

*Global Information  
Management*

European  
SWIM  
State of Play



*Presented By: Paul Bosman*

*Date: August 25, 2015*



Federal Aviation  
Administration



**AIR TRANSPORTATION  
INFORMATION EXCHANGE  
CONFERENCE**

**Global Information Management**

**August 25-27, 2015**

**NOAA Auditorium and Science Center • Silver Spring, MD**



# Global Progress

Doc 10039 AN/511



MANUAL ON SYSTEM WIDE INFORMATION MANAGEMENT (SWIM) CONCEPT

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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."**

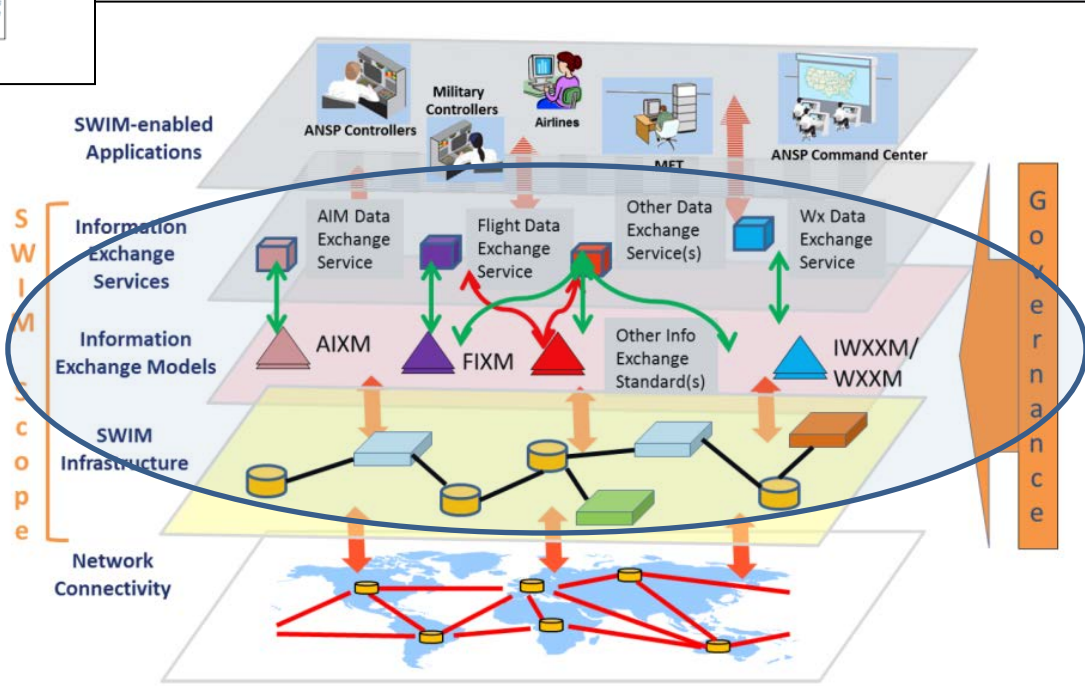
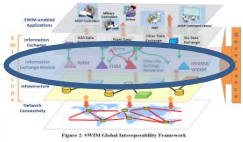


Figure 2. SWIM Global Interoperability Framework





# Information



**AIXM**  
ICAO & Increasing implementations  
Digital NOTAM  
Lessons learned (Business rules, AIFS, ..)

**WXXM**  
I(CAO)WXXM  
Data coming (really ... ?)  
CCB ?

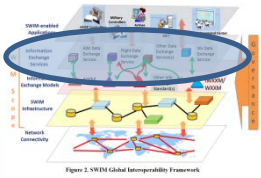
**FIXM**  
Ops drive FF-ICE/1  
ICAO/ISO/AIXM alignment  
Towards implementation – V4

**What about me ?**  
AIDX, AMDB, Asterix, ED133, Env XM, ...



**ICAO Pick-up !**





# Services

More and more being Developed & Deployed



How to find the European Services ?  
Correct answer : It depends !

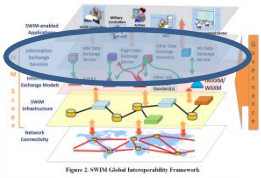
## The European ATM Portal.



