AIXM/WXXM Conference
4th-6th of May 2010
Washington, DC

AIXM – European operational developments

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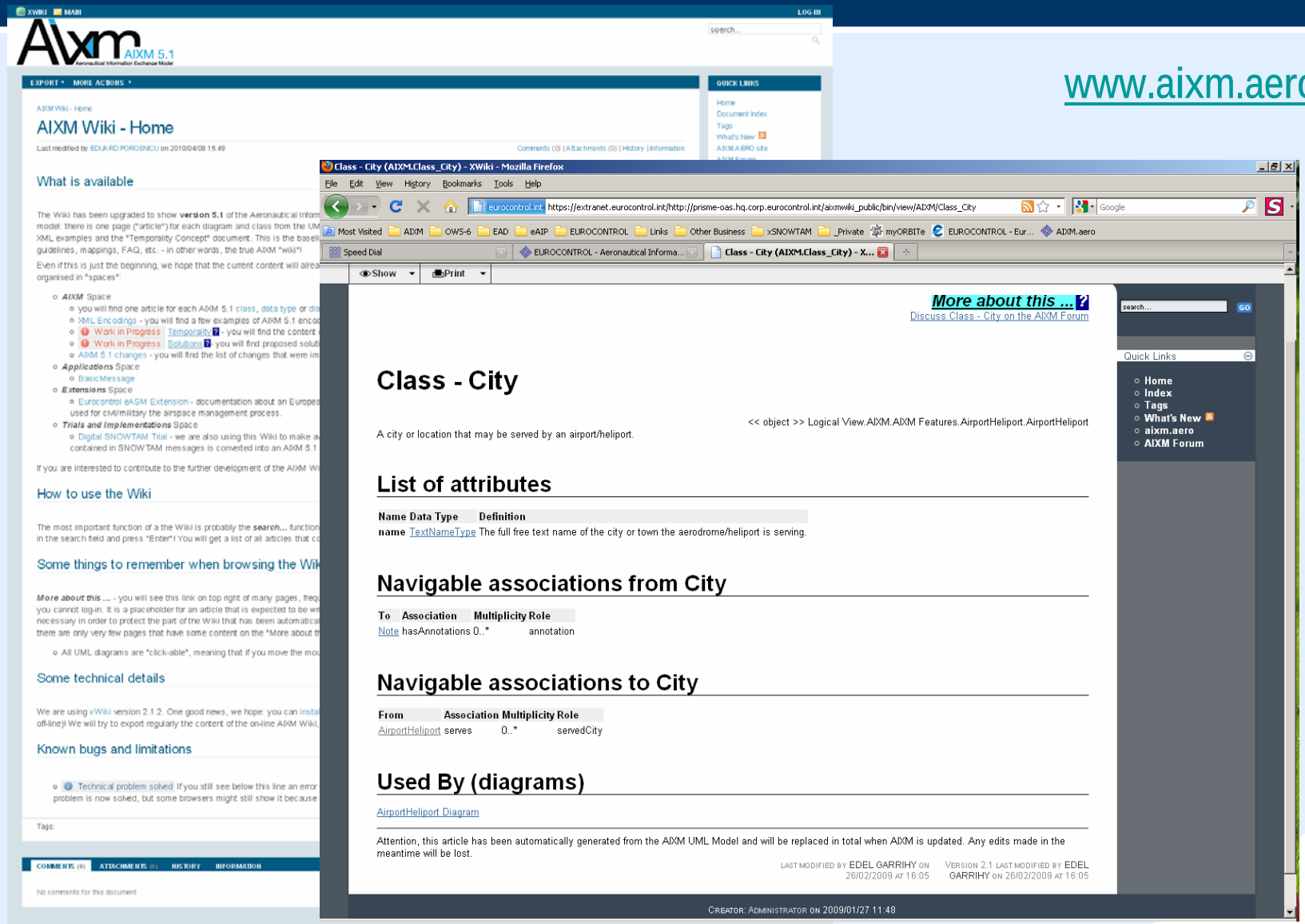
Content

- AIXM 5.1 documentation enhancements
- Digital NOTAM Concept finalization
- Start of implementation

AIXM 5.1 documentation enhancements

AIXM - Wiki

www.aixm.aero/wiki



Mapping AICM 4.5 -> AIXM 5.1

egis avia
Sofréavia

OBSTACLE

geoLat
geoLong

txtName
txtDescrType[1]
codeGroup[2]
codeLgt[3]
txtDescrLgt
txtDescrMarking
codeDatum
valGeoAccuracy
uomGeoAccuracy
valElev
valElevAccuracy
valHgt
valGeoidUndulation
uomDistVer
valCrc
txtVerDatum
txtRmk

Vertic
name [txtNa
lighted [cod
group [code
1..*
Vertical
verticalExte
@uom [u
type [txtDes

Microsoft Excel - Revision Sheet - AIXM 4.5 to 5.1 Mapping - v0.8.xls

	B	C	D	E	F
3	Document Title			AIXM 4.5 to AIXM 5.1 Mapping Guidelines	
5	Document Reference			AIXM-45-51-Mapping	
7	Document Issue			0.8	
9	Reviewer			Insert your company/name here	
11	Page	Para	Category	Comment	
12	18.	2.2	editorial	txtDescrRefPt is written in italics, meaning, according to the convention that it is mapped according to the special rules provided in the annex. Although this is an elegant and optimised (reduces duplications) solution, it makes the document less readable, because you do not see immediately in which Annex to look.	I would recommend for the attributes mapped to notes to specifically indicate that in each diagram. For example with a small superscript "Note" after the name of the attribute.
13	24.	2.5	comment	The mapping does not seem correct because it looks as the mapping also creates a NavaidEquipment of type VOR.	Merge this mapping with the mapping of the individual navaid types?
14	26.	2.6	comment	This mapping is incomplete, because it does not indicate what type of ObstacleArea is needed.	Include the EAD mapping guidelines for Obstacles, which are more detailed.
15	27.	2.7	question	Questions related to the 5.1 geometry: 1. why only GM_Ring? where is the LinearRing represented? 2. from the ElevatedCurve, why only ArcByCenterPoint and Geodesic? where are the rest of supported curves (e.g. LineStringSegment, Circle, etc.)	If, for any reason, the particular geometries are excluded, the reason should be stated.
16	27.	2.7	comment	ElevatedPoint indicates gml:pos is derived from "[geoLat geoLong]". This might be interpreted as the prescribed order (lat then long value) which is not true. The order of the coordinates in the gml:pos tuples is dependent on the srsName resource.	Explain in the Annex that gml:pos is to be constructed in agreement with the srsName declaration
	245.	A1.1	comment	From our experience on further analysing the srsName values, we came up to the following conclusion: codeDatum cannot be mapped over geodetic datum URNs simply because they don't	Review the datum / srsName mapping table based on the wo done in the EAD for the mapping of the obstacle data.

Consolidated
Ready

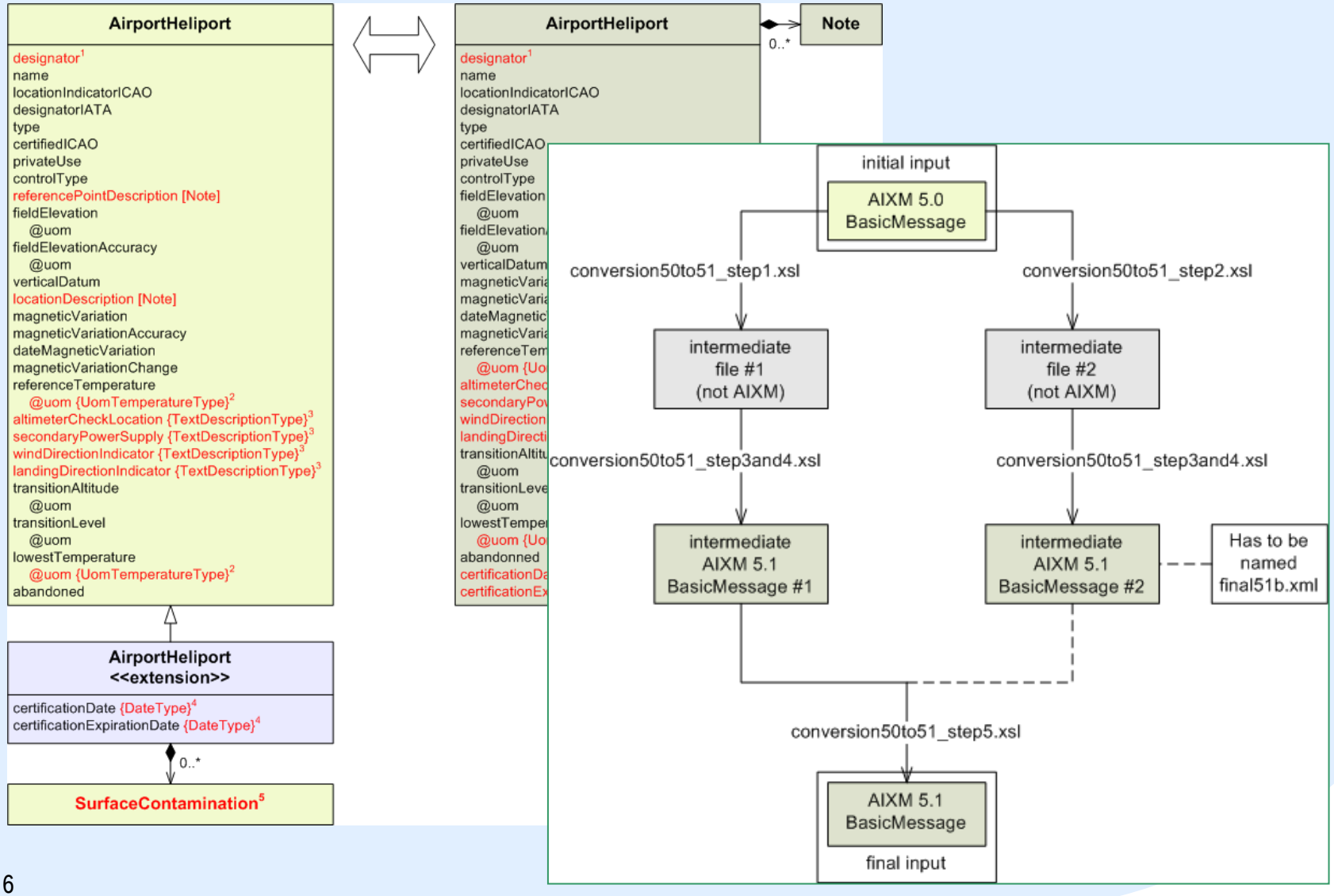
Note
rtyName [name of the attribute]
se[1]
1..*
LinguisticNote
[content of the attribute]
ang[3]
si:nil[2]
ilReason[2]

