OPERA: Operational Programme for the Exchange of Weather Radar Information

ALADIN-HIRLAM workshop, Toulouse

Maud Martet

26-28 April 2016

OPERA: An EUMETNET Project

EUMETNET: EIG of 31 European National Meteorological Services that provides a framework to organise co-operative programmes between its Members in the various fields of basic meteorological activities.

OPERA: an EUMETNET Programme that operates and develops the ODYSSEY data hub, which collects radar volume data, distributes quality flagged volume data to modellers and other radar data users, and produces quality controlled radar products.

OPERA 4: Fourth phase of the OPERA programme (2013 - 2017).

Odyssey: OPERA Data Center generates and archives composite products from raw single site radar data using common pre-processing and compositing algorithms.

Odyssey: Outlook

What is Odyssey?

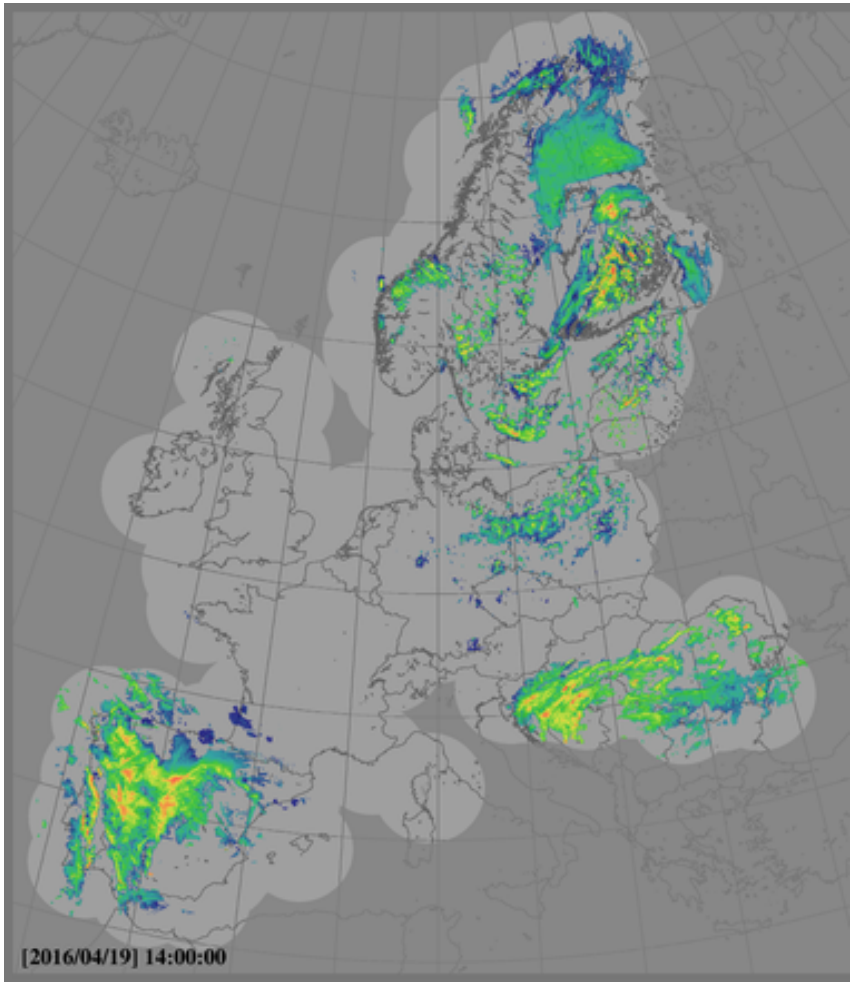
Radar data hub generating composite radar data over Europe with **149** radars from **24** countries

Various radar configurations:

- bands (S, C and X),
- scan strategies,
- resolutions,
- Single or Multiple PRF,
- Nyquist velocities.

