Aeronautical Information Services

Global Aviation Safety – Use Cases using XM’s & SWIM

Presented to: ATIEC 2016
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Date: September 21, 2016

Aviation Information World – Forecasting the Future
Luciad

We build APIs
To deliver geospatial situational awareness
For critical systems
SWIM – Past, Present & Future

• **2008:** Launch of a new information paradigm through the ATM system

• **2016:** Technological reality at a global scale, supporting current and future aviation needs
  – Next-generation data exchange: AIXM, FIXM, WXXM

• **2016+:** Wide area of applications and services that benefit from global interoperability through SWIM & *XM
  – Safer aviation system
Safe Integration of RPAS

- Increasing amount of RPAS operating in Very Low Level (below IFR / VFR altitudes)
  - Environmental monitoring
  - News / sports coverage
  - Remote-area delivery

- An integration into our ATM system is inevitable to safely benefit from its potential
  - Where can I fly? How can traffic be monitored & controlled? How to keep track of past RPAS flights?
RPAS VLLOC - Architecture

RPAS VLLOC Platform

RPAS operator Desktop client

RPAS operator Mobile client

RPAS supervisor Web client

SWIM services

RPAS Notification Service

NM B2B airspace data service (Eurocontrol)

Weather data services (IBLSof, OpenWeatherMap)

RPAS Validation Service

EAD service (Frequentis)

ADS-B service (FlightAware)
RPAS VLLOC

• SWIM-based solution
  – AIXM 5.1 to represent RPAS operations
  – OGC WFS-T for exchange of RPAS operations
  – OGC WPS for validation of RPAS operations
  – Data ingestion: Digital NOTAM (FAA NDS, EAD), AIXM 5.1 baseline (FAA NASR, EAD), weather data (OGC services), …

• Partners:
  – VITO (European research organization)
  – Unifly (ATM / RPAS consultancy)

• SESAR SWIM Master Class 2014 Runner up
Demo
Contrail Formation Analysis

- **Contrails have a net warming effect**
  - Can be predicted by means of the Schmid-Appleman criterion
  - Difficult to avoid without technological assistance

- **Enable pilots / air traffic controllers to easily determine probable contrail forming**
  - Even small changes in the flight path can sometimes prevent contrail forming
ConSA - Architecture
ConSA

- **SWIM-based architecture**
  - WXXM 2.0 to represent contrail formation probability
  - OGC WFS to dynamically calculate the probability based on live weather data input and to make it available to clients
  - Data ingestion: humidity / pressure / temperature data via OGC NetCDF & WCS (e.g., Meteo France)

- **Partners:**
  - Airbus Defence & Space
  - Meteo France
Airspace reservation analysis

• Ever increasing number of flights
  – More occupied airspace
  – Conflicting with users requiring a free portion of airspace
  • Test flights, military training flights, RPAS …

• Enables users to find a free portion of airspace (airspace reservation) with minimal impact
  – Taking into account 4D trajectory information and existing airspaces
CAPS - architecture

Current Data Flows

AIXM 5.1

FIXM (i.e. 4D Trajectories)

AIXM (Airspace Data)

Future Option eAUP/ eUUP

IBL Soft Meteo (OGC,WXXX)

Open Weather Map (OGC,WMS)

Bing Maps

VOLCEURO (WFS)
CAPS

• **SWIM-based architecture**
  – AIXM 5.1 for airspace reservations
  – OGC WFS-T for airspace reservation data exchange
  – Data ingestion: AIXM 5.1 (airspaces), FIXM 2.0 (trajectories; migration to 4.0), weather data (OGC services)

• **Partners:**
  – Airbus Defence & Space

• **SESAR SWIM Master Class 2014 Winner**
Demo (ConSA + CAPS)
3 diverse use cases...

- With *XM and SWIM as driving / enabling technology!
  - Good + growing adoption by the industry & community
  - Fast development without compromising quality
  - Meeting next-generation aviation needs
  - Interoperability & reusability

- Contributes to global aviation safety
  - RPAS VLLOC: safe integration into the ATM system
  - ConSA: climate safety
  - CAPS: 4D impact analysis → increased safety
Thank you

- Questions? Contact us at info@luciad.com
- Visit us at the exhibition