warning
<<codelist>>
WIP
PARKED_ACFT
FAILAID
SECONDARY_POWER
SPOWER
OTHER
OTHER

- Draft Version "0.8" posted for review on the AIXM forum on Feb 24th, 2010 - Your feedback is welcome.

EUROCONTROL

AIXM Mappings 5.0 <-> 5.1



Business Rules

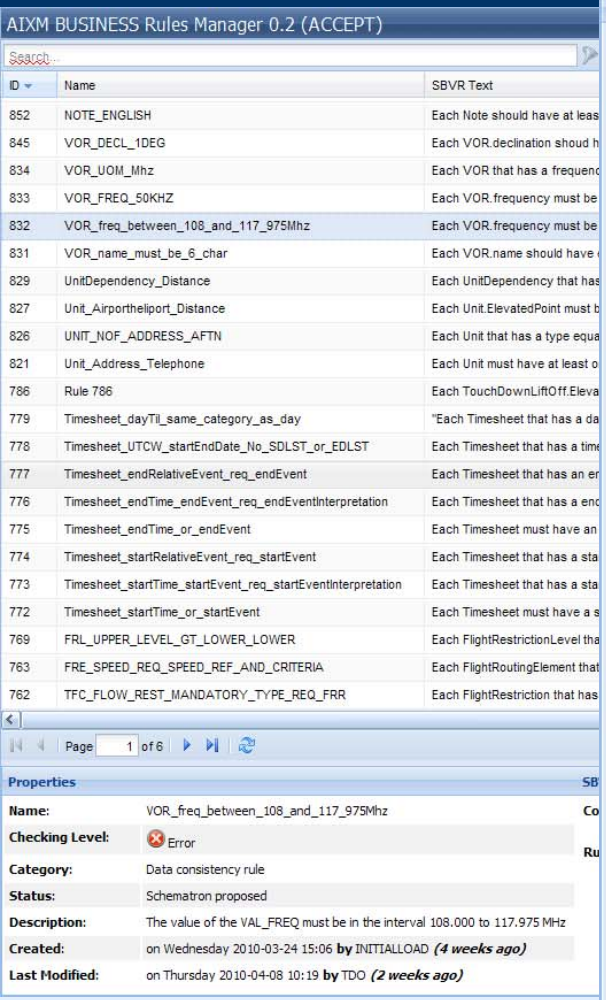
- Constraints on the business extracted from official documents
  - consistency rules, recommended practices, coding rules, etc.
- AIXM 4.5 examples
  - "*All geographical coordinates should be expressed in the WGS 84 system*"
  - "*The geographical distance between the position of the DME and the position of the related VOR must be less than 30 metres if the VOR is located at an aerodrome/heliport*"
  - Etc.
- Apply SBVR
  - Semantics of Business Vocabulary and Business Rules v1.0" published by OMG in January 2008
- Schematron encoding
  - Proof-of-concept – "AIXM Rule Checker" tool - ARC

