



## EIG EUMETNET OPERA

# The OPERA Radar Data Centre – Odyssey An operational service and future

Stuart Matthews, UK Met Office  
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Nicolas Gaussiat, Robert Scovell, Daniel Idziorek, Karine Bouyer



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# EUMETNET OPERA

- EUMETNET OPERA (**O**perational **P**rogramme for the **E**xchange of **R**ADAR information)
  - Partnership of 30 European National Meteorological services
  - Started in 1999 and planned to continue until at least 2017.
  - **OPERA I**, 1999 to 2003. Emphasis on data formats and exchanging knowledge between National Meteorological Services
  - **OPERA II**, 2004 to 2006. More of the same and in addition the decision made to make OPERA more operational with the development of the European Radar (Pilot) Data Hub (PDH)
  - **OPERA III**, 2007 to 2012. Building on the success of the PDH, the development and operational launch of OPERA's Data Centre (ODC). Now known as **Odyssey**
- See Asko Huuskonen's (OPERA Programme manager) EUMETNET OPERA Poster for more on the whole work of OPERA

## How we got to here – Pilot Data Hub

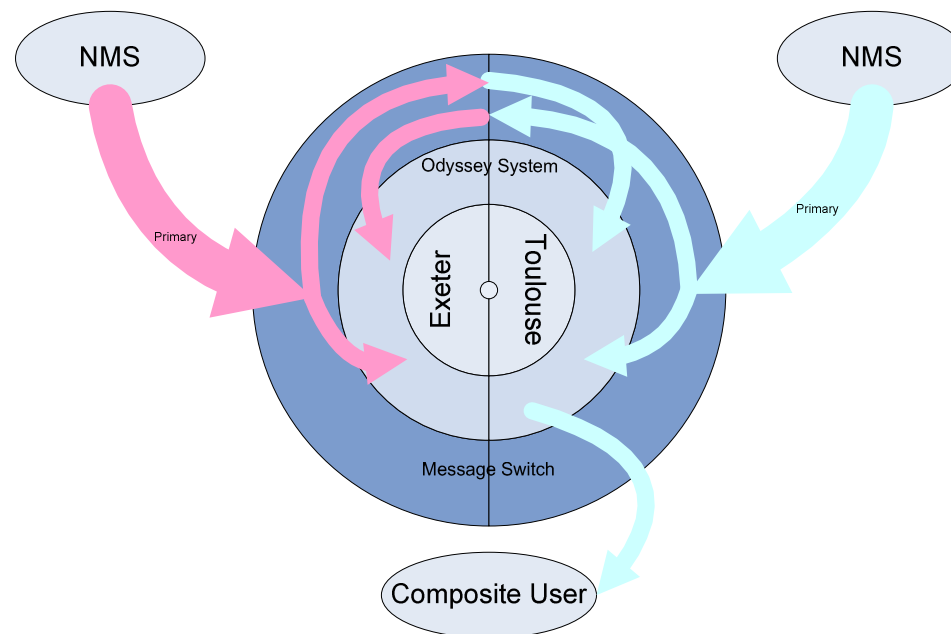
- 2004 EUMETNET decision to move OPERA onto a more operational footing by creating operational products for its members
- The **OPERA Pilot Data hub** was subsequently developed and hosted by the UK Met Office
  - Receiving processed single site Cartesian products and National composites from OPERA members
  - Generated surface rain-rate composite products
  - Almost all OPERA members were able to contribute, resulting in complete European coverage
  - Proved 30 National Met Services could work together to this.
  - But... Unexpected variability in the quality of the input data and re-projection loss of accuracy
  - NWP and other users wanted a homogeneous product
- ERAD 2006, Barcelona. Workshop
- Service ended in February 2012

## How we got to here – OPERA Data Centre

- OPERA III (2007-12) - Decision made to take the concept of a centralised European data centre to the next level
- User requirements and functional specifications gathered (2007-8)
  - Input data would be restricted to raw polar reflectivity data
  - Capable of receiving and processing data from 200 operational radars
- ERAD 2008, Helsinki. Another workshop to gather requirements
- Autumn 2009, joint Météo France - UK Met Office development project starts
- ERAD 2010 Sibiu. Development project paper and poster
- Odyssey starts operational service, on time and on budget, in January 2011. Formal EUMETNET sign off in May 2011.

