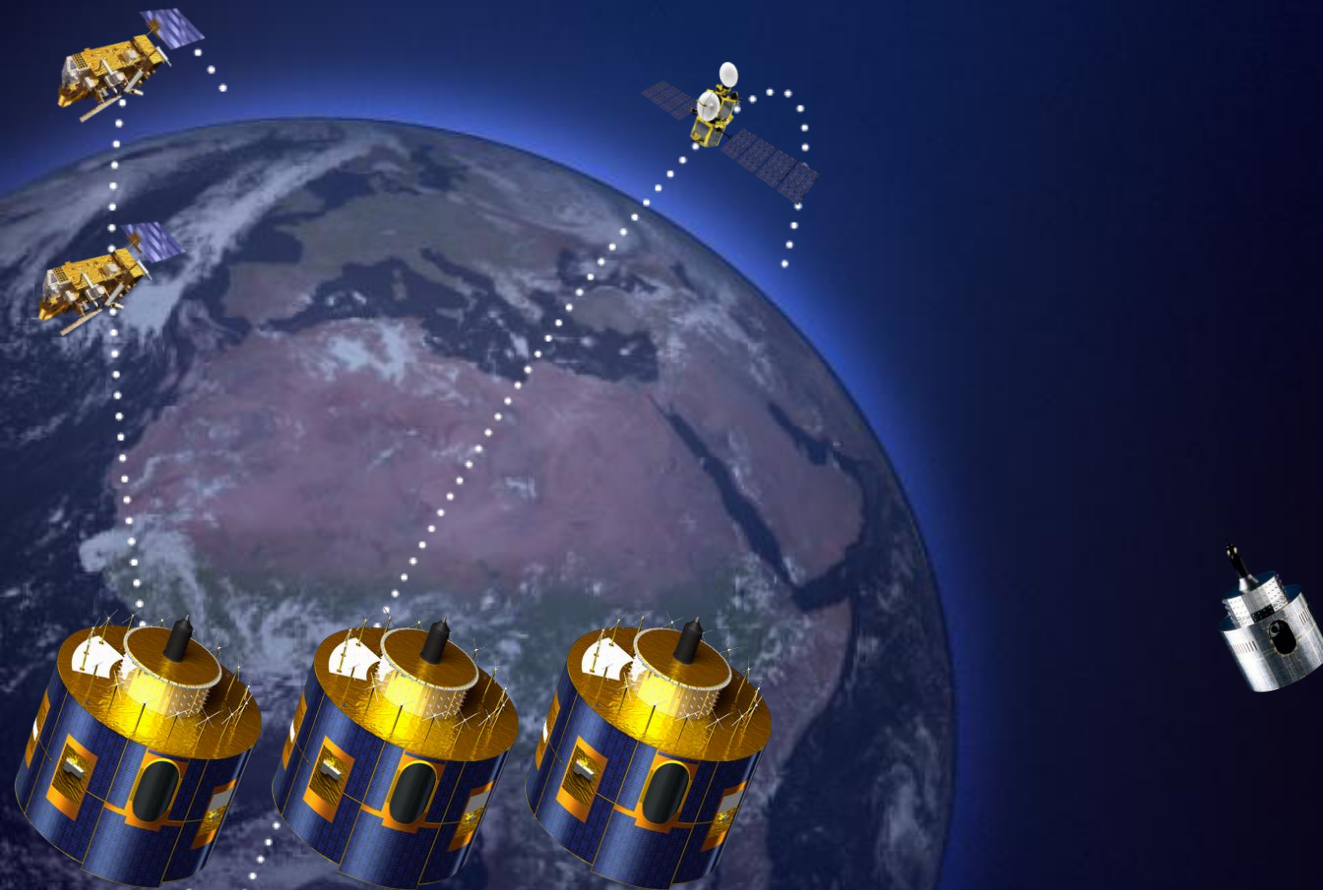


DATA ACCESS AT EUMETSAT



Copernicus Climate
Data Store Workshop
ECMWF
3-6 March 2015

Harald Rothfuss



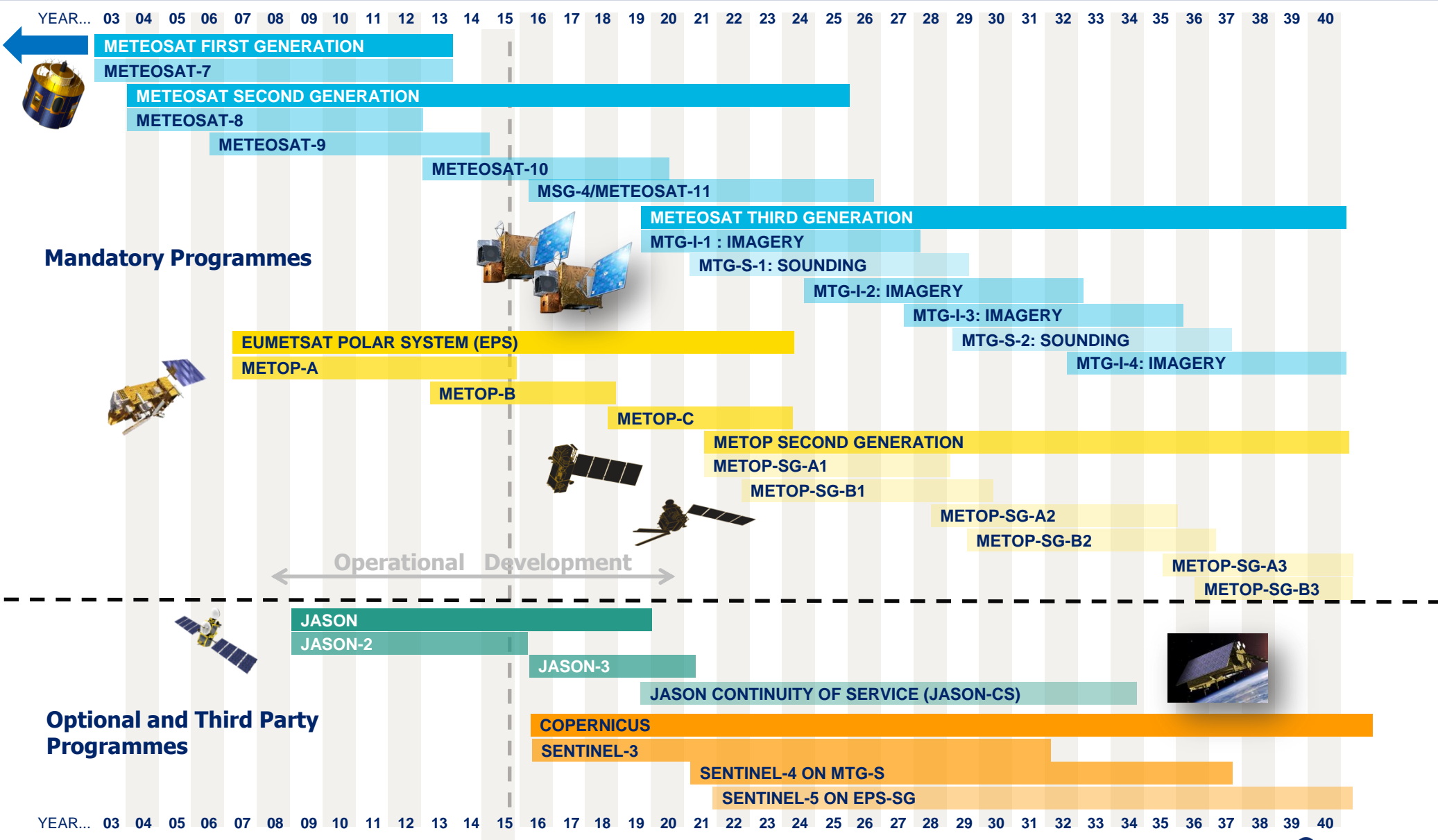
Overview of Presentation

- 1. Introduction to EUMETSAT**
- 2. EUMETSAT Data Access Principle**
- 3. Earth Observation Portal and provided services**
 - Interoperability with Partners**
 - Single sign-on – registration service**
 - Data Delivery Mechanisms**
- 4. Experience and Recommendations**

