

Digital NOTAM and Digital Briefing concepts

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EUROCONTROL

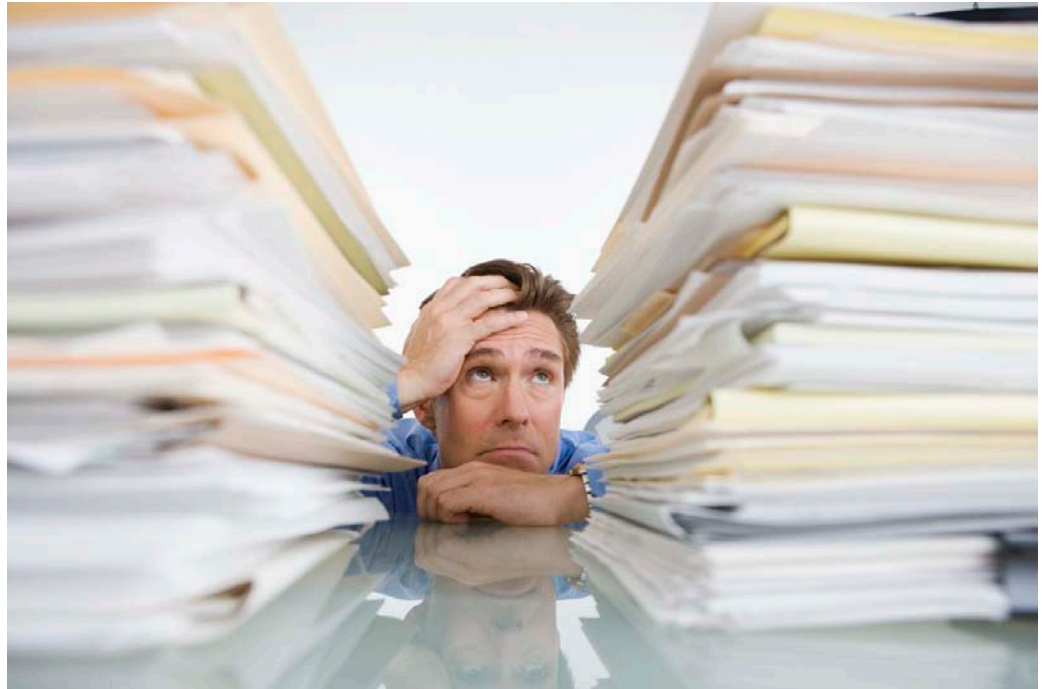
Starting with a quiz 😊



orld-

Who is affected

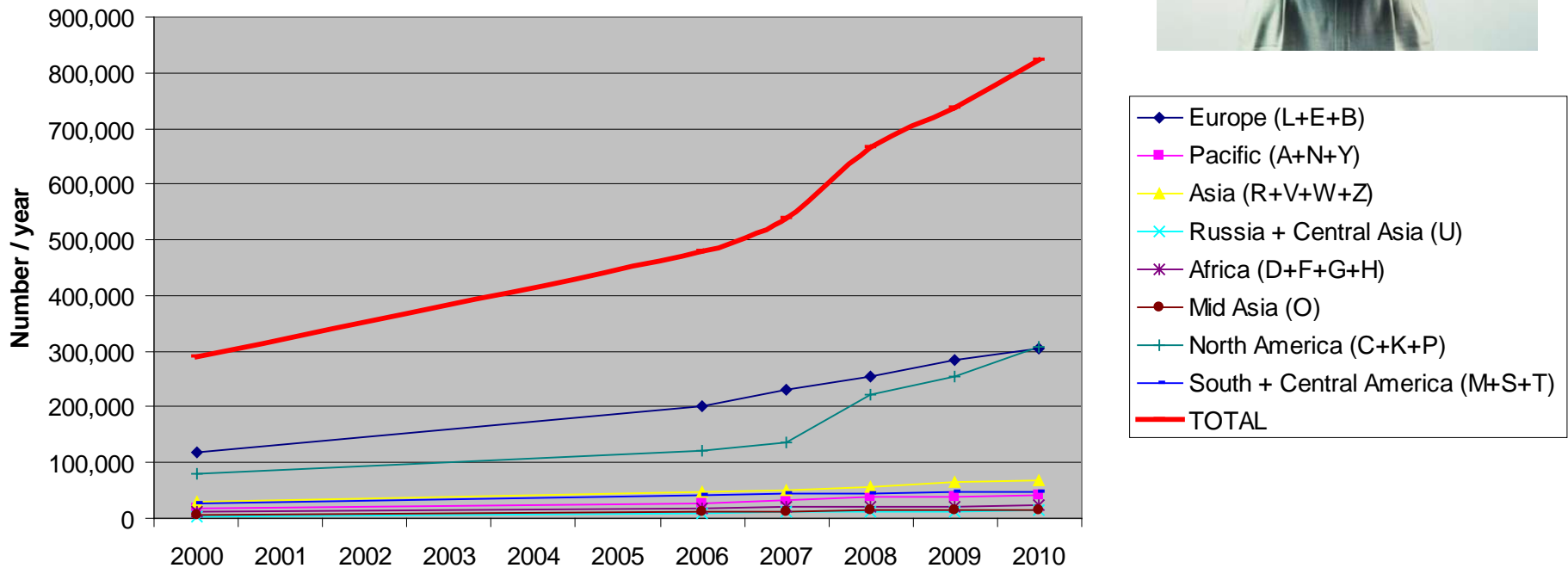
- Airspace users
- Service Providers
- AIS/NOTAM offices
- Airports and other data originators



NOTAM numbers



(International) NOTAM Trends



Source: European AIS Database (EAD)

What is the risk



Source: [HindSight - Aviation Safety Magazine for Air Traffic Controllers - Skybrary](#)

Solution – Digital Aeronautical Data

- Aeronautical Information Exchange Model (AIXM)
 - Digital NOTAM
- Electronic AIP (eAIP)
- Weather Exchange Model (WXXM)
- Etc.



Content

- Digital NOTAM
 - Expected Benefits
 - Specification
 - Trials
 - Implementation plans
- Digital Briefing

Digital NOTAM

Expected Benefits

NOTAM quality problems

... obstacles with imprecise positions

... irrelevant information

... runway shortenings when the NOTAM simply gives a new TORA and does not really say WHERE the runway have been shorter (in what end)

... complex restricted area boundaries that take hours to put on a map!