Technical constraints

- Concentration of polar volume radar data
- Utilization of OPERA Data Information Model (**ODIM**)



Maximum reflectivity composite
19/04/2016 14h00 UTC

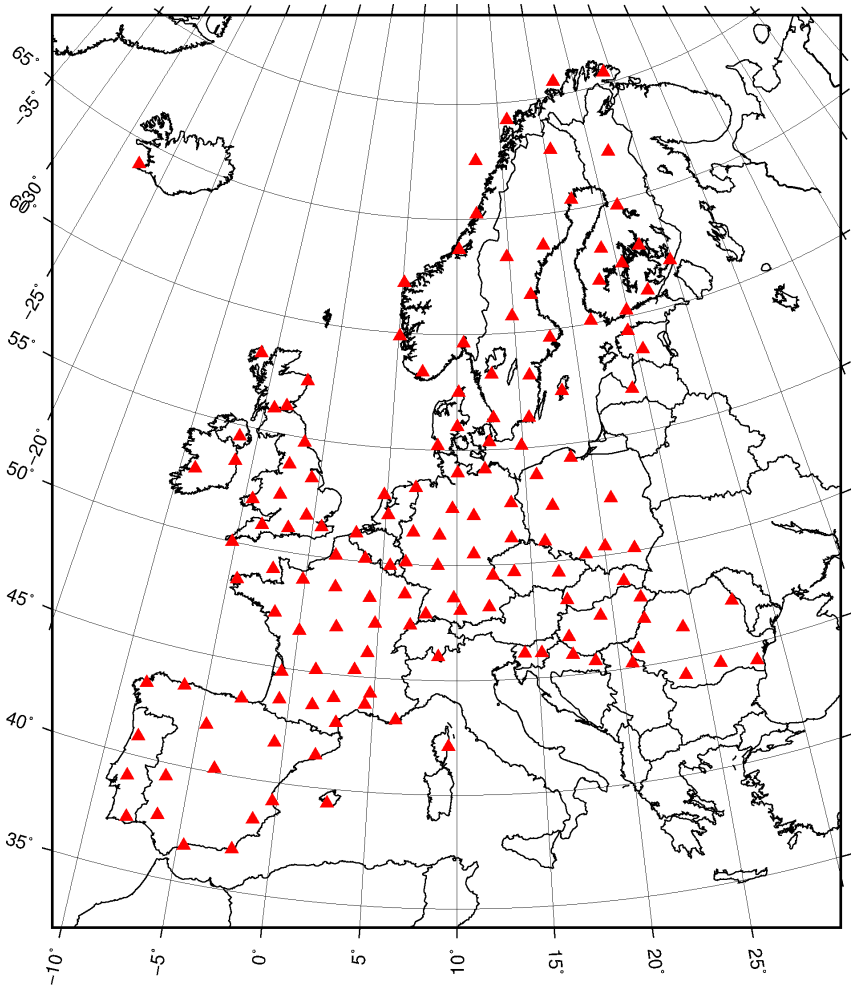
Odyssey: data received

NMS must send:

- Reflectivity with ground clutter suppression (DBZH)
- "Raw" reflectivity (only noise filtered) (TH)
- Doppler velocities (VRAD)

Data currently received at Odyssey:

Parameters	DBZH	TH	VRAD
Nb countries	24	10	16
Nb radars	149	71	121

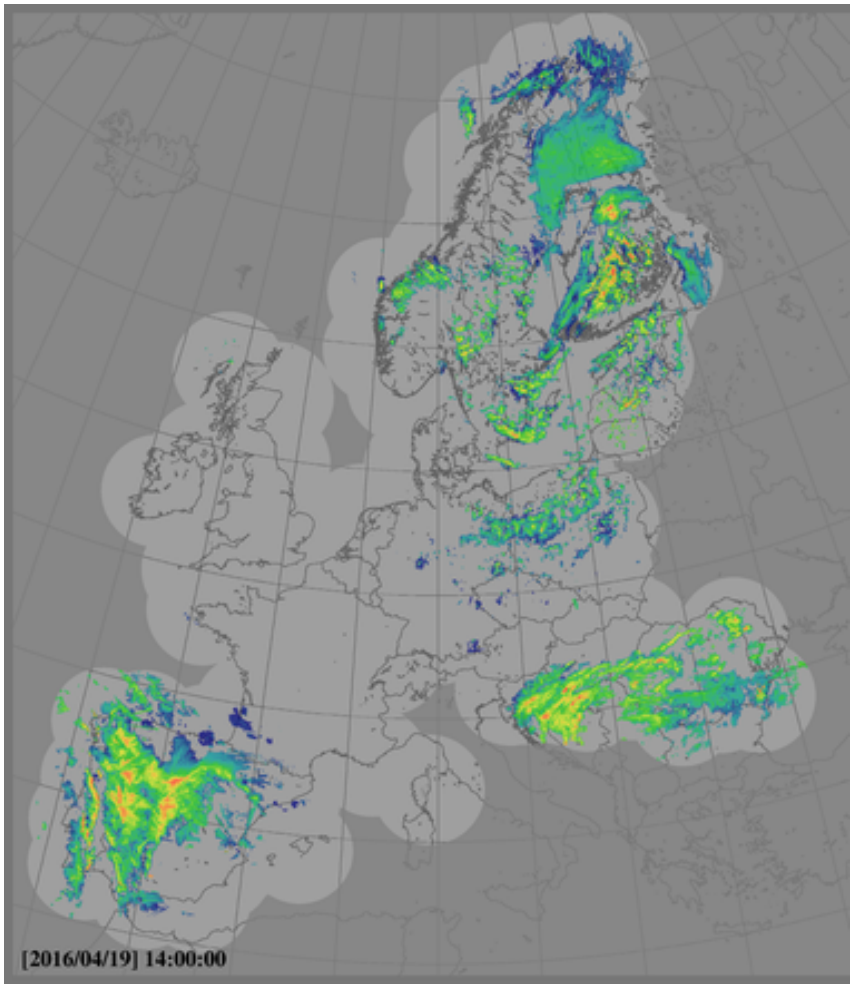


Radars included in Odyssey

Odyssey: individual radar data

PPIs filtering (odc_toolbox)

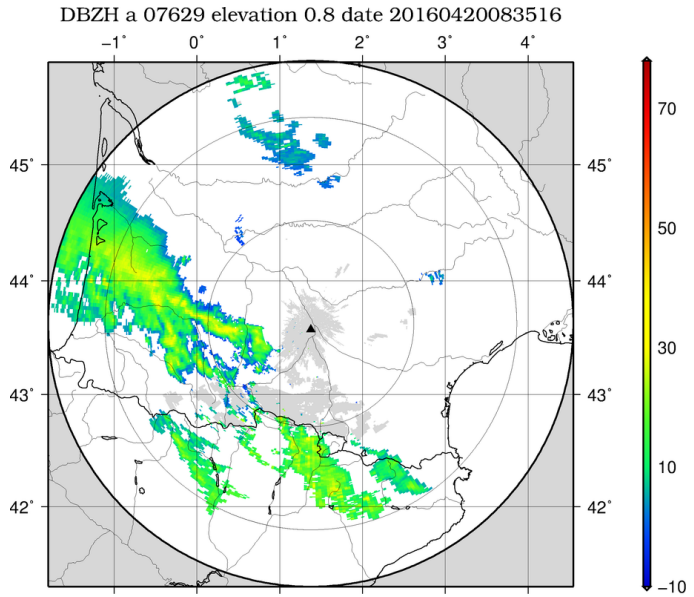
- Bropo module
- Satellite filtering (using Precipitating Clouds product from SAF-NWP)
- Beam blockage attenuation correction
- Total quality index production (minimum of all the quality index produced by the other modules)
- Hit accumulation filtering