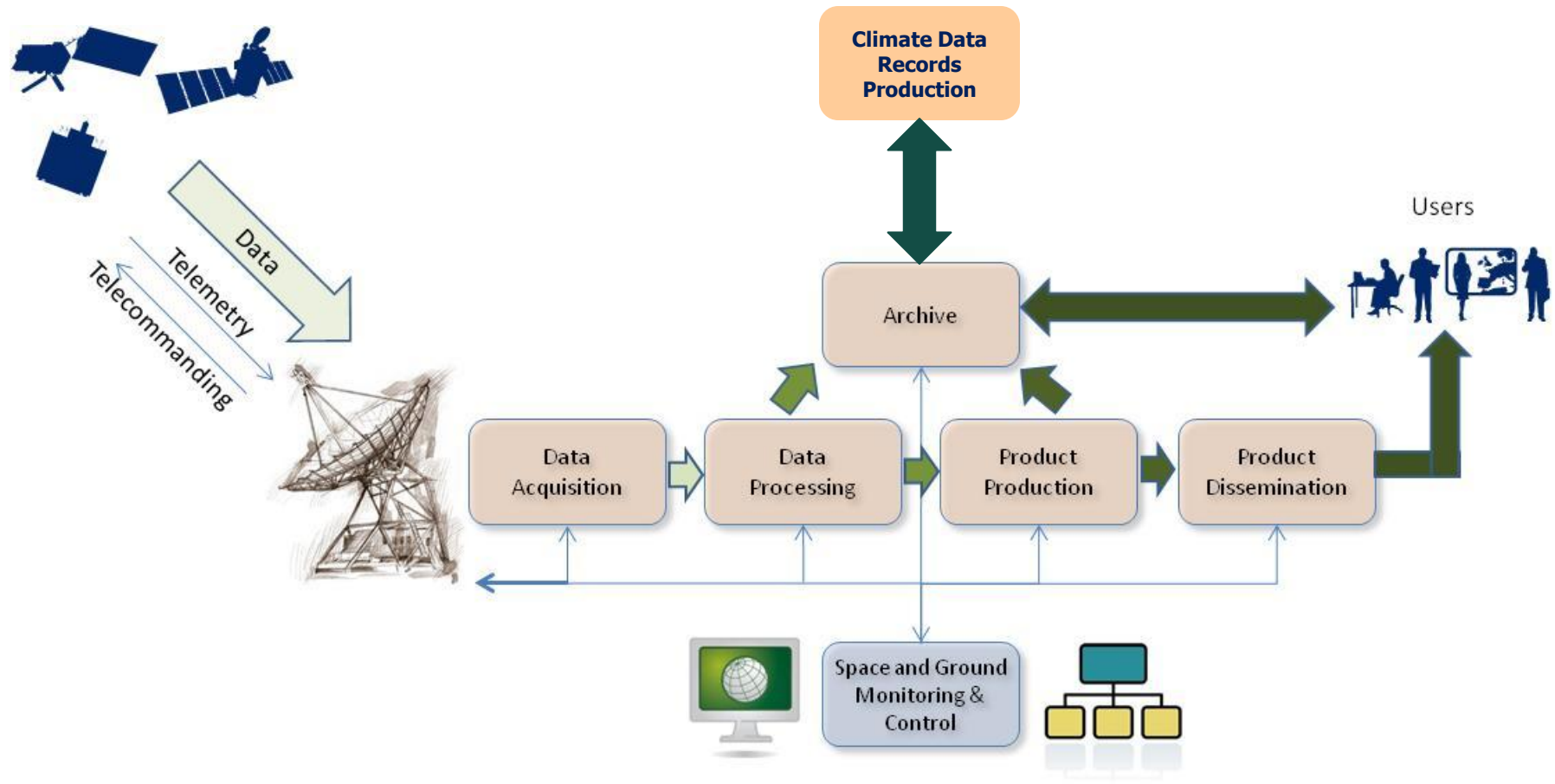
Introduction to EUMETSAT

- The primary objective is to establish, maintain and exploit European systems of operational meteorological satellites, taking into account as far as possible the recommendations of WMO
- ***A further objective is to contribute to the operational monitoring of the climate and the detection of global climatic changes***

Introduction to EUMETSAT - Programmes Overview

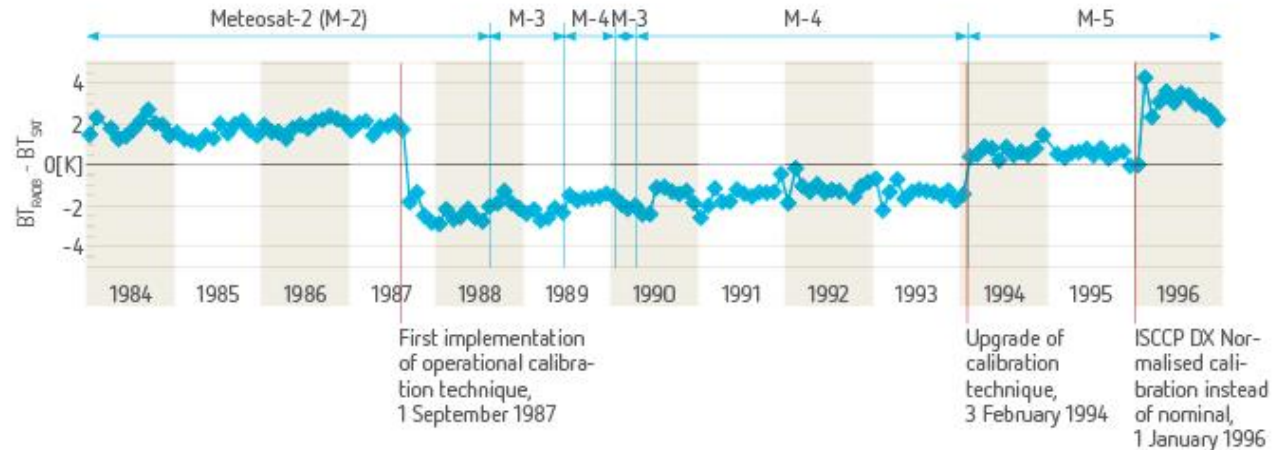


Satellite & overall system architecture



Scope of EUMETSAT Climate Monitoring Activities

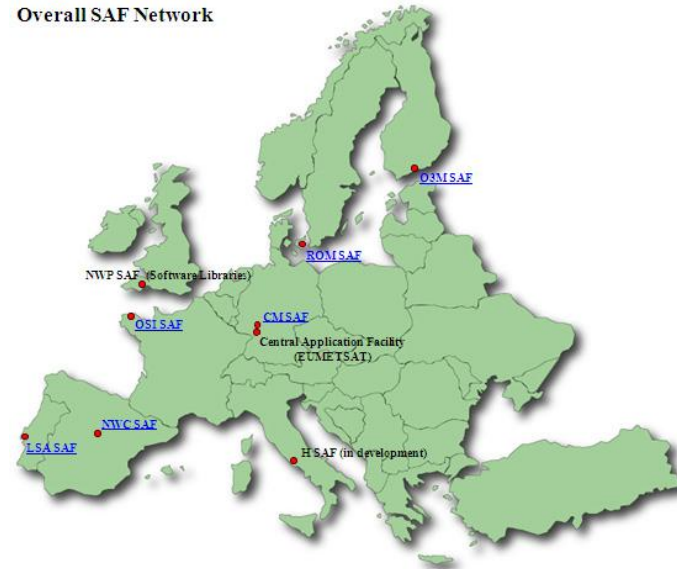
- Re-calibration and cross calibration of historical data;
- Production and scientific quality analysis of Fundamental Climate Data Records;
- Production and scientific quality analysis of Thematic Climate Data Records;
- Delivery to users/projects with comprehensive documentation;
- Support to European research projects (ERA-CLIM2, QA4ECV, FIDUCEO, GAIA-CLIM);
- Development of methods for maturity/quality/capacity assessment (CORE-CLIMAX, SCOPE-CM)
- International coordination: WMO, CEOS-CGMS, WCRP



Application Ground Segment of EUMETSAT



Overall SAF Network



Support to Nowcasting and Very Short Range Forecasting

Led by Agencia Estatal de Meteorologia Spain



Ocean and Sea Ice

Led by Meteo France



Climate Monitoring

Led by Deutscher Wetterdienst Germany



Numerical Weather Prediction

Led by Met Office (UK)



Land Surface Analysis

Led by Portuguese Meteorological Institute



Ozone and Atmospheric Chemistry Monitoring

Led by Finnish Meteorological Institute



Radio Occultation Meteorology (formerly GRAS SAF)