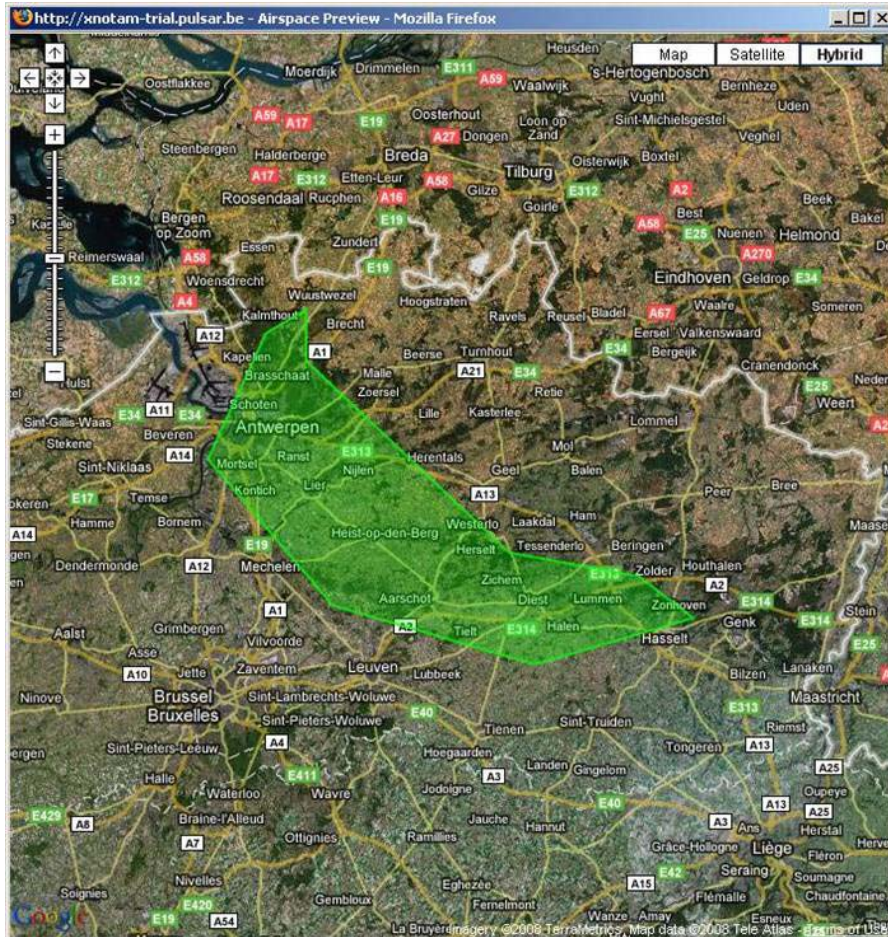
10%

of the NOTAM have errors according to a study done by EAD on randomly selected messages!

... typing errors

... very long and complex to read!!!

Benefits – improved data quality



Digital data:

- clearer / more precise than free text
- enables validation
 - automatic by the system
 - visually by the operator



Benefits – improved PIB

PIB -

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media

Address 3-12-04%2022:34&ifr=true&vfr=true&operational=false&featu

PRE-FLIGHT INFORMATION BULLETIN

FROM: Tue Jun 10 22:34:00 CEST 2003 TO: Thu Dec 04 22:34:00 CET 2003

FLIGHT RULES: **VFR IFR**

PURPOSE: ALL

SELECTED FEATURES: AERODROME/HELIPORT APRON DME PARKING
NDB RUNWAY TAXIWAY VOR

- AERODROME EHAM
FROM 2003-07-02T13:00:00 TO 2003-10-02T13:00:00
BIRD CONCENTRATION
 - RUNWAY 01L/19R
 - RUNWAY DIRECTION 01L
FROM 2003-06-09T00:25:00 TO 2003-06-09T12:00:00 EST
TRANSMISSION METER OUT OF SERVICE
 - TAXIWAY W7
FROM 2003-06-15T23:18:00 TO 2003-06-17T03:00:00
TWY OUT OF SERVICE ACFT HEAVIER THAN 19000 KGS
- NDB CH 521314.22N 0043327.36E

