The future of satellite product dissemination and formats

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Abstract

"In order to ensure that the maximum value can be had from its data and products, EUMETSAT is working with standard data formats designed to meet the needs of its specific user communities. Near real time data for NWP are exchanged on the WIS (GEONETCast + GTS/RMDCN) in BUFR and GRIB as well as in netCDF (JASON 2 and SAF products) and HDF (MODIS data) depending on the preference of the target community. Off-line products from the data centre are currently available in a number of formats and in the coming months will also be available in netCDF as a standard delivery format across programs and products.

EUMETSAT works through a number of groups (both internal and external) to ensure that the data representation used is consistent with the prevailing standards, and to ensure that the evolution of these standards is consistent with EUMETSAT's own objectives."

The future of satellite product dissemination and formats

Agenda

- Product format harmonisation
- Offline data access via
  - **EarthObservation Portal**
  - **EUMETSATs data centre**
- Real-time data access via EUMETCast

Product format harmonisation

- Product format harmonisation issues at WMO
  - **IPET-DRC and IPET-MDI**
- Product format harmonisation within CGMS
- Product format harmonisation at EUMETSAT - the FAG

Product format harmonisation issues at WMO

The WMO Commission for Basic Systems (CBS) met in Dubrovnik in March/April 2009

CBS established a number of teams for the 2009 – 2013 period, among which are:

Inter-Programme Expert Team on Data Representation and Codes (*IPET-DRC*)

- Maintain and adapt existing codes
- Monitor and facilitate migration to table driven codes
- Update and publish the Manual on Codes
- Collaborate with IPET-MDI

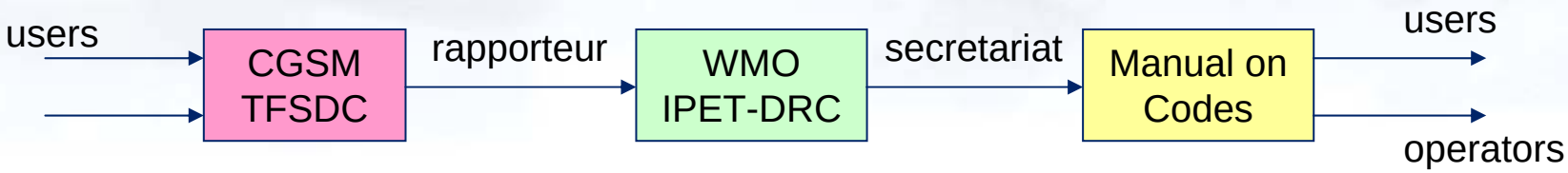
Inter-Programme Expert Team on Metadata and Data Interoperability (*IPET-MDI*)

- Develop core data profile of ISO 191xx, including standards for metadata, feature catalogues etc.
- Develop interoperability procedures and guidance
- Develop inter-programme data representation policy

Product format harmonisation issues at CGMS

The Coordination Group for Meteorological Satellites (**CGMS**) is a forum for the exchange of technical information on geostationary and polar orbiting meteorological satellite systems.

CGMS has established a Task Force on Satellite Data and Codes (**TFSDC**) to synthesise and consolidate input from the meteorological satellite community (product users and satellite operators) prior to submission to WMO process for formal adoption in operational codes.



Product format harmonisation issues at EUMETSAT

Data format issues are coordinated by the **Format Advisory Group** (**FAG**)

Representatives from 10 divisions covering operations, future programmes and quality assurance

Terms of reference:

- **To collect the format requirements from the EUMETSAT user community**
- **To collect the format requirements from the EUMETSAT Programmes**
- **To be aware of the format recommendations from external authorities such as the WMO**
- **To review the new formats proposed before the corresponding requirements or Engineering Change Proposals are produced**
- **To function as a liaison group for all EUMETSAT data format issues**
- **To participate in the verification of new format definitions**

Product format harmonisation summary

- Through the activities of its expert teams, WMO will maintain and evolve data formats according to the needs of its member states, and develop policy with regard to standardisation of data representation and interoperability of data and meta data

- CGMS will call upon the expertise of its members through the TFSDC in order to ensure consistent and appropriate requirements for data representation are passed to WMO

