

*Global Information
Management*

European
Information
Services

Lessons Learned &
Next Steps

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Overview

- European Information Services: Structure
- Strategy
- Communication Paradigms
- Available Services
- Roadmap
- Lessons Learned

European IS: Structure



THE NETWORK MANAGER CONNECTING THE NETWORK TO DELIVER IMPROVED PERFORMANCE

Network Manager
nominated by
the European Commission

DELAYS

2011
0.8 MINUTE
PER FLIGHT

2014
0.6 MINUTE
PER FLIGHT

AIRSPACE DESIGN & CAPACITY PLANNING
WE WORK WITH ALL OUR STAKEHOLDERS TO CREATE AN EFFICIENT, FLEXIBLE AND DYNAMIC AIRSPACE STRUCTURE AND TO EXTRACT MAXIMUM CAPACITY FROM THE NETWORK

CIVIL-MILITARY COORDINATION
FLEXIBLE USE OF AIRSPACE
THE MILITARY FREE UP AIRSPACE WHEN THEY ARE NOT USING IT

BAD WEATHER
CAUSES 13% OF PRIMARY DELAY.
WE WORK TO REDUCE THE DISRUPTION & KEEP THE NETWORK RESILIENT

THE NETWORK

- 2.27 MILLION PASSENGERS PER DAY
- 27,000 FLIGHTS PER DAY
- 1,940 AIRCRAFT OPERATORS
- 520 AIRPORTS
- 65 CONTROL CENTERS
- 42 EU / NON-EU STATES

AIRPORTS IN THE NETWORK
AIRPORT COLLABORATIVE DECISION MAKING
AIRPORTS WORK BETTER WHEN ALL SERVICES, FROM ATC TO BAGGAGE-HANDLING, ARE CONNECTED WITH EACH OTHER AND THE NETWORK

MANAGE SCARCE RESOURCES
100% OF REQUESTS MET IN 2013
CENTRAL CODE ALLOCATION FOR 20 STATES

NETWORK PLANNING

- NETWORK STRATEGIC PLAN
- NETWORK PERFORMANCE PLAN
- NETWORK OPERATIONS PLAN

SAFETY
RUNWAY SAFETY
LESS THAN 1 SERIOUS INCIDENT PER MILLION AIRCRAFT MOVEMENTS

CRISIS MANAGEMENT
WE COORDINATE THE MANAGEMENT OF RESPONSES TO ANY CRISIS WHICH IMPACTS ON AVIATION IN EUROPE

DATA SHARING
AERONAUTICAL SERVICES
PROVIDING INFORMATION FOR THE FLIGHT: FROM AIRSPACE CLOSURES TO WEATHER

FLOW MANAGEMENT SINCE 1995

WE MANAGE SURGES IN AIR TRAFFIC SO AS TO MINIMISE IMPACT ON THE NETWORK. FLOW MANAGEMENT MINIMISES FUEL BURN AND EMISSIONS BY HOLDING AIRCRAFT ON THE GROUND SO AS TO AVOID CONGESTION IN THE AIR

