



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



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Evolution of the EUMETSAT SAF Network  
LSA SAF Workshop November 2010



# Outline

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



# SAF

The EUMETSAT Network of  
Satellite Application Facilities

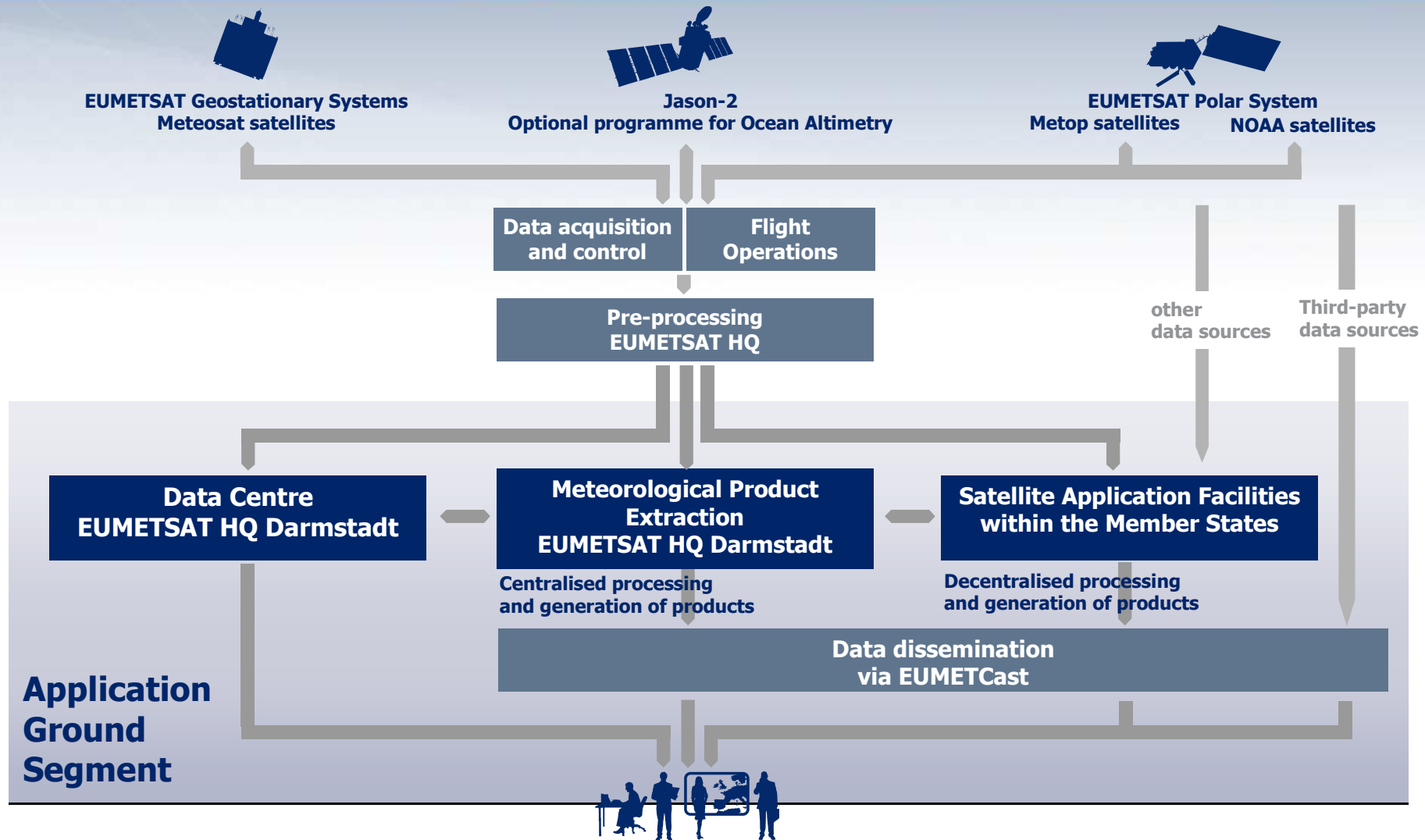


# The SAF Concept

- 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.