[eatmportal.eu](http://eatmportal.eu)

[eur-registry.swim.aero](http://eur-registry.swim.aero)





# European ATM Portal

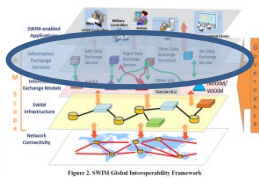
eatmportal.eu



|  |  |   |   |   |   |
|--|--|---|---|---|---|
| AeronauticalInformation                | Service to provide Airport Feature and Map information in a Web Feature Service (WFS) form.          | 5 | 4 | 4 | 4 |
| AeronauticalInformationFeature         | The service to supply aeronautical features on request in compliance with the WFS standards.         | 5 | 4 | 4 | 4 |
| AeronauticalInformationMap             | An AeronauticalInformationService providing maps upon request. Following ISO 15192:2005.             | 5 | 4 | 4 | 4 |
| AeronauticalInformationPublication     | Alert users when new aeronautical information is available; provide dynamic data updates to...       | 5 | 4 | 4 | 4 |
| AirportFlightInformationPublication    | Airport Flight Information Publication service is part of a series of services that help automate... | 5 | 4 | 4 | 4 |
| AirportMETForecast                     | A service providing MET parameters forecasted at the airport.  | 5 | 4 | 4 | 4 |
| AirportMETInducedCapacityReduction     | Service to provide the capacity of an airport reduced as a result of meteorological factors.         | 5 | 4 | 4 | 4 |
| AirportMETNowcast                      | Service to provide a now cast for an airport.  | 5 | 4 | 4 | 4 |
| AirportMETObservation                  | A service providing MET parameters observed at the airport.  | 5 | 4 | 4 | 4 |
| ARESActivation                         | Logical service model for the Activation of one ARES.  | 5 | 4 | 4 | 4 |
| ARESDeactivation                       | Logical service model for the Deactivation of one ARES.  | 5 | 4 | 4 | 4 |
| ARESPreActivation                      | Logical service model for the Pre activation of one ARES.  | 5 | 4 | 4 | 4 |
| ARESTimeQuery                          | The ARESTimeQuery service provides the means for the WOC, AMC... to retrieve an ARES using the...    | 5 | 4 | 4 | 4 |
| ARESTimeRelease                        | Logical service model for the release of one ARES.   | 5 | 4 | 4 | 4 |
| ArrivalManagementInformation           | The definition of standardised Arrival Management services supports the application of Arrival...    | 5 | 4 | 4 | 4 |
| ATCFightObjectControl                  | The ATCFight Object Control service allows consumers to request a number of changes to a Flight...   | 5 | 4 | 4 | 4 |
| CalculatedPreDepartureSequenceDelivery | The Calculated Pre-Departure Sequence Delivery service delivers the TSAT ordered TQOT A-CDM line...  | 5 | 4 | 4 | 4 |
| ExtendedFlightPlanSubmission           | The Submission service supports the Airspace User to request the validation of an Extended...        | 5 | 4 | 4 | 4 |
| FlightPlanDataDistribution             | The FlightPlanDataDistribution Service supports the service provider (Network Manager) to...         | 5 | 4 | 4 | 4 |
| METAR                                  | A service providing the METAR bulletin according to ICAO Annex 3 requirements.                       | 5 | 4 | 4 | 4 |
| METARAlertForecast                     | SWA010 Service handling forecast (0-2hours, 3D, Probability factor) and Forecast(2 hours to...       | 5 | 4 | 4 | 4 |
| METARAlertObservation                  | SWA010 Service handling actual significant weather phenomena for immediate assessment by consumers.  | 5 | 4 | 4 | 4 |
| NetworkOperatorPlan                    | The NetworkOperatorPlan Service provides synchronises the Network Operators Plan with the...         | 5 | 4 | 4 | 4 |
| OATFlightDataDistribution              | Service to provide the interface for the distribution of OAT Flight Data from IRR to the...          | 5 | 4 | 4 | 4 |
| OATFlightPlanSubmission                | The OAT Flight Plan Submission service supports the State user (usually the WOC), in enabling...     | 5 | 4 | 4 | 4 |
| PreDepartureSequenceSetting            | The Pre-Departure Sequence Setting service as part of a series of services that help automate the... | 5 | 4 | 4 | 4 |
| ReportAeronauticalInformation          | The service package models the provision of the aircraft flight management system Estimated Time...  | 5 | 4 | 4 | 4 |
| ReportAeronauticalInformation          | The ReportAeronauticalInformationService...  | 5 | 4 | 4 | 4 |
| RunwayManagement                       | Service to deliver information about run...  | 5 | 4 | 4 | 4 |
| RunwayUseSequence                      | The runway use sequence service is...  | 5 | 4 | 4 | 4 |
| SharedFlightObject                     | This package contains the service to...  | 5 | 4 | 4 | 4 |
| SHOWTAM                                | Service providing the SHOWTAM bulle...   | 5 | 4 | 4 | 4 |
| TAF                                    | A service providing the TAF bulletin a...  | 5 | 4 | 4 | 4 |
| TargetOff-DeckTimeSettingService       | Target Off-Deck Time Setting service...  | 5 | 4 | 4 | 4 |



