



Evolution of the EUMETSAT Network of Satellite Application Facilities (SAF)



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Outline

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- Objectives
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- SAF Network Deployment and Status
- Short Introduction to the individual SAFs
- Development and Service Model
- Interaction with the SAF users
- Outlook
- Summary

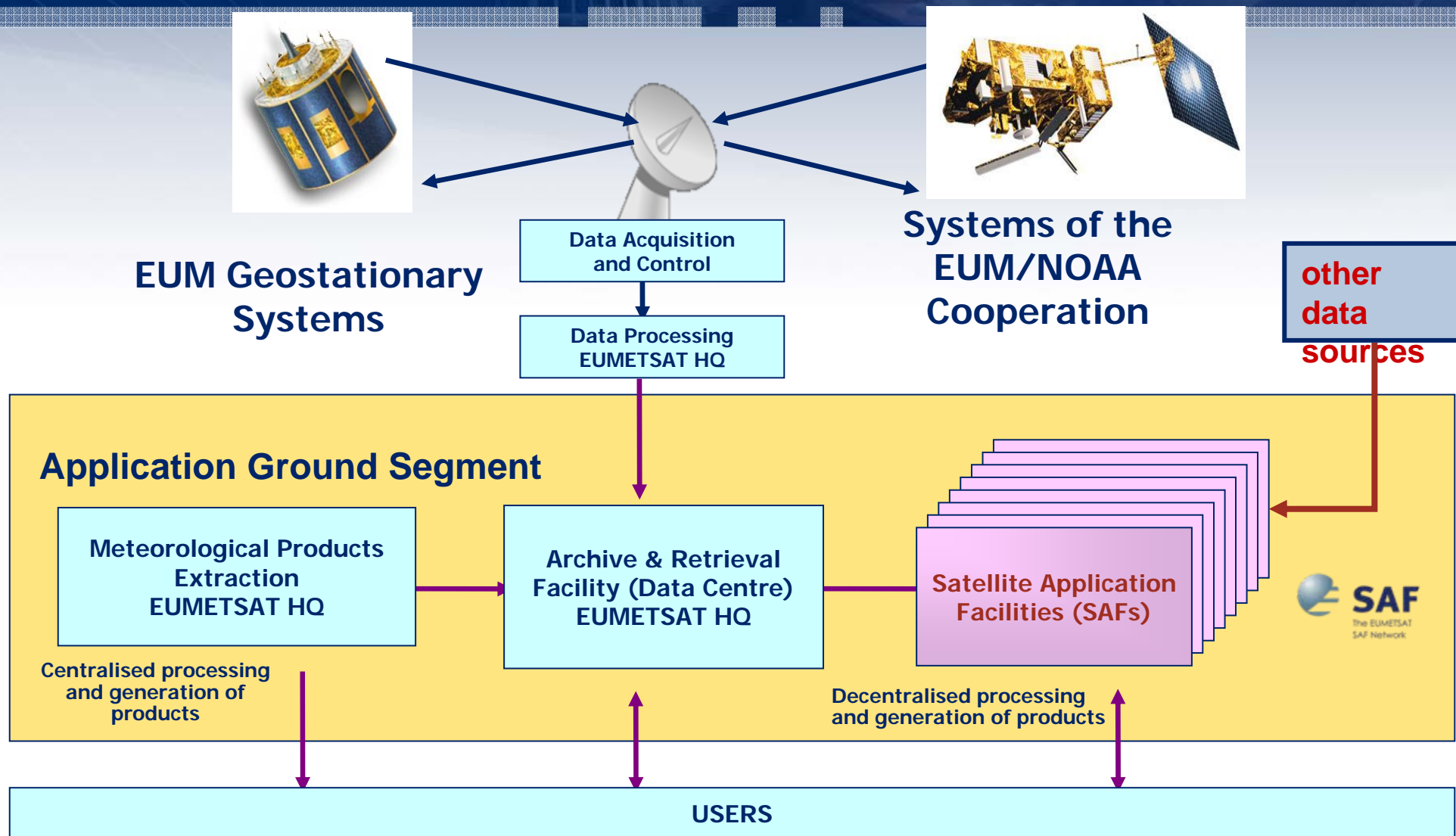
The SAF Concept



- In 1992 EUMETSAT adopted the concept of a Distributed Application Ground Segment including:
 - *the EUMETSAT Central Facilities in Darmstadt*
 - *and a network of elements known as **Satellite Application Facilities (SAF)**, as specialised development and processing centres.*
- SAFs utilise the **specific expertise** available in EUMETSAT's Member and Cooperating States.
- The SAF network **complements** the production of standard meteorological products derived from satellite data at the central facilities in Darmstadt and also distributes user software packages.
- SAFs are developed by **consortia** of organisations from the EUMETSAT Member States and Cooperating States, and are located at the National Meteorological Services in Member States.