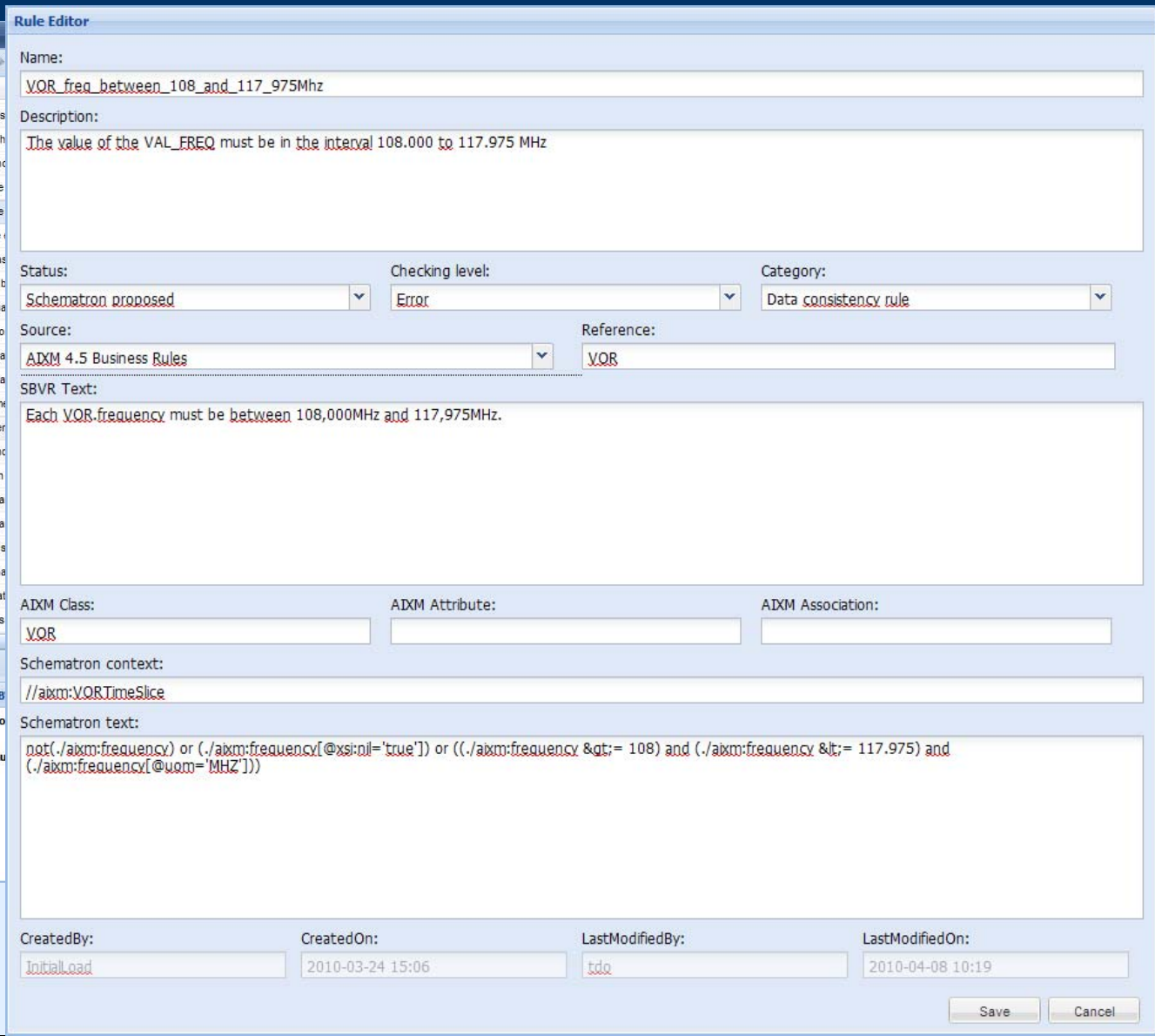
Business Rules

	Source	§	Rule textual description	Comments	XSD Rule	AIXM Class	AIXM Attribute	AIXM Association
60	AIXM 4.5 Bus	ILS_GP	Each Glidepath.slope must be between 1deg and 5deg	The value of the VAL_SLOPE has to lie between 1 and 5 degrees [Data plausibility rule - Source: AIXM]		GlidePath	slope	
61	AIXM 4.5 Bus	ILS_LLZ	Each Localizer.frequency must be between 108Mhz and 111,975Mhz	The value of the VAL_FREQ has to lie between 108 MHz and 111.975 MHz [Standard - Source: ICAO Annex 10, Vol. 1, section 3.1.3.2]		Localizer	frequency	
62	AIXM 4.5 Bus	ILS_LLZ	Each Localizer.frequency should have a uom equal to 'MHz'	As a plausibility rule, the value of the UOM_FREQ should be 'MHz' [Standard - Source: ICAO Annex 10, Vol. 1, section 3.1.3.2]		Localizer	frequency	
63	AIXM 4.5 Bus	MKR	Each MarkerBeacon.frequency must be equal to 75Mhz	The value of the VAL_FREQ must be 75 (MHz) [Standard - Source: ICAO]		MarkerBeacon	frequency	
64	AIXM 4.5 Bus	MKR	Each MarkerBeacon.frequency must have a uom equal to 'Mhz'	"The value of the UOM_FREQ must be MHz if VAL_FREQ is specified. [Standard - Source: ICAO] "		MarkerBeacon		
65	AIXM 4.5 Bus	MLS_AZIMUTH	Each Azimuth.angleCoverLeft must be greater than Azimuth.angleProportionalLeft	VAL_ANGLE_COVER_LEFT must be greater than VAL_ANGLE_PROP_LEFT [Consistency rule - Source: AIXM]		Azimuth	angleProportionalLeft	
66	AIXM 4.5 Bus	MLS_AZIMUTH	Each Azimuth.angleCoverRight must be greater than Azimuth.angleProportionalRight	VAL_ANGLE_COVER_RIGHT must be greater than VAL_ANGLE_PROP_RIGHT [Consistency rule - Source: AIXM]		Azimuth	angleProportionalRight	
67	AIXM 4.5 Bus	MLS_ELEVATION	Each Elevation.angleNominal must be greater than Elevation.angleMinimum	VAL_ANGLE_NML must be greater than VAL_ANGLE_MNM [Consistency rule - Source: AIXM]		Elevation	angleNominal, angleMinimum	
68	AIXM 4.5 Bus	MSA	Each SafeAltitudeAreaSector that has exactly one SafeAltitudeArea.type equal to 'MSA' must have exactly one CircleSector.lowerLimit that is at least 300 M.	The value of VAL_DIST_VER cannot be less than 300 metres		SafeAltitudeAreaSector		
69	AIXM 4.5 Bus	NAVAID_LIMITATION	Each RadioFrequencyArea that has a type equal to 'COV' must have at least one CircleSector.outerDistance	If CODE_TYPE='CVR' ('coverage'), then VAL_DIST_OUTER is mandatory		RadioFrequencyArea		
70	AIXM 4.5 Bus	NAVAID_LIMITATION	Each RadioFrequencyArea that has a type equal to 'SCL' must have an angleScallop	If CODE_TYPE='SCL' ('scalloping'), then VAL_ANGLE_SCALLOP is mandatory		RadioFrequencyArea		
71	AIXM 4.5 Bus	NAVAID_LIMITATION	Each CircleSector that has an outerDistance and that has an innerDistance must have CircleSector.outerDistance greater than CircleSector.innerDistance	VAL_DIST_OUTER must be greater than VAL_DIST_INNER		CircleSector		
72	AIXM 4.5 Bus	NAVAID_LIMITATION	Each CircleSector that has a lowerLimit and that has an upperLimit must have CircleSector.lowerLimit that is at most CircleSector.upperLimit.	If both VAL_DIST_VER_LOWER and VAL_DIST_VER_UPPER are specified, then the value of the lower limit must be smaller than or equal to the value of the upper limit (when converted to a common unit of measurement and reference system)		CircleSector		
73	AIXM 4.5 Bus	NAVAID_LIMITATION	Each RadioFrequencyAera that has an angleScallop must have a type equal to 'SCL' or 'COV'	VAL_ANGLE_SCALLOP may be specified only if CODE_TYPE is 'SCL' or 'CVR'		RadioFrequencyArea		
74	AIXM 4.5 Bus	NDB	Each NDB.name should have exactly 6 letters	TXT_NAME should, if possible consist of 6 letters [Standard - Source: ICAO Annex 11, Appendix 2, paragraph 2.1.2]		NDB	designator	
75	AIXM 4.5 Bus	NDB	Each NDB.frequency must be between 190kHz and 1750kHz	The value of the VAL_FREQ must be in the interval 190 to 1750 kHz. [Standard - Source: ICAO Annex 10, Vol. 1, section 3.4.4.1]		NDB	frequency	
76	AIXM 4.5 Bus	NDB	Each NDB.frequency must have a uom equal to to 'kHz'	The value of the UOM_FREQ must be kHz.[Standard - Source: ICAO Annex 10, Vol. 1, section 3.4.4.1]		NDB	frequency	
77	AIXM 4.5 Bus	ORG_AUTH	Each OrganisationAuthority that has a type equal to 'ORG', 'INTL_ORG', 'ACFT_OPR'	"For every organisation/authority having CODE_TYPE = 'O', 'IO', 'AOA', 'HA', 'A' or 'ATS', there must be at least one postal address and one		OrganisationAuthority		

Business Rules

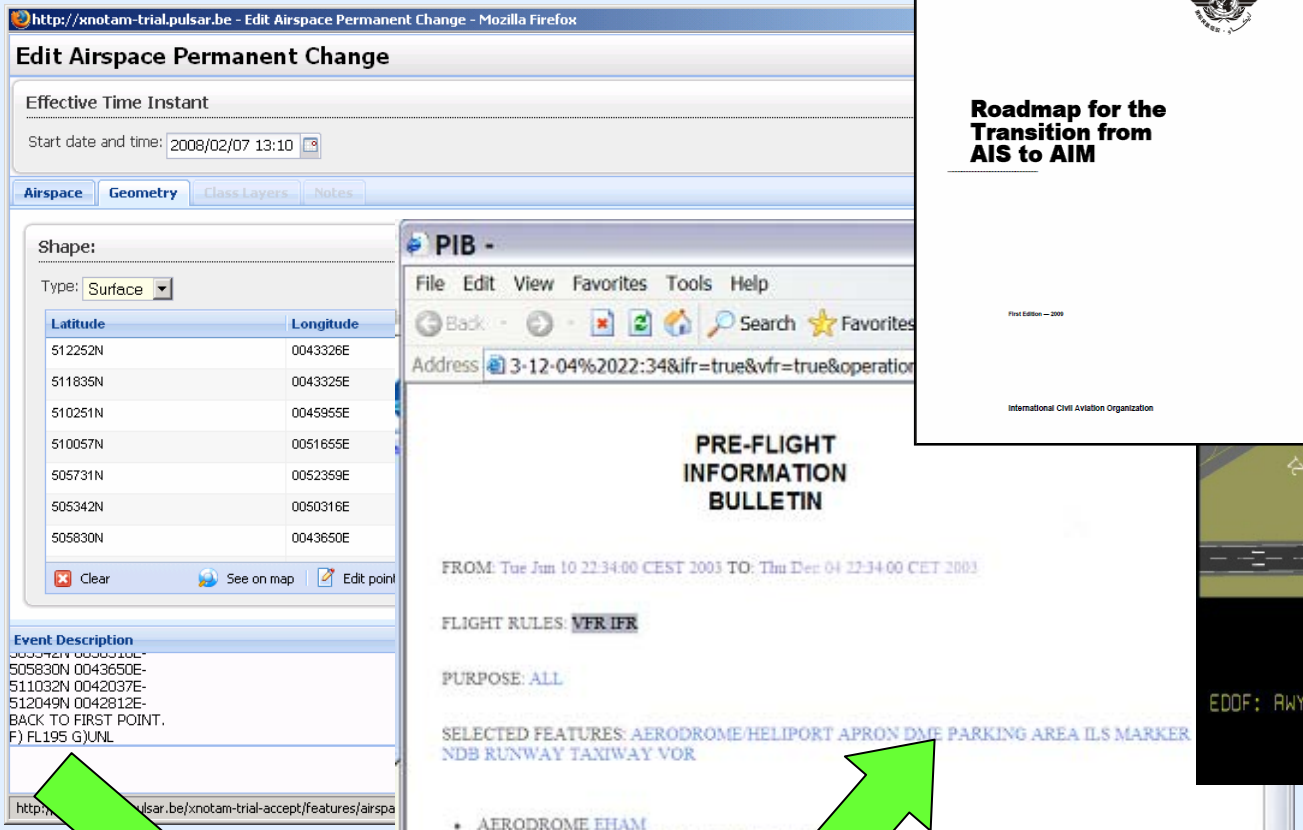
"*Rule Manager*"

