congested. As an effort to avoid possible disorder by applying changes during the busy hours, some States respectively chose a date or time which are different from the ICAO requirement. As a result, there is a considerable gap among States in the AIRAC effective time. AIRAC effective time difference within APAC Regions is tabled in **Appendix I** to this Report.

A Case of Problems Caused by AIRAC Effective Time Difference

9.7 In light of the foregoing, Japan also prepared an information paper on the problem caused by different AIRAC effective time in the Regions. Japan demonstrated a case of the operational problems experienced during flights between Japan and the Republic of Korea, which is caused by the 24 hours difference in AIRAC effective time between the two States, with a PowerPoint presentation highlighting the difficulties on operators, as in **Appendix J** to this Report.

9.8 The meeting agreed on the need for the harmonization in the application of AIRAC effective date and time unless the operational requirements from ATC and the aircrew dictate otherwise. After the discussion, it was determined that a rigid specific time to suit States concerned could not be agreed upon.

9.9 The Chairman agreed that he would lead further discussion and research regarding AIRAC time in APAC Regions and include Australia, China, Japan, New Zealand and the Republic of Korea with a view to reporting to the next Task Force meeting on possible or implemented remedies.

Centralized AIS Database for the Asia and Pacific Regions

9.10 Philippines reported that Eurocontrol had introduced the European Aeronautical Database (EAD), which is now in use and with a number of contracting States connected to it. Thus, the concept of centralized database has proven its effectiveness in operation. Similar circumstances exist in the Asia Pacific and other regions of the world, where there is a need for consolidation and harmonization of aeronautical data to provide users with the best quality data available for air operations. It was agreed that given the importance of high quality aeronautical data and information in the overall framework of global air navigation, and the continuing emergence of extra long-haul operations, the need for rapid and accurate exchange of aeronautical data and information is one of the key components essential to the safety of international air operations.

9.11 Philippines proposed a regional centralized AIS database system which should not only provide a centralized database to ingest and store aeronautical data and information, but also incorporate the necessary tools for workflow automation, quality management and security and provide the portal for linking into other global data assets.

9.12 This holistic approach to the provision of aeronautical data and information would benefit a wider range of users. The aviation community, as primary users, stand to benefit by having increased access to high quality, temporal and consistent data and information, and thus providing consistency in decision making based on a common view of aeronautical data.

9.13 Philippines considered that the economies of scale that would come with consolidation and the sharing of costs would ensure that the centralised AIS database would remain current and at the forefront of technology, thus economically preserving the overall data asset and data management tools. In effect, overall aviation safety will be enhanced and will provide advances into the realm of Collaborative Decision Making (CDM), in the sense that a greater range of providers, e.g. AIS, ATM, airlines and airport authorities, have access to a coherent, reliable data in a common format.

9.14 Sri Lanka agreed the importance of having the regionally centralized AIS database that the Philippines proposed. The meeting noted that there was a strong desire among some States for a regional solution to emerge.

9.15 Japan informed the meeting that their database could be used by other States. Similarly, Australia offered its solution under their Project Mercury which was the subject of IP/10.

Philippines AIS Database System (PhADS)

9.16 Philippines provided information on the development of the Philippine AIS Database System (PhADS) under the New CNS/ATM Systems Development Project funded by Japan Bank for International Cooperation (JBIC). This system will be commissioned by 2012.

System Scope

9.17 The meeting was advised that PhADS was fully compliant with ICAO SARPs, Eurocontrol Standards for AICM, AIXM, AMXM, WXXM and ISO 19100 Series. The system scope covers the development of static database, NOTAM (including future xNOTAM), flight plans, Pre-flight Information Bulletins (PIB), eAIP, electronic Mapping and Charting (eMAP/eCHART), the Internet service, eTOD and electronic Meteorological Data (eMET). The scope also includes the provision and installation of redundant servers, workstations, gateway routers & hubs and secure internet gateway.

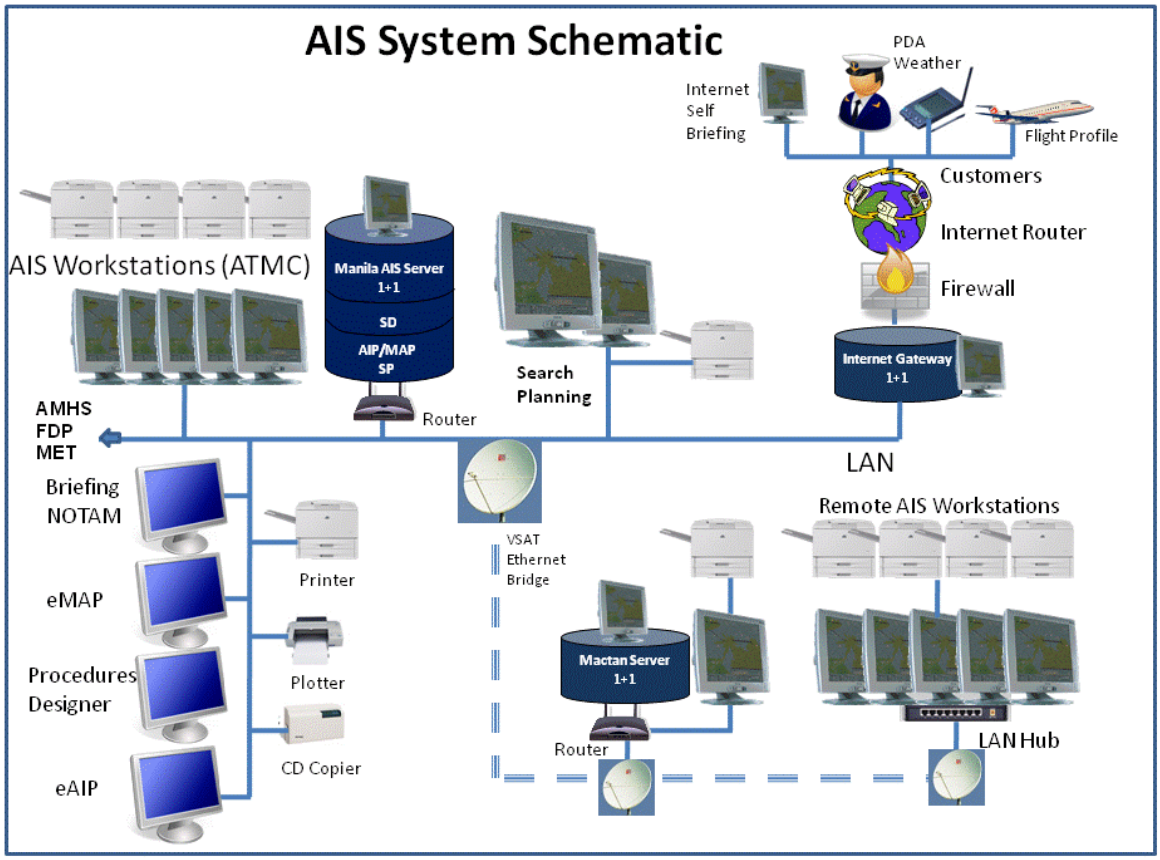

Figure 3: PhADS Schematic Diagram

AIS-AIM and AIS Automation in Australia

9.18 Australia informed the meeting that Airservices Australia had published three newsletters to its staff to inform them of developments in the AIS domain and its acquisition Project for AIS Automation. The newsletters were provided for the benefit of AAITF/4 as in **Appendix K** to this Report to make the meeting aware of developments and endeavours underway in Australia to achieve AIM and to implement modern AIS Automation tools.

Agenda Item 10: Review of Task List

10.1 The meeting reviewed the task list of the Task Force as in **Appendix L** to this report.

Agenda Item 11: Date and Venue for the Next Meeting

11.1 The meeting agreed tentatively that the next meeting of the Task Force may be held in Beijing, China in June 2010 in conjunction with the AIM Global Congress.

12. **Closing of the Meeting**

12.1 Mr. Hobson thanked all the participants for their contributions and attendance at AAITF/4. He thanked for Japan for providing the conference facilities, and all the presenters for their work. He expected that we had all learned from the sharing of experiences and implementation endeavours. The preceding eTOD Special Implementation Project was particularly enlightening and beneficial.

12.2 Mr. Harano thanked the core members of Australia and Japan for the preparation of the meeting. He also thanked all the participants for their attendance and interest. Further, Mr. Harano thanked JCAB for providing facilities and the administrative work. He also thanked Mr. Hobson for his role of the chairman. Finally, he wished all the participants safe trip back to home.

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LIST OF WORKING AND INFORMATION PAPERS

WORKING PAPERS

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/1	1	Provisional Agenda	Secretariat
WP/2	4	Review of the Report of APANPIRG/19, and Follow-Up on Decisions and Conclusions Relevant to the AIS Field	Secretariat
WP/3	5, 6	Development for Review of Air Navigation Deficiencies in the AIS Field	Australia
WP/4	8	Review of the Proposal for the Amendment of Annexes 15, 4, 11 and 14, and the PANS-ABC	Secretariat
WP/5	9	AIRAC Effective Time Difference in the Asia-Pacific Regions	Republic of Korea
WP/6	7	Transition from AIS to AIM	Singapore
WP/7	9	Centralized Aeronautical Information Service (AIS) Database for the Asia and Pacific Region	Philippines
WP/8	10	Review of the Task List of AAITF	Secretariat

INFORMATION PAPERS

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/1	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP/2	2	Review of the Third Meeting of the AIS Implementation Task Force (AITF/3)	Australia
IP/3 rev	3	Terms of Reference of AAITF	Secretariat
IP/4	8	− Withdrawn −	Hong Kong, China
IP/5	8	The Eurocontrol Sponsored XNOTAM Trial	Australia
IP/6	4	Future Effective Date/Time in NOTAMC and NOTAMR	Secretariat
IP/7	5	Report on AIS-AIMSG/1	Japan
IP/8	8	The Data-Exchange between EAD and JCAB AIS DB	Japan
IP/9	8	Implementation of Graphic NOTAM	Japan
IP/10	9	AIS – AIM and AIS Automation in Australia	Australia
IP/11	9	The Philippine AIS Database System (PhADS)	Philippines
IP/12	9	A Case of Problems Caused by AIRAC Effective Time Difference	Japan

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Topic	Page	Action Recorded
eTOD/SIP	C-2, C-4, C-9	Completed
Guidance Material for AIS in Asia/Pacific – Amendment to Chapter 3 (OPADD)	C-3, C-8, C-9	Completed
NOTAM Format (NOTAMC & NOTAMR)	C-3, C-9, C-12, C-13	Closed
AIRAC Notification	C-4	Completed
AIXM	C-5	Closed
ICAO Headquarters' AIS-AIM Study Group	C-6, C-7	Completed
AAITF Terms of Reference	C-8	Completed

APANPIRG									
Review Status of Implementation of APANPIRG/18 Conclusions and Decision - Appendix A (Page A6–A9) of the report of APANPIRG/19	C 18/12 D	**Assistance to States to improve AIS capability**	That, in follow up to the comprehensive survey on AIS conducted in the Asia/Pacific Region in 2006/2007, ICAO undertake a special implementation project during the second half of 2008 for a workshop/seminar to be held on AIS automation	Establish SIP Conduct SIP	ICAO HQ Regional Office assisted by States	SIP approval SIP completed	 2009.	**COMPLETED** Council has approved -a Seminar, to be scheduled for late 2008 **ON GOING** Scheduled in Feb 2009 in Tokyo Japan	

Concl/ Dec No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 18/13 D	**Amendment to Chapter 3 of *Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region***	That, the amended Chapter 3 (OPADD) of the *Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region* as shown in **Appendix J** to the APANPIRG/18 Report on Agenda Item 3.2 be adopted and circulated as regional guidance material.	Circulate amended Chapter 3 to the States	ICAO APAC Office	State Letter	Dec2008	**COMPLETED** State Letter AP127/07 (ATM) of 20 November 2007 and on website
C 18/14 D	**Review of the NOTAM format**	That, in light of various terminologies in common use for NOTAM, such as date-time of filing, date-time of origination, effective, applicable, period of validity, comes into force and the need for NOTAMC and NOTAMR to be explicit and unambiguous, ICAO be invited: a) to review and revise Annex 15 – *Aeronautical Information Services*, Appendix 6 - NOTAM Format, Instructions for the Completion of the NOTAM Format, Section 5 – Item B to provide that NOTAMC and NOTAMR shall have immediate effect and prohibit a NOTAMC and a NOTAMR with a future date-time coming into force; and b) to define the terminologies used for NOTAM in the Instructions for Completion.	Review the NOTAM format	ICAO HQ	Appropriate provision ICAO Issue Form transmitted to HQ by Regional Office in early 2008	2010	**CLOSED** Work will be progressed by ICAO HQ. ANC has supported and requested the secretariat to process the issue form as a priority.

Concl/ Dec No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 18/15	Strategies to implement eTOD	That, in light of the experiences encountered by States attempting to implement Annex 15 provisions on eTOD, ICAO be invited to:					
D		a) hold an eTOD Workshop in the Asia and Pacific Region during 2008;	conduct workshop	ICAO APAC Office	SIP Approval Workshop	Feb 2009	**COMPLETED** **ON GOING** Scheduled in Feb 09 in Tokyo Japan
		b) make available the *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information* (Doc 9881), as soon as possible; and	circulate guidelines to states	ICAO APAC Office	State letter	2010	**CLOSED**
		c) provide specific guidance on cost recovery and property rights of eTOD material	establish and provide guidelines	ICAO HQ	Specific guidelines		**CLOSED**- WW symposium conducted in June 08 addressed this issue.

Concl/ Dec No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 18/16 D	State Non-Compliance with AIRAC notification periods	That, in light of the longstanding concerns of APANPIRG in respect to the importance of regular and ongoing compliance by AIS service providers with Annex 15 – *Aeronautical Information Services* provisions on AIRAC notification periods, and in order to make stakeholders aware of the AIRAC system, the Regional Office urge States to: a) implement robust measures as soon as practicable to promulgate relevant information to aviation administrations, airport authorities, project managers, airspace planners, construction companies, etc, and b) specifically include this item in their safety oversight programmes.	Urge States to comply with Annex 15	ICAO APAC Office	State letter	Dec2007	**COMPLETED** State Letter AP103/07 (ATM) dated 10 October 2007

Review Status of Implementation of APANPIRG Outstanding Conclusion and Decisions Appendices A and B (Page B3) of the report of APANPIRG/19.

Concl/Dec No. --- Strategic Objective *	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Status
C 17/14 **D**	**Improvement of aeronautical information exchange and management**	That, in order to increase the reliability and integrity of the aeronautical information in support of navigation functions, ICAO be invited to establish, as a matter of urgency, a standard model for the electronic exchange of aeronautical information.	Establish a standard model for the electronic exchange of aeronautical information. During March 2008, the Air Navigation Commission agreed that: a) a new study group, to be known as the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG), be established to assist the Secretariat with the development of: 1) a global strategy/roadmap for the transition from AIS to AIM to be delivered in draft by December 2008; 2) SARPs and guidance material, expected by 2010, related to the provision of a standard aeronautical information conceptual model and standard aeronautical information exchange model to enable the global exchange of data in digital format;	ICAO HQ	Appropriate provisions	**CLOSED** actions being managed by ICAO HQ

TBD = To be determined

					3) other SARPs, guidance and training material necessary to support AIM implementation; and b) the AISMAPSG and the ADMSG be disbanded.					

Agenda Item 2: Global and Inter Regional Activities; Page 2-1 of the report of APANPIRG/19	**2.2 Transition to Aeronautical Information Management** 2.2.1 The meeting noted that to satisfy new requirements arising from the ATM operational concept, AIS must transition to a broader concept of aeronautical information management (AIM), with a different method of information provision and management given its data centric nature as opposed to the product centric nature of AIS. 2.2.2 To support this transition from AIS to AIM, the meeting noted that ICAO has put in place a work programme (**Appendix A** to the Report on Agenda Item 2.0) which includes development of a global strategy/road map; appropriate provisions in Annex 4 and Annex 15 and associated guidance material for standard aeronautical information conceptual and exchange models to enable the global exchange of data in digital, open-architecture formats; and establishment of new digital requirements with an appropriate presentation of aeronautical information to the end user such as eAIP, electronic charts and the use of Geographic Information System (GIS). Furthermore, it will be necessary to define the human resource activities to realize the future AIM. This will involve identification of the basic future personnel skills required, mechanisms for validating competency, and the development of supporting guidance and training material. Also, a work plan will be developed to consider the resolution of any legal and institutional issues. 2.2.3 In view of the complexity of the issues involved in the transition from AIS to AIM, ICAO has established a new ANC study group named the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG) to assist the ICAO Secretariat with the development of a global strategy/road map for the transition from AIS to AIM and to prepare new AIM SARPs and guidance material. Consequently, the existing Aeronautical Information and Charts Study Group (AISMAPSG) and the Aeronautical Data Modelling Study Group (ADMSG) of ICAO have been disbanded. On-going activities at the regional level will be integrated with that of the study group to ensure harmonization at the global level. The meeting suggested that MET issues, including the review of existing provisions in Annex 3 — *Meteorological Service for International Air Navigation*, and a review of Doc 7192 be included in the work of the study group as the transition from AIS to AIM develops. 2.2.4 Noting the information on transition to AIM, the meeting recognized the need for States to establish a work programme once ICAO completes the development of the global strategy/road map for transition from AIS to AIM in 2009.

EXPECTED OUTPUTS OF ICAO WORK PROGRAMME FOR TRANSITION FROM AIS TO AIM

D2-INF-AIM – Aeronautical Information Management

ID	*Expected output*	*Source*	*Final results*	*Completed*
1.	Global strategy/roadmap for the transition from AIS to AIM.	A36–WP/321	State letter/Guidance material	2008 (Draft)
2.	SARPs and guidance material related to the provision of a standard aeronautical information conceptual model and standard aeronautical information exchange model to enable the global exchange of data in digital format. Definition of a means to allow the further evolution of these models in a managed and supportable manner.	A36–WP/321	Amendments 36/37 to Annex 15 Amendments 56/57 to Annex 4 New manual and amendment Defined means to allow the further evolution of the models	2010/13 2010/13 2010/13 2010
3.	SARPs and guidance material related to an appropriate presentation of digital aeronautical information to the end user, including eAIP, electronic charts and use of GIS within the context of AIM.	A36–WP/321	Amendments 36/37 to Annex 15 Amendments 56/57 to Annex 4 Amendments to Doc 8126 Amendments to Doc 8697	2010/13 2010/13 2010/13 2010/13
4.	Guidance material and further development of SARPs related to the quality system to support AIM.	A36–WP/321	New AIM quality system manual Amendment 36 to Annex 15	2010 2010
5.	Review of SARPs and guidance material related to electronic terrain and obstacle data to determine if refinement of SARPs or additional guidance material is necessary.	EANPG Conc. 49/39	Amendment 36 to Annex 15 Amendment to Doc 9881	2010 2010
6.	Guidance and training material related to staffing and training for the transition from AIS to AIM.	A36–WP/321	New AIM training manual Amendment to Doc 8697	2010 2010
7.	Development of a proposed work plan to consider key legal and institutional issues raised during the Worldwide Symposium on Enabling the Net-Centric Information Environment (Montreal, 2 to 4 June 2008)	A36–WP/321	AN-WP	2009

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Agenda Item 3: Regional Air Navigation Planning and Implementation Issues; Page 3.2-14 - 3.2-17 of the report of APANPIRG/19

3.2.64 Viet Nam expected continued coordination for adjustment of ATS domestic routes; establishment of new ATS routes with shorter distances serving traffic between Ha Noi – Siem Riep, Ho Chi Minh/Phuket/ Kuala Lumpur and Hong Kong/beyond respectively. Viet Nam would continue work in relation to ATS airspace classification, reducing radar spacing on ATS route A1, setting up new DVOR flight operation procedures, revision of ATC LOAs and SAR agreements, developing ATS contingency plan, implementing AIDC between Ho Chi Minh ACC and Sanya ACC, Singapore ACC. Vietnam would also be participating in ADS-B study and implementation activities, PBN activities, preparation for on-board carriage of ELT 406 MHz, SADIS 2G and AWOS stations, adoption of new TAF Code and other activities.

AIS Matters

3.2.65 The meeting recalled that APANPIRG/14 (August 2003, Bangkok) expressed that AIS was an essential service that had safety implications and was crucial to the provision of air traffic services. Accordingly, under Decision 14/8, APANPIRG reactivated the regional AIS Implementation Task Force (AITF). The third meeting of the AITF (AITF/3, June 2008) was held back-to back with the Global AIM Congress in Singapore.

Review of AITF Terms of Reference (TOR)

3.2.66 AITF/3 was of view that the TOR and the name of the Task Force should be changed to reflect the transition from AIS to AIM. ATM/AIS/SAR/18 agreed that the TOR be amended and the name of the Task Force be changed to the AIS-AIM Implementation Task Force (AAITF).

Review of Air Navigation Deficiencies in the AIS Field and Proposed Action Plan

Preliminary Examination of Actions

3.2.67 The meeting was informed that Australia reported to AITF/3 on an examination of deficiencies in Asia/Pacific Regions which related to AIS matters. Australia provided a summary of identified deficiencies and research based on a survey that had been conducted by the Regional Office and presented to AITF/2 (February 2007, Bangkok). Australia proposed some actions (and "tools" in the form of draft letters) that might assist States in eliminating the identified deficiencies. It was noted that the area of highest concern was that some States had insufficient resources to fully meet the ICAO requirements, and as a consequence have a number of deficiencies that are enduring.

3.2.68 AITF/3 agreed that the draft letters would be useful tools and might be useful in attracting remedial actions to improve the AIS outcomes in their States. Particularly, a consistent theme throughout the meeting days was the continued poor adherence to AIRAC notification provisions.

3.2.69 AITF/3 was also presented with information on the electronic Terrain and Obstacle Databases (eTOD) and industry developments. The Task Force was made aware of ICAO Special Implementation Project (SIP) funding for special eTOD workshop.

Review of Euro OPADD (Operating Procedures for AIS Dynamic Data) Edition 2.1

3.2.70 The meeting recalled that APANPIRG had adopted the OPADD as guidance material for the Asia/Pacific Regions, continuing the practice of harmonizing operating procedures in the Regions with those of the European States and fostering global harmonisation. Subsequently, Edition 2.1 of the Euro OPADD had become available.

3.2.71 AITF/3 reviewed the recent amendment (Edition 2.1) to the Eurocontrol Operating Procedures for AIS Dynamic Data (OPADD) and recommended that Edition 2.1 be adopted. In considering this matter, the recognized that Euro OPADD Edition 2.0 had been previously been adopted as regional guidance material under the terms of APANPIRG Conclusion 18/13 and that the Edition 2.1 was an updating amendment to the Edition 2.0. ATM/AIS/SAR/SG/18 agreed with the AITF/3 recommendation and requested that the Secretariat take action to update Chapter 3 of the *Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region* with Edition 2.1. of the OPADD.

ICAO Special Implementation Project

3.2.72 The meeting was informed that SIPs were established under a special budget of the ICAO Assembly and were designed to assist States in overcoming problems of implementation, which may have significant adverse effects on the safety, regularity, or efficiency of international civil aviation. Arising from proposals prepared by the Regional Office, the AIS Seminar/Workshop SIP has been approved by ICAO Council. The purpose of the SIP is to conduct a combined workshop/seminar for States in the Asia/Pacific Region to address issues related to AIS automation and electronic terrain and obstacle data (eTOD) implementation. Planning has commenced for the SIP and the AITF considered that combined workshop/seminar could be held in conjunction with the AITF/4 meeting during February 2009 in Tokyo, Japan, with assistance from the JCAB and Eurocontrol.

Future date-time in NOTAMC and NOTAMR

3.2.73 ATM/AIS/SAR/SG/18 noted that the Air Navigation Commission (ANC) supported the proposal in APANPIRG Conclusion 18/14 that the use of future effective date-time in NOTAMC and NOTAMR be reviewed to determine appropriate provisions for Annex 15 – *Aeronautical Information Services* and that the ANC had requested the Secretariat to process the issue as a priority with target date of 2010. However, as the relevant Annex 15 amendment enabling use of future date-time became effective from November 2007, the AITF and ATM/AIS/SAR/SG/18 noted concerns from States as to what actions should be taken in the intervening period 2007 to 2010, specifically whether or not the future date-time should be used for NOTAMC and NOTAMR.

3.2.74 In this context, the Secretariat informed the meeting that the *Aeronautical Information Services Manual* (Doc 8126), at Chapter 6, Appendix A, Instructions for the Completion of the NOTAM Format, Section 5. Item B), provides that:

> *For date-time group use a ten-figure group, giving year, month, day, hours and minutes in UTC. This entry is the date-time at which the NOTAMN comes into force. In the case of NOTAMR and NOTAMC, the date-time group is the actual date and time of the NOTAM origination.*

3.2.75 Similarly, the Asia/Pacific Operating Procedures for AIS Dynamic Data (OPADD), which were adopted by APANPIRG/18 as a regional guidance material (Conclusion 18/13), provide that, *"for NOTAMR and NOTAMC, the Item B) time shall correspond to the actual date/time of creation of that NOTAMR or NOTAMC"*, and *"no future coming into force is permitted"* (paragraph 2.10.1.1 of OPADD refers).

3.2.76 Recognising that the intention of the AIS Manual is to assist States in the uniform application of the Standards and Recommended Practices (SARPs) contained in Annex 15, and that the OPADD is an approved regional guidance material, the meeting adopted the following Conclusion:

Conclusion 19/10 – Future Date-time for NOTAMC and NOTAMR

Recognizing that the concerns raised in APANPIRG Conclusion 18/14 relating to use of future date-time in NOTAMC and NOTAMR have been included in the Air Navigation Commission work programme for formal resolution by 2010, States be encouraged to use relevant guidance material in the Aeronautical Information Services Manual (Doc 8126) and the Asia/Pacific Operating Procedures for AIS Dynamic Data (OPADD) in the application of Annex 15 SARPs.

Republic of Korea – AIS Quality System ISO Certification

3.2.77 Republic of Korea informed the meeting that the Civil Aviation Safety Authority (CASA), which is the responsible body for the provision of Aeronautical Information Services and Aeronautical Charts Services within the Incheon FIR, had implemented an AIS Quality Management System (QMS) during 2007 to meet Annex 15 provisions. An outline of the process adopted by CASA is described below.

3.2.78 One of the consulting companies in the Republic of Korea was selected to support the QMS implementation and ISO 9001:2000 Certification process. In cooperation with the consultants, CASA reviewed the organizational structure of AIS and all the documents and procedures related to the provision of AIS. In addition, CASA trained AIS managers and officers on the QMS under the auspices of the consultant company.

3.2.79 After the thorough review of current AIS documents and procedures, CASA developed a QMS Manual for Aeronautical Information as a foundation document, containing the quality policy and objectives, authorities and responsibilities, resources, monitoring and evaluation, internal regulations and procedures. Each element of QMS Manual meets the requirements of the ISO 9001:2000 Quality Management Standards.

3.2.80 As a final phase of the certification process, CASA selected an ISO 9001:2000 certification company to conduct a review of all relevant documents, AIS and aeronautical charts offices under CASA. After a thorough evaluation process, the company concluded that CASA met the requirements of ISO 9001:2000 in the fields of Integrated Aeronautical Information Package (AIP, AIC, NOTAM, PIB) and aeronautical chart, and issued the ISO 9001:2000 Certification in December 2007.

India – Status of AIS/AIM Automation

3.2.81 India informed the meeting that they introduced automation in AIS in 2000 at all international NOTAM offices, where manual handling of NOTAM etc have been replaced with computer-based systems to facilitate airlines obtaining real time Pre-flight Information Bulletins (PIB) through Automated Self-Briefing Systems (ASBS). This initiative was expanded to include MET products along with PIBs which are made available to the airline community at their premises through Remote Briefing Terminals (RBTs). Such RBTs also have value added features for the airlines to obtain clearance information as well as to originate delay and cancellation information of their flight via AFTN.

