



SESAR Showcase

A Conference & Exhibition of SESAR 1 Results

Amsterdam, 14-16 June 2016





System Wide Information Management

Peder Blomqvist (LFV)

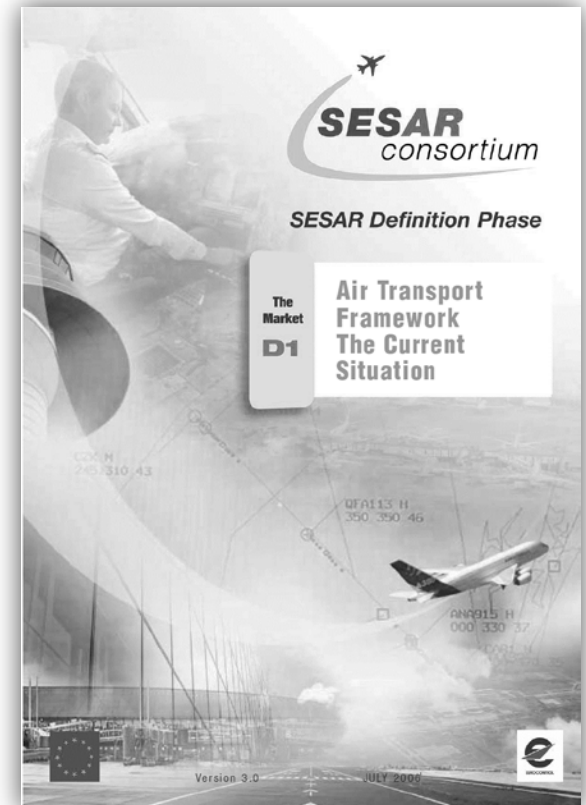
Xavier Jourdain (Thales)

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Information management challenges

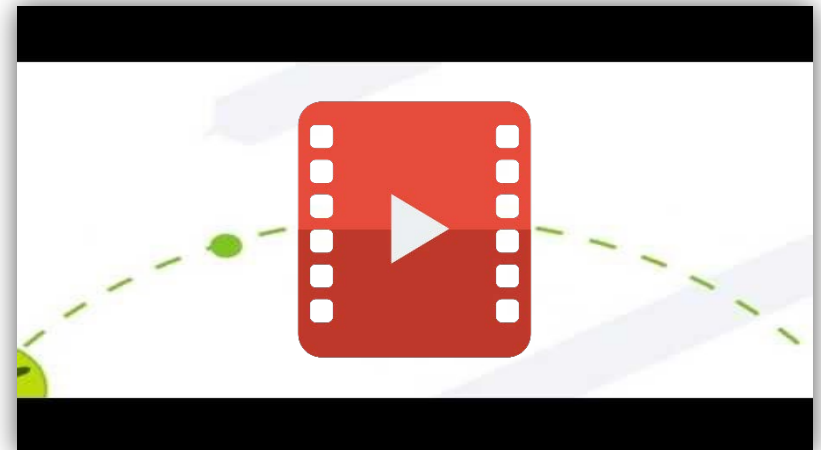
- Incompatible operations
- Fragmentation
- Low levels of interoperability
- Limited adaptability
- Need for automation
- Centred on ground systems



Many SESAR Partners researched and developed the SWIM concept



System Wide Information Management



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How SWIM addresses the challenges

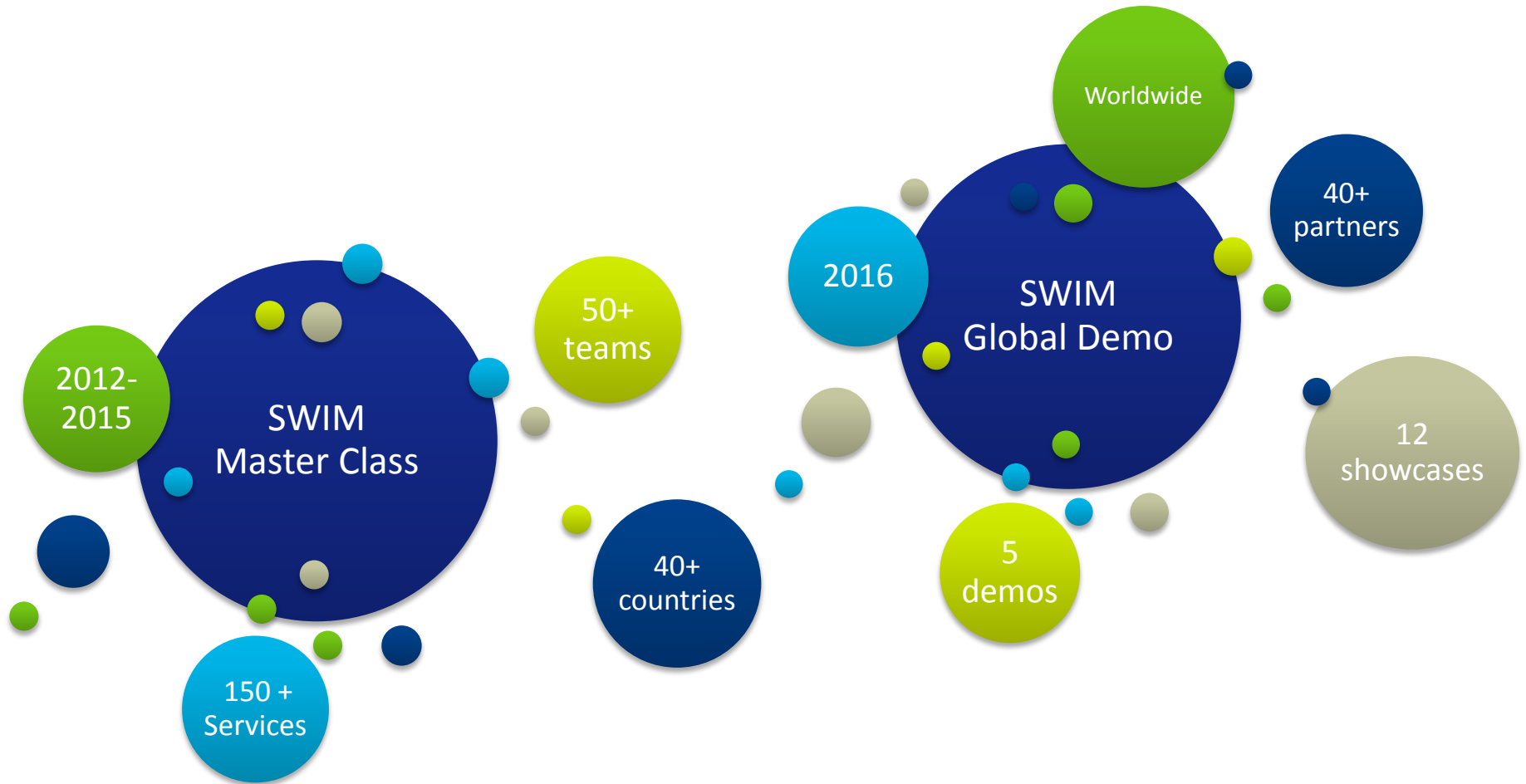
- Connecting the ATM stakeholders
- Creating an interoperable information infrastructure
- Making the ATM system adaptable
- Increasing the level of automation
- Integrating the aircraft as a node in the ATM network



