B1 – SWIM

ICAO APAC/EUR/MID

Service improvement through integration of AIM, MET and ATM Information Services

Paul Bosman

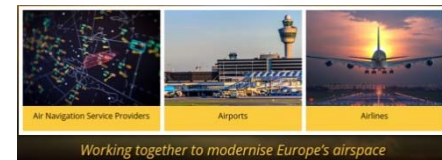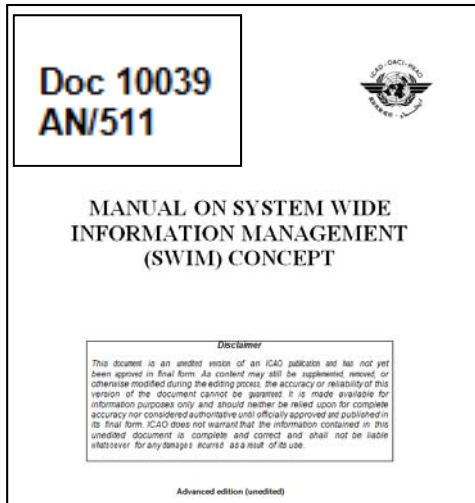Head of ATM Strategy Division, EUROCONTROL

2 October 2017
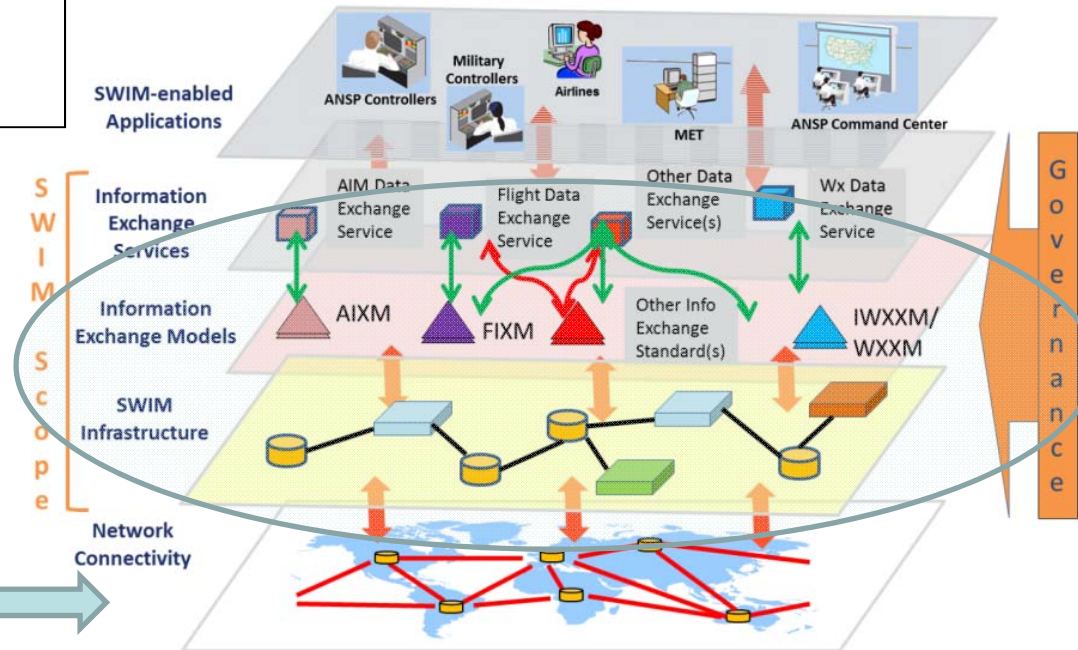
European SWIM Evolution

- February 1998
  - A new STAR was born
  - (Luxembourg – 02:30 AM)

- 2008-2016
  - SESAR 1 kick-started European SWIM Developments
  - First SWIM Pioneers

- 2017+
  - SWIM implementations increasingly happening

What is SWIM ?

