

# Aeronautical Information Services

## Global Aviation Safety – Use Cases using XM's & SWIM

Presented to: ATIEC 2016

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*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)**

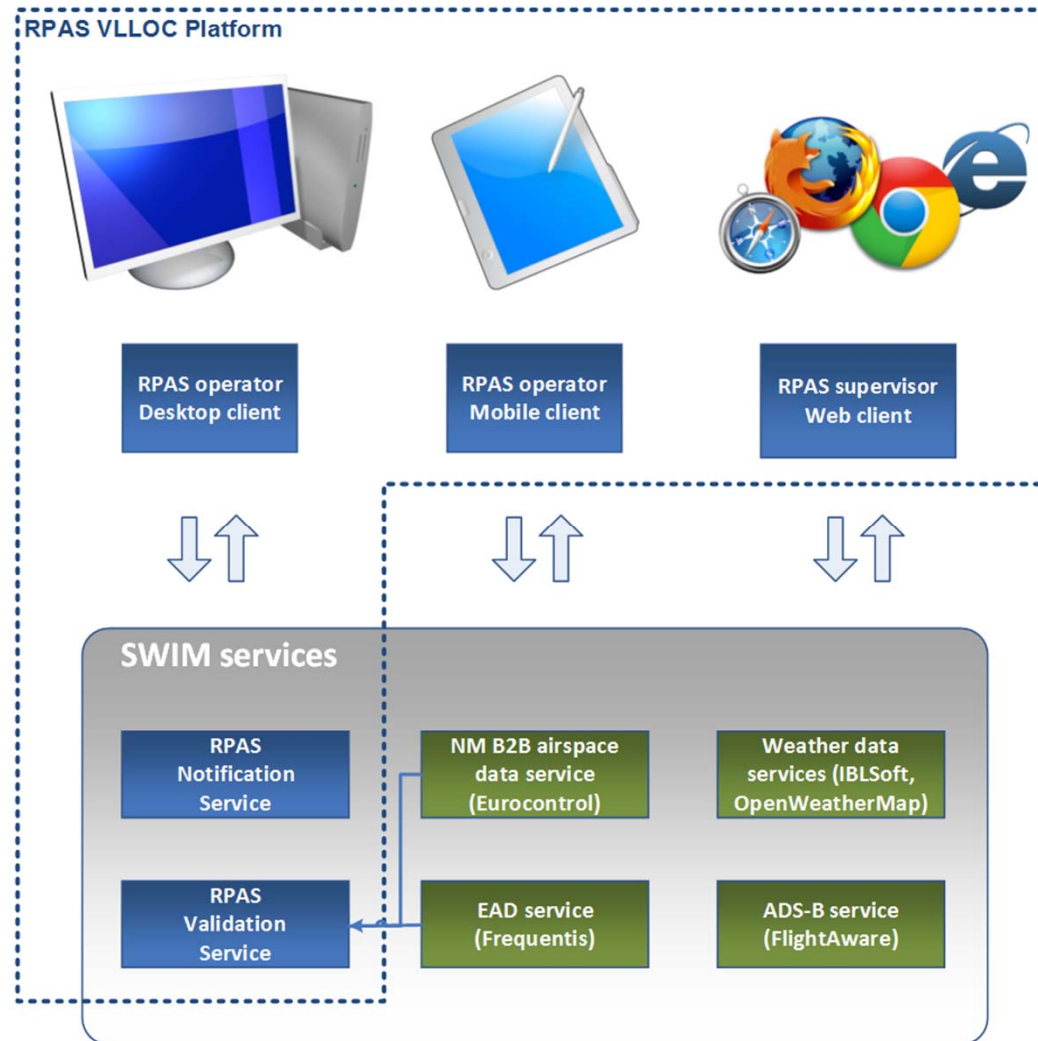
- Environmental monitoring
- News / sports coverage
- Remote-area delivery