SWIM concept showcases



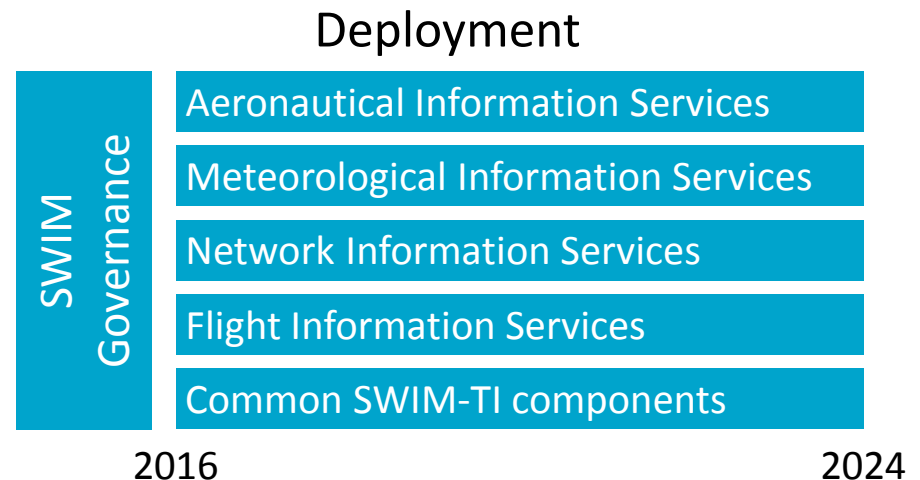
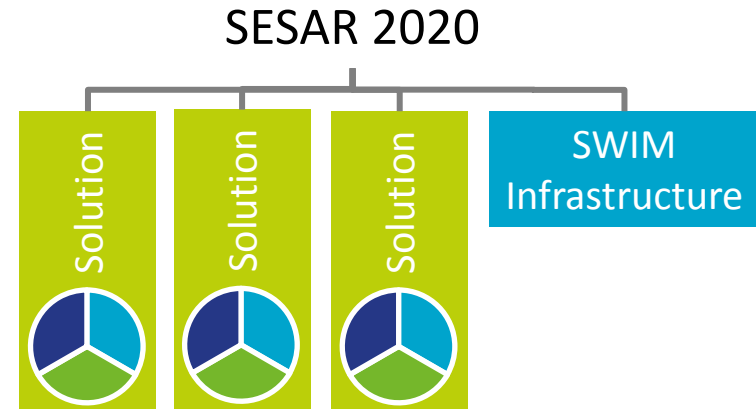
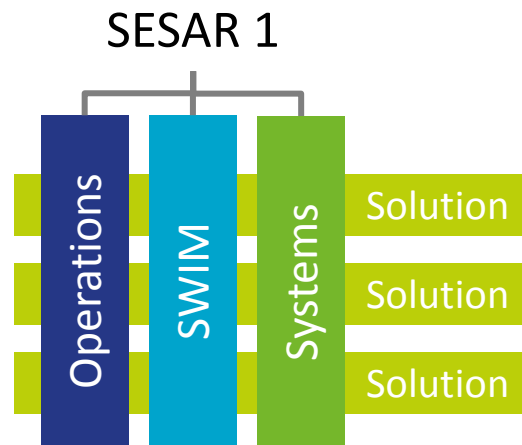
SWIM Master Class & Global Demo



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Deployment & future research in EU



Thank you for your attention



More information:

<http://www.swim.aero/>

peder.blomqvist@lfv.se

xavier.jourdain@thalesgroup.com

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Enabling future weather information for European aviation

Rosalind Lapsley (EUMETNET)

Daniel Muller (Thales)



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Why is weather important?

Major contributor to delays – improved planning will minimize the impact weather has on operations



- Airport adverse wx (i.e. snow, thunderstorms), or nominal wx (i.e. strong winds impacting capacity)
- En-route or ATFM adverse wx (i.e. severe convection) dictating usable airspace, or nominal wx (i.e. wind patterns changing flow management/capacity)



MET related incidents/accidents

- Severe convection
- Turbulence
- LVP
- Snow, ice or heavy rain affecting braking action



**Integrating enhanced MET information will
maximise performance and efficiency.**

**More than 20%
of the airport delays in Europe
are weather related**

**15% of en-route
ATFM delays in Europe
WX related**

**Boeing – weather the
highest training concern**

**US estimate weather
delay costs could be
reduced by 66% by
investing in better MET
services and their
integration into ATM**

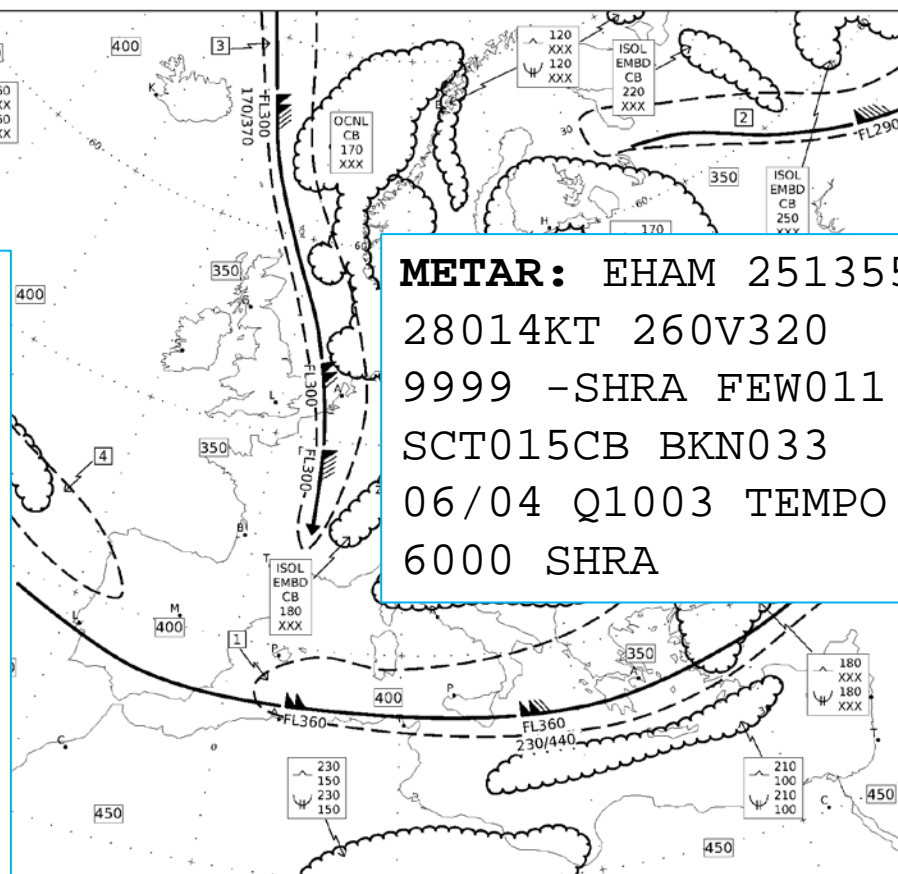
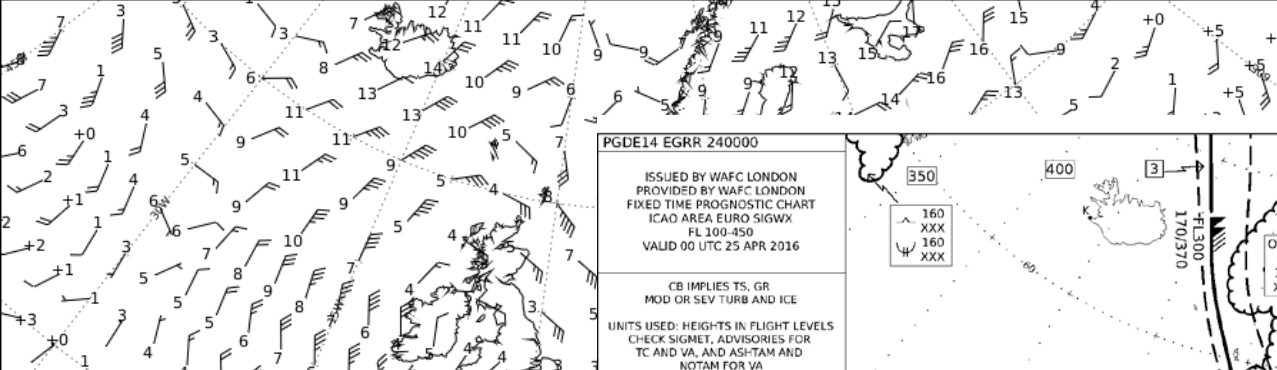
**US NTSB: over 20% of the
aviation accidents
weather related**

Is the current MET information adequate for ATM?

An example for approach – current limitations are:

- An oversimplification of how the wind may vary throughout the approach, particularly:
 - Wind shear i.e. changes in speed and/or direction by altitude
 - Smaller scale (or moving) features such as fronts, sea breezes, nocturnal/low jets etc.
 - Low level (<5000FT) disturbances caused by surface features (hills, valleys, coast, buildings etc.)
- Access to real-time observations of all weather in the control zone.