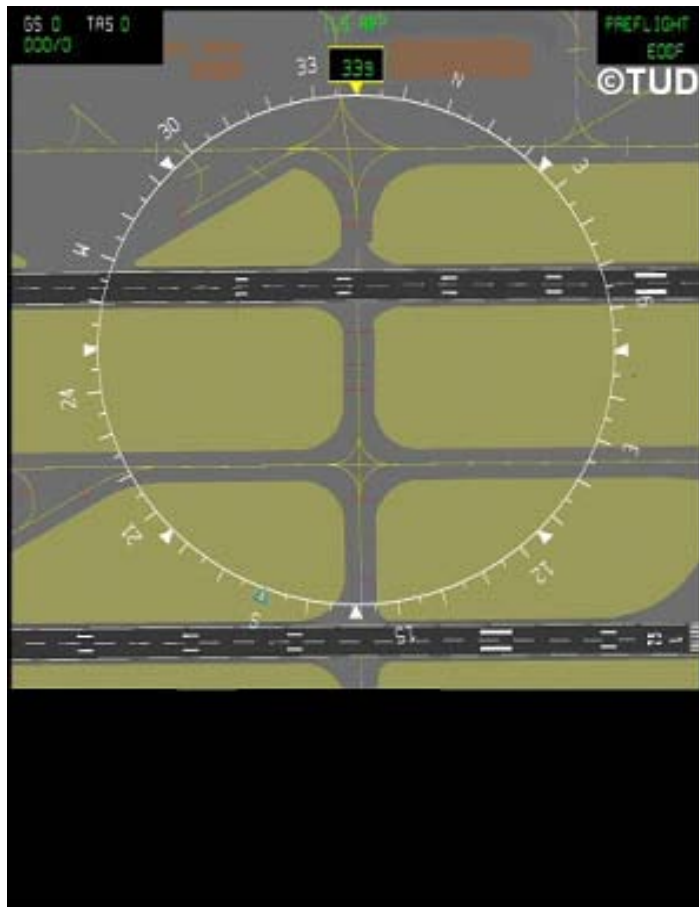


Positive impact on safety

Benefits – dynamic overlay for EFB

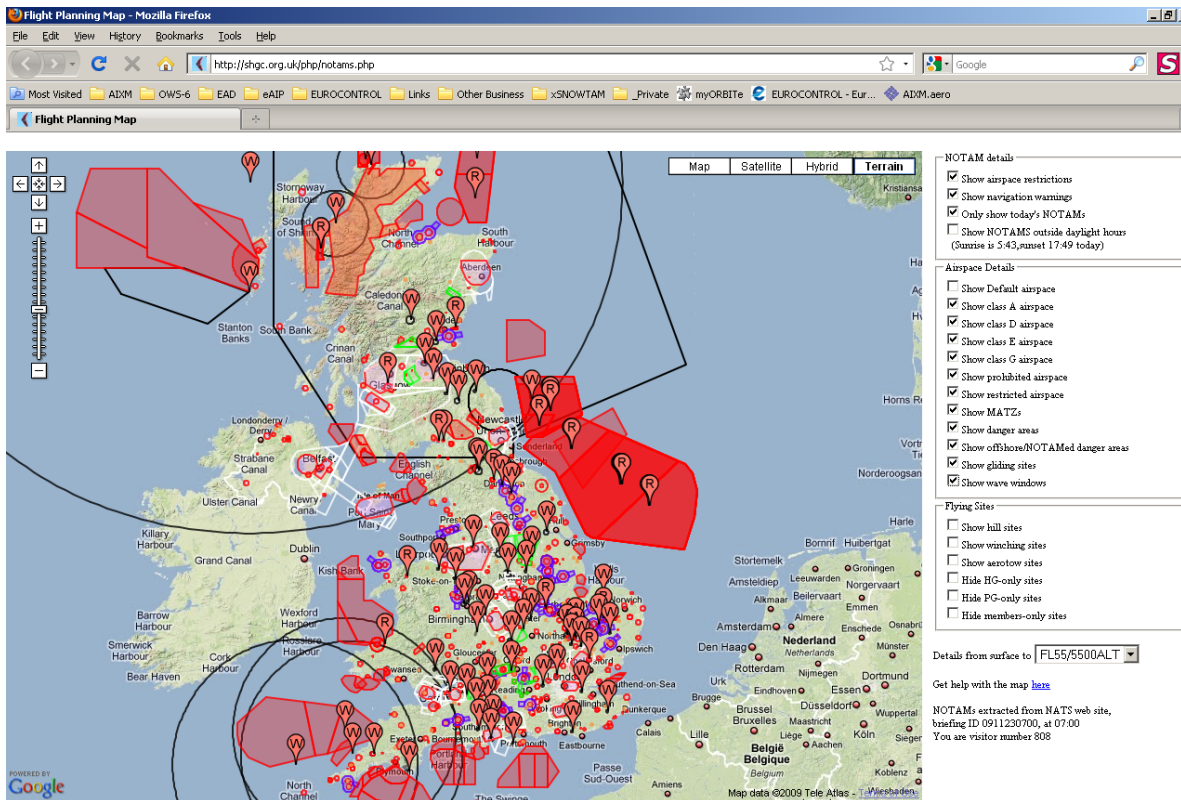
static

static + dynamic



Benefits – also for VFR!

- Make digital airspace reservation data available for VFR community -> enable graphical visualisation



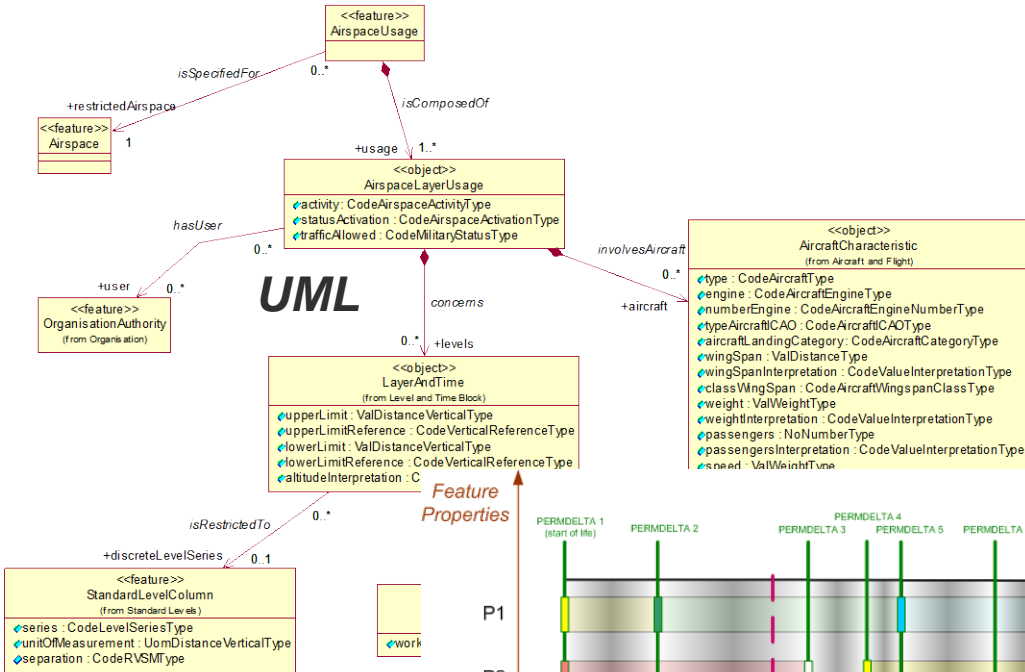
Example: <http://shgc.org.uk/php/notams.php>

Digital NOTAM

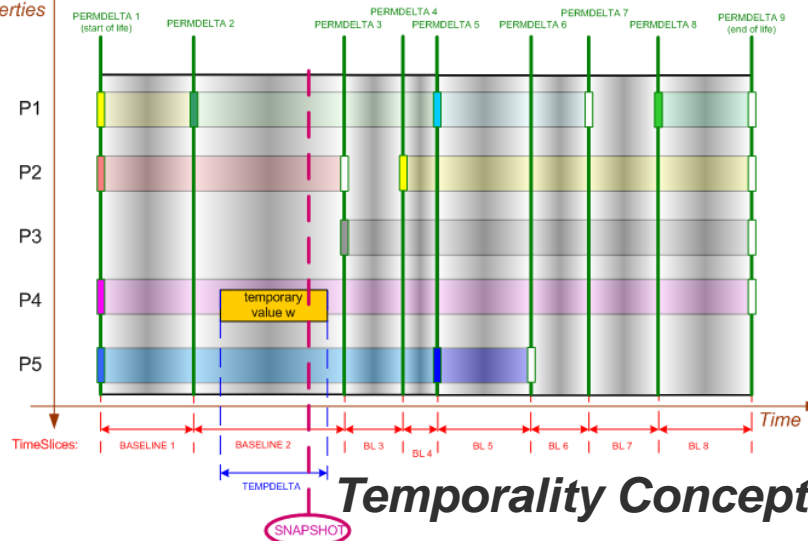
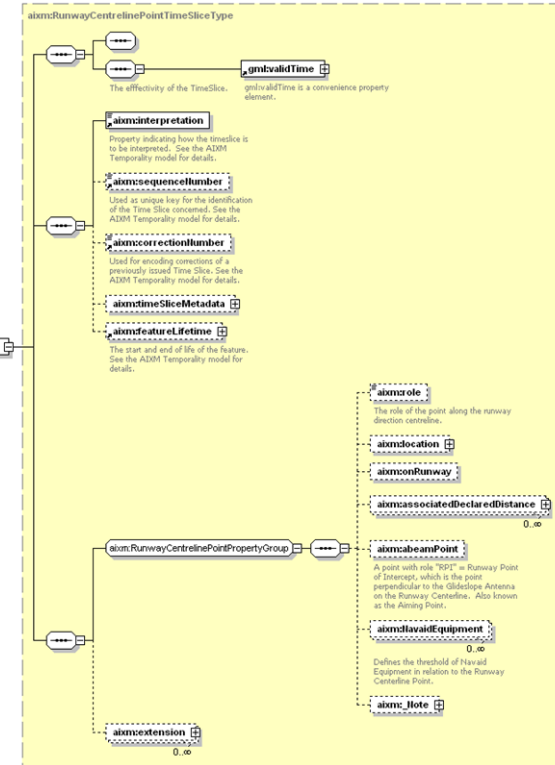
Specification

Data Model - AIXM 5.1

Joint development **EUROCONTROL – FAA**
supported by the international AIS community



XSD



Generated by XmlSpy www.altova.com

www.aixm.aero

Digital NOTAM Event Specification

AIXM 5	AIXM version 5.1	Digital NOTAM Event Specification
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AIXM