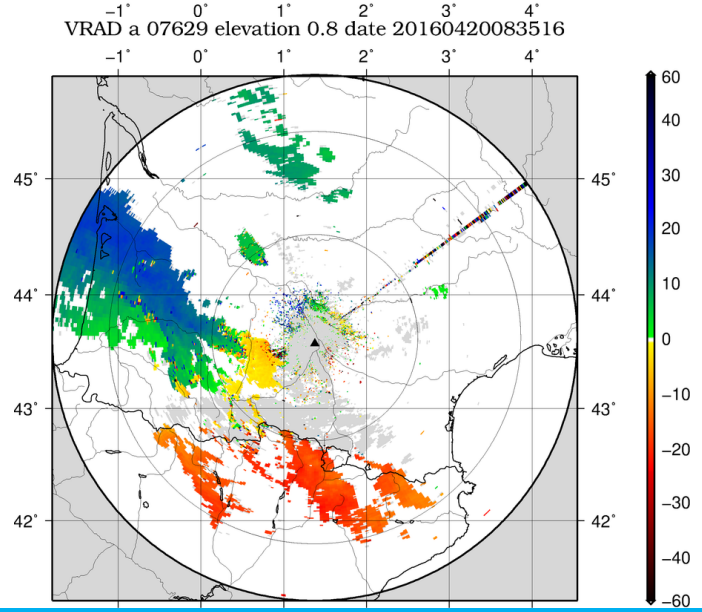


Maximum reflectivity composite
19/04/2016 14h00 UTC

Odyssey: individual radar data

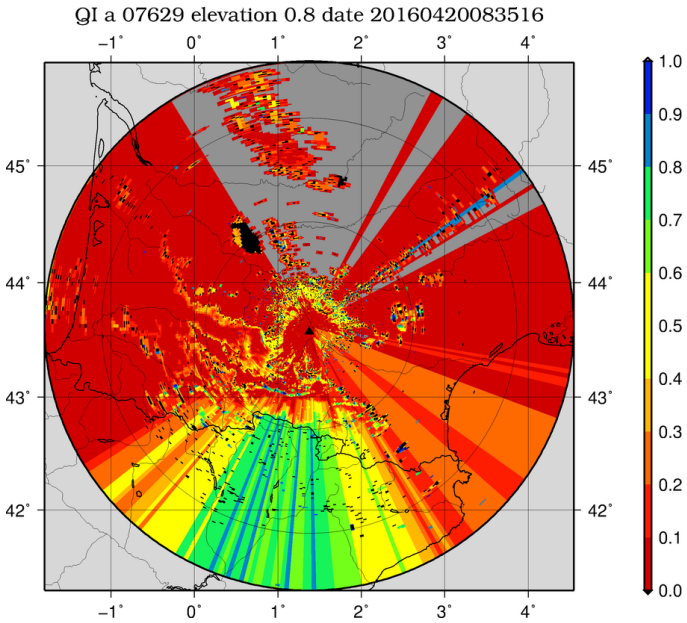
Flagged data example





Toulouse radar (France), elevation 0.8°

- Reflectivity (top left),
- Doppler velocity (bottom left),
- Quality index (bottom right).