- **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



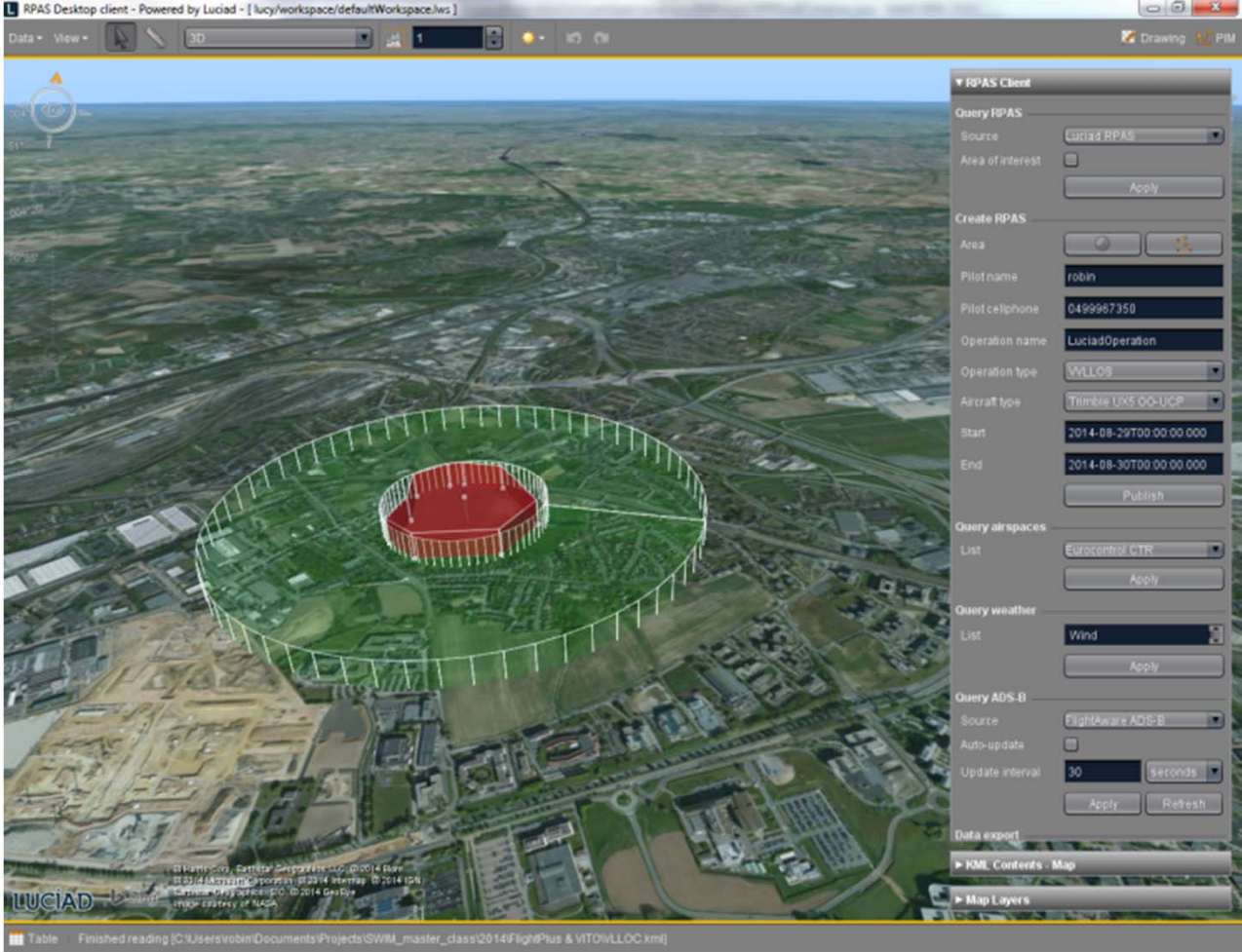
# RPAS VLLOC



- **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

