STATUS OF THE EUMETSAT EARTH OBSERVATION PORTAL
In response to CGMS action 37.17

Working Paper Abstract

EUMETSAT initiated the Earth Observation Portal to improve data access for users to EUMETSAT Earth Observation (EO) data and products. Through the use of industry standards (e.g. OGC, INSPIRE), it aims to provide partner agencies with interoperable access to EO data.

The collection discovery service (known as Product Navigator) is a EUMETSAT provided service for the discovery of EO Products and Data. This service is operational, since 2008. The EO Product search and ordering, including federated user management has been developed, but not integrated with ESAs HMA project. The integration of those services would allow partner agencies to perform a round trip from discovery, search and ordering using interoperable standards. The integration of the remaining services is expected at the beginning of 2011.

EUMETSAT is currently developing a pilot Web Map Service (WMS) to facilitate open access to visualise EUMETSAT data sets using GIS technologies.

The EUMETSAT Earth Observation Portal offers a harmonised user interface to facilitate the discovery and access to Earth Observation data. Through interoperable standards, it aims to provide inter-organisational access to these data.

Status of the EUMETSAT Earth Observation Portal

1 INTRODUCTION

EUMETSAT initiated the Earth Observation Portal to improve data access for the users of EUMETSAT data and products. Through the use of industry standards (e.g. OGC, INSPIRE), it aims to provide partner agencies with interoperable access to these data.

The current objectives of the EUMETSAT Earth Observation Portal (EO Portal) are:

1. To implement a central service point to provide EUMETSAT users a single point of online access to all EUMETSAT data and dissemination services. Thus, the EUMETSAT Earth Observation Portal will allow users to discover, search and order EO data or subscribe to data access serv ices (in particular to EUMETCast/GEONETCast and the Data Centre);

2. To allow partner agencies to discover, search, order and subscribe to EUMETSAT data and dissemination services via a set of programmatic, interoperable services.

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Future evolutions of the EO Portal could allow EUMETSAT users to discover, search, order/subscribe earth observation data from partner agencies such as CNES Altimetry products, NOAA data, ECMWF data, GMES, etc.

The EUMETSAT EO Portal offers a harmonised user interface to facilitate the discovery of and access to Earth observation data. Through interoperable standards, it will provide inter-organisational access to these data.

2 SINGLE ENTRY POINT TO DATA AND PRODUCTS

2.1 Collection Discovery - Product Navigator

The EO Portal provides collection discovery through the 'Product Navigator', a publicly accessible web-based user-interface which allows the browsing, searching and discovery of all EUMETSAT data and products.

The Product Navigator also contains collection entries for the third-party satellite data and products EUMETSAT provides through its EUMETCast broadcast system. The Product

Navigator also allows users to discover the data and products provided by GEONETCast partners (NOAA and CMA) through their own DVB broadcast systems. The Product Navigator can be accessed via the EUMETSAT main web site or via the direct URL: http://navigator.eumetsat.int/

A dedicated GEONETCast version of the Product Navigator is disseminated on EUMETCast and distributed to GEONETCast Partners.

The Product Navigator is based on the company con terra´s "sdi.suite, terraCatalog". Metadata is described using ISO 19115/-2 standards and provides out of the box OGC/INSPIRE catalogue interfaces. The Product Navigator is a registered component of the GEOSS Common Infrastructure.

2.1.1   Product Navigator Collection Search and Discovery

The Product Navigator search interface provides different search methods to facilitate search across the various collection metadata attributes. A number of combinations of spatial extent, content type, data format, keyword etc., can be used to form the query definition.