- EUMETSAT's FAG will ensure an organisation wide perspective is available in consideration of format related issues

Data and Product Discovery and Delivery

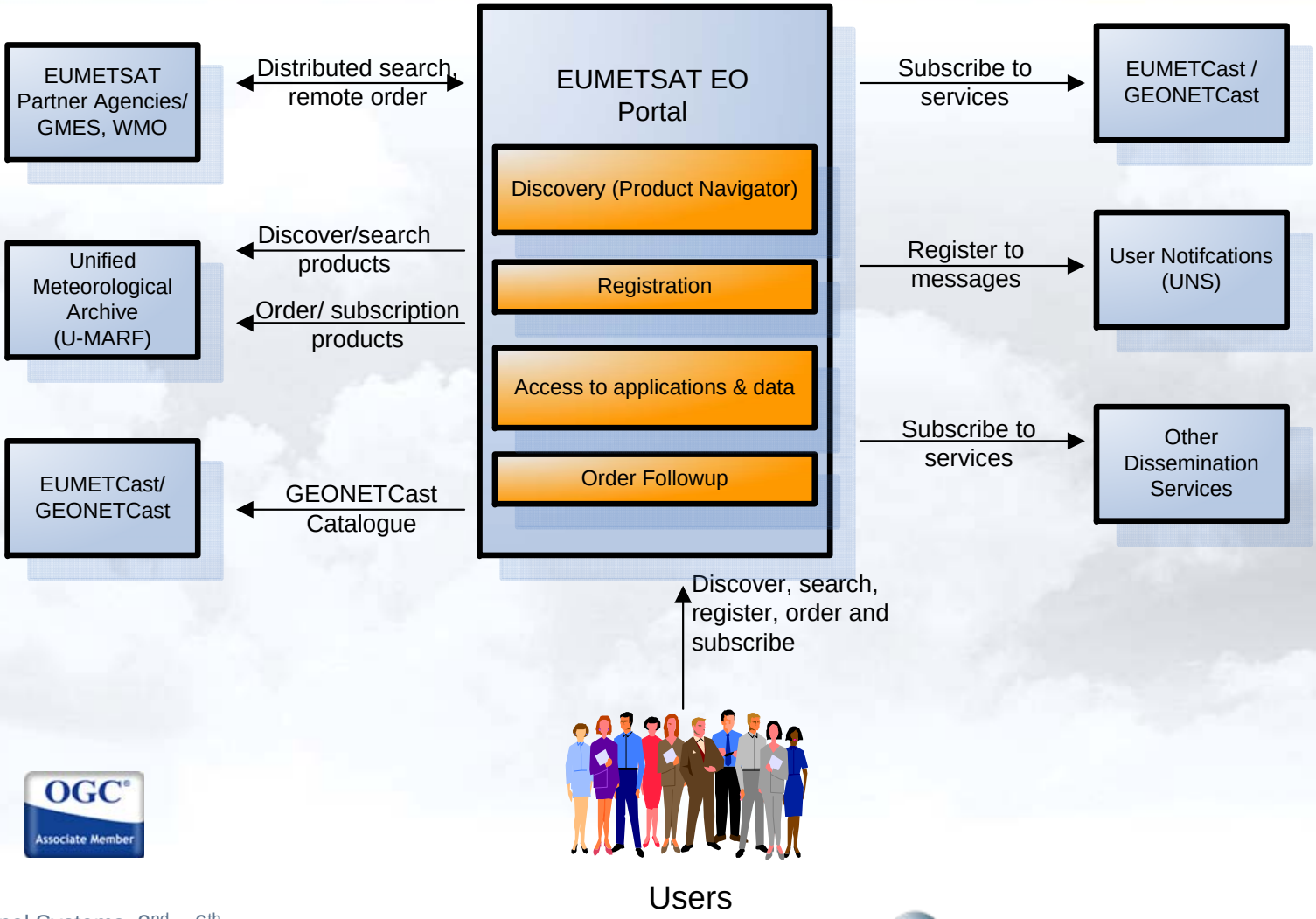
- Earth Observation Portal
- Access to EUMETSAT data centre (UMARF)
- Near-real-time dissemination

Data Discovery via the EUMETSAT EO Portal

- A one-stop-shop Earth Observation Portal which is fully compliant to:
  - ISO 19139 v1.0 (XML encoding of ISO 19115/19119)
  - ISO Metadata Application Profile v1.0 (ISO19115/19119)
  - OGC Catalogue Services CSW 2.0.2 interface (internetworking with other catalogues)
  - INSPIRE
  - WMO core profile

  which allows end-users to discover and access earth observation data.

