

EUMETSAT Headquarters, Darmstadt, Germany

Central Operations Report for the period January to June 2012





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The Central Operations Reports can be found under 'Service Status' on <u>www.eumetsat.int</u>.

For a full account of service enhancements, please refer to the Product Update History, also on the Service Status webpage.



Introduction

Welcome to the report on EUMETSAT's Central Operations for the first half of 2012.

Overall operational service performance was very good across almost all services this half-year, with only the following events impacting the services indicated:

- EUMETCast Africa: this service suffered an outage in February due to extreme snowfall at the Fucino Ground Station in Italy disrupting the dissemination uplink. See slide <u>44</u> for more info.

- Meteosat-8: a problem in April with the functioning of the sun sensors onboard the satellite impacted image-processing on the ground. See slide <u>8</u> for more info.

One highlight has been the successful launch of MSG-3 from the Kourou Space Centre in French Guiana on the 5th of July. EUMETSAT teams worked intensively for many months, preparing the infrastructure to support the operations of the new satellite alongside its two predecessors, and now, following the successful launch, the commissioning of the new satellite is progressing well. It is currently expected that the satellite will be ready for full operational use in early 2013.

The other launch planned for this year, that of the Metop-B satellite from the Baikonur Cosmodrome in Kazakhstan, is now scheduled for the 17^{th} of September. Much preparation of Metop systems and teams also was carried out in the past half-year and we are now ready to support the commissioning of Metop-B and the validation of the Metop ground segment for dual-satellite operations, foreseen to start in the last quarter of 2012. This will be the first time in EUMETSAT's history that two satellites will be undergoing commissioning in parallel and it \rightarrow



Introduction (continued)

implies significant effort and task management for operations personnel supporting the activities in the coming months.

Aside of all of the activities associated with the MSG-3 and Metop-B satellites, there have been the following operational service additions of note in the reporting period:

Third-Party Data Services:

(1) EUMETCast dissemination of Level 1 data from the Low-Earth Orbit satellite Fengyun FY-3B (operated by the China Meteorological Agency, CMA) commenced in January

(2) EUMETCast dissemination of products based on data from the geostationary meteorological satellite Fengyun FY-2D (also operated by CMA) commenced in February, replacing products from FY-2C

> Charts showing the availability of both of the above can be found on slides <u>41</u> and <u>42</u>.

A further Third-Party Data Service, namely the provision of near-real-time data from ISRO's Oceansat-2, has been under trial during the first half of 2012. Final preparations are currently underway to declare the service fully operational later this year.

In summary, an eventful year so far, with more to come!

Best regards, Mikael Rattenborg Director of Operations



Performance Reporting: Categories

The charts on the following slides present a summary view of the performance of the services within the categories listed here:

- Meteosat Services
- Metop/NOAA Global Data Service
- Metop/NOAA Regional Data Service (EARS)
- Search and Rescue Support
- Jason-2 OGDR Service
- Third-Party Data Services
- EUMETCast
- The EUMETSAT Data Centre
- EUMETSAT's Helpdesk Service

Several terms with special meaning (e.g. 'Nominal RCs') appear in the following slides. A <u>glossary</u> is provided at the end of the report.



Performance Reporting: Conventions

Availability of EUMETSAT Services:

The availability of most operational services provided by EUMETSAT is measured monthly against service-specific targets. This report presents the performance of the individual services in the form of charts showing their month-by-month availability, accompanied by commentary identifying any significant events or factors (whether satellite or ground-segment in nature) which may have had impact on the provision of them.

Events with General Impact:

Any event which significantly affected the availability of a single service (e.g. the malfunction of a single instrument) is indicated on the relevant slide for that service.

Some events impact the availability of more than one individual service (e.g. an outage of EUMETCast). Such events are described on separate slides near the start of the 'Meteosat Services' and 'Metop/NOAA Global Data Service' sections. Where needed, slides concerning other services make reference to one or the other.



Meteosat Services

This service category comprises the data and products produced with the Meteosat System, which comprises geostationary satellites positioned at longitudes 0°, 9.5°E and 57°E. These satellites nominally support the prime imaging, Rapid-Scan and 'Indian Ocean Data Coverage' (IODC) services respectively.