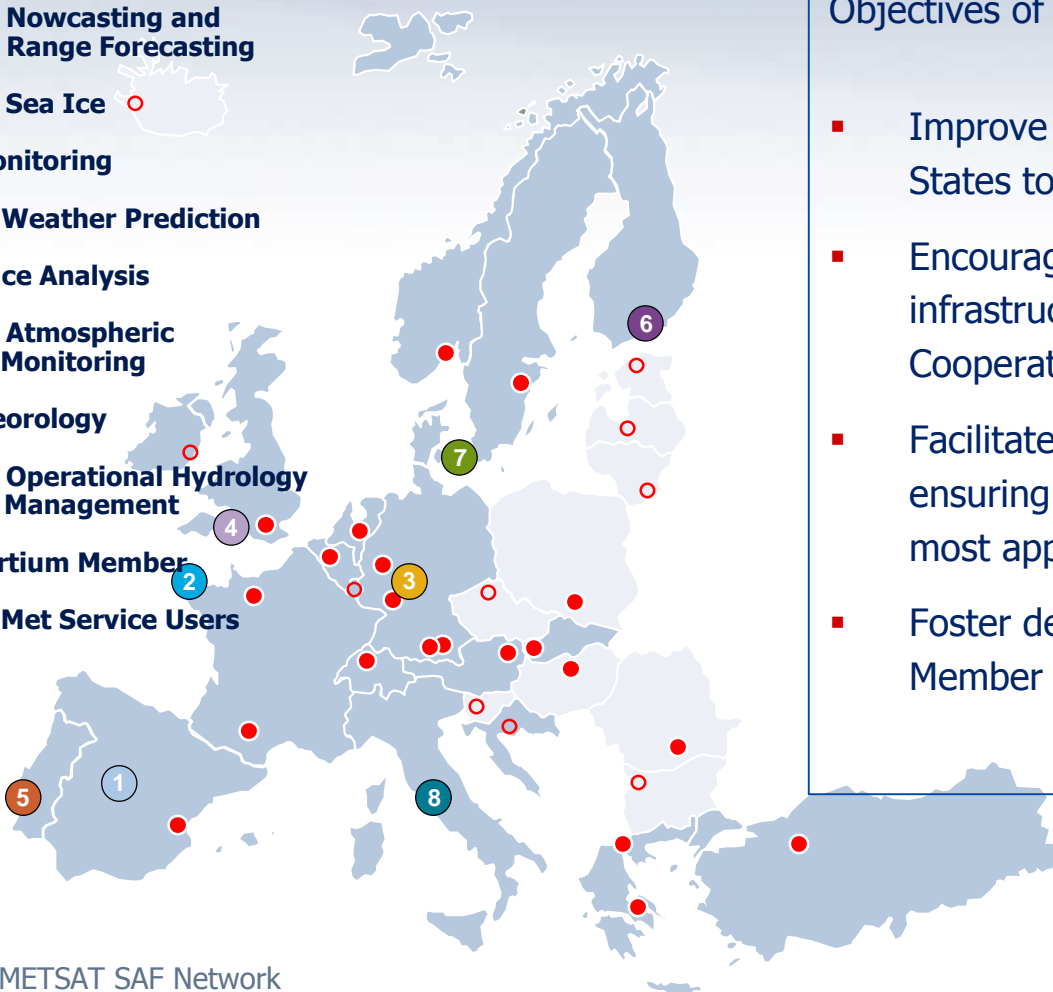
# The EUMETSAT SAF Network





# Objectives

- Member State
- Cooperating State
- ① Support to Nowcasting and Very Short Range Forecasting
- ② Ocean and Sea Ice
- ③ Climate Monitoring
- ④ Numerical Weather Prediction
- ⑤ Land Surface Analysis
- ⑥ Ozone and Atmospheric Chemistry Monitoring
- ⑦ GRAS Meteorology
- ⑧ Support to Operational Hydrology and Water Management
- SAF Consortium Member
- Additional Met Service Users



- ### 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

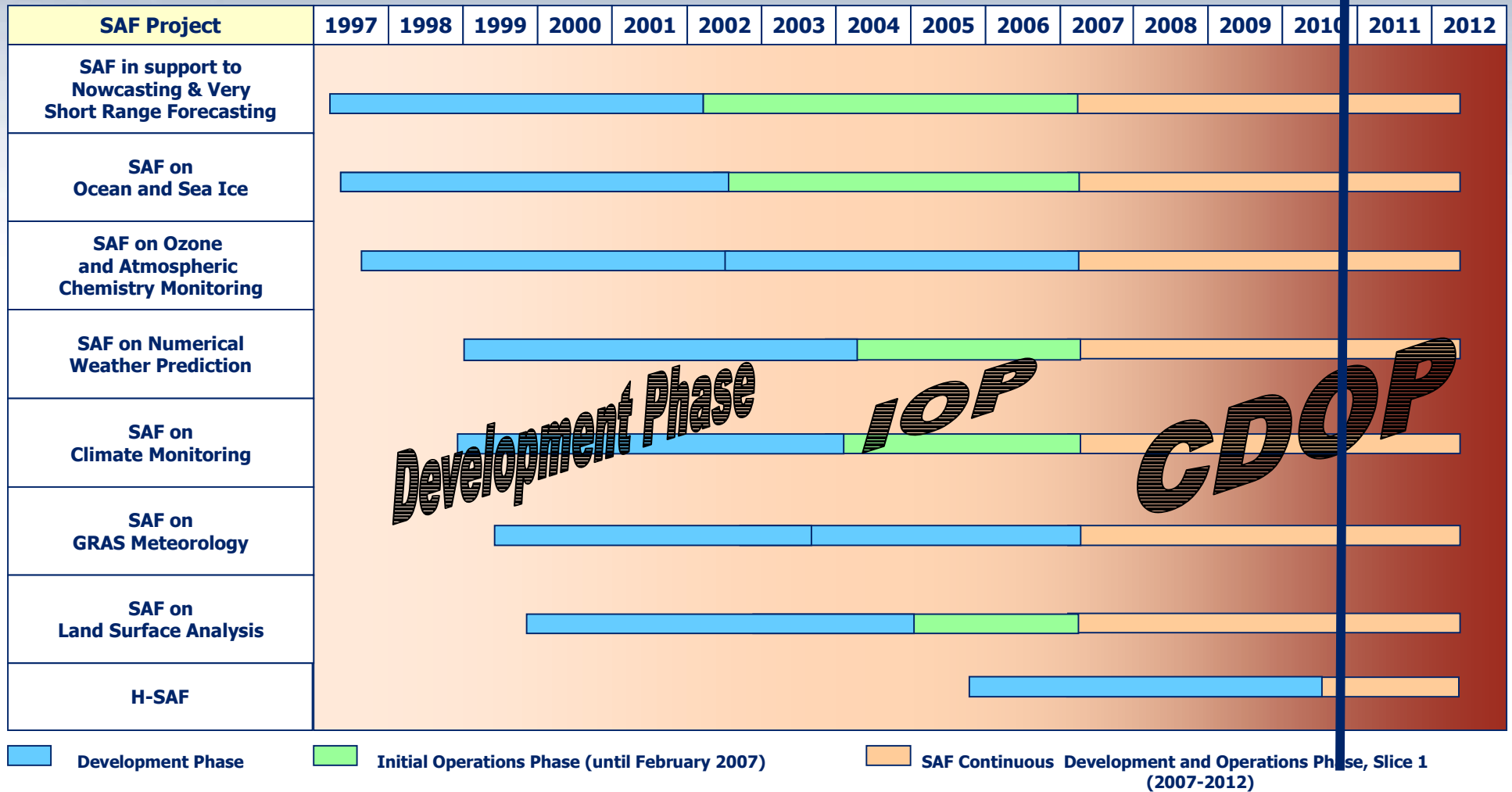




# The SAF Network Deployment

- 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 8<sup>th</sup> 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.
- The H-SAF started a 18-month Continuous Development and Operations Phase on 1 September 2010