# Operational Service - Configuration

- Runs in parallel at the UK Met Office and Météo France centres in Exeter and here in Toulouse
- Both centres produce identical products using the same software application and input data
- Only one centre (the operational node) is disseminating products at any given time
- Very high levels of service availability and resilience

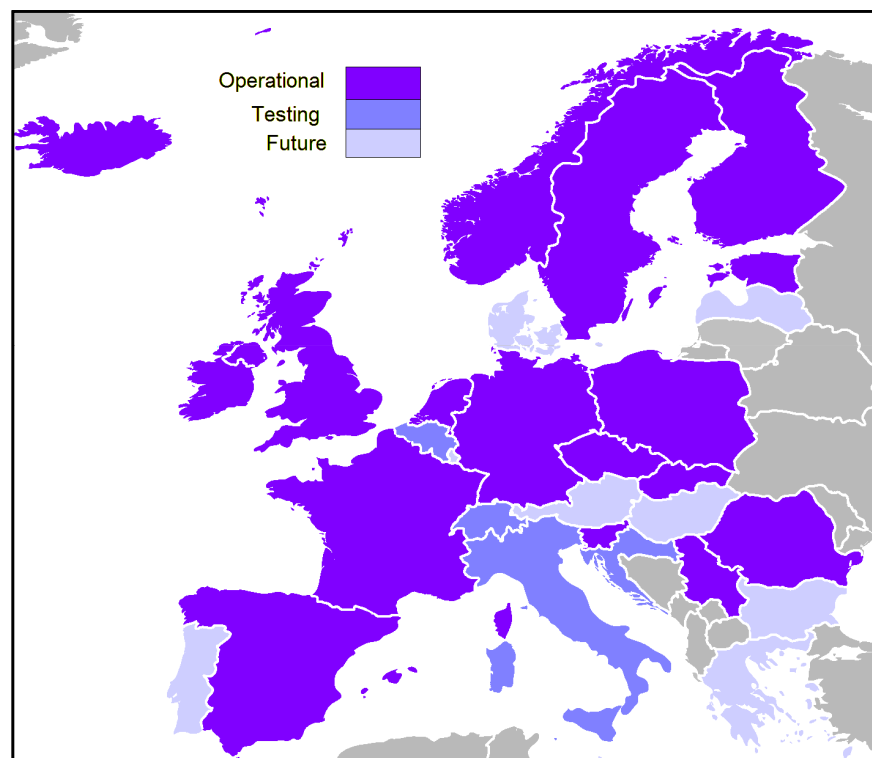


## Operational Service - Performance

- Service targets set on behalf of users by EUMETNET:
  - Availability target of 99.0% and
  - Timeliness target of at 95% delivered by Data Time +20minutes
- Last 12 months
  - Availability at 99.8% and
  - Timeliness at 99.4%
- Incoming data availability and timeliness also measured
  - High level of availability achieved for the majority of radars (~90%)
  - Approximately 99% of data received does so on time (i.e. ready for the compositing start time of DT+10 minutes)
- All performance measured at Deutscher Wetterdienst (DWD) at the EUCOS Quality Management Portal.
- Thanks to the teams in Exeter and Toulouse who keep things running smoothly.

## Operational Service – Input Data

- Started in January 2011
  - 10 Nations: UK, France, Iceland, Slovakia, Czech Republic, Poland, the Netherlands, Sweden, Finland and Estonia
  - Data from 77 operational radars
- By June 2012
  - Another 7 nations added: Germany, Ireland, Norway, Spain, Slovenia, Serbia and Romania
  - Data from 127 operational radars
- Also, test data received from Croatia, Switzerland, Belgium and Italy
  - Potentially 30 more radars
- It is expected that during 2012/13 most of the other OPERA members will start operationally sending data to Odyssey.