200,000 600,000
TONNES OF FUEL TONNES OF CO₂

SAVED YEARLY

FLIGHT EFFICIENCY INITIATIVE LAUNCHED IN 2013

WE OFFER AIRCRAFT OPERATORS THE MOST EFFICIENT ROUTES ON THE DAY OF OPERATION

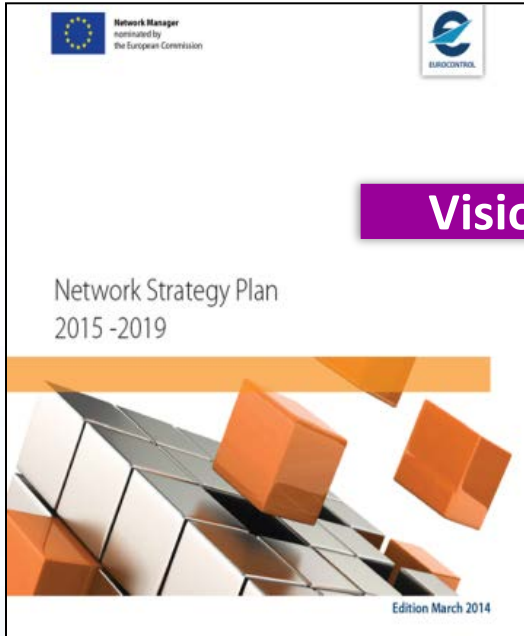
32,644 202,700
MINUTES NAUTICAL MILES

SAVED IN 2014



European IS: Structure

- EAD (European AIS Database)
 - Publication of ICAO annex 15 airspace data+++
- Network Manager (NM) <= **FOCUS**
 - Pan-European operations... (see above)
- National Service Providers
 - AIS, NRC, NEC, FMP, ACC, MIL, ...
- Airspace Users
- FRAGMENTATION!



Vision

The European ATM Network will be supported by system wide information **sharing of dynamic ATM information serving all operational users' needs** and building on the **SESAR** developments

Objective

S02- Deploy interoperable and effective information management systems

S02/4 Implement a service-oriented architecture in compliance with the European **SWIM** specifications to ensure **interoperability** in support of the Network Functions at central, regional or local level.

Action

Communication Paradigms

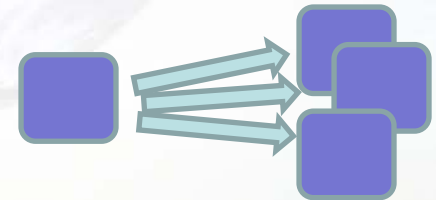
- **Request / Reply**

- POX (Plain Old XML) messages: XML over HTTP
- SOAP: same XML with a SOAP envelope
- Support of WSDL 1.1 and SOAP 1.1



- **Publish / Subscribe** (both pull & push)

- SOAP and POX for the subscription and pull
- AMQP 1.0 for the push



All SWIM/YP (Yellow Profile)

Available Services

Airspace Structure

- AS, AD(Z), PT, RT, TP, UT, FW, RS, TV(Z)
- Complete **AIXM 5.1** dataset AIRAC + daily
- Incremental **AIXM 5.1** Dataset dynamic updates
- Not AIFS (WFS not supported)

Airspace Availability


- Management of AUP (for AMCs) (Airspace Use Plan)
- Publication of e-AMI (EAUP/EUUP - CDRs and RSAs) **AIXM 5.1**

Flow


- **ATFCM Regulations**
- **Traffic Counts**
- Management **ATFCM tactical updates**: runway configurations, sector configurations, capacities, ETC
NO **XM at all... TMI ontolo-XM

Available Services


Flight Plan

- 
- Flight plan **validation** and Route **generation**
 - Flight plan **filing** and **management**: create, update, cancel, delay, departure, arrival, status request
 - **Flight plan querying** by AO, AD(Z), PT, AS, TV
 - **NOT YET FIXM**

