

# EUMETSAT current and future plans on product generation and dissemination

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EUMETSAT is currently operating two geostationary satellite systems based on the first and second-generation Meteosat satellites. These satellites provide a multitude of data and products over the Atlantic and Indian Ocean regions. Additionally EUMETSAT ATOVS Retransmission Service (EARS) provides fast access to ATOVS data for regional Numerical Weather Prediction covering North America, Northern Atlantic and Europe. In 2005 EUMETSAT plans to launch its first polar orbiting satellite METOP-1 providing not only continuity to some of the existing instruments on the NOAA satellites but also containing many instruments like IASI, GOME and GRAS. Finally EUMETSAT is also participating in the JASON-2 altimeter programme. This paper will give an overview of the current and future plans on product generation and dissemination using these systems.

## 1 Introduction

EUMETSAT is currently operating two geostationary satellite systems. The first generation Meteosat-satellites -5 and -7 provide are currently located at 0° and 63°E, providing a full field of view coverage every 30 min with a full set of derived meteorological products like Atmospheric Motion Vectors and Clear Sky radiance. Meteosat-6, currently located at 10°E, serves as the standby satellite for Meteosat-7 and provides simultaneously a rapid scan services with 10 min imagery and a subset of derived products for the European region. Meteosat Second Generation entered full operations 29 January 2004 as Meteosat-8. The operational product suite provides enhanced and new products from its current position at 3.4°W. The next satellite of the MSG series, MSG-2, is currently foreseen to be launched in early 2005. The MSG series I comprised of a total of 4 satellites ensuring the service for the next 10–15 years.

In the future the geostationary systems will be complemented with the EUMETSAT Polar System (EPS) for which the launch of the first satellite MetOp-1 is currently planned for the 4<sup>th</sup> quarter of 2005. The instrumentation onboard the EPS satellites will be a mix of currently operational instruments on the NOAA satellites, like the AVHRR and HIRS, as well as instruments that until now have only been demonstrated in research mode or that are completely new like ASCAT, GRAS, GOME and IASI. The following EPS satellites, MetOp-2 and MetOp-3, are currently foreseen to be launched in 2010 and 2014.

Additionally to these programs EUMETSAT is also supporting the Ocean Surface Topography Mission (OSTM) through the EUMETSAT optional JASON-2 Altimetry programme. Currently the launch of JASON-2 is foreseen in 2008.

## 2 Products

Table 1 presents the current product suite produced at Eumetsat with the geostationary system

Additionally to these products it should be noted that the EUMETSAT Satellite Application facilities provide an extended range of products for various application. For further information please consult the EUMETSAT WEB-site.

With respect to EPS EUMETSAT is responsible for the generation and distribution of level-1 products for all instruments and the level-2 products from the sounding instruments IASI and ATOVS. Further level-2 products are derived at the SAFs and some are distributed via EUMETSAT in near-real time. The level-1b data contains the following information for all instruments:

- Brightness temperatures for IR and microwave channels
- Reflectances for visible channels
- Bending angles for GRAS
- Calibrated brightness radiances/solar irradiances for GOME-2
- Backscatter coefficient for ASCAT

Including:

- basic identification: date, time, spacecraft, orbit no, orbit elements;
- pixel geo-location information, allowing the derivation for each pixel: observation time, latitude, longitude, Sun and satellite zenith angles, azimuth difference; viewing angle;
- land/sea mask, elevation;
- calibration coefficients;
- algorithm, version information;
- quality information

Additionally the Clear Sky Radiances for all microwave and IR channels of core payload AVHRR/3, AMSU-A, MHS, HIRS/4, IASI are part of an extended set of level-1b products.

Products	Acronym	UMARF archive	GTS	EUMETCast (LRIT) (5)	First Generation Satellites
Atmospheric Motion Vectors	AMV	Yes	Yes	Yes	Yes
Cloud Analysis	CLA	Yes	Yes	Yes	Yes
Cloud Analysis Image	CLAI	Yes	No	Yes	No
Cloud Mask	CLM	Yes	No	Yes	No
Cloud Top Height	CTH	Yes	No	Yes	Yes
Clear Sky Radiance	CSR	Yes	Yes	No	Yes
Climate Data Set	CDS	Yes	No	No	Yes
High Res. Precipitation Index	HPI	Yes	No	No	YES
ISCCP Data Set AC, B1 & B2	IDS	Yes	No	No	YES
Tropospheric Humidity	TH	Yes	Yes	Yes	Only UTH
Total Ozone	TOZ	Yes	Yes	Yes	No
Sea Surface Temperature	SST	Only first Generation	No	No	Yes
Calibration Support	CAL	Yes	No	No	Yes
Global Instability	GII	Yes	No	Yes	No

Table 1 The products derived with the first and second-generation Meteosat satellites.