Led by Danish Meteorological Institute



Support to Operational Hydrology and Water Management

Led by Italian Meteorological Institute

Overview of Presentation

1. Introduction to EUMETSAT
- 2. EUMETSAT Data Access Principle**
3. Earth Observation Portal and provided services
 - Interoperability with Partners
 - Single sign-on – registration service
 - Data Delivery Mechanisms
4. Experience and Recommendations

EUMETSAT Data Access Principle

- **EUMETSAT aims to promote the availability and use of near real-time and archived data for a wider global user community**
- **This is achieved through the provision of:**
 - **an online catalogue using interoperable standards**
 - **a single entry point for service registration**
 - **freely available web imagery**
 - **delivery mechanisms using commercially available reception station equipment**
 - **the use of agreed standard data formats (WMO standards & community-specific de-facto standards)**
 - **Persistent Identifiers (DOI) for Climate Data Records**
- **Use of international standards in data discovery and access allows for easier data exchange with other satellite operators and data providers**

Overview of Presentation

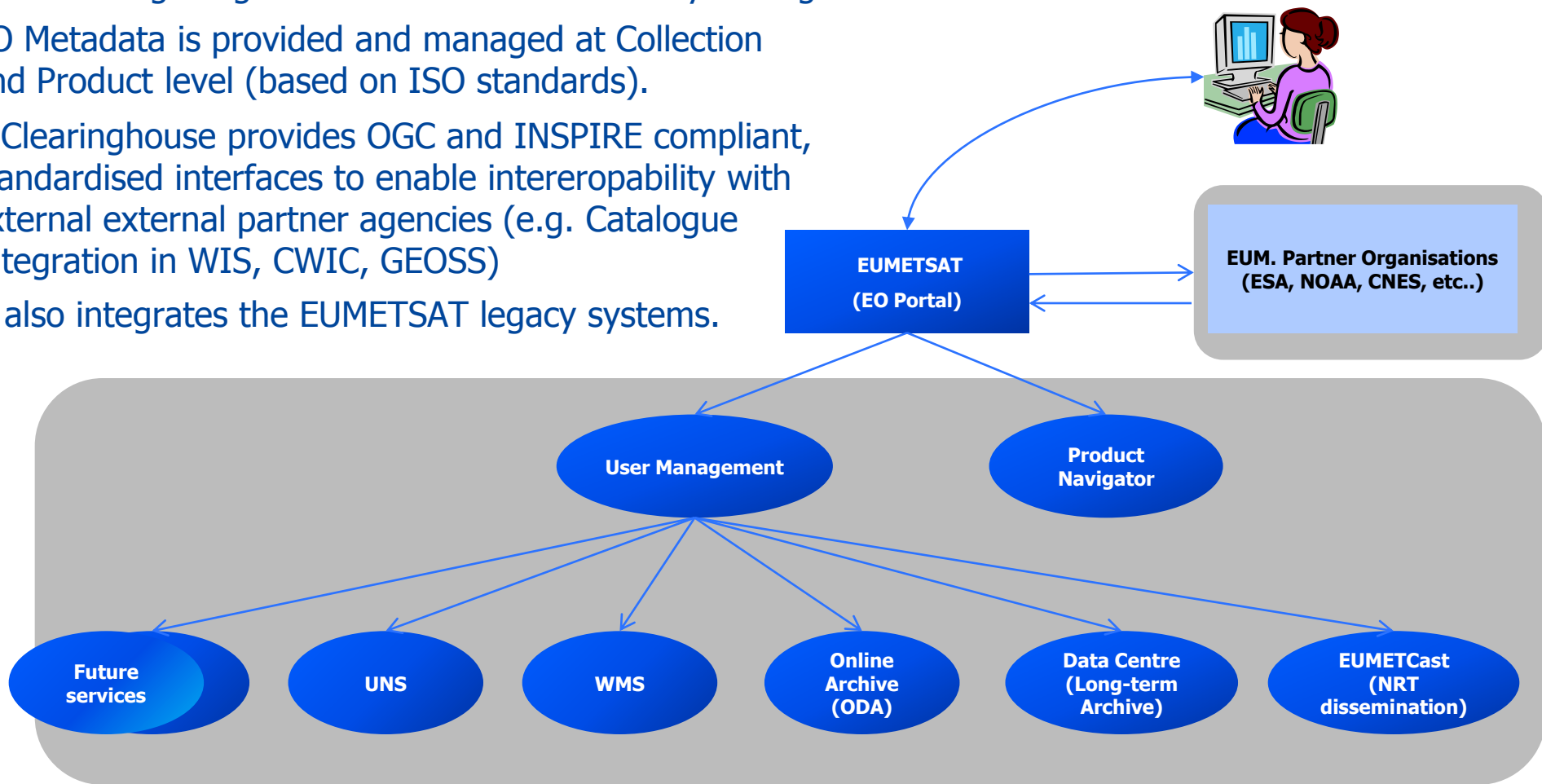
1. Introduction to EUMETSAT
2. EUMETSAT Data Access Principle
- 3. Earth Observation Portal and provided services**
 - **Interoperability with Partners**
 - **Single sign-on – registration service**
 - **Data Delivery Mechanisms**
4. Experience and Recommendations

EO-Portal Interoperability

The EO Portal allows **Discovery, Search and Ordering** of EUMETSAT's own Missions data/products as well as these from Partners Organisation (ESA, NOAA, CNES, etc.)

- It offers Single Sign on and a federated Identity Management.
- EO Metadata is provided and managed at Collection and Product level (based on ISO standards).
- A Clearinghouse provides OGC and INSPIRE compliant, standardised interfaces to enable interoperability with external external partner agencies (e.g. Catalogue Integration in WIS, CWIC, GEOSS)

It also integrates the EUMETSAT legacy systems.



