Digital NOTAM

The Digital Age

Cooperative Network Design

EUROCONTROL

What is a Digital NOTAM

Event

Current 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."

Digital aeronautical information update

"A **data set** made available through digital services containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to systems and automated equipment used by personnel concerned with flight operations."

EFFICIENCY - direct gains
SAFETY - through data quality

Data quality

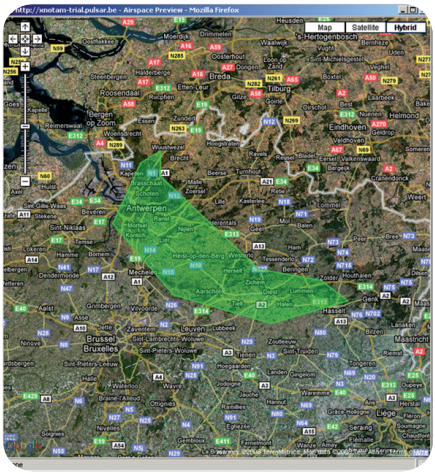
Information provided as Digital NOTAM is suitable for automatic checks, which should ensure better compliance with the ICAO standards and recommended practices and improved coherence and correctness. Digital aeronautical data also facilitates graphical representation, which enables visual checks by human operators. This will eliminate the risk of mistyped or missing data, which is a common problem of the current text NOTAM.

Digital Services

The ultimate goal is a fully graphical, continuous briefing process from the flight planning phase, followed by pre-flight briefing, in-flight updates and post-flight de-briefing. The same information package will be available on the ground and in the air, continuously updated.

SESAR – the common picture for all actors

For the advanced air traffic management concepts to work, a common and accurate situational awareness is required by all actors. People and automated systems shall have access to and work with a common, up-to-date data set. Obviously, this includes the information that is currently distributed by NOTAM messages.



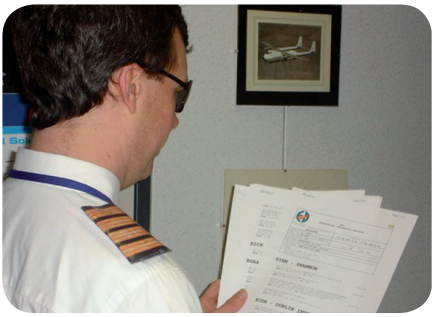
CAPACITY - enabler

Enhanced pre-flight briefing (PIB)

This is one radical improvement enabled by digital NOTAM, which now allows applying critical human factors aspects in the design of the PIB:

- prioritise critical information;
- organise information by item concerned (runway, gate, etc.);
- embed graphics where appropriate ("a picture is a thousand words");
- filter out irrelevant information, which can represent more than 50% of the current bulletins;
- reduce the risk of information overload, which is a growing problem because of the significant increase in the number of NOTAM in force world-wide.

These are not possible today because of the free text format of the current NOTAM messages.



Fully computer readable

Digital NOTAM 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 characteristics of a digital NOTAM include:

- **Geo-referenced** - the information can be automatically plotted on a chart;
- **Temporal** - the effective time can be computer interpreted;
- **Linked to static data** - the change is cross-referenced to the baseline information;
- **Transformable** – the information can be converted into any graphical or textual output, including the existing ICAO NOTAM format;
- **Query Enabled** - a computer system can use complex queries to select temporary and last minute updates of interest based on user-specified criteria;
- **Electronically distributable** - the information can be directly transmitted and incorporated into other computer systems without manual intervention.