# Status



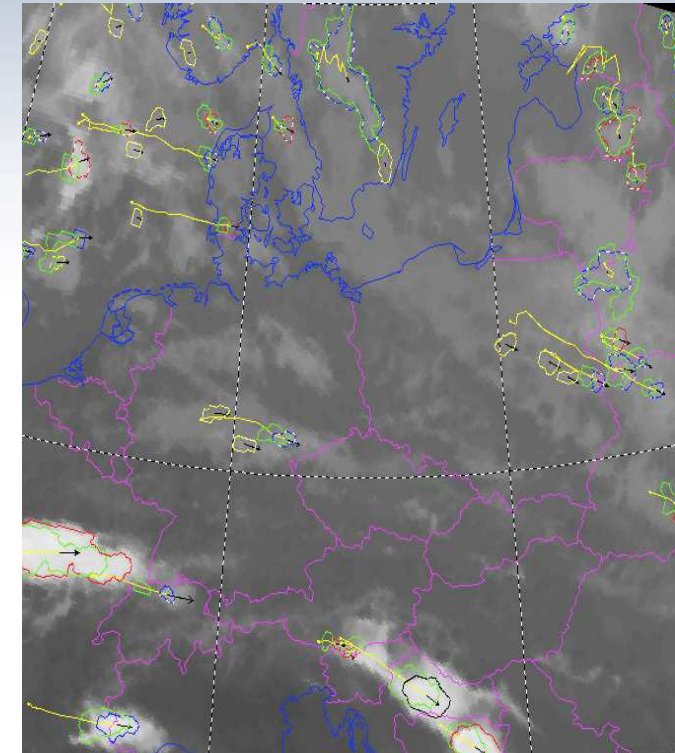


# Nowcasting SAF



## “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

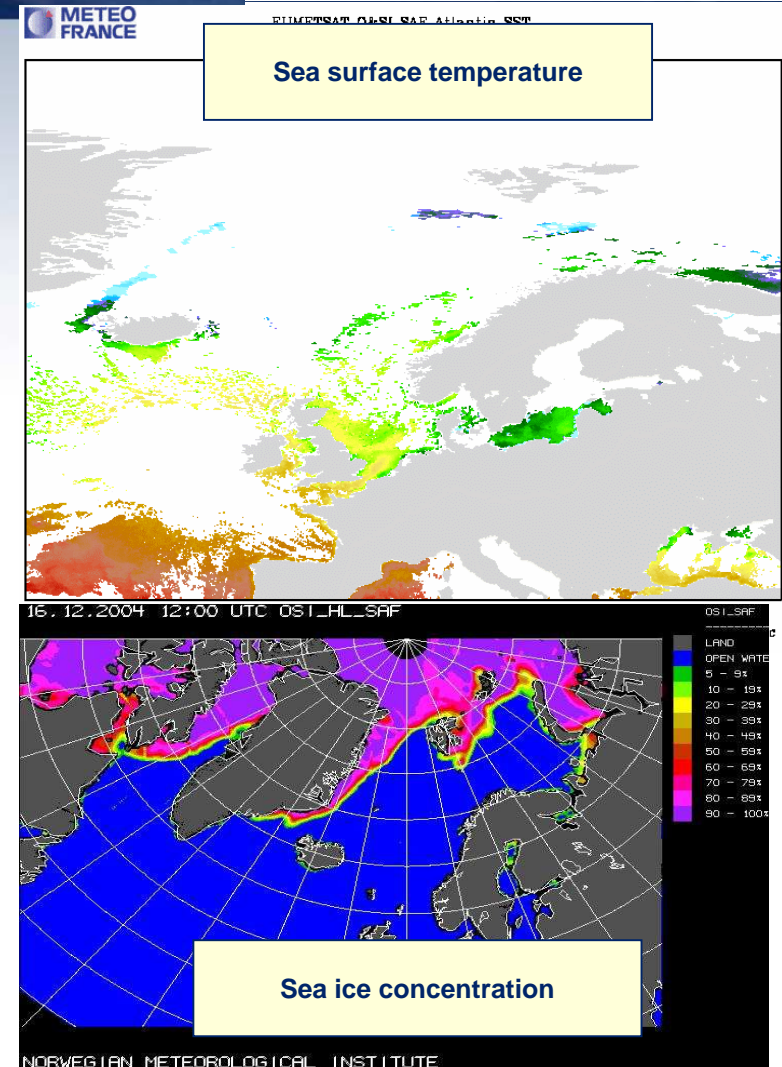


Rapidly developing Thunderstorm Product

# 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 (extend, 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

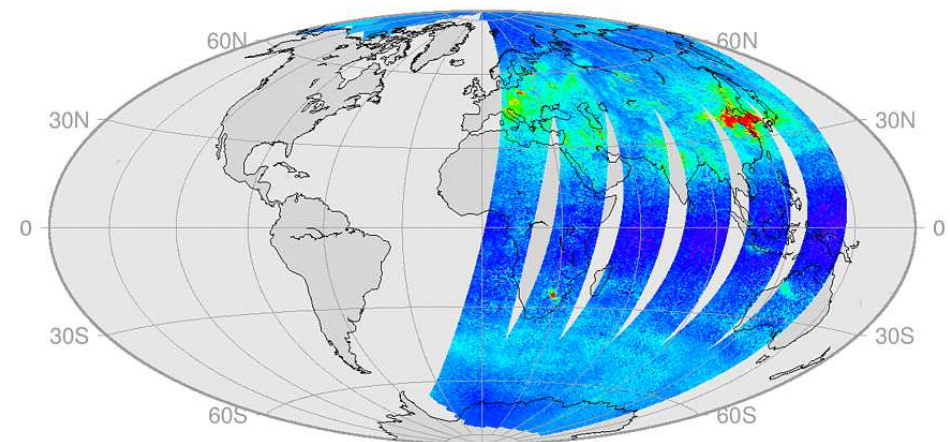


- SAF on Ozone and Atmospheric Chemistry Monitoring (O3M SAF)
- developed for the processing of data on ozone, other trace gases, aerosols and ultraviolet radiation
- Emphasis on the Global Ozone Monitoring Experiment (GOME-2) on EPS (Metop)
- Leading Entity is the Finnish Meteorological Institute FMI,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