Digital NOTAM Event Specification
- Increment 1 -

Developed by Focus Group

- NOTAM operators
- NOTAM users
 - including Lufthansa Systems

Page 1 of 84

Content

- Introduction
- General requirements
- AIXM Event Schema
- Event Scenarios
- Data encoding rules
- Digital NOTAM Services
- Annex 1 - EBNF sources
- Annex 2 - XML Examples

Version 1.0

- Released May 2011
- Baseline for the EAD implementation in 2012

Digital NOTAM

Implementation

D-AIM Trial

Graphical presentation of temporary aeronautical information

Initial airborne use cases:

- Temporary Segregated Area (TSA) Status
- Taxiway or Runway Closure
- Digital Meteorological Information, geo-spatially displayed

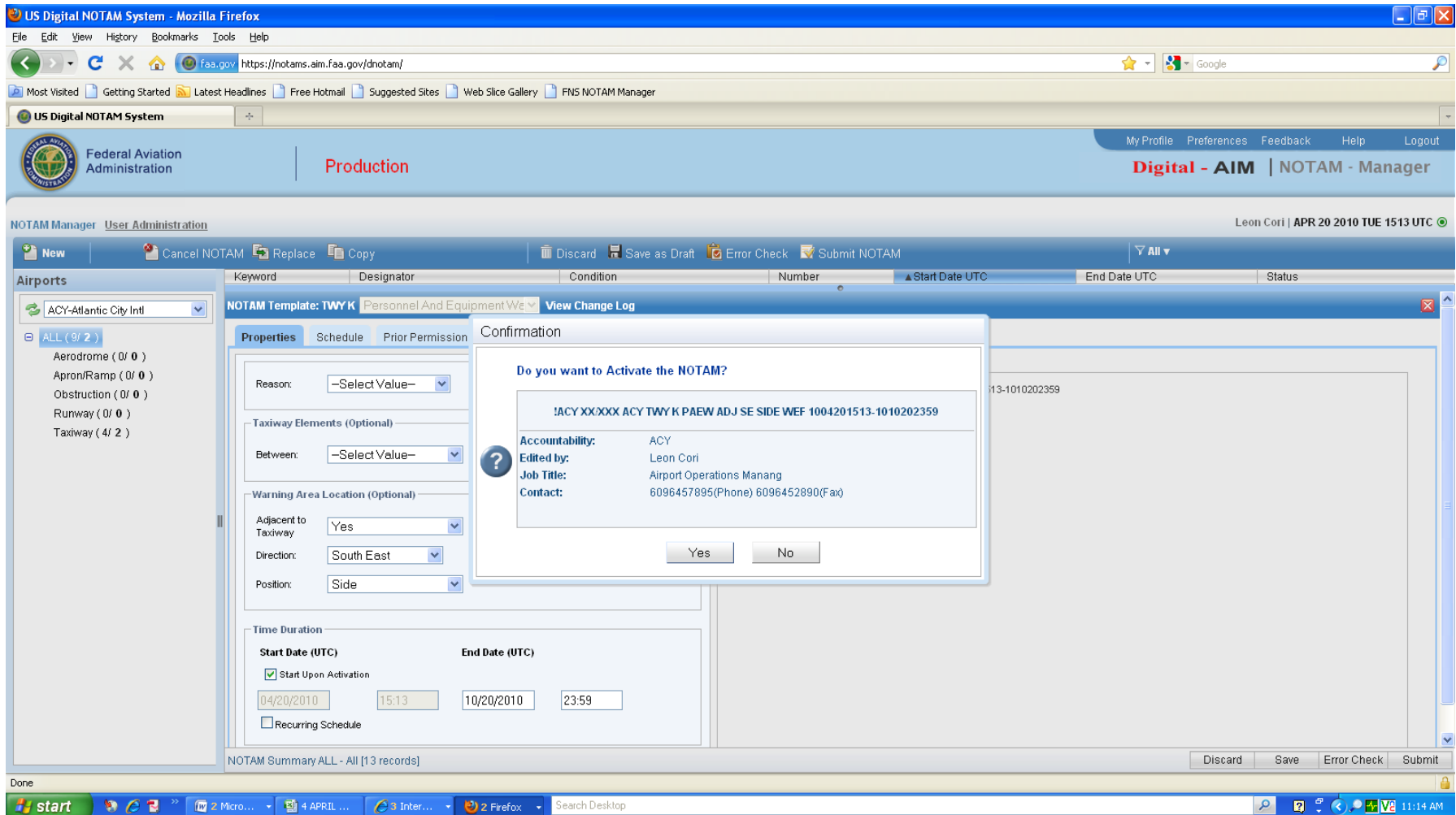


Aircraft passing activated Temporary Segregated Area (TSA), from D-AIM test flight, autumn 2008



Aircraft landing on RWY 09/27 at Norrköping Airport, EFB showing RWY 11/29 Closure, from D-AIM test flight, autumn 2008

FAA Digital NOTAM System



US Digital NOTAM System - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Faa.gov https://notams.aim.faa.gov/dnotam/

US Digital NOTAM System

Federal Aviation Administration | Production | Digital - AIM | NOTAM - Manager

My Profile Preferences Feedback Help Logout

Leon Cori | APR 20 2010 TUE 1513 UTC

NOTAM Manager User Administration

New Cancel NOTAM Replace Copy Discard Save as Draft Error Check Submit NOTAM

Airports

ACY-Atlantic City Intl

ALL (9/2)

Aerodrome (0/0)

Apron/Ramp (0/0)

Obstruction (0/0)

Runway (0/0)

Taxiway (4/2)

NOTAM Template: TWY K Personnel And Equipment We View Change Log

Properties Schedule Prior Permission Confirmation

Reason: -Select Value-

Taxiway Elements (Optional)

Between: -Select Value-

Warning Area Location (Optional)

Adjacent to Taxiway: Yes

Direction: South East

Position: Side

Time Duration

Start Date (UTC) End Date (UTC)

Start Upon Activation

04/20/2010 15:13 10/20/2010 23:59

Recurring Schedule

Confirmation

Do you want to Activate the NOTAM?

!ACY XXXXX ACY TWY K PAEW ADJ SE SIDE WEF 1004201513-1010202359

Accountability: ACY

Edited by: Leon Cori

Job Title: Airport Operations Manang

Contact: 6096457895(PHONE) 6096452890(FAX)



Yes No

NOTAM Summary ALL - All [13 records]



Discard Save Error Check Submit

start 2 Micro... 4 APRIL... 3 Inter... 2 Firefox Search Desktop 11:14 AM



SNOWTAM Trial (since 2009)


EUROCONTROL's Digital SNOWTAM Trial


Airport Overview Find Airports Manage Rejected SNOWTAMS Administration
Quick search:
Provider: EDUARD POROSNICU @ EUROCONTROL Helpdesk


EUROCONTROL's Digital SNOWTAM Trial


Airport Overview Find Airports Manage Rejected SNOWTAMS Administration
Quick search:
Provider: EDUARD POROSNICU @ EUROCONTROL Helpdesk


EDDW/BREMEN


Airport Overview Find Airports Manage Rejected SNOWTAMS Administration
Quick search:
Provider: EDUARD POROSNICU @ EUROCONTROL Helpdesk

Filters

UTC Date/Time:

Dataset: EAD Local

Airport

EDDW >>

Aprons

No apron data available.