Furthermore the Portal is a GEOSS registered component and service;



EO Portal – Discovery of Distribution and Formats

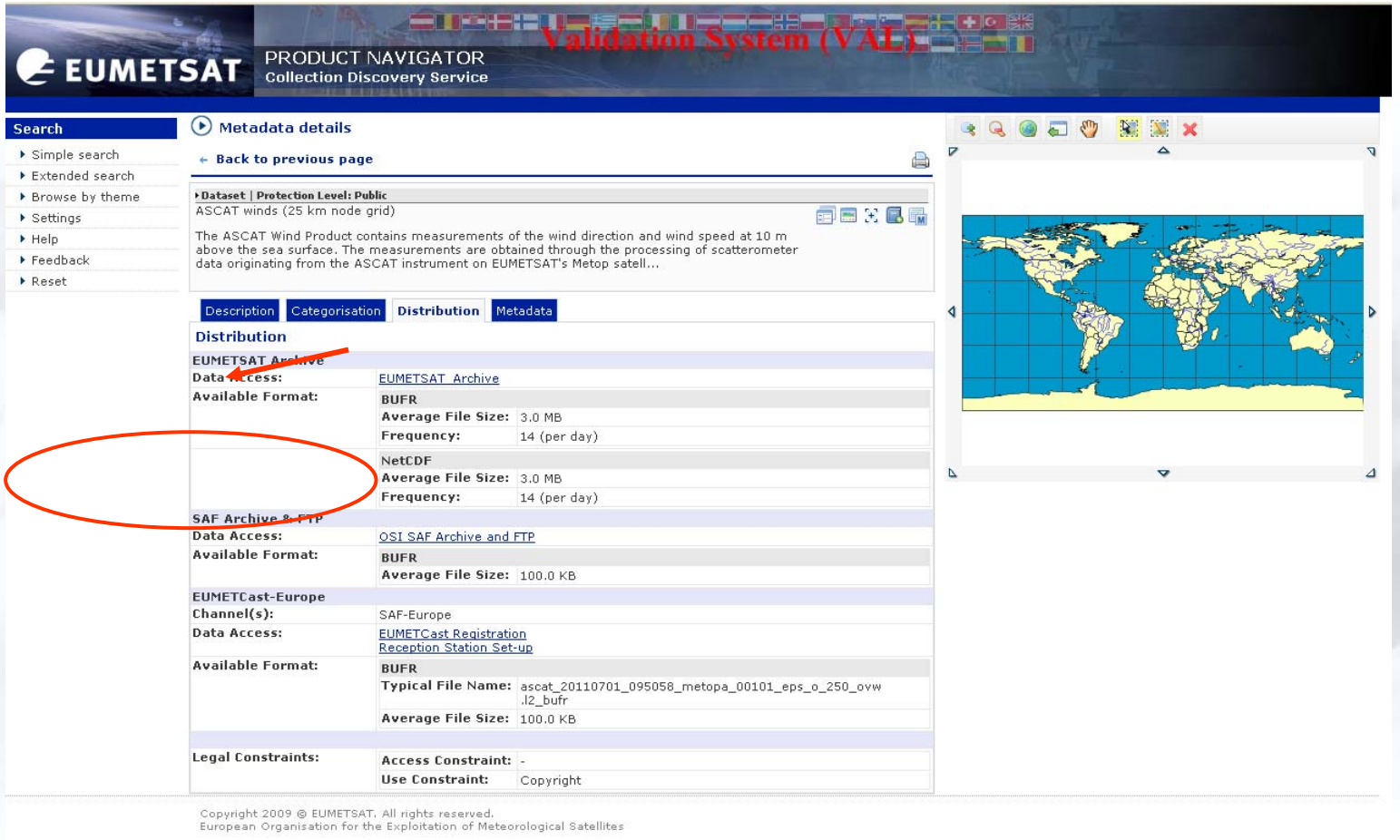
Example of ASCAT Wind products in NetCDF format.