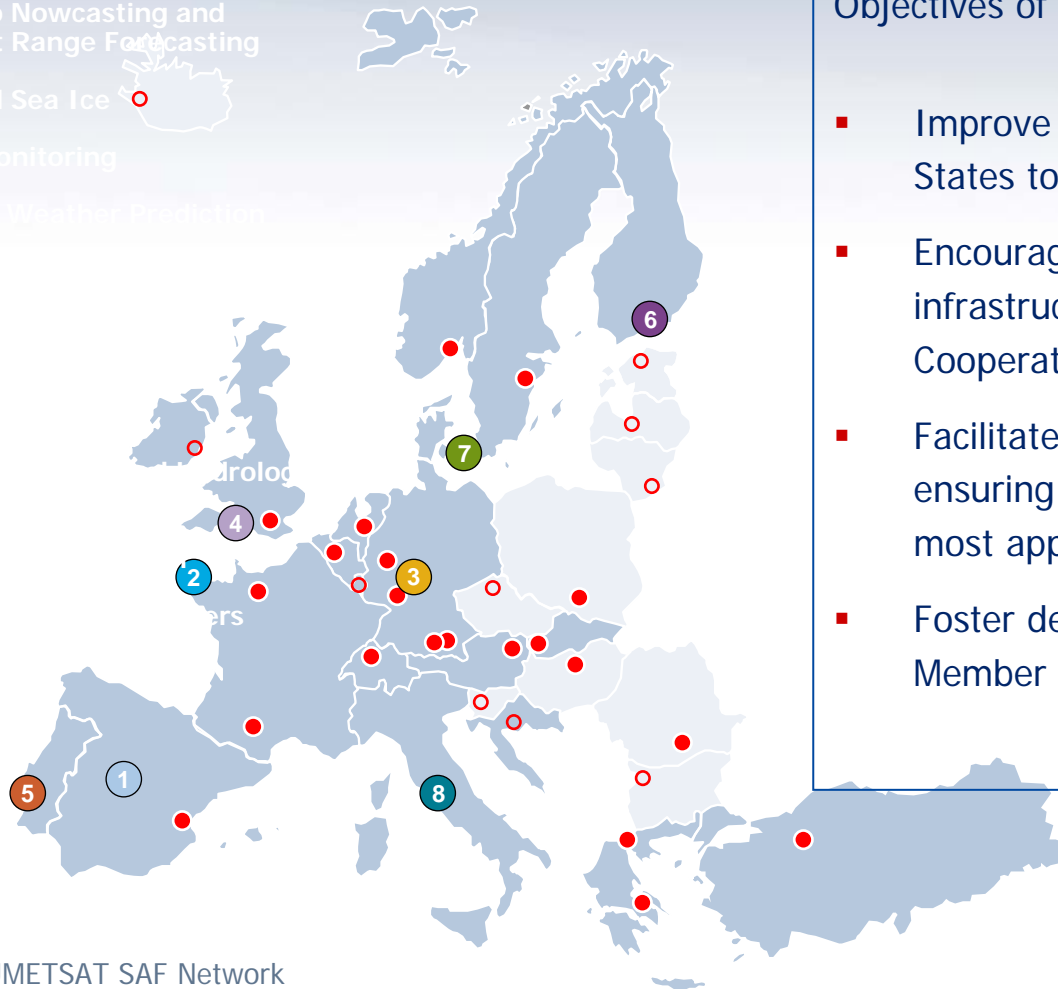
The EUMETSAT Application Ground Segment





Objectives

-  Member State
-  Cooperating State
-  Support to Nowcasting and Very Short Range Forecasting
-  Ocean and Sea Ice
-  Climate Monitoring
-  Numerical Weather Prediction
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- ### Objectives of the SAF Network
- Improve the ability of EUMETSAT's Member States to exploit satellite data;
 - Encourage the utilisation of existing skills and infrastructure in Member States and Cooperating States;
 - Facilitate cost-effective exploitation by ensuring that services are distributed in the most appropriate way;
 - Foster development of cooperation with non-Member States and other organisations.

Benefits

- Improved information for land use, ecology, disaster monitoring and agricultural forecasting
- Benefits for sea transport, fishing and offshore industries
- Improved data for input to Numerical Weather Prediction
- Availability of user software packages for operational applications
- Improvements to short range forecasting of severe weather hazards
- Benefits to aviation, agriculture, construction, gas, water and electricity industries
- Better understanding of causes and effects of pollution of the upper atmosphere and the depletion of ozone
- Early warning of hazards (precise details for evacuation and alerting of emergency authorities)
- Enhanced data for climate monitoring