Doc 10039
AN/511

MANUAL ON SYSTEM WIDE
INFORMATION MANAGEMENT
(SWIM) CONCEPT

Disclaimer

This document is an unedited version of an ICAO publication and has not yet been approved in final form. As content may still be supplemented, removed, or otherwise modified during the editing process, the accuracy or reliability of this version of the document cannot be guaranteed. It is made available for information purposes only and should neither be relied upon for complete accuracy nor considered authoritative until officially approved and published in its final form. ICAO does not warrant that the information contained in this unedited document is complete and correct and shall not be liable whatsoever for any damages incurred as a result of its use.

Advanced edition (unedited)

> *Definition : SWIM consists of standards, infrastructure & governance enabling the management of ATM information and its exchange between qualified parties via interoperable services."*

SESAR

Figure 2. SWIM Global Interoperability Framework

IP = Internet, …

(SWIM =) Service Orientated Architecture

SOA is a style of software design … The basic principles are **independent of vendors, products and technologies**

It is enabled by **technologies and standards** that make it easier for components to communicate and cooperate over a network, **especially an IP network**

service-orientation promotes **loose coupling**

help businesses respond **more quickly and more cost-effectively** to changing market conditions

Business value is given more importance than technical strategy
Strategic goals is given more importance than project-specific benefits
Intrinsic inter-operability is given more importance than custom integration
Shared services is given more importance than specific-purpose implementations
Flexibility is given more importance than optimization
Evolutionary refinement is given more importance than pursuit of initial perfection

European Progress in a nutshell

Information

AIXM
- ICAO & Increasing implementations
- Digital NOTAM
- Lessons learned (Business rules, CCBs, ..)

WXXM
- I(CAO)WXXM
- Data coming (really … ?)
- CCB ?

FIXM
- Ops drive FF-ICE/1
- ICAO/ISO/AIXM alignment
- Towards implementation − V4

ICAO Pick-up !
- AIRM

What about me ?
- AIDX, AMDB, Asterix, ED133, Env XM, …

Services

eur-registry.swim.aero

SESAR SWIM Registry

1000 Users

150 Organizations

70 Service Implementations

Technical Infrastructure

- **IT is found to be _mature_**
  - •IT in ATM

- **Mostly an issue of _agreeing_ on used (open) standards**

- **Through so called _Technical Profiles_ (Yellow / Blue / …)**

E.g. Yellow = SOAP1.1/1.2, WSDL1.1/2.0, WSI1.2/2.0, WS-Security1.1, TLS1.0/1.1/1.2, PKI x.509v3, XML-Encryption, XML-Signature, ECRYPT II, XML 1.0/1.1, XML-Schema, WFS/WMS/..., HTTP/1.1, HTTP-GET/POST, MTOM (Red is core, rest is optional for Provider)

+ now Pub/Sub : AMQP1.0 incl JMS bridging !