Data model – AIXM 5.1

Data model – AIXM

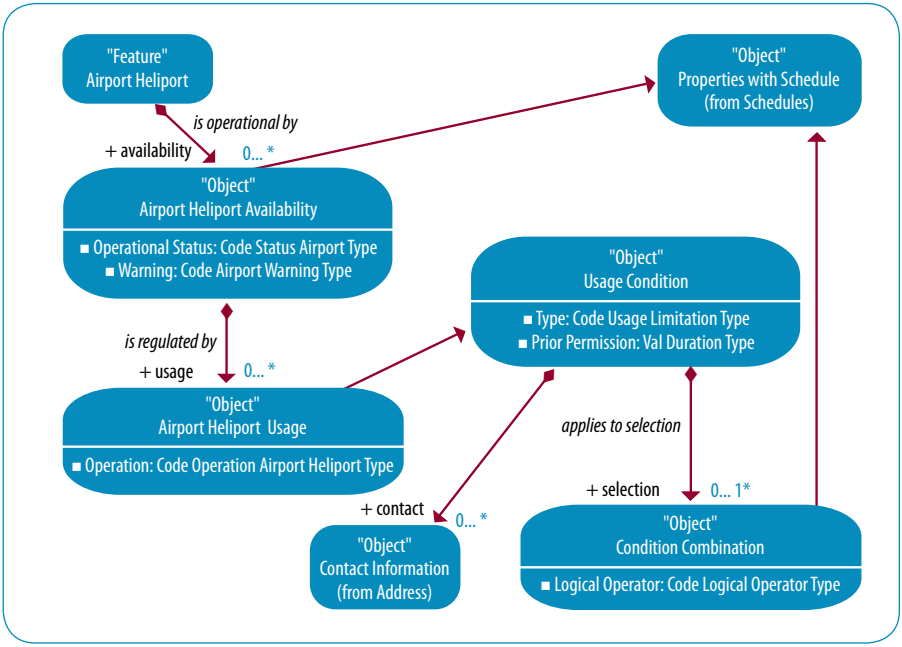
To implement Digital NOTAM, a comprehensive computer model for aeronautical information is needed. The Aeronautical Information Exchange Model (AIXM) version 5.1 is one such model, developed in cooperation between EUROCONTROL and FAA, with the support of the international AIS community.

This is an evolution of earlier AIXM versions, which are used in practice in the European AIS Database (EAD), for the central database and locally in States that are connected to it on a system-to-system basis.

From a high level point of view, AIXM covers:

- Aerodrome/Heliport data
- Navigation Aids
- Terminal procedures
- Airspace and route structure
- ATM and related services
- Traffic restrictions
- Other data related with the above major concepts

AIXM provides both a data model covering these areas of interest and a data encoding specification, which is based on the Geography Markup Language (GML).



AIXM 5.1 provides an extensible, modular aeronautical information exchange standard that can be used to satisfy information exchange requirements for current and future aeronautical information applications, including:

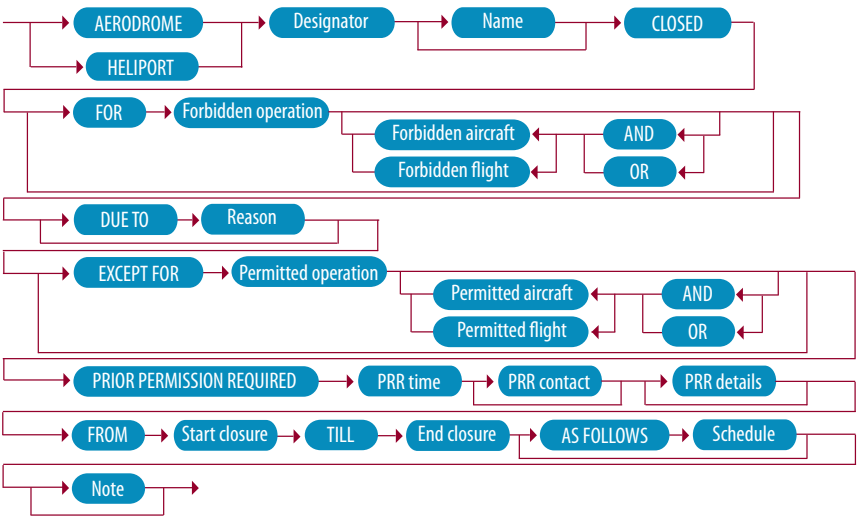
- Automated production of Aeronautical Information Publications (AIPs)
- Automated aeronautical chart creation and publication systems
- Digital NOTAMs
- Aerodrome Mapping Databases (AMDBs) and related applications
- Cockpit situational displays and Flight Management System (FMS) data requirements

Digital NOTAM Scenarios

Common encoding and data validation rules will be key for the successful implementation of the Digital NOTAM concept. Each category of events (runway closure, navaid unserviceable, airspace restriction, etc.) needs to be identified in order to specify the rules that are specific for that type of event.