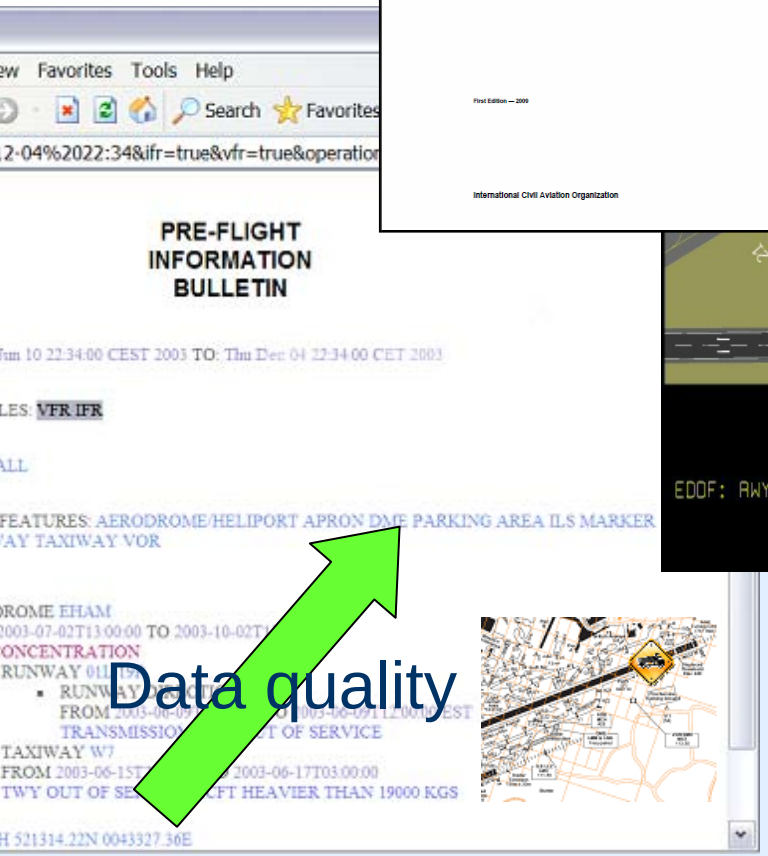


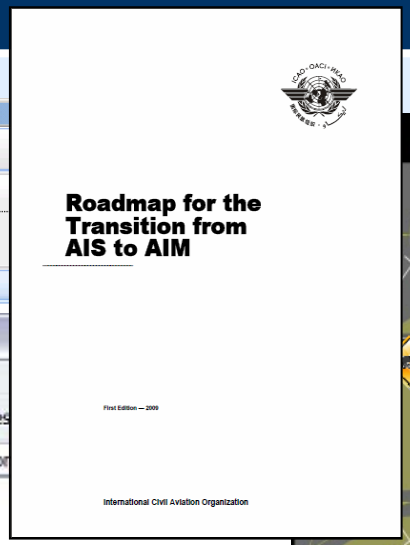


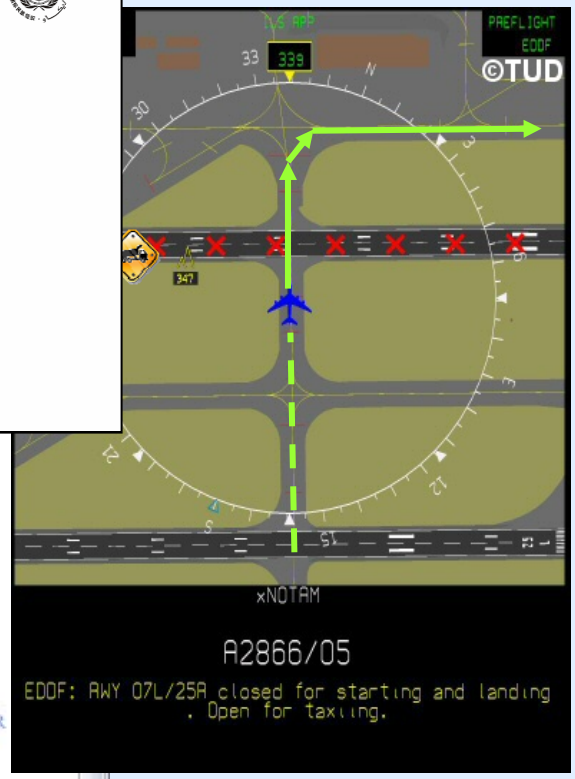
Digital NOTAM – Concept finalization

Benefits





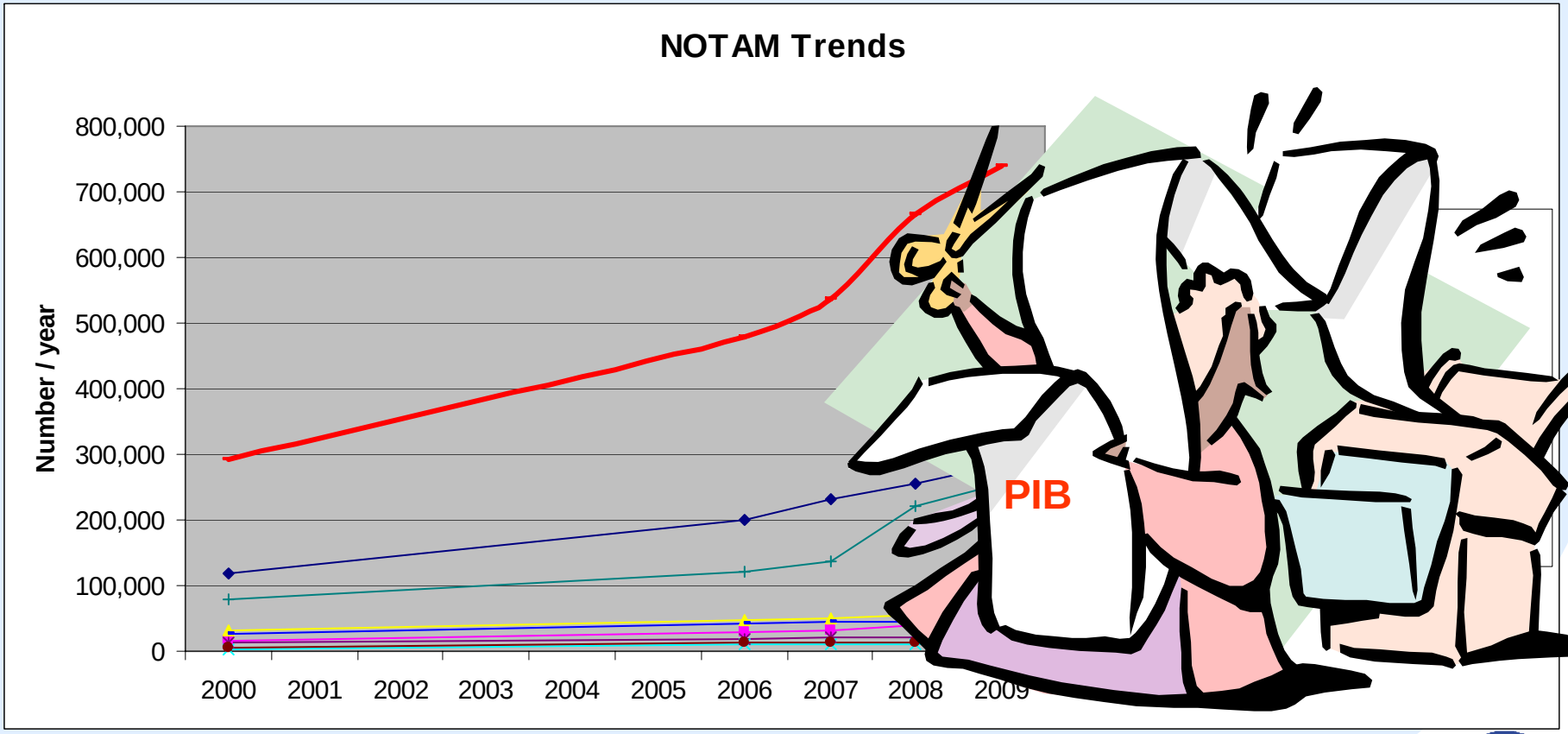




Manual workload

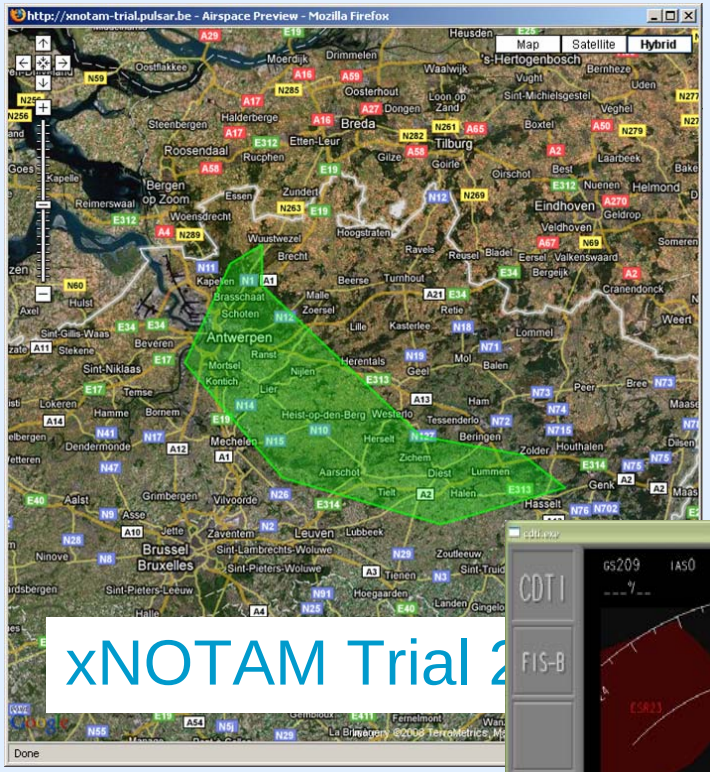
Data quality

Do nothing – not an option



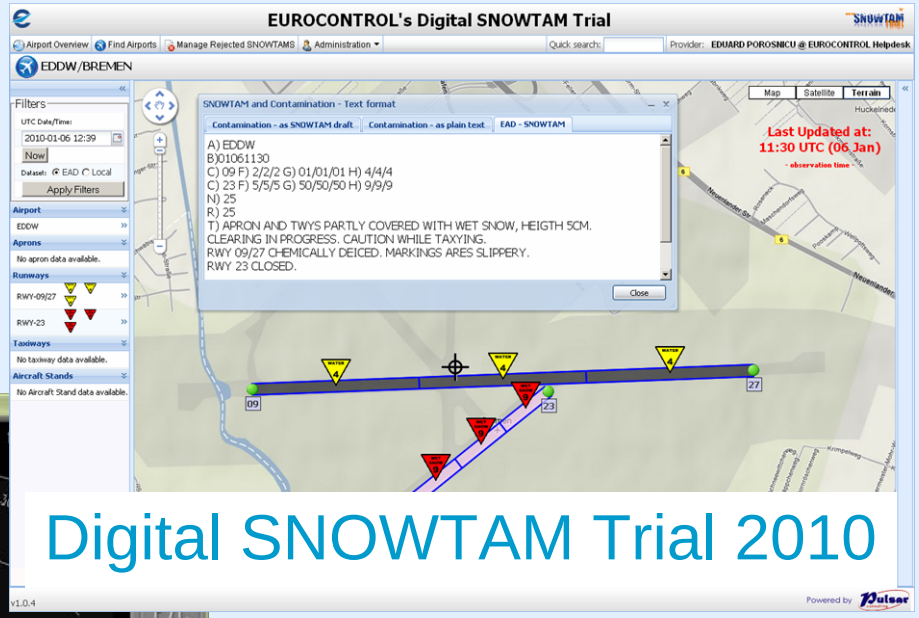
Source: European AIS Database (EAD)