3.2.82 Presently, these services are also made available at about 10 major domestic aerodromes by replicating the NOTAM databases from International NOTAM offices in India. In order to bring in further automation in AIS in India where manual means are still utilized in AIS functions other than cartography, an *"Integrated AIS/AIM Automation System"* is being implemented to ensure efficiencies and quality checks on the production processes of the AIP products from the design to publication stages.

3.2.83 Automation will be achieved at the primary AIS Unit in New Delhi by establishing a database information management system based on the AICM/AIXM concepts for managing the aeronautical data for AIP output including its amendments/supplements and maps/charts. In accordance with the Global AIM concept, the automation system will also integrate and harmonize all the current workflow functions involved in the design and publication processes at the AIS unit. System design, planning & qualitative requirements have been established and the procurement process has commenced. The new system is expected to be operational by the end December 2008.

Update on the Development of the ICAO EUR/NAT Regional Database for the Five-Letter Name-codes Allocations

3.2.84 The meeting was provided with an update on the ICAO EUR/NAT Regional Database (ICARD) for five-letter name-codes and route designators. APANPIRG/18 had recognized the considerable benefits of using the ICARD system and, under Conclusion 18/11, endorsed the regional use of ICARD.

3.2.85 The initial trial phase of implementation of ICARD for Asia/Pacific has been successfully completed. Accordingly, all States of the Region are now invited by the Regional Office to register in the ICARD system and to start using it. States should contact the Regional Office, who will provide guidance and assistance in this respect.

Search and Rescue (SAR) Matters

Review of Format of SAR Capability Matrix

3.2.86 In considering the follow up work arising from Conclusion 18/17, the meeting accepted the recommendation made by the ICAO/IMO Joint Working Group on SAR that the last column of the State SAR Capability Matrix be renamed to "COSPAS-SARSAT Distress Alerts". In thanking the Joint Working Group and the United States for coordinating and arranging this positive outcome, the meeting amended the Matrix format accordingly and agreed to the following Conclusion:

Conclusion 19/11 – Update SAR Matrix including guidance material

That the updated format for the SAR Capability Matrix Table and explanatory text shown in **Appendix K** to the APANPIRG/19 Report on Agenda Item 3.2 be adopted and the explanatory text be included as a perpetual attachment to the SAR Capability Matrix, to serve as guidance to States when filling in the Matrix.

SAR Capability Matrix and List of SAR Agreements

3.2.87 The meeting reviewed and updated the SAR Capability Matrix Table (using the new format – see Appendix K above) and list of SAR Agreements as presented in **Appendix L** to the Report on Agenda Item 3.2, noting that ATM/AIS/SAR/SG/18 had adopted a date order sorting for the SAR agreements for ease of reference. The Secretariat thanked States for the input received since ATM/AIS/SAR/SG/18 and would ensure that these updates were entered into the tables.

Attachment 3 to the report of APANPIRG/19 Follow-up to APANPIRG/19 Conclusions/Decisions – Action Plan (Page 3-6)

Attachment 3 to the APANPIRG/19 Report
Follow-up to APANPIRG/19 Conclusions/Decisions – Action Plan

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 19/10 A D	**Future date-time for NOTAMC and NOTAMR**	Recognizing that the concerns raised in APANPIRG Conclusion 18/14 relating to use of future date-time in NOTAMC and NOTAMR have been included in the Air Navigation Commission work programme for formal resolution by 2010, States be encouraged to use relevant guidance material in the Aeronautical Information Services Manual (Doc 8126) and the Asia/Pacific Operating Procedures for AIS Dynamic Data (OPADD) in the application of Annex 15 SARPs.	Notify States	ICAO APAC Office	State Letter	Dec 2008

Appendix D to the Report

FOLLOW-UP OF AIS-AIMSG/1 ACTION AGREED (AC)

Status on 10 December 2008

√ = completed

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/1	**Draft Roadmap for the Transition from AIS to AIM** That the draft *Roadmap for the Transition from AIS to AIM*, together with the amendments agreed during the meeting, be endorsed by the group.	√	N/A	N/A
1/2	**Finalization of the Roadmap for the transition from AIS to AIM** That: a) further comments on the revised roadmap be provided by 19 December 2008 through correspondence; and; b) these comments be incorporated by the Secretariat for final review by the group before submission to the Air Navigation Commission in February 2009.	19 December 2008 15 January 2009	ALL AIS/AIMSG Secretariat	AIS-AIMSG/1-SN/3
1/3	**Consideration of the ATM operational concept** That the group endorse the concept of a systematic assessment of the global ATM operational concept to ensure all AIM requirements are included in the future amendments to Annex 15.	√	N/A	N/A
1/4	**Aerodrome mapping databases** That **Stéphane (Rapporteur)**: a) act as a liaison with the joint EUROCAE/RTCA Committee WG44/SC217 to develop a draft proposal to integrate aerodrome mapping databases into Annexes 4, 14 and 15 provisions while maintaining compatibility with the AIXM; and b) submit the draft proposed for consideration by the group at the AIS-AIMSG/2 meeting.	27 July 2009	**Stéphane**	

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/5	**Draft Amendment 36 to Annex 15: Electronic terrain and obstacle data** That: a) members comment, by 5 January 2009, on the proposal to amend Chapter 10 of Annex 15 related to Areas 1, 3 and 4; and b) an ad hoc group comprised of **David (Rapporteur)**, **Benoit**, **Gregory**, **John**, **Manfred**, **Stéphane**, **Steve** and **Takashi** develop a draft proposal for inclusion in Amendment 36 to Annex 15 by 15 January 2009.	5 January 2009 15 January 2009	**David** Benoit Gregory John Manfred Stéphane Steven Takashi	AIS-AIMSG/1-SN/21
1/6	**Draft Amendment 36 to Annex 15: Automation enabling digital data exchange** That the following text [SoD, page 7, refers] be included in Amendment 36 to Annex 15.	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD
1/7	**Draft Amendment 36 to Annex 15: Electronic AIP (eAIP)** That the following text [SoD, page 8, refers] be included in Amendment 36 to Annex 15.	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD
1/8	**Draft Amendment 36 to Annex 15: Quality** That the proposed amendments in Appendix C [of the SoD] be included in Amendment 36 to Annex 15.	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD
1/9	**Draft Amendment 37 to Annex 15: Reference to guidance material related to Chain solutions** That a note referring to guidance material on data supply chain management be included in Amendment 37 to Annex 15.	December 2011	Secretariat	AIS-AIMSG/1-SoD
1/10	**Draft Amendment 36 to Annex 15: NOTAM date and time** That Amendment 36 to Annex 15 include the following change [SoD, page 9, refers] to Appendix 6.	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/11	**Draft Amendment 36 to Annex 15: Reference to guidance material on NOTAM** That Amendment 36 to Annex 15 include the following changes [SoD, page 10, refers].	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD
1/12	**Draft Amendment 36 to Annex 15: AIRAC late postponement** That Amendment 36 to Annex 15 include the following changes [SoD, page 11, refers] to Chapter 6.	Air Navigation Commission Preliminary Review February 2009	Secretariat	AIS-AIMSG/1-SoD
1/13	**AIS-MET data link services** That **Stéphane (Rapporteur)** act as a liaison with the joint EUROCAE WG76/RTCA SC 206 Committee regarding the possible inclusion in ICAO Annexes of high-level SARPs related to AIS-MET datalink services and report back to the group on developments at the AIS-AIMSG/2 meeting.	27 July 2009	**Stéphane**	
1/14	**Guidance material for aerodrome mapping data bases** That **Stephane (Rapporteur)** and **Paul** provide draft guidance material on aerodrome mapping data bases (AMDBs) for consideration by the AIS-AIMSG/2 meeting.	27 July 2009	**Stéphane** Paul	Doc 9881
1/15	**Guidance material on AIXM** That **Paul (Rapporteur)** and **Gregory** provide draft guidance material on digital data exchange based on AIXM for review by the AIS-AIMSG/2 meeting.	22 July 2009	**Paul** Gregory	
1/16	**Ad-hoc group on including AIM in Annex 15 SARPs** That an ad-hoc group consisting of **Steven (Rapporteur)**, **Charity**, **Gregory**, **Paul**, **Stéphane** and **Tony** be tasked to: a) consider the restructuring of Annex 15 to introduce the notion of services and separate data from publication; b) develop a digital AIM services manual; and c) submit draft proposals to the AIS-AIMSG/2 meeting.	22 July 2009	**Steven** Charity Gregory Paul Stéphane Tony	

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/17	**Future evolution of the data exchange model** That the group act as the primary body for reviewing and endorsing the evolution of the model at the global level based on mature proposals emanating from regional and multi-national agreements.	√	N/A	N/A
1/18	**Guidance material on electronic AIP (eAIP)** That **Manfred** prepare draft guidance material on the provision of electronic AIP, aligned with the existing guidance on AIP in Doc 8126, for comment by the study group at the AIS-AIMSG/2 meeting.	27 July 2009	Manfred	
1/19	**Guidance material on AIS training** That an ad-hoc group, consisting of **David (Rapporteur)**, **Manfred, Benoit*** and **Augustin,** be formed which would: a) create a plan, by 1 February 2009, for the development of an AIS training manual, taking into account available material on AIS training and aligning with the principles in the PANS-TRG; b) ensure, during development of the AIS training manual, coordination with Secretariat members responsible for the PANS-TRG; and c) present a draft of the AIS training manual to the AIS-AIMSG/2 meeting. ** Indicates participation in the group is to be confirmed.*	1 February 2009 27 July 2009	**David** Augustín Benoit Manfred	Doc 9868 CASP ATDG

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/20	**AIS quality manual** That: a) group members provide, to the Rapporteur of the group in b) below, examples of AIS quality manuals in use in States; b) an ad hoc group, consisting of **Susumu (Rapporteur)**, **Greg, Manfred, Charity, Augustin** and **Tony*** develop a plan, to be completed by 1 March 2009, for the production of a new AIS quality manual to be based on the fundamental structure of the *Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation* (Doc 9873); c) the ad hoc group provide a draft AIS quality manual for review by the AIS-AIMSG/2 meeting; and d) the ad-hoc group develop guidance material on the means for measuring integrity to be included in the AIS quality manual. ** Indicates participation in the group is to be confirmed.*	15 January 2009 1 March 2009 27 July 2009 27 July 2009	ALL MEMBERS **Susumu** Augustín Charity Gregory Manfred Tony	Doc 9674 Doc 9873 Doc 9906 ADP and SDP CHAIN
1/21	**Guidance material on CHAIN solutions** That **Manfred** supply guidance material on data supply CHAIN management to be integrated in the AIS quality manual for review by the ad-hoc group referred to in Action agreed 1/20 on the AIS quality manual.	15 January 2009	Manfred	
1/22	**Guidance material on NOTAM** That guidance material on NOTAM in Doc 8126 be harmonized with OPADD 3.0 by the Secretariat as part of Amendment No. 2 to Doc 8126.	30 June 2009	Secretariat	OPADD 3.0

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/23	**Integrated briefing** That: a) an ad-hoc group, consisting of **John (Rapporteur)** and **Manfred** develop guidance material on the provision of integrated briefing by 1 June 2009; and b) the Secretariat prepare a Study Note for the AIS-AIMSG/2 meeting based on the guidance material provided.	1 June 2009 10 August 2009	**John** Manfred	
1/24	**Frequently asked questions (FAQ) on AIRAC adherence** That: a) the Secretariat post frequently asked questions (FAQ) on AIRAC adherence on the AIM website; and b) members enable wider use of the FAQ by creating links from other websites.	1 March 2009	Secretariat ALL AIS-AIMSG	
1/25	**Evaluation of pTracker Tool** That the Secretary evaluate the "pTracker tool" and determine how to disseminate it for use by States and users.	1 March 2009	Secretariat	pTracker Tool
1/26	**Guidance material on AIRAC adherence** That the Secretary evaluate the use of AIRAC related paragraphs in aeronautical industry standards ED 77/DO 201A and the *Manual on Required Navigation Performance (RNP)* (Doc 9613) in Doc 8126.	30 June 2009	Secretariat	ED 77/DO 201A Doc 9613

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/27	**Update of NOTAM Selection Criteria** That the Secretary: a) update the NOTAM Selection Criteria (NSC) in Doc 8126 to reflect new NOTAM Codes introduced in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes* (PANS-ABC, Doc 8400) and; b) analyze the reports submitted by the EANPG (EANPG Conc. 47/42 refers) to progress the changes needed to clarify and improve the use of NSC for NOTAM in Annex 15, Doc 8400 and Doc 8126.	30 June 2009 26 February	Secretariat	
1/28	**Progress report on Amendment No. 2 to Doc 8126** That the Secretary provide a progress report on Amendment No. 2 to Doc 8126 at the AIS-AIMSG/2 meeting.	10 August 2009	Secretariat	
1/29	**Data process and procedures in the AIS quality manual** That the ad-hoc group created to address the AIS quality manual in Action agreed 1/20 use the EUROCONTROL AIS Data Process and Static Data Procedures documentation provided by **Paul** as examples to be included in the manual.	1 March 2009	Paul	ADP and SDP
1/30	**Identify data process and procedures that would be required for the provision of new datasets** That **Manfred** identify, for review by the AIS-AIMSG/2 meeting, the new data process and procedure requirements, related to the future provision of new datasets, in addition to the current paper or text products.	27 July 2009	Manfred	

AC number (Deliverable)	***Title*** *Action*	*Follow-up action (target/completion dates)*	***Rapporteur*** *Ad-hoc group members Secretariat or ALL AIS-AIMSG*	*References*
1/31	***Aeronautical Chart Manual*** **(Doc 8697)** That an ad hoc group, consisting of **David (rapporteur), Charity, Bill, Raul, Greg*, Paul*** and **Augustin*** develop a plan, to be completed by 1 May 2009, for the development of a new edition of the *Aeronautical Chart Manual* (Doc 8697). ** Indicates participation in the group is to be confirmed.*	1 May 2009	**David** Augustín Bill Charity Gregory Paul Raul	
1/32	**Legal and institutional issues** That an ad hoc group, consisting of Eugene (Rapporteur), Bill, Stéphane, Steven and Paul, be tasked with: a) consolidating all available information related to cost recovery, copyright and liabilities for AIS; and b) developing a list of current and future institutional and legal issues to be considered in the context of current AIS and future AIM.	27 July 2009	**Eugene** Bill Paul Stéphane Steven	Doc 9082 Doc 9161 Presentation by J. de la Camara
1/33	**Expertise on the inclusion of meteorological information in the data-centric environment** With a view to coordinating synergies, preventing duplicated/conflicting requirements, and discovering other areas, besides data modelling, for cooperation which may benefit from a joint MET-AIM approach, that: a) the Secretary invite the WMO to nominate a member to the group; b) the Secretary coordinate with the Secretaries of ICAO MET study groups and operations groups; and c) members ensure that expertise be made available on the inclusion of meteorological information in the data-centric environment for future meetings of the group and for the work of the group, as necessary.	1 March 2009	Secretariat ALL AIS-AIMSG	

DRAFT

ROADMAP FOR THE TRANSITION FROM AIS TO AIM

FOREWORD

The *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) was developed as a strategic document to guide the implementation of CNS/ATM systems with respect to the *Global Air Traffic Management Operational Concept* (Doc 9854) and the Strategic Objectives of ICAO.

The *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) contains near- and medium-term guidance on air navigation system improvements necessary to support a uniform transition to the air traffic management system envisioned in the *Global Air Traffic Management Operational Concept* (Doc 9854). More specifically, Doc 9750, Chapter 1, Table 1-1 sets out twenty-three global plan initiatives. Two initiatives are directly related to aeronautical information and most of the other initiatives have an indirect impact on the way aeronautical information will be exchanged in the future.

This roadmap has been developed to address more specifically, and in greater detail, the direction given in Doc 9750 for aeronautical information. The changes required are such that it is being referred to a transition from aeronautical information services (AIS) to aeronautical information management (AIM) to reflect the importance of the evolution. It offers practical guidance and advice to regional planning groups and States for development of the implementation and funding strategies which will be required for the global plan initiatives related to aeronautical information. The roadmap identifies the major milestones recommended for a uniform evolution across all regions, it identifies specific projects that need to be undertaken and identifies timelines for implementation.

The roadmap is intended to serve as a strategic positioning initiative to add impetus to the continuing improvement of aeronautical information services in terms of quality, integrity and definition of new services and products to better serve aeronautical users. It should place the future AIM in a position to better serve airspace users and ATM in terms of their information management requirements. The expectations are that the transition to AIM will not involve many changes in terms of the scope of information to be distributed. The major change will be the increased emphasis on data distribution.

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GLOSSARY

TERMS

***Information management.** The processes defined to ensure the collection, utilization and transmission of quality data which is tailored for the needs of each component of the air traffic management system.

***Interoperability.** The capacity for diverse systems and organizations to exchange information by transferring data and executing remote procedures in a manner that requires the client system to have little or no knowledge of the unique characteristics of the server system.

***NOTAM.** A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

ABBREVIATIONS/ACRONYMS

AICM	Aeronautical information conceptual model
AIM	Aeronautical information management
AIP	Aeronautical information publication(s)
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical information services
AIXM	Aeronautical information exchange model
ATM	Air traffic management
AN-Conf/11	Eleventh Air Navigation Conference (2003)
EUROCONTROL	European Organisation for the Safety of Air Navigation
PIB	Pre-flight information bulletin
RNAV	Area navigation
RNP	Required navigation performance
SARPs	Standards and Recommended Practices
IP	Internet protocol
WGS-84	World geodetic system-1984

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* Not an official ICAO definition (used in the context of this document only).

Part I

Overview

WHY AERONAUTICAL INFORMATION MATTERS

1. The Eleventh Air Navigation Conference (AN-Conf/11) held in Montreal in September 2003 endorsed the operational concept and recognized that, in the global air traffic management (ATM) system environment envisioned by the operational concept, aeronautical information service (AIS) would become one of the most valuable and important enabling services. As the global ATM system foreseen in the operational concept was based on a collaborative decision-making environment, the timely availability from authorized sources of high-quality electronic aeronautical, meteorological, airspace and flow management information would be necessary. Some recommendations of AN-Conf/11 addressed the importance of aeronautical information in particular.

2. In June 2006, a Global AIS Congress was held in Madrid, Spain. The event was facilitated by the European Organization for Safety of Air Navigation (EUROCONTROL) in partnership with ICAO. The congress considered the essential role of AIS in the evolving world of ATM. It noted that computer-based navigation systems, and area navigation (RNAV), required navigation performance (RNP) and ATM requirements, introduced a need for new corresponding AIS requirements for quality and timeliness of information. The role of AIS would need to transform to an information management service, changing duties, responsibilities and scope to satisfy these new requirements and to cope with and manage the provision of information.

3. The congress supported the recommendations of AN-Conf/11 dealing with aeronautical information, and began to define a future high-level view as to the shape, nature and content of a strategy for the evolution from traditional product-centric AIS to the enlarged scope of data-centric aeronautical information management (AIM). Realizing the safety-critical nature of aeronautical information, the congress agreed that, in order to prevent diverging developments in the future, it was considered essential that ICAO take the lead at the global level with regard to the transition from AIS to AIM. Accordingly, the congress developed ten recommendations calling for ICAO action or support from States and international organizations.

4. In September 2007, the 36th Session of the Assembly recognized the need to support the recommendations of the congress and called for further coordination with States and international organizations.

5. Today, high-quality aeronautical information is often cited in research programmes as a pre-requisite for the development of the many new interoperable tools that future aircraft will carry to improve their effectiveness in navigating safely and efficiently. These new tools will also be used by ATM systems to improve the efficiency while maintaining safety. This will result in the provision of more services to more aircraft in the same airspace at the same time.

HOW INFORMATION IS DISTRIBUTED TODAY

6. We are in the age of the Internet, satellite navigation and computer networks, yet our approach to aeronautical information distribution is still based on paper charts, paper documentation and telex-based text messages. Systems exist in isolation. Much of the data is entered more than twice in different computers using a keyboard rather than via file transfer or database transactions.

7. Better aeronautical information is essential if we are to have an integrated and interoperable ATM system which enables air navigation service providers to safely handle more traffic in the same amount of space during the same amount of time. Such a system would effectively link the full range of services from airspace design to flight planning, airport operations planning and flight separation assurance while continuing to maintain the safety and security of the travelling public and lessening the environmental impact on the planet and its population.

8. Better aeronautical information is essential if we are to have a flexible ATM System which reduces costs and environmental impacts while improving access to congested airspace and remote airports in developing countries. Such a system would allow planners and decision makers to make the right decisions for the development of new tools and techniques based on information of the right accuracy, available on time at the right place.

9. Better aeronautical information is essential if we are to have a system that empowers airspace users by giving them a greater role in shaping the ATM system, understanding their options and helping them making informed decisions while maintaining the public safety and minimizing the impact on the environment. Such a system would be focussed on users needs.

10. Corrupt or erroneous aeronautical information has the potential to adversely affect the safety of satellite navigation just as corrupt or malfunctioning navigation aids adversely affects the safety of ground-based navigation.

11. These improvements are central to the ICAO Global Air Traffic Management Operational Concept and justify by themselves the name change from AIS to AIM that identifies the new focus on all aspects related to proper information management as opposed to the traditional way of focusing on the provision of standard products to the pilot only.

THE OBJECTIVE OF THE TRANSITION TO AIM

12. Recommendation 1/8 of AN-Conf/11 clearly stated the objective for global aeronautical information as follows:

> “That ICAO, when developing ATM requirements, define corresponding requirements for safe and efficient global aeronautical information management that would support a digital, real-time, accredited and secure aeronautical information environment”.

13. The Global Air Traffic Management Operational Concept, which had been developed to be visionary in scope and not constrained by the level of technology available at the time, was also endorsed by AN-Conf/11.

14. Much has been done in the community, and the technology has become more mature and more widely deployed. However, some regions are more advanced than others and the need for the adoption of global standards is becoming more evident now than it was in 2003. Present and future navigation systems, and other air traffic management systems, are data dependant. All require

access to global, broad-based aeronautical information of a considerably higher quality and timeliness than is generally available today. The provision of aeronautical information is a core process that underpins all elements of ATM.

15. To satisfy new requirements arising from the Global Air Traffic Management Operational Concept, aeronautical information services must transition to a broader concept of aeronautical information management, with a different method of information provision and management given its data-centric nature as opposed to the product-centric nature of AIS.

WHAT WILL CHANGE

16. The Global Air Traffic Management Operational Concept defines seven interdependent concept components that will be integrated to form the future ATM system. They comprise airspace organization and management, aerodrome operations, demand and capacity balancing, traffic synchronization, conflict management, airspace user operations and ATM service delivery management. The order of these components implies no priority.

17. The management, utilization and transmission of data and information are vital to the proper functioning of these components. The exchange and management of information used by the different processes and services must ensure the cohesion and linkage between the seven concept components described above.

Users

18. The provision of aeronautical information today is mainly focused on the requirements of pre-flight briefing. The provision of aeronautical information tomorrow will address the requirements of all components of ATM systems.

Data

19. The shift from standardizing products to standardizing data will enable more freedom in the definition of future products while maintaining a high degree of quality, integrity and coherency of the information contained in these new products.

20. Both graphical and text products will be based on the same underlying, standard definition of geo-referenced data. The definition of a standard aeronautical information exchange model will ensure standardized interfaces between computers of providers and users of data. This will enable the definition of new products where both text and graphics will be presented in a more readable form. This will enable the definition of new services where the same information will be made available in the decision support tools for all ATM components.

21. The current standard in Annex 15 — *Aeronautical Information Services* is centred on products and does not provide specifications required for data exchange. A central element in the transition to AIM will be the standardization of the data elements in terms of field names, field types and field definitions. This will be provided in the form of a standard data dictionary for aeronautical information. Furthermore, the definition of standard structured groupings of fields by features, attributes and associations is necessary. This will be provided in the form of a standard conceptual model for aeronautical information. Finally, the mechanisms to maintain a dataset, up to date across different components, would need to be agreed. This will be provided in the form of a standard exchange model for aeronautical information where the access to individual datasets will be standardized.

22. By using this approach, the definition of the data products is decoupled from definition of the usage for the end products. The end-user applications which make use of the information transferred in the form of datasets do not rely exclusively on the structure and format of the messages, but are free to transform the data and combine it with other data to construct the final view appropriate for the end user.

Products

23. Pre-flight briefings are often loaded with information not relevant to the flight because of the limited filtering capabilities that the current NOTAM format is offering. Pre-flight briefings are often also difficult to read and interpret because of the lack of graphical capabilities of the current NOTAM format. This will require that new standard products combining textual and graphical information be specified.

24. Electronic chart displays are becoming easier to install in the cockpit and at lower costs. Their functionality is increasing and it is likely that they will progressively complement some paper charts and replace others. This will require updated standards and symbols for electronic displays capabilities.

25. The AIM concept requires that all aeronautical information, including that currently held in aeronautical information publications (AIP), be stored as individual standardized datasets to be accessed by user applications. These datasets will be defined as new products managed by the future AIM.

Static versus dynamic information

26. Stability is essential for proper planning of airspace operations. Examples of changes that must be announced well in advance are: the installation or decommissioning of ground-based air navigation aids; the opening of a new aerodrome for international flight operations; airspace danger and restricted areas; and the route structure for major traffic flows.

27. Events of short duration or known with little advance notice are inevitable occurrences. These events must be announced quickly in a manner that is comprehensible by the different components of the ATM system.

28. In an interoperable environment based on data standards, these two types of information will be transferred by a common network under the same data transfer mechanisms using the same data standard definitions.

AIRAC cycle

29. It is expected that the need for aeronautical data to become effective on internationally agreed common dates will remain. Coordination and planning constraints require major changes to be announced well in advance and introduced only at regular intervals.

30. The quality and integrity requirements of databases will define new roles for human intervention such as verification, monitoring and correction before releasing new data.

31. The current cycle is essentially based on the maximum expected time for postal delivery of the paper products. The distribution of data products through data networks will not suffer from the same delay in delivery. Shorter cycles will become possible to better match users needs. Transitioning to a modern distribution mechanism will mean that the specifications for new concepts of operation need not be constrained to a twenty-eight-day cycle. 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 advanced planning.

EIGHT GUIDING PRINCIPLES FOR THE TRANSITION TO AIM

32. The projects identified in the roadmap must be specified and conducted in accordance with the following eight guiding principles. The transition from AIS to AIM will have to:

1. comply with the process for amendments to the Annexes to the Chicago Convention;

2. support or facilitate the generation and distribution of aeronautical information which serves to improve the safe and cost-effective accessibility of air traffic services in the world;

3. provide a foundation for measuring performance and outcomes linked to the distribution of accurate aeronautical information and a better understanding of the determinants of ATM, safety and effectiveness not related to the distribution of the information;

4. assist States to make informed choices about their aeronautical information services and the future of AIM;

5. build upon developments in States, international organizations and industry and acknowledge that the transition to AIM is a natural evolution rather than a revolution;

6. provide over-arching and mature standards, that apply to a wide range of aeronautical information products and services;

7. be guided by the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) and ensure that all development is aimed at achieving the ATM system envisaged in the *Global Air Traffic Management Operational Concept* (Doc 9854);

8. ensure, to the greatest extent possible, that solutions are internationally harmonized and integrated and do not unnecessarily impose multiple equipment carriage requirements for aircraft or multiple systems on the ground.

THE ROADMAP TO AIM

33. The purpose of the roadmap is to develop the AIM concept and associated performance requirements by providing a plan to manage and facilitate, on a worldwide basis, the transition from AIS to AIM. The plan is based on what we know today but has been developed to provide sufficient flexibility for the new concepts that will emerge from future research.

34. Three phases of action are envisaged for States to complete the transition to AIM:

Phase 1 — Consolidation

Phase 2 — Migration to digital databases

Phase 3 — Information management

35. The roadmap must proceed with caution when advocating more sophisticated information management initiatives to ensure that they do not impede the obligations of States to correct infrastructure and other deficiencies already identified.

36. In the first phase, existing standards will need to be refined and strengthened and their implementation in all States ensured. This will concern mainly: quality requirements; AIRAC adherence; the implementation of the adopted standard reference system for coordinates (World Geodetic System-1984); and the provision of terrain and obstacle data. The projects in the first phase will be conducted to identify potential gaps in order to focus on near-term work programme activities.