VA ADVISORY DTG: 20160401/0600Z
VAAC: TOULOUSE
VOLCANO: ETNA 211060
PSN: N3744 E01500
AREA: ITALY SUMMIT
ELEV: 3330M ADVISORY
NR: 2016/03

INFO SOURCE: WEBCAM, SAT DATA
AVIATION COLOUR CODE: YELLOW
ERUPTION DETAILS: ERUPTION IS
ENDED OBS VA DTG: 01/0600Z OBS
VA CLD: NO VA FCST VA CLD +6HR:
01/1200Z NO VA EXP FCST VA CLD
+12HR: 01/1800Z NO VA EXP FCST
VA CLD +18HR: 02/0000Z NO VA
EXP RMK: PLEASE CHECK SIGMET
FOR CURRENT WARNINGS. NXT
ADVISORY: NO FURTHER ADVISORY

METAR: EHAM 251355Z
28014KT 260V320
9999 -SHRA FEW011
SCT015CB BKN033
06/04 Q1003 TEMPO
6000 SHRA

TAF: EGTE 251059Z 2512/2521
30014KT 9999 SCT010 PROB30 TEMPO
2512/2516 9000 SHRA BKN014
PROB30 TEMPO 2512/2521
31017G27KT

MET in SESAR is collaborative

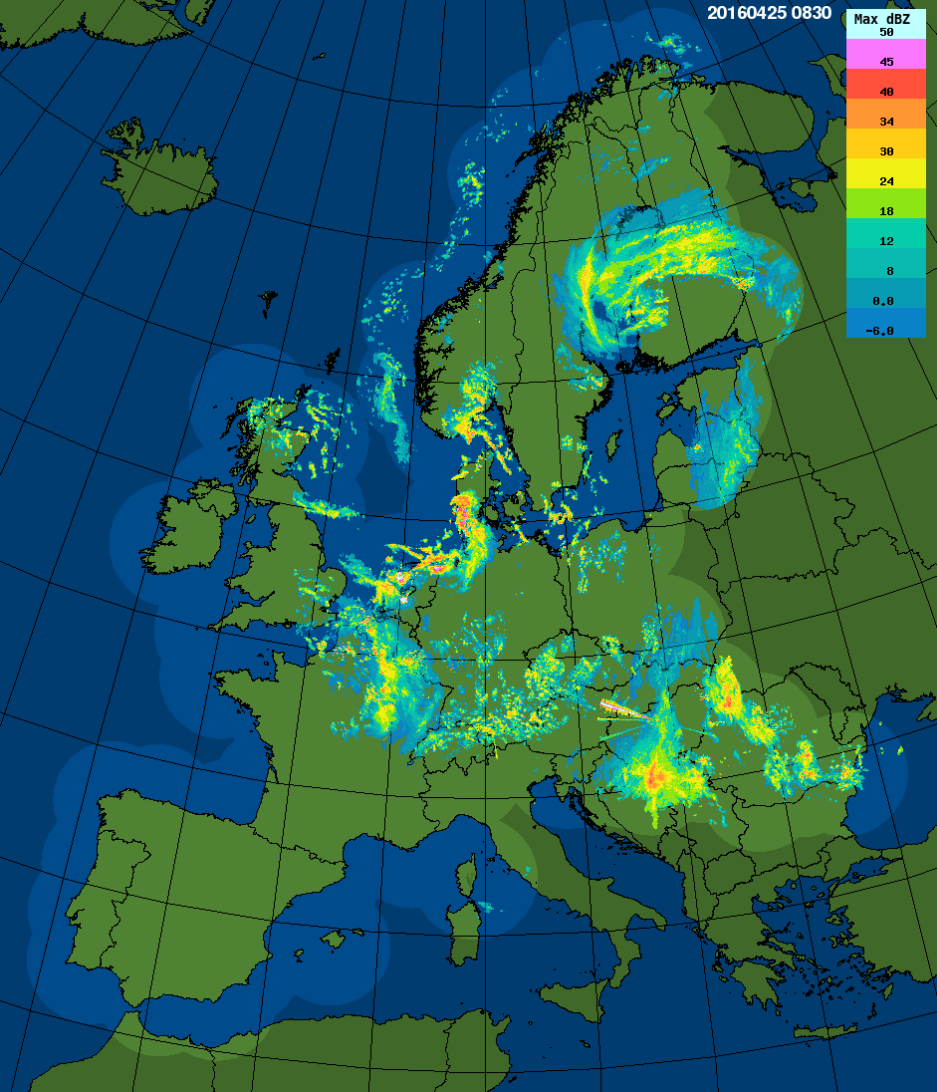


The most significant changes to be made are the way MET information is disseminated, displayed and integrated into decision support.

Development of enhanced MET information services for pan-European aviation, key features are

- a consistent and harmonised “weather picture” for our region (irrespective of MET provider)
- MET Information Services tailored to specific ATM operational applications, ready for integration into those systems

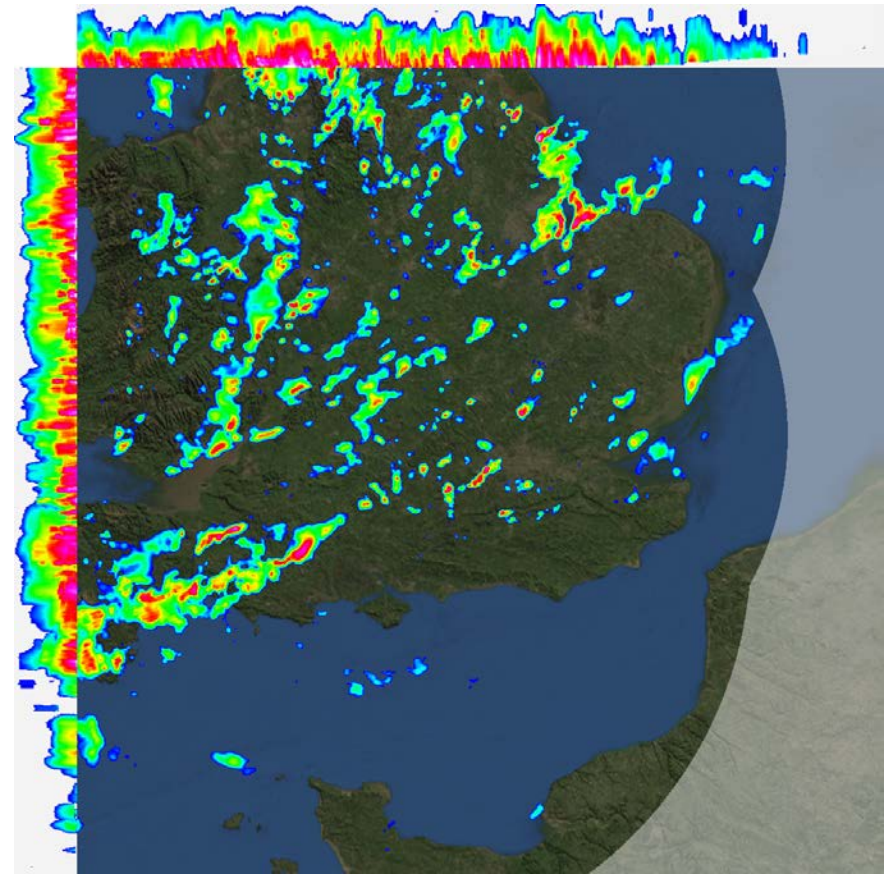




Radar composite

~200 radars in EU with diverse specifications are harmonised in one radar composite (OPERA)