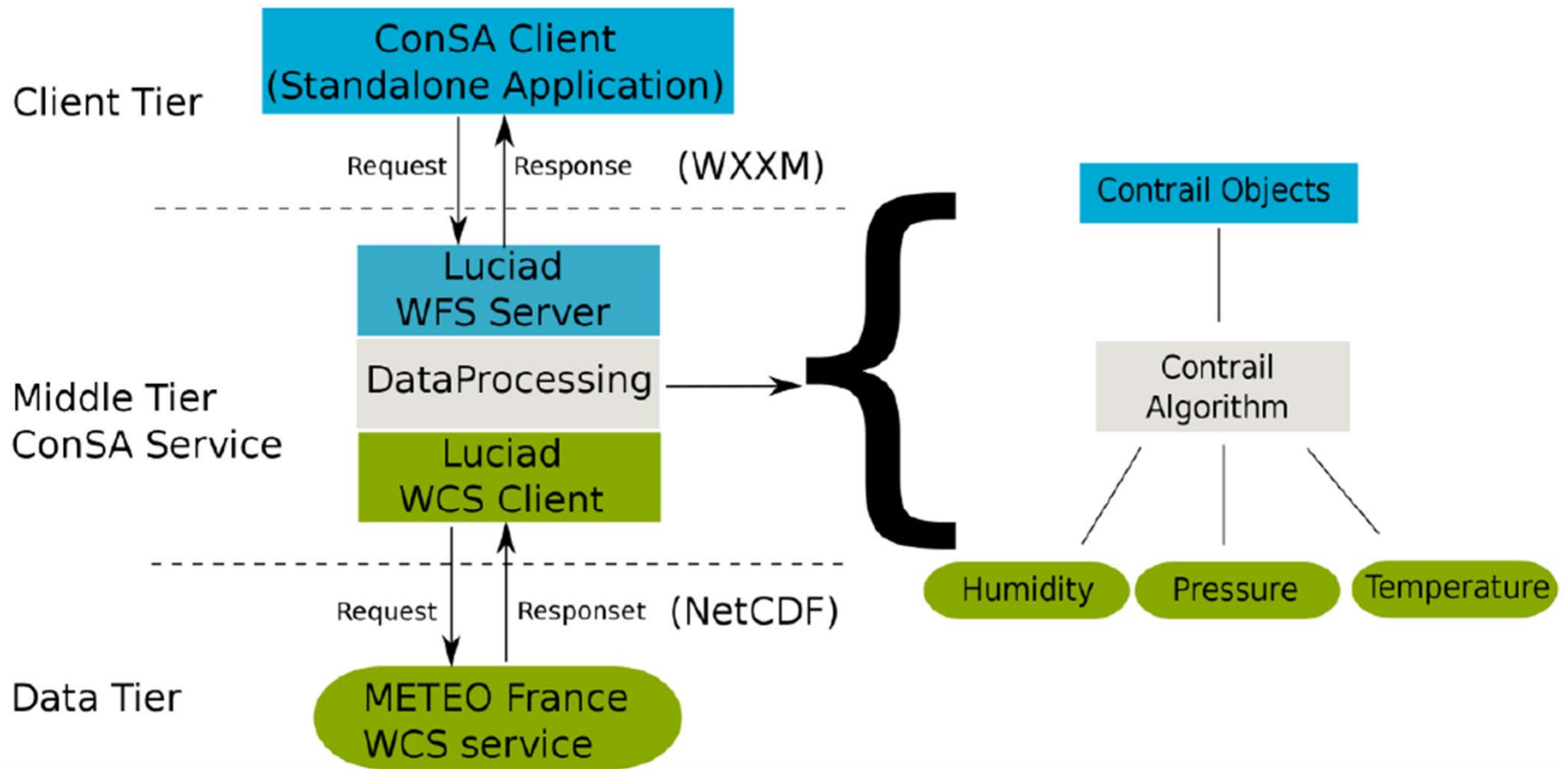


- **Enable pilots / air traffic controllers to easily determine probable contrail forming**