Concept validation



xNOTAM Trial 2

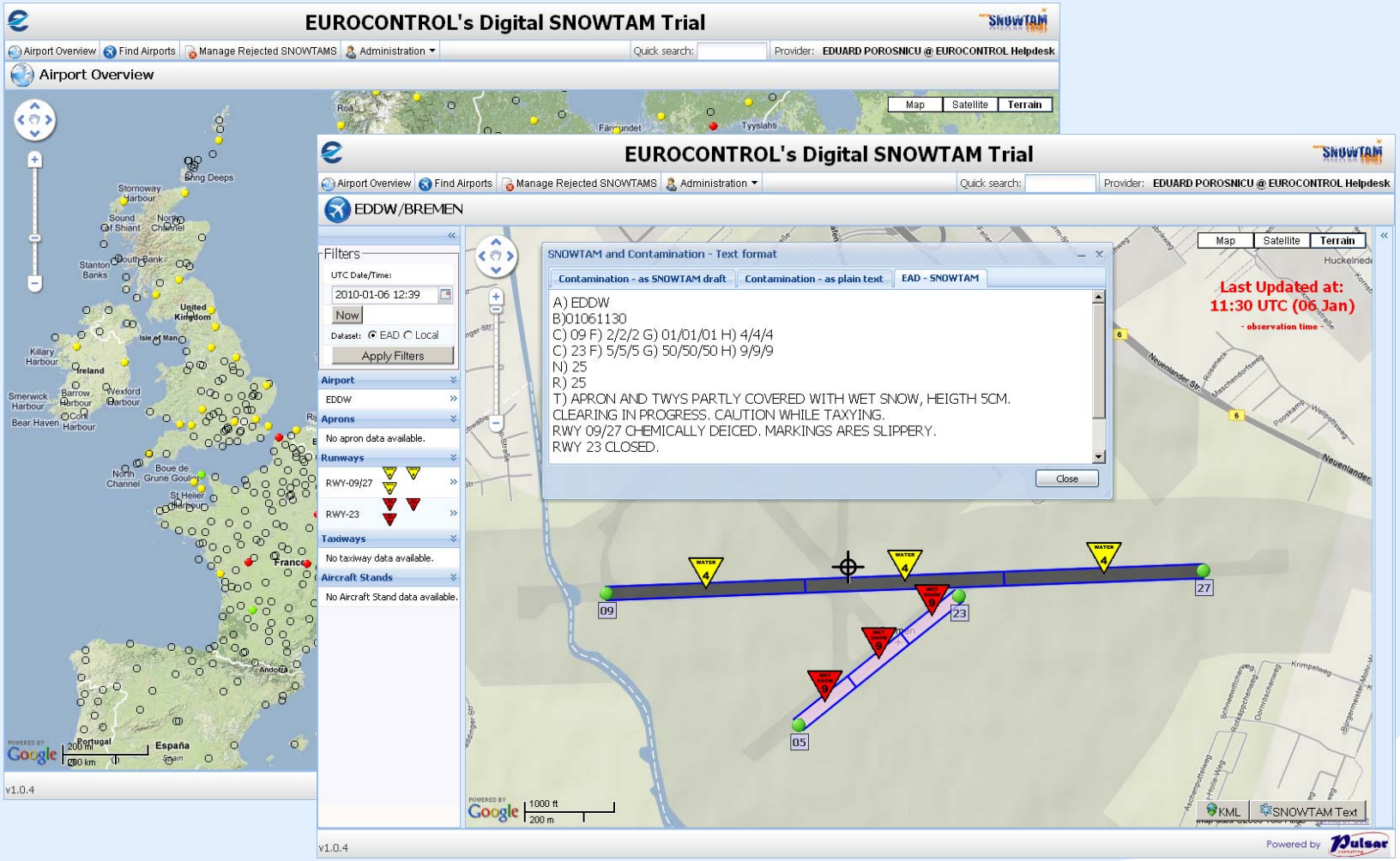
D-AIM Trial 2008



Digital SNOWTAM Trial 2010

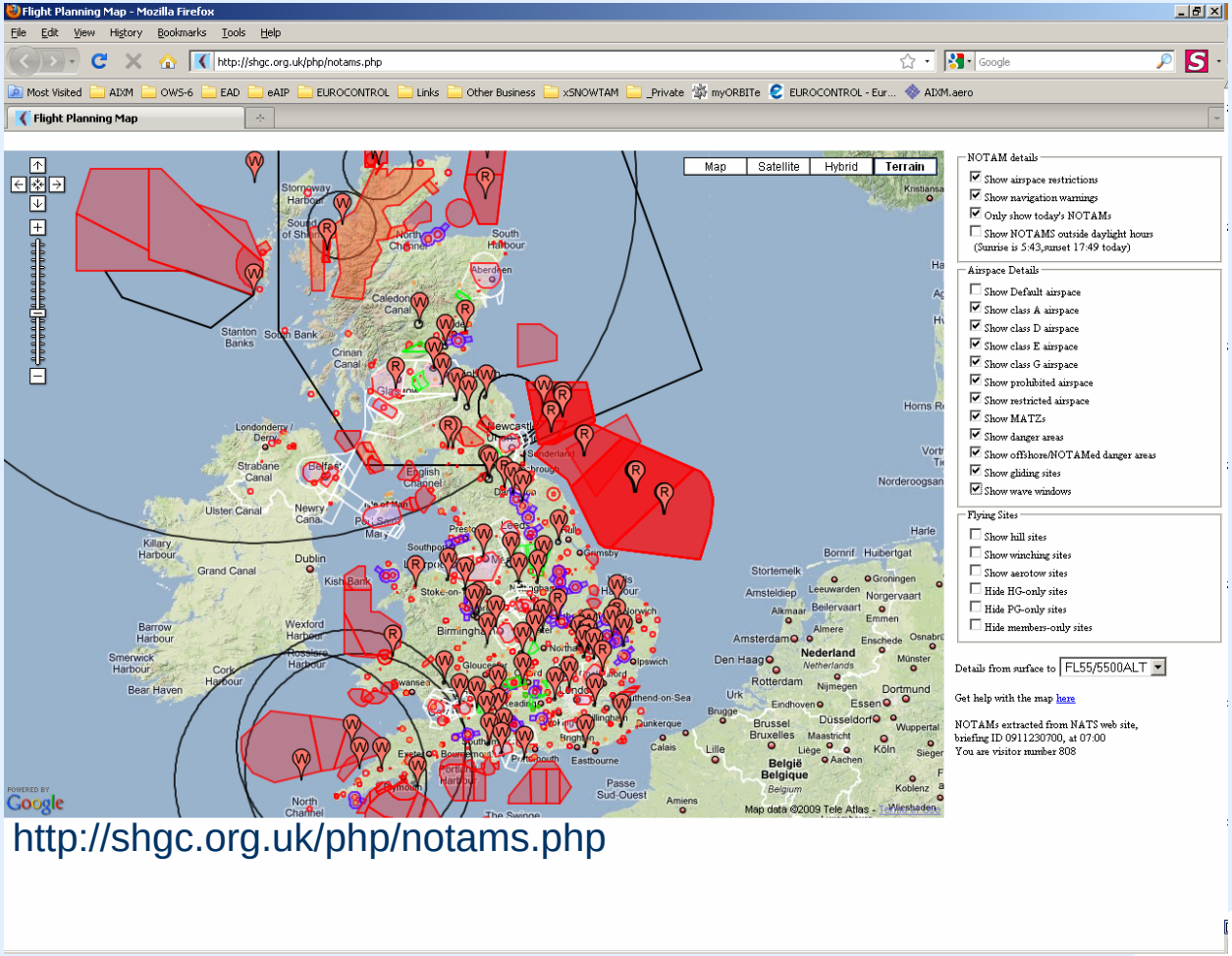
Realistic short term benefits

- Graphical SNOWTAM – very positive comments from airlines



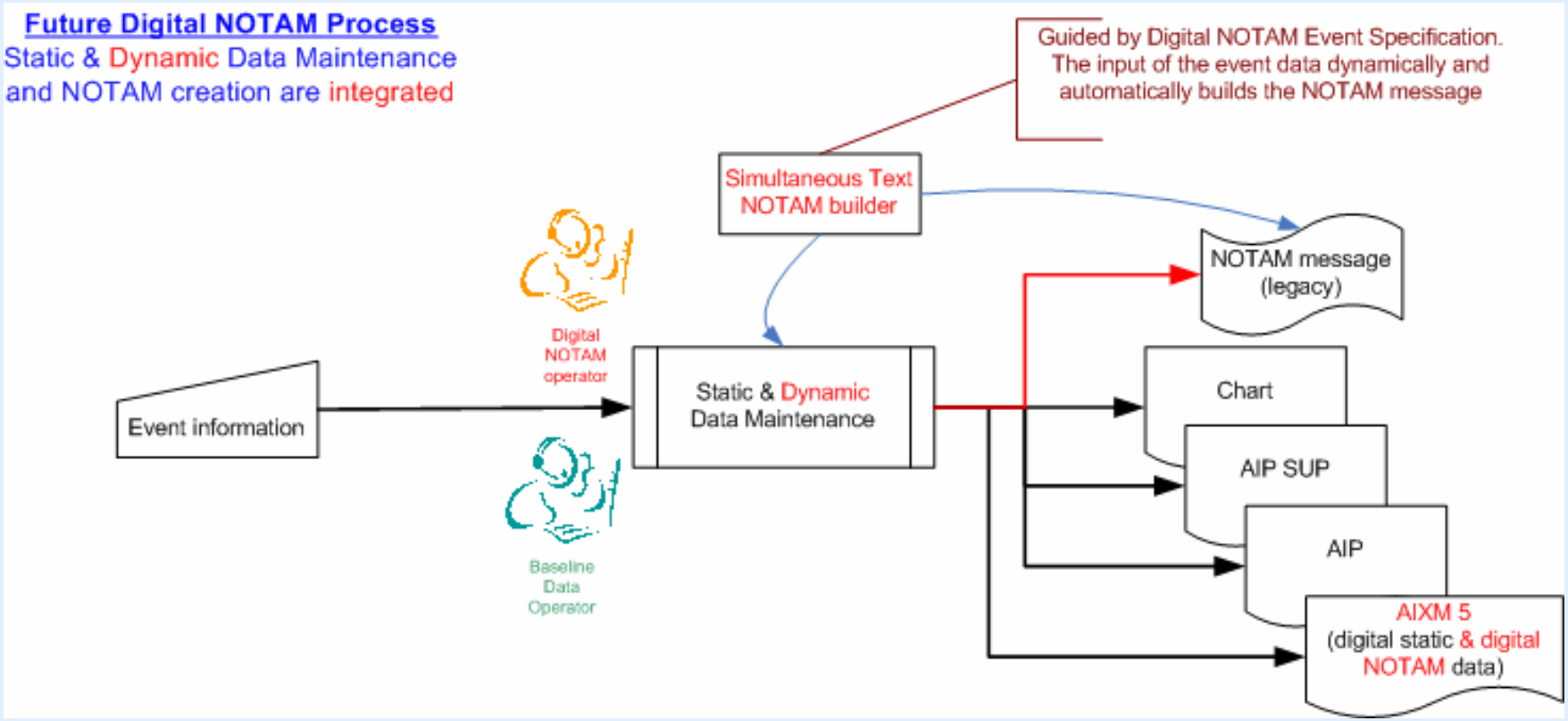
Realistic short term benefits

- Airspace reservation for VFR community
  - Eliminate the need for difficult & imprecise text-to-graphics translations



http://shgc.org.uk/php/notams.php

Digital NOTAM provision



Event specification

- Identify categories of events
  - temporary obstacle at the airport
  - ad-hoc restricted area
  - etc.
- For each type of event, specify:
  - the data usually provided
  - the data encoding rules
    - including AIXM mapping
    - associated validation rules
  - the conversion rules into text NOTAM (ICAO format)
  - Examples
- Digital NOTAM Focus Group
  - Scope of Increment 1
  - Event Scenarios

Equivalent to FAA "NOTAM Scenarios" work

Scope of Increment 1

1. Airspace activation / reservations / warning areas / CTR (that are not H24);
   - Justification: up-to-date “airspace activity” charts for VFR community, graphical enhancements to PIB, visualisation for ATC/APP, information provided to the pilot by ATC on request;
2. Route closures (CDR1, CDR 2, other routes);
   - Justification: up-to-date airspace/route availability data for flight planning applications;
3. Navaid events (all, including ILS);
   - Justification: critical data for Airline Operational Centres;
4. Airport/Runway closures;
   - Justification: critical data for Airline Operational Centres, graphical enhancements to PIB;

Scope of Increment 1

5. Taxiway closures / work areas;
   - Justification: graphical enhancements to PIB (identified difficulty – requires static data for Taxiway elements geometry);
6. Obstacles;
   - Justification: critical data for Airline Operational Centres, graphical enhancements to PIB;
7. SNOWTAM;
   - Justification: critical data for Airline Operational Centres, graphical enhancements to PIB;
8. All other NOTAM as Text NOTAM associated with the feature;
   - Justification: completeness of the solution, to avoid digital data users having to also consult text NOTAM from another source.

Event Specification

- Goal: world-wide applicability
  - Compatible with ICAO SARPS & Guidelines for NOTAM
  - Reuse a maximum from the FAA “scenarios”
- First priority until end of May 2010
  - Increment 1