37. In the second phase, the introduction of database-driven processes will improve the value of current products by improving their quality and availability for current users. This will concern mainly the creation of a national database to be used to produce the existing products and services, but with better quality and availability. The global deployment of new, already well specified products such as electronic AIP will also be initiated. The projects in the second phase will be conducted to enhance the quality and availability of existing products in the medium-term work programme activities.

38. In the third phase, new products and services will be developed. Quality control and staff training and planning will be applied to current and new products and services. This will support a new AIM function for air navigation service providers which will enable the provision of the new data that will be required by the future ATM components. The projects in the third phase will be conducted to serve new users and to promote continuous improvement by the research community.

39. The roadmap will identify the main projects to be conducted for the three phases. Each project will involve two types of activities: one will be the development of the standards required and the other will be the implementation in States of the standards.

a) ***Development of Standards.*** The development of new standards often lie on the critical path of the transition. Amendments to ICAO Standards and Recommended Practices (SARPs) are required for uniform implementation of the transition to AIM in all States. Actions related to the establishment of these standards in Annexes to the Chicago Convention and in guidance material will be led by the ICAO Secretariat with the support of States and International Organisations.

b) ***Implementation of Standards.*** Implementation of Standards allowing the transition to AIM will be the responsibility of States. The roadmap will provide a description of projects that States may have to consider to accomplish the transition. Guidance material will be issued by ICAO to assist in the implementation.

40. Part II of the roadmap lists numerous projects of varying complexity. Some will result in the establishment of new databases or the expansion of existing ones. Others will seek to foster better data and technical standards for gathering information and data protection. Still others will focus on obtaining consensus on the indicators and determinants of quality aeronautical information. Almost all of the projects will involve collaborative efforts with key stakeholders at the national, regional and inter-regional levels. Securing stakeholder participation at the outset of the process and maintaining it throughout the project implementation phase are critical to ensuring that outcomes are relevant, practical and contribute to improving the efficiency and safety of air travel and of the ATM system.

41. Accordingly, consultations through various ICAO working arrangements have been and will remain an ongoing feature of the roadmap. The input and feedback of all players is key to ensuring

that the roadmap contributes to better aeronautical information and a stronger ATM system for the air transport industry.

Phase 1 — Consolidation

42. During Phase 1 of the transition to AIM, projects will aim 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.

43. The structure of the AIP will require minor changes to prepare for the standardization of the future electronic AIP, but it is foreseen that a complete and comprehensive review will not be necessary. It is, therefore, important that States make every effort to issue their aeronautical information as specified in Annex 15.

44. The NOTAM system as it exists today will also require modification to cope with new types of information (e.g. GNSS navigation) and to respond to the difficulties being reported by the users. It is not clear at this time when and how the current NOTAM system will be changed. Research and trials are underway and their results will be addressed in Phase 3 of the transition to AIM or later. It is important to continue to improve the current SARPs related to NOTAM to better serve users needs with the current products. It is also important for States to continue to invest the time and effort necessary to comply with these SARPs.

45. Many ICAO charts types form an integral part of the AIP. Amendments to specifications are also envisaged for electronic chart display but most of the SARPs in Annex 4 — *Aeronautical Charts* will remain applicable after the transition to AIM. It is important that States comply with the existing Annex 4 SARPs.

46. The requirement to use a common horizontal, vertical and temporal reference system remains essential to facilitate the exchange of data between different systems. 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.

47. Provision of terrain and obstacle data becomes applicable during Phase 1 of the transition to AIM. It will be an important project to be conducted by States. Feedback from States on the implementation experience may require adaptation of the relevant SARPs.

48. Quality requirements are covered by current SARPs in terms of accuracy and integrity. The projects in Phase 1 aim to meet these requirements. Should the requirements prove too difficult to implement, the relevant SARPs would be reviewed. In addition, States will implement and continuously improve their quality management system in view of its increasing importance for future products and services.

49. The requirement for States to adhere to the Aeronautical Information Regulation and Control (AIRAC) process must be emphasized. The quality of the future service to be provided under information management will rely on proper mechanism for distribution and synchronisation of information. Shorter response times will be required in the future. This can only be achieved if the current requirements can, at the very least, be met.

Phase 2 — Migration to digital databases

50. During Phase 2 of the transition to AIM, the main focus will be on the establishment of database-driven processes for the production of the current products in all States. States which

have not yet done so will be encouraged to introduce the use of databases in their production processes. The emphasis will not, therefore, be on the introduction of new products or services.

51. A global aeronautical information conceptual model will provide guidance for States to implement such databases. Guidance material will include advice on a minimum data set to begin a phased development of the database.

52. Many States are already providing electronic forms of their AIPs, whether on CD or on the Internet. These electronic AIP may be accessible for printing and/or for navigation via a web browser tool. Guidance material based on existing best practices will be provided to States to ensure that new types of media will be harmonized for users.

Phase 3 — Information management

53. During Phase 3 of the transition to AIM, new data products will be defined to standardize the exchange of data in an interoperable form. This will require the adoption of a standard aeronautical information exchange model.

54. New data products will be introduced and organizational changes will need to be defined to implement better management of information in terms of: staff planning and staff training; formalization of agreements with data providers to ensure high degree of data quality; introduction of an extensive amount of explicit meta-information; clear definition and allocation of the cost-recovery mechanisms; and explicit traceability of the changes to information and identification of liabilities.

55. The third phase will enable the future AIM functions of the States to better address the new requirements that will be required of them in the Global Air Traffic Management Operational Concept.

56. ATM systems will require a common information reference model with quality procedures for the management of seamless information flow to ensure not only interoperability between States, but interoperability between different systems within the State. AIM products and services will be specified to serve these interoperability requirements.

The regional dimension

57. During the complex transition to AIM, industry, regulators, manufacturers, service providers and other organizations will need to work together to achieve the best results.

58. In Europe, the SESAR Master Plan and the Single European Sky initiatives have assembled a multitude of partners to define a modernization programme to significantly reduce of costs and a increase service capabilities.

59. In the United States, the NextGen programme is also underway to modernize the national air transportation system to allow increased capacity and reliability, while improving safety and security and minimizing the environmental impact of aviation.

60. These are only two of the many examples of modernization programmes that are underway in different regions of the world. All initiatives are seeking a more efficient and reliable exchange of information between the various components of the future ATM system. They refer to new concepts such as system-wide information management, increased automation for collaborative decision making, better integration of systems and 4-D trajectory, to name just a few.

61. These initiatives are all using the Global Air Traffic Management Operational Concept as a guide to ensure a common reference. They are referring to the Global Air Navigation Plan for CNS/ATM Systems as a common planning framework. All of these initiatives need some assurance of stability in the development of new techniques. This is the purpose of the Global Air Navigation Plan for CNS/ATM Systems and this roadmap.

62. This roadmap provides a structured framework for States to plan and to monitor their progress against other States in the same region and across regions of the world and supports regional and national plans to implement the transition to AIM.

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Part II

Project Summaries

CATEGORIES

Projects in the roadmap fall under the following six categories that can be used for their classification:

A — Indicators

B — Infrastructure and technical standards

C — Products and services

D — Training and human resource management

E — Quality assurance

F — Legal, institutional and organizational

A — Indicators

The transition to AIM will rely on measurable performance indicators to ensure transparent and comparable measures. The indicators will demonstrate progress at regional meetings. The target audience is decision makers and the research and development communities.

B — Infrastructure and technical standards

The transition to AIM will rely on infrastructure and technical standards to be agreed at the global level.

C — Products and services

The current AIP, NOTAM, charts and pre-flight briefings products will continue to be distributed once the transition to AIM is completed. The transition to AIM will define new versions of these products in a form that is interoperable with the other elements of the ATM systems.

D — Training and human resource management

The transition to AIM will rely on training guidelines to cover the new technical standards and new data products definitions.

E — Quality assurance

The transition to AIM will rely on improved quality assurance processes progressively being implemented or reinforced.

F — Legal, institutional and organizational

The Global Air Navigation Plan for CNS/AIM Systems addresses, in general, the legal, institutional and organizational questions raised by the implementation of the new concepts. Questions specific to the transition to AIM will emerge as it progresses. The transition to AIM will rely on proper identification of the relevant questions and a proper resolution mechanism.

PROJECTS

The following projects constitute a framework under which States and ICAO will coordinate the transition to AIM:

P-01 — Data quality monitoring

P-02 — Data integrity monitoring

P-03 — AIRAC adherence monitoring

P-04 — Monitoring of States' differences to Annex 4 and Annex 15

P-05 — WGS-84 implementation

P-06 — Integrated aeronautical information database

P-07 — Unique identifiers

P-08 — Aeronautical information conceptual model

P-09 — Aeronautical information exchange model

P-10 — Communication networks

P-11 — Electronic AIP

P-12 — Aeronautical information briefing

P-13 — Terrain

P-14 — Obstacles

P-15 — Aerodrome mapping

P-16 — AIM training manual

P-17 — Quality manual

P-18 — Service level agreements

P-19 — Interoperability with meteorological products

P-01 — Data quality monitoring

An ongoing challenge for organizations producing information is to ensure that the quality of the information produced suits its intended uses, and that data users are provided the appropriate information about data quality.

P-02 — Data integrity monitoring

Data integrity requirements introduced by safety objectives must be measurable and adequate.

P-03 — AIRAC adherence monitoring

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.

P-04 — Monitoring of States' differences to Annex 4 and Annex 15

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 application of the Standards by States.

P-05 — WGS-84 implementation

The target of expressing one hundred 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.

P-06 — Integrated aeronautical information database

The establishment and maintenance of a database where aeronautical information from a State is integrated and used to produce current and future products and services is a major step in the transition to AIM. This database may be operated by States or by regional initiatives under delegation from the States.

P-07 — Unique identifiers

Improvements to the existing mechanisms for the unique identification of aeronautical features is required to improve the effectiveness of information exchange without the need for human intervention.

P-08 — Aeronautical information conceptual model

Defining the semantics of the aeronautical information to be managed in terms of data structures is essential for introducing interoperability.

This project will use existing documentation developed by States and international organizations considered mature enough for global applicability. This will serve as a

reference for the database design needed in P-06 for States that do not yet have a database.

New information requirements coming from the Global Air Traffic Management Operational Concept will be analyzed and modelled if needed (e.g. airspace sectors, or information related to airspace and route traffic restrictions, or generic information related to aircraft performance, or information related to airline operators call signs).

P-09 — Aeronautical information exchange model

The data exchange products and services, and the mechanisms to exchange or access the products or services, will be defined by an exchange model. The content of the model will be driven by the conceptual model (top-down) and by requirements coming from technological choices (bottom-up).

P-10 — Communication networks

More data will be exchanged on ground networks and the current data will be exchanged in a more structured form that will require more bandwidth. It is envisaged that a transition of the network to be based on Internet protocol (IP) will be required to cope with these future needs. This project should express the needs of future AIM in terms usable for network specification. It will identify which data network will be used to distribute the new data products and services of the future AIM, what information can be exchanged via the public Internet and what information requires a secured network reserved for aviation.

P-11 — eAIP

The integrated aeronautical information package will not be phased out because new products will be introduced to serve the needs of future systems and new users. On the contrary, the integrated aeronautical information package will be adapted to include the new data products needed during the transition to AIM.

The electronic version of the AIP will be defined in two forms: one will be in the form of a printable document, and the other will be in a form that can be viewed by web browsers.

Guidance material will be required to help States implement best practices and to avoid the proliferation of many different presentations of AIP information over the Internet.

P-12 — Aeronautical information briefing

Fine tuning of the current NOTAM format by introduction of new selection criteria is needed to improve the layout of the information presented to pilots. Later, the combination of graphical and textual information is envisaged.

P-13 — Terrain data

The compilation and provision of terrain data is an integral part of the transition to AIM.

P-14 — Obstacle

The compilation and provision of obstacle data is an integral part of the transition to AIM.

P-15 — Aerodrome mapping

There is a new requirement emerging from industry that traditional aerodrome charts should be complemented by structured aerodrome mapping data which can be imported into electronic displays.

P-16 — Training manual

A new training manual will need to be developed to reflect the new competencies required by the transition to AIM.

P-17 — Quality manual

In order to assist States in the implementation of an efficient quality management system, a quality manual template will need to be developed.

P-18 — Agreements with data originators

Data of high quality can only be maintained if the source is of good quality. Templates will be provided for States to structure their relationships along the whole data chain from the producer to the distributor. This may take the form of template service level agreements with data originators, neighbouring States, information service providers or others.

P-19 — Interoperability with meteorological products

The meteorological products that will be required in the future will need to be integrated with similar technologies in the future flight briefings and other types of information provided to all ATM components.

This project will identify the actions that are required to ensure that the interoperability model that will be introduced by the transition to AIM will be compatible with future products envisaged to exchange information related to meteorological conditions affecting aviation.

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Part III

Roadmap Timeline

1. The roadmap serves as general indication of what the air transport industry may be expecting from States in their implementation of the transition to AIM. The timeline indicates the major milestones that are envisaged by ICAO in support of the transition to AIM and in support of the Global Air Traffic Management Operational Concept initiatives related to the management of aeronautical information.

Now	Phase 1 — Consolidation, has begun.
November 2010	Phase 2 — Migration to digital databases, begins with Amendment 36 to Annex 15 and Amendment 56 to Annex 4.
November 2013	Phase 3 — Information management, begins with Amendment 37 to Annex 15 and Amendment 57 to Annex 4.
2013	Possible divisional-type meeting should a substantial number of subjects of worldwide scope involving aeronautical information field need to be agreed in order to finalize the transition to AIM.
November 2016	Subsequent amendments to Annexes finalizing the transition to AIM.

2. The consultation process for Amendment 36 to Annex 15 would need to be initiated in the first quarter of 2009 for the amendment to be adopted in March 2010 and to become applicable in November 2009.

3. Projects within Phases 1, 2 and 3 will have an overlapping duration. The roadmap is giving an indication to States for setting the priorities by which to start the projects.

4. It is envisaged that Amendment 36 to Annex 15 will consolidate the existing standards to support Phase 1 of the transition to AIM and will provide guidance for Phase 2. This means that it is not foreseen that new data products will be mandatory, but, if provided, recommendations will be given in the form of guidance material for a harmonized transition to Phase 3.

5. It is envisaged to propose new binding requirements for new data products to be submitted for a comprehensive global review. The results of this global consultation will specify a further, more comprehensive amendment to Annex 15. The date of applicability of this amendment would be the date when the transition to AIM will be considered effective by the global community.

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Improvement Options

Number	Task	2007/2008 Status	Carried Forward - 2009
1	Examine the most recent AIS survey and identify areas of highest concern	**Done.** The area of highest concern is general rather than specific. Some States have insufficient resources to fully meet the ICAO requirements, and, as a consequence, have a number of deficiencies that are enduring.	The most important document(s) in the short term and perhaps eclipsing the previous survey results is the development of an ICAO sponsored Global Roadmap for AIS to AIM. In this regard, the papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 3, 15 and Information Papers 3 & 7 are relevant. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**
2	Discover shortest path to finalisation of WGS84 implementation wherever that is not yet completed	**Done.** The shortest path to implementation of WGS84 is for States to have surveyed and then publish their primary civil international airport(s) critical data (runway and navigation aids). The survey itself can be contracted to suitably equipped engineering firms. Perhaps related to Item 1. States are encouraged to obtain quotes for this task and present the findings to chiefs of administration. A draft letter has been prepared ready for adaptation to suit local requirements and protocols.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Note 5 is relevant. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**

Number	Task	2007/2008 Status	Carried Forward - 2009
3	Discover shortest path to finalisation of ICAO format implementation wherever that is not yet completed	**Done.** The shortest path to finalisation of ICAO format implementation is for States to engage expert document writers to reformat their old AIP. Perhaps related to Item 1. States are encouraged to obtain quotes for this task and present the findings to chiefs of administration. A draft letter has been prepared ready for adaptation to suit local requirements and protocols.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 3, 15 and Information Papers 3 & 7 are relevant. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**
4	Discover shortest path to finalisation of Quality Systems (including training of AIS staff) implementation wherever that is not yet completed	**Done.** The shortest path to finalisation of Quality System (including training for AIS Staff) is for States to engage expert training organisations and quality system implementation organisations to reengineer the AIS. Perhaps related to Item 1. States are encouraged to obtain quotes for this task and present the findings to chiefs of administration. A draft letter has been prepared ready for adaptation to suit local requirements and protocols.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 4, 5, 6, 14, 16, 18 & 20 and Information Papers 5 are relevant. Study Notes 16, 14, 20 (Common AIS Staff Profiling, CHAIN Solutions & Static Data Procedures) are immediately and highly relevant to AAITF. Consider for immediate adoption in Asia/Pacific Region. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**

Number	Task	2007/2008 Status	Carried Forward - 2009
5	Discover shortest path to finalisation of NOTAM/AIS Automation wherever that is not yet completed	**Done.** The shortest path to finalisation of Quality System (including training for AIS Staff) is for States to purchase equipment and implementation firms with demonstrated expertise in this domain. Perhaps related to Item 1. States are encouraged to obtain quotes for this task and present the findings to chiefs of administration. A draft letter has been prepared ready for adaptation to suit local requirements and protocols.	There are many commercial-off-the-self solutions available; and/or collaborative/cooperative ventures with other AISs. (e.g. Australia issues NOTAM on behalf of Timor).
6	Implement a quality improvement system to track and demonstrate improvement in rate of non-adherence to AIRAC.	**Pending:** With agreement from AAITF the Chairman intends to invite IATA to score occurrences of non-AIRAC performances to the Chairman for review and discussion at subsequent AAITF meetings. Alternatively, this could be managed by ICAO Regional Office and/or transmitted up through the ATM/AIS/SAR Sub-group and APANPIRG. A draft letter has been prepared for review by AITF/3.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 22 is immediately and highly relevant to AAITF. Consider for immediate adoption in Asia/Pacific Region. PTracker may offer significant benefit for the measurement of performance. **http://www.eurocontrol.int/aim/public/standard_page/ptracker.html** **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**

Number	Task	2007/2008 Status	Carried Forward - 2009
7	Broaden the opportunity for Asia/Pacific AIS to conduct peer reviews on their activities	**Done.** The opportunity to adopt a peer review could be enhanced by demonstration of its effectiveness. Perhaps related to Item 1. States are encouraged to obtain quotes for this task and present the findings to chiefs of administration. A draft letter has been prepared ready for adaptation to suit local requirements and protocols.	Largely covered off now by emerging SARPs – Item 4 above and AIS-AIMSG Study Notes refer.
8	Investigate and then replicate successful Eurocontrol KPIs and AIS checklist (as demonstrated to the 2002 Task Force)	**Not yet commenced.**	Largely covered off now by emerging SARPs – Item 4 above and AIS-AIMSG Study Notes refer.
9	Investigate opportunities for cooperative and collaborative approaches to AIS investments and functionalities	**Ongoing.** Airservices Australia is seeking expressions of interest to the AIS Automation industry for replacement of its AIS database and related system. Airservices welcomes other States to initiate enquires relating to cooperative or collaborative investments opportunities. The project is Project Mercury and further information can be obtained at http://www.airservicesaustralia.com/tenders/eoi_aim/default.asp	Airservices Australia is currently in procurement phase and consequently subject to probity protocols. More up-to-date information on Project Mercury is therefore not immediately available; however Airservices Australia remains a strong supporter of cooperative and collaborative approaches to AIS and AIM solutions.
10	Monitor Implementation Tasks associated with Electronic Terrain and Obstacle Data (eTOD)	**Ongoing.** Await deliberations from ICAO on revision to Annex 15.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 21 is relevant. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**

Number	Task	2007/2008 Status	Carried Forward - 2009
11	Monitor Implementation Tasks associated with Digital Aeronautical Charts	**Ongoing.** Await deliberations from ICAO on revision to Annex 15.	Papers presented at the December 2008 Study Group meeting in Montreal represents significant progress, and the eventual requirements for implementation will overtake in importance. Study Notes 21 is relevant. **http://www.icao.int/anb/AIM/SG/meetings/2008/AISAIMSG1/**

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Global AIM Congress – Singapore

17-19th June 2008

Congress Report

GLOBAL AIM CONGRESS – SINGAPORE
17-19TH JUNE 2008
CONGRESS REPORT

INTRODUCTION

The Global Aim Consortium[1]

The objective of the Consortium is to complement and support the work of ICAO by creating awareness, understanding and buy-in to ensure that global aeronautical information evolves in terms of scope, time and quality to meet the needs of users. The content of its work has evolved from the original focus on an "event"[2] to include discussions of more technical content thought to be of global concern including exchange models, terrain and obstacle data implementation and the adoption of enterprise architecture and their appropriateness for inclusion in public awareness. For instance Enterprise Architecture is a means to define the business model to describe the future nature and structure of the provision of aeronautical information services. The Consortium therefore serves as an excellent means for the exchange of project information and as a platform for discussion and as a unique (in the AIS world) window into the activities, challenges and operational culture differences of the diverse States represented and as such fills a no-cost void in the portfolio of awareness media.

The Singapore Global AIM Congress

The second Regional AIM Congress entitled "Quality AIM" was held in the Marina Mandarin Hotel Singapore on the 17-19th June 2008. The Congress was preceded by two parallel AIM oriented workshops and succeeded by an ad-hoc meeting of the Asia/Pacific AIS Task Force (AITF). All three events were sponsored by the Civil Aviation Authority of Singapore (CAAS) and the CAAS is to be congratulated on and thanked for its generosity and the excellence of the arrangements.

ATTENDEES

One hundred and ninety four persons from forty-six States, thirteen from the Asia-Pacific Region, attended the Congress. It should be noted that around two hundred and thirty people registered for the Congress resulting in a no-show rate of approximately fifteen percent which appears to be the norm. The Global AIM Consortium targeted a maximum of two hundred attendees with a realistic expectation of between one hundred and sixty to one hundred and eighty persons. The outcome was most pleasing and clearly demonstrates the global depth of interest in matters AIM.

The Global AIM Consortium is an informal group of States and Organisations dedicated to the propagation of the understanding, acceptance and implementation of Aeronautical Information Management (AIM). It is comprised of representatives from Australia, Canada, China, Japan, Singapore, South Africa, The Federal Aviation Administration and Eurocontrol. 2 The Global AIS Congress held in Madrid in June 2006.

The Congress was supported by an exhibition by industry. Eleven companies participated filling the available exhibition space. The Companies reported good business and it was evident that the exhibition was a most welcome accompaniment to the Congress.

The Congress was moderated by Mr. Bob Peake Special Advisor CNS/ATM Strategic Coordination Unit, Airservices Australia and a special thanks to his excellent service.

REPORT on CONGRESS

The Singapore AIM Congress was the second of three planned Regional Congresses designed to maintain the momentum achieved in Madrid in 2006. The aim of these for a is to ensure the evolution of AIM is a process which is inclusive to all AIM stakeholders rather than being an exclusive activity of a few. The Singapore Congress was targeted directly at the Asia/Pacific Region and it was most pleasing to note that thirteen States from the Region attended.

Agenda. From extensive feedback it was confirmed that the Agenda was well balanced, informative and interesting and that it met the expectations of the AIM community in full. A copy of the Agenda is available at: www.eurocontrol.int/aim

It was clear that much thought and effort had been put into the development of the presentations by the speakers. Whilst some were clearly designed to inform, others were more thought provoking. The material provided the source for many of the questions submitted to the Panel Debate. The speakers are to be congratulated on the excellence of their presentations and thanked for the time and effort they dedicated to the Congress.

Whilst it would be unfair to compare any presentation with another, it is reasonable to record that the presentations on Digital AIM, the Digital NOTAM projects, Enterprise Architecture, Performance-based Navigation (PBN) and the evolution of (Airbus) avionics clearly demonstrated the way ahead and that significant change is already happening and its pace accelerating. Clearly the AIS/AIM community must quickly adapt to the changing needs of its customers.

The presentations on the application of PBN in the Asia/Pacific Region and Area Navigation (RNAV) approaches in the Himalayas clearly demonstrated that the Region is engaged in the process of change and the call for a Regional aeronautical information database provided an excellent catalyst for debate.

It should be noted, however that the Congress was not solely devoted to technical developments as “institutional and training” issues were discussed. Presentations on the challenges facing those responsible for Regulating AIM and on the potential for competency qualifications through the introduction of requirements in the ICAO TRAINAIR programme were raised and resulted in Action Items to be undertaken ahead of the Congress planed for South Africa in 2009.

Panel Debate. In order to ensure fidelity to schedule and to overcome shyness insome, the Global AIM Consortium has adopted a policy of taking questions through a dedicated panel session, the questions being supplied in the first instance through the medium of pro forma. The one hour session was well serviced with questions across the broad range of material presented and resulted in a number of action items which are recorded towards the end of this report.

One question or concern of note was a fear that a two or more track process of change was being introduced with the less resource constrained States accelerating away from those of the emerging economies. The Chairman of the Global AIM Consortium responded. He stated that there was no ambition to create different standards for different States or parts of

the world indeed it was quite the reverse. The intention was to promote the establishment of a firm foundation of global Standards to ensure interoperability through the digital environment on which all States could build. Clearly some Regions such as Europe and States such as the USA had pressing problems in terms of capacity etc that needed to be addressed quickly by the development and application of technology based on these common global Standards. Where States were not faced with such problems, why should they be expected to invest in expensive systems when there was no business case to support the expenditure? The need to provide the medium to assist all States towards the digital environment was clearly recognised and that this was a role for ICAO supported by international organizations and others was clearly stated.

The role of the AIS-AIM Study Group brought welcome new focus on the progress of change. Nevertheless, the Chairman noted that ICAO had severe resource constraints, a consequence of which was the lack of an AIS officer in the Asia/Pacific Region and counselled all present to assist ICAO in any way they could. The Moderator urged Asia/Pacific States to contribute to and participate in the work of the Region's AIS Task Force which was to meet on the Friday through Sunday immediately following the Congress.

Presentations. All the presentations from the Congress and the Workshops are available at: www.eurocontrol.int/aim

Publicity material. As for previous Congresses, a Congress brochure complete with Agenda, Speakers notes and a short synopsis of their presentations had been produced by Eurocontrol. Though shipped by air courier five days before the Congress, the material was not available at the start of the Congress it having been delivered to San Francisco. It is regretted that the courier failed to deliver the material to the Congress at all and it is to be returned to Eurocontrol from where it will be posted to the Congress delegates at the Courier's expense.

(Note: the brochures arrived in Eurocontrol on 2nd July and are now in the process of being prepared for postal distribution).

The Congress logo was warmly praised. It carried on the theme of global encirclement to represent the bringing together of the AIM community first used in Brussels in 2007 with the circle adjusted to the equator to reflect Singapore.

REPORT on WORKSHOPS

The two workshop streams, Management and Technical were very well received and at the request of the Raporteur of the AITF the presentation on Terrain and Obstacle data (TOD) was repeated for the AITF. The workshop streams were not themed but were designed to be tutorials to amplify key elements of AIM to a level of detail not available through the medium of presentation to Congress. The success of these workshops was such that the concept will be carried through to the Global AIM Congress 2009 scheduled for South Africa. Of a less pleasing note was that though the workshop streams were limited to forty attendees, the capacity of the two training rooms, and were oversubscribed, each was attended by approximately thirty persons. The registration and no show deprived others who clearly would have attended if the places had been available.

FURTHER AIM EVENTS

The Board of ATNS, South Africa approved the hosting of the Global AIM Congress on 26th June 2008. It is provisionally scheduled for 23-25th June 2009 in Johannesburg, South Africa. The probable location should be available after the next meeting of the Global AIM Consortium in late October 2008 and will be then posted on the Eurocontrol website and publicised by all media available including AIS AGORA forum.

A register of interest will be opened in early July and industry in particular is requested to make use of this service to help ATNS in their organisational tasks.

It should be noted that it is presently intended to hold a Global AIM Congress similar in style to Madrid during June 2010 and the ATMB, CAAC have indicated that they would be pleased to host the event in Beijing.