**Services for Architects**



# European Registry



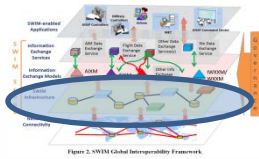
**EAD, NM B2B, ...**

**Coming soon:  
FAA registry connect**

| Service Name  | Status   | Category   | Notes  |
|---|--|--|--|
| Aeronautical MET message service  | v 1.0   Under development   Prototype   Current and Supported      | Meteorological Information   | This service delivers annex 3 aeronautical message in REXM 1.0 format.   |
| AirspaceAvailabilityService   | v 19   Ready for consumption   Operational   Current and Supported | Aeronautical Information Management  | This service is ment for querying and m Aeronautical Information Management  |
| AirspaceStructure KML service   | v 1.0  | Aeronautical Information Management  | This service allows to retrieve Airspace ATM Information Management, Airspace (ramp), Take Off, Departure, En-route, A   |
| AirspaceStructureService  | v 19   Ready   | Aeronautical Information Management  | AirspaceStructureService has been dev Aeronautical Information Management  |
| AIXM2KML Translation service  | v 1.0  | ATM Information Management, Aeronautical Information Management, Aeronautical Information, Meteorology,  | This service provides an easy way to trz ATM Information Management, Aeronautical Information Management, Aeronautical Information, Meteorology,   |
| Aviation Statistic Data Service   | v 1.0   R  | Aeronautical Information Management, Aeronautical Information, Environment   | Aeronautical static data plays a key rol ATM Information Management, Aeronautical Information Management, Aeronautical Information, Environment  |
| AXL SDO 5.1. Service  | v 1.0   Terminat   | ATM Information Management, Aeronautical Information   Airport (ramp), Take Off, D   | The AvitechDonionService provides sai ATM Information Management, Aeronautical Information Management, Aeronautical Information   Airport (ramp), Take Off, D  |
| CLONED FlightFilingService  | v 19   Re  | ATM Network Management   Flight   Air  | FlightFilingService enables the creator ATM Network Management   Flight   Air  |
| FlightAware ADS-B data serv   | Ready for consumption   Current and Supported                      | CNS Infrastructure, Surveillance   | The flightware service provi CNS Infrastructure, Surveillance  |
| FlightFilingService   | v 19   Re  | ATM Network Management   | FlightFilingService enables t ATM Network Management   |
| FlightManagementService   | v 19   Re  | ATM Network Management   | FlightManagementService pr ATM Network Management  |
| FlightPreparationService  | v 1  | ATM Network Management   | FlightPreparationService is r ATM Network Management   |
| Flightradar 24 ADS-B live str   | Global flight tracking coverage                                    | Traffic Sequencing, CNS Infr Management, Meteorologica Airport CDM, Trajectory Plan Structure Allocation, Airspace Surveillance   Airport (ramp),  | Global flight tracking coverage Traffic Sequencing, CNS Infr Management, Meteorologica Airport CDM, Trajectory Plan Structure Allocation, Airspace Surveillance   Airport (ramp),  |
| Geodectic Calculation Servic  | The Geodectic Calculation Se                                       | ATM Information Manager Aeronautical Information   En  | The Geodectic Calculation Se ATM Information Manager Aeronautical Information   En   |
| GNSS Monitoring Service   | v 1.0   E  | CNS Infrastructure, Surveillance CDM, ATM Network Manage   | Pildo Labs is well known at E CNS Infrastructure, Surveillance CDM, ATM Network Manage   |
| MeasuresService   | v 19   Ready for consumption   Operational   Current and Supported | Shared Information Service   | ThisMeasureService is intended to provide querying and update capabilities on ATFCM (Air Traffic Flow and Capacity management) measures.   |
| MET 4DWxCube Weather Cu   | Operational   Current and Supported                                | Traffic Sequencing, Meteorol Synchronisation, Airspace An Operator, Airspace User, ANE   | MET 4DWxCube Weather Cu provides operational reac Traffic Sequencing, Meteorol Synchronisation, Airspace An Operator, Airspace User, ANE   |
| MET at airport service  | v 1.0  | Meteorological Information, M  | This service delivers detailed Meteorological Information, M   |
| Met Hazards Service   | v 1.0  | Meteorological Information, M  | This service delivers MET ha: Meteorological Information, M Take Off, Departure, En-route  |
| Met Hazards Service   | v 1.0  | Meteorological Information, M  | This service delivers MET ha: Meteorological Information, M Take Off, Departure, En-route  |