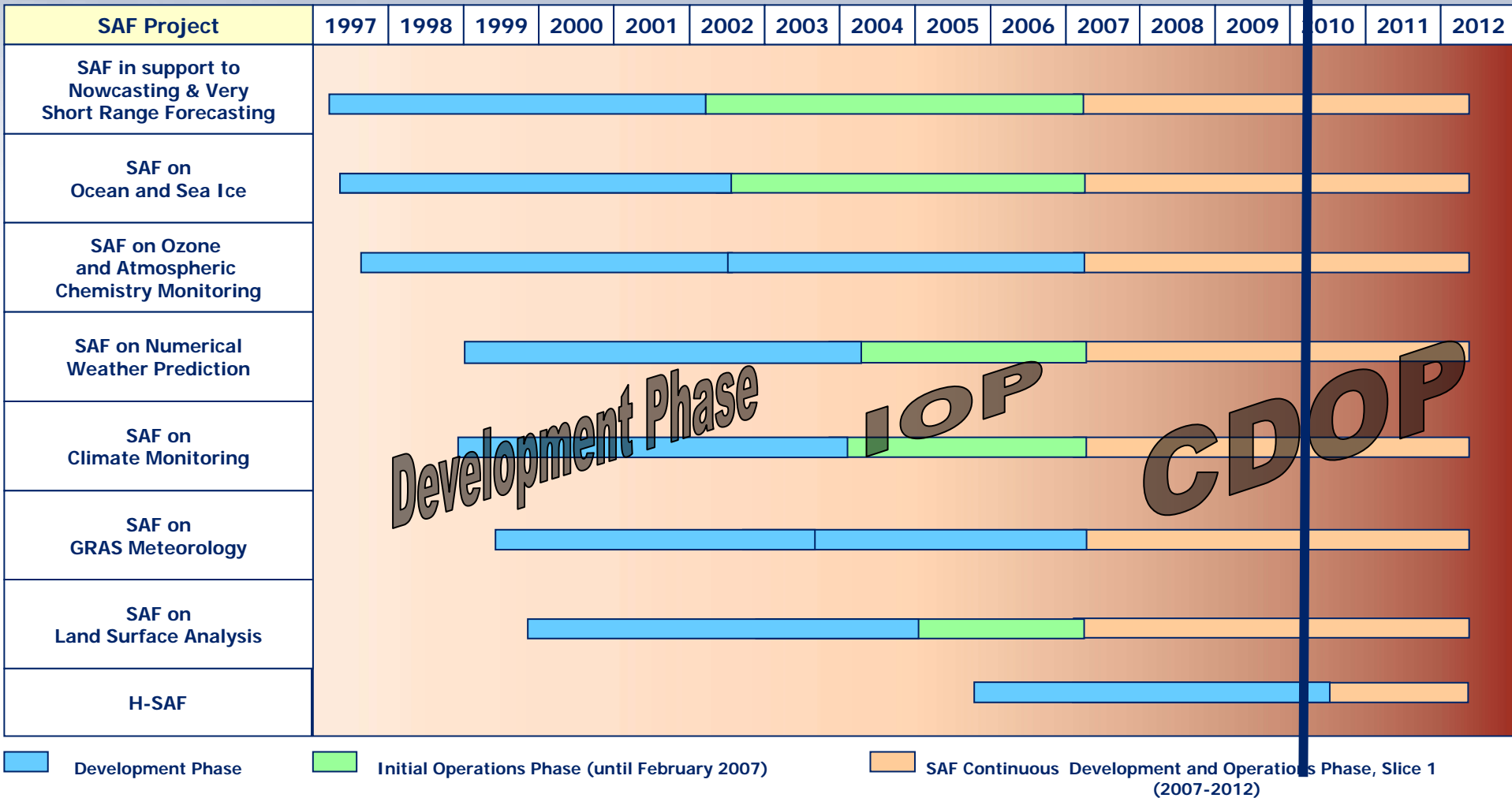




The SAF Network Deployment

- Seven SAF projects were approved, related Cooperation Agreements established, and development activities initiated in the period 1997-1999.
- The first 7 SAFs incrementally initiated operational activities, using first MSG data and then Metop (EPS) Data.
- An 8th SAF theme on support to Operational Hydrology and Water Management (H-SAF) was approved by the EUMETSAT Council in November 2002, thus creating a new SAF opportunity.
- An H-SAF Project started in September 2005, following approval by EUMETSAT Council of the proposal prepared under coordination of the Italian Meteorological Service.

Status

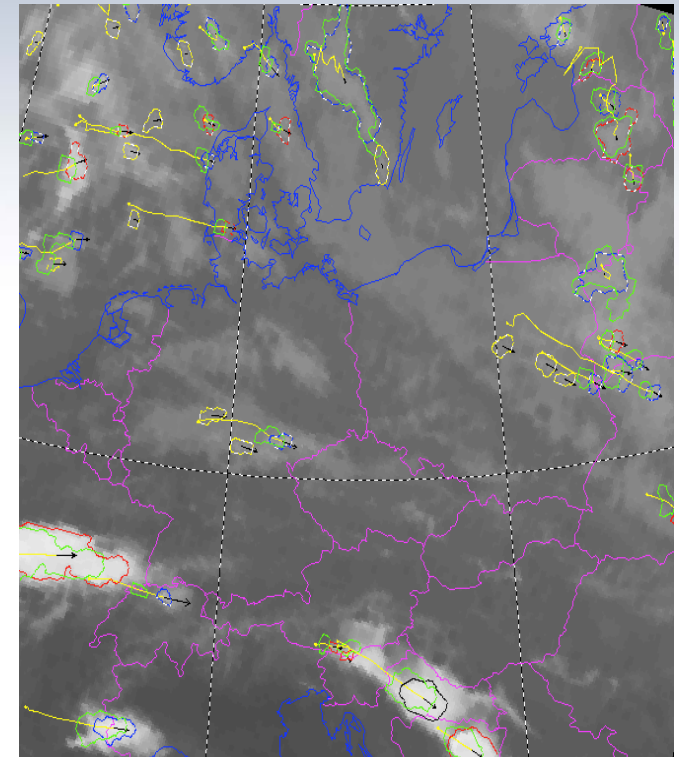


Nowcasting SAF



“Support to Nowcasting and Very Short Range Forecasting” (NWC SAF)

- established to utilise the new data from MSG and the polar platforms (Metop and NOAA) for enhancing Nowcasting
- Development of Software packages for the operational extraction of products relevant to Nowcasting and for local installation
- Leading Entity is the Spanish Meteorological Agency AEMET in Madrid
- NWC SAF is in its Continuous Development and Operations Phase (CDOP) since March 2007
- First official software versions released in October 2004