In addition ICAO is considering holding an AIM Divisional meeting in 2013. The AIM Divisional meeting is likely to be held in conjunction with one for Aviation Meteorology with integrated plenary sessions to reinforce the broad scope of AIM.

CONCLUSIONS

The aims of the Congress were to inform and involve the Asia/Pacific Region in the evolution of the concept of AIM and to act as the catalyst for change. From the strong feedback received it is clear that the Congress achieved this objective.

The global AIM community was well represented with forty-six States present. One pleasing feature noted was at the start of the Congress people were standing by themselves of in small familiar groups. At the end of the Congress the barriers appeared to be down and the majority appeared to be intermingling, a most pleasing outcome.

The scope and pace of change has clearly accelerated since Brussels and more so since Madrid. Developments in digital AIM, in avionics, in training and in other domains all need to be reflected on the global scene. The Congress was not designed to make recommendations but it was abundantly clear that the community must be proactive in evolving AIM to ensure that aeronautical information provision can satisfy the needs of Air Traffic Management in a timely way.

Industry and the AIM community must increase their cooperation and work together to identify and then satisfy the needs of information provision. A need reflected in the Airbus presentation. And those responsible for Regulation must become more involved in the domain which they regulated which is not the case today.

As in previous Congresses, the role of ICAO was clearly recognised and supported. It is clear that all stakeholders are looking to Montreal for guidance and leadership and the work of the AIS-MAP Study Group will do much to provide this lead. The Congress clearly recognised that through the medium of the Study Group, events such as the Congresses, through the work of international organisations, service providers and the gamut of industrial activity the AIM community can agree and implement change.

That the Singapore Global AIM Congress was an undoubted success is assured from the feedback received. The success was due to many factors not least to the generosity, hospitality and efficiency of the CAAS and its dedicated staff, it is impossible to thank them enough.

ACTIONS

Action 1: Report: Raporteur Global AIM Consortium to write a Report on the Singapore Global AIM Congress, to publish the report on the Eurocontrol AIM web site, and to submit the Report to ICAO, Montreal and to the ICAO Asia/Pacific Regional Office in Bangkok for information.

Action 2: Enterprise Architecture:

A2.1. Airservices Australia, FAA supported by Eurocontrol to continue develop the concept of Enterprise Architecture within the context of AIM and to include further discussion during the AIM Consortium meeting in October.

A2.2. The Consortium to develop a “strawman” outline to indicate how ICAO Doc.8126 could be amended to reflect AIM for presentation to a workshop dedicated to the concept to be held on the Monday immediately preceding the Global AIM Congress planned for South Africa in 2009.

Action 3: Training: ATNS South Africa in conjunction with the Raporteur Global AIM Consortium develop contents/material for a Training and Skills workshop to be held on the Monday immediately preceding the Global AIM Congress planned for South Africa in 2009 in parallel to the EA Workshop. Consideration shall be given to:

- Amendment to ICAO Doc.8126:
- The means to include such material in the ICAO TRAINAIR programme.

Action 4: Regulation: ATNS South Africa, UK CAA and the Raporteur Global AIM Consortium to develop the Regulatory aspects of AIM for discussion in South Africa either as a Congress item or through a dedicated parallel forum.

Action 5: EUROCAE to make available web site address for WG76 – AIS/MET Data Link activities.

Ken REID
For the Global AIM Consortium

ADENDUM

Please note that some members of the AIM Community took the opportunity to discuss and agree the creation of an International Federation for AIM. The Moderator was pleased to read out a message from the Group to the Congress which read as follows:*"We are happy to announce that during the progress of this Congress, 22 persons representing 37 countries, came to a decision to sign the Convention for the creation of the "International Federation of AIM Associations" (IFAIMA) with the general objective of "to cooperate with each other and with organisations (e.g. ICAO, Eurocontrol….), which have under consideration matters associated with Air Navigation and in particular Aeronautical Information Management and Aeronautical communications. We look forward to the participation of most of the countries associations globalwide. For more information, IFAIMA Blog will be updated with the last developments within the next couple of weeks on IFAIMA. BLOGSPOT.COM or by mail: IFAIMA@GMAIL.COM"*

AAITF/4
Appendix H to the Report

EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

xNOTAM Trial 2008 - Report

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Abstract

This document contains a short summary of the xNOTAM Trial executed in 2008 by EUROCONTROL with participation of NOTAM offices (test data providers) and commercial companies and data integrators (test data users).

A large part of this document has been derived from the Report provided by Pulsar Consulting, who have developed and hosted the xNOTAM Trial System for EUROCONTROL.

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AIXM

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1 Introduction

1.1 AIXM version 5

The Aeronautical Information Exchange Model (AIXM) version 5 has been developed as the data encoding specification that will support the current and future ATM needs for digital aeronautical information. One of the major AIXM 5.0 design aspects is an exhaustive temporal model, at feature level, able to describe both the permanent and the temporary status of a feature's properties.

The AIXM 5.0 version has been released in March 2008 (www.aixm.aero), result of a common effort of EUROCONTROL and the United States Federal Aviation Administration, supported by the international AIS community. The AIXM 5.0 deliverables include the following:

- A core conceptual model, which describes the aeronautical information features and their properties, associations, lists of values and business rules in the form of a UML class model.
- A Temporality Concept, which defines a model for capturing the evolution of the properties of an aeronautical information feature, from the start of its life until its permanent withdrawal. In particular, this model enables the provision of digital NOTAM.
- An Application Schema Specification document, which defines the procedures to be followed by a group of stakeholders in order to define a dedicated XML encoding format for a specific application, using the pool of UML classes defined in AIXM.
- A set of XML files that implement all the classes defined in the AIXM UML model.
- Additional documentation that explains the model and its intended usage.

An updated AIXM version (5.1) is expected to be published in 2009, correcting the few model deficiencies and providing clarifications for usage aspects of the model, as identified during the current validation and trial activities.

1.2 Digital NOTAM Concept

A "digital NOTAM" is a data set that contains in a structured format the information currently distributed by text NOTAM messages. A digital NOTAM (xNOTAM) can be fully interpreted by an automated system without human interpretation.

xNOTAM is not a simple conversion of the current message into a new, more structured format. It is a radical change, by which the information updates (both temporary and permanent) are merged with the information of longer duration, using the same data structures and distribution channels.

The digital NOTAM concept is an investment in the future, but with immediate practical benefits for the end users. It will bring new value to developments made in recent years, such as the European AIS Database (EAD). xNOTAM can accommodate legacy system and will improve the quality of the information provided to end users, in both traditional text NOTAM and digital NOTAM formats.

In order to prove that digital NOTAM area feasible, a large scale xNOTAM Trial was organised by EUROCONTROL in 2008, involving test data providers from NOTAM offices in Europe and from other States world-wide. This document contains information about the trial architecture, participants and results.

At the time when this document was released, the analysis of the lessons learned from the Trial was not yet finalised. Therefore, that "Conclusion" chapter shall be considered as "draft".

2 Trial Overview

The aim of the xNOTAM trial was to demonstrate the maturity of the "digital NOTAM" concept. By digital NOTAM we mean a fully data modelled NOTAM, where all information is stored in a computer model that can be interpreted by computers. Basically, a digital NOTAM eliminates the free form text contained within a NOTAM and replaces the text with a series of structured facts about the affected aeronautical facility concerned.

2.1 Objectives

The main objectives of this xNOTAM trial were:

- to validate the applicability of the AIXM 5 timeslice model to managing permanent and temporary changes in a database;
- to validate the applicability of the AIXM 5 timeslice model to communicating permanent and temporary changes to digital NOTAM users;
- to check the completeness of pre-selected AIXM 5 feature definitions (properties and domains of values) against real world NOTAM information requirements;
- to involve AIS Offices from ECAC State as test digital NOTAM data providers;
- to help evaluating the operational impact of an xNOTAM implementation on the way of working of AIS organisations and downstream data users;
- to identify potential digital NOTAM users and applications that could benefit on short and medium term from the implementation of the digital NOTAM concept in ECAC;
- to identify additional risks associated with the digital NOTAM concept;
- to identify technologies and software able to support the digital NOTAM concept;
- to provide performance measures for digital NOTAM dissemination;
- to identify essential bottlenecks that could prevent early adoption of digital NOTAM (for example required bandwidth, unique feature identification, security) and which in turn might need pan-European or global implementation efforts to be undertaken such as for instance in the context of SESAR;
- to show that digital NOTAM can improve safety.

2.2 Scenario and architecture

In order to achieve these objectives, a trial scenario has been designed, with the following key steps:

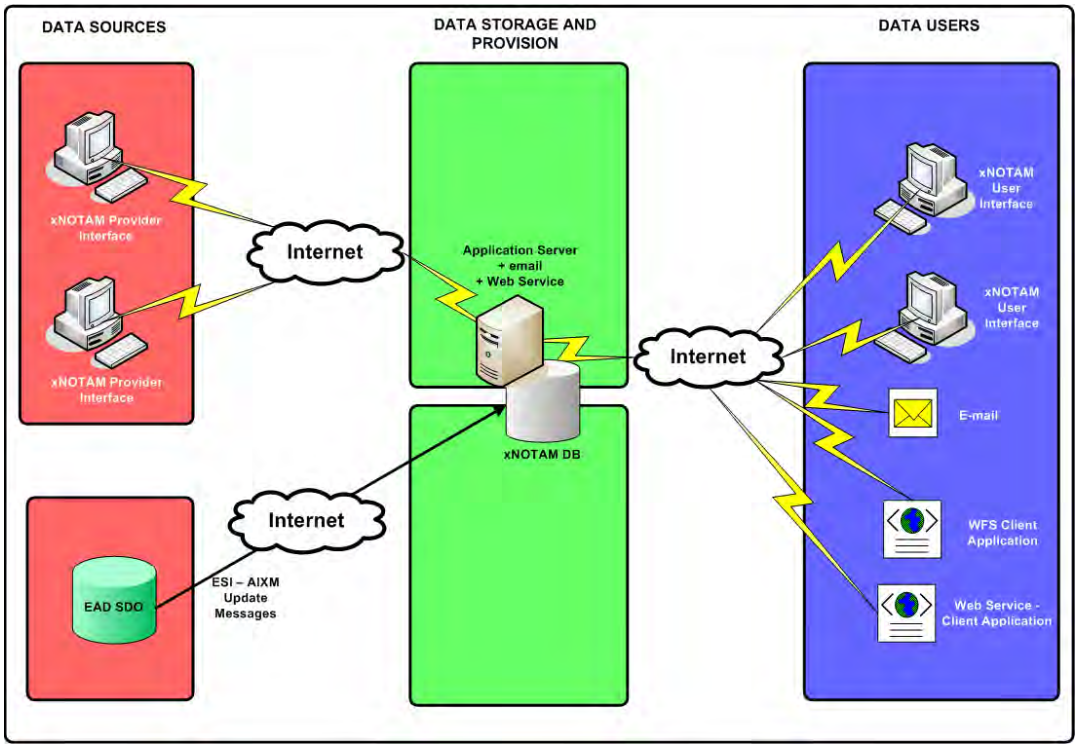
- Design and implement a test xNOTAM database
  - based on the conceptual (UML) model contained in the AIXM version 5 Release Candidate 2
  - for a number of key aeronautical features (airspace, routes, navaids, points, airports, runways, taxiways)
  - fed with baseline data from the EAD Static Database (SDO), using AIXM 4.5 messages
- Design and implement a test xNOTAM Provider Interface that provides test digital NOTAM providers with the means:
  - to maintain a list of real world NOTAM issued by their organisation, that are candidate for being encoded as digital NOTAM
  - to encode the content of selected real world NOTAM, as temporary/permanent changes, according to the AIXM 5 timeslice model
- Design and implement a test xNOTAM User Interface that enables test data users:

- to query the database using a Web interface and to receive the result in the form of an AIXM 5 feature collection, containing baselines and temporary/permanent information about selected features, for a specified geographical area and a specified time range
- to query and receive the current status of a feature via a Web Service or Web feed
- to subscribe for automatically receive ("push" via e-mail) AIXM 5 messages containing baselines and temporary/permanent change notifications, encoded as AIXM 5 timeslices

Note: e-mail delivery should be seen as an ad-hoc solution, for trial purpose only. It is considered not suitable for real operations. It was included here in order to offer a low cost delivery channel for potential trial participants who do not want to invest in a more sophisticated connectivity.

- Run the xNOTAM trial:
  - involving test data providers from ECAC member States and test data users
  - provide a report of the trial, including lessons learned and an archive of all the test data (AIXM timeslices) created during the trial period
  - issue recommendations for the eventual improvement of AIXM 5 Specification.

The Application used during the Trial has been developed and hosted for the duration of the Trial by Pulsar Consulting, working under contract for the Agency. Below is a diagram that depicts the main components of this application.



The database has implemented a part of AIXM 5 Release, which supports the encoding of the data and events (NOTAM) about the following features:

- Airspace, AirspaceUsage;
- RouteSegment, RoutePortionUsage, Significant Points (Navaid and Designated Points);
- Aerodrome, Aerodrome Surfaces Usage, Runway, RunwayDirection, Taxiway;
- Obstacles;
- Notes.

2.3 Participants

The most impoartant element of the Trial was participation of NOTAM Offices from many States as test data providers and of commercial companies and data integrators as test data users.

Originally, the Trial has been planned to take place in a single session, between March and July 2008. However, because of the interest triggered by the Trial in some States that could not participate at that time, a second session is being organized in October-November 2008.

NOTAM/AIS offices from the following States have participated as Test Data Providers in the two sessions

Session 1	***Session 2***
Belgium	Australia
Czech Republic	Bahrain
Egypt	Egypt
France	France
Iceland	Germany
Netherlands Military	Hungary
Poland	Jordan
Romania	Italy
Serbia and Montenegro	Latvia
Slovenia	Malta
South Africa	Netherlands (civil and military)
Spain	Singapore
Switzerland	Slovak Republic
United States Air Force (USAF)	Turkey

The xNOTAM encodings (AIXM 5) produced during the Trial have been made available to the following Organisations acting as test users:

- AENA
- Comsoft
- Frequentis
- GWDI
- IDS-SPA
- Jeppesen
- Luciad
- SkyJob EFB
- TheNetFirm
- EAG
- NLR
- BBN
- SafeSoftware
- NOTAM Check
- NOTAM Plot
- TU Darmstadt
- Qinetiq
- etc.

3 Workflow

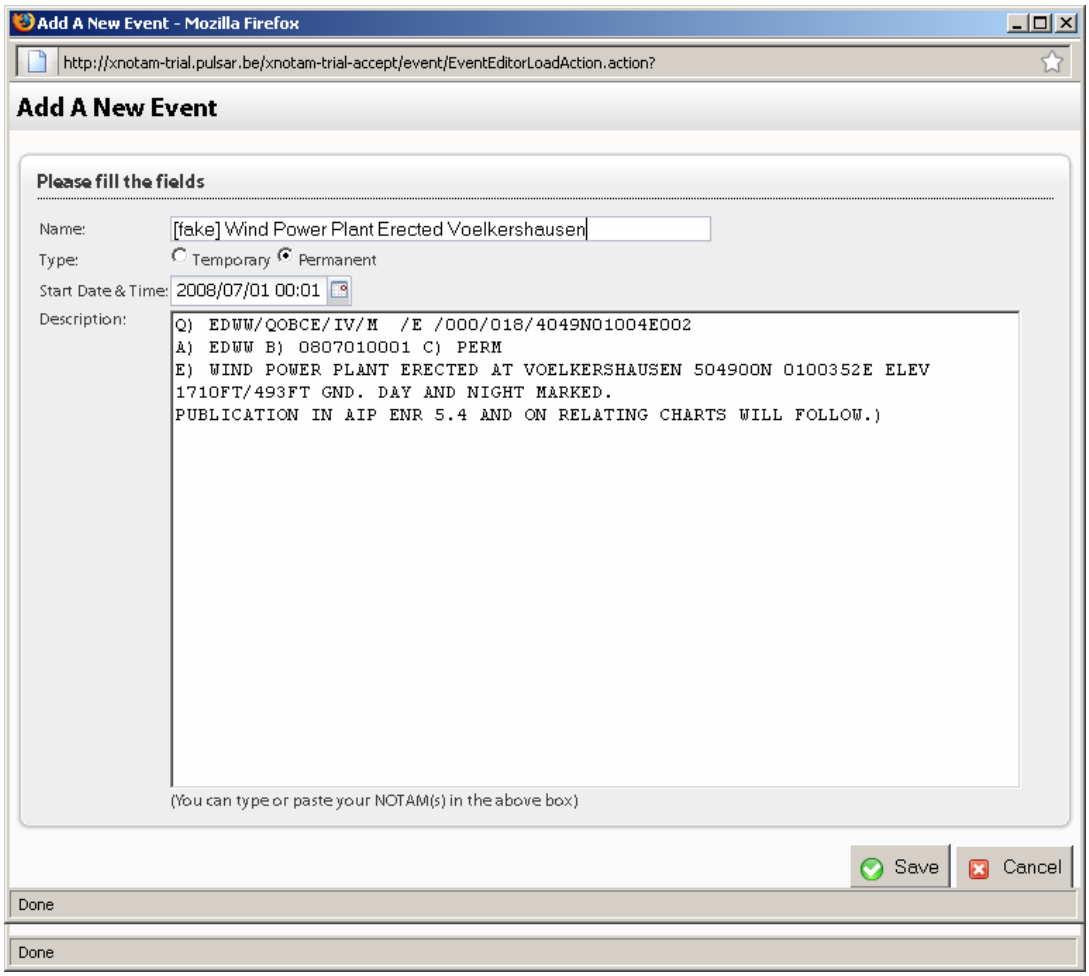
The workflow in the Trial has been reversed as compared to the workflow of a real digital NOTAM application. In a real (future) system, once an aeronautical information Event (such as “navaid unserviceable”) occurred, the first step is to record the information in the aeronautical information database. From that, the system shall automatically generate a digital NOTAM (AIXM 5) and a text NOTAM proposal (for as long as operationally necessary). However, this was not possible during the Trial, one side because it was not in the scope of the Trial to produce NOTAM text and on the other side because the Trial was not meant to interfere with the NOTAM issuing duties of the participants.

Therefore, a reversed workflow has been put in place, by which the text of the real world NOTAM has been used as the event description and encoded in the application as digital NOTAM. Below is an example, step by step, of the encoding of such an event. Numerous other examples are available in the xNOTAM Wiki[1], which has been used as a manual for the participants in the Trial.

3.1 Encoding example

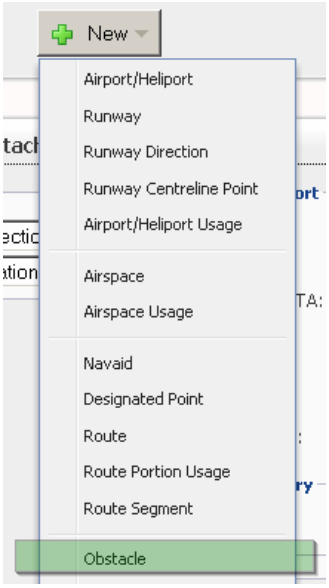
NOTAM example

```
Q) EDWW/QOBCE/IV/M  /E /000/018/4049N01004E002
A) EDWW B) 0807010001 C) PERM
E) WIND POWER PLANT ERECTED AT VOELKERSHAUSEN 504900N 0100352E ELEV
1710FT/493FT GND. DAY AND NIGHT MARKED.
PUBLICATION IN AIP ENR 5.4 AND ON RELATING CHARTS WILL FOLLOW.)
```

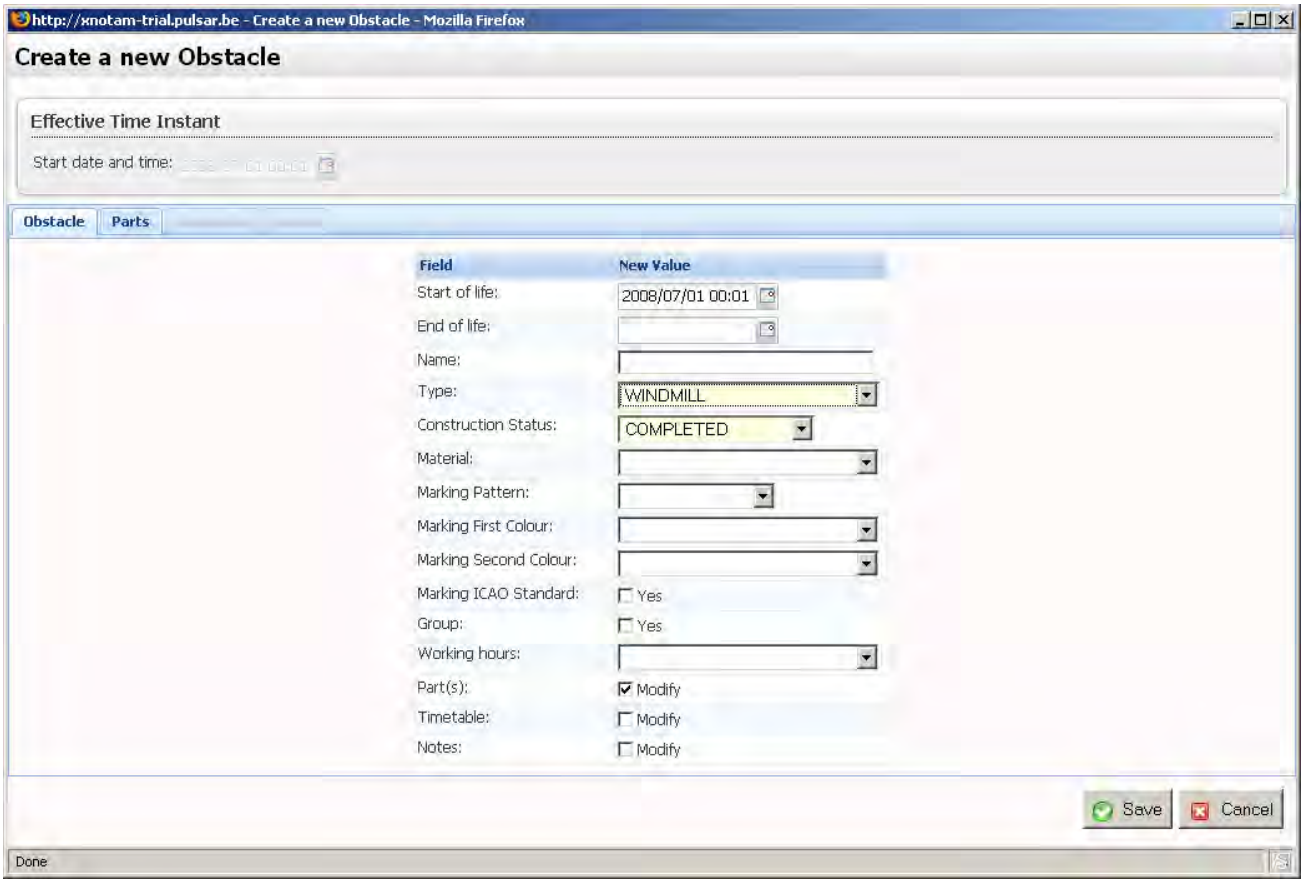


[1] http://wiki.pulsar.be/xnotam-wiki/index.php/Main_Page

- Process the Event by adding a new Obstacle. As it is a new obstacle, the feature becomes attached to the Event.

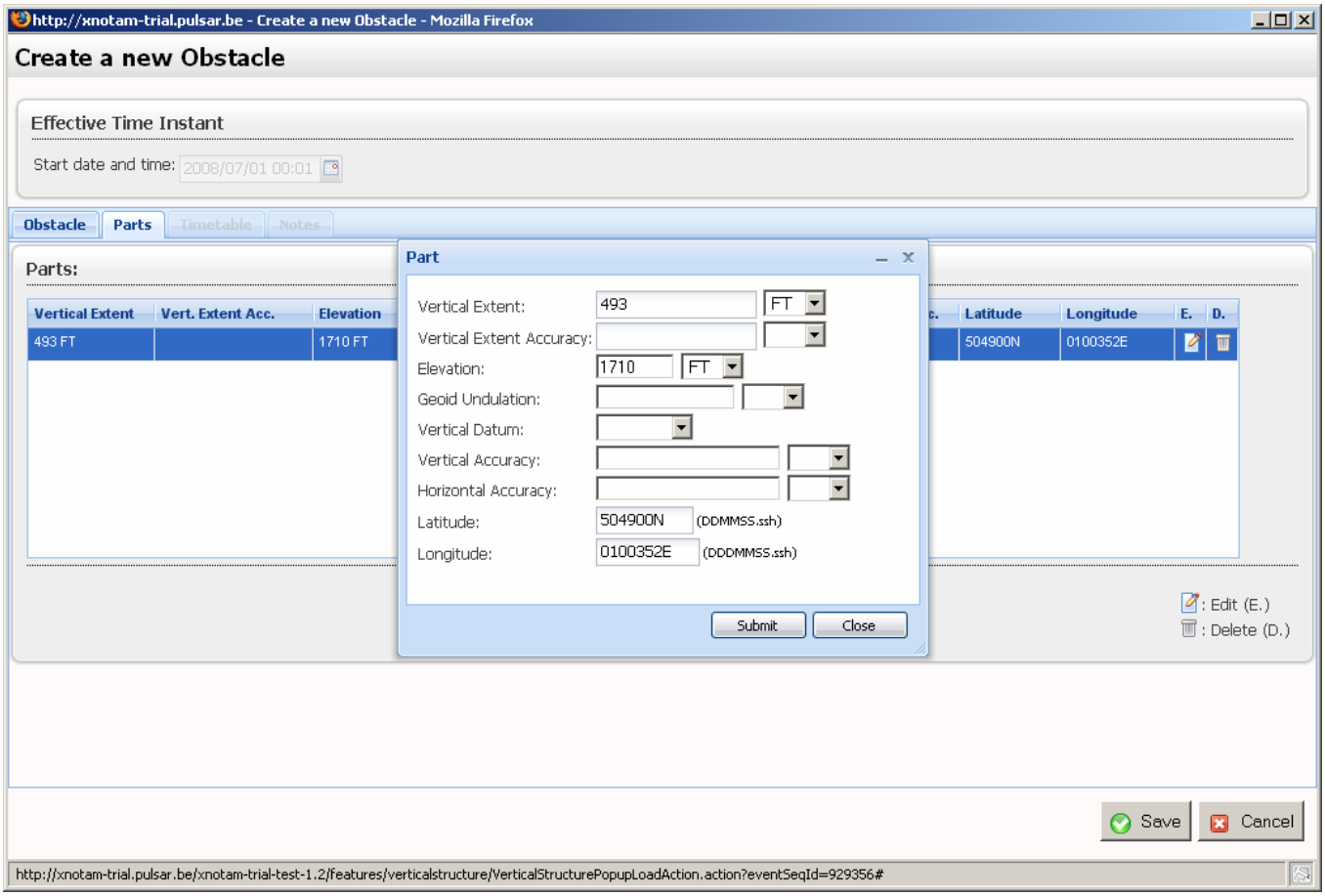


- Add the details to the timeslice.



This highlights a few issues. The example interprets the 'WIND POWER PLANT' as a 'WINDMILL' in AIXM 5.0. It might well have been a 'WINDMILL_FARM' or indeed a 'POWERPLANT'. More details and a more exact definition are required than is given in the NOTAM. The fact that is 'DAY AND NIGHT MARKED' is also a bit unclear, as it does not clearly indicate if the day marking is 'lighting' or just color marking (painting) . Therefore, the example does not record anything about the marking.

- The example assumes the Obstacle is made up of only one structure. Its elevation and height ("Vertical Extent") are entered as well as its coordinates.