| METAR Service   | v 1.0   Term   | ATM Information Manager route, Arrival   Airport Operat  | The METAR service covers th ATM Information Manager route, Arrival   Airport Operat  |
| NOTAM Distribution Service  | v 1   Under development   Prototype   Upcoming not Supported       | Trajectory Management, Trajectory Planning   Aeronautical Information   En-route, Oceanic   Airspace User  | The purpose of the FNS-ND3 Beta. Test will be to provide feedback on the FNS-ND3 web service in a test environment only, with no authorization for u Trajectory Management, Trajectory Planning   Aeronautical Information   En-route, Oceanic   Airspace User   |
| RPAS Very Low Level Operations Coordination (VLLOC) Platform - Notification Service | v 1.0   Ready for consumption   Prototype   Current and Supported  | Surveillance Infrastructure, ATM Information Management, Flight Information Management   Flight, Environment   En-route   ANSP, Network Manager  | There is a growing demand for RPAS (Remotely-Piloted Aircraft Systems) operations for all kinds of civil applications: aerial filming, environmental Surveillance Infrastructure, ATM Information Management, Flight Information Management   Flight, Environment   En-route   ANSP, Network Manager                       |
| RPAS Very Low Level Operations Coordination (VLLOC) Platform - Validation Service   | v 1.0   Ready for consumption   Prototype   Current and Supported  | Surveillance Infrastructure, ATM Information Management, Flight Information Management   Flight, Environment   En-route   ANSP, Network Manager  | There is a growing demand for RPAS (Remotely-Piloted Aircraft Systems) operations for all kinds of civil applications: aerial filming, environmental Surveillance Infrastructure, ATM Information Management, Flight Information Management   Flight, Environment   En-route   ANSP, Network Manager                       |
| SNOWTAM Service   | v 1.0   Terminated   Prototype   Current and Supported             | ATM Information Management, MET Information Management   Aeronautical Information, Meteorology   Airport (ramp), Take Off, Departure, En-route, Arrival   Airport Operator, Airspace User, ANSP  | The SNOWTAM service covers the dissemination of standard ICAO SNOWTAM over SWIM. ATM Information Management, MET Information Management   Aeronautical Information, Meteorology   Airport (ramp), Take Off, Departure, En-route, Arrival   Airport Operator, Airspace User, ANSP   |
| Spacecraft Reentry Hazard Area Service  | v 0.15   Under development   Prototype   Upcoming not Supported    | Airspace Access   Other   En-route, Oceanic, Arrival   Airspace User, ANSP   | Global Space Operations, their consequences and value propositions, by Airspace Access   Other   En-route, Oceanic, Arrival   Airspace User, ANSP  |
| TAF Service   | v 1.0   Terminated   Prototype   Current and Supported             | ATM Information Management, MET Information Management, Aeronautical Information, Meteorology   Airport (ramp), Departure, En-route, Arrival   Airport Operator, Airspace User, ANSP   | The TAF service covers the dissemination of standard ICAO TAF over SWIM. ATM Information Management, MET Information Management, Aeronautical Information, Meteorology   Airport (ramp), Departure, En-route, Arrival   Airport Operator, Airspace User, ANSP  |
| UUID Registry Service   | v 1.0   Under development   Prototype   Upcoming not Supported     | ATM Information Management, ATM Network Management   Aeronautical Information   ANSP, Network Manager  | The UUID (Universally Unique Identifier) web based service for the allocation and registration of unique IDs for aeronautical data in ATM Information Management, ATM Network Management   Aeronautical Information   ANSP, Network Manager  |
| Weather for ATM and Environment   | Operational   Current and Supported                                | ATM Information Management, Meteorological Information, MET Information Management, Shared Information Service Management, Information, Meteorology, Environment   Airport (ramp), Take Off, Departure, En-route, Arrival   Airspace User, | erman Bundesministerium für Wirtschaft und Technologie (BMWi) the Project "Weather for ATM and Environment, Meteorological Information, MET Information Management, Shared Information Service Management, Information, Meteorology, Environment   Airport (ramp), Take Off, Departure, En-route, Arrival   Airspace User, |