Runways

RWY-09/27

RWY-23

Taxiways

No taxiway data available.

Aircraft Stands

No Aircraft Stand data available.

SNOWTAM and Contamination - Text format

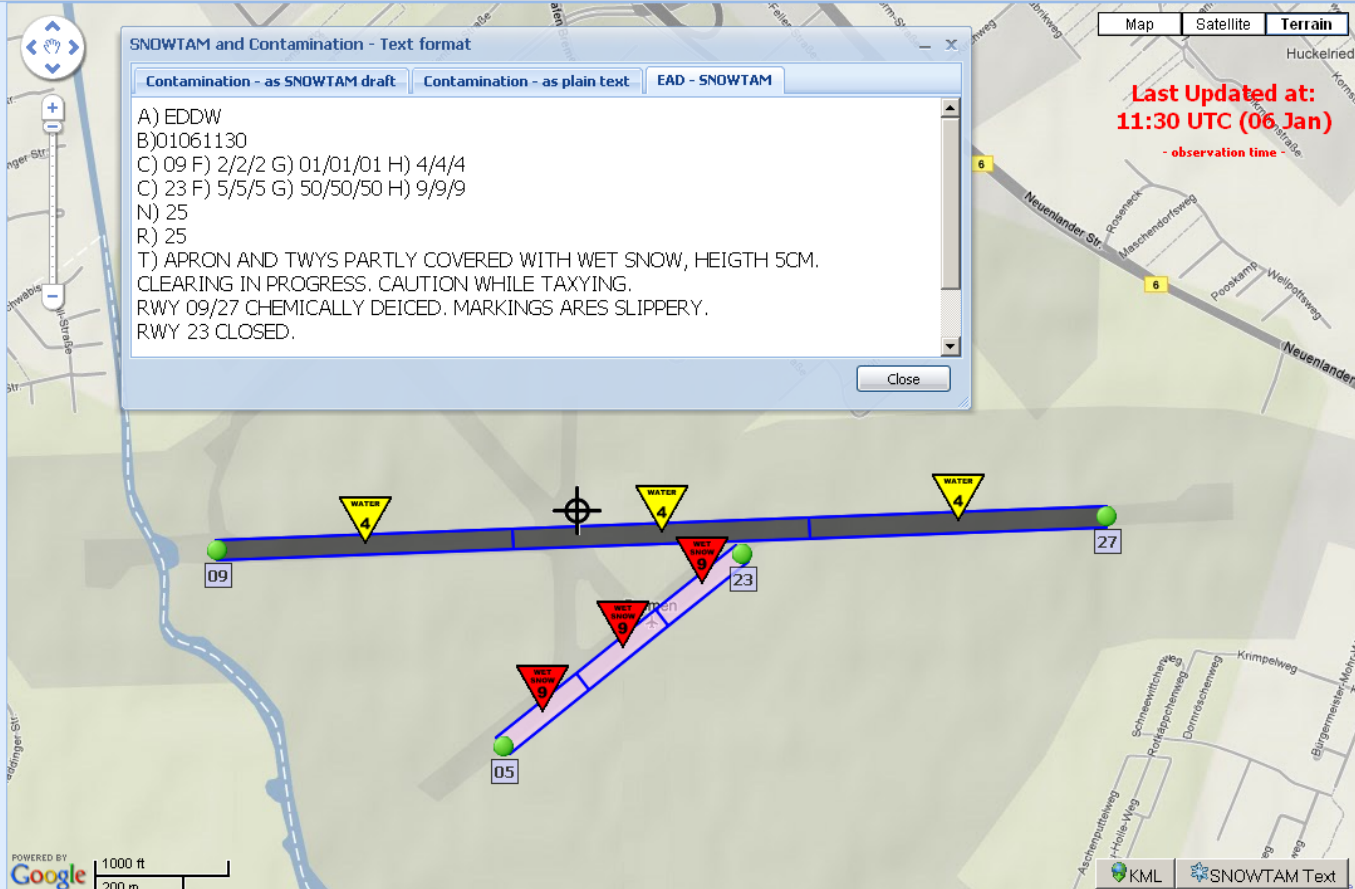
Contamination - as SNOWTAM draft Contamination - as plain text EAD - SNOWTAM

A) EDDW
 B) 01061130
 C) 09 F) 2/2/2 G) 01/01/01 H) 4/4/4
 C) 23 F) 5/5/5 G) 50/50/50 H) 9/9/9
 N) 25
 R) 25
 T) APRON AND TWYS PARTLY COVERED WITH WET SNOW, HEIGHT 5CM.
 CLEARING IN PROGRESS. CAUTION WHILE TAXYING.
 RWY 09/27 CHEMICALLY DEICED. MARKINGS ARE SLIPPERY.
 RWY 23 CLOSED.

Last Updated at:
11:30 UTC (06 Jan)