Product Navigator contains description of all products available from EUMETSAT via different distribution means such as (EUMETCast, Data Centre etc.)

Each collection contains distribution means. In this example here is the ASCAT 25 Km wind product shown, which can be obtained in NetCDF format from the Data Centre.

When new formats such as the “NetCDF” one is added for a product, then our Navigator is updated to express that.

http://www.eumetsat.int/Home/Main/Access_to_Data/ProductNavigator/index.htm



Offline delivery in netCDF

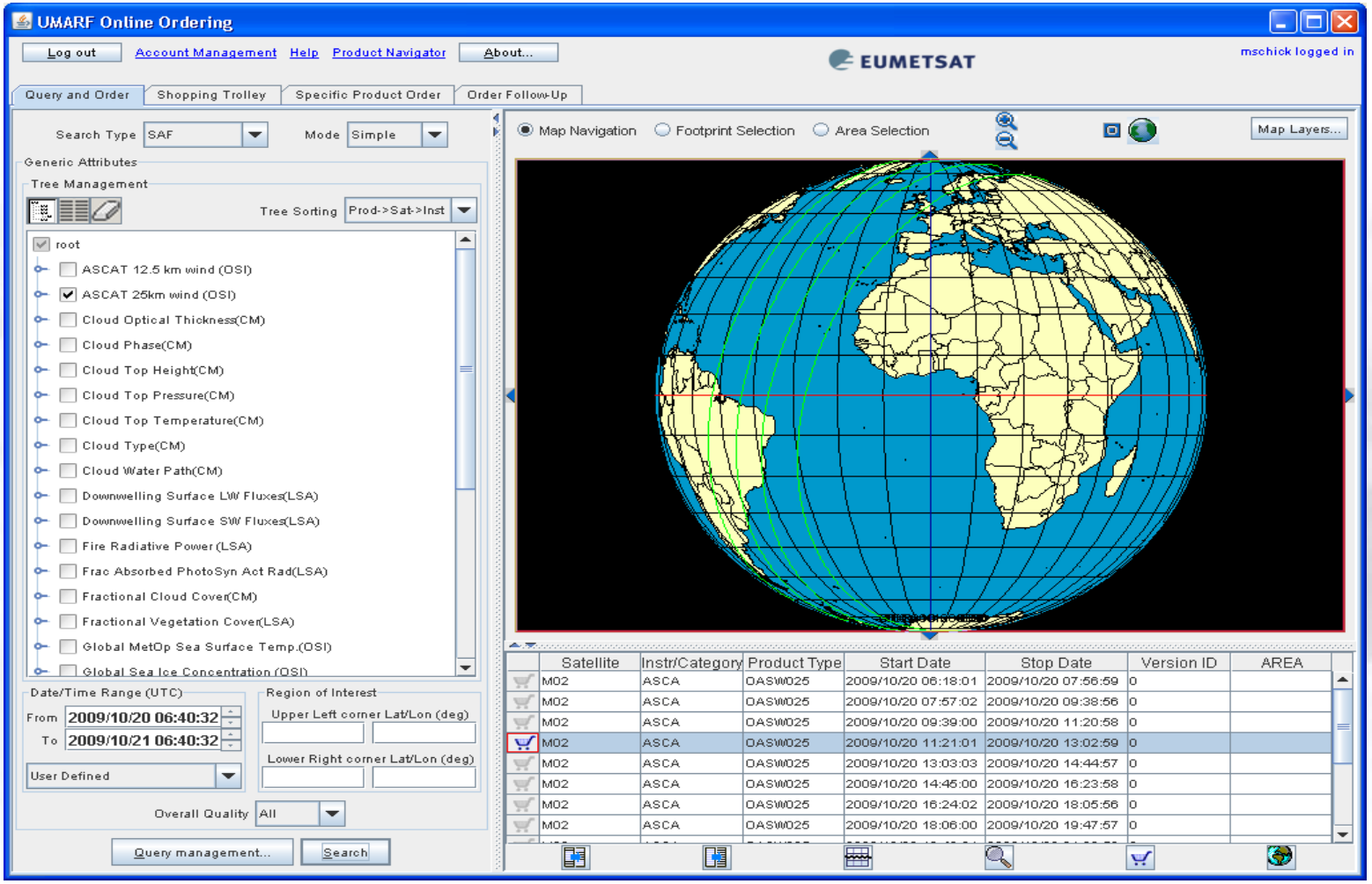
- Proposal FAG is to add “netCDF4” as an additional delivery format from the EUMETSAT Data Centre for all data ordered by end users
- Will use “netCDF4 classic” format and follow CF metadata convention (OGC discussion paper OGC 06-122)
- To be introduced gradually across existing programs beginning in 2010
- OSI SAF WIND products are already made available in netCDF format generated by the OSI SAF
- Will be default for future products and programs
- Usage of netCDF4 allows also to open GRIB1/2, BUFR and simple HDF5 products using the netCDF API
- CF-netCDF products can be made available via THREDDS as OGC WCS/ WMS services