**Services for Implementers**

# Technical Infrastructure



- IT is found to be mature



IT in ATM

- Mostly an issue of agreeing on used (open) standards

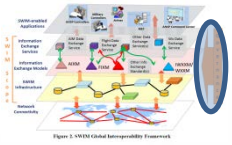


- Through so called Technical Profiles (Yellow / Blue / ...)



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



## What are the SWIM Standards ?

### Foundation

- Essential Requirements
- Controlled Vocabulary
- Examples
  - Need for semantic interoperability
  - Based on Open Standards
  - Interoperable Services



### Guidance

- AIRM
- AIRM Rulebook
- Service Rulebook
- Technical Infrastructure profiles
- Compliance Framework



**SWIM Registry**

**Performance Based Approach**



# SWIM Outreach



**Together we can  
make things happen**



# SESAR SWIM Masterclass

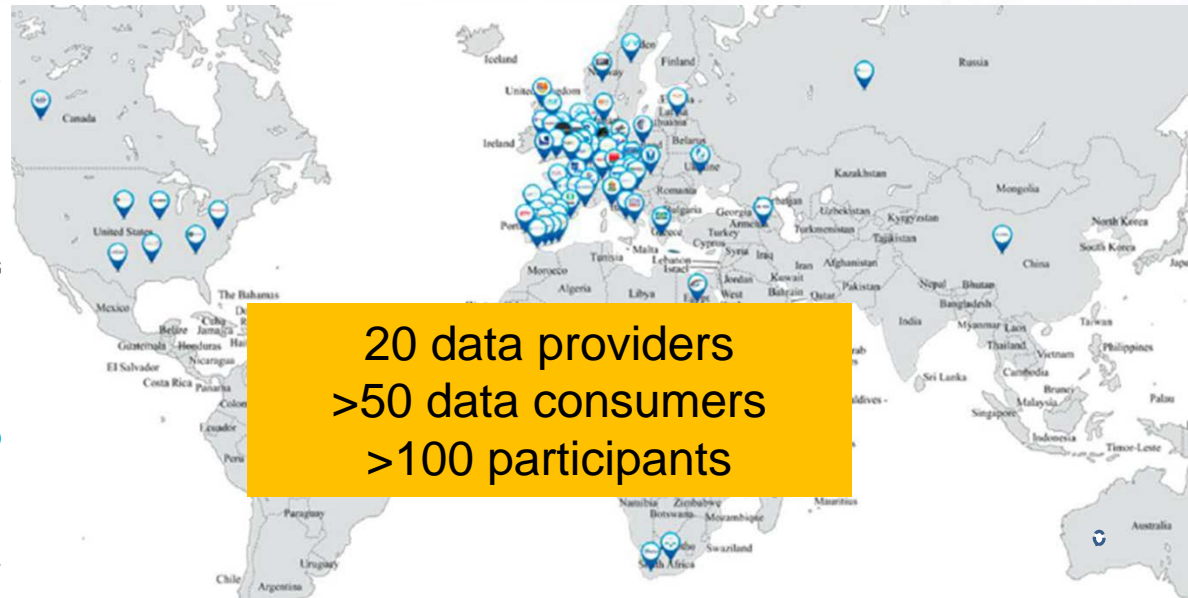
Air Transportation Information  
Exchange Conference -  
Global Information Management

## A global SWIM Sandbox

During 6 months 'play' together in a Non-Operational environment  
providing/consuming SWIM Services



## 2014 Participants



20 data providers  
>50 data consumers  
>100 participants

- Aeronautical, Meteorological, Flight, Environmental, Surveillance, Aircraft, ... services