3D identification helps identify hotspots in the TMA

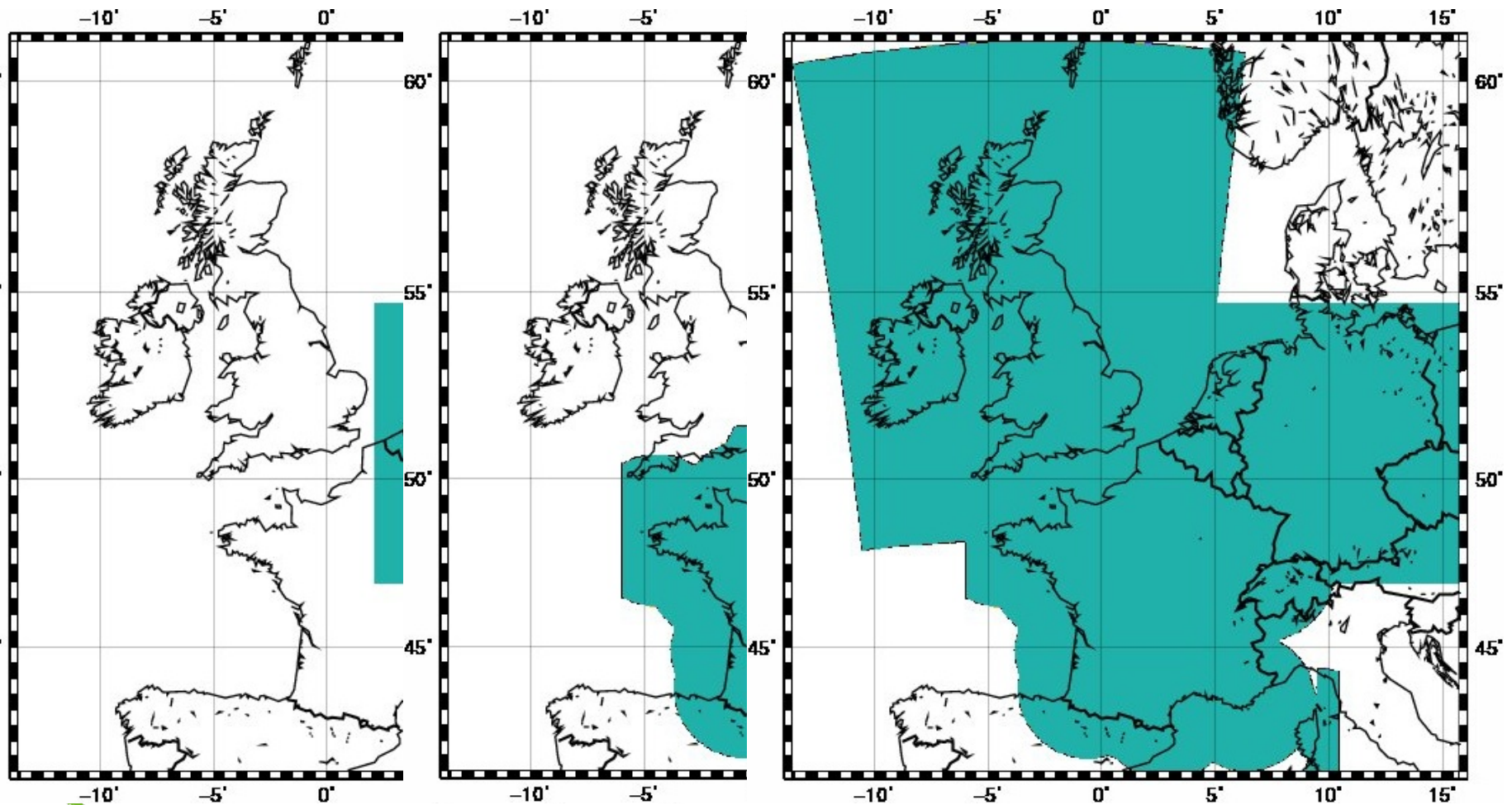


3D Convection

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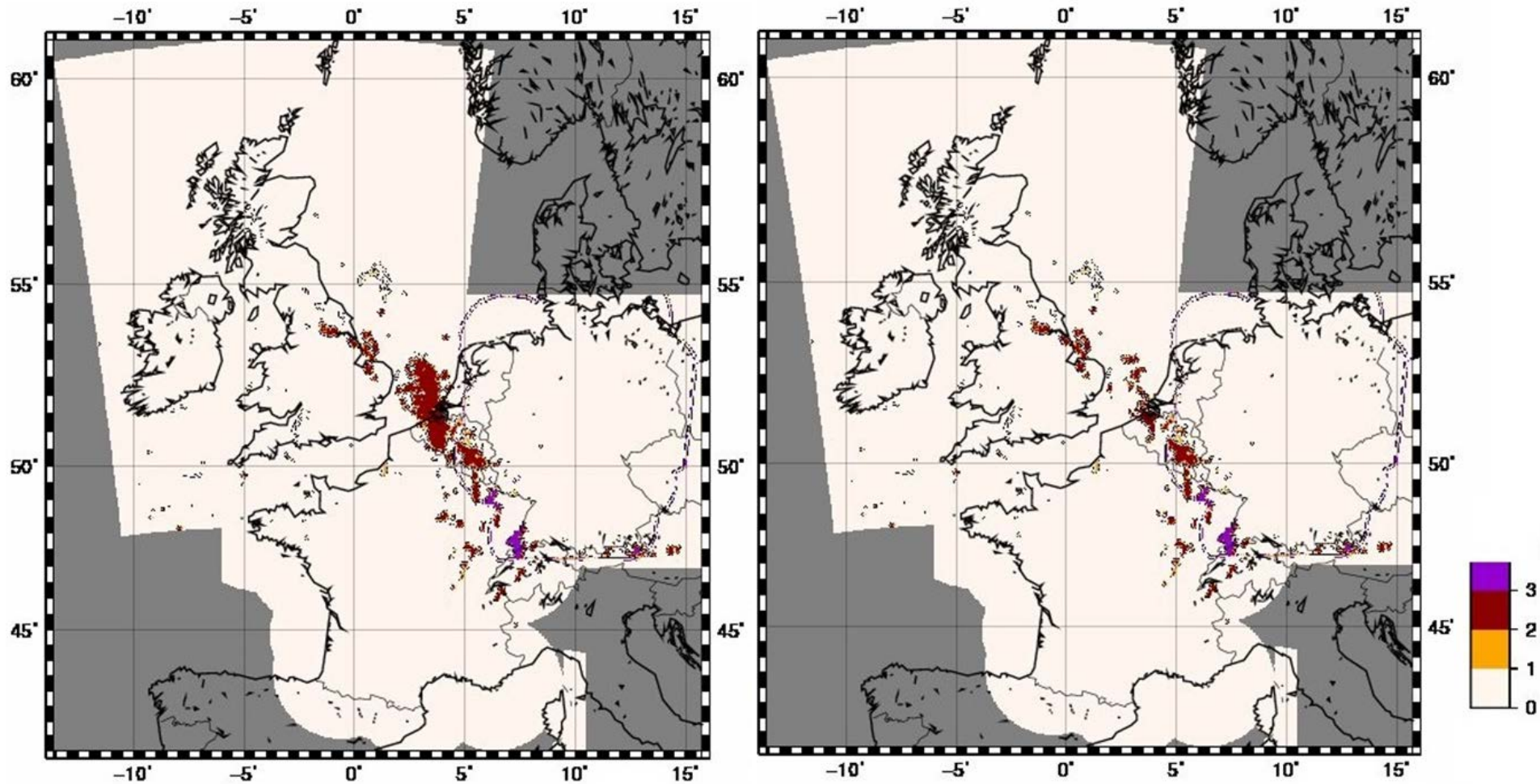
Nowcasting of convection: domain



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Nowcasting of convection: weighting



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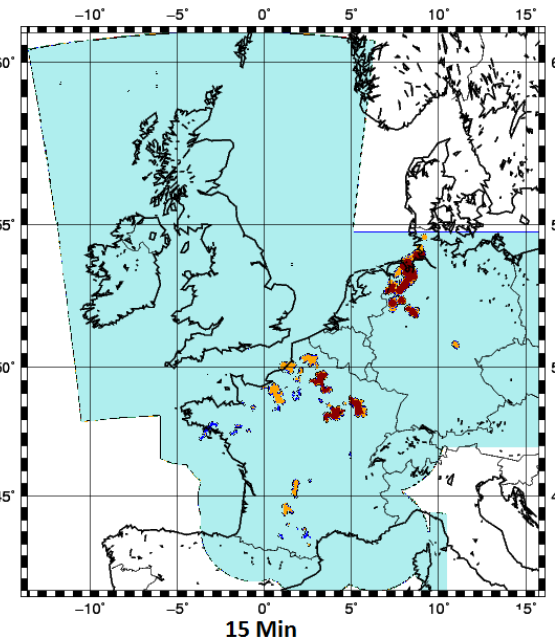
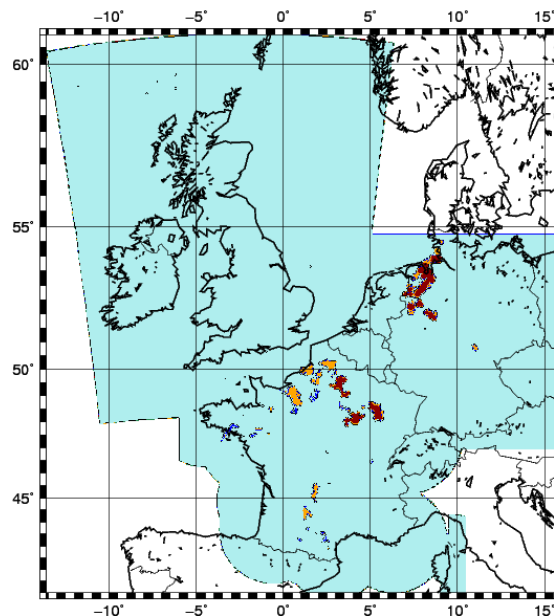
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Consolidated product