OGC – Open Geospatial Consortium
WCS – Web Coverage Service
THREDDS is from Unidata. A servlet based web application serving NetCDF data. Data can downloaded using HTTP, OpenDAP, WMS and WCS by end users.

OGC 06-122:
OGC SWG (Standard Working Group established during last OGC meeting in Darmstadt. Discussion paper OGC 06-122.
netCDF classic (based on NASA ESDS SPG)
Candidate core of OGC 06-122 in Dezember

EO Portal -> Data Centre Access

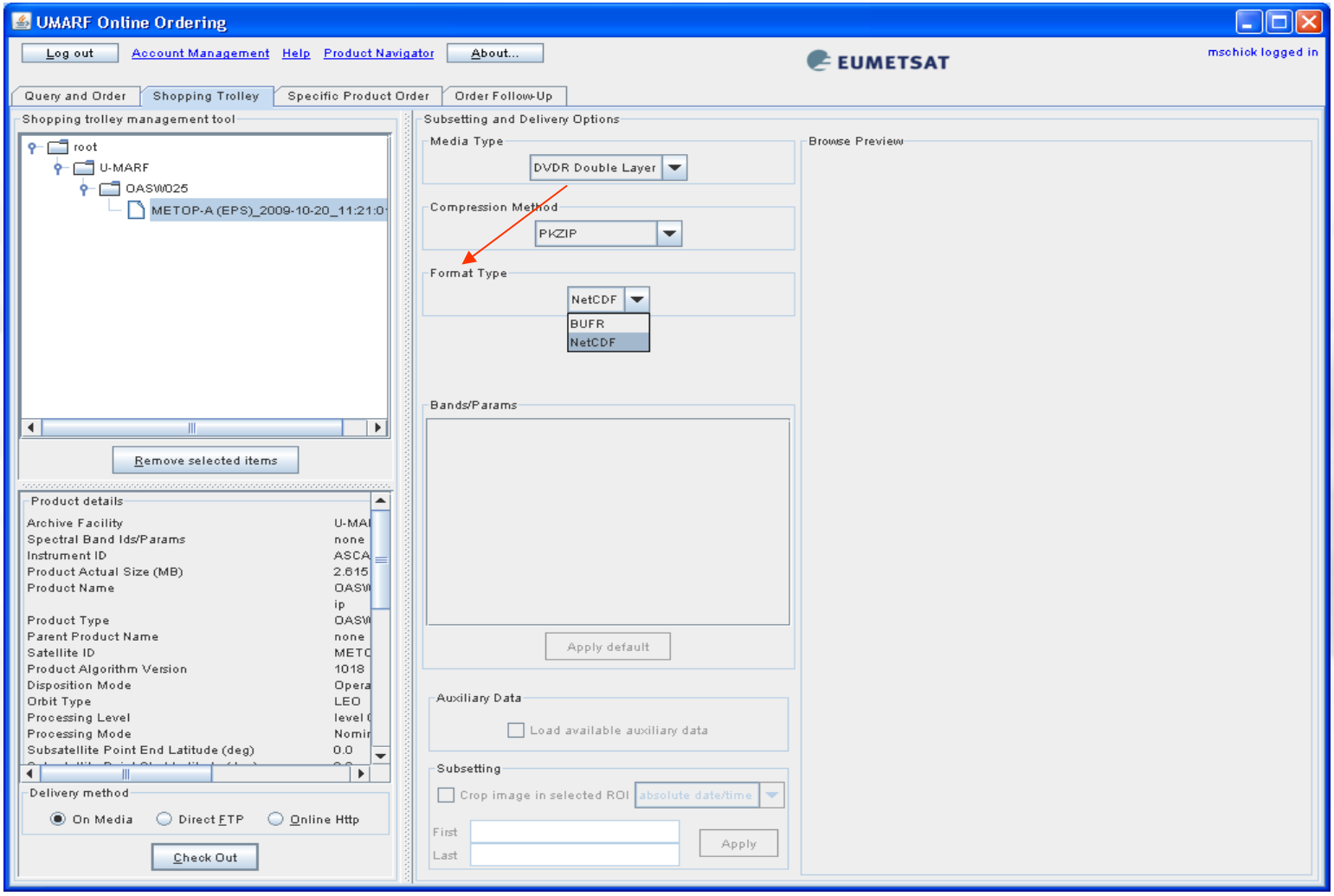
Clicking on the Navigator the Data Centre link, will automatically start the Data Centre Ordering application, which will allow to perform a temporal search of the desired products. Once obtained they can be added to the shopping trolley (see next slide)….