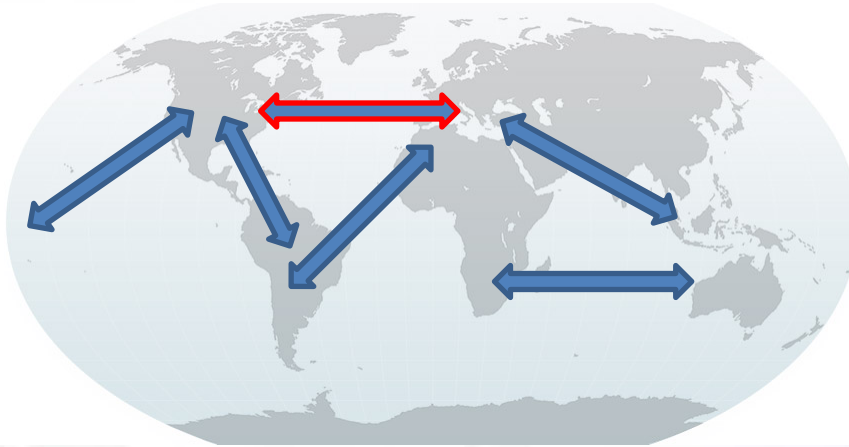
Federal Aviation  
Administration



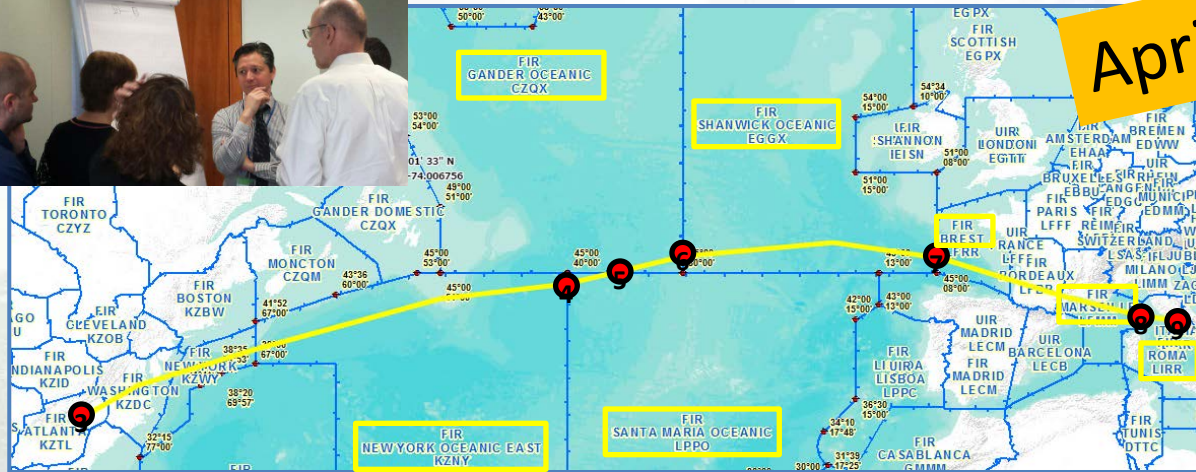
EUROCONTROL