- Commit the Event

3.2 AIXM 5 output

After the commit of the Event, the data is stored in the database and an AIXM 5 encoding is output, which is the “raw view” of the digital NOTAM. Note that the XML encoding below corresponds to a slightly different NOTAM Event than the one used in the screenshots above.

```
<?xml version="1.0" encoding="UTF-8"?>
<dnotam:Event xmlns:dnotam="http://www.aixm.aero/schema/5.0/RC2-xNOTAM/dnotam"
xmlns:aixm="http://www.aixm.aero/schema/5.0/RC2-xNOTAM" xmlns:fua="http://www.aixm.aero/schema/5.0/RC2-
xNOTAM/extensions/eur/fua" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.aixm.aero/schema/5.0/RC2-
xNOTAM/dnotam http://www.aixm.aero/schema/5.0/RC2-xNOTAM/dnotam/Digital_NOTAM_Event.xsd
http://www.aixm.aero/schema/5.0/RC2-xNOTAM/extensions/eur/fua http://www.aixm.aero/schema/5.0/RC2-
xNOTAM/extensions/eur/fua/FUA_Features.xsd" gml:id="Event-0003">
    <dnotam:name>[f5087/08] wind power plant</dnotam:name>
    <dnotam:description>(F5087/08 NOTAMN
Q)EDWW/QOBCE/IV/M/E/000/010/5239N00846E005
A)EDWW B)0810311001 C)PERM
E)WIND POWER PLANT ERECTED AT BARENBURG 523825N 0084627E, ELEV
753FT/589FT GND. DAY AND NIGHT MARKED. PUBLICATION IN AIP ENR
5.4 AND ON RELATING CHART WILL FOLLOW</dnotam:description>
    <dnotam:type>PERMANENT</dnotam:type>
    <dnotam:hasMember>
        <aixm:VerticalStructure gml:id="VID2611146">
            <gml:identifier codeSpace="http://www.eurocontrol.int/xnotam">b8359f03-65aa-4af5-92e2-5e4d18a6d56e</gml:identifier>
```

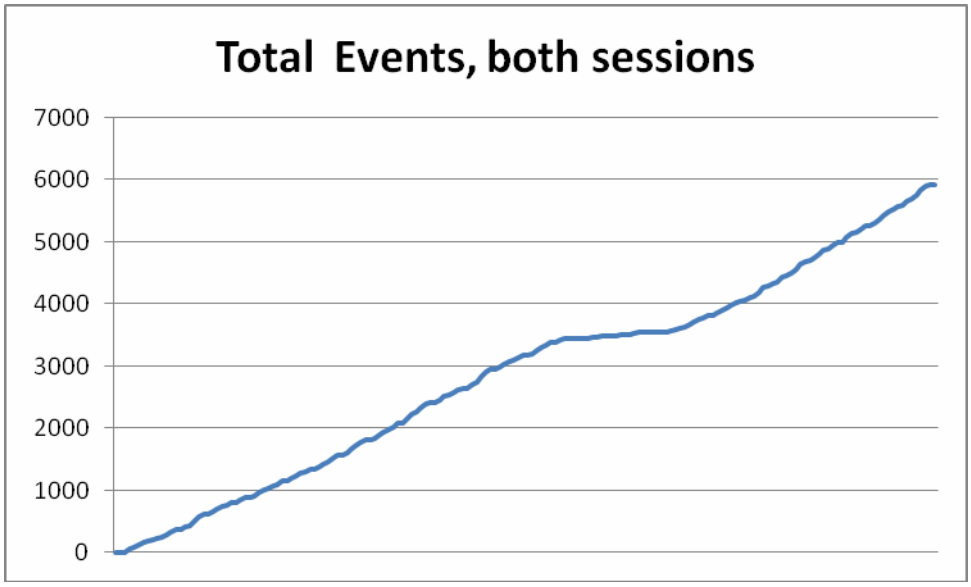
```
        <aixm:timeSlice>
            <aixm:VerticalStructureTimeSlice gml:id="VID2611147">
                <gml:validTime>
                    <gml:TimeInstant gml:id="VID000001">
                        <gml:timePosition>2008-10-31T10:01:00</gml:timePosition>
                    </gml:TimeInstant>
                </gml:validTime>
                <aixm:interpretation>PERMDELTA</aixm:interpretation>
                <aixm:sequenceNumber>1</aixm:sequenceNumber>
                <aixm:correctionNumber>0</aixm:correctionNumber>
                <aixm:featureLifetime>
                    <gml:TimePeriod gml:id="VID000002">
                        <gml:beginPosition>2008-10-31T10:01:00</gml:beginPosition>
                        <gml:endPosition/>
                    </gml:TimePeriod>
                </aixm:featureLifetime>
                <aixm:name>BARENBURG</aixm:name>
                <aixm:type>WINDMILL</aixm:type>
                <aixm:constructionStatus>COMPLETED</aixm:constructionStatus>
                <aixm:material>CONC</aixm:material>
                <aixm:markingICAOStandard>YES</aixm:markingICAOStandard>
                <aixm:isMadeOf>
                    <aixm:VerticalStructurePart>
                        <aixm:verticalExtent uom="FT">589</aixm:verticalExtent>
                        <aixm:hasPointShape>
                            <aixm:ElevatedPoint gml:id="VID000005" srsName="urn:x-ogc:def:crs:OGC:1.3:CRS84"
srsDimension="2">
                                <gml:coordinates>8.77416666666667,52.6402777777778 </gml:coordinates>
                                <aixm:elevation uom="FT">753</aixm:elevation>
                            </aixm:ElevatedPoint>
                        </aixm:hasPointShape>
                    </aixm:VerticalStructurePart>
                </aixm:isMadeOf>
                <aixm:hasAnnotations>
                    <aixm:Note>
                        <aixm:propertyName>Part(s)</aixm:propertyName>
                        <aixm:isWrittenAs>
                            <aixm:LinguisticNote>
                                <aixm:note lang="ENG">PUBLICATION IN AIP ENR
5.4 AND ON RELATING CHART WILL FOLLOW</aixm:note>
                            </aixm:LinguisticNote>
                        </aixm:isWrittenAs>
                    </aixm:Note>
                </aixm:hasAnnotations>
            </aixm:VerticalStructureTimeSlice>
        </aixm:timeSlice>
        <aixm:timeSlice>
            <aixm:VerticalStructureTimeSlice gml:id="VID2611154">
                <gml:validTime>
                    <gml:TimePeriod gml:id="VID000003">
                        <gml:beginPosition>2008-10-31T10:01:00</gml:beginPosition>
                        <gml:endPosition/>
                    </gml:TimePeriod>
                </gml:validTime>
                <aixm:interpretation>BASELINE</aixm:interpretation>
                <aixm:sequenceNumber>1</aixm:sequenceNumber>
                <aixm:correctionNumber>0</aixm:correctionNumber>
                <aixm:featureLifetime>
                    <gml:TimePeriod gml:id="VID000004">
                        <gml:beginPosition>2008-10-31T10:01:00</gml:beginPosition>
                        <gml:endPosition/>
                    </gml:TimePeriod>
                </aixm:featureLifetime>
                <aixm:name>BARENBURG</aixm:name>
                <aixm:type>WINDMILL</aixm:type>
                <aixm:constructionStatus>COMPLETED</aixm:constructionStatus>
                <aixm:material>CONC</aixm:material>
                <aixm:markingICAOStandard>YES</aixm:markingICAOStandard>
                <aixm:isMadeOf>
```

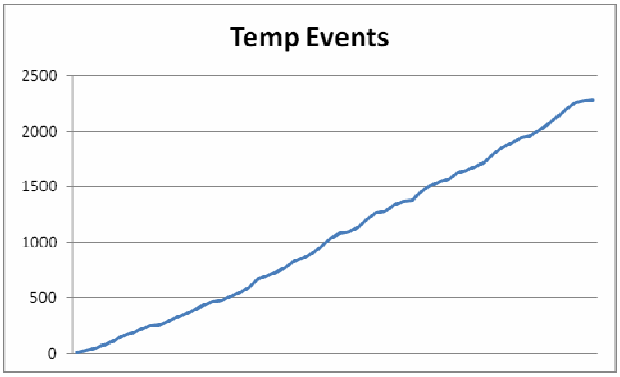
```
                    <aixm:VerticalStructurePart>
                        <aixm:verticalExtent uom="FT">589</aixm:verticalExtent>
                        <aixm:hasPointShape>
                            <aixm:ElevatedPoint gml:id="VID000006" srsName="urn:x-ogc:def:crs:OGC:1.3:CRS84"
srsDimension="2">
                                <gml:coordinates>8.77416666666667,52.6402777777778 </gml:coordinates>
                                <aixm:elevation uom="FT">753</aixm:elevation>
                            </aixm:ElevatedPoint>
                        </aixm:hasPointShape>
                    </aixm:VerticalStructurePart>
                </aixm:isMadeOf>
                <aixm:hasAnnotations>
                    <aixm:Note>
                        <aixm:propertyName>Part(s)</aixm:propertyName>
                        <aixm:isWrittenAs>
                            <aixm:LinguisticNote>
                                <aixm:note lang="ENG">PUBLICATION IN AlP ENR
5.4 AND ON RELATING CHART WILL FOLLOW</aixm:note>
                            </aixm:LinguisticNote>
                        </aixm:isWrittenAs>
                    </aixm:Note>
                </aixm:hasAnnotations>
            </aixm:VerticalStructureTimeSlice>
        </aixm:timeSlice>
    </aixm:VerticalStructure>
  </dnotam:hasMember>
</dnotam:Event>
```

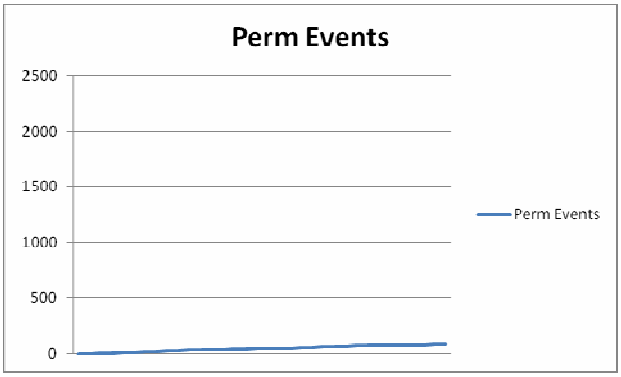
4 Usage statistics

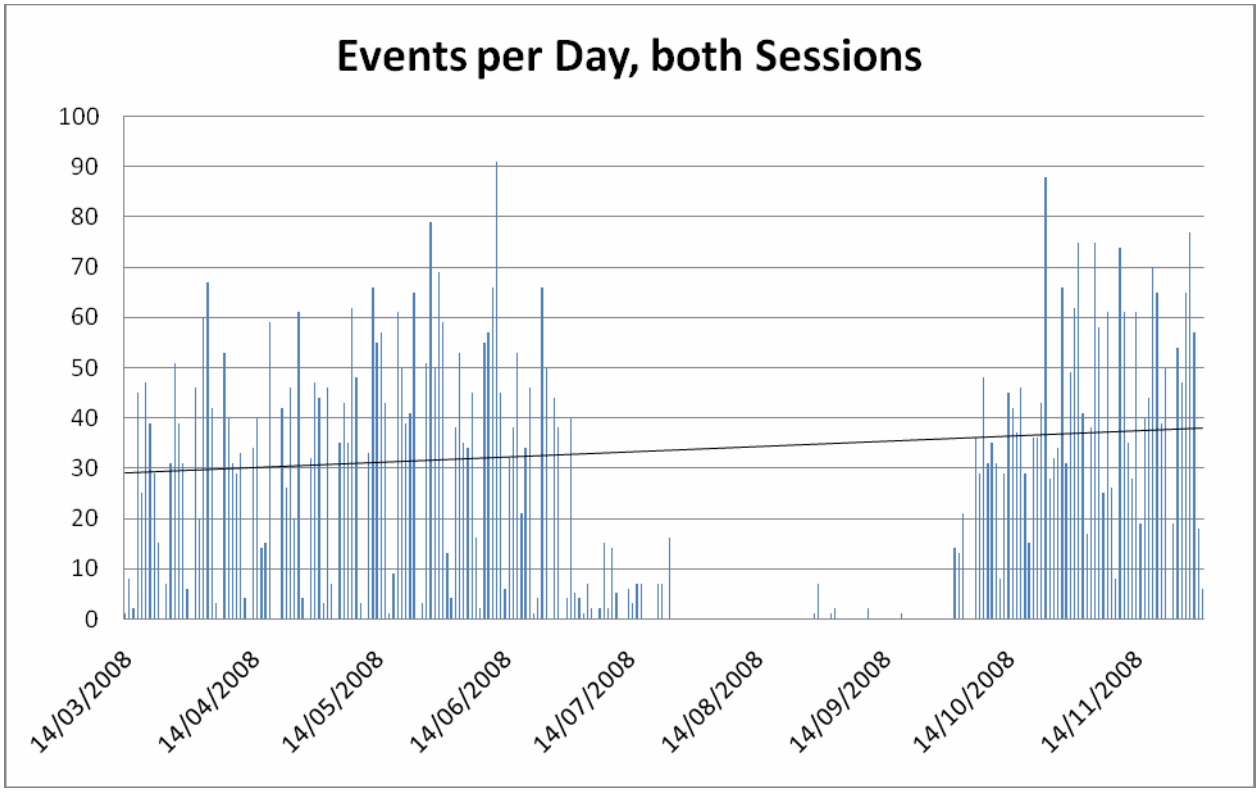
4.1 Providers Activity

A total of **5587** events have been created during the Trial.

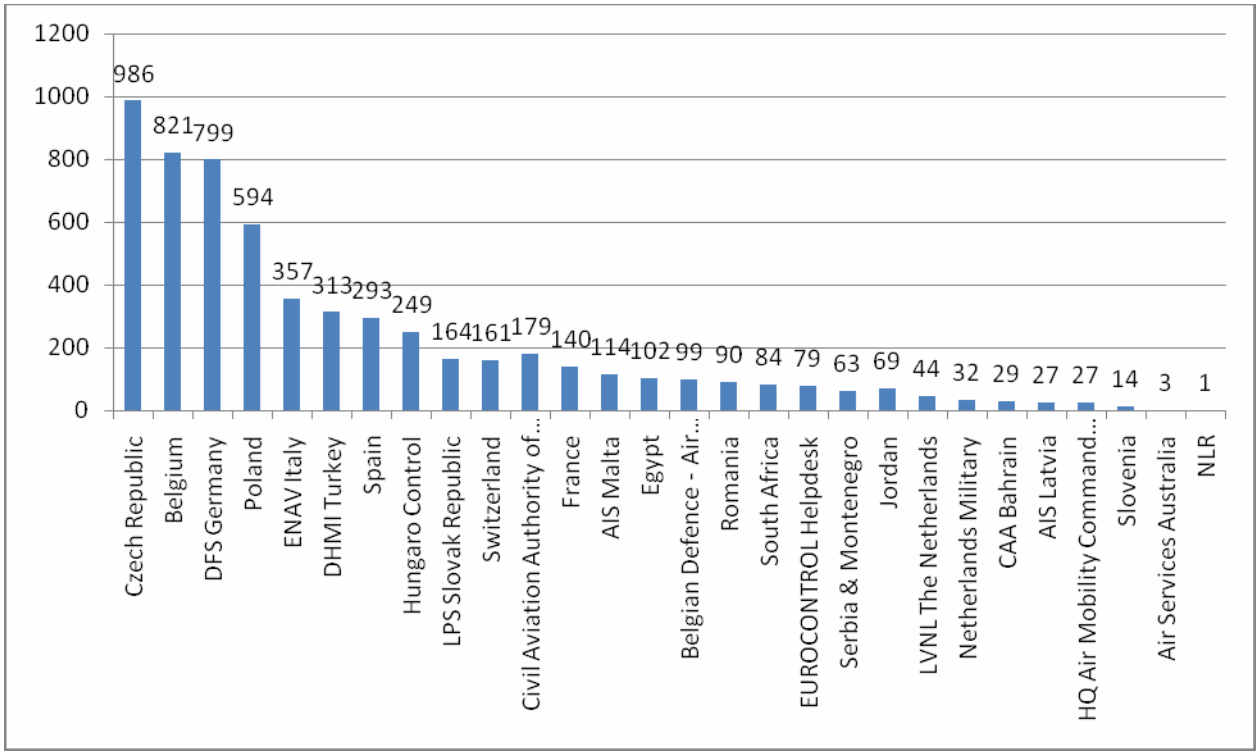




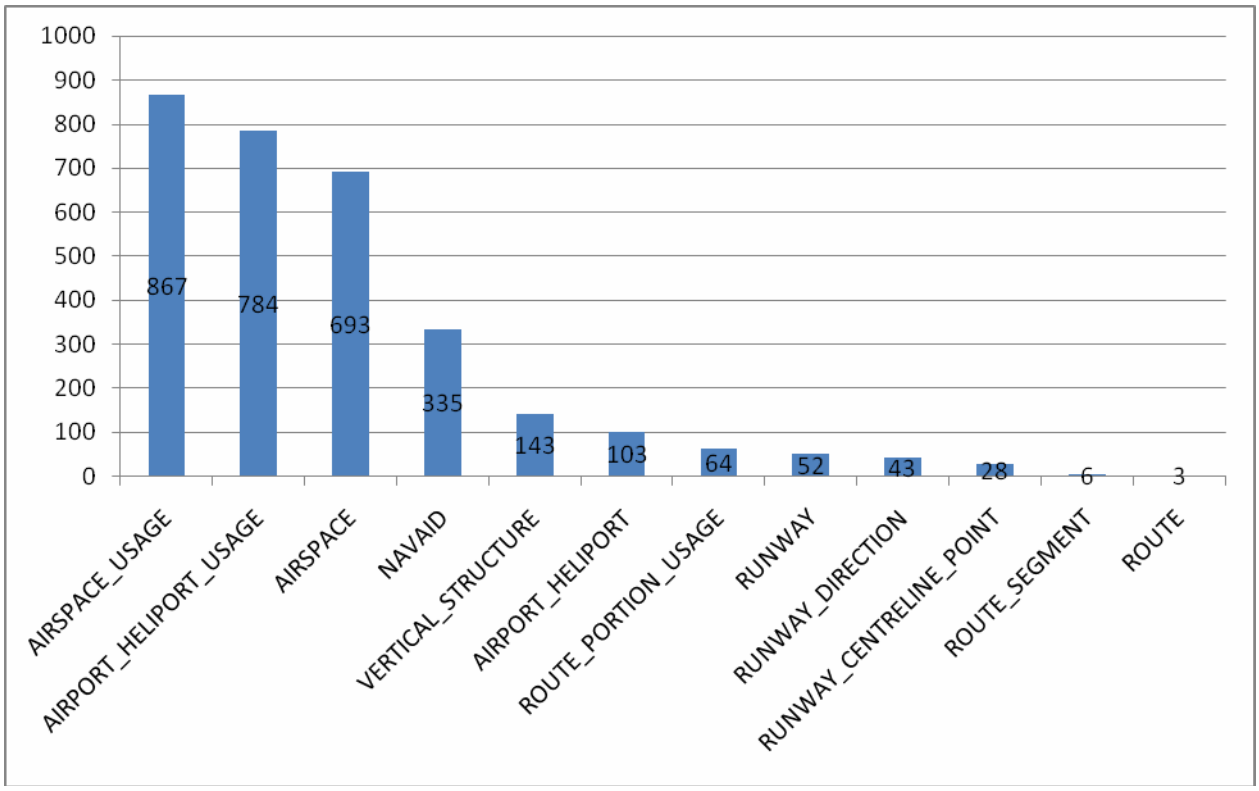




4.1.1 Events per organization

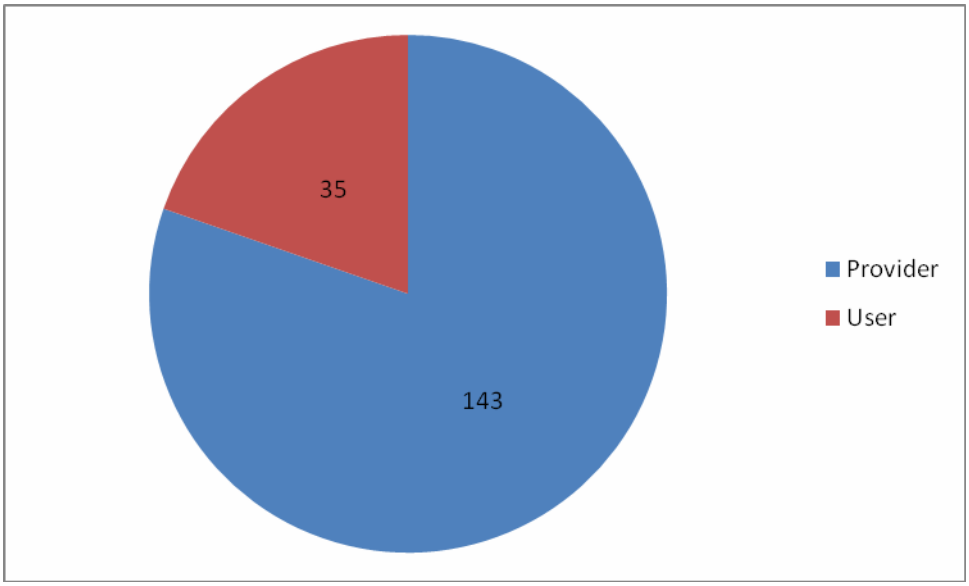


4.1.2 Types of features used in events (session 2 only)



4.2 Application Usage Statistics

In total, 178 Operators participated in the xNOTAM Trial. The overall distribution between Data Users and Providers, for both sessions is as follows:



- **Generated AIXM5 XML Files**: 35.600

Those are AIXM5 files generated by the Notification system and by the reporting functionalities;

- **Database size**: 30GB (physical database file on server, compressed).

  The Oracle Spatial geometries take a lot of place. For example: airspaces may be defined by a lot of points (because arcs and circles are converted into segments by Oracle, a circular airspace above Brussels may contain more than 3000 segments).

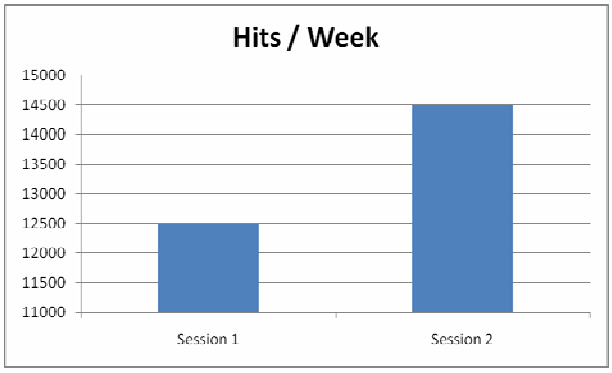
  For performance reasons and to resolve some compatibility issues, each time a geometry is updated in the database, its corresponding GML is pre-generated too, which takes even more place than the geometry itself (as an XML 'dialect', GML is much more verbose).

  To ensure best performances for reporting and download functionalities, the corresponding Events AIXM5 XML has been pre-generated (cached); this represents a total of 38GB of data (18GB during Session 1 and 20GB during Session 2).

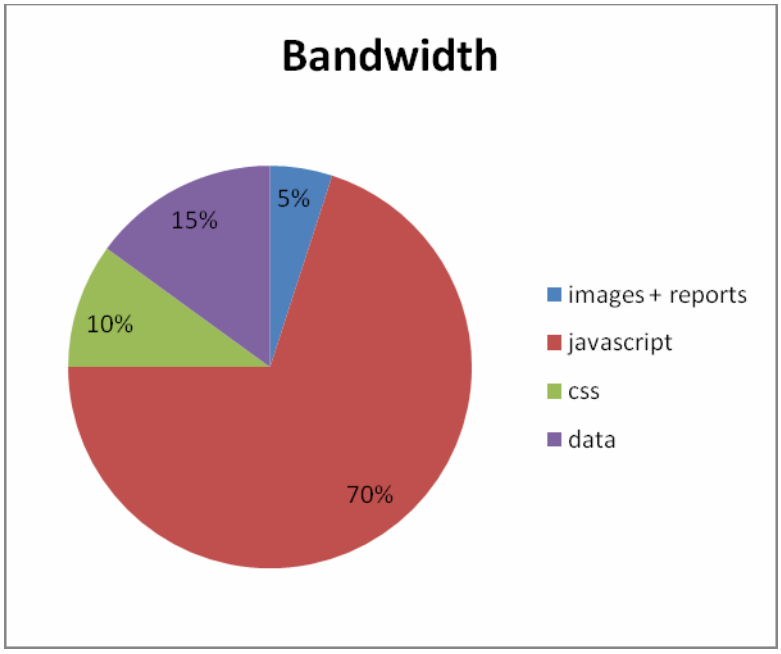
  We have also developed an AIXM5 XML cache at the timeslice level for the Reporting Type 3 (Features) functionality, added in Session 2. This represents also 20GB of data. In fact, it contains the same information as the Event cache described above, but organized differently.

  Note that those are uncompressed values, which explains why the physical database file is smaller on the server disk.

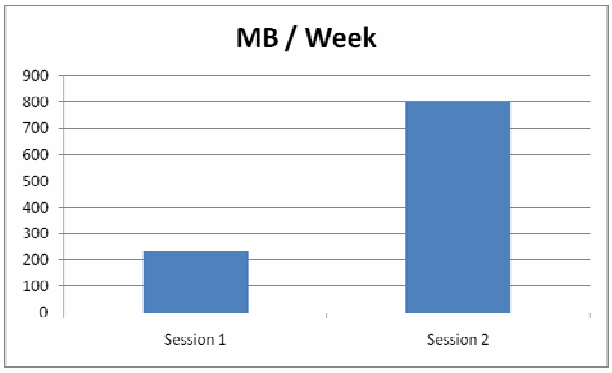
- **Total page views/visits**: 160.000 (=14500 avg. / week)



- **Total traffic**: 8.6 GB

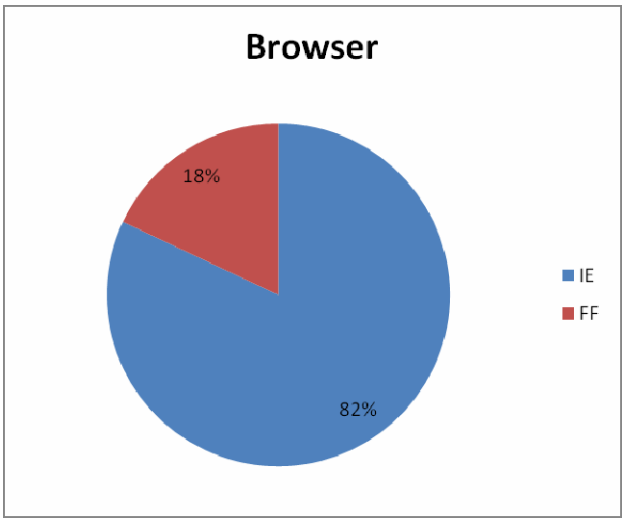


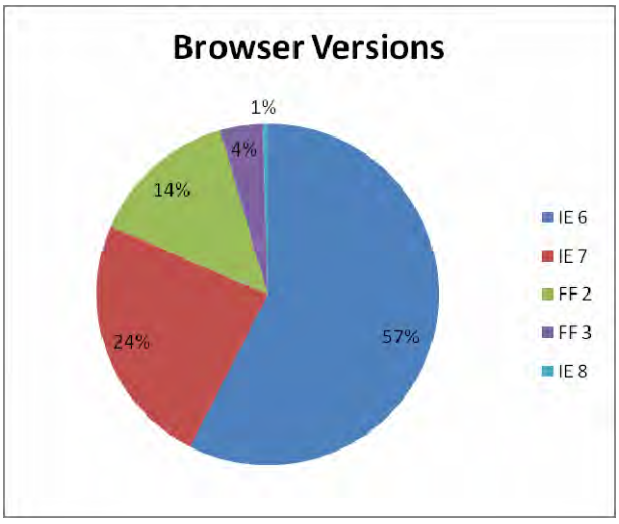
Note: our statistics tool has agregated xml/zip (reports) and images into one category.



Compared to Session 1

- **Browsers**:
  - Internet Explorer: 82% (IE6: 57%, IE7: 23.5%)
  - Firefox: 18% (Mainly FF2)





Compared to Session 1, the distribution between Internet Explorer and Firefox is about the same: 4/5 and 1/5, respectively. What's noticeable is the progression of Internet Explorer 7, which is now used by 24% of users, against only 10% in the previous session.