Data Centre – Format Type selection in Trolley

Which will allow you specify the delivery format. In this example here in NetCDF format.

http://archive.eumetsat.int/umarf/Jnlp?acronym=OASW025



Product and Format Guidelines on EUMETCast

The formats used depend upon the **requirements of the user community** (not on the dissemination mechanism) receiving the data:

- Near real time products for NWP are encoded in GRIB 2 and BUFR. These data are disseminated via the GTS/RMDCN and via DVB-S on EUMETCast
- Near real time products concerning fire and (soon) volcanic ash detection are in text, and being changed to use the Common Alert Protocol (CAP)
- Forthcoming Normalised Differential Vegetations Index (NDVI) products from MSG have been requested in HDF5
- Offline data are available from the data centre in a number of formats, with netCDF to be gradually additionally offered
- EUMETSAT is compliant to the new GTS file naming convention with regards to dissemination on GTS/RMDCN and it is planned to adopt the same file naming for EUMETSAT data on EUMETCast (excluding third party data)

WIS integration

With regards to being a Data Collection and Production Centre (DCPC) within WIS, the current operational near real-time data dissemination services offered by EUMETSAT include:

- 24/7 near-real time dissemination of EUMETSAT and foreign satellite and in-situ data via EUMETCast over Europe, Africa and South America. Within the context of GEONETCast the system is a GEOSS registered component and service;

- Interconnectivity with WMO Region VI members via RMDCN;

- User services which support above core services;

- Independence of data formats.

All those DCPC capabilities are fully compliant with the WMO “WIS functional architecture” and “WIS Compliance Specifications for GISC, DCPC and NC”. Those already operationally implemented services are used by our user community regularly.