# SWIM Global Demos

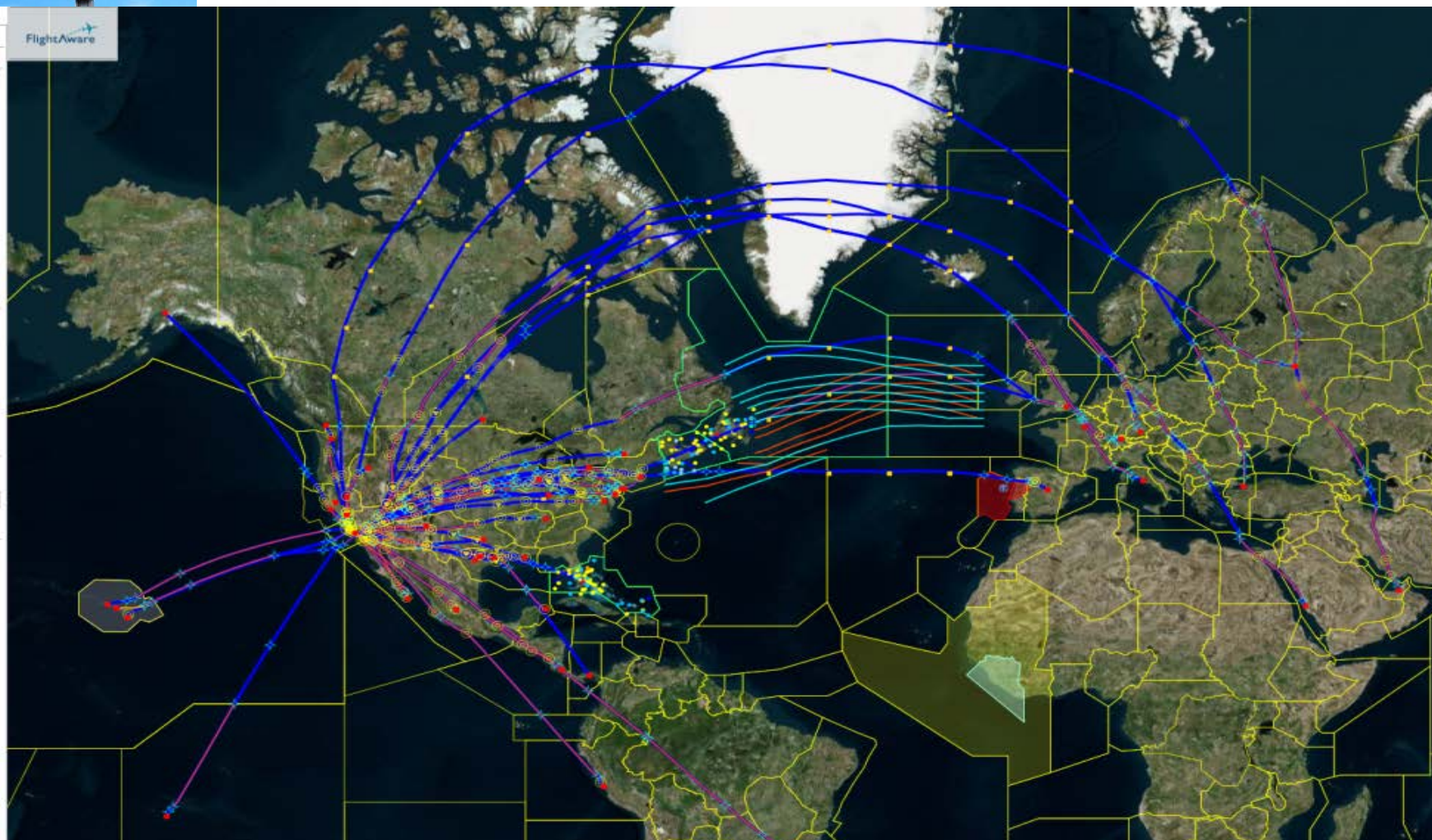


April – May 2016





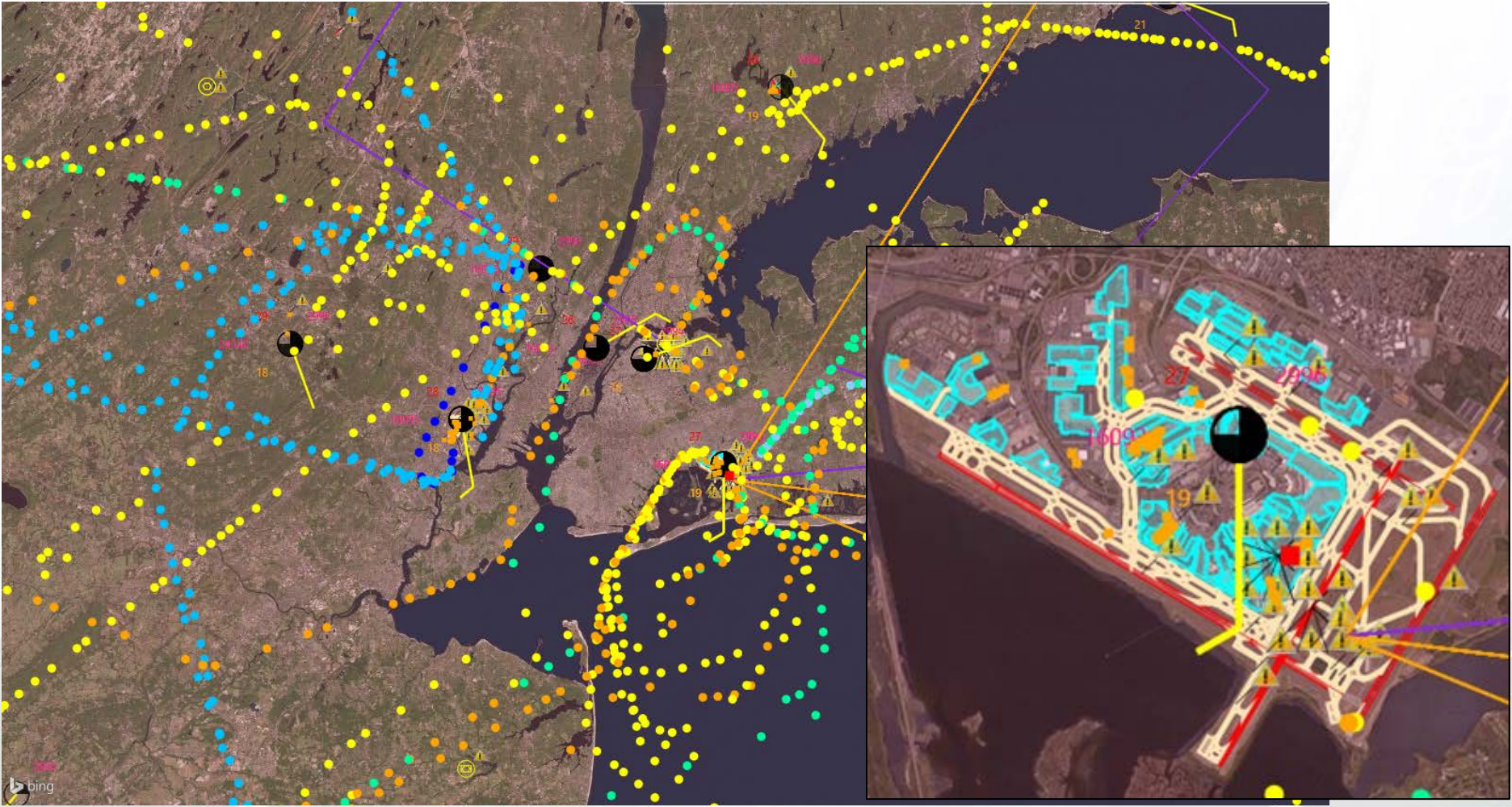
# How real is this all ?