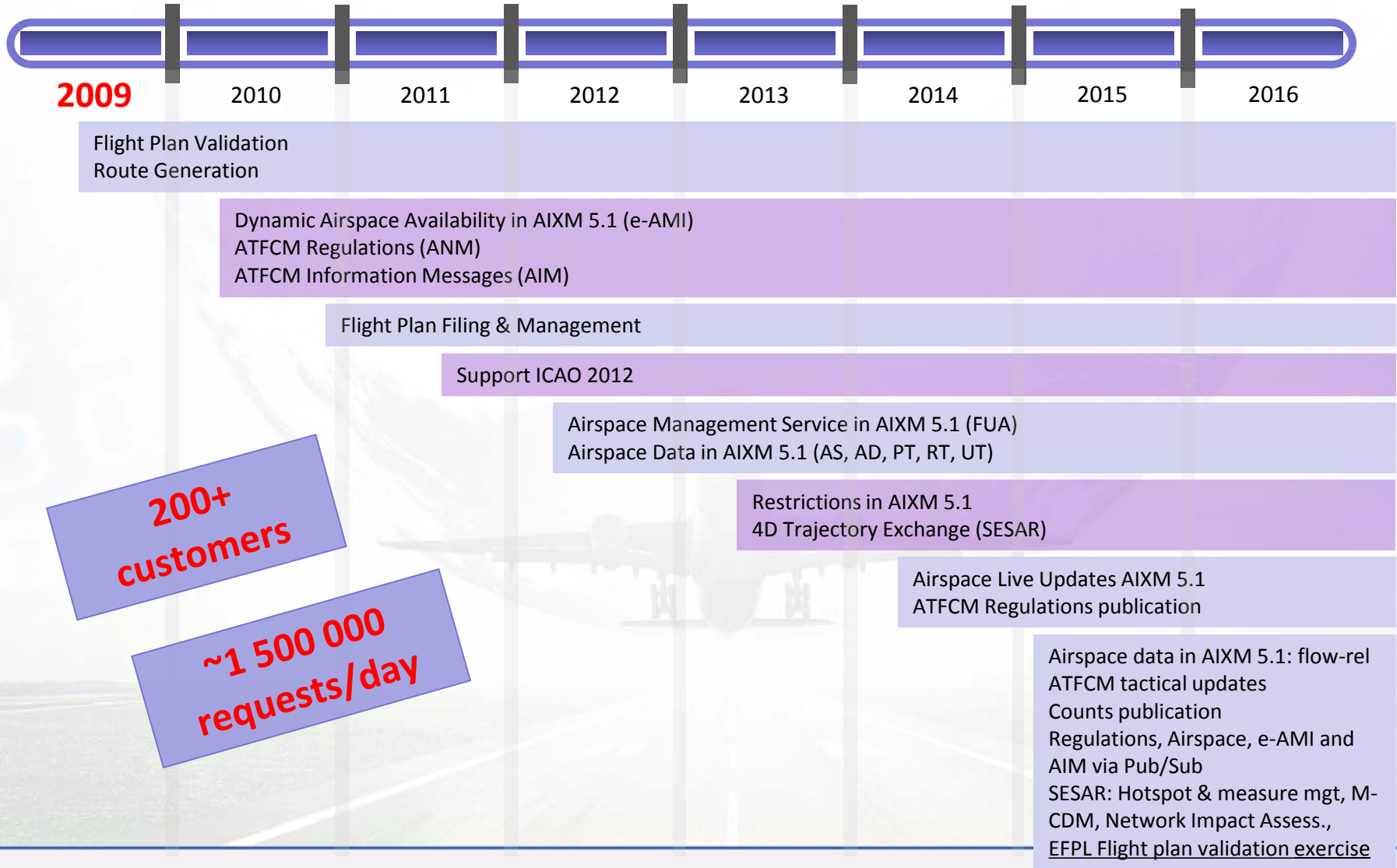
Flight

- 
- **Pre-departure & airborne Flight lists and details** by AO, AD(Z), PT, AS, TV
 - **NOT YET FIXM**