  - FG Meeting on 16-17 June

Segregated Area activation

Last modified by superadmin on 2010/03/25 12:29

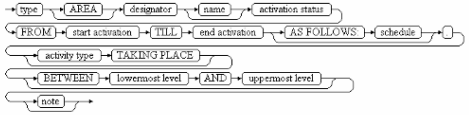
Definition

The activation of an existing (predefined) segregated, reserved, restricted or similar airspace.

Event data

The template shown below highelights the information that is usually provided by a data originator for this kind of event. Elements in "lower case" indicate variables that, in a real message, are replaced with actual data.

Template



Example:

```
TRA EAR23 DONLON EAST ACTIVE
FROM 10 JUL 2010 07:00 TILL 10 JUL 16:00.
MILITARY EXERCISE TAKING PLACE.
For further information please contact DONLON ACC on phone (12) 123 45 67.
```

The table below provides more details about each variable contained by the template and also the mapping with the AIXM 5.1 structure. The name of the variable (first column) is recommended for use as label of the data field in human-machine interfaces (HMI).

Data item	value	AIXM mapping
type	The type of airspace concerned according to the CodeAirspaceType	Airspace.type
designator	The published designator of the airspace concerned	Airspace.designator
name	The published name of the area	Airspace.name
activation status	The activation status according to the CodeStatusAirspaceType	Airspace/AirspaceActivation.status
start activation	The effective date & time when the airspace becomes active	Airspace/AirspaceTimeSlice /TimePeriod.beginPosition
end activation	The end date & time when the airspace activity ends and the area is released for civil use	Airspace/AirspaceTimeSlice/TimePeriod.endPosition
schedule	A schedule might be provided, in case the area is effectively only active according to a regular timetable, within the overall activity period	Airspace/AirspaceActivation/Timesheet/... ?
activity type	The kind of activity that takes place in the airspace, mapped to the AIXM CodeAirspaceActivityType list of values	Airspace/AirspaceActivation.activity
lowermost level	If the activation only starts from a certain level, above the floor of the Airspace itself	Airspace/AirspaceActivation/AirspaceLayer.lowerLimit and lowerLimitReference
uppermost level	If the activation ends at a certain level, below the ceiling of the Airspace itself	Airspace/AirspaceActivation /AirspaceLayer.upperLimit and upperLimitReference
note	A free text note that provides further instructions concerning the area activation	Airspace.annotation

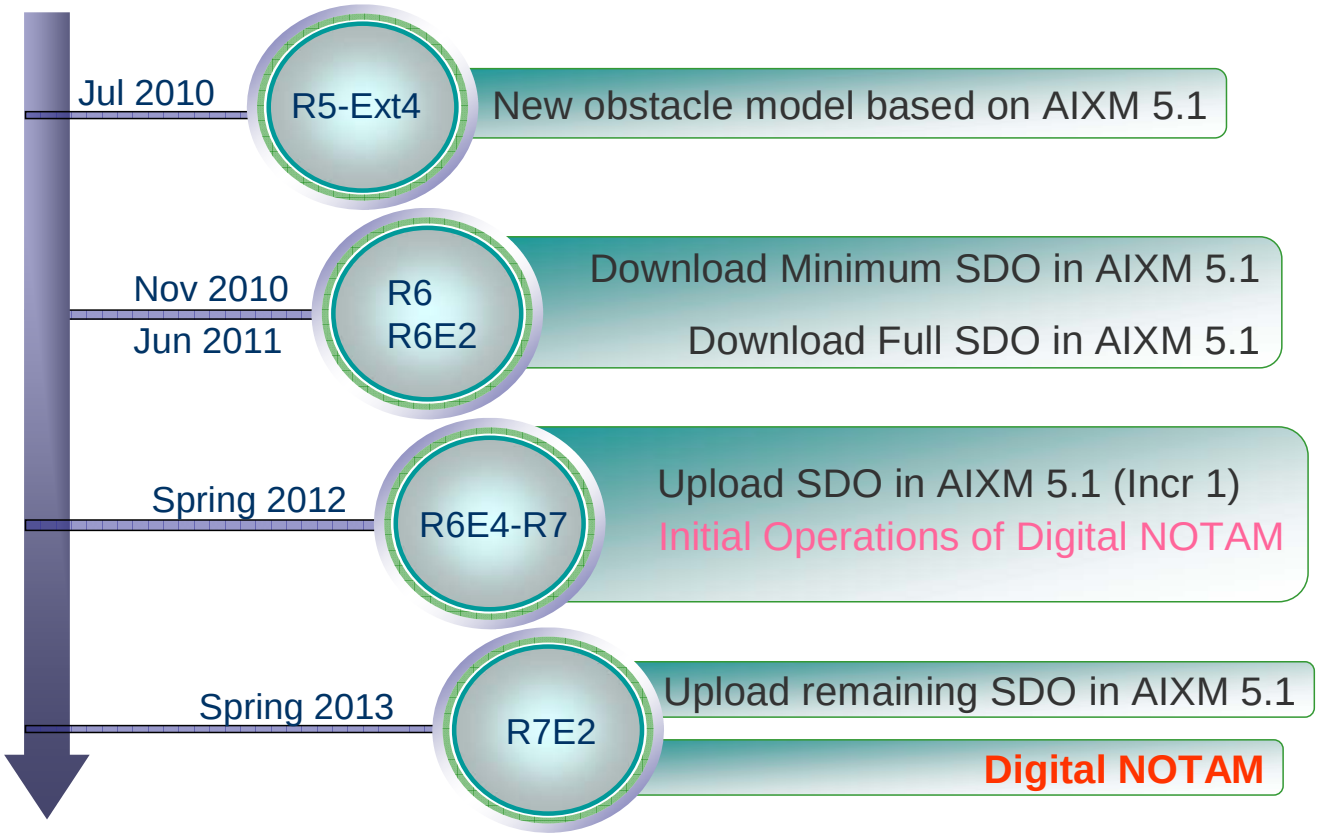
Notes:

- NIL

Start of implementation

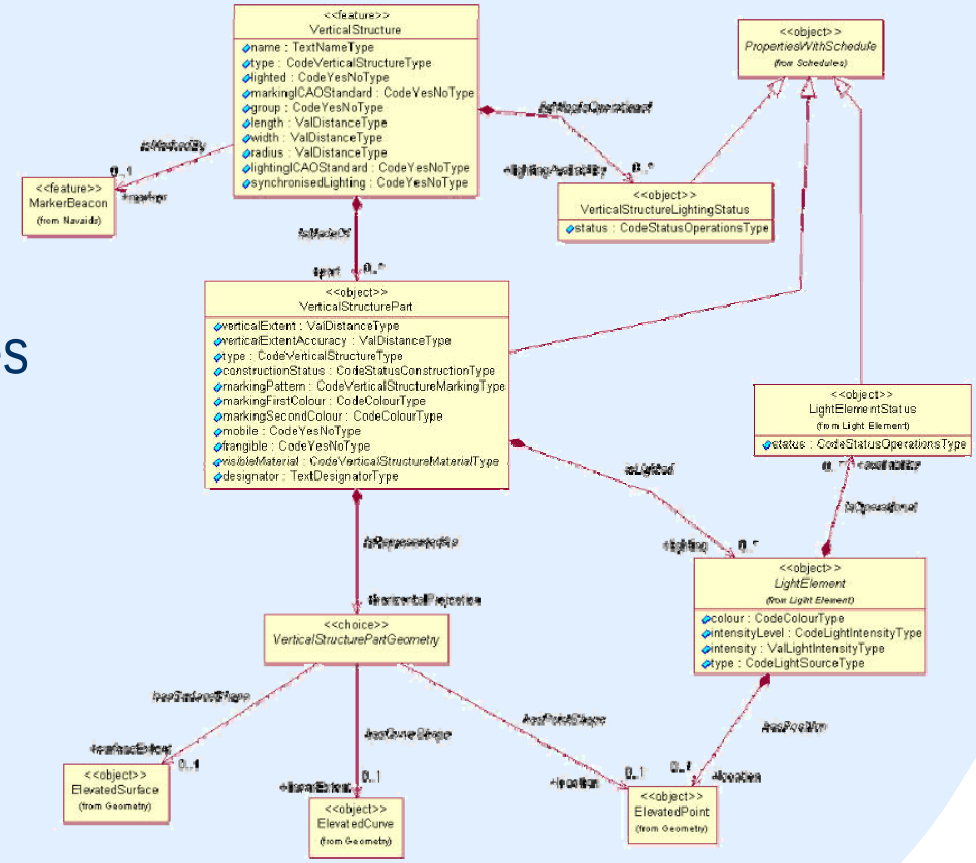
European AIS Database (EAD)

AIXM 5.1 Implementation – Timetable



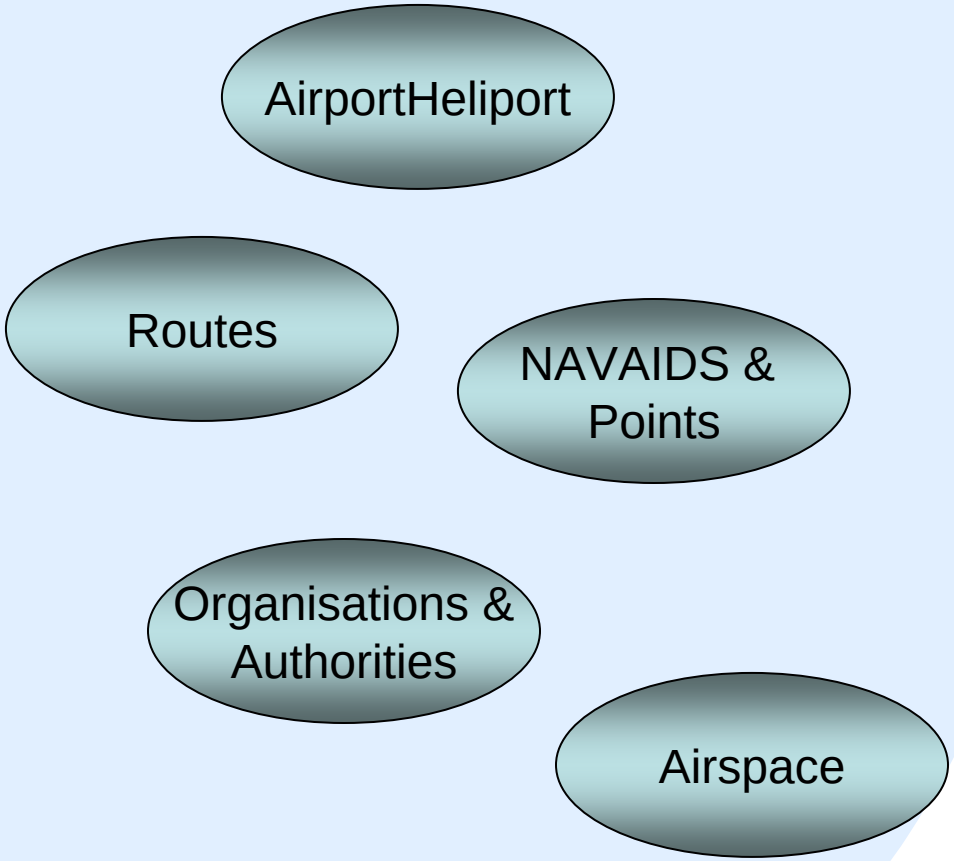
Obstacle Implementation

- First step of AIXM 5.1 implementation
  - VerticalStructure
  - ObstacleArea
- Upload/Download of obstacles in AIXM 5.1
- Business & Mapping Rules