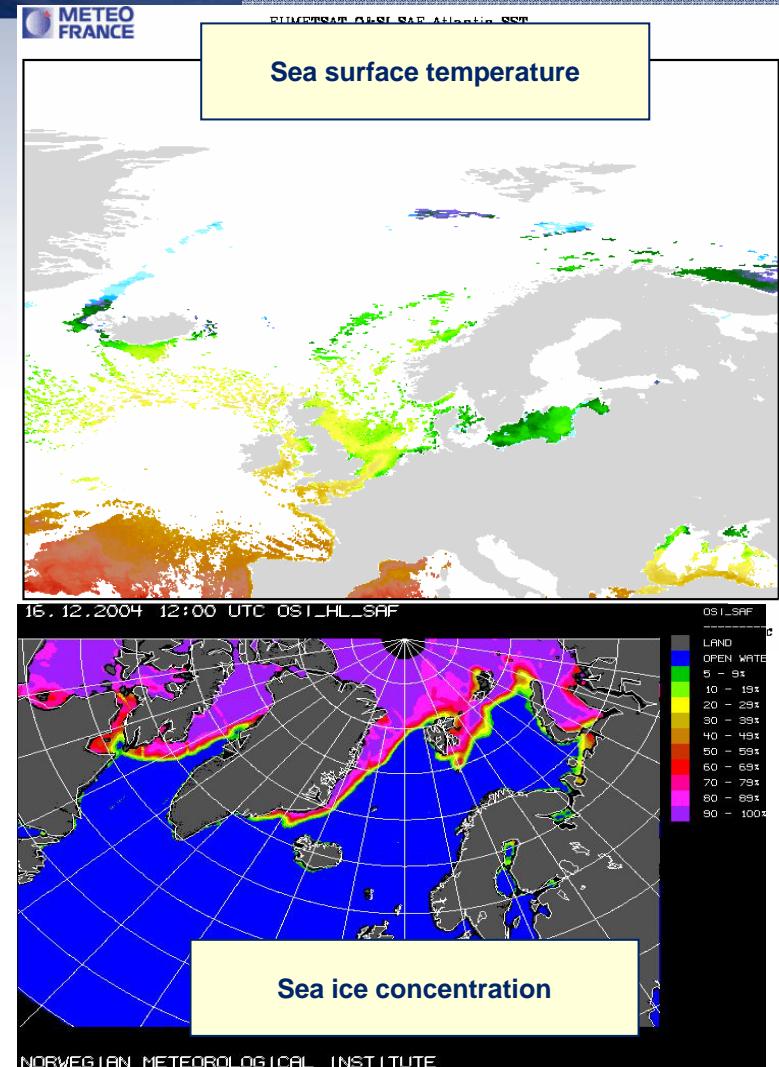


Rapidly developing Thunderstorm Product

Ocean and Sea Ice SAF



- Ocean and Sea Ice (OSI) SAF routinely produces and disseminates products characterising the ocean surface and the energy fluxes across the sea surface
- Operationally produces information on the sea ice characteristics (extent, concentration, ...)
- Leading Entity is Météo-France in Lannion
- OSI SAF distributes near real-time products based on NOAA, MSG, Metop, SeaWinds, DMSP and GOES data
- OSI SAF is in its Continuous Development and Operations Phase (CDOP) since March 2007



Ozone SAF

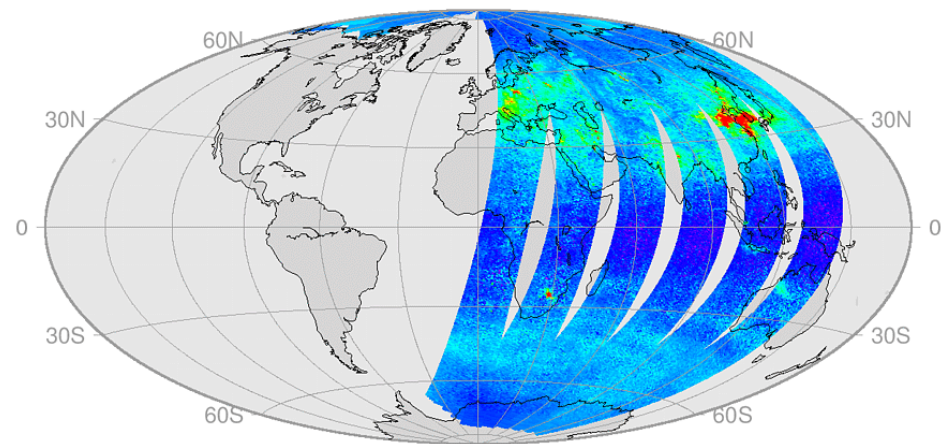


- SAF on Ozone and Atmospheric Chemistry Monitoring (O3M SAF)
- developed for the processing of data on ozone, other trace gases, aerosols and ultraviolet radiation
- Emphasis on the Global Ozone Monitoring Experiment (GOME-2) on EPS (Metop)
- Leading Entity is the Finnish Meteorological Institute FMI, Helsinki
- The O3M SAF is in its Continuous Development and Operations Phase (CDOP) since March 2007
- First release of products in Summer 2007

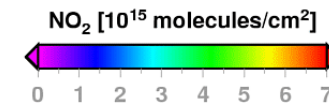
GOME-2 / MetOp

Mar 26, 2009

NO₂ Vertical Column Density



One-day Composite
Lv2 Version: GDP-4.3
<http://wdc.dlr.de>



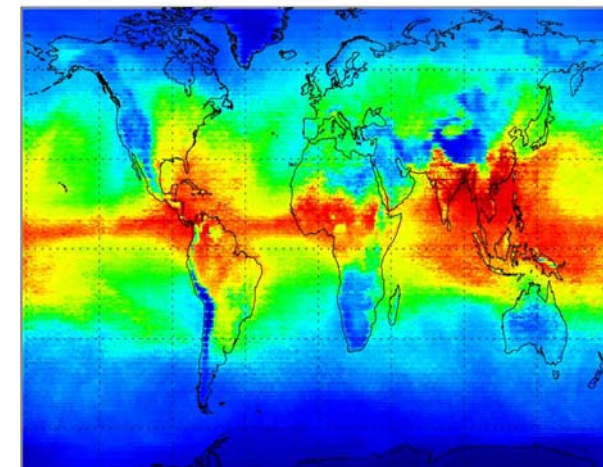


Climate Monitoring SAF

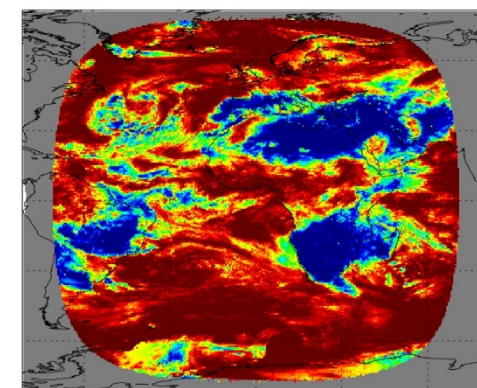


- SAF on Climate Monitoring
- generates and archives high-quality data-set for specific climate application areas
- Currently concentrates on:
 - cloud parameters
 - radiation budget parameters
 - atmospheric humidity
- Leading Entity is the German Weather Service DWD, Offenbach
- In Continuous Development and Operations Phase (CDOP) since March 2007
- NOAA-AVHRR based data operationally produced since November 2004, MSG based data from October 2005, Metop data used since 2009.
- Climate Data Records: 20 years of SSM/I Water Vapour information released in 2009.