The individual services addressed in this section are as follows:

- Meteosat 'Full-Earth Scan' image data acquired at 0° and 57°E
- Meteosat 'Rapid Scan' image data acquired at 9.5°E
- Meteorological products derived from that image data
- Data Collection and Retransmission (the DCP service)



Meteosat Services: Events with General / Significant Impact

The following event impacted the <u>Rapid-Scanning Service</u> to the extent described:

25-26 April:

The suspected obscuration of the two sun sensors onboard Meteosat-8 caused many Repeat Cycles between 12:25 UTC on 25-April-12 and 07:25 UTC on 26-April-12 to be of non-nominal quality. Any meteorological products derived were not disseminated. The image processing system was switched to using Earth-sensor datation and the images produced thereafter were nominal.

It is believed that the sun sensors have been obscured by a partially-detached thermal sensor frame. This has been deduced from the long-term investigation undertaken into the circumstances surrounding the satellite's unexpected change of spin-rate on 22-May-2007. This investigation was performed in the context of OPS Incident #27 and gave rise to the consensus that degraded fixing material has led to the partial-detachment of the thermal sensor frame.

It is difficult to predict the further evolution of the sensor frame's detachment, but Meteosat-8 operations have continued to be stable and image-processing remained nominal during the first half of the year.



Meteosat Services \rightarrow SEVIRI 0° Image Data

Performance measured in terms of:

- 1) the number of <u>Nominal</u> Level 1.0 Repeat Cycles (RCs) which have been generated 'on-time', as a percentage of those scheduled
- 2) the combined timely availability of nominal HRIT Level 1.5 RCs via EUMETCast

Events Which Impacted Availability:

- February: L1.5 RCs impacted by a Meteosat-9 manoeuvre on 21st February
- March: Nominal L1.0 RCs impacted by colinearity (see Glossary) and fuel-migration effects*. L1.5 RCs further impacted by eclipse effects (1-19 March), and an ephemeris data corruption on 31st March
- April-May: Nominal L1.0 RCs: Fuel-migration effects*; L1.5 RCs further impacted by a manoeuvre on 22nd May
- June: Nominal L1.0 RCs: Fuel-migration effects*; L1.5 RCs further impacted by a manoeuvre on 25th June
- * The image-processing system modifications implemented in September 2011 compensate for some of the effects of Meteosat-9's fuel migration, but not all, hence the residual numbers of RCs impacted in the months shown above. Work continues to reduce the impact where possible.





Meteosat Services \rightarrow IODC 57°E Image Data

Performance measured in terms of:

- (1) the number of Perfect Images which have been generated, as a percentage of the total number of images scheduled,
- (2) the availability of Perfect Formats directly disseminated via Meteosat-7, as a percentage of the total number of formats scheduled.

Events Which Impacted Availability:

22 May: Tracking problem with primary antenna coincided with maintenance outage of secondary antenna, impacting dissemination uplink. 14 formats affected (lost or degraded).





Meteosat Services → SEVIRI 9.5°E Rapid-Scan Image Data

Meteosat-8 currently supports the MSG Rapid-Scan Service (RSS), using a scan period of 5 minutes, covering latitudes from 15 to 70°N, using all 12 SEVIRI spectral channels.

Performance is measured in terms of the number of <u>nominal</u> Level 1.0 Repeat Cycles (RCs) which have been generated 'on-time', as a percentage of those scheduled, plus the availability of Level 1.5 RCs disseminated via EUMETCast.

Note that, due to operational constraints, RSS is interrupted approximately once a month to perform full-Earth scanning, and also for a full month in the November/December timeframe. More info: <u>www.eumetsat.int</u> 'Service Status'.

Events Which Impacted Availability:

April 25-26: Image quality impacted by the loss of sunsensor datation (167 RCs affected). See slide <u>8</u> for more info.





Meteosat Services \rightarrow Meteorological Products derived from 0° Data

Performance measured in terms of the number of meteorological products which have been generated at EUMETSAT from the Full-Earth Scan images provided by Meteosat-9, as a percentage of those products scheduled.