Governance

Initial SWIM (iSWIM)
EU initiative to move towards **SESAR Deployment Carrot/Stick** approach
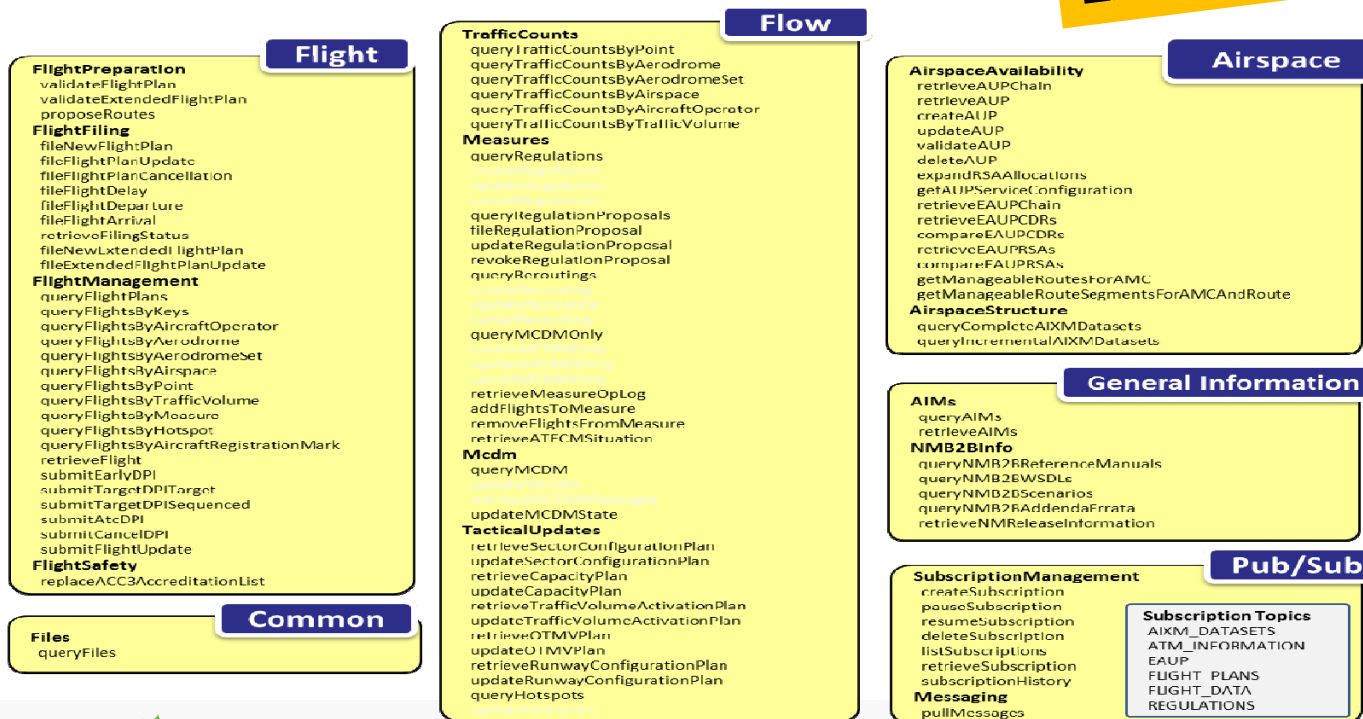
Planned SWIM Specifications & Guidance
- SWIM Services
- SWIM Information
- SWIM Technical Infrastructure Yellow Profile
- Compliance criteria
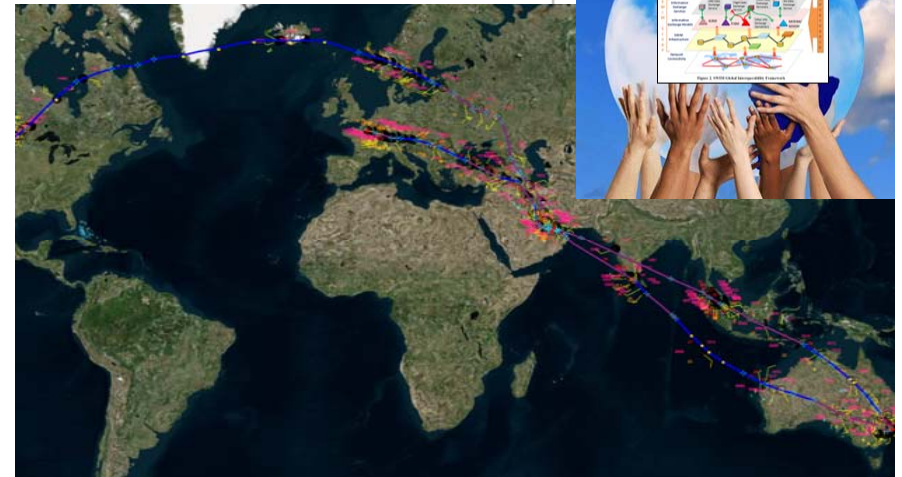
Performance Based Approach