These search methods include search using a simple key word field, "Simple Search", a hierarchical category search, "Browse by theme" and a multi-metadata attribute search, "Extended Search". Through the Extended Search users a combination of single and multiple fields to build up their search query, see Figure 1.
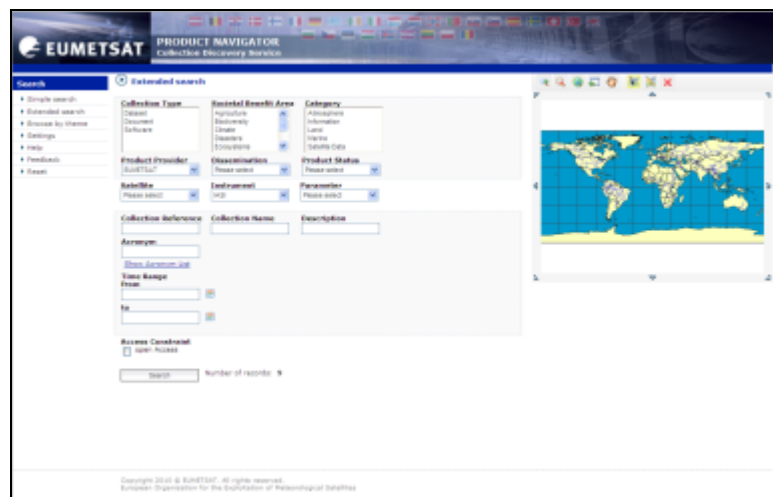

Figure 1: Product Navigator Extended Search

When a specific collection entry is selected by the user, the following types of information are displayed: collection description; geophysical categorisation; spatial resolution; originating satellite sensor; dissemination format; etc. The Product Navigator allows users to discover related resources through the provision of links to auxiliary information such as validation report, product user guides and format guides, see Figure 2.

The Product Navigator also provides information on data access (offline and Near Real-time) through links to the Central User Management (EO Portal Registration) and links to the Data Centre ordering system.

Figure 2: Product Navigator Metadata Details

2.2 Centralised User Management

With the introduction of the EO Portal User Management component, the multiple EUMETSAT user registration tools (EUMETCast Online registration, Data Centre online registration, UNS, etc) are being replaced by a single, centralised user management implementation, see Figure 3. User can access the EO Portal Registration service through the EUMETSAT main website or via the direct URL: http://eoportal.eumetsat.int/
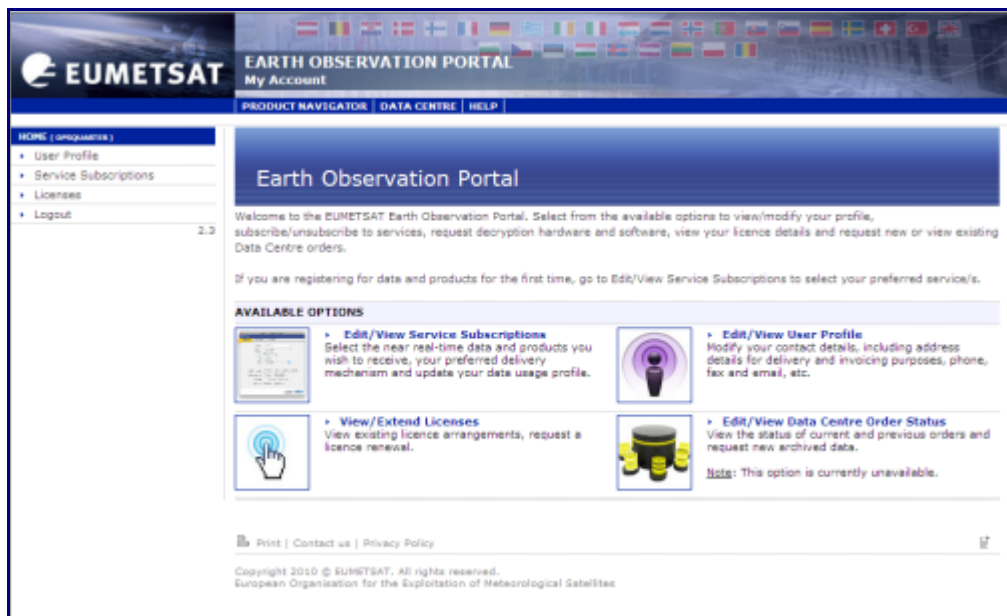

Figure 3: EO Portal User Registration

The EO Portal Registration allows users to modify their user profile, manage their subscriptions to EUMETCast data streams, request data access licence renewals, order data through the Data Centre and register for service support messages.