Note that the availability of products is only measured at the point of generation.

Events Which Impacted Availability:

None significant.



- 0° Met Product Target Availability 98.5%



Meteosat Services → Meteorological Products derived from 57°E Data

Performance of this component of the IODC service is measured in terms of the number of meteorological products which have been generated at EUMETSAT, as a percentage of those scheduled.

Note that the availability of products is only measured at the point of generation.

Events Which Impacted Availability:

None significant.





Meteosat Services → Meteorological Products derived from 9.5°E RS Data

Meteorological products derived from the 5minute Rapid-Scan (RS) Repeat Cycle images produced using Meteosat-8.

Performance of this service is measured in terms of the number of meteorological products which have been generated at EUMETSAT, as a percentage of those scheduled.

Note that the availability of products is only measured at the point of generation.

Events Which Impacted Availability:

April 25-26: Quality of images on which the products were based was impacted by the loss of sun-sensor datation. See slide <u>8</u> for more info.





Meteosat Services \rightarrow DCP Channel Availability at 0°

Data Collection and Retransmission operations at 0° utilise Meteosat-9's international and regional DCP channels.

The chart shows the availability of the 0° DCP service. It is measured in terms of the number of hourly reference DCP messages on all operational regional channels which have been successfully received back by EUMETSAT, as a percentage of those sent.

(Note that the availability of the 4 DCP channels supported by Meteosat-7 as part of the Indian Ocean Tsunami Warning System (IOTWS) is not included)

For information concerning the geographical distribution of registered DCPs, please see the next slide.

Events Which Impacted DCP Channel Availability: None significant.





Meteosat Services → Geographical Distribution of DCPs

As of the end of June 2012, there were 1106 registered Data Collection Platforms (known as DCPs) belonging to 124 operators and deployed amongst the 80 countries shown in the table to the right.

As of the end of June, out of the total number of registered DCPs, there were 603 units in active operation.

Notes:

(1) Larger numbers of DCPs are highlighted with darker colours.

(2) Red entries indicate countries where DCP operation has ceased, green entries where it has commenced.

DCPs	Country	DCPs	Country	DCPs	Country	DCPs	Country
(0)	Albania	2	Djibouti	2	FYR Macedonia	9	Senegal
51	Algeria	1	Egypt	2	Madagascar	63	South Africa
11	Angola	5	Falklands	8	Malawi	7	Spain
2	Armenia	1	Finland	1	Malaysia	3	Sri Lanka
3	Austria	113	France	3	Maldives	2	Swaziland
1	Bangladesh	45	Germany	19	Mali	10	Tanzania
2	Belarus	8	Ghana	3	Malta	1	Thailand
3	Benin	1	Gibraltar	1	Mauritania	2	Тодо
(0)	Bosnia & Herzegovina	2	Greece	4	Mauritius	4	Tunisia
11	Botswana	11	Guinea	12	Morocco	1	Turkey
1	Brazil	2	Guinea-Bissau	23	Mozambique	48	UK
4	Bulgaria	20	Indonesia	2	Myanmar	22	Ukraine
6	Burkina Faso	2	Iran	18	Namibia	1	Union des Comores
61	Cameroon	120	Iraq	23	Niger	61	USA
1	Cap Verde	9	Ireland	16	Nigeria	2	Vietnam
1	Central African Republic	98	Italy	3	Oman	1	Yemen
3	Chad	3	Ivory Coast	4	Pakistan	15	Zambia
2	Congo	1	Jordan	3	Palestine	13	Zimbabwe
3	Croatia	4	Kenya	3	Philippines		
1	Cyprus	(0)	Lebanon	11	Republic of Moldova		Total = 1106 DCPs
	Democratic Republic of	6	Lesotho	10	Republic of Seychelles		
20	the Congo	11	Libva	12	Romania		



Metop/NOAA Global Data Service

This service comprises the provision of Level 0 data and Level 1 products derived from the data generated by the following Metop-A instruments:

A-DCS, AMSU-A, ASCAT, AVHRR, GOME-2, GRAS, HIRS, IASI, MHS, SEM

EUMETSAT also produces Level 1 products based on the data from NOAA-19's AMSU, AVHRR, HIRS and MHS instruments.