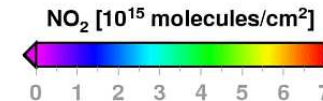
GOME-2 / MetOp

Mar 26, 2009

NO<sub>2</sub> Vertical Column Density



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

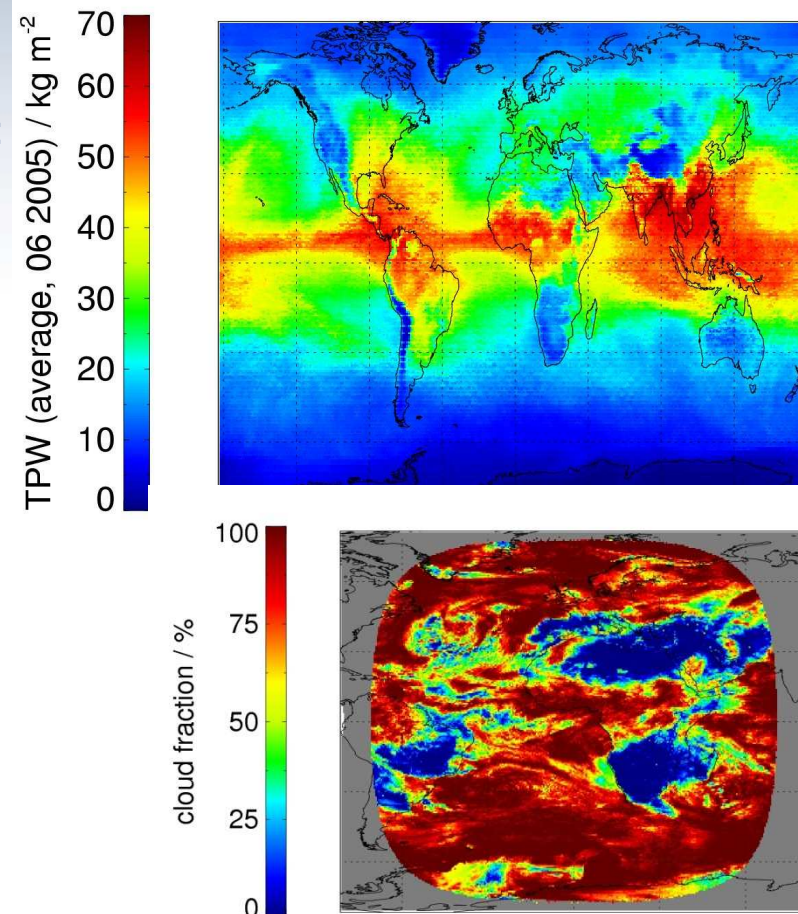




# Climate Monitoring SAF

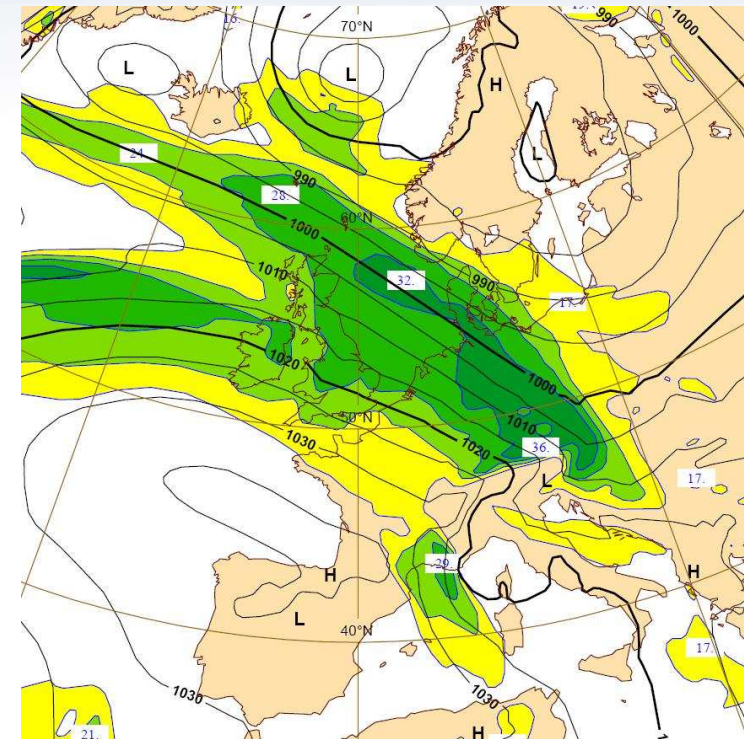


- SAF on Climate Monitoring
- generates and archives high-quality data-set for specific climate application areas
- Currently concentrates on:
  - cloud parameters
  - radiation budget parameters
  - atmospheric humidity
- Leading Entity is the German Weather Service DWD, Offenbach
- In Continuous Development 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.





- 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



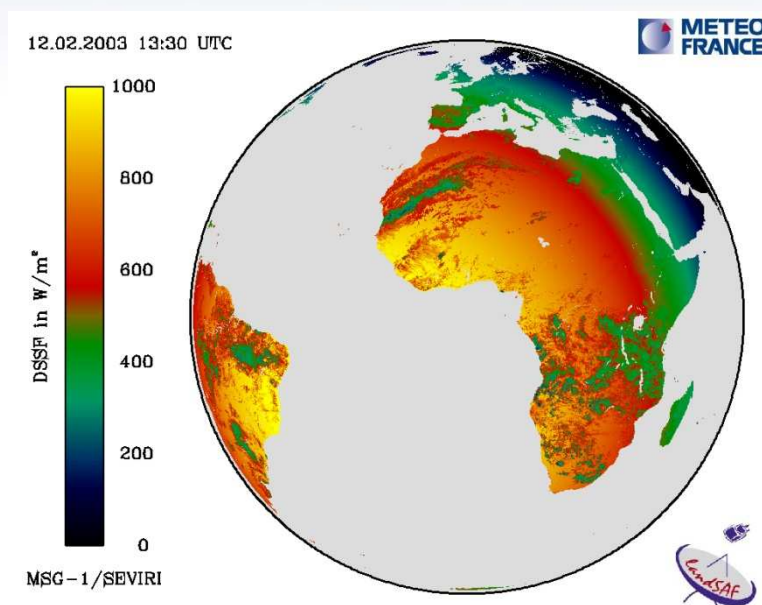
- SAF on GRAS Meteorology
- GRAS: Global Positioning System (GPS) Receiver for Atmospheric Sounding flown on EPS/Metop satellites
- near real-time and offline:
  - ▶ sounding data (temperature, pressure, humidity)
  - ▶ corresponding validation products, and
  - ▶ assimilation software
- The Leading 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