Users wishing to access data in near real-time are already benefitting from the centralised EO Portal registration, with over 3000 of the users who receive data via EUMETCast, Direct Dissemination and FTP over the Internet registered with the EO Portal. By the end of 2010 users of the Data Centre will be able to register through the EO Portal to order offline data sets and to monitor the status of their ongoing orders. In 2011 the EUMETSAT User Notification Service (UNS) email alert/message subscription service will be incorporated into the EO Portal central user management to complete the EUMETSAT legacy integration into the EO Portal.

3 INTEROPERABLITY THROUGH THE CLEARINGHOUSE

3.1 Goals of Interoperability

Using interoperable interface specifications the EUMETSAT EO Portal provides capabilities to discover, search and order/subscribe to EO data from partner agencies and in turn to allow partner agencies to gain access to EUMETSAT services. This is achieved through the 'Clearinghouse'.

The Clearinghouse provides programmatic interfaces using OGC/ESA/HMA- and INSPIRE-specifications. The Clearinghouse interacts internally with the EUMETSAT legacy systems and externally via web-service interfaces with the partner agencies in order to provide EO services to the EUMETSAT EO Portal and EUMETSAT partners, see Figure 4.
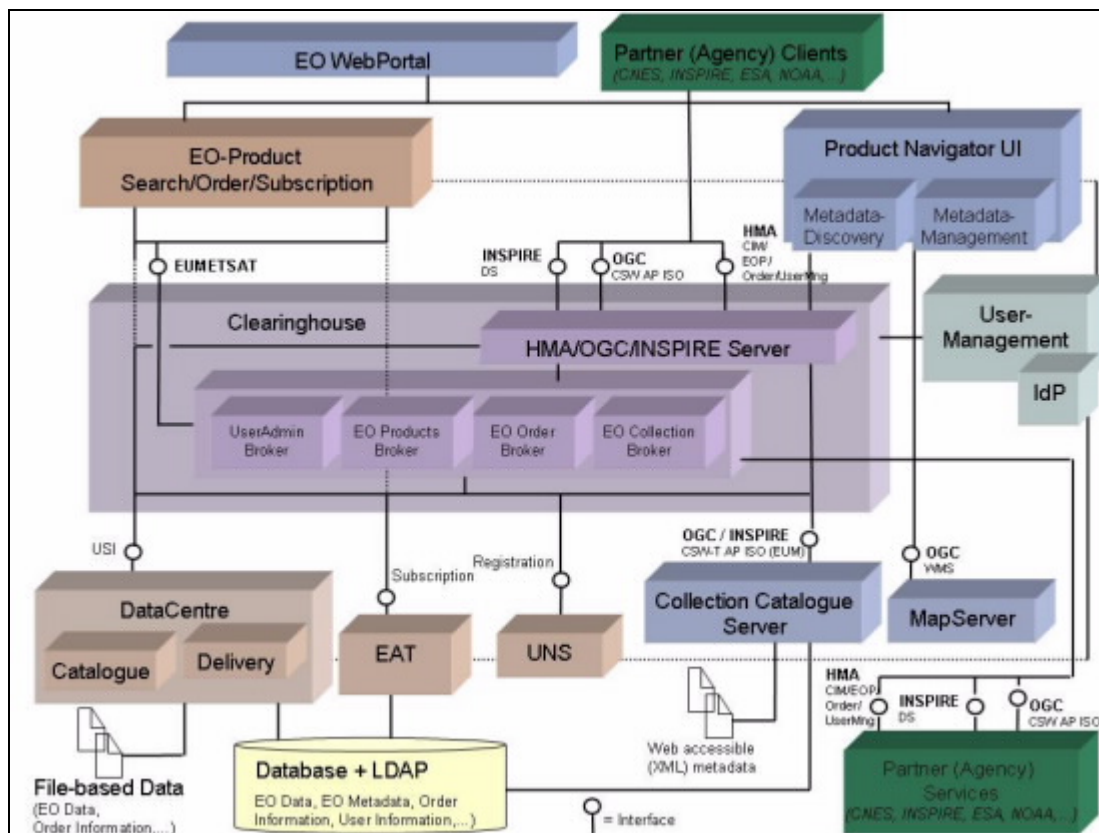

Figure 4: EO Portal & Clearinghouse System Architecture

EO metadata is provided and managed at 'Collection' and 'Product' level:
    EO Product: existent set of EO data, identifiable by values such as spatial and/or temporal extent and/or a specific band. Physically located within larger datasets
    EO Collection: whole set of EO Products sharing the same product specification

These metadata levels are reflected within the ESA HMA and WMO WIS projects.