A Digital NOTAM Event Specification is being developed for this purpose. The work initially done in parallel by Eurocontrol and by the Federal Aviation Administration (FAA) of United States is being merged in a single document, which aims for global applicability.

Template



Implementation in Europe

The deployment of the Digital NOTAM in Europe requires the existing systems to be upgraded to support AIXM version 5.1, both for static and dynamic data. In order to support the initial operating capability foreseen by the European ATM Master Plan by 2012, the European AIS Database (EAD) has started the migration process towards AIXM 5.1

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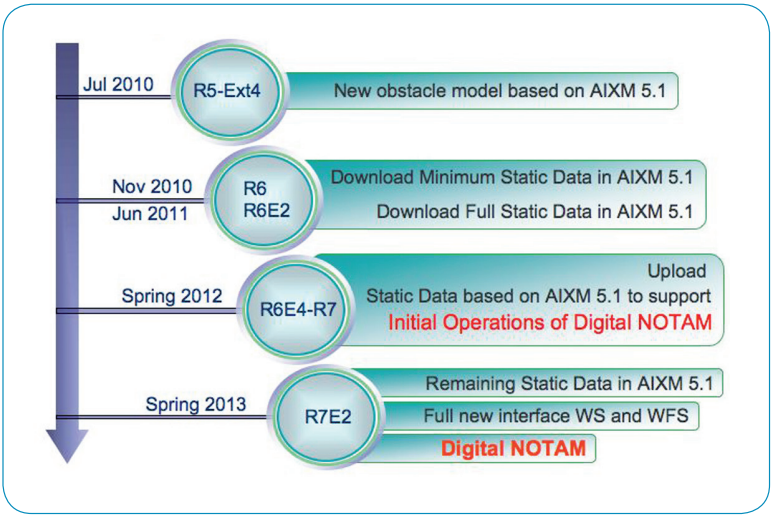
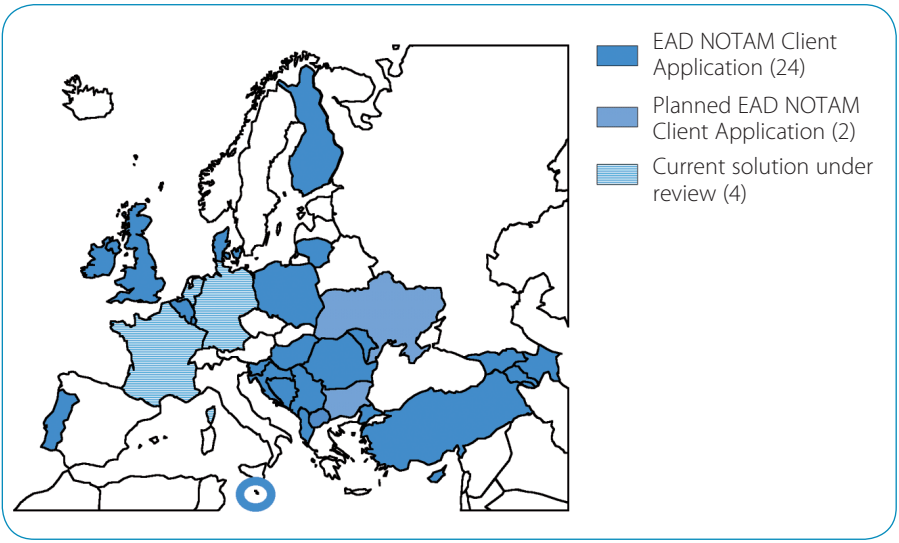