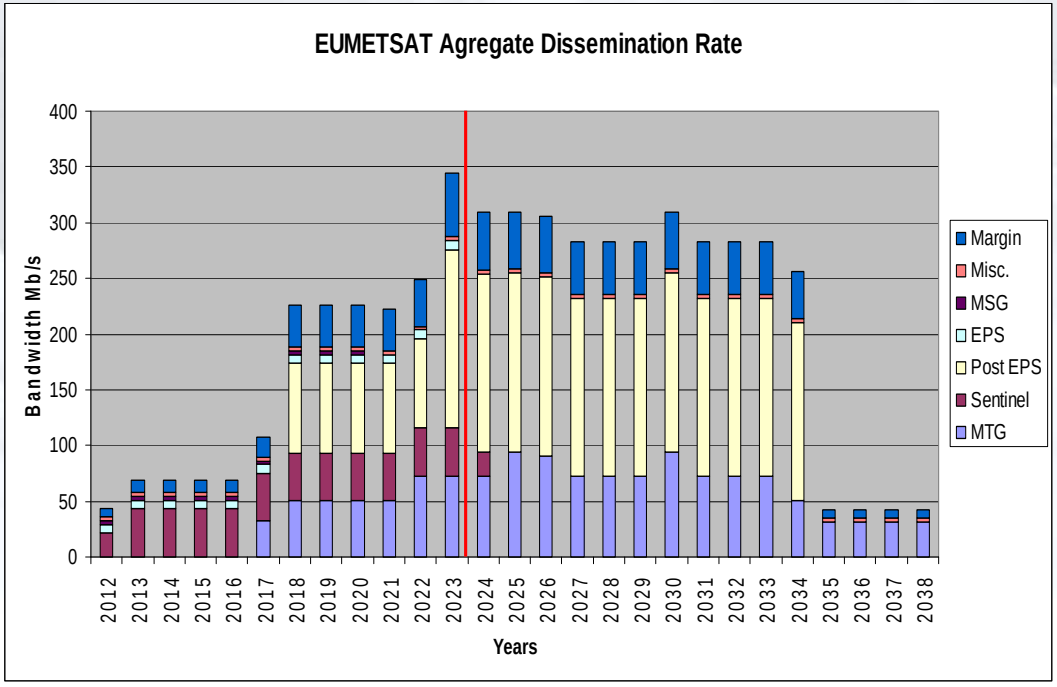
EUMETSAT’s obligation by its Member States to serve the user communities in Region VI and Region I will result in a connection of EUMETSAT as a DCPC to the emerging Global Information System Centres (GISCs) in Region VI and Region I. This will also address the distribution and harvesting of the related meta data.

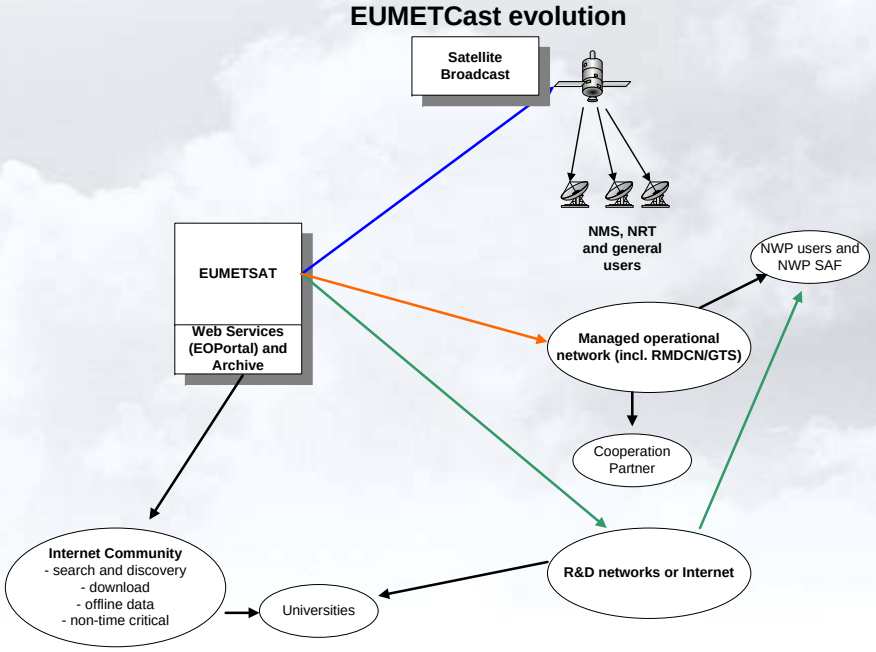
EUMETCast evolution

EUMETCast

- Currently 16.5Mbit/sec Ku-Band
- 2700 users (incl. DWDSat + RETIM)
- 10 fold data rate increase by 2018
- Potential multi-transponder dissemination
- Usage of new protocols e.g. DVB-S2

- Interfacing and integration with other dissemination components (e.g. RMDCN, Internet, R&D networks)
- Evolution of existing managed networks





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