The consolidation of the interoperability standards, (the GEO initiative for service oriented interoperability, the ESA HMA project development and the WMO WIS project), is ongoing at EUMETSAT with outstanding activities expected to be finalised during 2011.

3.2 User Management and the Clearinghouse

To facilitate inter-organisational user authentication, the Clearinghouse is fully integrated with the Security-/ User Management concept. Protected services are secured by WS-Security and expect SAML2 tokens. For the interaction with protected web services of other domains (e.g. partner companies) the Clearinghouse has to request security tokens from the EO-Portal User Management Security Token Service (STS). The advantage in using this approach is that each business entity maintains its own user accounts and there is no requirement for a global unique id.

3.3 EO Portal and the WMO WIS

The aim of the WMO Information System (WIS) is to create a single coordinated global infrastructure for the collection and sharing of information in support of all WMO and related international programmes. The structure of the WIS includes, National Centres (NC), Global Information System Centres (GISC), Data Collection and Production Centres (DCPC) and Data communication networks. Within the framework of the EUMETSAT EO Portal, EUMETSAT has developed interfaces which allow interaction with the GISC and the DCPC.

Through the pilot V-GISC project EUMETAT has developed an interface with the Offenbach GISC maintained by Deutscher Wetterdienst (DWD). The interface provides data collection harvesting which allows users of the GISC to search and discover EUMETSAT Product Navigator collection entries. In addition, through the WMO/WIS z39.50/SRU (Search and Retrieve by URL) interface users can query the Product Navigator in order to extract the metadata XML files.

In a further development, EUMETSAT is currently implementing a DCPC metadata ingestion interface. This interface will allow WIS NCs who provide data through EUMETSAT, e.g. via EUMETCast, with the mechanism to upload their product metadata to the EUMETSAT collection metadata catalogue, i.e. the Product Navigator, see Figure 5.
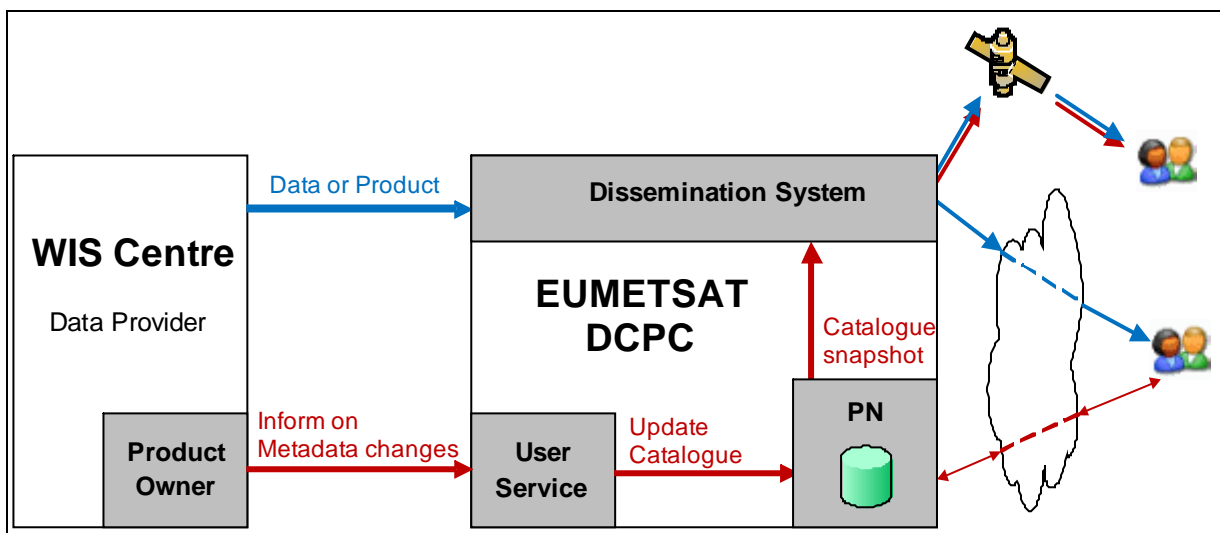