A SWIM Pioneer - NM

- NM B2B live since 2009

- 200+ connected organisations

Over 6 million Exchanges / day !
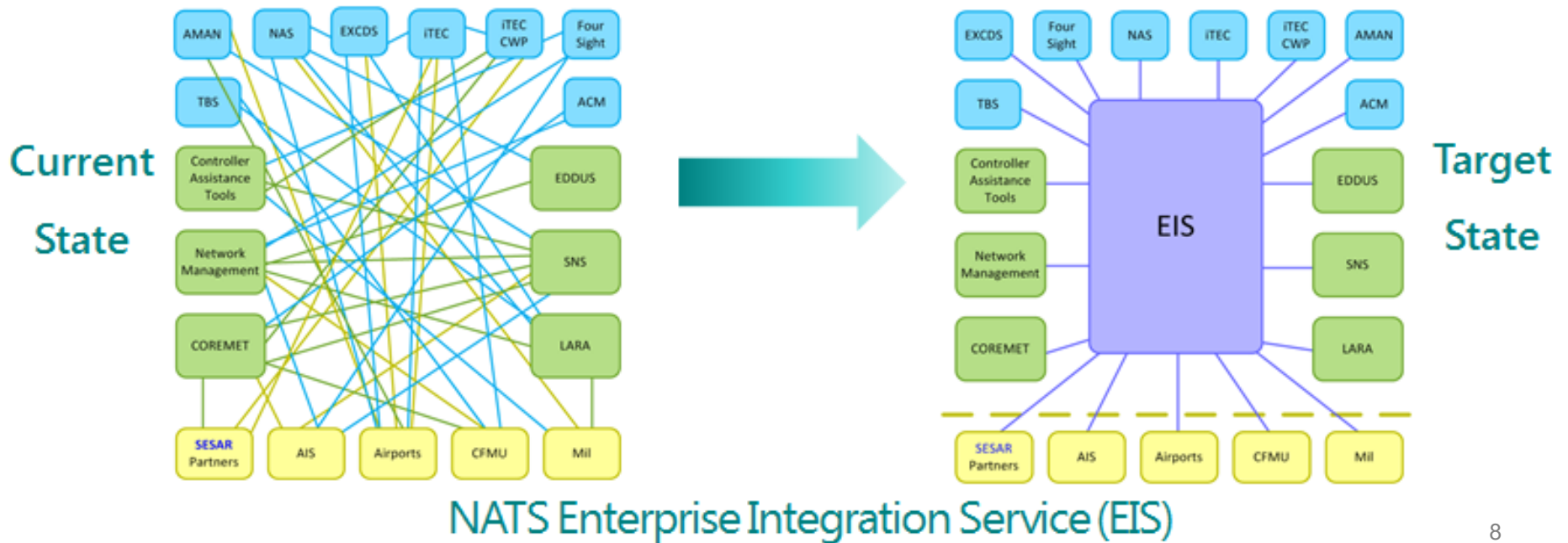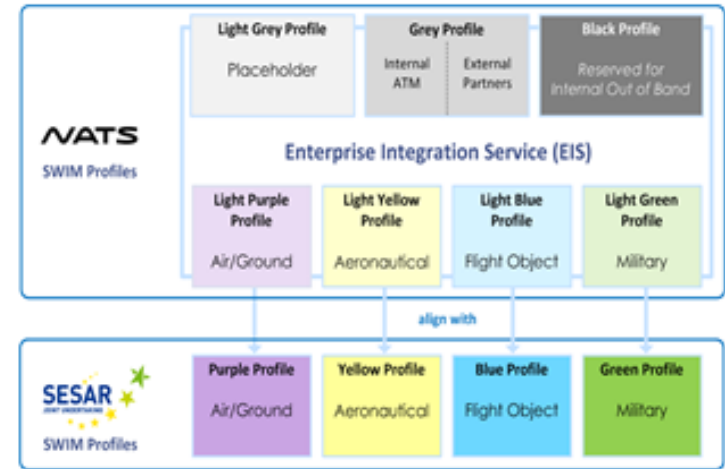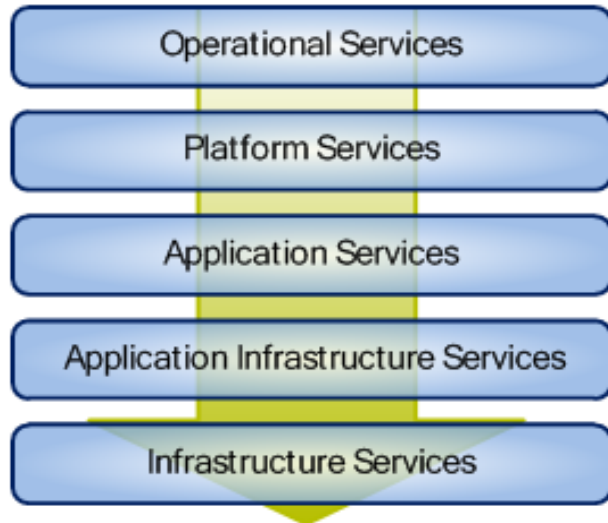
SESAR SWIM Global Demos