Odyssey: Composite data

Products

- Maximum reflectivity
- Instantaneous rain rate
- one hour accumulation

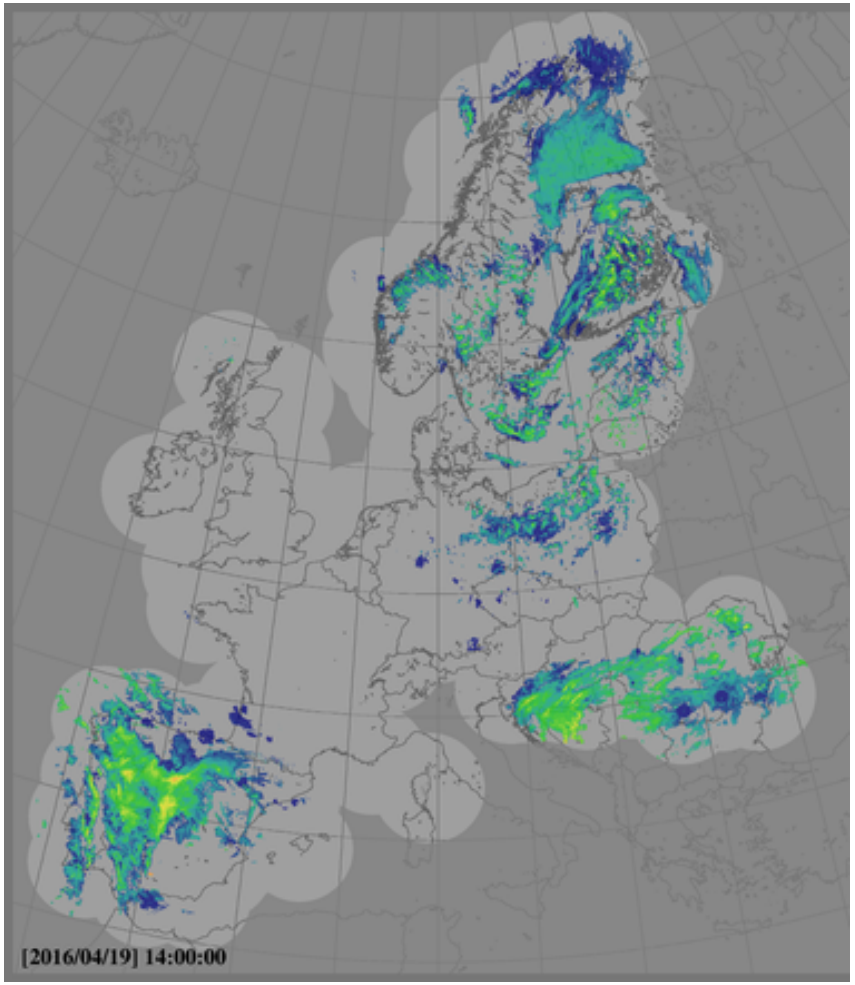
Resolutions

- 15 minutes
- 2 km x 2 km

Composite quality index

Combination of:

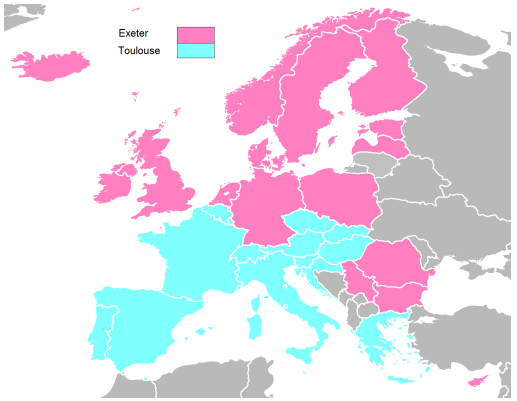
- total quality index produced by the PPIs filtering
- basic quality index function of distance to the radar and altitude of the beam