EAD: AIXM 5.1 and Digital NOTAM implementation timetable

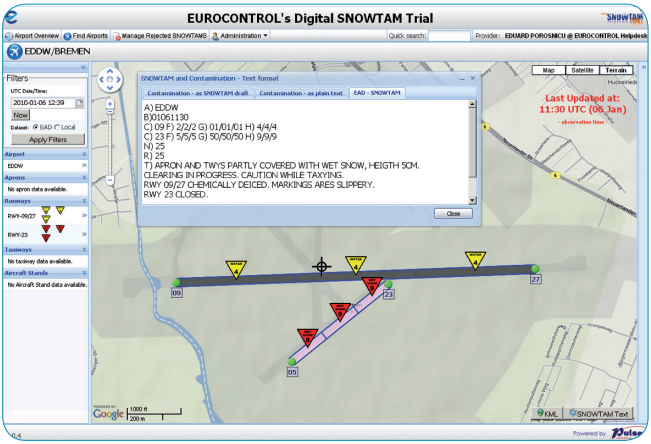
All the European States depend on the EAD capabilities to comply with the ATM Master Plan and/or need to align their implementation planning with the EAD AIXM migration planning.

A vast majority of ANSPs do currently fully rely on the EAD to create and/or publish their NOTAM and distribute the briefings to their users.

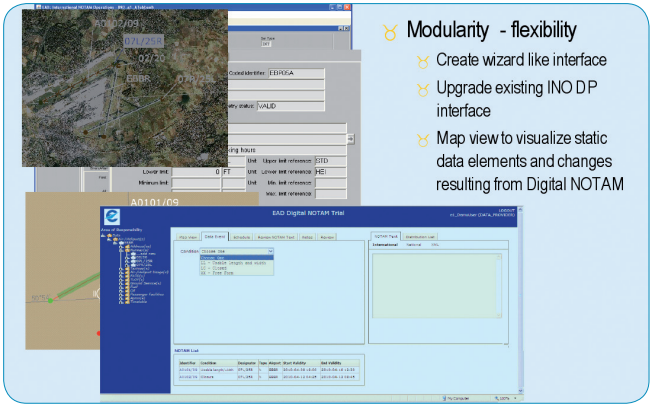


Trials and Prototyping

Two major Trials took place in Europe, in order to validate the maturity of the Digital NOTAM concept and to identify the most efficient implementation approach. The initial "xNOTAM Trial" of 2008 was followed by a "Digital/Graphical SNOWTAM Trial" in 2009-2010, which has also involved test clients from airline operational centers.



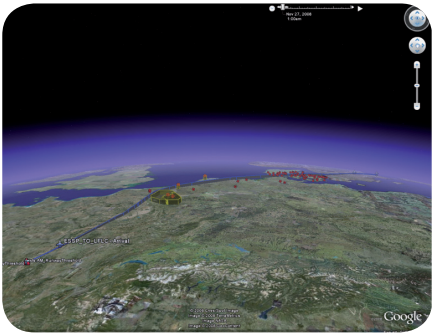
An EAD Digital NOTAM prototype focussing on the data provision has been started end 2009, in order to identify the most efficient and user friendly way for integrating Digital NOTAM capabilities in the EAD applications. By end 2010, this will be followed by a detailed description of the specifications to prepare for implementation in 2011.



Stakeholder Consultation

Digital NOTAM and the AIXM 5 development have been constantly presented to and supported by a broad spectrum of stakeholders including through dedicated workshops. The implementation roadmap for Digital NOTAM in the European Area is being developed in consultation with the key stakeholders – national regulators and service providers, EAD, commercial service providers, airlines, etc.

The goal is to minimise the ANSP implementation costs while also enabling a sufficiently rapid development of the benefits at the level of the whole ATM system. For this purpose, based on pre-operational Trials and in consultation with the stakeholders, an incremental approach was selected.



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