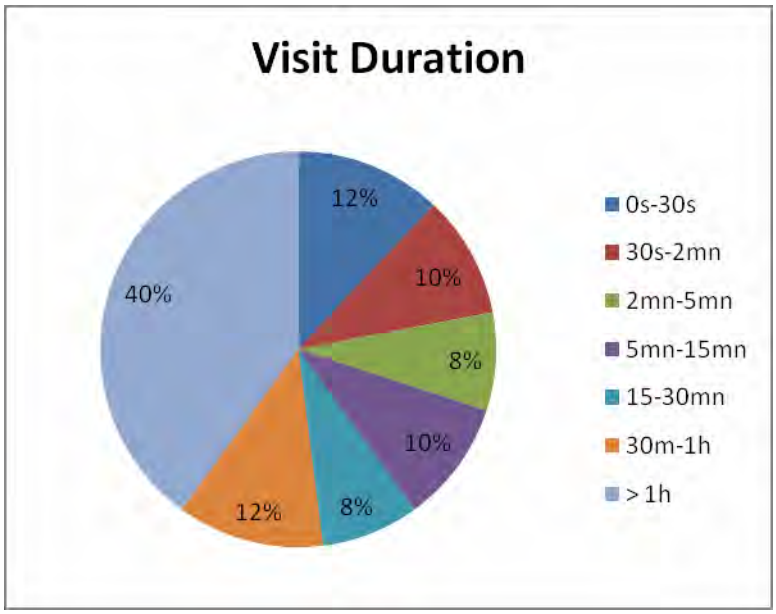
We also see that users have started migrating slowly towards Firefox 3, and that Internet Explorer 8 (still in beta) makes a shy apparition.

- **Client Operating System**: 100% Windows
    - XP: 97%
    - Vista: 2%
    - W2000/2003: 1%

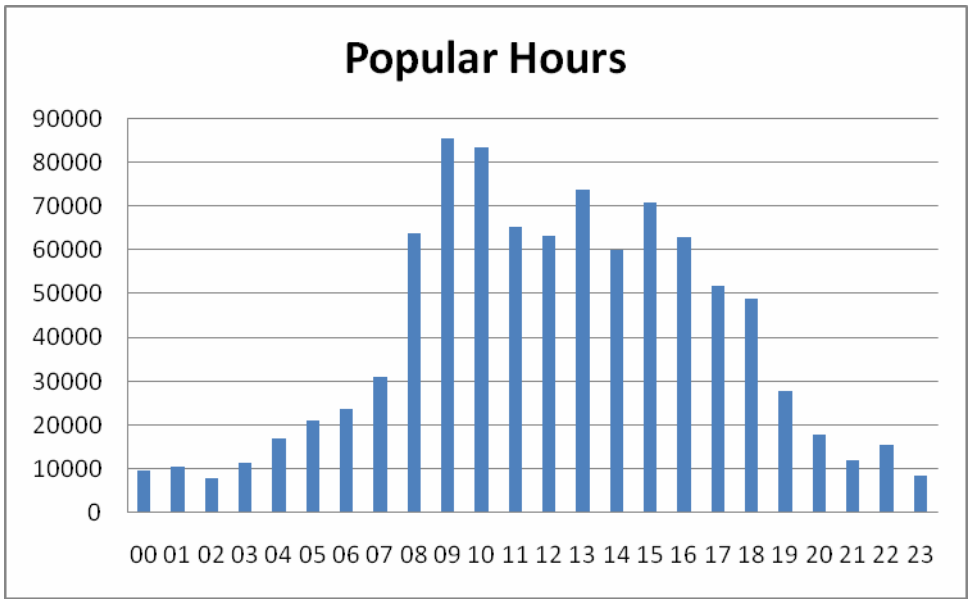
This is almost a status quo compared to Session 1, with a small progression of Windows Vista (1% previously).

- **Visit duration**:

Visit Duration	Percentage
0s-30s	12%
30s-2mn	10%
2mn-5mn	8%
5mn-15mn	10%
15-30mn	8%
30m-1h	12%
> 1h	40%

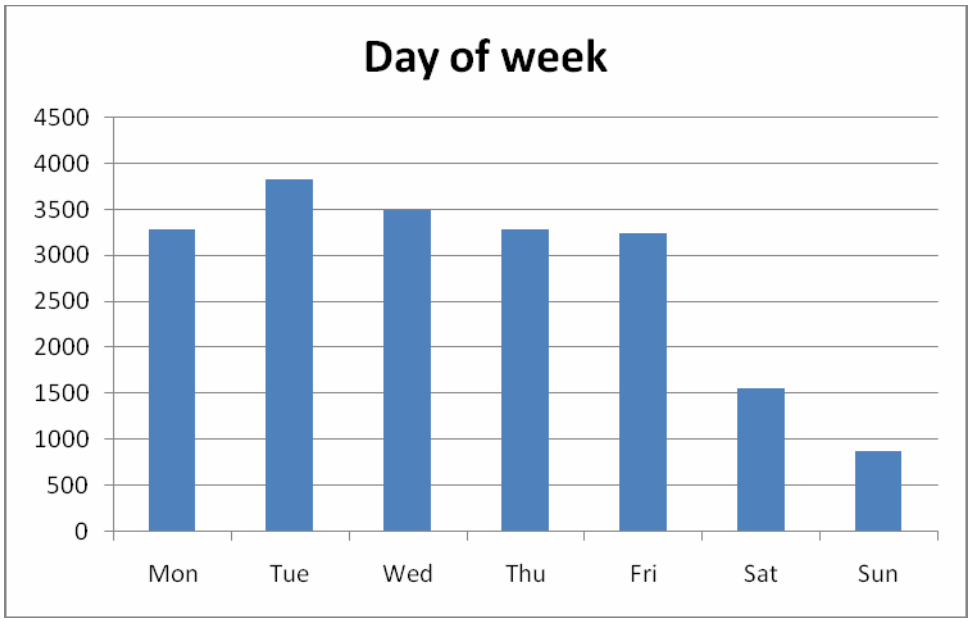


4.2.1 Most Popular Hour of Day



In Session 1, the most popular hours were 13h and 14h.

4.2.2 Most Popular Day of Week



5 xNOTAM Trial Infrastructure

This chapter will describe the hardware architecture used by Pulsar to support the xNOTAM Trial Application. We'll first give a brief explanation on Pulsar network infrastructure. We'll then explain how the different xNOTAM environments were built and integrated.

5.1 Pulsar Network Architecture

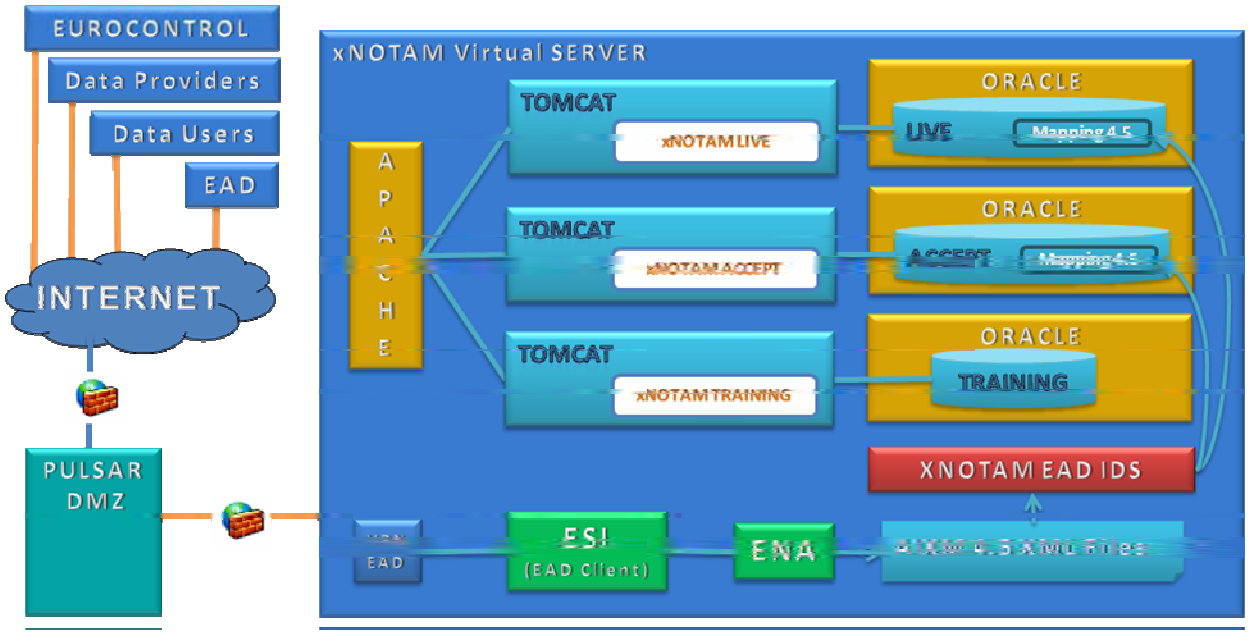
5.1.1 General Architecture

The Pulsar network is composed of different zones:

- An internal zone, which is secured and protected, called « Pulsar LAN »
- A zone with restricted access from outside called « Pulsar DMZ » (Demilitarized Zone). It is a boundary between Pulsar and outside ;
- A DMZ has been created exclusively for xNOTAM. It is also in this zone that the VPN (Virtual Private Network) between Pulsar and EAD has been installed.

5.1.2 xNOTAM Specific Integration

There are three different xNOTAM environments running at the same time. One for the production environment (called "live"), one to allow EUROCONTROL to test the application (called "acceptance") and a last one used for specific trainings (called "training"). Each environment is running on a virtual server and uses its own Oracle 10g database instance:



Each environment runs on an Apache Tomcat instance (it is an open-source Servlet Container able to run Java Web Applications) and is made available on the intranet and internet by an Apache Web Server.

5.1.3 Hardware Characteristics

Pulsar has used the following hardware to host the different environments:

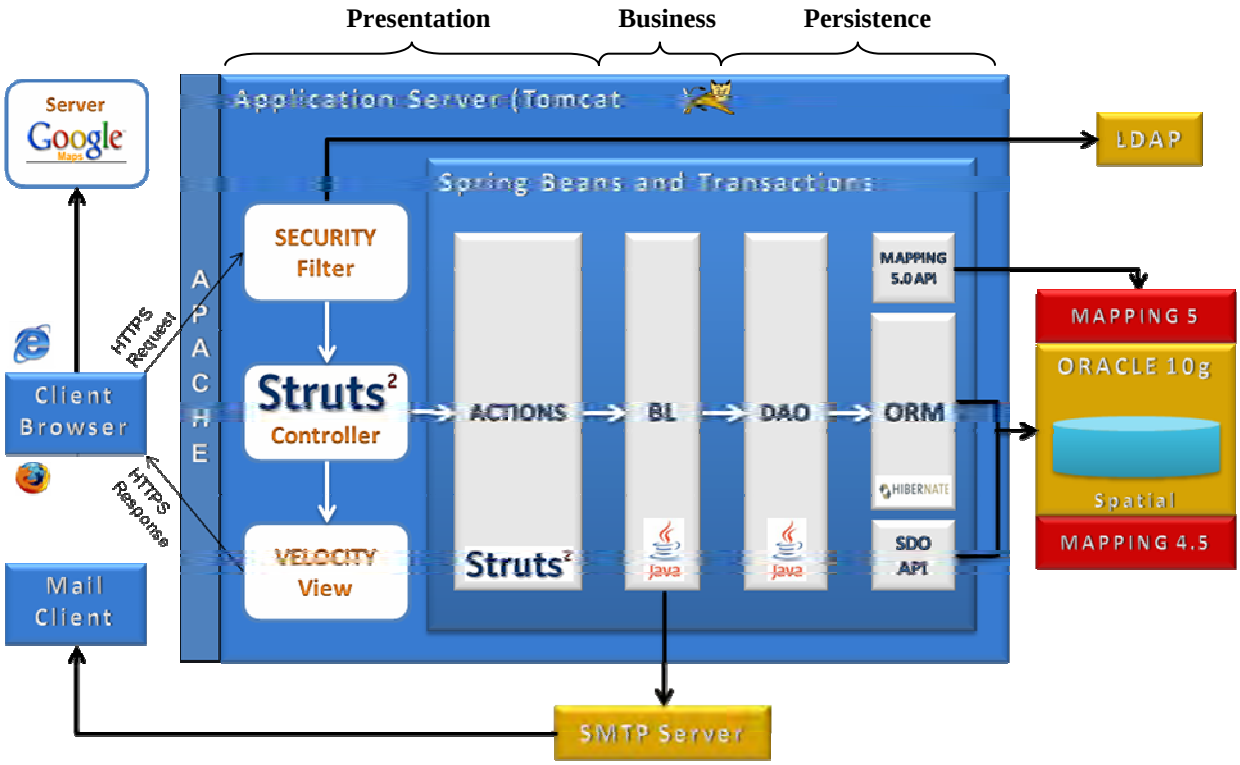
- Web Server:
  - DELL PowerEdge 1750, BiXeon 3.2 GHz, 3 GB of RAM, SCSI Hard drive 10000 RPM RAID1 (redundant HDD);
  - *Operating System:* Linux Debian Etch;
  - *Network:* Two gigabit Ethernet cards;
  - *Back-up:* DB backup on a remote site;
  - Virtualized server;
  - Redondant power supply;
- Database Server
  - HP
  - Quad Core
  - 4 GB memory

5.2 GID Plus Framework Architecture

The xNOTAM Trial Application has been built on top of Pulsar's GID Plus Web Framework. GID Plus is based on the MVC (Model-View-Controller) and DAO (Data Access Objects) patterns. This allowed Pulsar to split the xNOTAM application into independent layers, which are explained below.

5.2.1 Application Architecture

The xNOTAM application architecture is divided in three *conceptual* layers:



- The **Presentation Layer** manages requests and responses between users and the server.
    - GID Plus uses the open-source **Struts2** web framework for this purpose. Struts2, as shown in the schema below, acts as a **Controller**. This means it receives requests from users and forwards them to the **Business Layer**. In other words, this central component is able to translate a URL into a Business action. It then forwards the results of the business actions (search results, updated timeslice…) to the View.
    - GID Plus uses the open-source **Velocity** library to render HTML pages
    - GID Plus uses the open-source **ExtJs** JavaScript library to provide a rich interactive user experience to users (sortable grids, tabs, dynamic layouts…)
- The **Business Layer** contains all the business logic of the application. It ensures that the business rules are respected.
- The **Persistence Layer** provides data storage and retrieval. It is built on the DAO pattern, meaning there is an abstraction layer between the application and the database. The specific DAO implementation developed for the xNOTAM Trial uses the open-source **Hibernate** ORM framework to translate data coming from a relational database (in this case Oracle, with specific Spatial extensions) and Java objects.

Those layers are literally *glued* together using the open-source **Spring** framework. This allows managing dependencies and transactions declaratively (in configuration files).

5.2.2 Technologies, libraries and frameworks

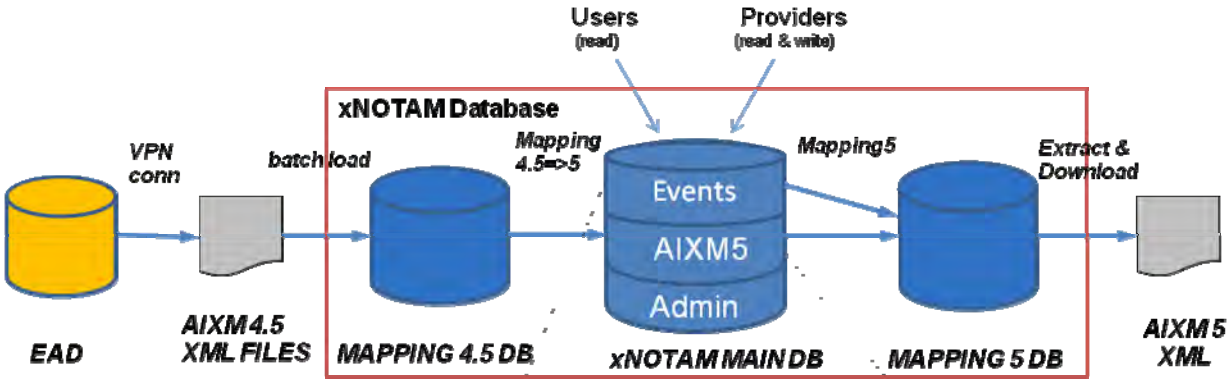
Here you can find all the technologies used to build the xNOTAM application:

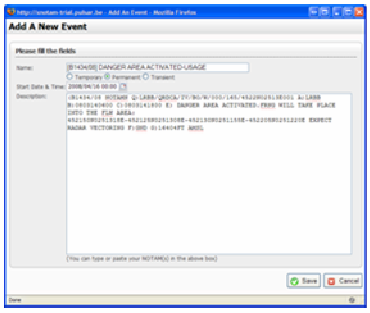
- **OS:** Linux Debian
- **Web servers:** Apache Web Server, Apache Tomcat
- **Framework :** GID Plus, *Struts2, Spring, Hibernate, Velocity, Apache Commons*
- **Database :** Oracle 10g, *Spatial Option, SDO API*
- **Protocols & standards :** HTTP, HTTPS, SMTP, UTF8, XHTML
- **Languages** : J2EE, *Java*, JavaScript, *PL/SQL*
- **Client side:** Web 2.0, (D)HTML, *XML, ExtJS*, DHTMLGoodies, *Ajax, jQuery*

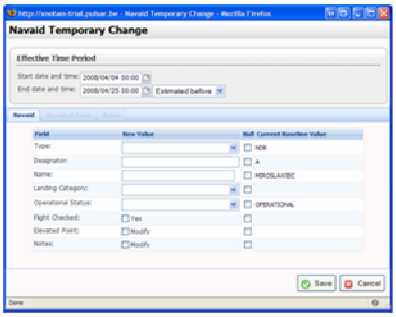
Note: while the xNOTAM application is hosted on a Linux Platform, the fact that it has been developed in Java means that it can be hosted on any platform able to run Java (including Windows).

5.3 xNOTAM Trial Data Flow

The xNOTAM Trial Application is able to handle both AIXM4.5 XML (input only, via a specific mapping) and AIXM5 XML (both input and output, via a Web Interface).







The AIXM 4.5 XML mapping is able to process Snapshots and Updates coming from EAD. The content of those AIXM 4.5 files is transformed by PLSQL scripts into AIXM5 Timeslices in the AIXM5 database.

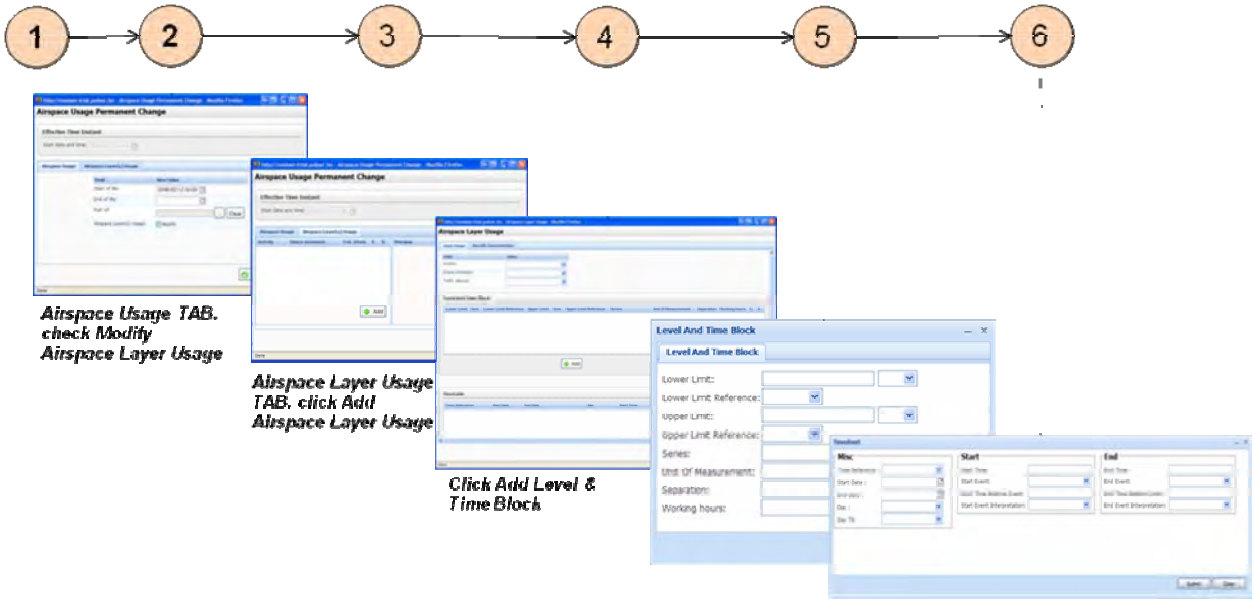
Data providers are able to add new Timeslices in the AIXM5 Database through the Web interface which can be used to add temporary and/or permanent timeslices (based on Events / real-world NOTAMs). The application works natively with AIXM 5 records.

For those AIXM5 records to be available to Data Users, another PLSQL script translates them into AIXM5 XML messages. For performance reasons, all generated XML is saved into the database along with their corresponding timeslices. This XML is accessible via the Reporting / Download functionalities of the application.

5.4 Lessons learned (technical)

5.4.1 Features Edition Complexity

The application contains lots of nested screens (for search, edit, etc).
Example: Airspace Timesheets Edition (6), coming from Event processing screen (1)



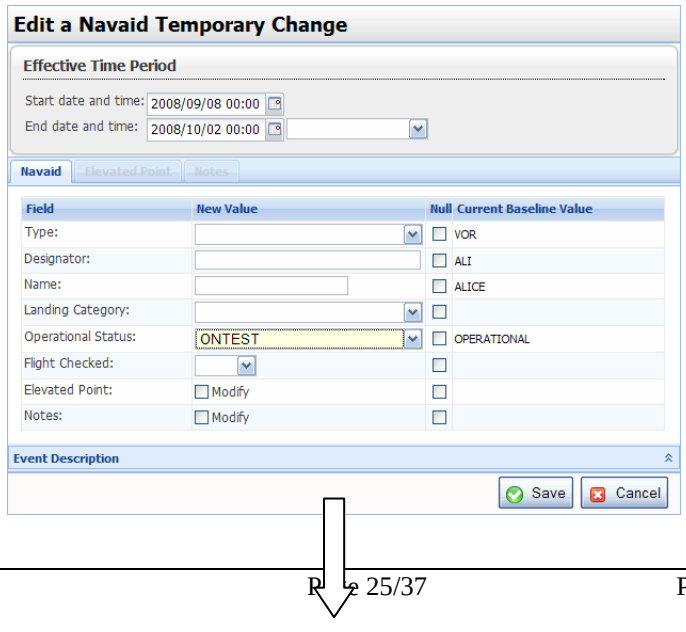
5.4.2 Oracle Spatial

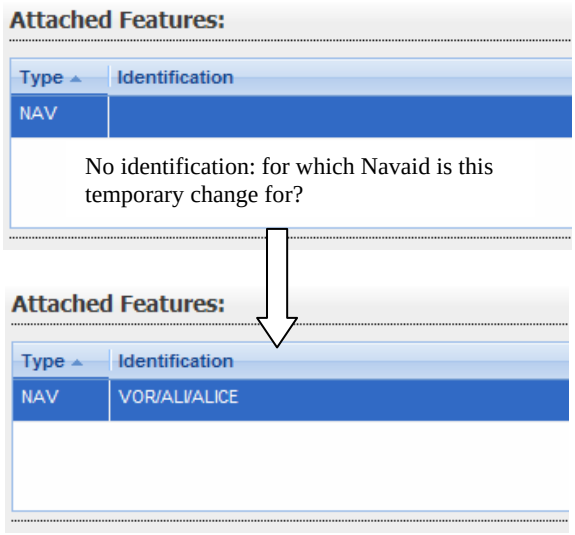
- **Oracle Spatial specific**
  - 2.5 GB data manipulation → 8h/conversion scripts, 1h export, 3h import x all environments ;
  - Conversion of spatial data → database corruption;
  - No arcs & circles in geodetic coordinates system → they need to be converted into segments. The number of segments depends on geometry size and precision (a simple circular airspace around Brussels may be converted into a 3000 segment polygon.
  - Spatial GML not fully compliant with AIXM 5 GML → translation procedures;

5.4.3 Identification

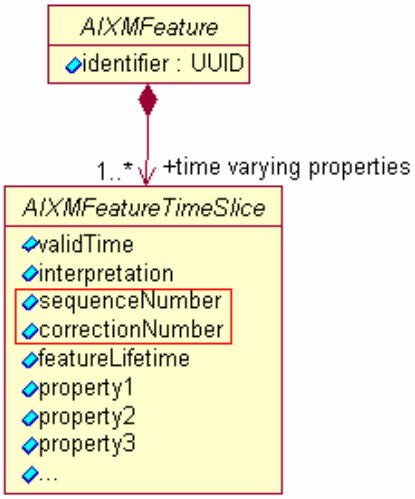
Identification is a piece of information used to allow users to identify the features and timeslices they are working on with the web application.

This is needed because a TempDelta may not have all the required information to be clearly and visually identified by a user. For example, a tempdelta modifying only a Navaid's operational status does not contain any information allowing a user to know its name or designator.



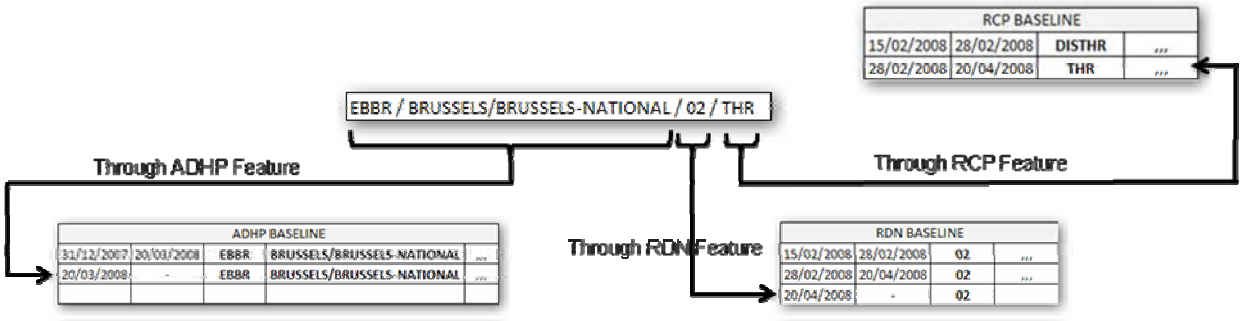


So we need to calculate its identification. The valid baseline should then be retrieved, according to the start date of the TempDelta:



The identification can be also based on parent timeslices identification. For instance, the Runway Centreline Point is identified by:

- Its Associated Airport Heliport designator and name;
- Its Associated Runway Direction designator;
- Its Role.



The identification was consequently quite complicated to calculate. This process is time consuming because it needs to go up in the hierarchy of features to find the parent's identification which is valid at the same time. Also when a feature's identification is updated, the application needs to update all its child feature timeslices whose identification depends on it. For example, if an airport's name should change, the application would have to update the identification of all its child runways, runways directions and runway centerline points.

To avoid calculating this identification "on the fly", each time a timeslice is displayed on screen, a solution based on triggers has been specifically developed to update impacted identifications each time a timeslice is updated in the database.

5.4.4 Feature Ownership

Feature ownership is a not a functionality of AIXM 5. It is an application-level access right used to allow features to be modified (using temp/perm timeslices) only by their owner.

The xNOTAM Trial only allows one single organization to be the owner of feature at a time. This has proved to be too restrictive, especially in the case where a feature is controlled by both military and civil organizations.