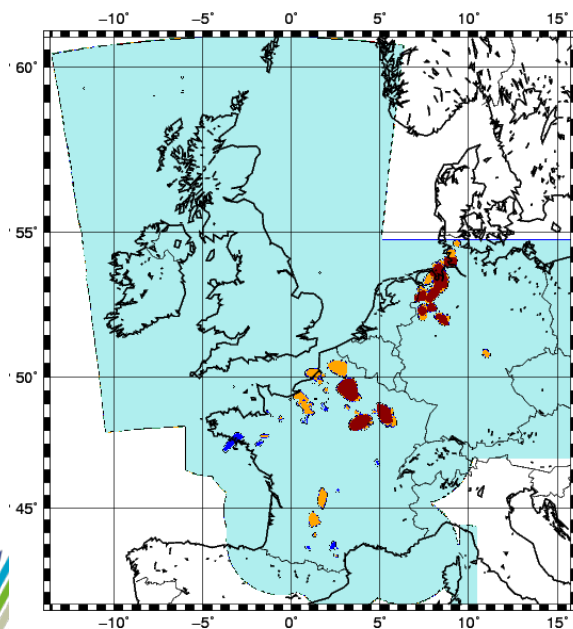
19/06/2013, 18:00

15 min intervals

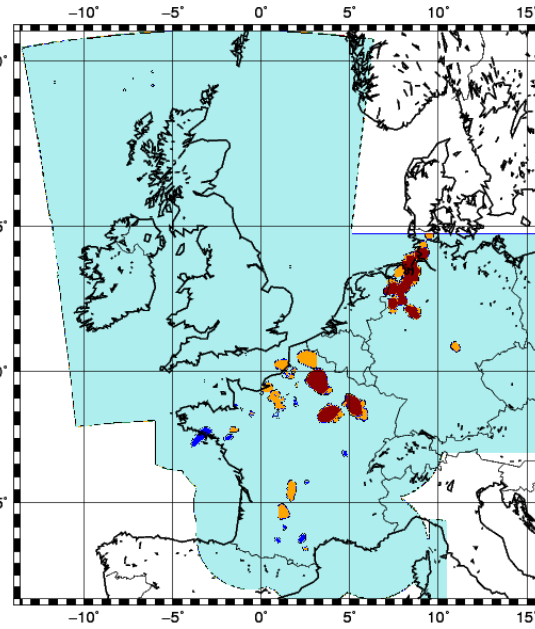
1.1 km



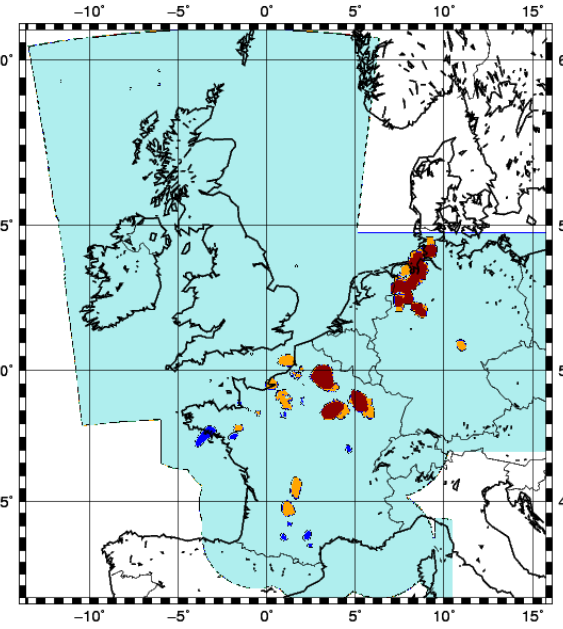
15 Min



30 Min



45 Min



60 Min

Consolidation and translation providers

MET information by authorised MET providers

Common & harmonised MET information

Consistent seamless MET information

Enhanced Observation and Forecasting Capabilities

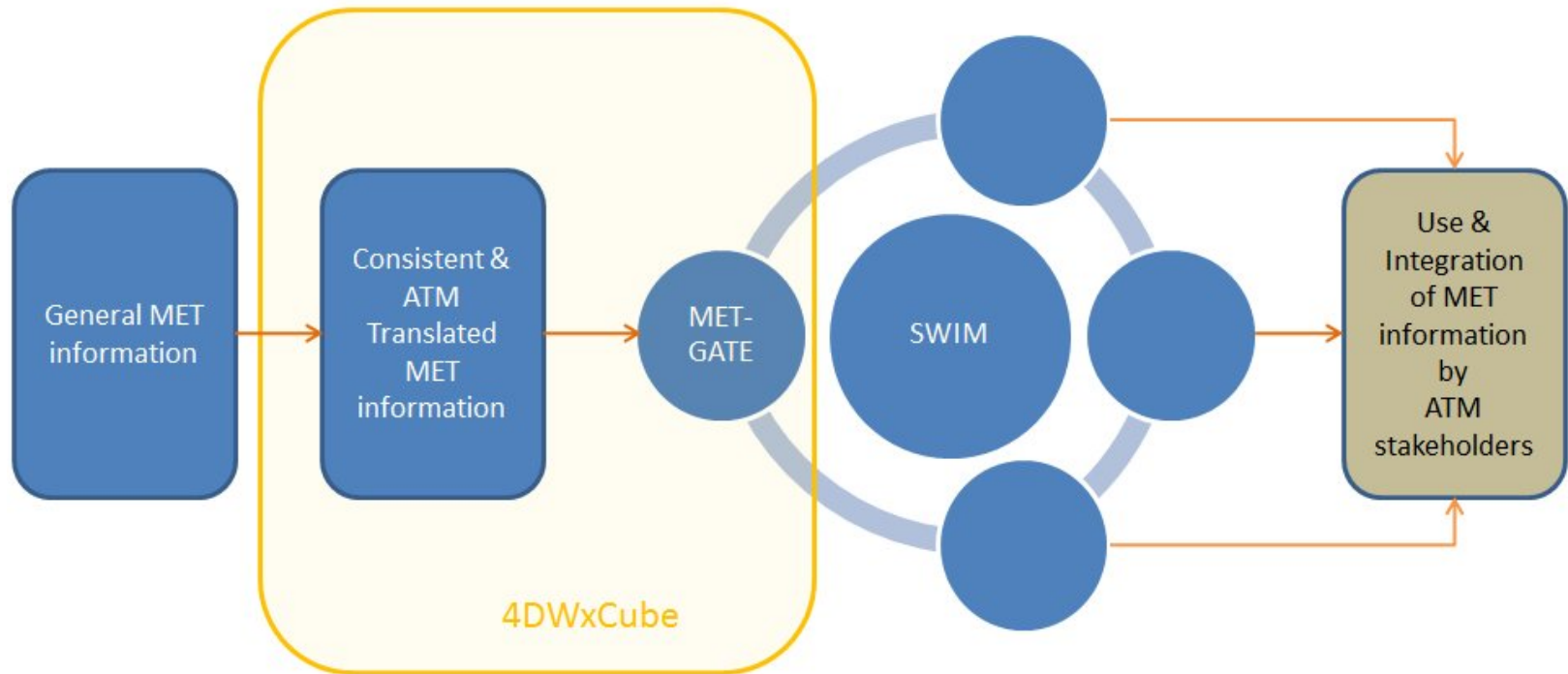
MET information based on latest science

MET information with highest performance scores

Translated MET information for specific aviation needs

Support to manage uncertainty of MET forecasts

4D Weather Cube and MET-GATE

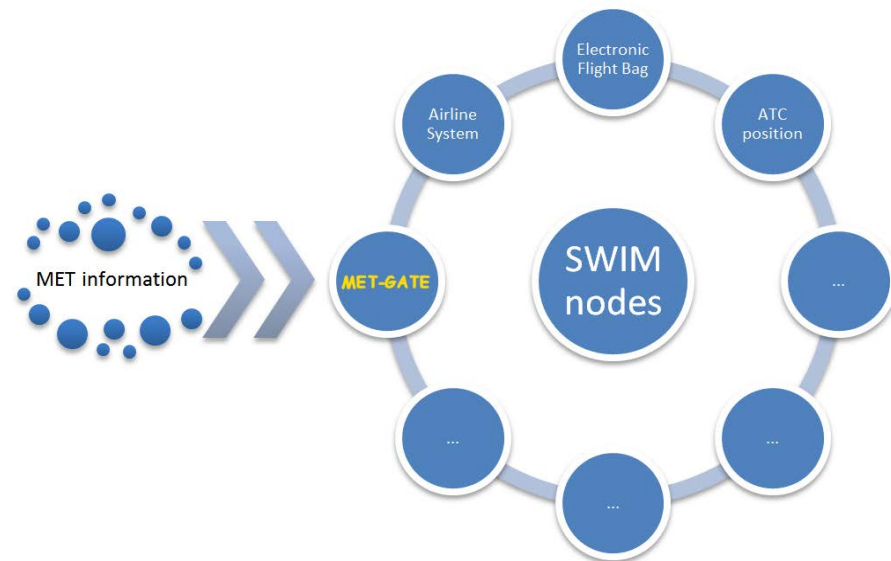


- improving safety
- enhancing efficiency
- minimising environmental impacts
- reducing cost

4DWxCube is designed specifically for European aviation; MET-GATE is the publishing and searching function. It will allow intelligent access to MET information in support of SWIM services.