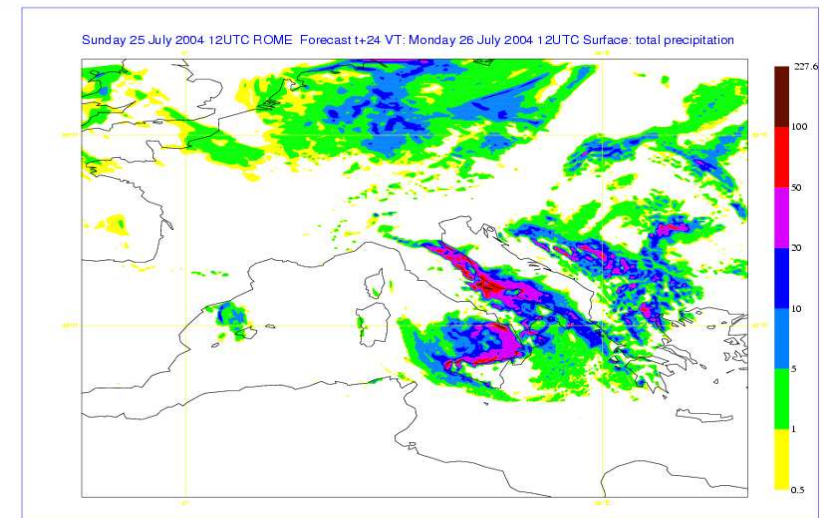
- SAF on Land Surface Analysis (LSA SAF)
- established to increase the benefit from MSG and EPS data related to land, land-atmosphere interaction and biospheric applications
- Generates operationally data services related to Surface Radiation, Vegetation and Soil Moisture
- Leading entity is the Portuguese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



# Hydrology SAF

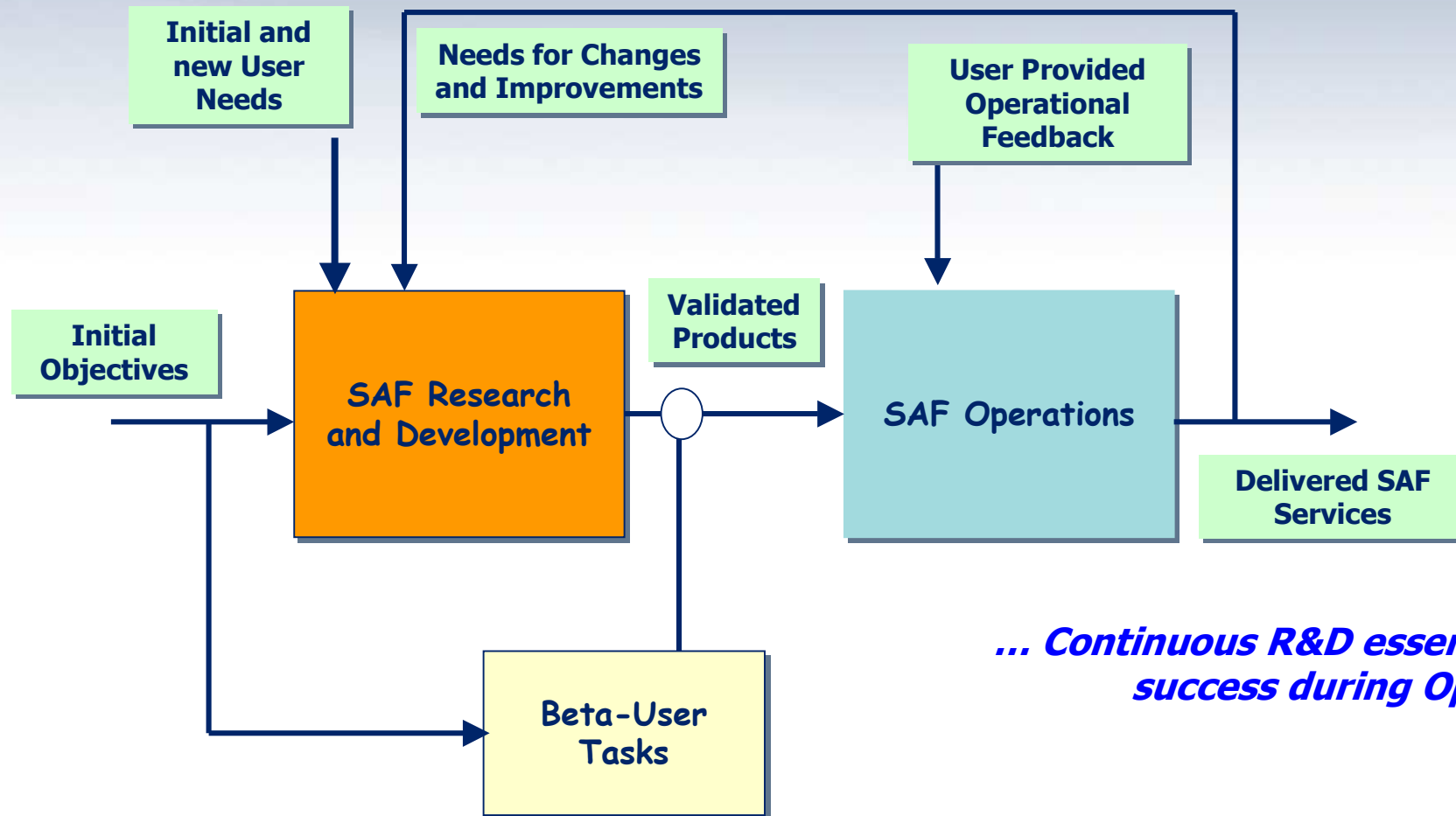


- SAF on Support to Operational Hydrology and Water Management
- Host institute: Italian Meteorological Service (USAM)
- SAF products focuses on
  - ▶ precipitation
  - ▶ soil moisture
  - ▶ snow parameters
  - ▶ utilisation of these parameters in hydrological models and NWP
- The H-SAF is in its CDOP since September 2010