- 8-9 June 2016
- Participants
  - SESAR partners, Air Services Australia, Brazil DECEA, FAA, Mongolia CAA, UAE
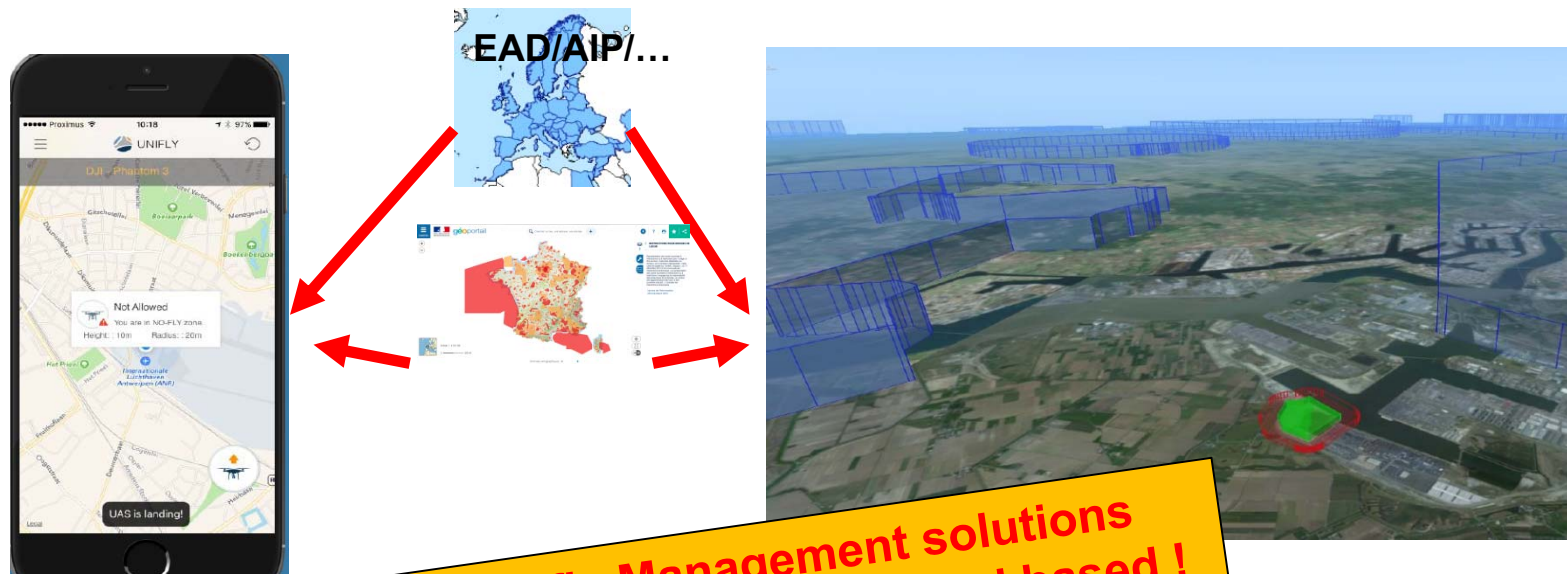 - 200 persons & 1000$^+$ online