TPW (average, 06 2005) / kg m^{-2}

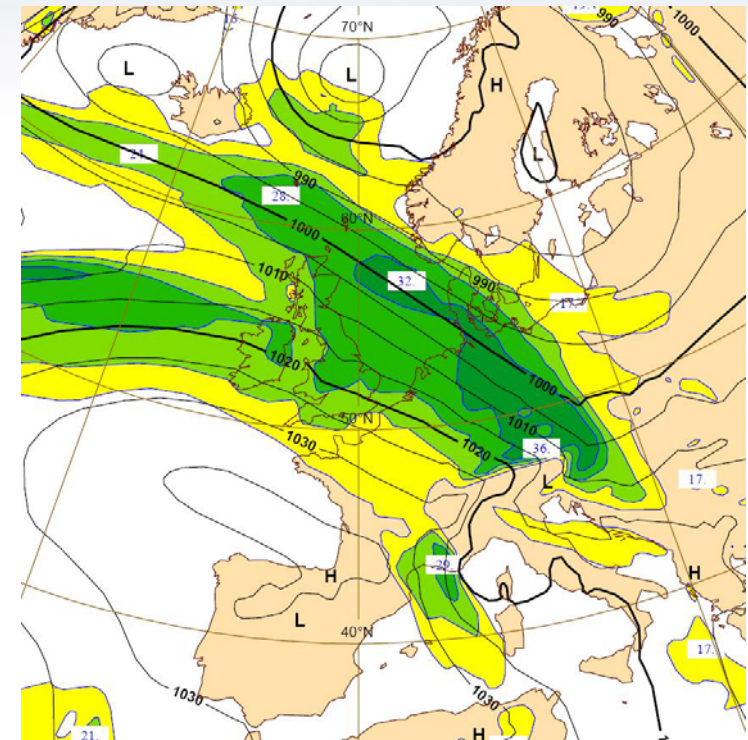


cloud fraction / %





- SAF on Numerical Weather Prediction (NWP SAF)
- aims at increasing the benefits to Met.-Services from Numerical Weather Prediction (NWP)
- develops advanced techniques for the effective use of satellite data
- Leading Entity is the UK MetOffice, Exeter
- The NWP SAF is in its Continuous Development and Operations Phase since March 2007



GRAS SAF



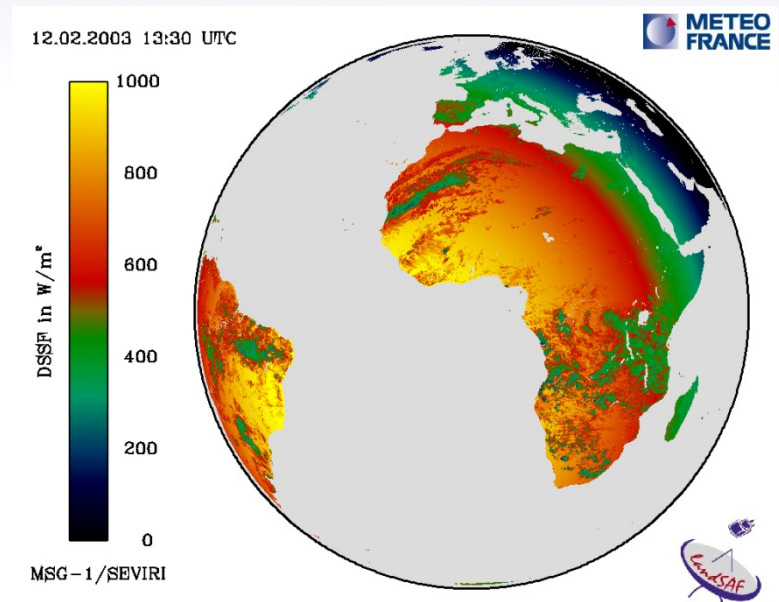
- SAF on GRAS Meteorology
- GRAS: Global Positioning System (GPS) Receiver for Atmospheric Sounding flown on EPS/Metop satellites
- near real-time and offline:
 - ▶ sounding data (temperature, pressure, humidity)
 - ▶ corresponding validation products, and
 - ▶ assimilation software
- The Leading Entity is the Danish Meteorological Institute DMI, Copenhagen
- The GRAS SAF is in its Continuous Development and Operations Phase (CDOP) since March 2007
- Software packages released since 2007, first NRT product dissemination in October 2008



Land Surface Analysis SAF



- SAF on Land Surface Analysis (LSA SAF)
- established to increase the benefit from MSG and EPS data related to land, land-atmosphere interaction and biospheric applications
- Generates operationally data services related to Surface Radiation, Vegetation and Soil Moisture
- Leading entity is the Portuguese Institute for Meteorology IM, Lisbon
- The Continuous Development and Operations Phase (CDOP) started in March 2007