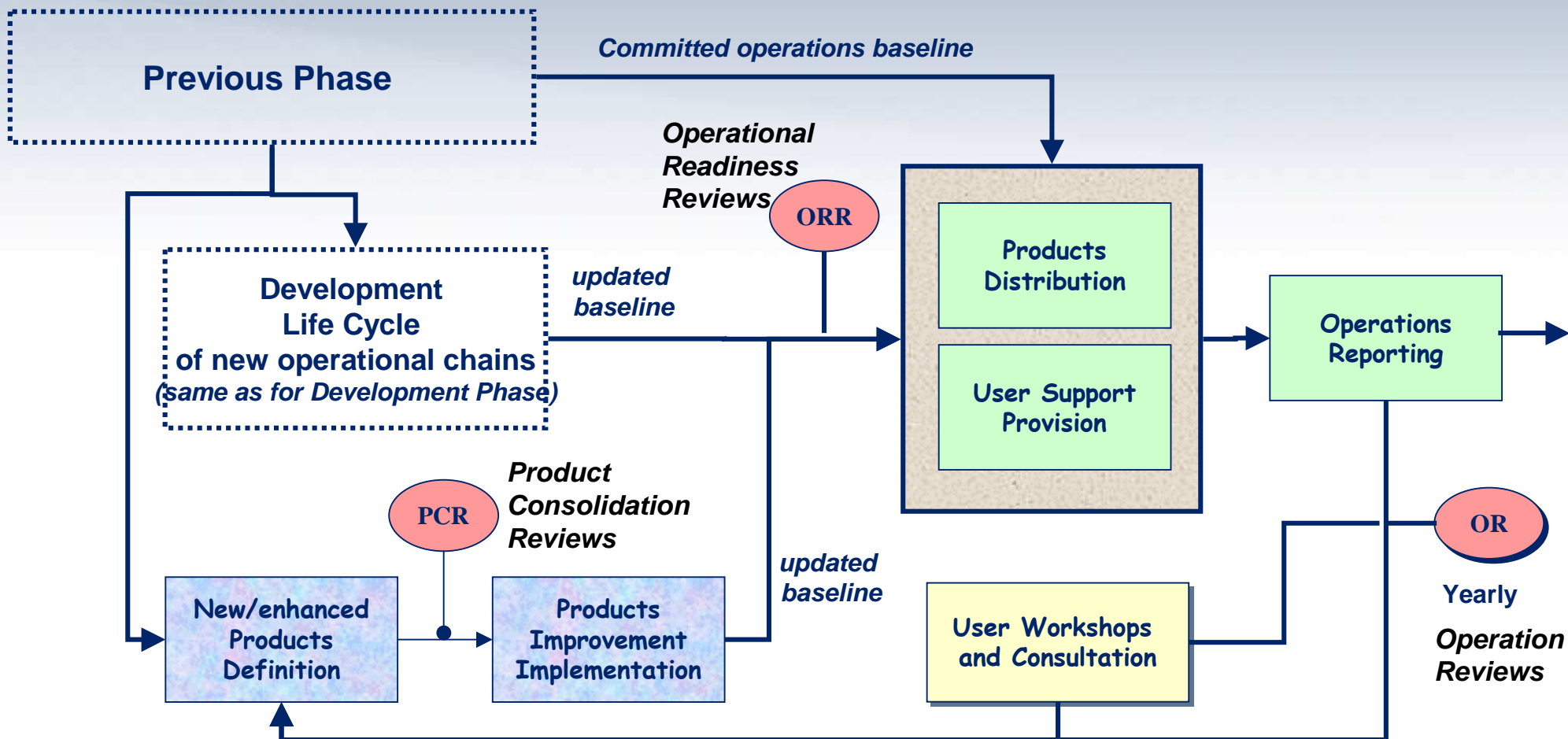
# SAF Development and Service Model



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

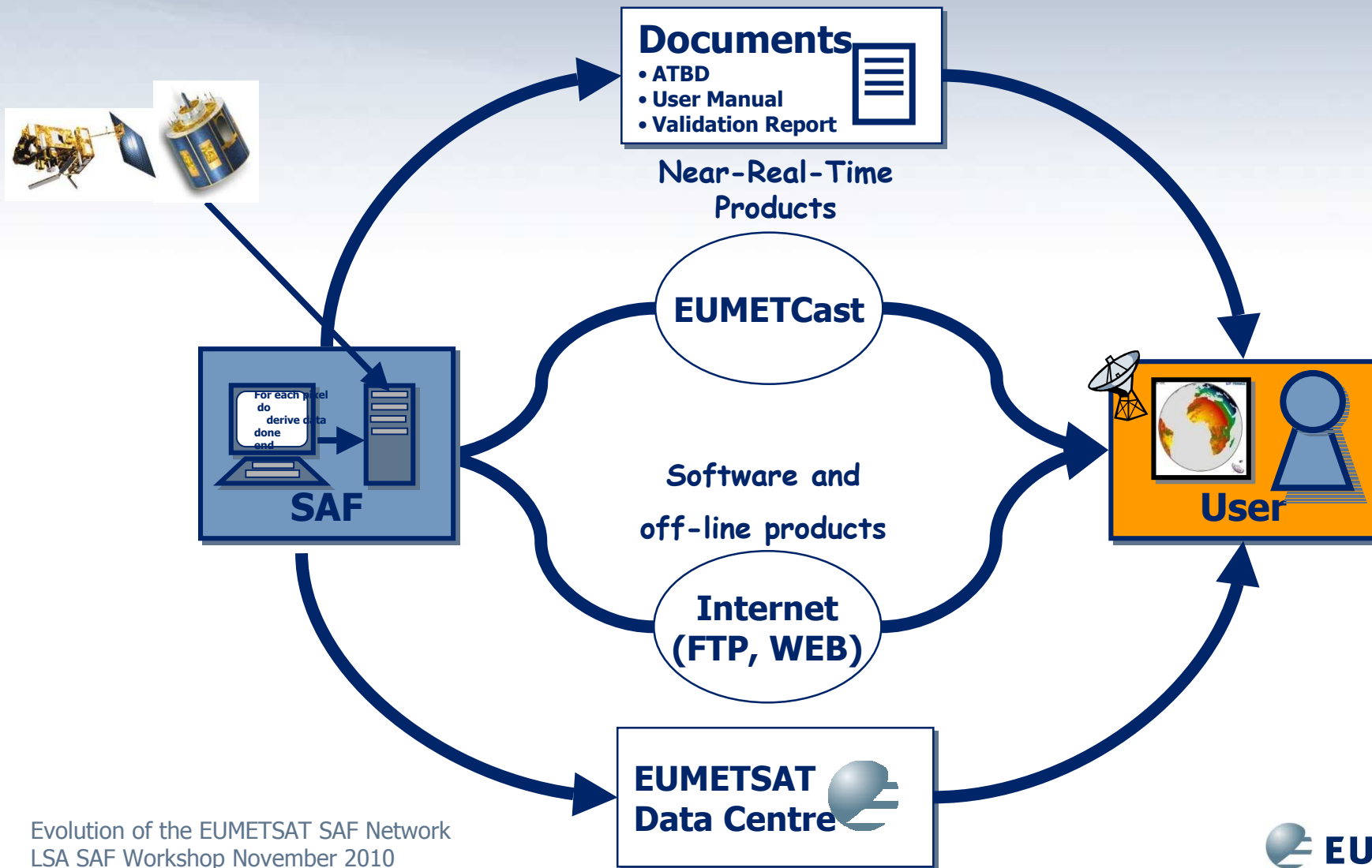
*... Very large group of scientists involved in the support to SAF Projects ...*