In addition, the Global Data Service also includes Level 2 products based on Metop-A IASI and ATOVS data.

The charts on the following slides show the month-by-month availability of the products, identifying any significant events which impacted the service.

Note: Unless otherwise indicated, the availability figures are derived as shown here:

- For Level 0: production statistics from EUMETSAT's EPS Product Generation Facility (PGF)
- For Level 1: reception statistics from EUMETSAT's reference EUMETCast User Station (US)
- For Level 2: as for Level 1



Metop/NOAA Global Data Service: Definition of Availability

Unless otherwise indicated in the availability slides, the monthly figures are those for `timely availability', where `timely' is used to mean the following:

Level 0 & 1: available within 2 hours 15 minutes of sensing Level 2: available within 3 hours of sensing

Availability figures are given per instrument and for one or more data levels thereof. It is measured in terms of the data / products that have been generated / disseminated for each of the months in the reporting period, as a percentage of that which would nominally have been generated / disseminated in the month had continuous operations been achieved without any deviation.

The charts on the next page show the profile of Metop-A data acquired via the Antarctic ground station, the service currently supported in a demonstrational phase, with a target of acquiring 9 of the potential 14 or 15 passes per day. The significance of the Antarctic Data Acquisition ('ADA') lies in the positive impact that it has on the timeliness of the data and products being made available to users. From 2014/Q2 onwards, it is expected that all passes will be supported in the operational phase.

Note: There are certain cases where the availability of Level 2 products is indicated as being marginally higher than that of Level 1, and similarly, for Level 1 compared to Level 0. This arises because of the differences in time-logging between different stages of production influencing the generation of statistics.



Metop/NOAA Global Data Service: Antarctic Data Acquisition (ADA)

Metop-A data is acquired at NASA's ground station on McMurdo Sound in Antarctica and routed to EUMETSAT HQ. This acquisition complements that of Svalbard, and its contributing value lies in allowing data to be processed and disseminated earlier, thus improving data timeliness of Metop-A-based products.

Each chart shows the numbers of days (y-axis) in the respective half-year period on which the number of passes (x-axis) were successfully acquired at McMurdo and relayed to Darmstadt.

Overall average number of passes achieved for the two half-year periods covered are given to the right of the charts. Current target is 9 passes per day (during demo phase until 2014/Q1), out of the 14 or 15 orbits of Metop-A.





Metop/NOAA Global Data Service: Operational Events with General Impact

The following events impacted the Metop/NOAA Global Data Service to the extents given:

- <u>17-21 January:</u> Telecom link from NOAA to EUMETSAT suffered an intermittent problem. Several orbits'-worth of data not transferred, resulting in loss of products for the AMSU, AVHRR, HIRS and MHS instruments onboard NOAA's N19 satellite.
- 20-22 March: Recurrence of telecom link problems impacted transfer of data from NOAA to EUMETSAT, impacting again the products for the above-mentioned instruments on NOAA's N19 satellite.



Metop Global Data Service \rightarrow A-DCS Level 0 Data

Metop-A carries an instrument for the Argos Advanced Data Collection System (A-DCS). Environmental data transmitted by measurement platforms (on land or sea or in the atmosphere) is collected and relayed by EUMETSAT to CLS (a CNES subsidiary) in Toulouse.

Events Which Impacted Availability:

None significant.





Metop/NOAA Global Data Service → AMSU Level 1B BUFR Products

The Advanced Microwave Sounding Unit (AMSU) is a 15-channel microwave radiometer supplied by NOAA which measures atmospheric temperature profiles.

Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

None significant for Metop.

Jan & March: Telecom link problems impacted transfer of data from NOAA to EUMETSAT (see slide <u>20</u>).



Notes: (1) Metop-A's AMSU channel 7 is degraded beyond spec and is no longer used for product processing.