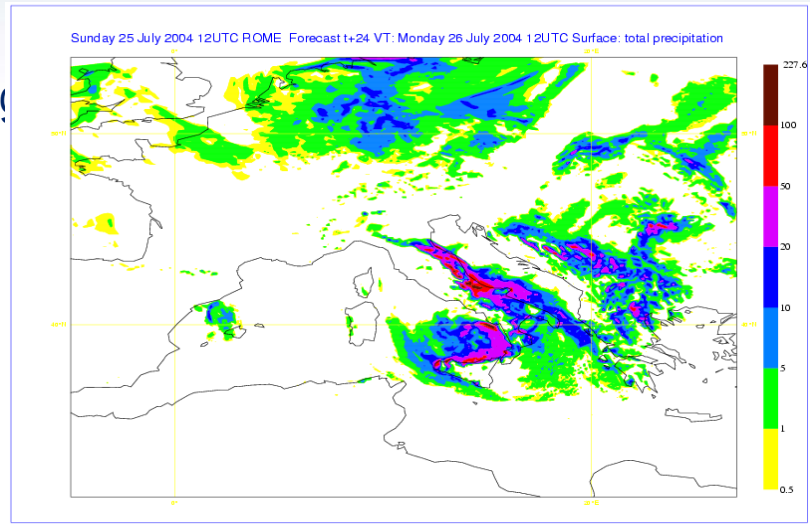




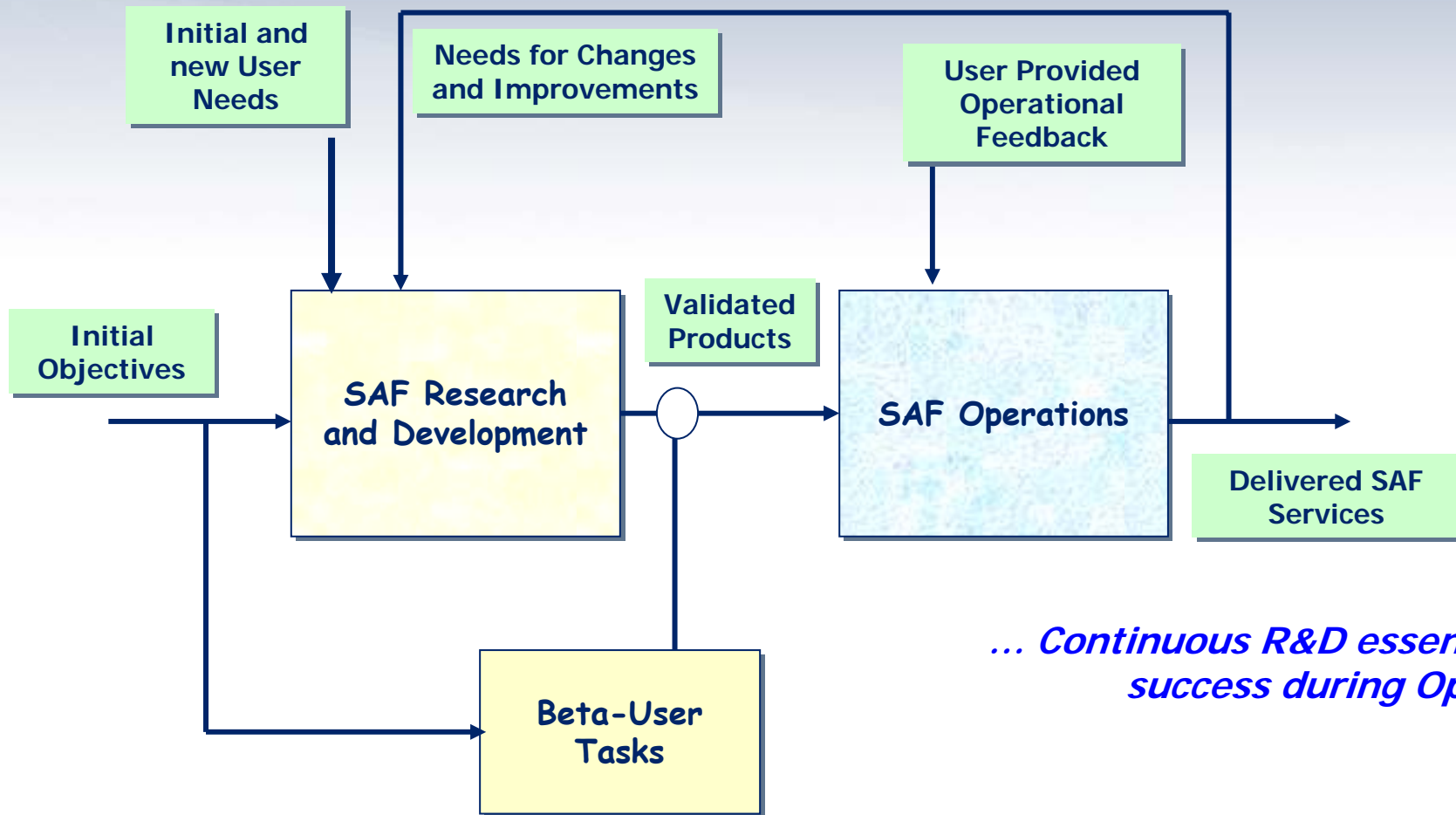
Hydrology SAF



- SAF on Support to Operational Hydrology and Water Management
- Host institute: Italian Meteorological Service (USAM), involving Member States and 4 Cooperating States
- SAF products focuses on
 - ▶ precipitation
 - ▶ soil moisture
 - ▶ snow parameters
 - ▶ utilisation of these parameters in hydrological models and NWP
- The H-SAF started Development Phase in September 2005