Clearinghouse – Overview of implemented Standards

Supported OGC/ESA/HMA, WMO, INSPIRE Standards:

- **OGC 07-006r1, OpenGIS Catalogue Service 2.0.2, supporting the Dublin Core based information model**
- **OGC 07-045, OpenGIS Catalogue Service 2.0.2 – ISO Metadata Application Profile 1.0**
- **OGC 07-038, OGC Cataloguing of ISO Metadata (CIM) using the ebRIM profile of CS-W**
- **OGC 06-131, EO Products Extension Package for ebRIM Profile of CSW 2.0**
- **OGC 06-080, GML Application Schema for EO Products**
- **OGC 06-141, Ordering Services for Earth Observation Products**
- **OGC 03-109r1, OGC Web Map Service 1.3.0**
- **OGC 07-063r1 OpenGIS WMS EO Application Profile (partial)**
- **OGC 07-118, OGC/HMA User Management [OGC 07-118]**
- **INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119 1.2 (full implementation with PN 2.0)**
- **INSPIRE DS: Technical Guidance to implement INSPIRE Discovery Services (full implementation with PN 2.0)**
- **WMO/WIS z39.50/SRU ISO19115**
- **EO Portal SOAP WS-S**
- **SAML 2.0 ECP Profile with SOAP Binding**
- **SAML 2.0 Web Browser SSO Profile with HTTP Redirect/Post Binding**

EOP – User Registration and Single Sign On

After Creating an EOP Account, users can login to the EOP to:

- **Modify service subscriptions (e.g. Add EUMETCast service)**
- **Order archived data from the Data Centre and view existing order status**
- **View data access *licensing arrangements***
- **Access User Notification Service (UNS) subscriptions (new feature to be implemented in 2015)**

- A subset of the data provided by EUMETSAT is subject to licensing terms and conditions, in accordance with EUMETSAT Data Policy.
- The licensing process is part of the registration process. During the registration process, users are prompted to submit license relevant information.

Product Navigator – Data discovery at your fingertips

PRODUCT NAVIGATOR

SEARCH

- SIMPLE SEARCH
- EXTENDED SEARCH
- BROWSE BY THEME
- SETTINGS
- HELP
- FEEDBACK
- RESET

Dataset

High Rate SEVIRI Level 1.5 Image Data - MSG - 0 degree

Rectified (level 1.5) Meteosat SEVIRI image data. The data is transmitted as High Rate transmissions in 12 spectral channels. Level 1.5 image data corresponds to the geolocated and radiometrically pre-processed image data, ready for further processing, ...

Description | **Categorisation** | Distribution | Metadata

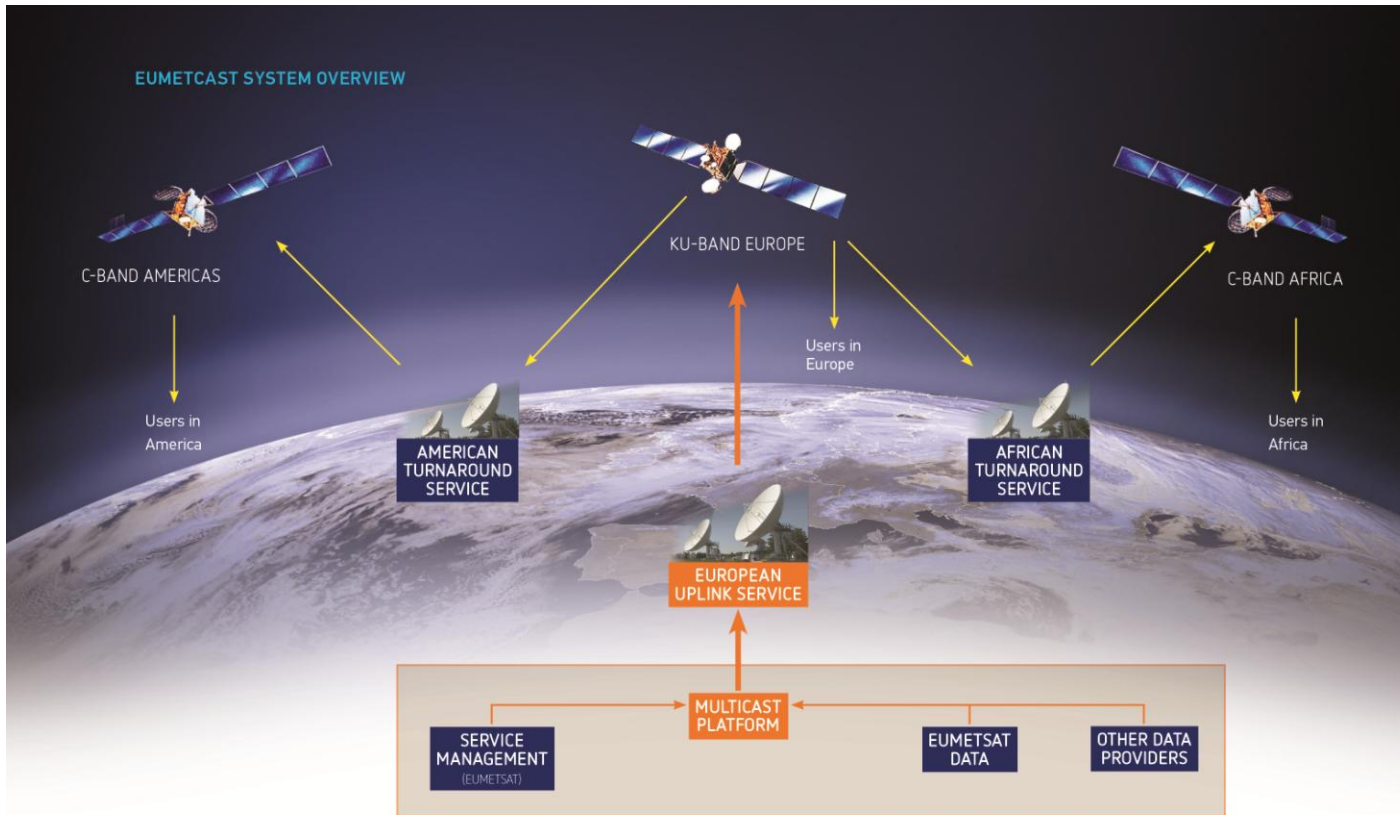
Collection Reference:	EO:EUM:DAT:MSG:HRSEVIRI	
Collection Name:	High Rate SEVIRI Level 1.5 Image Data - MSG - 0 degree	
Acronym:	HRSEVIRI, MSG15	
Description:	Rectified (level 1.5) Meteosat SEVIRI image data. The data is transmitted as High Rate transmissions in 12 spectral channels. Level 1.5 image data corresponds to the geolocated and radiometrically pre-processed image data, ready for further processing, e.g. the extraction of meteorological products. Any spacecraft specific effects have been removed, and in particular, linearisation and equalisation of the image radiometry has been performed for all SEVIRI channels. The on-board blackbody data has been processed. Both radiometric and geometric quality control information is included.	
Product Status:	Operational	
Date:	creation:	2009-03-23
	revision:	2010-09-21