- 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**

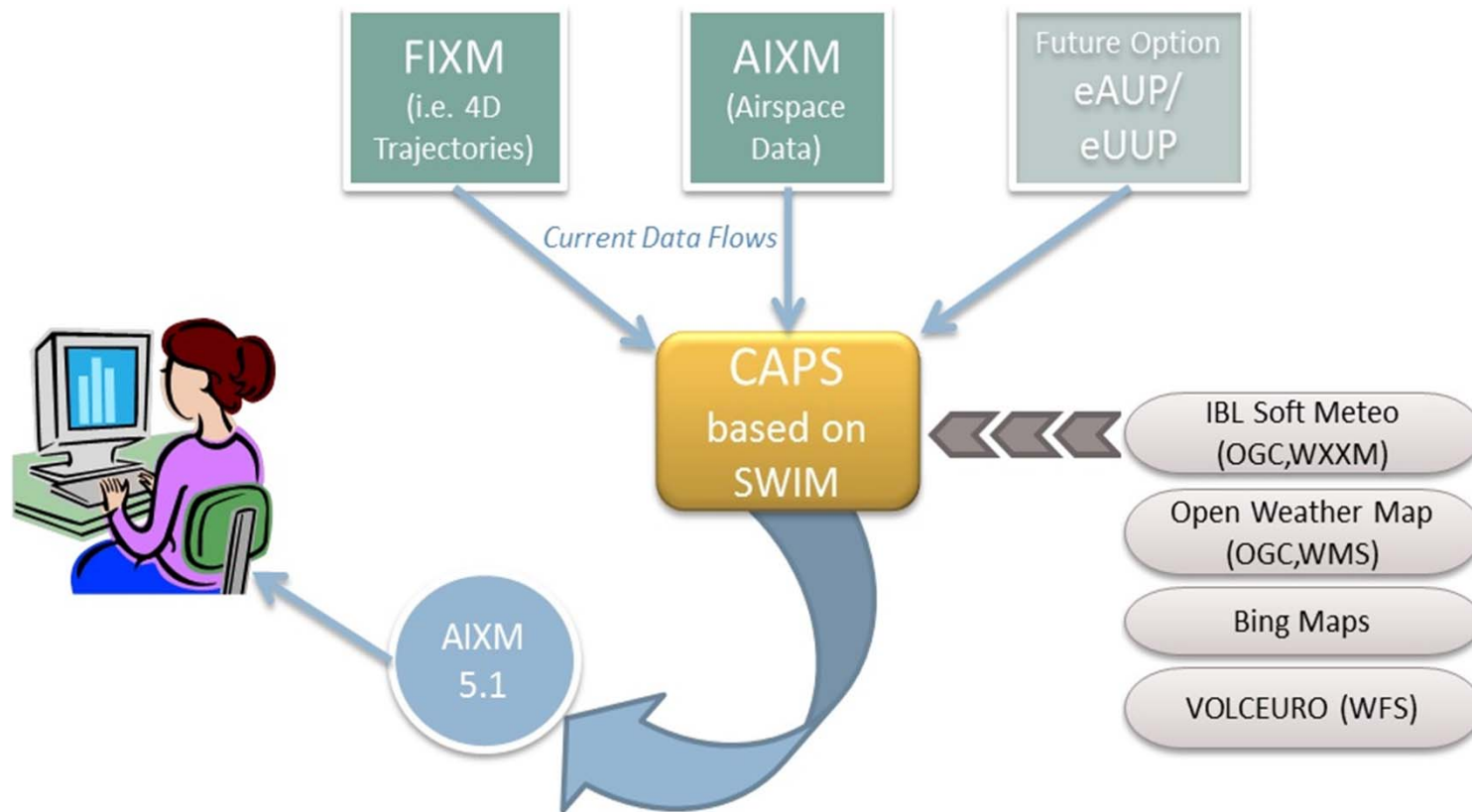
- More occupied airspace
- Conflicting with users requiring a free portion of airspace
  - Test flights, military training flights, RPAS ...



- **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



# 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)

**0 AIRSPACE CONFLICTS**

**17 FLIGHT PLAN CONFLICTS**

- GW107W
- GW172P
- HAY2388
- DLH6YY
- DLH952
- GW13V
- GW126V
- GW125W
- GW106A
- IBS927
- GW148
- GMI6514
- DLH21A
- GW135J
- GW19M
- GW14J
- GW19374

**REQUEST ARES**    **PROPOSALS**    ARES1

**CONFLICT TYPE**    3D    4D

**REQUEST TYPE**    DMA    VPA

**METEO**    CLOUDS    PRECIP

Upper FL: 711.4    Width: 30.0    Start time: 2015-01-10T01    Airfield: EBBL

Lower FL: 150.0    Length: 20.0    End time: 2015-01-10T10    Displacement: 11.1

Wed, 7 Jan 2015 17:40:30    Sun, 11 Jan 2015 17:40:30

# 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](mailto:info@luciad.com)**
- **Visit us at the exhibition**