Supports consolidation and is harmonised (between European NMS) forecast information, facilitating common situational awareness between aviation stakeholders.

**The MET-GATE a one stop shop
for all your MET requirements**



The TOPMET/TOPLINK concept

**MET situation
current &
forecast**



**Airlines
constraints**



**Airport
constraints**



**ATC/ATFM
constraints**



Collaborative Flow / Fleet / Flight Optimisation:

- Fuel consumption
- Predictability
- Safety
- Punctuality
- Capacity
- Cost

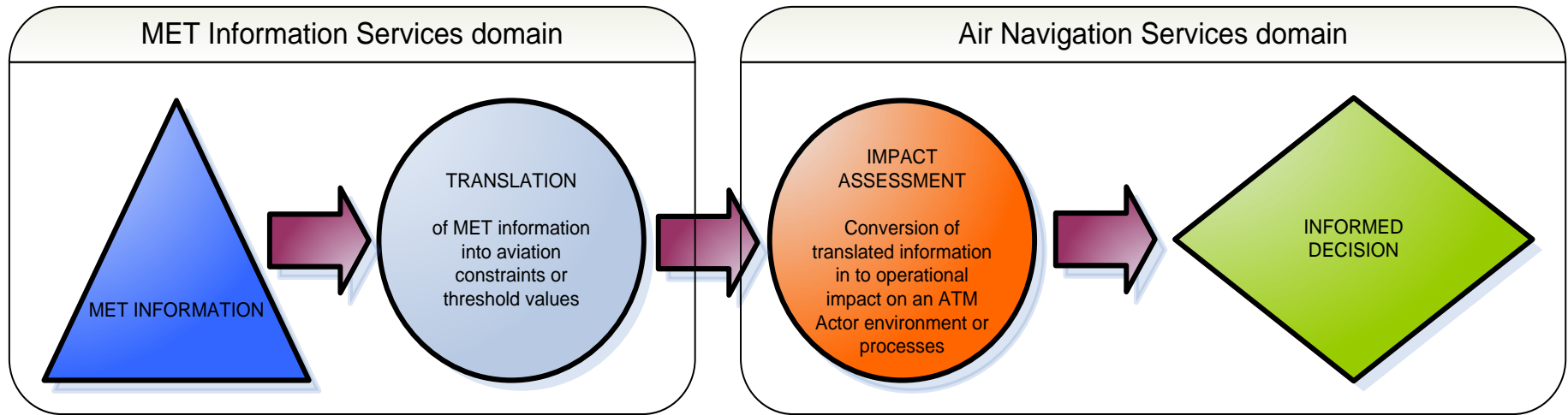
**Improving global efficiency & safety through collaborative
System-Wide Information Management**

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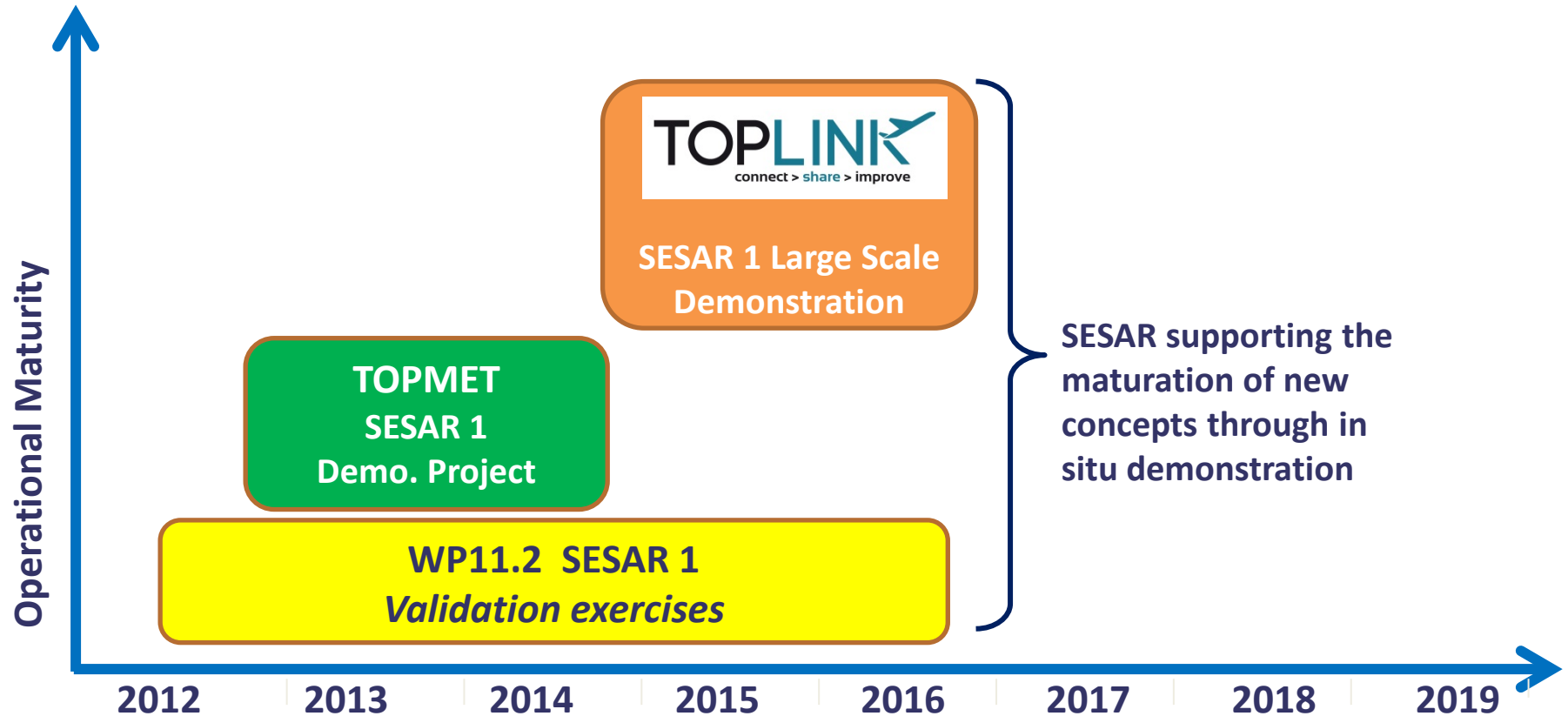
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MET-ATM integration architecture



Incremental validation of WP11.2 developments



Integration of MET data services into aviation applications utilized as subject for SWIM operational concept exploration