(2) NOAA-19's AMSU channel 8's degradation has not worsened in this reporting period and therefore the data is still considered usable for the time-being



Metop Global Data Service \rightarrow ASCAT Level 1B (SZO & SZR) Products

The Advanced Scatterometer (ASCAT) is a C-band radar which measures global ocean wind vectors.

Performance of the Level 1B service is measured in terms of the timely availability of the 'SZO' and 'SZR' products (spatial resolutions of 50 and 25 km respectively) on the EUMETCast reference user station.

Events Which Impacted Availability:

None significant.



Name and Address of the Owner, where the



Metop/NOAA Global Data Service \rightarrow ATOVS Level 2 Products

ATOVS Level 2 product processing transforms the calibrated radiance measurements from the AMSU-A, MHS and HIRS instruments (onboard Metop and NOAA-19 satellites) into information on the vertical distribution of atmosphere state parameters, on cloud and surface parameters and total atmosphere contents. All the parameters derived are assembled in one ATOVS L2 sounding product for each satellite.

Performance of the Level 2 service is measured in terms of the timely availability of the BUFR-encoded products received on the EUMETCast reference user station (US).

Events Which Impacted Availability:

None significant for Metop.

Jan & March: Telecom link problems impacted transfer of data from NOAA to EUMETSAT (see slide <u>20</u>).



Note: Metop-A's AMSU channel 7 has degraded beyond spec and is thus no longer used for ATOVS L2 product processing.



Metop/NOAA Global Data Service \rightarrow AVHRR Level 1B Products

The Advanced Very High Resolution Radiometer (AVHRR) is a multi-spectral imaging instrument provided by NOAA which produces global cloud imagery and images of land and sea surfaces. Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

None significant for Metop.

Jan & March: Telecom link problems impacted transfer of data from NOAA to EUMETSAT (see slide <u>20</u>).





Metop Global Data Service \rightarrow GOME-2 Level 1B Products

The Global Ozone Monitoring Experiment-2 (GOME-2) is a scanning spectrometer used to measure profiles and total columns of atmospheric ozone and other trace gases.

Events Which Impacted Availability:

None significant.



Harrison Property in success

The degradation of the GOME-2 instrument on Metop-A remains unexplained but performance has remained stable since September 2009. Further information on the long-term performance of GOME-2 is available under 'Product Quality Monitoring' on the webpage: <u>`www.eumetsat.int > Home > Service Status'</u>

The GOME-2 Newsletter can be found on the same page. See also <u>`www.eumetsat.int > Data & Products > Resources'</u> for further information on instrument performance and product quality.



Metop Global Data Service → GRAS Level 1B Products

The GNSS Receiver for Atmospheric Sounding (GRAS) is a radio occultation instrument which determines atmospheric profiles using GPS signals from typically between 28 and 30 GPS navigation satellites in operational use.

The chart shows:

- (1) the total numbers of GRAS Level 1B occultations produced per month (plus geolocation and quality flags)
- (2) the proportion of them successfully disseminated
- (3) the daily average number of occultations for each month provided to users (in italics)

Note that all occultations produced are disseminated (with appropriate quality flags, including those produced during manoeuvres and recovery from anomalies).

Events Which Impacted Availability:

None significant.



Daily Average Occultations for Month Available to Users (Right Scale)

Daily Average Target (500 Occultations)

In addition to the outages associated with Metop-A manoeuvres, GRAS L1B data is flagged 'degraded quality' for a fixed 4 hours following any anomaly, regardless of the actual level.



Metop/NOAA Global Data Service \rightarrow HIRS Level 1B BUFR Products

The High Resolution Infrared Radiation Sounder (HIRS) measures incident radiation using 19 infrared channels and 1 visible channel, the data contributing to the determination of the atmosphere's vertical temperature profile and water vapour from the Earth's surface to an altitude of about 40 km. Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

None significant for Metop.

Jan & March: Telecom link problems impacted transfer of data from NOAA to EUMETSAT (see slide <u>20</u>).





Metop Global Data Service → IASI Level 1C & Level 2 BUFR Products

The Infrared Atmospheric Sounding Interferometer (IASI) is used for global measurement of atmospheric temperature, water vapour and trace gases, as well as surface temperature, surface emissivity and cloud characteristics.