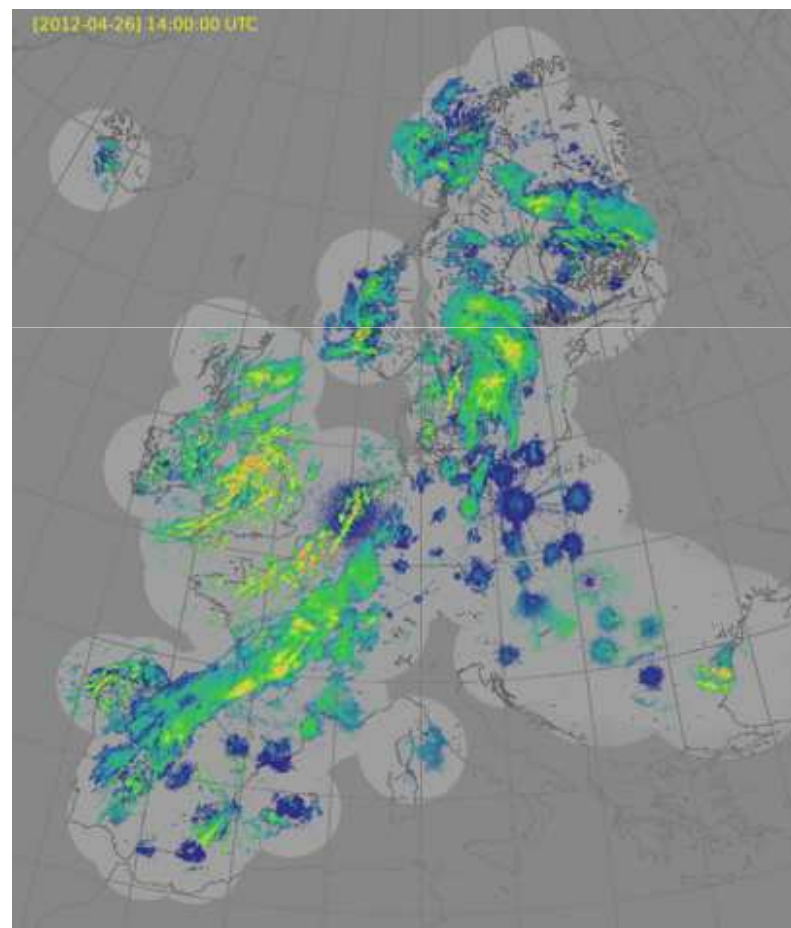


## Operational Service – Input Data

- ‘Raw’ reflectivity data
  - A major challenge for the whole of OPERA was how to describe these new products required for international exchange
  - A significant achievement of OPERA III was the development of the OPERA Data Information Model (ODIM).
  - Odyssey receives individual elevations, one at a time, from some radars and complete volumes from others
  - But what is ‘raw’ data and should ground clutter be removed at source? These questions remain unanswered for now.
- Data volumes
  - Exchanging raw polar volumes, rather than Cartesian products, resulted in a significant (>10x) increase in bandwidth requirements
  - Bottlenecks and conflict with other data exchanged between National Met Services, especially NWP products, needed to be resolved.

## Operational Service – Products

- 3 composite products generated by Odyssey
  - Surface rain-rate
  - Max reflectivity
  - Hourly accumulations
- 2km resolution
- 15 minute updates generated at Data Time +10 minutes
- Projection - Lambert Equal Area
- Format – ODIM compliant BUFR and HDF5
- Archive as well as real-time
- But only basic pre-processing
  - Radar consistency checks
  - Rain-rate and accumulation products use the lowest beam height



## Future plans - 2012

- New OPERA Work package underway during 2012 to improve composite quality
- Working closely with the BALTRAD project to introduce algorithms
- Two planned improvements to take place this year:
  - BALTRAD Anomaly detection routine, developed by FMI (speckle, clutter, birds, insects, ship, external emitters, solar emitters). Described by Daniel Michelson, yesterday.
  - Pixel ‘Hit accumulation’ being generated to help eliminate permanent clutter from incoming data. Suitable rejection level now being set

## Future plans – 2013-17 OPERA IV

- New OPERA project will start in January 2013
- EUMETNET requirements for OPERA have been produced, including...
  - Maintain the Odyssey system
  - Centrally produced Quality Index at the pixel level. Flagging (not removal) ground clutter, attenuation, blockage, etc, etc.
  - Redistribute incoming data (reflectivity and radial wind), with centrally generated QI, to NWP users.
  - Use of the QI in Odyssey composite generation routines
  - Further ahead – 3D composites, 5 minute updates, use of dual polarisation parameters
- OPERA Members are now preparing proposals
  - Will see even closer collaboration between all OPERA members and BALTRAD in the development of algorithms for Odyssey
- Final decision will be made in Autumn 2012

# Conclusions

Since **ERAD 2010**

- The Odyssey development project successfully completed on time, on budget and met all objectives.
- EUMETNET OPERA now has an operational centralised data centre for Europe
  - Odyssey is robust with very high levels of performance
  - Receives and processes data from approximately 130 operational European radars with high level of availability and timeliness
- There is still a lot of work to do to improve the quality of Odyssey products
  - The next phase of OPERA will see even closer collaboration between all European NMS and BALTRAD to develop solutions.
- **ERAD 2014. Reports on first phase of OPERA IV**
  - Usable composites, redistribution of incoming data (including QC flag) to NWP?



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## An operational service and future

Thank you & Questions?



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