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TOPMET: Quantitative results reported by participants

| KPA | KPI | Scenario | Expected Benefit | TOPMET Results |
|-------------------|-----------------------------------|-------------------|------------------|------------------------------|
| EFFICIENCY (FUEL) | Extra fuel consumption due to MET | Airline rerouting | Reduce by 20% | 26% reduction (4 flights) |
| | | Airline diversion | Reduce by 20% | 79% reduction (1 flight) |
| EFFICIENCY (COST) | Extra flight cost due to MET | Airline rerouting | Reduce by 10% | 19% reduction (4 flights) |
| | | Airline diversion | Reduce by 10% | 73% reduction (1 flight) |
| | | ANSP improved TFM | Reduce by 10% | 18 % reduction (848 flights) |
| PREDICTABILITY | Extra flight delay due to MET | Airline rerouting | Reduce by 20% | 33% reduction (4 flights) |
| | | ANSP improved TFM | Reduce by 20% | 18 % reduction (848 flights) |

Promising quantitative results from limited operational trials resulted in a follow-on Large Scale Demonstration – TOPLINK



TOPLINK: Multiple data sources

WXXM

Weather information:



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE



AIXM

Aeronautical information:



European AIS Database -
EAD



SERVICE
DE L'INFORMATION
AERONAUTIQUE



FIXM

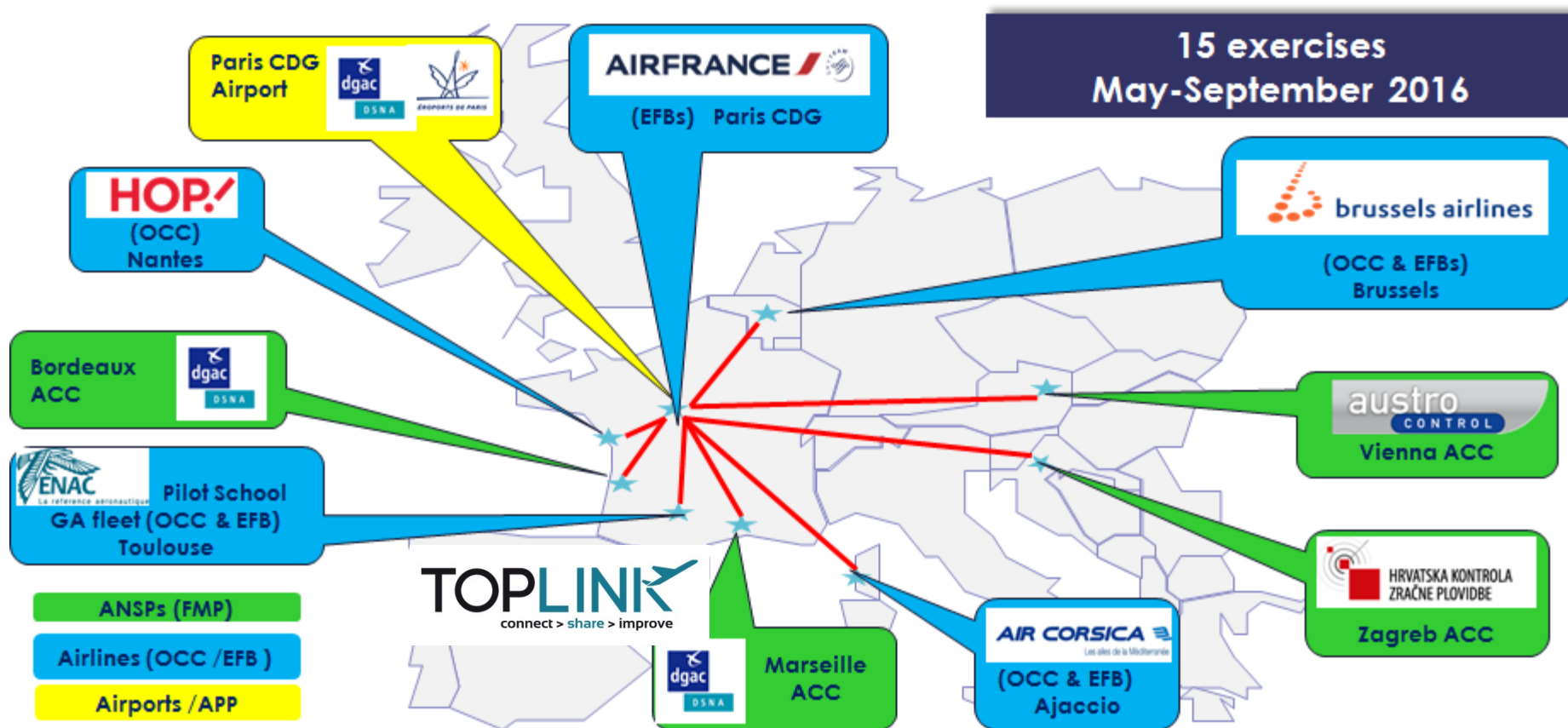
Flight information:



الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY



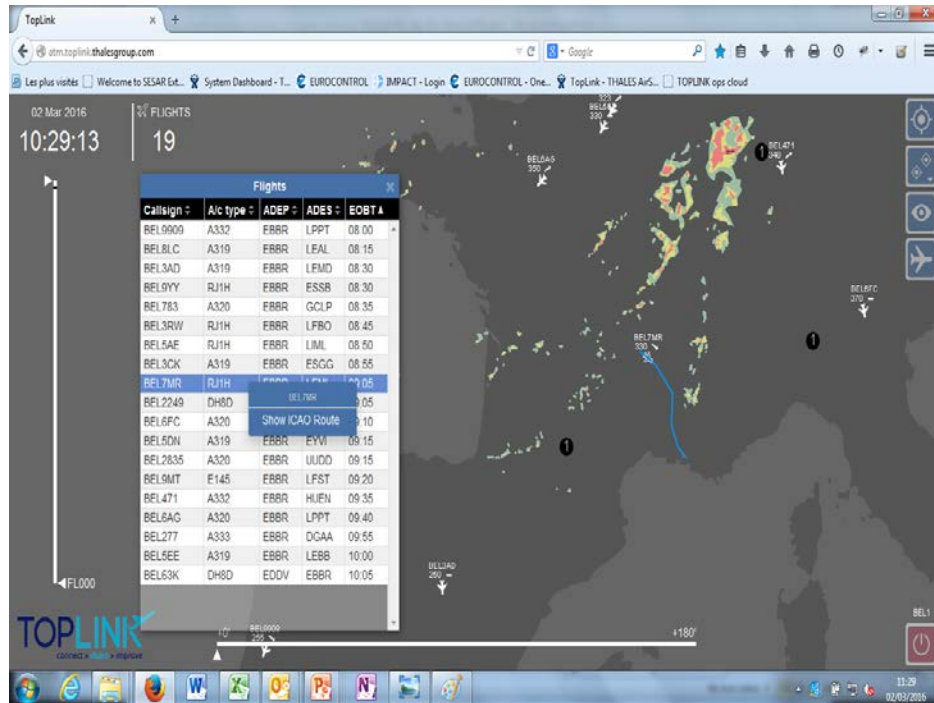
TOPLINK: Large Scale Demonstration project



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TOPLINK: Ground Users' terminal



Shared awareness

- Common situational picture (weather, traffic, airspace,...)