Events Which Impacted Availability:

None significant.



Note that external calibrations are performed typically on a monthly basis and these reduce the availability of Level 1 / Level 2 data (relative to that of Level 0) by approximately 0.5 to 0.6% of the scheduled availability.



Metop/NOAA Global Data Service \rightarrow MHS Level 1B BUFR Products

The Microwave Humidity Sounder (MHS) is used to measure atmospheric humidity primarily, but also to measure cloud liquid water content and to provide qualitative estimates of precipitation.

Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

None significant for Metop.

Jan & March: Telecom link problems impacted transfer of data from NOAA to EUMETSAT (see slide <u>20</u>).



Notes:

- NOAA-19's MHS instrument's channel 3 remains out of spec
- A local oscillator swap on Metop-A's MHS instrument performed 6-Dec-2011 decreased noise on channels 3 & 4 to pre-launch levels



Metop/NOAA Global Data Service \rightarrow SEM Level 0 Data

The Space Environment Monitor (SEM) consists of a pair of instruments which provide data to determine the intensity of the Earth's radiation belts and the flux of charged particles at the satellite's orbiting altitude.

Level 0 data (consisting of the SEM instrument source packets in EPS native format) is provided to NOAA via dedicated terrestrial line.

Events Which Impacted Availability:

None significant.





Metop/NOAA Regional Data Service

This service category comprises EARS-ATOVS, EARS-AVHRR and EARS-ASCAT services.

For EARS-ASCAT, Metop-A Level 0 data is provided by the Fast Dump Extract System (FDES) at Svalbard and, as of 23-August-2011, also from a subset of the HRPT stations (Athens, Lannion, Maspalomas, Moscow, Muscat and St. Denis). FDES provides fast access to the most recent part of each X-band dump and transfers the relevant data to the EARS system for further Level 1 processing, as do the HRPT stations. The resultant Level 1 products are forwarded to KNMI in the Netherlands for the generation of Level 2 data.

ATOVS Level 0 data is acquired by the EARS network of HRPT stations, Level 1 products are generated at those locations and forwarded to EUMETSAT for distribution. ATOVS data is also available from FDES.

AVHRR data is also acquired from both Metop-A and NOAA satellites and processed by the EARS network .

Performance of the EARS services is measured in terms of the availability of the data on the user reception stations being within 30 minutes of the instrument's observations, with the exception of the Ewa Beach, Miami and Monterey stations, for which a less-stringent timeliness of 45 minutes for data availability is allowed.



Metop/NOAA Regional Data Service \rightarrow EARS-ATOVS

This service provides ATOVS products covering data-sparse areas, derived from data received from the following satellites(listed in order of priority): Metop-A, NOAA's N19, N16, N18 and N15 (N17 data being phased out since August 2011). Both Metop's AHRPT partial coverage data and that from FDES are used.

The availability target shown in red on the chart is that for the products received by users (relative to scheduled ground station passes) and covers Levels 1A, 1C in BUFR, and Level 1D products.

Events Which Impacted Availability:

April to June: (1) Outage of NOAA data from Monterey station due to router problem (in period 23-April to 2-May)

(2) Schedules for NOAA stations not representative of actual pass acquisitions

General Issue: Problems with the HRPT transponder onboard NOAA's N15 satellite impacts the operation of the ATOVS service generally, resulting in fewer products overall.





Metop/NOAA Regional Data Service \rightarrow EARS-AVHRR

This service provides data from the AVHRR instrument onboard the NOAA satellite N19 and from the instrument on Metop-A (AHRPT partial coverage data and FDES).

Availability shown on the chart is for Level 0 data received by users (relative to scheduled regional passes). Note that no higher-level products are generated.

Events Which Impacted Availability:

None significant.





Metop/NOAA Regional Data Service \rightarrow EARS-ASCAT

This service provides products derived from the data produced by the ASCAT instrument onboard the Metop-A satellite.