Figure 5: EUMETSAT NC-DCPC System Overview

3.4 EO Portal and ESA HMA

The ESA Heterogeneous Missions Accessibility (HMA) project main objective is to involve stakeholder, namely national space agencies, satellite or mission owners and operators, in a harmonisation and standardisation process of their ground segment services and related interfaces. The HMA project focused on the definition of 5 interfaces:

1. **Catalogue Service**, to browse and retrieve metadata on collections and products available across the HMA collaborating catalogues

2. **Ordering Service**, to order products identified in a catalogue

3. **Programming Service**, to place request for new acquisitions onto the HMA partner missions' ground segments (n/a to EUMETSAT)

4. **Mission Planning Service**, to facilitate programming requests preparation (n/a to EUMETSAT)

5. **Online Data Access Services**, to retrieve products from the online access archives offered through the HMA

Within the context of the EUMETSAT EO Portal, EUMETSAT has implemented an interface which allows collection harvesting of Product Navigator entries using the ESA Catalogue Service. In a further development, EUMETSAT is developing an interface to the ESA DIAL architecture which will allow users to order the EUMETSAT Data Centre products which have been discovered through the ESA Catalogue Service. Within the framework of GEOSS, EUMETSAT data can be discovered using the GEO FEDEO client which has been developed by ESA using the HMA standards. An example of FEDEO search result is provided in Figure 6.

Figure 6: EUMETSAT Data within the FEDEO Catalogue

3.5 Further Interoperable Enhancements

Future evolutions of the EO Portal could allow EUMETSAT users to discover, search, order/subscribe earth observation data from partner agencies. To achieve this, EUMETSAT would need to establish agreements with respective partners, these could include:

- CNES and CLS : for altimetry and oceanography products (in particular Jason products)
- NOAA : for all earth observation products
- ECMWF : for forecast data exchanges
- ESA : for ESA Envisat, ERS, Proba and Sentinel data

These agencies/partners may have different interoperability solutions for specific functionality, e.g. user management, which may require the implementation of specific adaptors on top of the generic services already implemented by EUMETSAT through its EO Portal.

4 EO PORTAL PILOT WEB MAP SERVICE

EUMETSAT is currently developing a pilot Web Map Service to facilitate open access to visualise EUMETSAT data sets using GIS technologies. The aim of the pilot is to:

- Access and visualize a selected set of EUMETSAT satellite products
- In contrast to the current Image Gallery on EUMETSAT's website, this application should provide standardized and service-based access to georeferenced image data while accounting for the temporal dimension of this data
- Assess the needs of the meteorological/climatologically user community for WMS on an operational basis

The pilot application is being developed by con terra on behalf of EUMETSAT. The application is using Web Map Service v. 1.3. It can generate animated map images with user-defined time periods. The prototype is being deployed at EUMETSAT and is configured to use a selection of GRIB, netCDF products which are converted into geoTiff format prior usage in the Web Map Service. The pilot service is expected to be launched towards the end of 2010.

5 CONCLUSIONS

With the fast evolution of technologies and demands to provide interoperable access of climate/meteorological data to different user communities/portals, organisations such as EUMETSAT have to enhance their services and access means towards today's standards.

Through the implementation of the Product Navigator and the EO Portal Registration, EUMETSAT has already achieved its goal to improve data discovery and data access for the EUMETSAT user community.

Experience from EUMETSAT shows that a significant amount of effort is needed to meet the interoperability goals. With the complexity of standards (e.g. OGC, ISO, INSPIRE, HMA) EUMETSAT has chosen to use the expertise of external companies to support the development activities. The introduction of new components towards an interoperable infrastructure is best achieved on a step-by-step basis and the prototyping of such components prior to introducing them into operational use is recommended.

The approach taken by EUMETSAT towards a harmonised/interoperable infrastructure will be continued in 2011. For this it is important that standards remain stable and partner organizations invest into an interoperable infrastructure so that an exchange of data can be achieved for the benefit of the end users.