Definition: SWIM consists of standards, infrastructure & governance enabling the management of ATM information and its exchange between qualified parties via interoperable services.”
European Progress in a nutshell

**Information**
- AIXM
  - ICAO & Increasing implementations
  - Digital NOTAM
  - Lessons learned (Business rules, CCBs, ...)
- WXXM
  - ICAO/ISO/WXXM
  - Data coming (really ... ?)
  - CCB?
- FIXM
  - Ops drive FF-ICE/1
  - ICAO/ISO/AIXM alignment
  - Towards implementation – V4

**Services**
- eur-registry.swim.aero
- 1000 Users
- 150 Organizations
- 70 Service Implementations

**Technical Infrastructure**
- IT is found to be mature
- Mostly an issue of agreeing on used (open) standards
- Through so called Technical Profiles (Yellow / Blue / ...)
  - E.g. Yellow = SOAP1.1/2, WSDL1.1/2.0, WS1.2/2.0, WS-Security/1.1, TLS1.0/1.1/1.2,
  - PKI x.509v3, XML-Encryption, XML-Signature, ECRYPT2, 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
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 feedback (incl ICAO\ATMRPP & IMP)
From demo to Operations – April 2016!

USA – Europe SWIM Flight Exchange

1. Publish Flight Data
2. ATFM recalculation
3. Publish Flight Data
3. Query Flight Data

Using open standards! (AMQP1.0)
Global Flight data exchange really accelerated through SWIM
The future is bright … or …. ?

Let’s congratulate ourselves on a job well done!

Virtualisation
Automation
Climate change

Aviation Information World - Forecasting the Future
Virtualisation - ATM Cloud Services

Cyber security
More than ever a concern!
Drones – A European discovery path

Drone/UAS Traffic Management solutions SWIM enabled from day 1 / Cloud based!
Drones – From toys to a total ATM overhaul?

- **Space operations**: 10-100s
- **Very High Level operations (VHL)**: 10.000s
- **IFR/VFR operations**: 100-1000s
- **Very Low Level operations (VLL)**: 10.000.000s

Global estimates for 2020-2025
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 5 years
- (i)WXXM 8 years
- SWIM 18 years
- AIXM 20 years
- 4D 40 years
Conclusions

• Significant SWIM progress
  – Technology is not the blocking factor anymore
  – Global implementation a real challenge!
  – Acceleration through Regulations or Market-set standards?

• Automation & Virtualisation
  – Next wave of Opportunities & Challenges

• Surely many ATIECs still required 😊