Key Features:

- Provides metadata descriptions, data provider and data access information.
- Includes all EUMETSAT products and third-party products distributed on EUMETCast and from the Archive.
- Uses open standards (e.g. OGC, Inspire) for catalogue interoperability with other organisations.

<http://navigator.eumetsat.int>

EUMETCast Data Delivery



Service Status Dec 2014:

- 40 Data Providers
- 330 Different Data Collections
- 4251 user stations world-wide

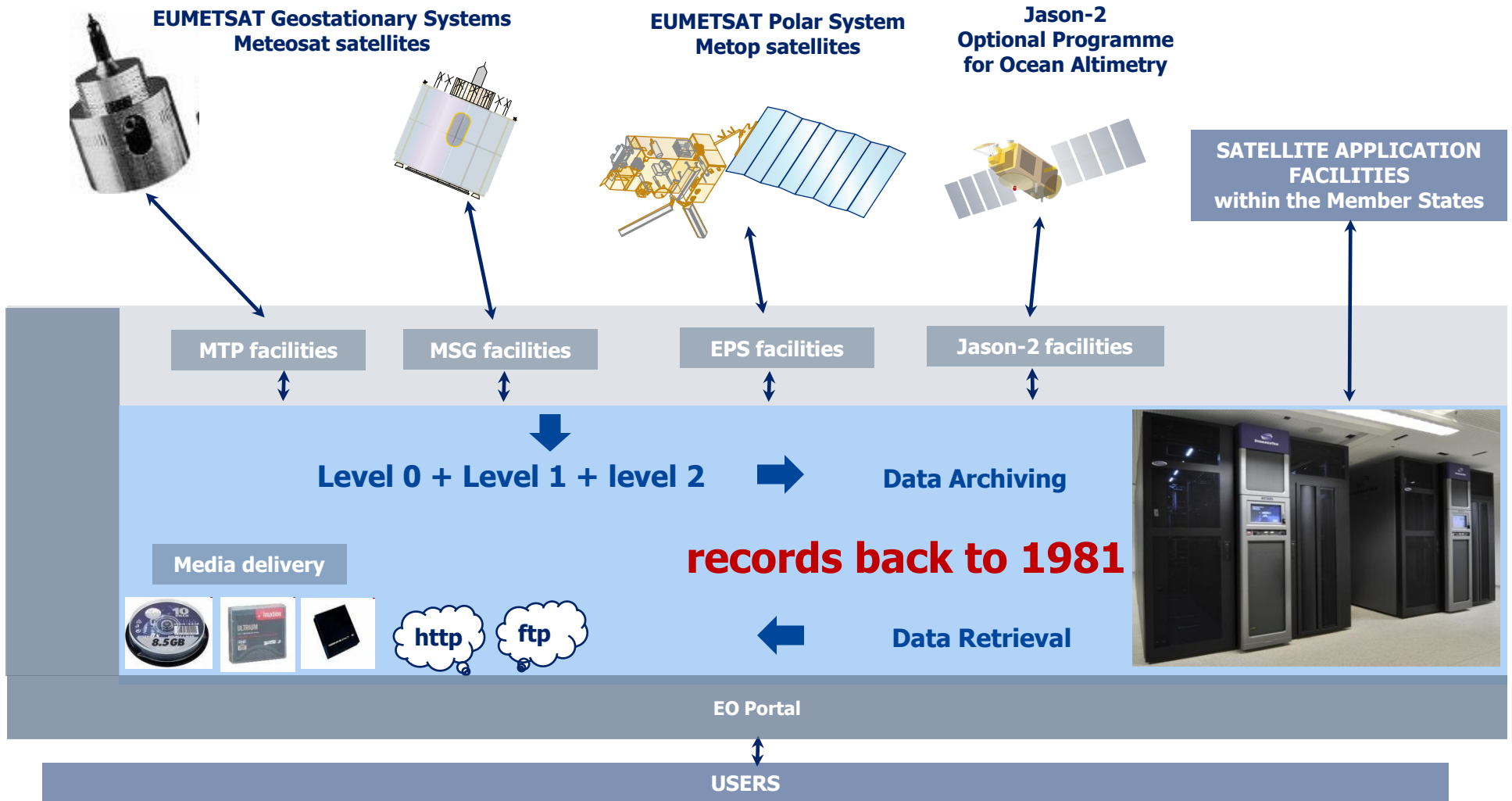
Bandwidth Status Dec 2014:

- 22.5 Mbps EUMETCast-Europe
- 2.6 Mbps EUMETCast-Africa
- 1.8 Mbps EUMETCast-Americas

Key Features:

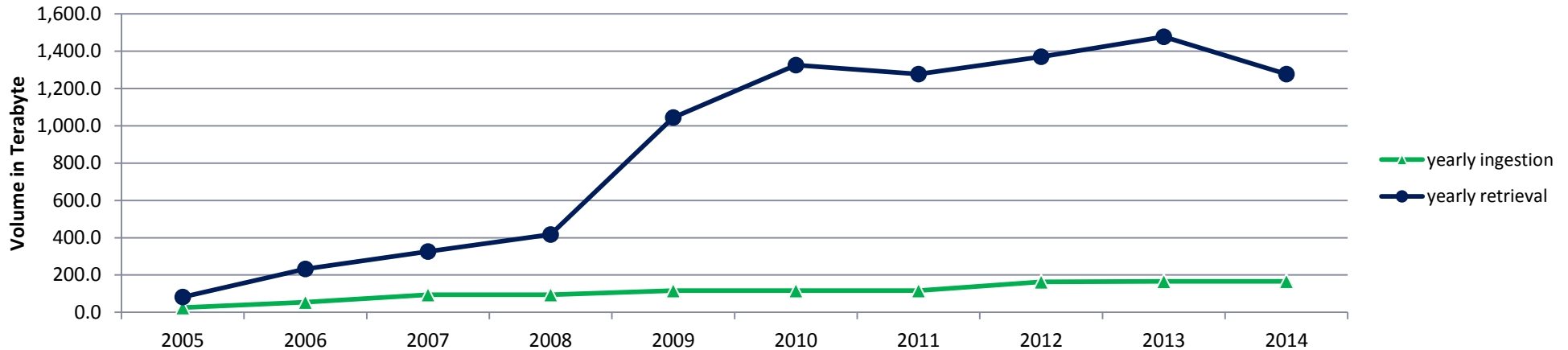
- **Off-the-shelf, commercially available DVB reception components**
- **One-stop-shop: many data streams via one station**
- **Secure delivery: multicast to a specific user, or group of users**
- **Handling many file formats, high and low volume data and supporting high-timeliness delivery requirements**
- **Worldwide coverage through GEONETCast partnership**

EUMETSAT Data Centre – Long Term Archive



EUMETSAT Long Term Archive

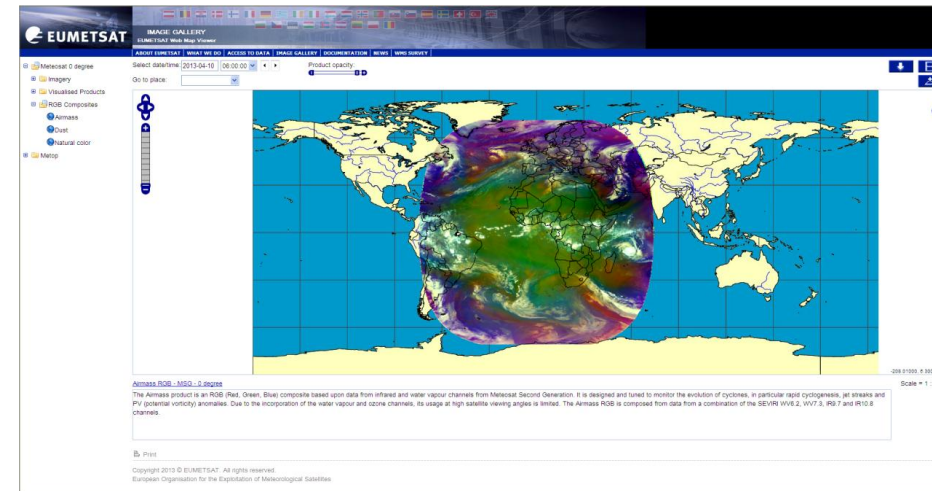
EUMETSAT Data Centre



- Ordering is free of charge and available 24 hours after sensing
 - All EUMETSAT Satellite data including Climate Data Records (CDR)
 - > 1 Petabyte in the archive
 - Long-Term Data Preservation in practice since 1995;
 - Disaster resilient - 3rd Copy
 - Ordering post-processing options
 - Band-subsetting
 - Region of Interest Selection
 - Delivery format selection
- => reduce delivery vol. by a factor 4
- NetCDF CF format available for most ordered data and CDR's

EO-Portal & WMS integration

- A pilot for a new service to visualise EUMETSAT satellite data will be launched end of Q1 2015.
- The service makes use of the OGC Web Map Service (WMS) specification, which allows users to see satellite imagery in a standard, interoperable way.
- Key features of the WMS
 - Provides a simple view of EUMETSAT's satellite products
 - Allows easy regional selection, overlay of products on World Map background
 - Imagery available in various formats
 - OGC standards allow for easy exchange of imagery between web map viewer providers
- This new service is intended to replace the existing web imagery service, featuring a selection of Meteosat and Metop imagery, RGB composites and other visualised products.