# The CDOP review logic



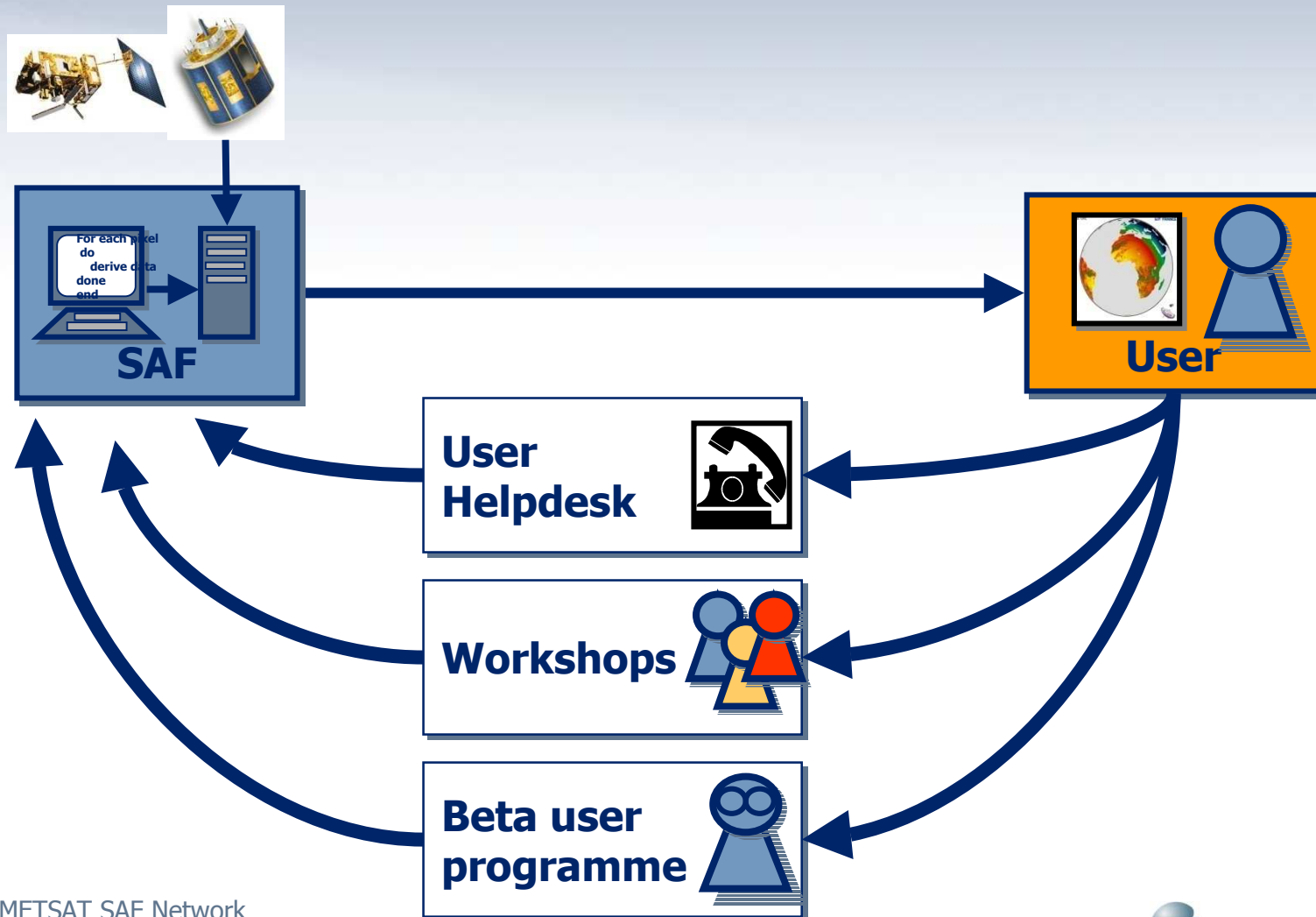


# Interaction with Users: Services provided to users



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# Interaction with Users: Feedback provided to SAFs