Assessment & alerts

- Assessment of impacts on user's operations, through customized KPIs and metrics
- Customized alerts

Mitigation

- “What-if” Flight rerouting, level change, delay, diversion, ...
- Collaborative Decision Support



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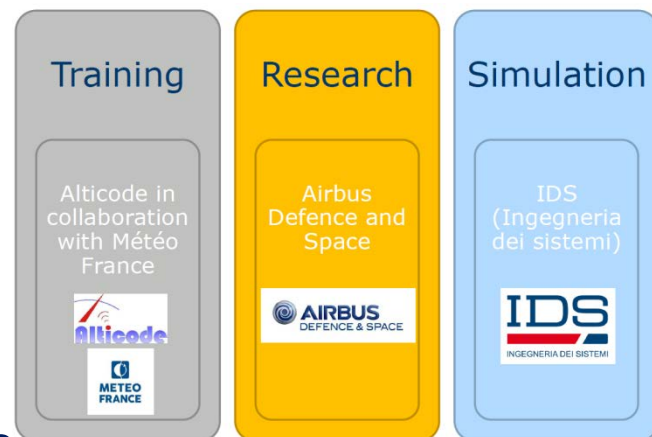
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MET-Gate & SWIM Master Class

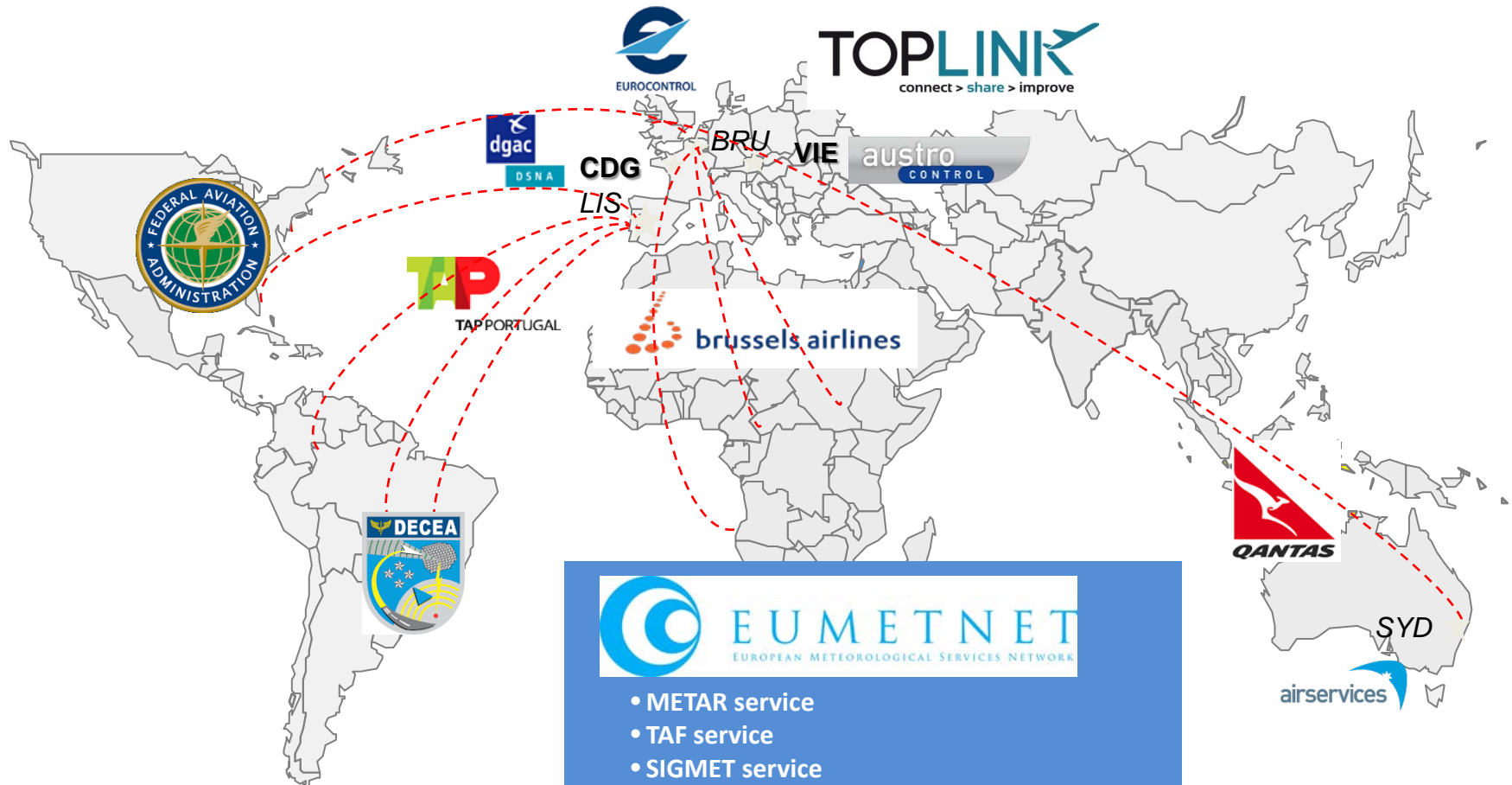
In 2015 EUMETNET entered '4D Weather Cube', and won best in show in the SWIM Information Services Category.

A number of services were provided:

- METAR service
- TAF service
- SIGMET service
- Airport MET forecast service
- Airport MET observation service
- MET Hazard EnRoute forecast service
- MET Hazard EnRoute observation service
- MET gridded forecast service



TOPLINK & SWIM Global Demo

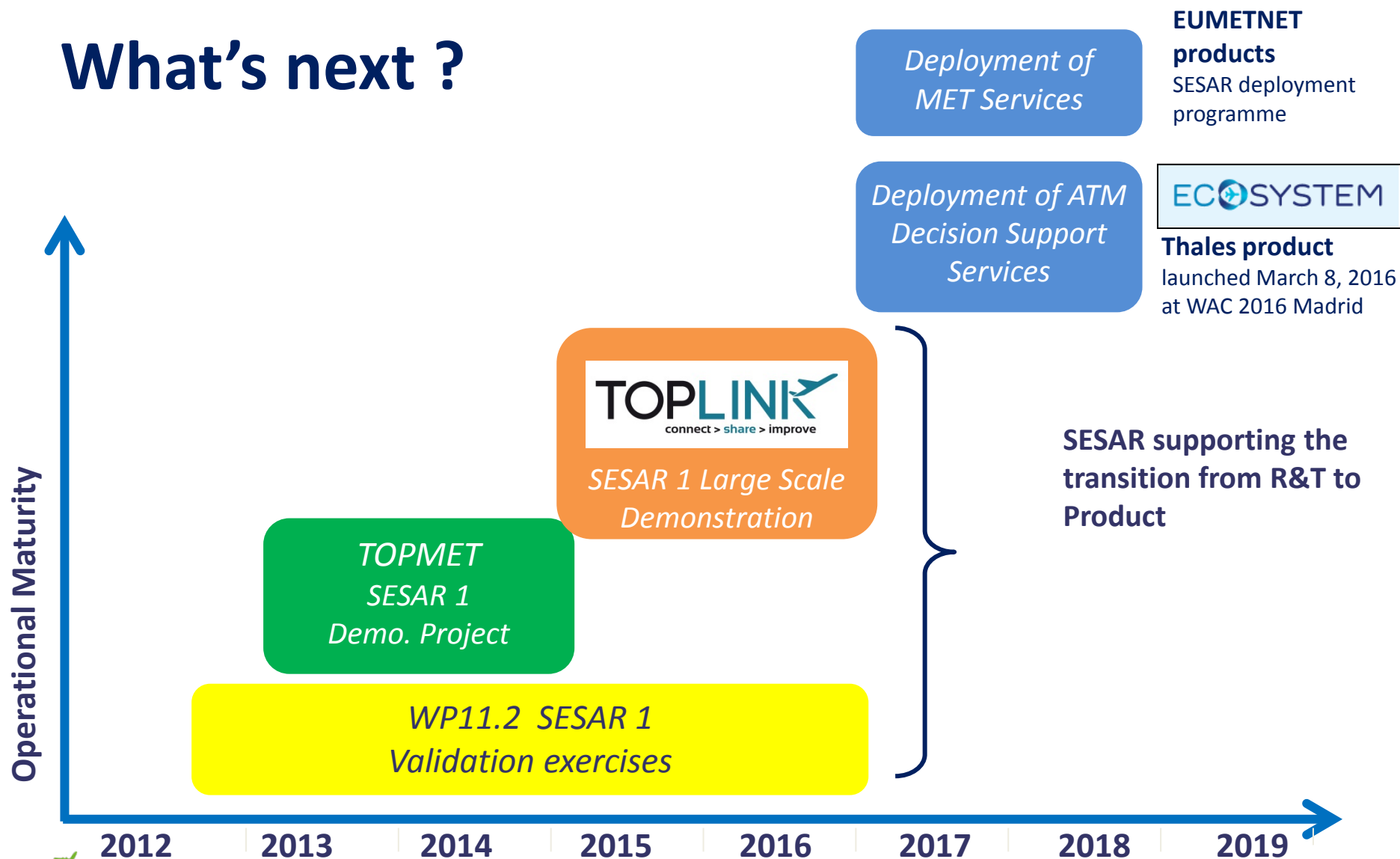


- METAR service
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What's next ?



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Thank you for your attention

More information:

sesar@eumetnet.eu

rosalind.lapsley@eumetnet.eu

daniel.muller@thalesgroup.com

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