5.4.5 Concurrent data sources

Timeslices may come from two different and concurrent data sources:

- AIXM 4.5 converted into PERMDELTA and BASELINES
- User encoded data (through the application)

This has been a problem since the same timeslices might have been recorded twice:

- once from EAD (official data)
- once from the application, base on real world / official NOTAMS

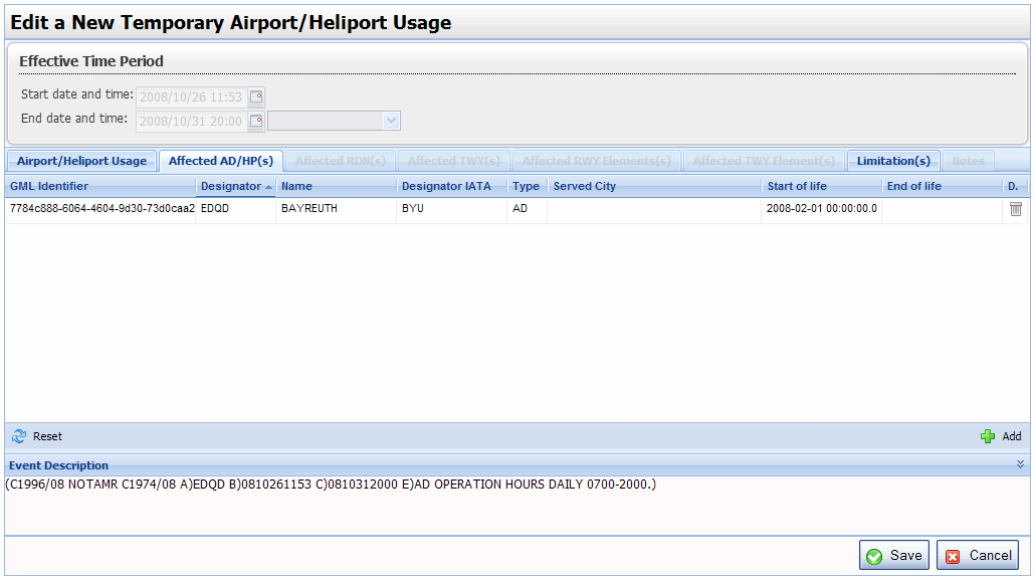
6 Facts & Figures

6.1 xNOTAM Trial Application v2.0

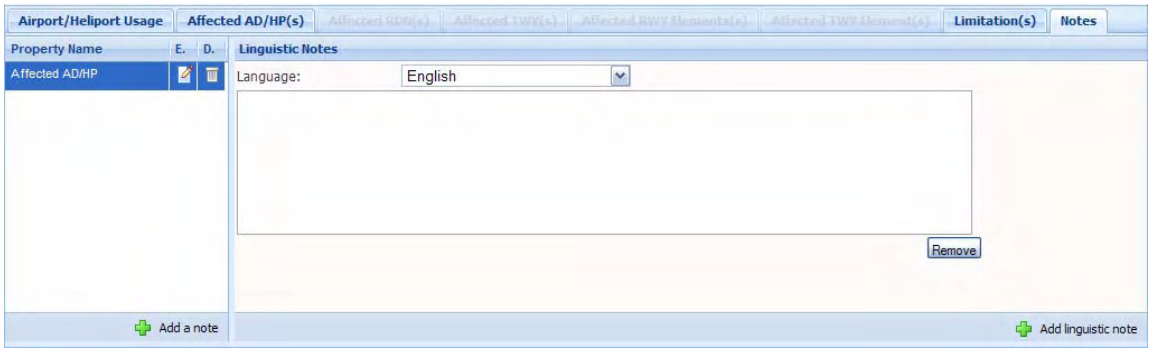
The second session of the trial has used the new version 2.0 of the application.

Not only this version brought numerous bug fixes and performance improvements, it also added new exiting and long-awaited functionalities:

- Event description visible in all editor pop-ups



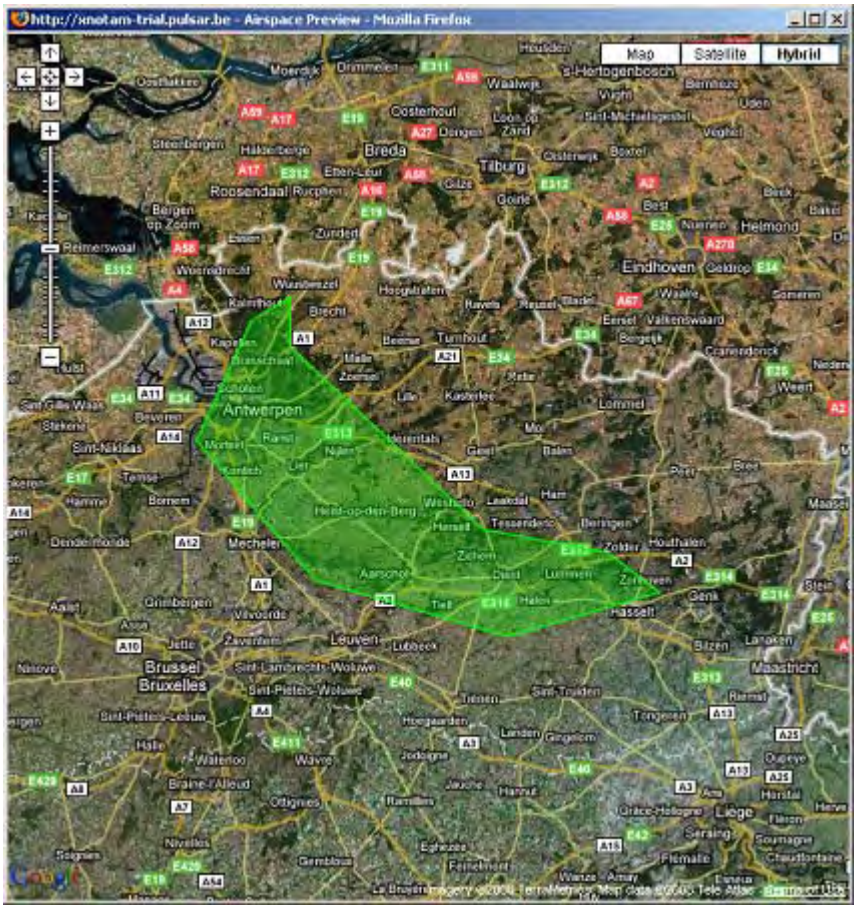
- 'Notes' tab available for all supported features



- Declared distances tab in Runway Centreline Point pop-up

- Interactive Google Map

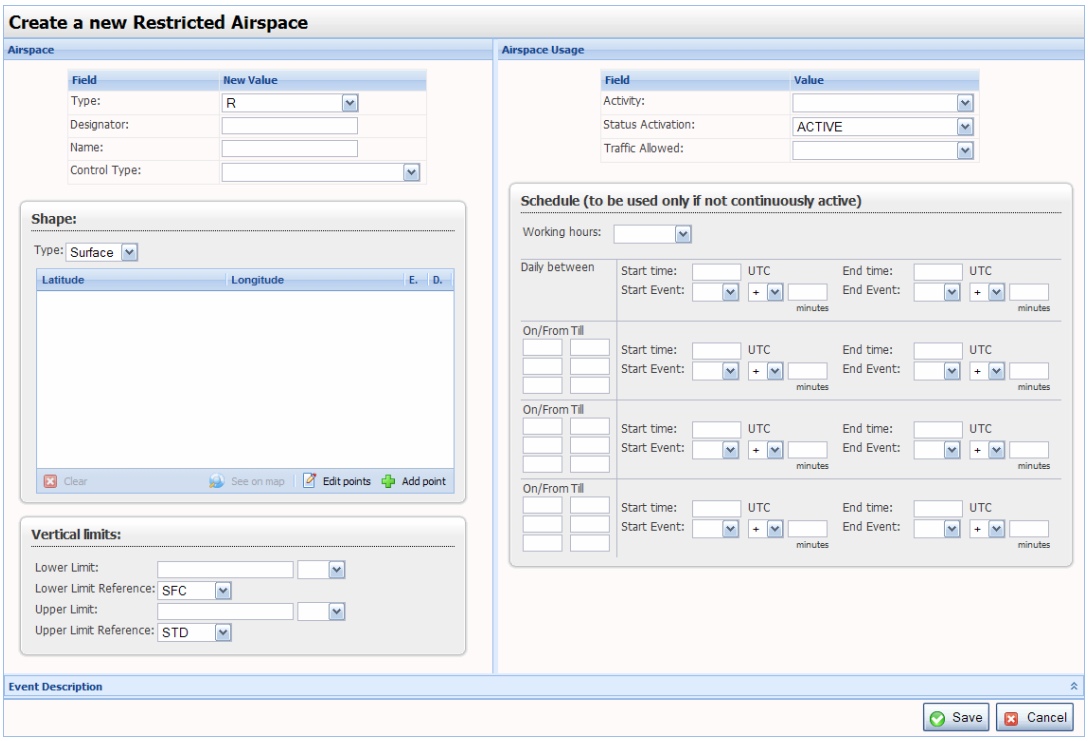
  In the first session, GoogleMap was already available in order to enable the visualization of Airspace geometries.



In the second session, functionality based on GoogleMaps has been added for:

- Visual selection of RunwayElements and TaxywayElements on a map
- Supported LFLC AMDB Data

- Airspace Restriction Template

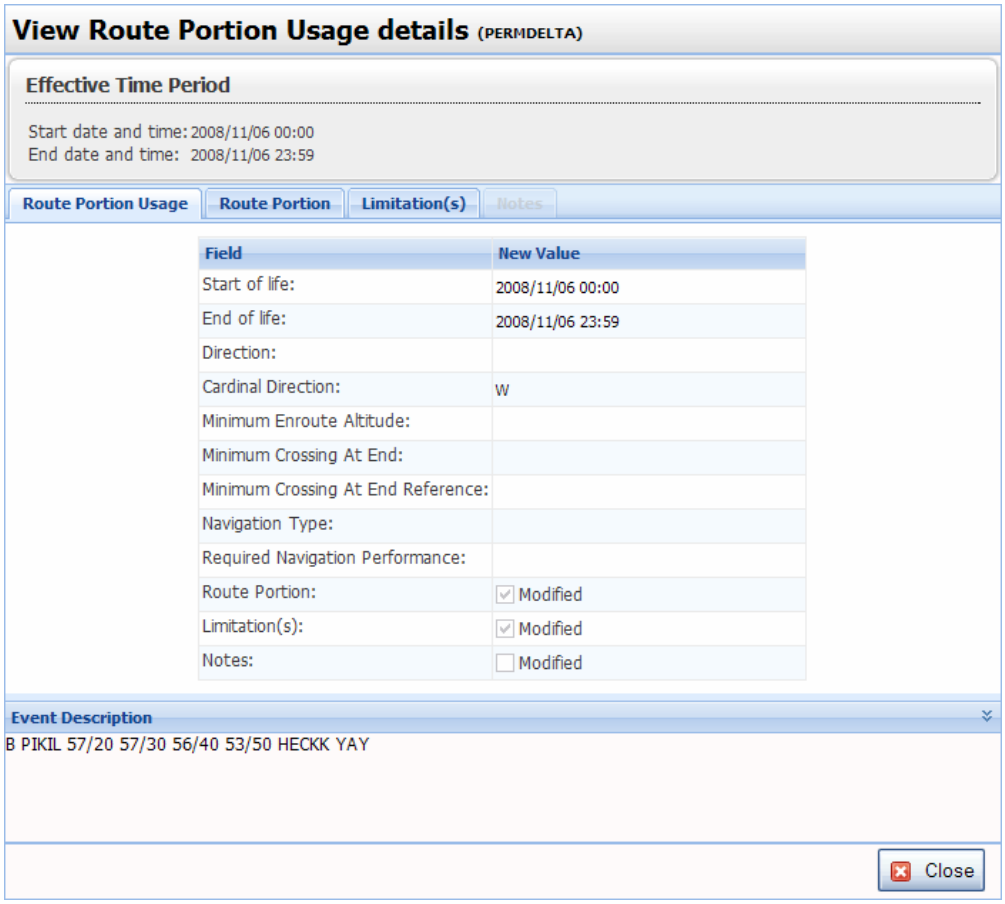


  - Allows encoding of new airspace restrictions, including their usage and timetables in one single step
  - Ability to encode multiple points at once to define an airspace (allows copy/paste from NOTAM Messages)

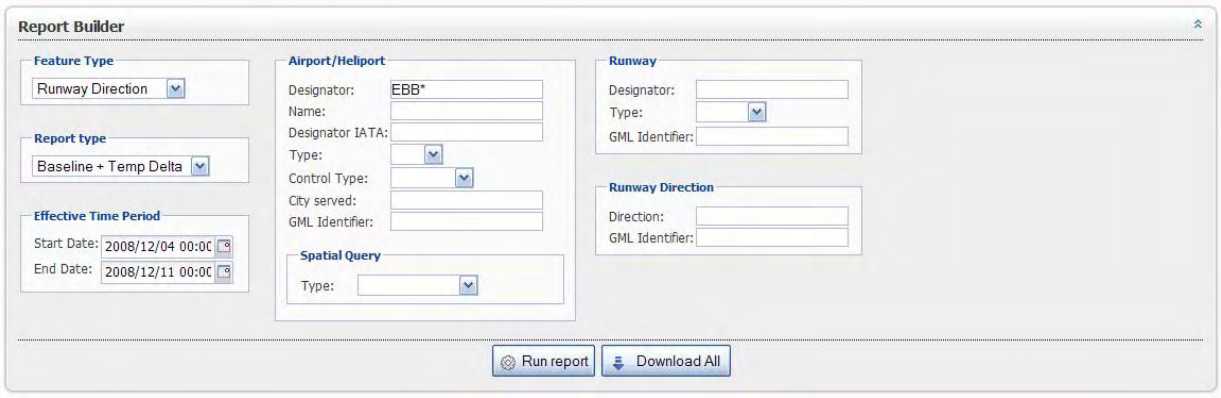
- Time line viewer for Navaids and Airspace Usages

- Create copy of existing events

- View Details for all features



- GZip compression for better transfer performances (bandwidth optimization)
- Better UTF-8 compliance
- Transient Events Removed
- WFS via Geoserver
- Reporting type 3 – “View Features”: Baseline report, baselines + tempdelta, snapshot



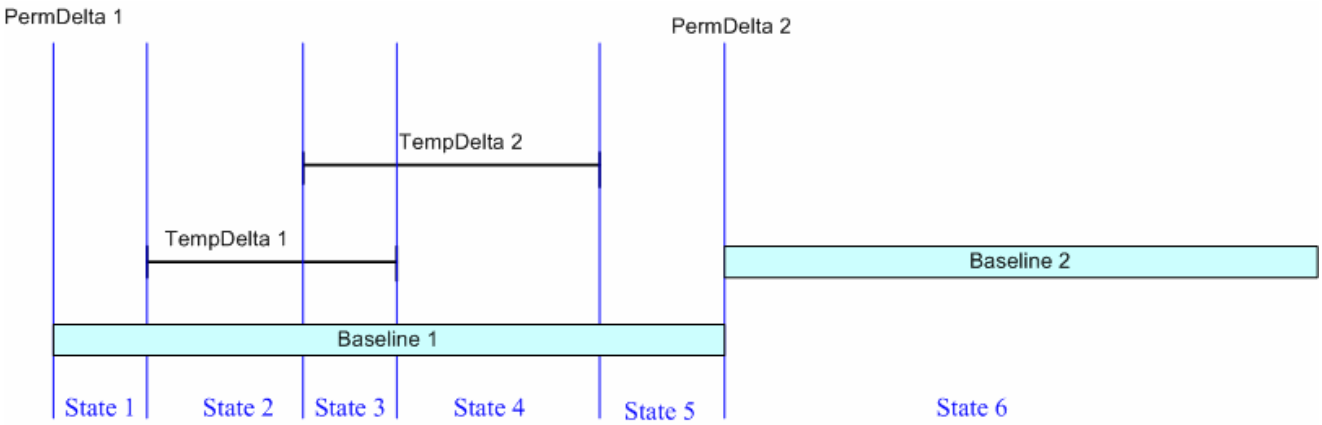
The development of the Snapshot Reports needed special processes; calculating snapshots, just like calculating the identification of timeslices (see later in the lessons learned chapter), is a time consuming and processor intensive process.

We didn’t have any information about snapshots directly available in the database. To avoid calculations at each query and, again, to ensure the best performances in the application, we

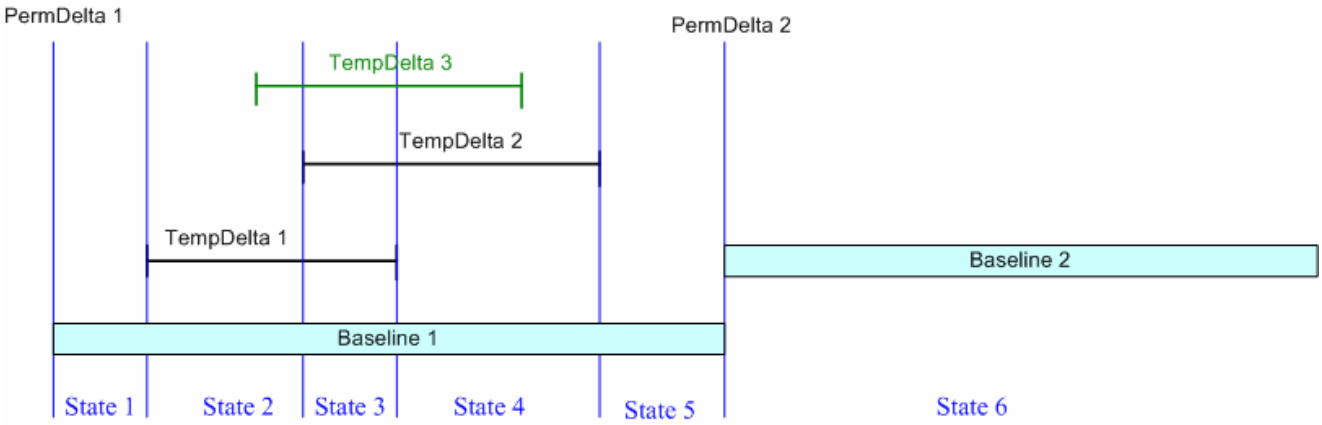
now save / cache all the snapshots for all features. All impacted snapshots are re-calculted each time a temp/perm delta is applied to a feature.

A snapshot, in the database, is valid during a time range (and this is the definition of a *state*). This is different from AIXM5, where a snapshot is a time instant, but having both start and end of validity of those timeslices allows exporting both “real” AIXM5 timeslices as time instants and “States” timeslices to be used for WFS.

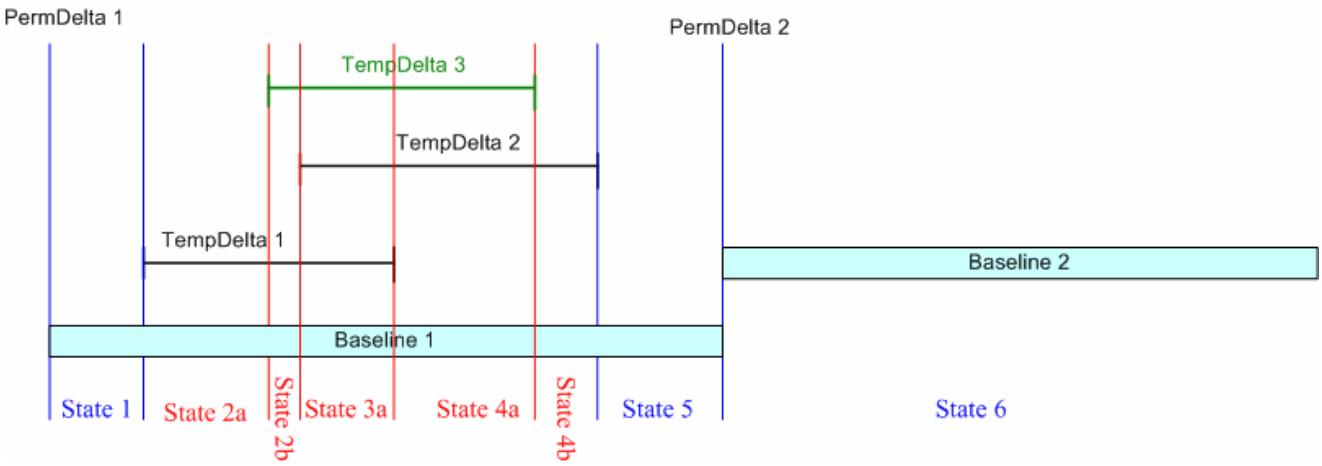
Here is a graphical explaination of how snapshots/states are handled. Initial situation:



On the example above, a temp delta 3 has been added:



=> The impacted states (2, 3 and 4) have to be removed;
=> The states 2a, 2b, 3a, 4a, 4b will be created;



In terms of data volumes, the portion of snapshot timeslices compared to the number of TEMP and PERM deltas varies a lot between features types. In average, we can tell we have a 4:1 ration (4 snapshots for one timeslice) in the database.

Ratios may vary, for example, from a 2:1 ratio for airport usages (where we have plenty of PERMDELTAS and few TEMPDELTAS) to a 15:1 ratio for runway centerline points.

All we can say for sure about the number of snapshots is that the more overlapping timeslices we have, the more snapshots we get.

6.2 Frame and Team

- **650 Man/Days**
- **2 to 6 Full Time Equivalent (depending on project phase):**
  - **Development team :**
    - 6 persons (1 technical leader & architect, 1 Oracle expert, 1 Oracle analyst and developer, 4 developers)
    - Tasks: AIXM/Functional/Technical Analysis, development, tests and corrections, production follow-up & support
    -
  - **Project management**
    - 2 persons
    - Tasks: client contact, budget, planning, technical integration, overall coordination
- **IT Infrastructure**
  - 2 persons
  - Tasks: Hardware, OS, network, EAD link, access rights, usage monitoring, backups
- **Project duration: 12 months (July 2007 – June 2008)**

6.3 Application Metrics

- **More than 135 screens (main web pages, pop-ups, tabs)**

(35 added since Session 1)

- **13 features types and 25 objects => 111 database tables**

  The following features were supported during the first phase of the trial:

  - AirportHeliport, Runway, RunwayDirection, RunwayCentrelinePoint
  - AirportHeliportUsage
  - Airspace, AirspaceUsage
  - Navaid, DesignatedPoint
  - Route, RouteSegment, RoutePortionUsage
  - Obstacles

- **110.000 lines of code**

  - **Java**
    - **535 files** (classes and interfaces, 60 new classes for version 2.0)
    - **55.000 lines of code** (8.000 new lines for version 2.0)
    - **20.000** lines of comments

  - **XML**
    - **120 files** (configuration, hibernate mapping, struts2 validation…)
    - **9.300 lines of code**

  - **Web** (**JavaScript, HTML)**

    - **HTML**:
      - **140 files**
      - **22.500 lines** of code

    - **Javascript**
      - **100 files**
      - **5300 lines** of code

    - **CSS** (stylesheets)
      - **5 files**, 500 lines

  - **Plsql code**
    - **18.000 lines of code**

  To have a better idea of what those figures represent, this equivalent to a 2000 page book (in A4 format, 50 lines per page).

- **5 database instances & 7 separate environments :**

  - DEVL used for the development of new functionalities
  - DEVL-FIX used for fixing bugs on a previously released version
  - TEST used for internal tests (integrations…)
  - ACCEPT used by EUROCONTROL to test new functionalities
  - ACCEPT-FIX used for testing bug-fixes on a previously released version

- TRAINING used for trainings
- LIVE used for production by EUROCONTROL and end-users

- **3 Oracle Schemas by environment →21 Oracle Schemas to manage**

  Each of those environments uses 3 different schemas:

  - **Mapping 4.5 Database**, saving feature natural keys for future EAD updates;
  - **xNOTAM Main Database**, with 3 parts : AIXM5, Events, Administration;
  - **Mapping 5 Database**, with AIXM5 XML ready for extraction and download.

7 Conclusions

Important Note: At the time when this document was released to the participants in the xNOTAM Workshop, the analysis of the lessons learned from the Trial was not yet finalised. Therefore, the content of this chapter shall be considered as “draft”.

7.1 Meeting the objectives

Without any doubt it can be stated that the Trial has reached its objectives. **The Trial has demonstrated the maturity of the “digital NOTAM” concept, based on AIXM version 5**, by:

- validating the capabilities of AIXM 5.0 for encoding the information contained in NOTAM messages, in a structure and format that can be understood by automated systems;
- providing a proof of concept for a “digital NOTAM encoding application”, used to demonstrate to NOTAM operators the fundamental difference between writing the current NOTAM text and encoding the information in a structured manner;
- generating a significant amount of test xNOTAM data which is now available to system developers.

In addition, the Trial has allowed identifying two key aspects that shall guide the operational implementation.

7.1.1 Incremental deployment

The Test Data providers have been requested to record statistical information, comparing the NOTAM issued by their office with the digital NOTAM Events that have been supported by the xNOTAM Trial Application. This has shown that, on average, 50% of the NOTAM issued in the real world are covered by the Trial. In some particular States, this went occasionally up to 80-90%.

This is very good news, since the NOTAM Trial has covered only a very limited subset of the complete AIXM model. This has triggered the idea of a possible incremental approach for the operational implementation, which could significantly reduce the risk and the cost of the future operational implementation Project. It would also allow focusing on “quick-wins”: information for which there is a high interest from the end users and which can be provided in digital NOTAM format on short term.

7.1.2 Need for templates/wizards

Although very little training was provided for the test data providers and although the interface was quite basic and occasionally requiring a deep understanding of the AIXM 5.0 model, most NOTAM operators have rapidly acquired “digital NOTAM encoding skills”. Questions received through the Helpdesk have demonstrated the interest of the participants for even the most obscure xNOTAM aspects. The excellent capacity of the NOTAM operators to adapt to the digital NOTAM way of working came as probably the most important and encouraging conclusion of the Trial

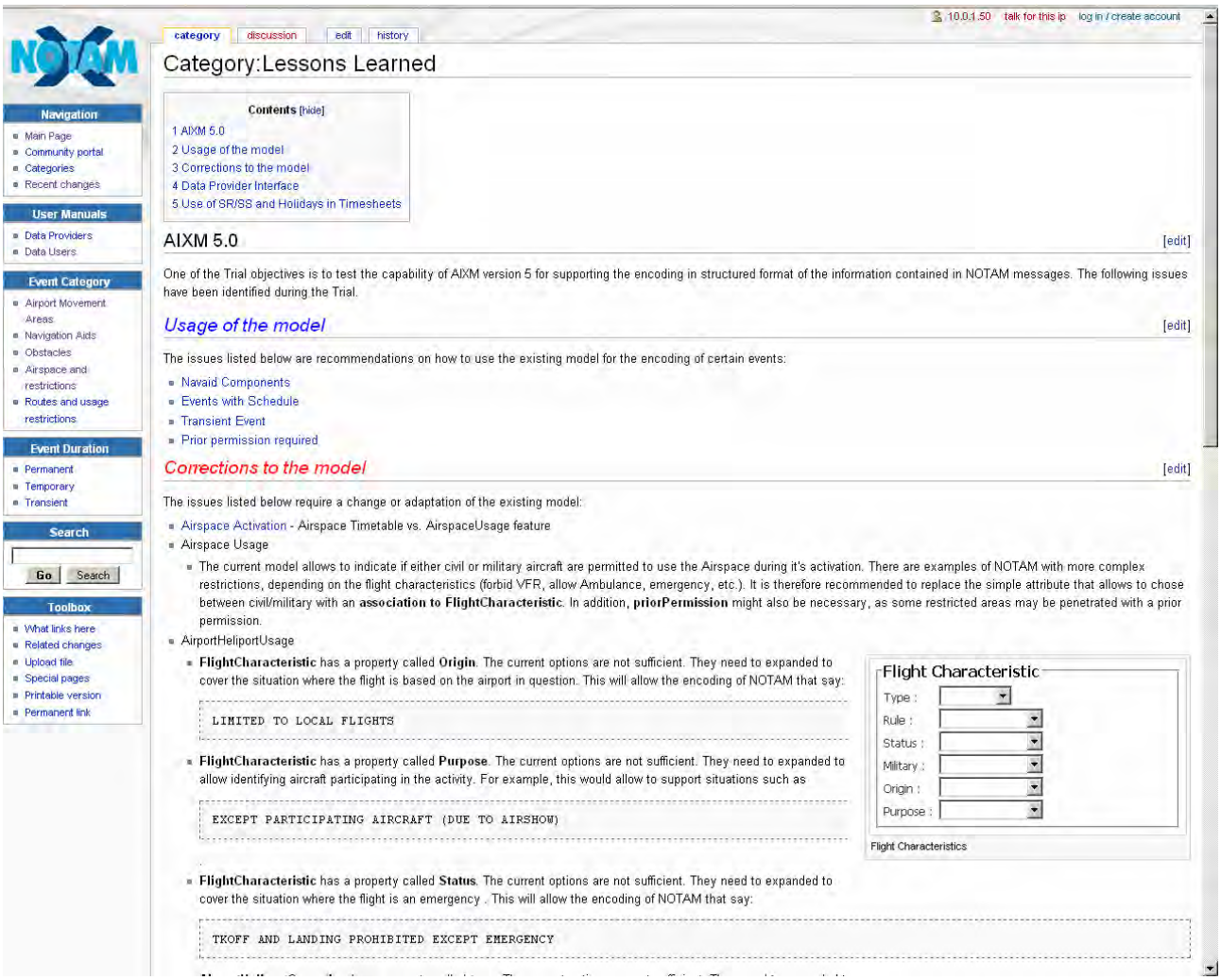
However, almost all test data providers have stressed that a real operational application shall be much more user friendly. In particular, common NOTAM types have to be supported by “templates” that should have only the input fields necessary for a kind of event and a simplified workflow. Only exceptional situations should require detailed knowledge of the AIXM model and should be assisted, as far as possible, by “wizards”.