As explained on <u>slide 32</u>, FDES at the Svalbard ground station extracts the relevant data from the X-band dump acquired there and provides it to EARS, which performs Level 1 processing and forwards resultant products to KNMI (Netherlands) for the generation of Level 2 data. As of August 2011, various HRPT stations have also been forwarding Level 0 data to EARS. Note that, due to reporting constraints, the HRPT station contribution is only reflected in the statistics as of April 2012. Availability shown on the chart is that of the Level 2 data received by users (relative to scheduled passes).

Events Which Impacted Availability:

22 April - 10 May: Moscow data unavailable





Search & Rescue Support

EUMETSAT supports the Cospas-Sarsat System for Search and Rescue (SAR) by flying a transponder onboard each of its more recently-launched satellites, namely Meteosat-8, Meteosat-9 and Metop-A.

The Cospas-Sarsat System is designed to provide distress alert and location data to assist SAR operations, using a constellation of geostationary and low-altitude Earth-orbiting satellites to relay signals from distress beacons to ground terminals. More information concerning the system can be found on <u>www.cospas-sarsat.org</u>.

For the reporting period January – June 2012, the availability of the transponders on the indicated satellites was as follows:

Meteosat-8: 100%

Meteosat-9: 100%

Metop-A: 99.99 % (13 cases of a known recurring software-reset limitation impacted the availability marginally)



Jason-2 OGDR Service

This service delivers the 'Operation Geophysical Data Record' products, derived from the altimetry data acquired from the Jason-2 satellite.

Jason-2 is the second satellite of the space segment of the Ocean Surface Topography Mission (OSTM), a cooperation between EUMETSAT, NOAA, CNES and NASA. EUMETSAT and NOAA process the data from the Jason-2 satellite in near real-time and archive and disseminate the products.

The chart on the next slide shows the availability of the products within timeliness constraints of 3 hours and 5 hours from the time of sensing.



Jason-2 OGDR Service

The chart shows the availability of the Jason-2 near real-time Operational Geophysical Data Record products disseminated via EUMETCast.

The target figure of 95% applies to the availability of data received on EUMETCast reception stations with a timeliness of 5 hours. The further target of 75% is for the more demanding objective of 3-hour timeliness.

Events Which Impacted Availability:

None significant.

(In general, redumps are taken at next visibility (or by other ground station) in cases of problematic passes and connection problems – this ensures minimisation of data loss, although some impact on timeliness occurs)





Third-Party Data Services

In addition to its own satellite data and meteorological products, EUMETSAT also distributes data and products from partner organisations as part of an international cooperation.

Image data from the following geostationary satellites is made available via EUMETCast, Direct Dissemination and the Internet:

- NOAA's GOES-13 ('GOES-East'), at 75°W, and GOES-15 ('GOES-West'), at 135°W
- JMA's MTSAT-2, at 145°E
- CMA's FY-2D, at 86.5°E, and FY-2E, at 105°E (also selected meteorological products)

Meteorological products based on LEO satellite data are also disseminated:

- Microwave Sounder products from CMA's FY-3A and FY-3B (currently only provided to National Met. Services)
- Level 1 and 2 products derived from data from the MODIS instrument on board NASA's Terra and Aqua satellites

The charts on the following slides show the availability of the data via EUMETCast.



Third-Party Data Services → Geostationary Satellite Data & Products

The charts on this slide show the timely availability (as a percentage of expected) of image data originating from geostationary satellites operated by NOAA and JMA (Japan Meteorological Agency), as disseminated via EUMETCast.

Events Which Impacted Availability:

March: GOES-West Service: Satellite problem (including a safe-mode) impacted data availability

> MTSAT-2 Service: Suninterference impacted some images





MTSAT-2 (145°E)





Third-Party Data Services \rightarrow Geostationary Satellite Data & Products (cont.)

The charts here show the timely availability (as percentage of expected) of selected meteorological products generated from the data acquired by the Fengyun geostationary satellites operated by the China Meteorological Agency (CMA), as disseminated via EUMETCast.

Events Which Impacted Availability: Mar- Apr: For both FY-2D & FY-2E satellites: fewer products due to eclipseseason

Note: Products for FY-2D made available operationally in February





Third-Party Data Services \rightarrow LEO Satellite Data & Products

90%

85%

80%

This slide presents charts which show the availability of data & products for LEO satellites operated by partner organisations, as disseminated via EUMETCast.