General Information

- 
- Access to **ATFCM Information Messages (AIM)**

Available Services

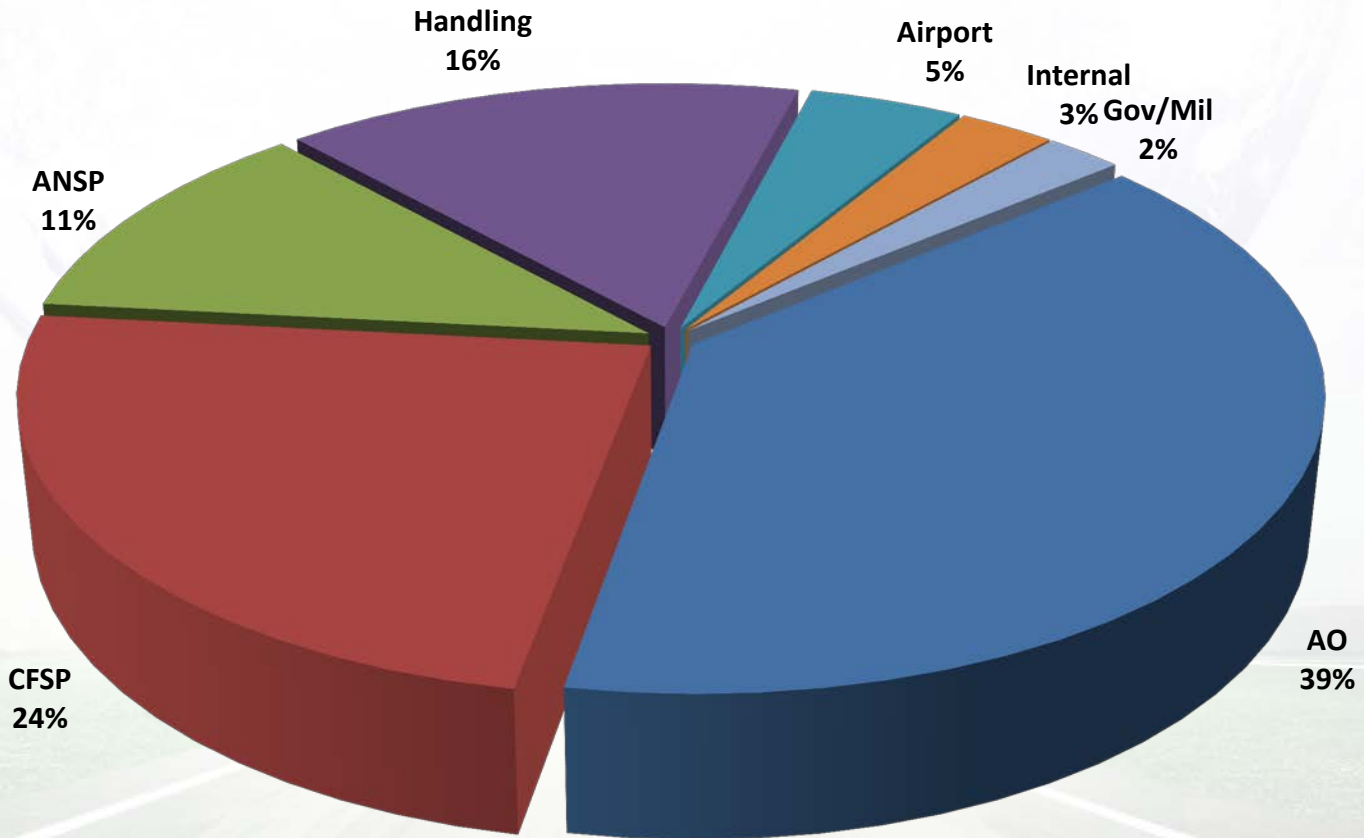


**200+
customers**

**~1 500 000
requests/day**

Available Services

Who uses them? (#OPS calls)

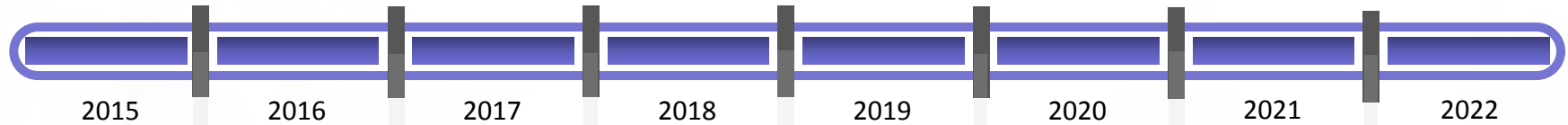


Available Services

Security

- **Authentication:** Client certificates
- **Encryption** via HTTPS
 - SSLv3 deprecated, to be removed in Oct 2015
 - Now TLS 1.0, moving to TLS 1.2 in Oct 2015
 - TLS includes HMAC (both-side integrity control)
 - **SWIM/YP!**
- **Authorisation:** based on user/company profiles
 - Up to flight plan management access control
- All exchanges **recorded** and can be consulted for investigation