- **Results**
  - SWIM is a reality and no technical barriers for global exchange found
  - Becoming major enabler for current & future ATM concepts & operations
  - Standards like AIXM, WXXM, FIXM successfully used by all
  - Lessons learned feed back (incl ICAO\ATMRPP & IMP)

Services and SWIM In NATS

NATS Enterprise Integration Service (EIS)

Latest example
Drone - Safe-to-fly applications!

"SERIOUS RISK OF COLLISION"

EAD/AIP/…

Drone Traffic Management solutions SWIM enabled from day 1 / Cloud based !

Is ATM Ready for the future ?

The world out there

- Millions of APIs available on the Web
- Google, Amazon, Salesforce, Twitter are all API companies
- Internet of things - 30 billion connected objects by 2020

ATM

- FIXM   6 years
- (i)WXXM   9 years
- SWIM   19 years
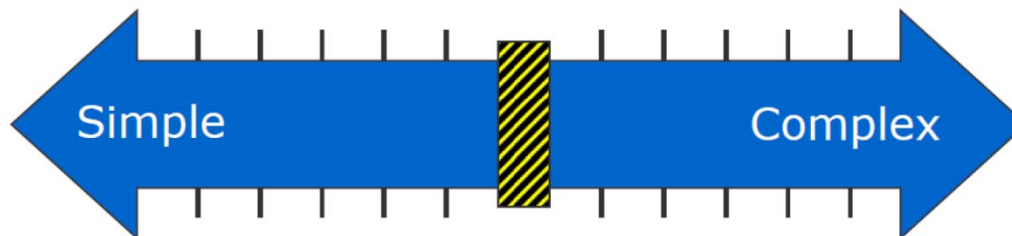- AIXM   20 years
- 4D   40 years

SWIM is nothing more than Service Orientated Architecture
A mainstream IT solution

XMs and ICAO ?

XML, GML ?

Which level of interoperability is "just right"?

Simple ◄─────────────► Complex

Too simple:
- Identified requirements can not be supported
- Insufficient harmonisation
- Few benefits

Too complex:
- Difficult to implement
- Substantial benefits available only to few users
- High costs

Regulation – Standardisation - Guidance

EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

Enclosure 2

EUROCONTROL Specification
for
SWIM Information Definition

EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

Enclosure 1

EUROCONTROL Specification
for
SWIM Service Description

EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

Enclosure 2

EUROCONTROL Specification
for
SWIM TI Yellow Profile

Help ! My boss asks me to do/be SWIM

A 'How-To-Get-Started' checklist

✓ Do you have some/all data in Digital Format (XMs, …) ?

✓ Are you able to provide this as a web-service ?

✓ Using technos such as SOAP, HTTP, TLS ?

✓ Over (secured/open) Internet ?

Then you are SWIM(ming) !

Unlock your data !!!

Conclusions

- Significant SWIM progress
  - Technology is not the blocking factor anymore
  - NB: SWIM = SOA

- Go easy on Regulation

  Key are Standards & Guidance !

- Plan & act practically on cyber-security

- **Evolutionary refinement** is given more importance than pursuit of initial perfection

- Surely many more events still required ☺