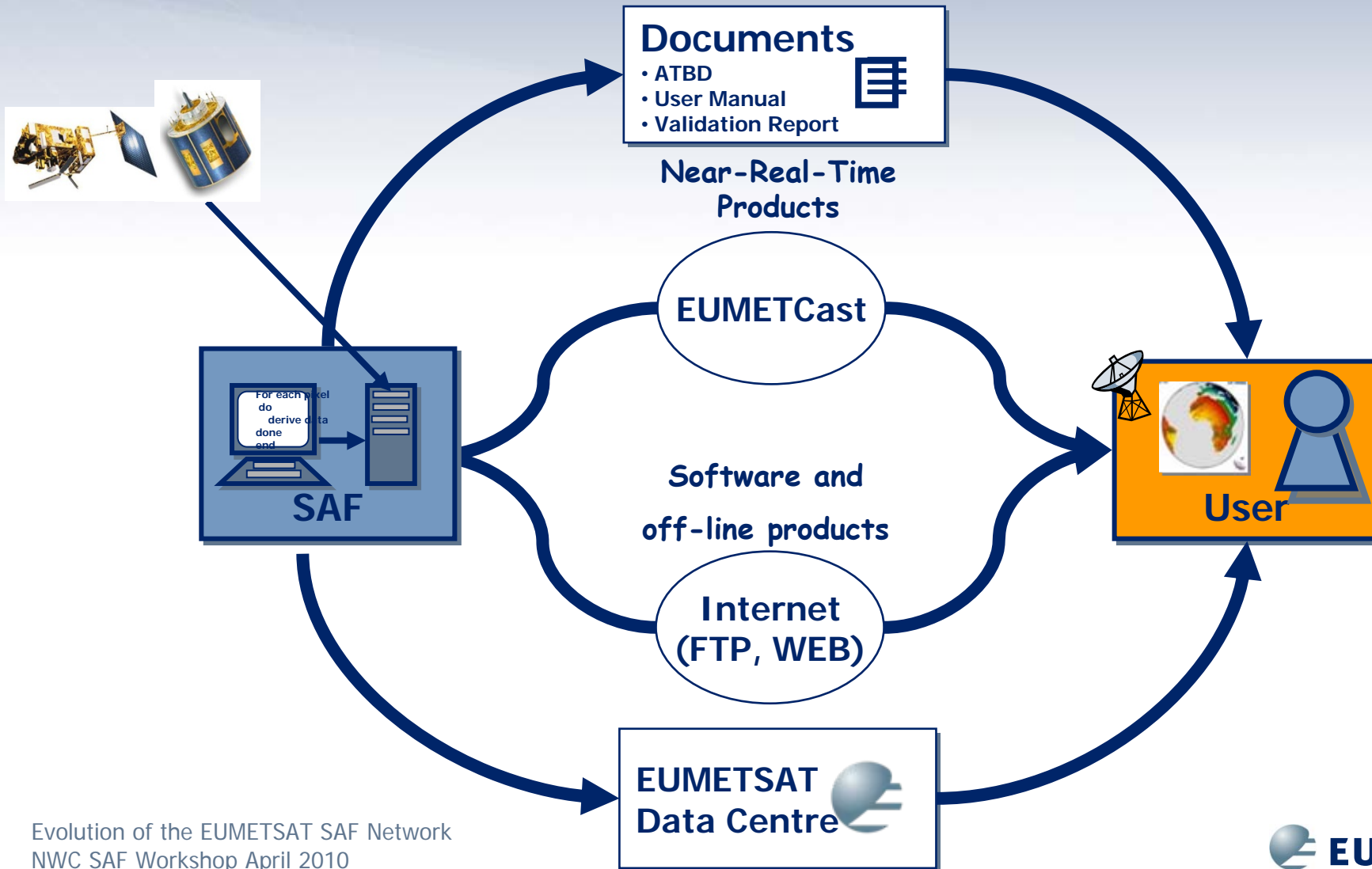
SAF Development and Service Model



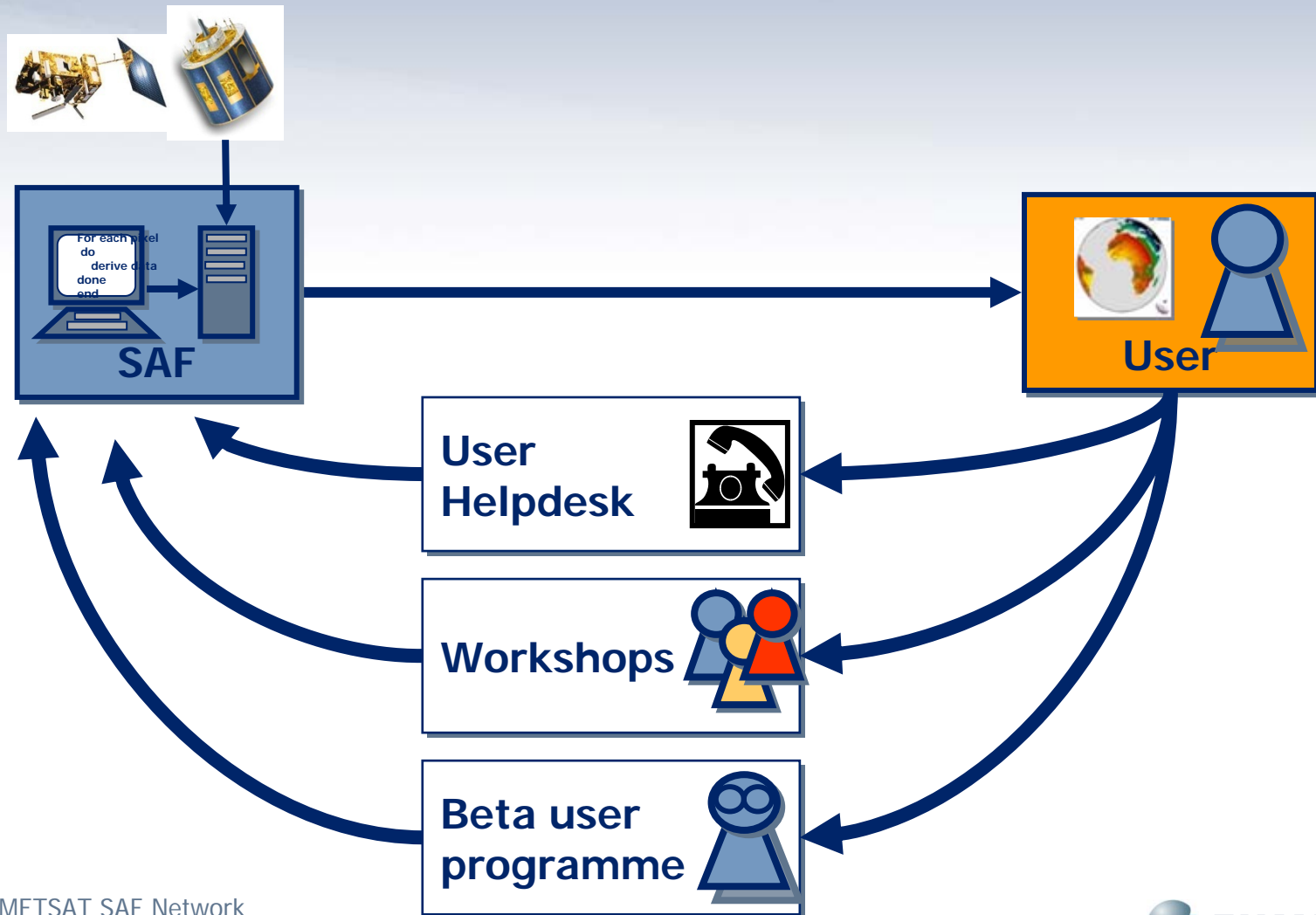
... Continuous R&D essential for SAF success during Operations ...

... Very large group of scientists involved in the support to SAF Projects ...