	AVHRR/3	HIRS/4	AMSU-A	MHS	IASI	GRAS	ASCAT	GOME-2
Temperature sounding		X	X		X	X		
Humidity sounding		X	X	X	X	X		
Cloud liquid water path			X	X	X			
Cloud cover	X	X			X			
Cloud Top Temperature	X	X			X			
Cloud Top Height	X	X			X			
Cloud Phase	X	X		X	X			
SST (skin)	X				X			
Sea ice concentration	X		X	X			X	
Ocean surface winds							X	
NDVI	X				X			
Soil moisture	X		X	X			X	
Snow/ice liquid water content				X			X	
LST (skin)	X				X			
Total Ozone		X			X			X
Ozone profile					X			X
Trace gases*					X			X
Aerosols	X				X			X

Table 2 The EPS level-2 products

Table 2 presents the currently foreseen set of level-2 products. For details on the EPS products please consult the EUMETSAT WEB-site.

### 3 Dissemination

Currently most of the products from the geostationary system are disseminated in near-real time to the users either via GTS or the EUMETCast system (see Table 1). For EPS the current baseline for dissemination is as follows:

- All level 1b data within 2h 15min to NRT
- Level 2 data within 3h to NRT
- Level 3 data variable

Based on requirements from regional and local forecasting EUMETSAT has additionally introduced on a trial basis the so-called EARS (EUMETSAT ATOVS Retransmission System), providing almost a full Northern Hemispheric coverage in near-real time. In response to further user inquiries EUMETSAT is currently exploring the possibilities to extend this service to provide:

- a continued service beyond 2004
- fast delivery ASCAT data
- full Northern Hemispheric Coverage
- AVHRR data

The extended EARS service will alleviate some of the foreseen data delivery problems with the EPS system, but for a significantly improved timeliness for the EPS products other alternatives would have to be explored in case a strong user requirement is identified. Figure 1 presents the current EARS coverage.

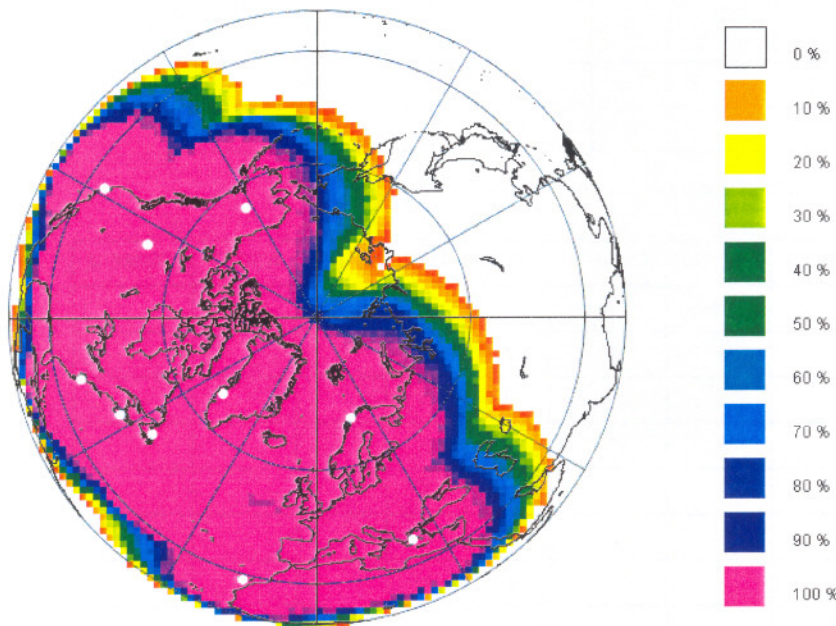


Fig. 1 The current EARS coverage.

Finally, for JASON-2 the EUMETSAT responsibilities are the

- Earth terminal, ground network
- Operational product processing and distribution
- User interface

### 4 Conclusions

EUMETSAT is currently operating two geostationary systems and will in the coming years also operate a polar system. Additionally EUMETSAT is supporting the JASON-2 altimetry mission and is providing a regional service with the EUMETSAT ATOVS Retransmission system. Currently the data from the geostationary systems are mostly provided in near-real time, whereas for the polar system the current baseline, reflecting the user requirements during the system definition stage, deliver data up to 3 hours after sensing. For some of the data the possibility to provide data with better timeliness is already explored (e.g. ASCAT for the Northern Hemisphere), but for others the user requirements have to be established and the potential ways forward explored.