- observation time

Map Satellite Terrain



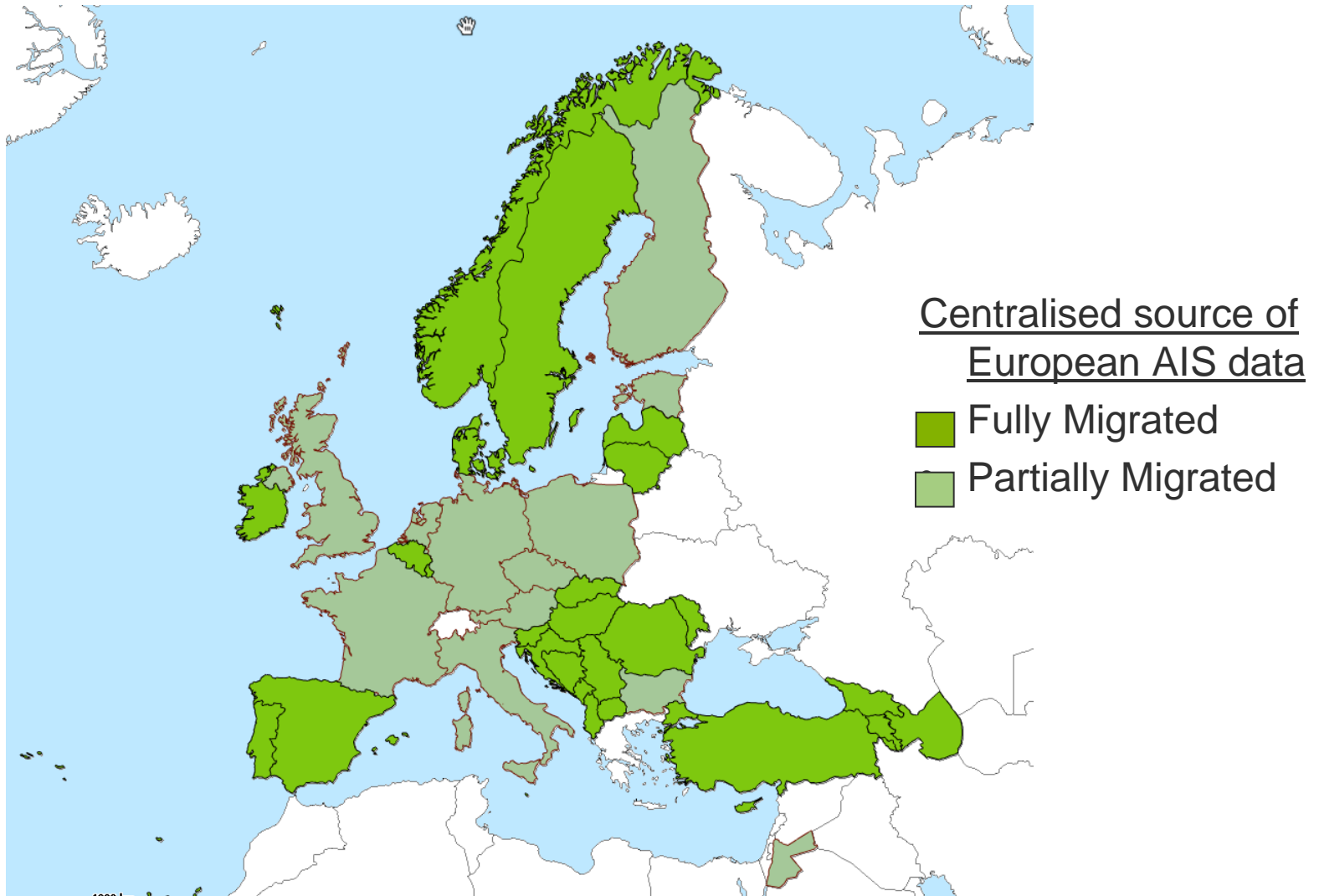
POWERED BY Google 200 m 1000 ft 200 m

v1.0.4

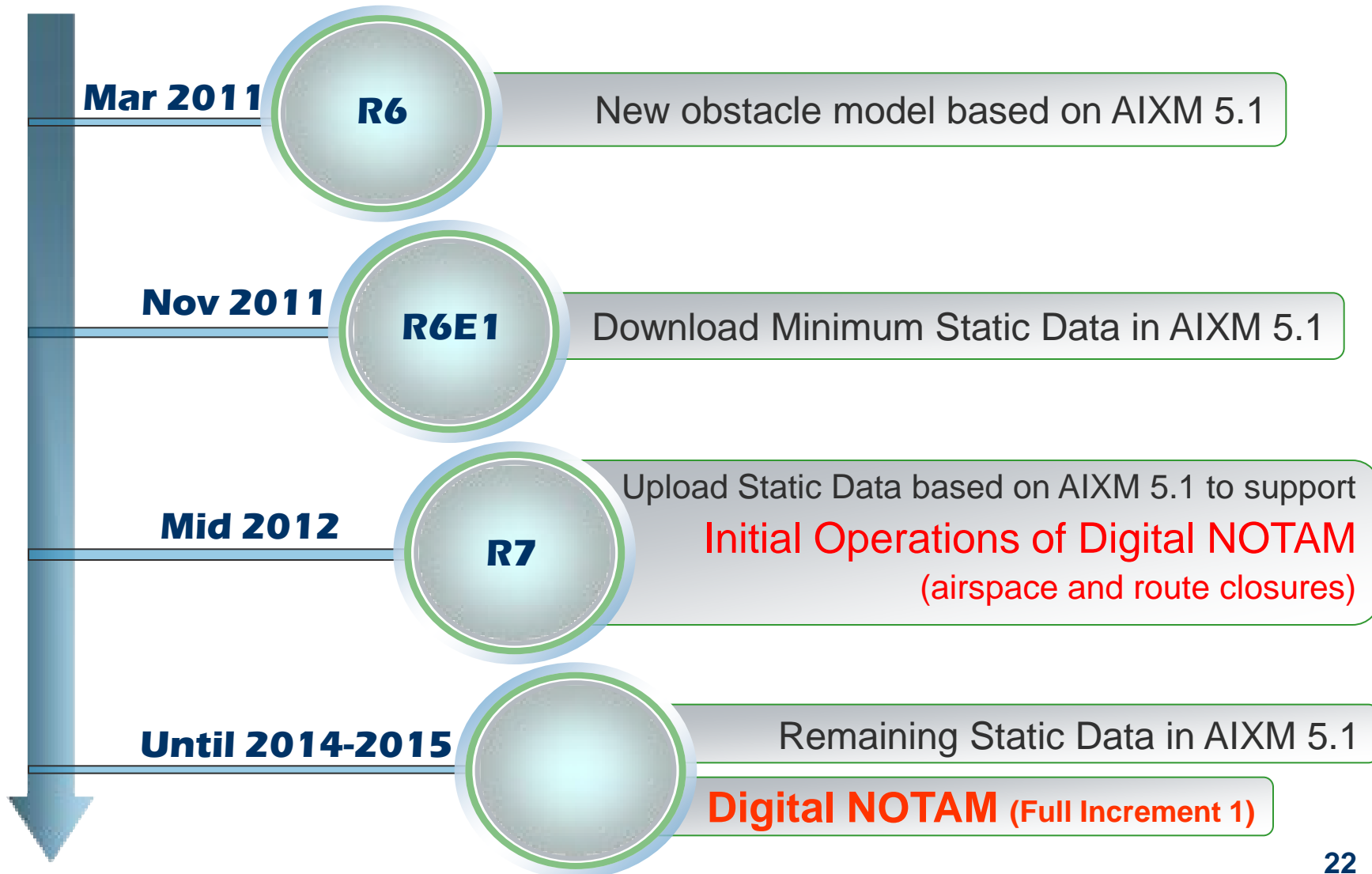
KML SNOWTAM Text

Powered by 

European AIS Database



EAD : Digital NOTAM implementation



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.

“Digital Briefing”