Roadmap



Flight plan event distribution via Pub/Sub (including to ATC)
Flight updates publication via Pub/Sub (including to ATC) (EFD, ...)
EFPL Flight plan validation and filing (OPS) – FIXM X.Y?
Departure Planning Information (DPI)
ATFCM Tactical updates via Pub/Sub

Extended Departure Planning Information
Arrival Planning Information
Flight Plan validation and filing in FIXM 4.0
OAT flight plan filing in FIXM 4.0
Flight plan event distribution in FIXM 4.0
Flow management message distribution via Pub/Sub
ATFCM situation with average delays
Network Events publication via Pub/Sub
Rerouting opportunities
Airport Strategic Plan

ATC Controller clearances
Full Support to FF-ICE

WFS?

Not a priority
today for NM.
Priority for EAD.
EAIMS will bring
together the
best of the two
worlds.

Lessons Learned

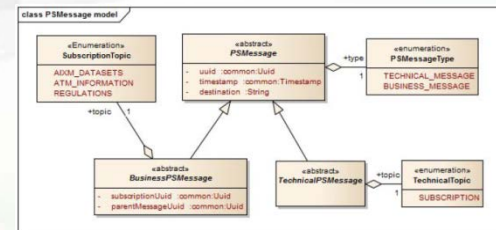
- **B2B services over SWIM/YP are GREAT, a MUST - ENABLER**
 - SWIM makes data exchange aspects much easier
 - But does not solve all!
- General: not immediate to move from HMI on top of legacy backend to B2B on top of same legacy
 - Backend interfaces to be adapted
 - When not their in-depth architecture
 - **Easy to start, requires significant industrialization efforts**

Lessons Learned

- **AIXM/FIXM extensions: flexibility vs. interoperability**
 - AIXM 5.1 for EAD is not AIXM 5.1 for NM
 - AIXM 5.2 in support to e.g. EAIMS (= NM/AS + EAD)

- **NM & EAD services are central:**
 - Need for standardizing these services?
 - Or need for standardizing more service components/enablers?

- E.g. NM B2B services based on **formal models – NOT UML**
 - Most artefacts are generated: documentation, UML, software, WSDL, XSD



Lessons Learned

- E.g. **standard error reporting** – complex, open to “creativity”
- E.g. **standard service versioning**
 - NM: Several OPS service versions are supported in parallel
 - Support customer migration own pace and schedules
 - A version remains at least one year before it can be declared deprecated
 - Once declared deprecated, a service remains available at least one year until it can be removed
 - => An OPS service exists always for at least two years!
- E.g. **standard “PREOPS” integration testing**
 - NM: PREOPS platform used for customers to test their client applications before going OPS
 - ~OPS quality, always available, but only office hours support
 - Unattended: flight plan goes MANUAL...
 - Data fed from OPS (frequency depends on service)
 - Distinct URLs, distinct certificates

NM Stakeholders Engagement

B2B Technical Forum

- Technical Managers of the ATM community
- Focusing on technologies and business services
- Contributing to the growth of the ATM API economy

1st meeting May 2014

- 37 participants
- 27 organisations

B2B Tiger Team

- Enthusiastic and fully committed members
- Several web conferences /year
- Help shape NM developments
- Boost customer implementations

2nd meeting Jan 2015

- 70 participants
- 41 organisations

Access to Resources

- **Service access on request** via online NM Service Request Form
direct link: <http://www.eurocontrol.int/services/nm-b2b>
- **Central repository of up-to-date information**
 - OneSky Teams Shared space "B2B - Web Services" (registration needed)
 - Direct link (after OneSky Online login)
<https://extranet.eurocontrol.int/http://beid.eurocontrol.be:8980/Members/irc/eurocontrol/b2bws/home>
 - Technical Documentation, Statistics, Samples
 - Discussion Forum
 - Allow to share problems/solutions
 - Good starting point for newcomer
 - SWIM Registry: <http://eur-registry.swim.aero/>
- B2B Web Services **contact** points:
 - Operational: andy.woolin@eurocontrol.int
 - Technical: pierre.hanoune@eurocontrol.int