EO-Portal & New User Notification Service (UNS 2.0)

How it will look like:

Ann Nr	Rev	Seq Nr	Type	Start Time	End Time	Orbits	Subject	Satellites	Subsystem	Component	Impact	Status
730	1		Planned Maintenance	01/07/2014 02...	01/07/2014 02...		in-plane-manoeuvre	[Suomi NPP]			data interrupted	
729	1		Service Alert	02/06/2014 14...	02/06/2014 19...		ground-segment-an...	[Aqua,Terra]			data interrupted	
728	1		Service Alert	02/06/2014 14...	02/06/2014 20...		ground-segment-an...	[]			data interrupted	
727	1		Service Alert	02/06/2014 13...	02/06/2014 16...		ground-segment-an...	[Suomi NPP]			data interrupted	
726	1		Service Alert	02/06/2014 14...	02/06/2014 18...		ground-segment-an...	[Metop-A, Metop-B, N...			data interrupted	
725	1		Service Alert	02/06/2014 14...	02/06/2014 18...		ground-segment-an...	[Metop-B]			data interrupted	
724	1		Service Alert	02/06/2014 13...	02/06/2014 17...		ground-segment-an...	[Metop-A]			data interrupted	
723	1		Service Alert	02/06/2014 14...	02/06/2014 19...		ground-segment-an...	[Metop-A, Metop-B, N...			data interrupted	
722	1		Planned Maintenance	18/06/2014 16...	18/06/2014 20...		ground-segment-ma...	[Suomi NPP]			data interrupted	
721	1		Planned Maintenance	17/06/2014 16...	17/06/2014 20...		ground-segment-ma...	[Suomi NPP]			data interrupted	
720	1		Planned Maintenance	16/06/2014 17...	16/06/2014 21...		ground-segment-ma...	[Suomi NPP]			data interrupted	
719	1		Planned Maintenance	09/06/2014 14...	09/06/2014 14...		general-announcem...	[Suomi NPP]			data interrupted	
718	1		Planned Maintenance	11/06/2014 10...	11/06/2014 12...		ground-segment-ma...	[MET-9]			data interrupted	
717	1		Planned Maintenance	11/06/2014 10...	11/06/2014 12...		ground-segment-ma...	[MET-10]			data interrupted	
716	1		Service/Product Enh...	17/06/2014 02...	17/06/2014 02...		new-product	[Metop-B]			data interrupted	
715	1		Service/Product Enh...	19/06/2014 02...	18/07/2014 02...		service-change	[]			data interrupted	
714	1		Planned Maintenance	06/06/2014 06...	06/06/2014 06...		general-announcem...	[NOAA-16]			data interrupted	
713	1		Service/Product Enh...	16/06/2014 02...	16/06/2014 02...		new-service	[Metop-B]			data interrupted	

Ann Nr	Rev	Seq Nr	Type	Start Time	End Time	Orbits	Subject	Satellites	Subsystem	Component	Impact	Status
717	1		Planned Maintenance	11/06/2014 10:00	11/06/2014 12:00		ground-segment-maintenance	[MET-10]			data interrupted	

Text:	Essential ground segment maintenance. During this maintenance period there is a risk of interruption to the 0-degree service.
Op Service Groups:	Meteosat Services
Op Service:	0° Service
Product Group:	0° Meteosat Meteorological Products, 0° SEVIRI Level 1.5 Image Data
Issue Time:	13/06/2014 14:01

Product Name	Meteosat Services
	0° Service
	0° Meteosat Meteorological Products
	0° SEVIRI Level 1.5 Image Data

- The new UNS web interface will allow users to easily search/filter and display all types of announcements related to operational satellite services.

Color code used to identify the announcement type:

- Planned Maintenance
- Service Alert
- Service/Product Enhancement

- User registration via the EOP for UNS email messages
- Planned availability: Q2 2015

Overview of Presentation

1. Introduction to EUMETSAT
2. EUMETSAT Data Access Principle
3. Earth Observation Portal and provided services
 - Interoperability with Partners
 - Single sign-on – registration service
 - Data Delivery Mechanisms
4. Experience and Recommendations

Experience and recommendations (I)

- **Data usability: Users generally exhibit a broad range of experience and knowledge on products and services on offer. The provision of related product information on e.g. applicability, limitations etc. is important.**
- **User grouping – e.g. by function or by access characteristics – allows prioritisation and optimal use of available resources (e.g. a flexible user quota system on data access).**
- **Introducing and applying relevant standards where possible is essential for interoperable access and distributed data holdings.**

Examples in EUMETSAT:

- **Various Metadata and Interoperability standards applied to discover, search and order data;**
- **NetCDF format following the Climate and Forecast (CF) conventions has been introduced as a delivery format from the Archive across existing missions and will also be used by future missions and for the generated Climate Data Records;**

Experience and recommendations (II)

- **Easy access to data – starting with product discovery – is key but often not easily provided.**

Current activities at EUMETSAT to further improve:

- **Provision of a Data Centre web interface, light weight ordering client;**
- **Enhance user search experience with the Product Navigator by more user friendly GUI with faceted search option and better matching of search results;**
- **Introduction of Persistent Identifiers (DOI) for improved access and citation of Climate Data Records;**

- **Existing data tailoring options at EUMETSAT – such as spatial and spectral subsetting on ordering – are well accepted.**

Exponentially increasing data volumes require a stronger information centric approach to reduce data delivery, e.g. via:

- **Improved visualisation of data and CDR's**
- **Data filtering**
- **Hosted processing**

Links

- **EUMETSAT:** <http://www.eumetsat.int>
- **Helpdesk:** ops@eumetsat.int
- **Overview of Products and Formats:**
<http://www.eumetsat.int/website/home/Data/Products/index.html>
- **EO Portal:** <http://eoportal.eumetsat.int/>
- **Product Navigator:** <http://navigator.eumetsat.int/>
- **EUMETCast:**
<http://www.eumetsat.int/website/home/Data/DataDelivery/EUMETCast/index.html>
- **Data Centre:**
<http://www.eumetsat.int/website/home/Data/DataDelivery/EUMETSATDataCentre/index.html>

Thank you