The only type of template developed during the Trial was available in Session 2 and it allowed the encoding of NOTAM announcing airspace reservations in just one step, without the need to go through multiple levels of pop-up windows and hiding the use of two AIXM 5 features (Airspace and AirspaceUsage) for the encoding of this data.

An operational implementation shall also maximize the use of graphical user interfaces, as it was the case for the RunwayElements and TaxiwayElements closure interface developed for the airport of Clermont-Ferrand in session 2.

7.1.3 AIXM 5.1 corrections

The Trial has also allowed to identify a number of gaps in the AIXM 5.0 model, that need to be corrected in the AIXM 5.1 version, which is scheduled for release in summer 2009. A part of these have been documented already in the xNOTAM Wiki: http://wiki.pulsar.be/xnotam-wiki/index.php/Category:Lessons_Learned. In the coming weeks, the Agency will analyse in more detail the AIXM 5 encodings from the xNOTAM Trial database and will document all eventual additional AIXM gaps identified.



AIRAC Effective Time Difference within the Asia-Pacific Regions

No.	Name of State	Time zone	AIRAC Effective Time (Local time)	Coordination for the use of a common AIRAC effective time
1	Australia	UTC + 10hr (Eastern)	1600 UTC(-1day) (0200 AM)	No
2	Bangladesh	UTC + 6hr	0001 UTC (0601 AM)	-
3	Hong Kong, China	UTC + 8hr	0001 UTC (0801 AM)	Yes
4	India	UTC + 5.30hr	0001 UTC (0531 AM)	-
5	Indonesia	UTC + 7hr (Jakarta)	coordinated case by case	Yes
6	Japan	UTC + 9hr	1500 UTC (-1day) (0000 AM)	Yes
7	Republic of Korea	UTC + 9hr	1500 UTC (0000 AM +1day)	Yes
8	Lao PDR	UTC + 7hr	0001 UTC (0701 AM)	-
9	Malaysia	UTC + 8hr	0001 UTC (0801 AM)	-
10	Mongolia	UTC + 8hr	0001 UTC (0801 AM)	-
11	New Zealand	UTC + 12hr	1200 UTC(-1day) (0001 AM)	Yes
12	Philippines	UTC + 8hr	0001 UTC (0801 AM)	-
13	Singapore	UTC + 8hr	0001 UTC (0801 AM)	Yes
14	Sri Lanka	UTC + 5.30hr	0001 UTC (0531 AM)	No
15	Thailand	UTC + 7hr	0001 UTC (0701 AM)	-
16	Unites States	UTC - 10hr (West coast)	0901 UTC (0101 AM)	-
17	Vietnam	UTC + 7hr	0001 UTC (0701 AM)	No

AAITF/4
Appendix J to the Report

THE DIFFERENCE OF AIRAC EFFECTIVE TIME BETWEEN KOREA AND JAPAN

The Fourth Meeting of ICAO Aeronautical Information Services-Aeronautical Information Management Implementation Task Force(AAITF/4)

25-27FEB2009 NARITA

JAPAN AIRLINES INTERNATIONAL

GENERAL INFORMATION

Between Korea and Japan,there is 24hours differences of AIRAC effective time.

Ex) for the AIRAC of this month,

In JAPAN,it become effective from 1500UTC of 11FEB.

In Korea,it become effective from 1500UTC of 12FEB.

The Operational problem 1

< Selecting FMS Navdata base >

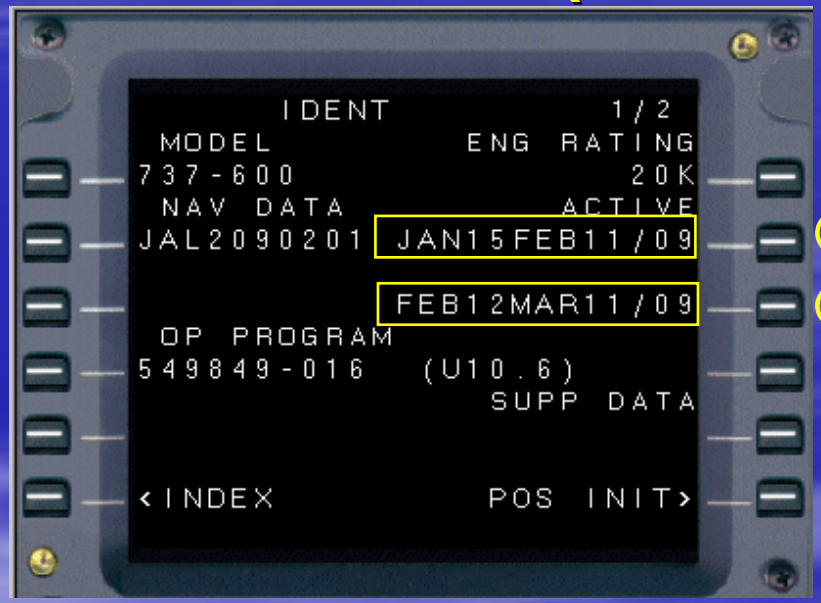
When pilots prepare for the flight between Korea and Japan on the ICAO AIRAC date, they have to take care not to choose non effective FMS Navdata.

Example

Flight:JL8831 / 12FEB

STD:HND at 08:20L(23:20UTC)

STA:GMP at 10:35L(01:35UTC)



Stored FMS Navdata:

①0901 cycle(Valid 15JAN-11FEB)

②0902 cycle(Valid 12FEB-11MAR)

Example

There are some procedure changes for RJTT and RKSS.(assumptive)

At this time,changes for RJTT only be effective.

If pilots select old data①,it does not include new procedure for RJTT and select new data②,the opposite happens.

Example

Ex) If SIDs for RJTT and STARs for RKSS change at the same AIRAC cycle;

for the case①,new already effective SIDs cannot be used on departure,

for the case②,old still effective STARs cannot be selected on arrival.

FMS DATA	RJTT	RKSS
①	×	○
②	○	×

The action to be taken

Comparing these changes,pilots have to select which data cycle has more important changes.

***selected data cycle of FMS cannot be changed after departure.**

***The action above is usually taken by long range flight like Japan-Europe,USA too,but properly never taken by short range flight like Japan-Korea.**

The operational problem 2

< Using enroute chart >

The charts we use are provided by Jeppesen,covering both Japan and Korea and corrected with effective date on AIRAC in Korea.

If some airways in Japan and Korea change at the same AIRAC cycle,pilots cannot refer still effective airway data at least for one side.

The action to be taken

We have to issue company's notices for pilots.

Conclusion

It is likely to be a threat for operators that AIRAC effective time differs 24hours between neighboring ICAO member countries.

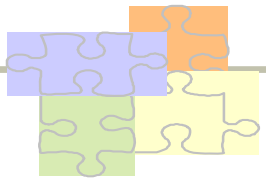
Thank you

Australian Newsletters on AIS to AIM

- What is Aeronautical Information Management (AIM)
- How will we achieve AIM?
- What is the ‘Mercury’ Project?

THE AIM IS 'AIM'

ATC Operations Support Branch
ATC Group, Airservices Australia



What is Aeronautical Information Management (AIM)

"The right digital Aeronautical Information, at the right place, at the right time."

We keep hearing the buzzwords – 'Harmonisation' and 'Interoperability', but what do they mean to ATC, and why are they so important?

Harmonisation refers to the ability of International States to coordinate national policies and technical standards, so that products and services can be traded freely.

Interoperability refers to the ability of diverse systems and organisations to work together (i.e. inter-operate). (wikipedia)

ATM systems have to communicate, share information and coordinate activities across international borders. The harmonisation and interoperability of these systems is therefore an obvious objective, and forms the basis of the (ICAO) Global ATM Operational Concept (doc 9854). The vision of this concept is "*to achieve an interoperable global ATM system, for all users during all phases of flight*".

The concept recognises the role and importance of *information services* in the ATM system, as providing cohesion and linkage between the seven operational components of the concept. In other words, the integration (or combining) of ATM services requires *information* to be accessible, timely, accurate and quality assured, so that ATM communities are able to collaborate, and users can make informed and safe decisions.

You may ask how the role of information in this concept is any different from what it has always been. Well, if we look at how traditional aviation systems were established, we find that they were designed specifically to meet the requirements of a particular organisation (or State). They were also usually developed and maintained by those organisations.

Initially, these systems had little need to share information between them, as each was seen to provide a very different and specific function. Over time however, technology advances have seen the automation of business processes that were once imagined as only ever being performed manually (e.g. landing an aircraft). To enable these advances, systems have had to access and use a much larger range of information. Although this information is often managed by other known systems, the lack of interoperability between those systems (a bit like trying to understand a different language) has resulted in duplicate data items being re-entered (often manually) into each individual system.

As a consequence, data is often found to be inconsistent, difficult to access, have a different meaning, and/or interpreted differently by each system. Not exactly an ideal situation for an industry that relies so heavily on the availability, quality and integrity of aeronautical information to ensure the safety and efficiency of air traffic services.

Aeronautical Information Management (AIM) seeks to enable the *interoperability* of organisational and global ATM systems. This is to be achieved by implementing ATM systems that comply with global standards (i.e. *harmonised standards*) for the management, exchange and quality control of information. This objective includes interoperability standards for Aeronautical, Terrain, Weather, Geospatial, Environment, Flight object, Aerodrome Mapping and Airport Operations Information.

How is AIM different to AIS?

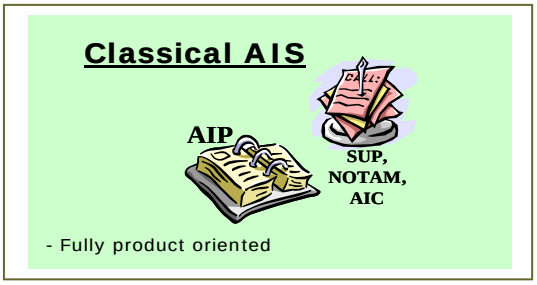
Aeronautical Information Services (AIS) refers to the provision of a specific range of aeronautical products and services, in accordance with the ICAO standards described in Annexes 4 and 15. These services include the timely production and distribution of an Australian AIP, AIP SUP, ERSA, DAP, AIC, DAH, Aeronautical Charts and NOTAMs. Paradoxically in this digital age, the distribution of AIS products continues to rely on paper documentation, charts and telex-based text messages.

Some organisations, such as Airservices Australia, developed databases to store the aeronautical data required to create AIS products. However at the time these systems were developed, there were minimal standards developed for describing how data should be captured, recorded, managed or exchanged. As such, these legacy databases are now unable to easily share information with other services or users. For example, Airservices aeronautical database 'ADMS' is unable to automatically exchange information with TAAATS. Both systems record information in very different ways. As such, the information that TAAATS requires from ADMS has to be extracted, manipulated manually, and then re-entered into TAAATS. This data exchange process currently requires a team of people, in both Brisbane and Melbourne. Through the AIM objective however, data will one day be automatically exchanged between these two systems (i.e. when both of these systems are able to comply with international standards for the exchange of aeronautical information).

Aeronautical Information Management (AIM) will change our focus from the production of specific aeronautical products (as is the case for AIS), to the management of aeronautical information. In other words, future aviation information management systems will be designed to comply with global standards on the management and exchange of aeronautical information.

Over the last five years, global standards for the management of aeronautical information (i.e. both static and dynamic data) have been developed. AIS systems and applications have also been developed to comply with, and fully exploit these standards. AIS systems are being addressed first in this global objective for AIM (i.e. the *harmonisation* and *interoperability* of ATM systems), in recognition that it is the AIS processes that capture and manage aeronautical information considered critical to the efficiency and safety of ATM operations.

Contemporary AIS products currently rely on paper documentation, charts and telex-based text messages.



The benefits of implementing systems that comply with global interoperability (AIM) standards are significant, and include:

- Improved quality control and management of safety critical aeronautical data.
- The easy exchange of information with other compliant systems and services (via automated interfaces).
- A reduction in the number of information databases required, removing data duplication, improving quality control and information access.
- The ability for AIS to evolve into a service that is able to provide new and flexible aeronautical information products.

What's in it for ATC?

The eventual benefits that ATC staff can expect include:

- Quicker and easier access to aeronautical information (e.g. to model airspace changes).
- Updates to ATC systems which occur quickly, with little or no down time (via automated interfaces).
- The release of ATC resources currently dedicated to the management of data.
- ATC Systems that are easier to modify and improve.
- Improved ATC coordination with other States as they also begin to implement compliant systems.

ACHIEVING 'AIM'

ATC Operations Support Branch
ATC Group, Airservices Australia

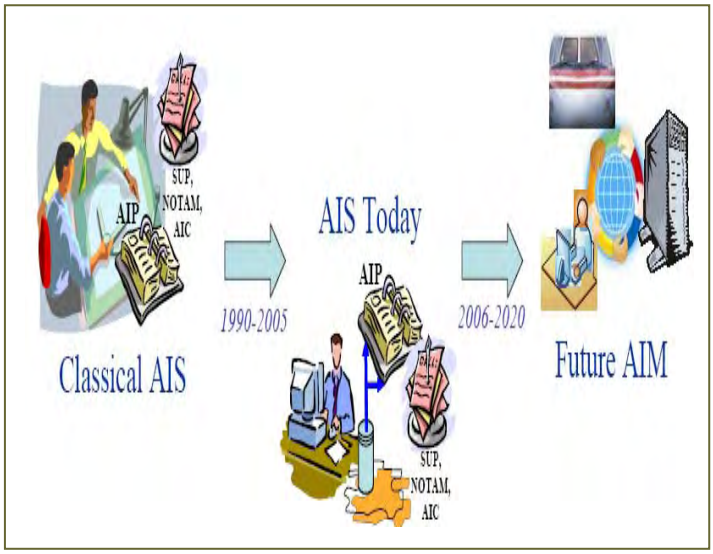
How will we achieve AIM?

Achieving the AIM objective will involve a significant level of work at international, regional and organisational levels. Much of the international work has already been advanced by Europe under their SESAR program, and by the USA under the NEXTGEN program.

However to make AIM outcomes truly international, ICAO must now integrate AIM objectives into their international standards and guidance material. This work was begun in 2008 with the creation of ICAO's 'AIS to AIM Study Group'. Their first deliverable, a 'Roadmap for the Transition from AIS to AIM', is due in February 2009 and is intended to provide guidance and advice to regional planning groups and States, on the development of strategies required to progress global plan initiatives related to aeronautical information. Australia accepted an invitation to participate on this Study Group, which had its first meeting in December 2008.

Airservices Australia has also begun work to advance the AIM objective. In 2008 we went to tender for the replacement of our existing AIS systems, with a capability that will comply with international interoperability standards for aeronautical information (called 'AIXM'). Our AIS replacement project is called MERCURY (click on this link for further information on the project). In conjunction with, and in addition to the Mercury project, other AIM projects and activities will be undertaken by Airservices over the coming years. A roadmap describing these activities, called the 'The AIM Transition Roadmap' will be developed and published sometime in 2009. Some of the activities in this Roadmap will include:

- The definition and implementation of enterprise architecture standards to ensure all organisational systems and applications are compliant with global and organisational interoperability standards;
- Implementation of international quality management processes & practices for information management (e.g. The AIS team are incrementally achieving ISO 9001 certification of AIS and data management processes);
- Participation on international and regional work groups, such as: ICAO AIS to AIM Study Group, ICAO Regional AIS to AIM Task Force, Global AIM Consortium and Congress, etc;
- Projects aimed at progressing regional cooperation, through collaboration and partnership on AIM activities;
- New skills will be required, so competency frameworks will need to be implemented, training programs developed, staff trained and processes documented;
- New products and services will evolve, as AIM takes hold. With increased interoperability, the ATC Group will have greater capacity to progress objectives for 'Collaborative Decision Making (CDM)' with other industry partners;
- The development of performance KPIs and monitoring systems, to ensure that what we promise, is what we deliver;



WHAT IS 'MERCURY'

ATC Operations Support Branch
ATC Group, Airservices Australia

What is the 'Mercury' Project?

"Not just a 'Messenger of Gods, the closest planet to the sun, or a liquid metal element, Mercury is the project name given to the replacement of our ageing AIS system".

As referenced in the 'What is AIM?' and 'Achieving AIM' fact sheets, the Mercury Project was initiated by Airservices Australia to deliver core capability against the AIM objective.

Whilst the purpose of the Mercury Project is to replace our ageing 'Aeronautical Information Services (AIS)' system with a contemporary, standards compliant system, it is also recognised as an enabling project for ATM capability.

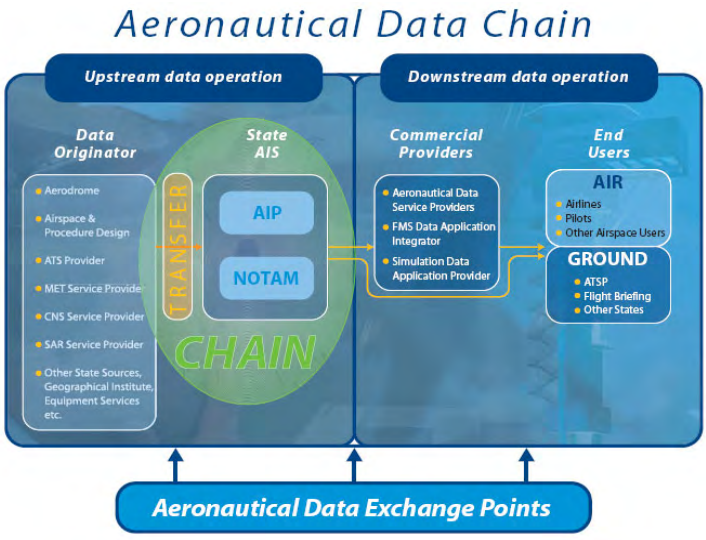
What will Mercury deliver?

To explain the full potential of Mercury, we should begin with explaining what services the AIS function currently provides to industry.

Traditional AIS (i.e. in accordance with ICAOs Annex 4 and 15 SARPs) is about the timely production and delivery of aeronautical information products to aviation users. These products or documents (called the 'Integrated Aeronautical Information Publication (IAIP)') provide information on flight rules, aerodromes, runways, weather, instrument approach and departure procedures, geographical and route information, aeronautical maps, and any other information considered essential to the safety and efficiency of air traffic management. Publication of these documents is in accordance with ICAOs 'Aeronautical Information Regulation and Control (AIRAC)' dates – which are a defined set of internationally agreed dates for the publication, distribution and implementation of aeronautical information updates.

Understanding that published aeronautical information is used by airlines, aircraft FMS, pilots and ATCs to assist with the processing of air traffic from departure to destination, it is consequently essential that AIS data management processes provide assurances over the integrity and quality of this information. Minimal manual handling of AIS data throughout its lifecycle is ideal, as it is the repetitive transcribing and manual re-entry of information that may compromise its integrity.

The lifecycle of AIS data involves many processes, often referred to as 'upstream' and 'downstream' data operations. Upstream operations begins with the capture and verification of data changes (i.e. from Airports, CASA, BoM, ATC, Procedure / Airspace Designers, RAAF, etc), and includes all other activities up to and including the publication of those changes. Downstream operations represent the distribution, application and integration of AIS amendments.



Sourced from Eurocontrol website on the CHAIN initiative: http://www.eurocontrol.int/aim/public/standard_page/qm_dataintegrity.html

Even in this digital age, the distribution of AIS products continues to rely on paper documentation, charts and telex-based text messages. Additionally, although we have automated some of our AIS processes, we also rely on a significant amount of

What will Mercury deliver? – cont'd.

manual handling and re-entry of data into the various ATM information systems, in order to achieve all upstream and downstream operations (e.g. TAAATS).

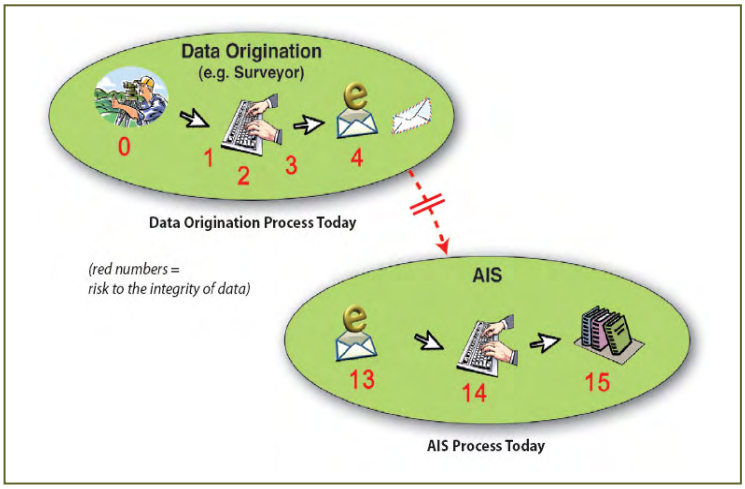


Diagram sourced from the Eurocontrol website on the CHAIN initiative: http://www.eurocontrol.int/aim/public/standard_page/qm_dataintegrity.html

The AIS systems currently used by Airservices Australia rely on a legacy (i.e. built and maintained in-house) Aeronautical Database Management System (ADMS) that is now more than 15 years old, together with various legacy software components used to automate the production of the ERSA and AIP pilot charts. The maintenance and enhancement of these ageing legacy applications are becoming increasingly complicated and expensive, while their capacity to satisfy operational requirements is diminishing with time.

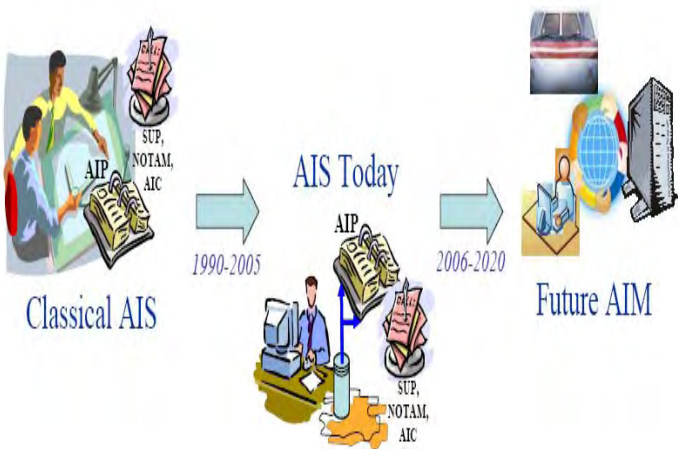
The AIS team also relies on certain commercial software components to assist with the production of aeronautical charts, desktop publishing software for the compilation of AIP documents and procedure design tools. These commercial software components do not integrate well with ADMS, thereby introducing inefficiencies and highlighting an ongoing dependency on manual processes for completing repetitive and complex data management and design activities.

The Global 'Aeronautical Information Management (AIM)' vision is to provide quality-assured, timely information to ATM systems, using international standards for the management and exchange of aeronautical information. This standard is called the '**A**eronautical **I**nformation e**X**change **M**odel (AIXM)'.

Although a relatively new standard, AIS systems compliant with this standard are now being implemented around the world. These systems will facilitate interoperability with other ATM systems and applications, as long as they are also AIXM compliant.

For example, if the AIS database and associated AIS applications (e.g. charting, procedure design, AIP production, etc) are AIXM compliant, then each application is able to easily exchange information with the database. This interoperability enables the automation of AIS processes – as information need only be recorded once in the database, and can be readily accessed and referenced by each application. Consequently, data integrity is improved because the information is recorded once in the database and application processes for accessing and applying this information are handled automatically (instead of manually).

The Mercury Project will acquire and implement an AIXM compliant AIS system, replacing ADMS with a new 'Reference Data Store (RDS)' for aeronautical information. Mercury will also implement AIXM compliant applications (for charting, procedure design, AIP, etc) that are fully integrated with the RDS. This will not only introduce operational efficiencies in our AIS processes, but increase assurances over the quality and integrity of aeronautical information. Ultimately, our AIS systems will be able to seamlessly exchange information with other ATM systems – enabling concepts such as 'Collaborative Decision Making (CDM)' to become a reality.



AAITF TASK LIST

(Last updated ~~June 2008~~February 2009)

	ACTION ITEM	TIME FRAME	RESPONSIBLE PARTY	Status	REMARKS
~~1.~~	~~Consider a standard model for the electronic exchange of aeronautical information.~~	~~Immediate~~	~~ICAO~~	~~Ongoing~~ Closed	~~APANPIRG/17 (August 2006) supported conclusions and recommendations of the AIS Congress (June 2006, Madrid) and adopted conclusion 17/14 to promote the development and implementation of data system that provides timely, accurate and high integrity data.~~ ~~A new Study Group was established – AIS-AIMSG for this purpose.~~
~~2.~~	~~Investigate the differences between EUROCONTROL OPADD (Operating Procedures for AIS Dynamic Data) and the current Asia/Pacific OPADD.~~	~~Ongoing~~	~~Work Group, Japan/New Zealand~~	~~Ongoing~~ Completed	
~~3.~~	~~Reinforce to States the critical safety nature of AIS and adherence to Annex 15 provisions, in particular those relating to AIRAC, as well as the need to ensure accurate and timely publication of AIS data.~~	~~Immediate~~	~~ICAO, All States, Chairman~~	~~Ongoing~~ Completed	~~APANPIRG/17 (August 2006) agreed that the text of Conclusion 14/9 continued to adequately describe the long standing regional concerns in this respect and should be further promulgated. The meeting elected to adopt Conclusion 17/17, incorporating and superseding Conclusion 14/9.~~
~~4.~~	~~Provide assistance to hold AIS automation and eTOD seminar/workshop in 2009~~	~~February/March/April 2009~~	~~Task Force, Japan, Chairman~~	Completed	~~Requested at AITF/3~~

	ACTION ITEM	TIME FRAME	RESPONSIBLE PARTY	Status	REMARKS
~~5.~~	~~Prepare a working paper to examine effective AIRAC time in Asia and Pacific Region~~	~~AITF/4~~	~~Republic of Korea~~	Completed	~~Raised at AITF/3~~
6.	Prepare a working/information paper to examine AIRAC system ~~notification~~adherence in India	AAITF/~~4~~5	India		Raised at AITF/3
7.	Report on the outcome of the AIS-AIM Study Group	AAITF/5	Japan		Raised at AAITF/4
8	Provide an update on its AIS automation project Mercury and also inform the Task Force regarding collaboration with other States that may have emerged	AAITF/5	Australia		Raised at AAITF/4
9	Lead further discussion and research regarding AIRAC time in Asia and Pacific Regions	AAITF/5	Chairman		Raised at AAITF/4