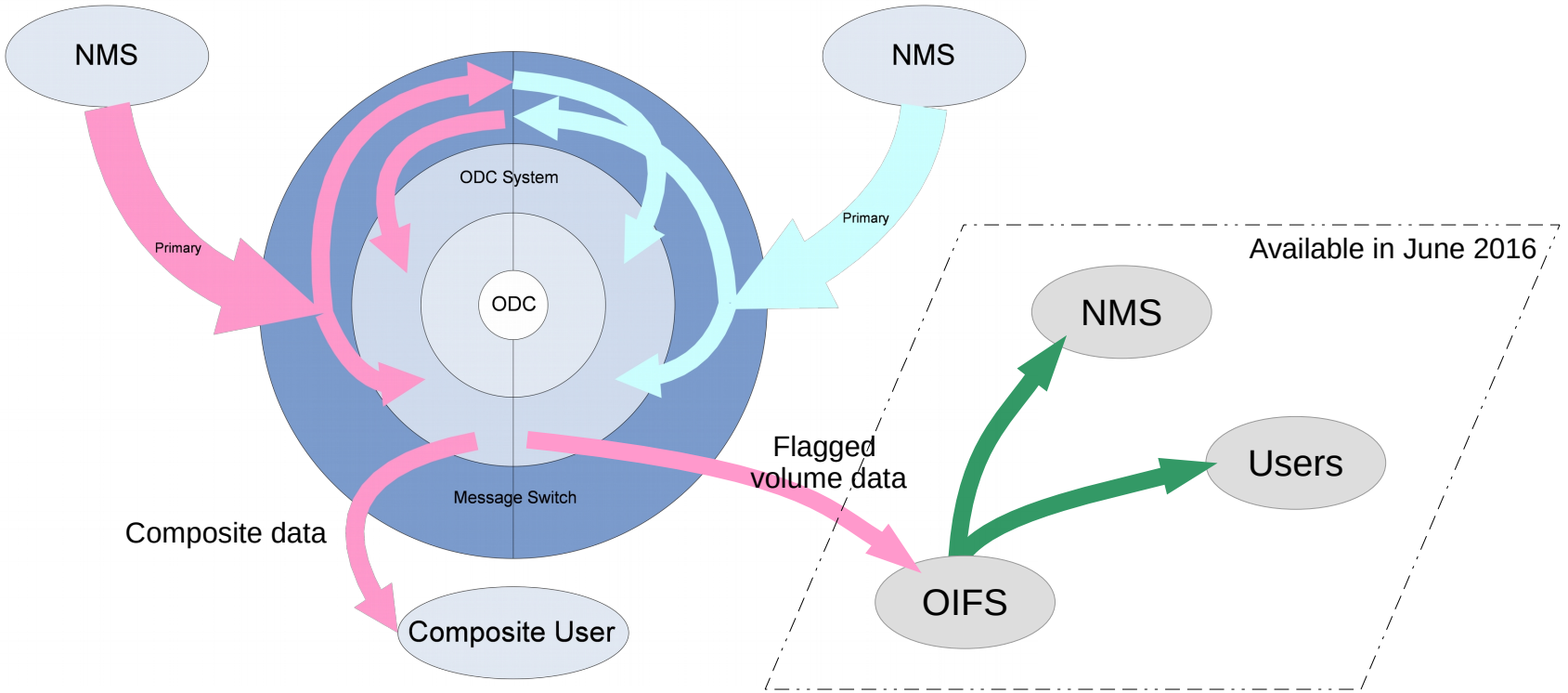


Rain rate composite
19/04/2016 14h00 UTC

Odyssey: Redistribution of flagged PPIs

Redistribution of composite data and PPIs (with quality information) for assimilation purposes or NWP verification





*OIFS: OPERA Internet File System

Odyssey data: Applications

Odyssey data have various applications:

- Forecasters: around 15 Met Services are using Odyssey composite data,
- Aviation: Eurocontrol and SHMU (Slovakia)
- Nowcasting: BarcelonaTech is using Odyssey composite data to perform nowcasting products,
- Assimilation: individual radar data or composite are used in NWP models.
- Verification: Philippe Lopez (ECMWF) compares ECMWF model with Odyssey composite data.

OPERA User Group was founded to improve the communication between the producers and users of the radar data in Europe. Its role is in expressing the needs and providing feedback of the user communities. (Chair: Klaus Stephan, DWD)

OPERA: Project development

Objectives by the end of OPERA4 (end 2017), relating to assimilation purposes:

- concentration of DBZH, TH and VRAD from all NMS: ongoing,
- redistribution of flagged volume data via OIFS (OPERA Internet File System): June 2016,
- use of DBZH and TH comparison to better specify ground clutter areas: 2017,
- no plan to unfold radial velocities.

Preparation of OPERA5:

- Ongoing discussion at Eumetnet level to specify objectives:
  - increased resolutions (delivery frequency and horizontal resolution),
  - reduced delivery time,
  - improved quality products,
  - 3D compositing.

Thank you for your attention.

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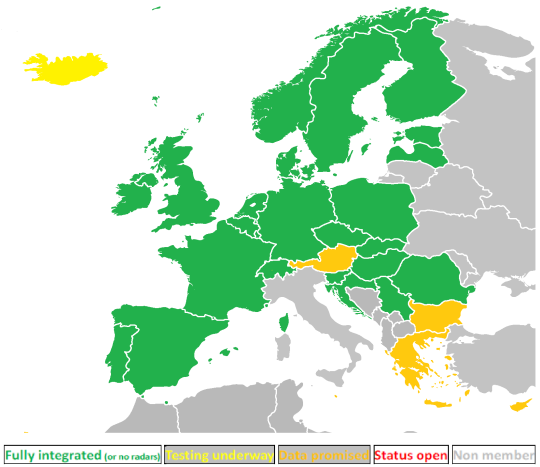
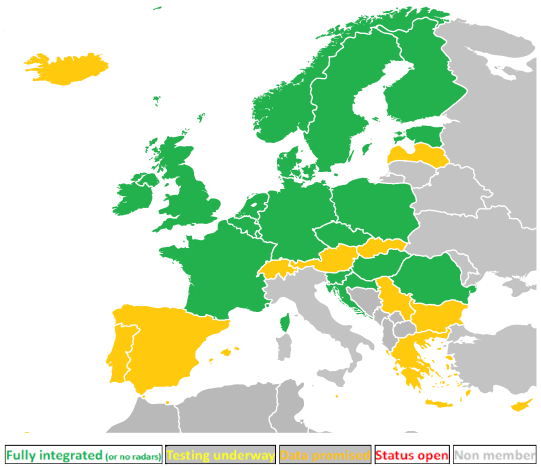
Data sent to Odyssey by country

DBZH



VRAD



TH