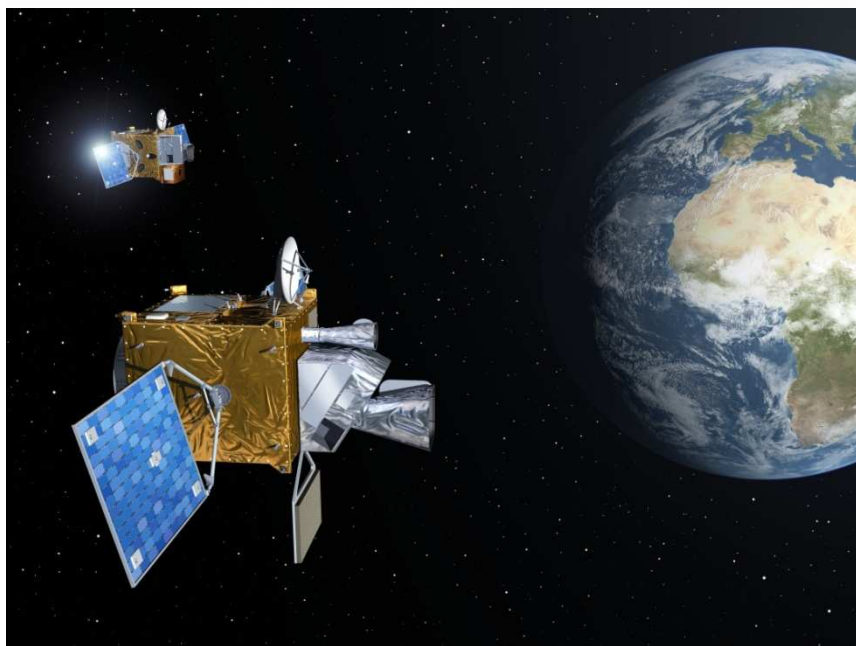
# Outlook: CDOP-2



## SAF Network after 2012:

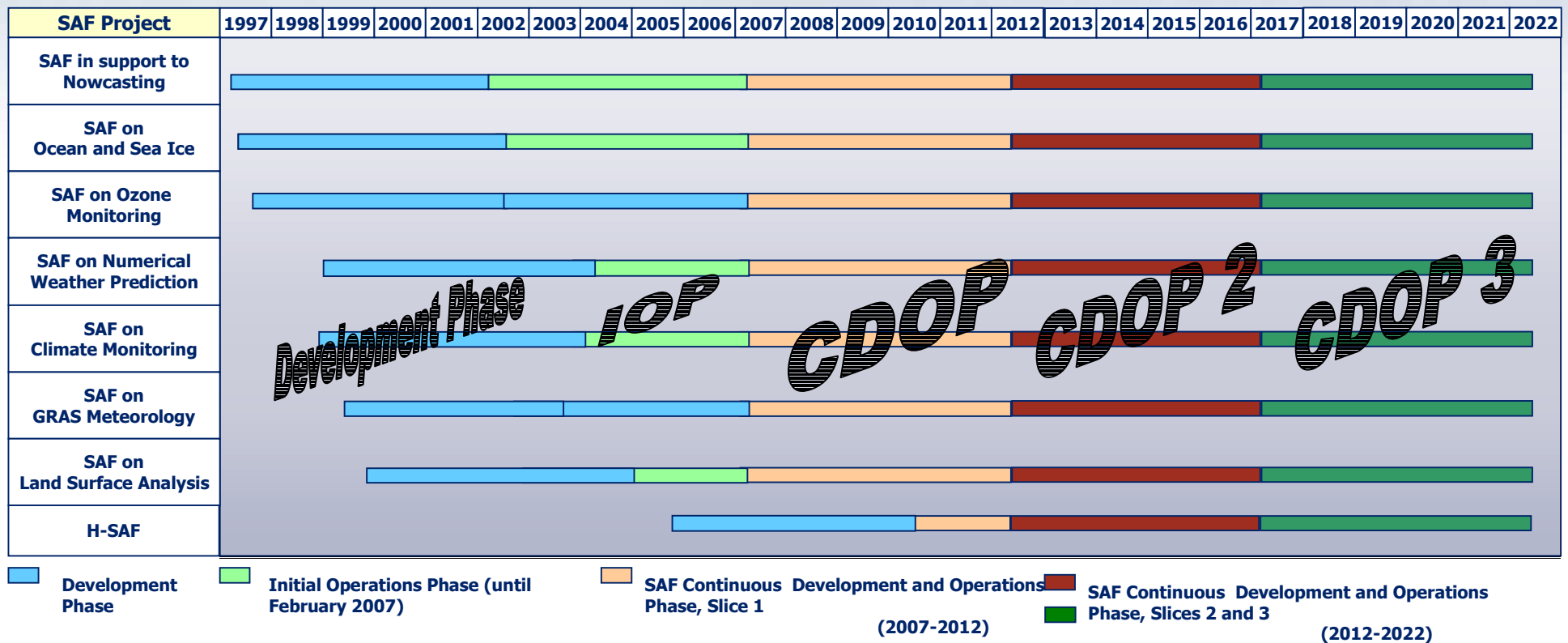


- funding for 5 years of CDOP-2 and 5 more years for a CDOP-3 foreseen within the MTG budget (subject to Council approval of the MTG programme)
- SAFs started planning for activities and products for the 2012-2017 timeframe
- development activities of Meteosat Third Generation (MTG) based products
- 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, ESA projects, etc.





# SAF Network Evolution



# Outlook: CDOP-2

## LSA SAF 2010 User's Workshop

- **User input** to discussions highly relevant for the planning of the LSA 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