Current PIB Issues

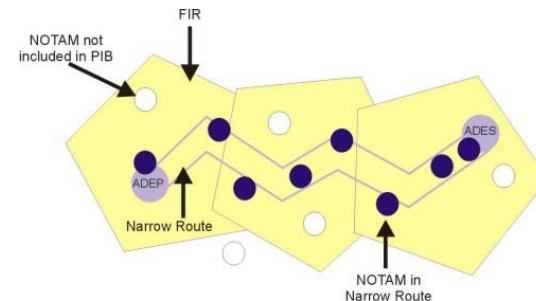
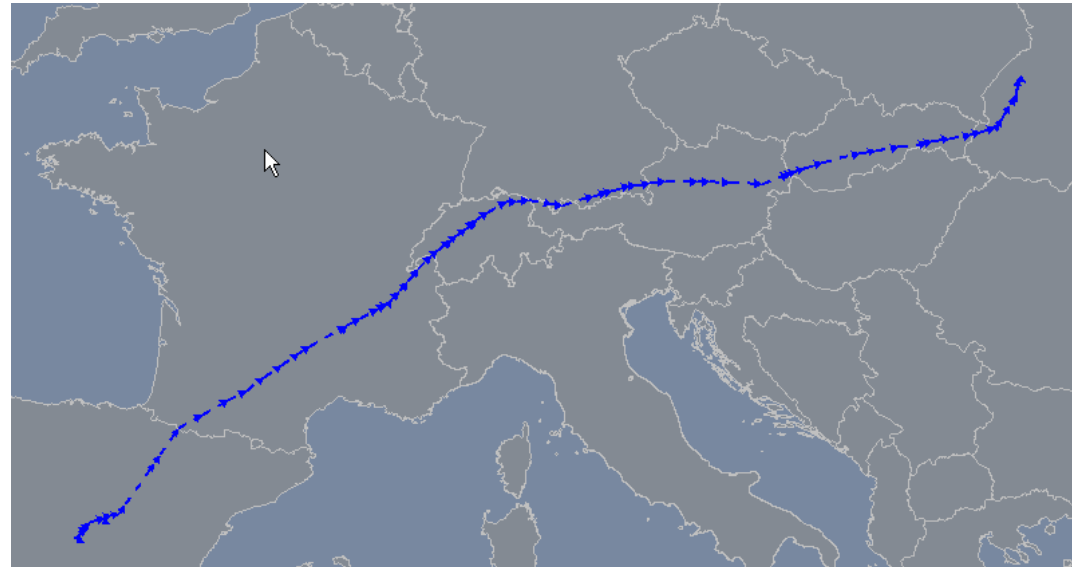
- Madrid/Spain (LEMD) to LVIV/Ukraine (UKLL)

Basic PIB

- ADEP, FIRs, ADES, ALTN
- ❖ **33 pages, 223 NOTAM**

Advanced PIB

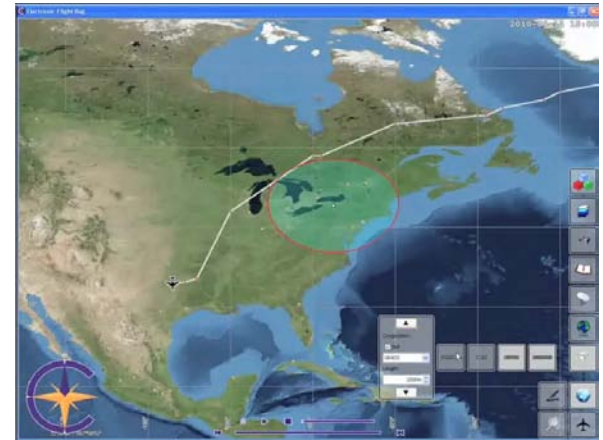
- *example for 09 June 2008*
- narrow route
 - based on NOTAM centre + radius
 - **not using real feature geometry and not using real impact!**
- ❖ **20 pages, 121 NOTAM**



Operational requirements

- Pre-Flight briefings today
 - cumbersome to build
 - too much information
 - sometimes irrelevant
 - presented in a format difficult to read by the pilot

- Expectations
 - graphical capabilities and better filtering based on Digital NOTAM messages will address these shortcomings



SESAE Work Breakdown Structure

<p>4 En Route Operation</p> <p>Project 04.02.01 Consolidation of operational concept definition and validation including operation mode and airport task sharing</p> <p>Project 04.02.02 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.03 Self Separation and pre-arranged addition to mixed mode environment</p> <p>Project 04.02.04 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.05 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.06 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.07 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.08 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.09 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.10 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.11 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.12 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.13 Self Separation in Mixed Mode Environment</p> <p>Project 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Self Separation in Mixed Mode Environment</p> <p>Project 04.02.30 Self Separation in Mixed Mode Environment</p>	<p>E Target Concept and Architecture Maintenance</p> <p>Project 04.02.01 Consolidation of operational concept definition and validation including operation mode and airport task sharing</p> <p>Project 04.02.02 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.03 Self Separation and pre-arranged addition to mixed mode environment</p> <p>Project 04.02.04 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.05 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.06 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.07 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.08 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.09 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.10 Self Separation in Mixed Mode Environment</p> <p>Project 04.02.11 Self Separation in Mixed Mode Environment</p> <p>Project 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Analysis</p> <p>Project 03.03.04 Validation Infrastructure Tools Development and Acceptance</p> <p>SWP 03.00 Global Co-ordination and Management</p> <p>SWP 03.01 Validation Infrastructure Requirements Definition</p> <p>SWP 03.02 Validation Infrastructure Development</p> <p>SWP 03.03 Validation Infrastructure Analysis</p> <p>SWP 03.04 Validation Infrastructure Tools Development and Acceptance</p>	<p>16 R&D Transversal Areas</p> <p>Project 16.01.01 Develop a top-down accident model and a Safety Target Achievement Roadmap (STAR) (16.1.1.1)</p> <p>Project 16.01.02 Training ATM with SESAR is kept (16.1.1.2)</p> <p>Project 16.01.03 Develop techniques for Dynamic Risk Hedging (16.1.1.3)</p> <p>Project 16.01.04 Develop the notion of "proof of concept" for aircraft certification when introducing new concept of operations (16.1.1.4)</p> <p>Project 16.01.05 ATM Security management - ATM Security Management (16.1.1.5)</p> <p>Project 16.02.01 Options to Mitigate Future Environmental Risks to ATM System Capacity</p> <p>Project 16.02.02 Future regulatory scenarios and impacts</p> <p>Project 16.02.03 Evolve from ATM IP Case to a IP Case Methodology for SESAR (16.1.1.5)</p> <p>Project 16.02.04 IP Tool Repository of SESAR standard IP methods and tools (16.1.1.5)</p> <p>Project 16.02.05 Impacts of future systems and procedures on air traffic, training, operations and safety</p> <p>Project 16.06.01 Security support and coordination function</p> <p>Project 16.06.02 Environment support and coordination function</p> <p>Project 16.06.03 Human Performance support and coordination function</p> <p>Project 16.06.04 Business Case Maintenance, support and coordination</p> <p>Project 16.06.05 Global Coordination and Management</p> <p>Project 16.06.06 Safety</p>
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<p>5 Network Sub-Systems Definition & verification</p> <p>Project 05.01.01 Integrated and Pre-operational Test & Commission</p> <p>Project 05.01.02 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.03 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.04 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.05 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.06 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.07 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.08 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.09 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.10 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.11 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.12 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.13 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.14 TMA - Co-Operative Planning in the TMA</p> <p>Project 05.01.15 TMA - Co-Operative Planning in 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sub-system definition</p> <p>Project 06.01.01 The Airport in the ATM Environment</p> <p>Project 06.01.02 Airport ATM performance (operation phase)</p> <p>Project 06.01.03 Full integration of airport planning & execution</p> <p>Project 06.01.04 Airport operations plan definition</p> <p>Project 06.01.05 Airport capacity and flow management</p> <p>Project 06.01.06 Airport Operations Centre (APOC) definition</p> <p>Project 06.01.07 Integration of FET Data into APOC processes</p> <p>Project 06.01.08 Operations in adverse weather and/or exceptional operating conditions / recovery management</p> <p>Project 06.02.01 Information Modelling Flight Data</p> <p>Project 06.02.02 Information Modelling Airport Domain</p> <p>Project 06.02.03 Information Modelling Other Domains</p> <p>Project 06.02.04 Information Modelling Flight Data</p> <p>Project 06.02.05 Information Modelling Airport Domain</p> <p>Project 06.02.06 Information Modelling Other Domains</p> <p>Project 06.02.07 Information Modelling 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Partners:

- Frequentis (lead), Thales
- EUROCONTROL (requirements)
- NORACON, DFS, ENAV
- + end user representatives

<p>9</p> <p>Project 09.01.01 Information Modelling Flight Data</p> <p>Project 09.01.02 Information Modelling Airport Domain</p> <p>Project 09.01.03 Information Modelling Other Domains</p> <p>Project 09.01.04 Information Modelling Flight Data</p> <p>Project 09.01.05 Information Modelling Airport Domain</p> <p>Project 09.01.06 Information Modelling Other Domains</p> <p>Project 09.01.07 Information Modelling Flight Data</p> <p>Project 09.01.08 Information Modelling Airport Domain</p> <p>Project 09.01.09 Information Modelling Other Domains</p> <p>Project 09.01.10 Information Modelling Flight Data</p> <p>Project 09.01.11 Information Modelling Airport Domain</p> <p>Project 09.01.12 Information Modelling Other Domains</p> <p>Project 09.01.13 Information Modelling Flight Data</p> <p>Project 09.01.14 Information Modelling Airport Domain</p> <p>Project 09.01.15 Information Modelling Other Domains</p> <p>Project 09.01.16 Information Modelling Flight Data</p> <p>Project 09.01.17 Information Modelling Airport Domain</p> <p>Project 09.01.18 Information Modelling Other Domains</p> <p>Project 09.01.19 Information Modelling Flight Data</p> <p>Project 09.01.20 Information Modelling Airport Domain</p> <p>Project 09.01.21 Information Modelling Other Domains</p> <p>Project 09.01.22 Information Modelling Flight Data</p> <p>Project 09.01.23 Information Modelling Airport Domain</p> <p>Project 09.01.24 Information Modelling Other Domains</p> <p>Project 09.01.25 Information Modelling Flight Data</p> <p>Project 09.01.26 Information Modelling Airport Domain</p> <p>Project 09.01.27 Information Modelling Other Domains</p> <p>Project 09.01.28 Information Modelling Flight Data</p> <p>Project 09.01.29 Information Modelling Airport Domain</p> <p>Project 09.01.30 Information Modelling Other Domains</p>	<p>10 SWM</p> <p>Project 14.01.01 SWM1 Scope Project follow-up and alignment</p> <p>Project 14.01.02 SWM1 Technical supervision and services options</p> <p>Project 14.01.03 SWM1 Design</p> <p>Project 14.01.04 SWM1 Platform development and Services Technical requirements</p> <p>Project 14.02.01 SWM1 Hardware</p> <p>Project 14.02.02 SWM1 Security solutions</p> <p>Project 14.02.03 SWM1 Technical supervision</p> <p>Project 14.02.04 SWM1 Platform development and Demonstrator delivery</p> <p>Project 14.02.05 SWM1 Test Platform</p>	<p>11</p> <p>Project 11.01.01 SWM1 Scope Project follow-up and alignment</p> <p>Project 11.01.02 SWM1 Technical supervision and services options</p> <p>Project 11.01.03 SWM1 Design</p> <p>Project 11.01.04 SWM1 Platform development and Services Technical requirements</p> <p>Project 11.02.01 SWM1 Hardware</p> <p>Project 11.02.02 SWM1 Security solutions</p> <p>Project 11.02.03 SWM1 Technical supervision</p> <p>Project 11.02.04 SWM1 Platform development and Demonstrator delivery</p> <p>Project 11.02.05 SWM1 Test Platform</p>	<p>12</p> <p>Project 12.01.01 SWM1 Scope Project follow-up and alignment</p> <p>Project 12.01.02 SWM1 Technical supervision and services options</p> <p>Project 12.01.03 SWM1 Design</p> <p>Project 12.01.04 SWM1 Platform development and Services Technical requirements</p> <p>Project 12.02.01 SWM1 Hardware</p> <p>Project 12.02.02 SWM1 Security solutions</p> <p>Project 12.02.03 SWM1 Technical supervision</p> <p>Project 12.02.04 SWM1 Platform development and Demonstrator delivery</p> <p>Project 12.02.05 SWM1 Test Platform</p>
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Acronyms

APP Approach

CNS Communications Navigation Surveillance

FMNC Flight & Wing Operations Centre / Meteorological Services

NIMS Network Information Management Systems

SESAE Single European Sky ATM Research

SWIM System Wide Information Management

TMA Terminal Manoeuvring Area

(SWP) (Sub-)Work Package

(*) WP 11 – no details available

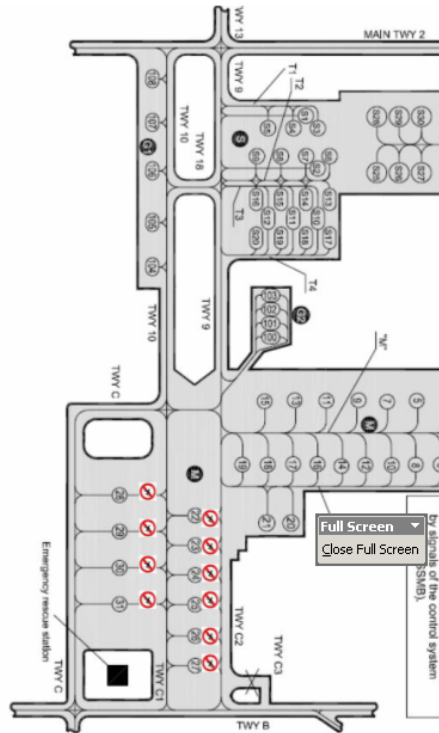
Digital Briefing Prototype

Pre-Flight Information Bulletin:
NARROW ROUTE

Validity (UTC):
09 MAY 2011 15:15 - 10 MAY 2011 15:15

DEPARTURE: UKBB (KYIV/BO)

→ Stand/ Push-back



[1] Stands 22-28 and 29-31 closed (A0361/11) 04-AP

→ Taxiing



[2] TWY A1 and TWY A2 closed. (A0261/11)	18-MAR-11 08:00	31-MAY-11 08:00
[3] TWY A3 closed. (A0308/11)	01-MAY-11 10:00	16-MAY-2011 23:59
[4] Segment TWY C2 closed FM TWY B to abeam stand 22. REF AIP UKBB AD 2.24.2-1. (A0301/11)	24-MAR-11 10:00	30-JUN-11 23:59
[5] Segment TWY B b/n TWY A2 and TWY A3 closed due to repair. REF AIP UKBB AD 2.24.2-1. (A0306/11)	24-MAR-11 10:00	30-JUN-11 23:59

Conclusion

Conclusions

- Key requirement is timeliness of data
- Digital NOTAM is necessary and has important benefits
- It is feasible with the current technologies
- ***... it is already happening!***
- More info
 - <http://www.eurocontrol.int/aim>
 - www.aixm.aero