Sources: NM, EAD, NAT Tracks, FAA NASR56, FlightAware, WAFC, ...



# How real is this all ?



Sources: FAA NASR56, FAA AMDB, Dig NOTAM, Terrain/Obstacle, SADIS, FlightAware, .



# How real is this all ?

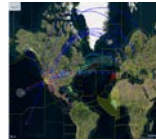


Sources: EAD, FlightAware, Air Services Australia, SADIS, ...



# Your personal take-aways

- Free : Follow SWIM Webinars
  - [www.sesarju.eu/swim/resources](http://www.sesarju.eu/swim/resources)
- Free : Install & Use Jumpstart
  - [www.sesarju.eu/swim/resources](http://www.sesarju.eu/swim/resources)
- Free : Participate to SWIM Masterclass (June-Dec 2015)
  - [www.sesarju.eu/newsroom/events/sesar-swim-master-class-2015](http://www.sesarju.eu/newsroom/events/sesar-swim-master-class-2015)
- Free : Participate to SWIM Global Demos (till Q2/2016)
  - [www.swim.aero](http://www.swim.aero)
- Free : Follow ICAO Information Management proceedings
  - [www.icao.int/airnavigation/IMP/Pages/default.aspx](http://www.icao.int/airnavigation/IMP/Pages/default.aspx)



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# Questions & Contact Information

- **SESAR Joint Undertaking**  
[www.sesariu.eu/swim](http://www.sesariu.eu/swim)  
**Linked in** [http://www.linkedin.com/groups?gid=3748809&trk=hb\\_side\\_g](http://www.linkedin.com/groups?gid=3748809&trk=hb_side_g)
- **Email** [swim@sesariu.eu](mailto:swim@sesariu.eu)
- **Registry**  
<http://eur-registry.swim.aero>
- **Data Exchange models**
  - *Aviation Information Data Exchange* [www.aidx.aero](http://www.aidx.aero)
  - *AIXM - Aeronautical Information Exchange Model* [www.aixm.aero](http://www.aixm.aero)
  - *WXXM – Weather Information Exchange Model* [www.wxmx.aero](http://www.wxmx.aero)
  - *FIXM - Flight Information Exchange Model* [www.fixm.aero](http://www.fixm.aero)
- **AIRM** <http://im.eurocontrol.int/wiki/index.php/AIRM>
- **Some additional info**  
[www.eurocontrol.int/im](http://www.eurocontrol.int/im) & [im.eurocontrol.int/wiki](http://im.eurocontrol.int/wiki)
- **IM Panel** <http://www.icao.int/airnavigation/IMP/Pages/default.aspx>