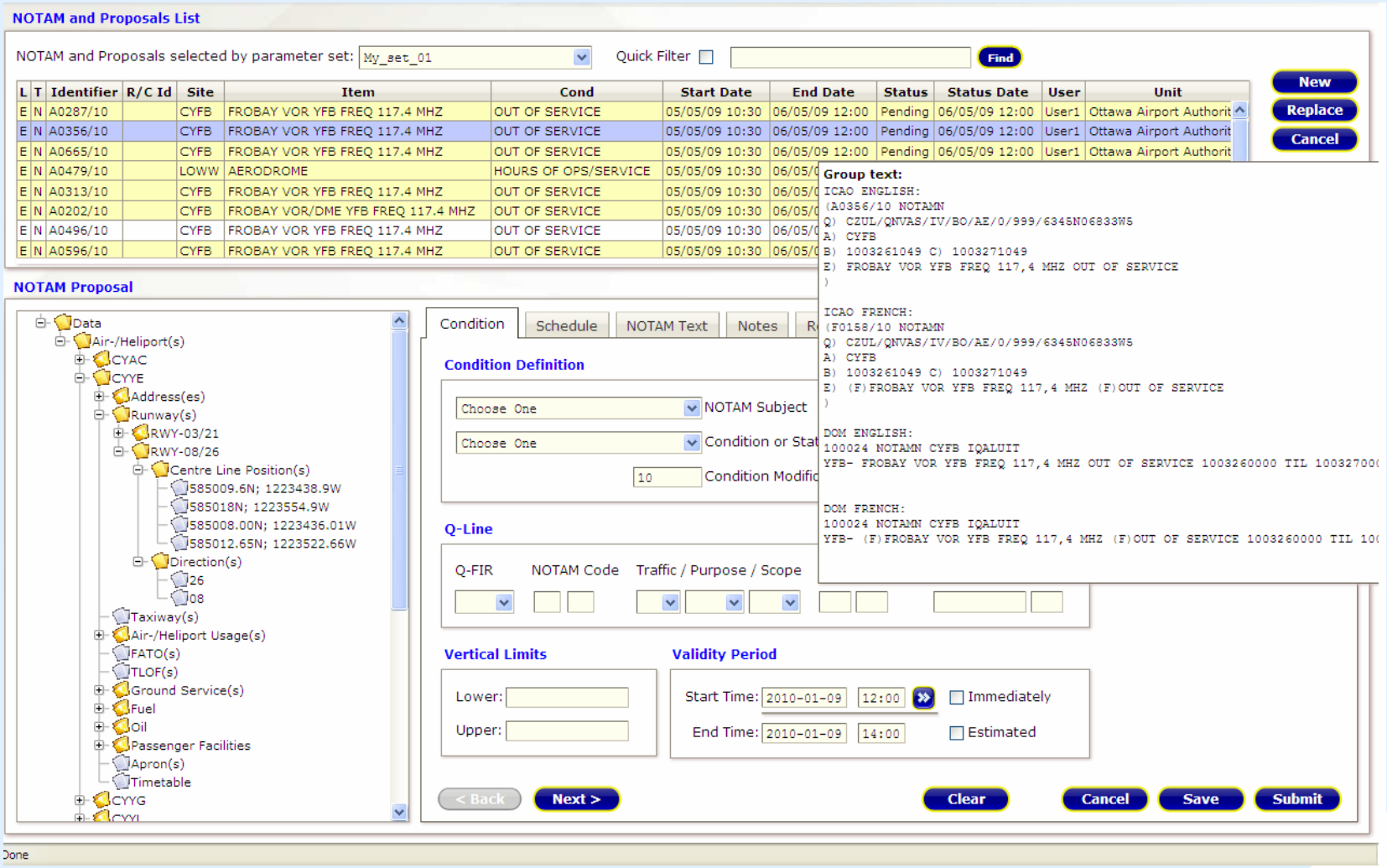


AIXM 5.1 Minimum Static Data Download

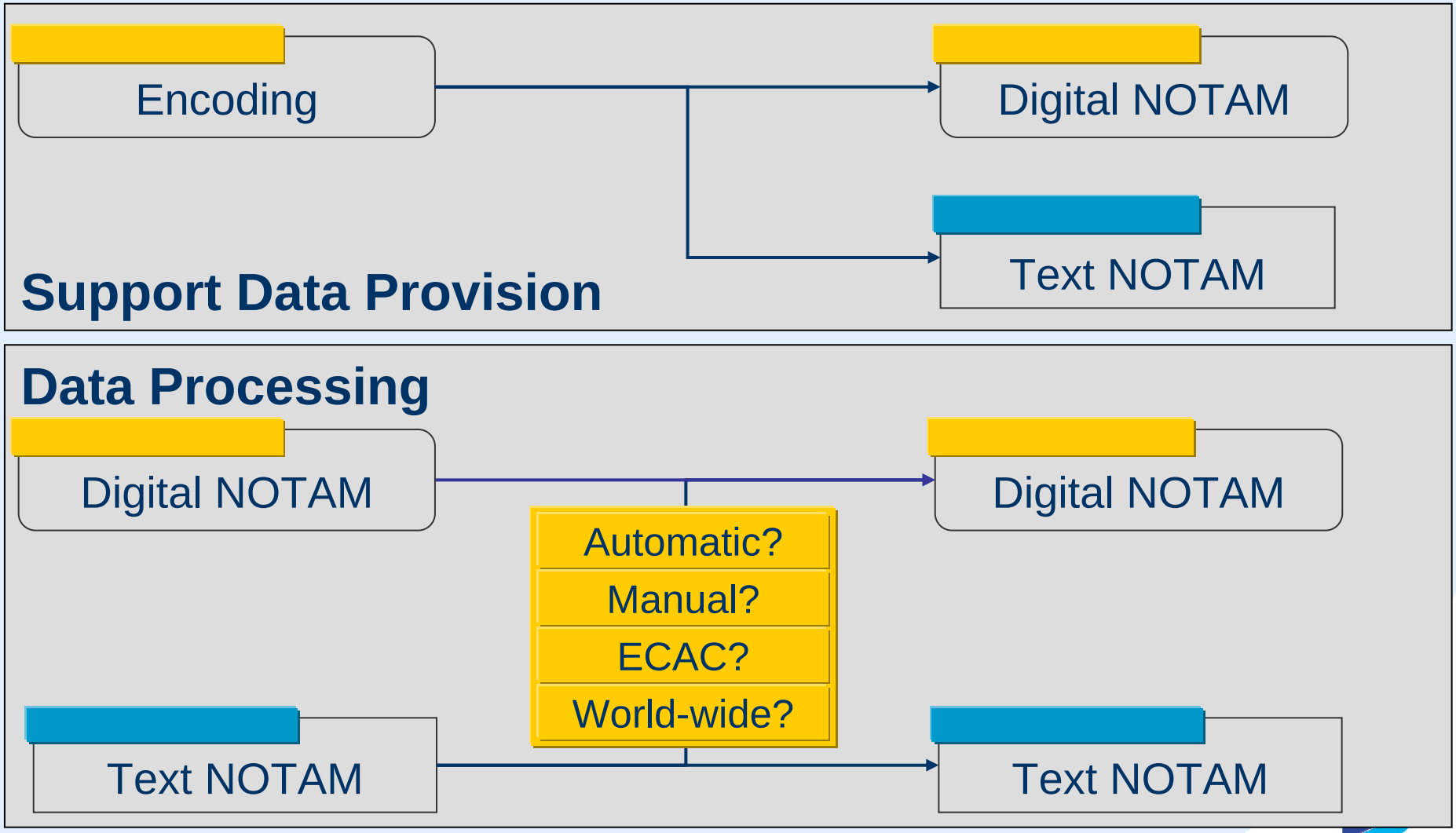
- Release 6 (NOV 2010)
  - Minimum SDO data download in AIXM 5.1
    - Stakeholder support for development and implementation of AIXM 5.1
    - Operational support for ATM / ATFCM / FPL…



EAD – Digital NOTAM Prototyping



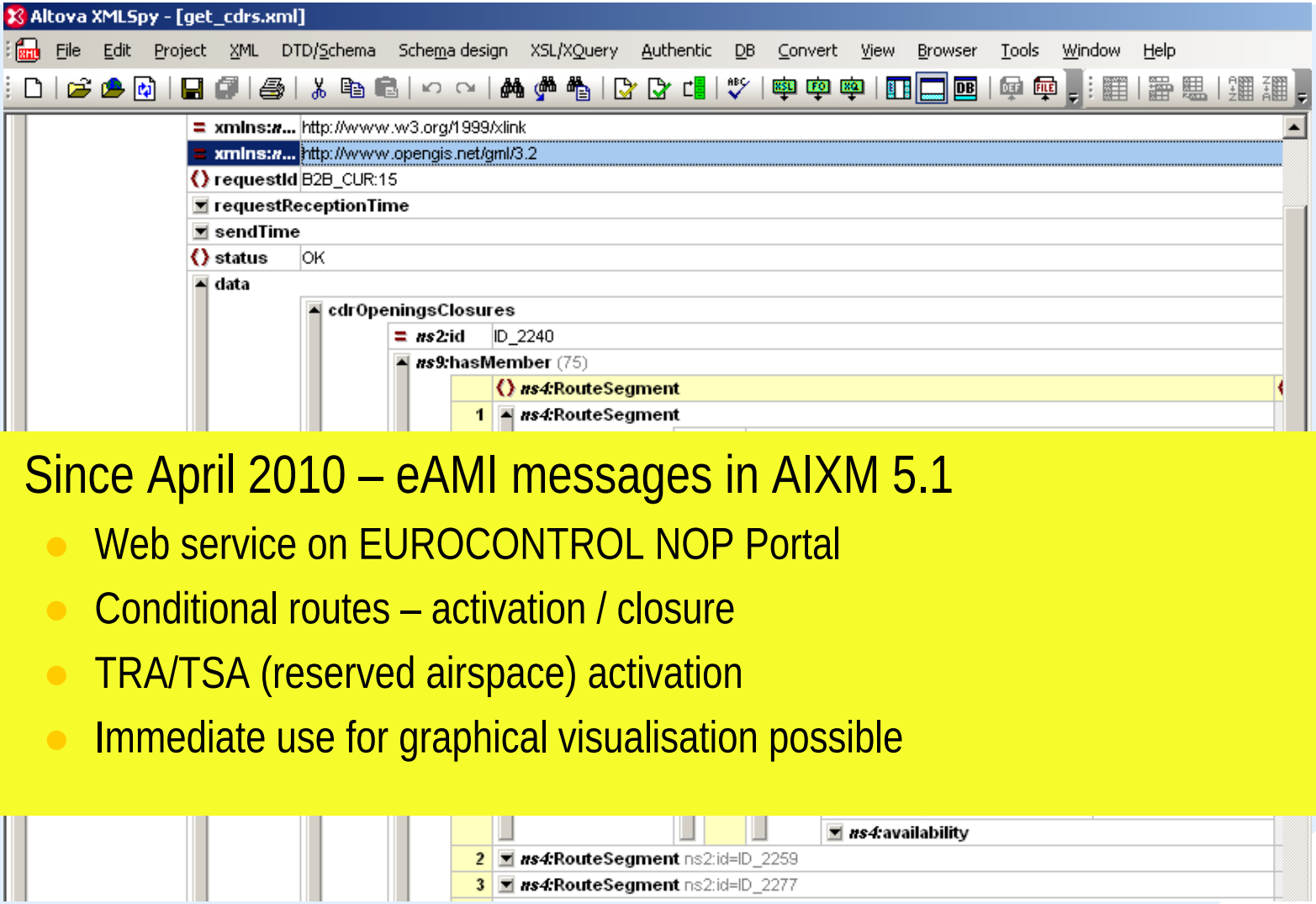
EAD functions



AIXM 5.1 – implementation by industry

- Proof of progress
  - AIXM Seminars
  - ATC Amsterdam - exhibition
  - Press releases
  - Exhibition here
  - OWS-7

CFMU – Airspace / route closure



- Since April 2010 – eAMI messages in AIXM 5.1
  - Web service on EUROCONTROL NOP Portal
  - Conditional routes – activation / closure
  - TRA/TSA (reserved airspace) activation
  - Immediate use for graphical visualisation possible

Summary

- AIXM 5.1 documentation enhancements
  - Wiki
  - AIXM Mappings
  - AIXM Business rules
- Digital NOTAM Concept finalization
  - Digital/graphical SNOWTAM Trial
  - Digital NOTAM Event Specification
- Start of implementation
  - European AIS Database (EAD)
  - Industry
  - CFMU eAMI Messages