Interaction with Users: Services provided to users

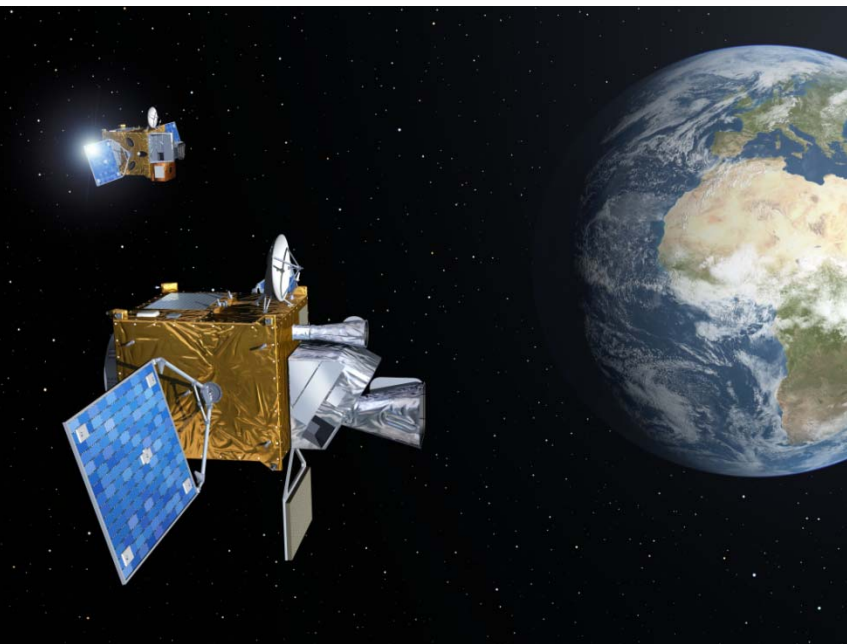


Interaction with Users: Feedback provided to SAFs





Outlook: CDOP-2

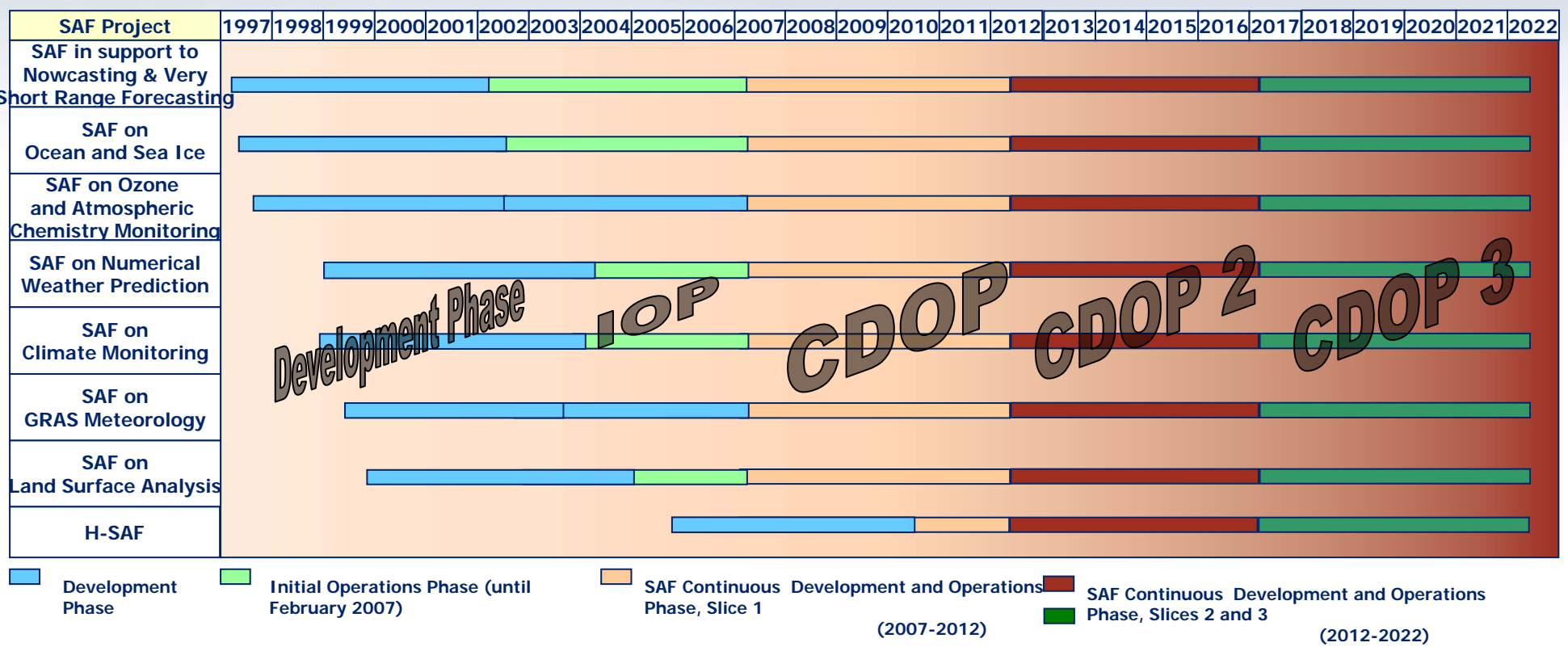


SAF Network after 2012:

- funding for 5 years of CDOP-2 and 5 more years for a CDOP-3 foreseen within the MTG budget (subject to Council approval of the MTG programme)
- SAFs started planning for activities and products for the 2012-2017 timeframe
- development activities of Meteosat Third Generation (MTG) based products
- Exploitation of synergies within the Application Ground Segment (SAF Network + Central Application Facilities)
- Reprocessing and homogeneous data set generation (e.g. for climate applications)
- Integration and interfacing with other initiatives: GMES, WMO SCOPE-CM, EUMETCaI, GHRSSST, GODAE, etc.



SAF Network Evolution





Outlook: CDOP-2

NWC SAF 2010 User's Workshop

- **User input** to discussions highly relevant for the planning of the NWC SAF product and services in the future.
- Invitation to users to **explicitly express their needs and requirements**:
 - geophysical parameters
 - satellite sensors used
 - Required accuracy (application dependent)
 - Formats, resolution, timeliness, spatial and temporal coverage
- Such input will help to **address at EUMETSAT Level** the users requirements in an appropriate way
- Users/Workshop contribution to **shape the SAF Network** Evolution is highly welcomed



Summary: SAF essentials



- SAF = Satellite Application Facility
- providing products and services to users on an operational basis with a long-term perspective
- specialised on topics and themes
- located at Weather Services in EUMETSAT Member and Co-operating States
- developed and operated by consortium of partners
- part of the EUMETSAT application ground segment
- complement production of standard meteorological products at EUMETSAT central facility