FY-3A and FY-3B: Level 1 data from microwave sounder instruments (currently only available for National Met. Services) onboard Fengyun LEO satellites. Availability shown as percentage of expected. FY-3B data became available 24-Jan-2012.

MODIS: Level 1 and 2 regional products derived from the MODIS instrument hosted on NASA's Terra and Aqua LEO satellites. Availability: total products disseminated /month and equivalent daily average/month. Total Precipitable Water products added April 2012.

Events Which Impacted Availability:

May: Approx 1.5 day's supply outage of FY-3A data







Daily Average for Month



Jan-12 Feb-12 Mar-12 Apr-12 May-12 Jun-12

EUMETCast

EUMETCast is EUMETSAT's primary dissemination mechanism for the near real-time delivery of satellite data and products generated by the EUMETSAT Application Ground Segment. Third-party data and products from partner organisations are also delivered by the system, which is based on Digital Video Broadcast (DVB) technology.

For more information about EUMETCast and the services which it supports, please visit the 'Data Access' section of <u>www.eumetsat.int</u>.

The chart on the following slide shows the availability of the system for the reporting period.



EUMETCast → **System Availability for the Year-To-Date**

The chart here shows the monthly <u>system</u> availability for the 3 EUMETCast services covering Europe, Africa and South America respectively. Both EUMETCast Africa and EUMETCast South America systems are, in effect, extensions of EUMETCast Europe and thus the system availability of each is calculated as a combination of each of their systems and the European one.

Events Which Impacted Availability:

- **<u>4-5 Sept:</u>** The European uplink component of EUMETCast suffered a ~6-hour outage, due to a partial failure of service provider's equipment at the uplink station. All services were affected, but to varying degrees of severity. The event was classified as OPS Incident #46.
- **<u>February:</u>** Severe weather conditions impacted the uplink of the EUMETCast Africa service at the Fucino ground station in Italy during the first week of the month, but most significantly on the 2nd and 3rd of February. The event was classified as OPS Incident #48.



Name and Address of the Owner, where the



EUMETCast → **Registered User Stations**

The chart shows the trend of registrations of EUMETCast user stations.

The EUMETCast system was first conceived to disseminate EARS data. It evolved into a means of dissemination for the MSG programme, and was extended to provide Metop and Jason-2 data in more recent years. Products of partner organisations such as NOAA, DWD and CMA have also been added to the system.

The significant increase in stations in 2010 was largely a result of the migration of the users of Météo-France's RETIM system to EUMETCast.

The number of stations shown registered for 2012 is as of the end of June 2012.

Note that the number of user stations is larger than the number of users (see next slide) due to some organisations possessing several user stations.





EUMETCast → Users Worldwide as of 30 June 2012



Use Adobe Reader's 'Zoom' function to view numbers of users in European countries



The EUMETSAT Data Centre

EUMETSAT's Data Centre archives all payload data acquired from EUMETSAT's operational satellites and most of the products derived from that data.

The Data Centre allows registered users to request data and products from the archive by use of its online 'self-service' ordering mechanism and supplies the requested items via physical media and the Internet. It also allows 'bulk orders' for long time-periods of data and 'standing orders' for repeated delivery of data / products over specified time periods to be requested for special needs.

Charts on the following themes appear on the next 3 slides:

- Orders Processed and Data Delivered
- Archive Orders versus Data To Be Retrieved
- Archive Order Delivery-Time Trends



The EUMETSAT Data Centre \rightarrow Orders Processed and Data Delivered

The chart here shows the orders processed monthly by the Data Centre and the resulting volumes of data delivered to the users in the 2 years up to and including June 2012. All types of orders (regular, bulk and standing) are included in the statistics.

There can be significant variation in the amount of data delivered per order, which thus gives rise to only a loose correlation between the numbers of orders processed in a month and the total volume of data delivered.

Since the start of 2012, some consolidation of standing orders has been made and consequently numbers of orders and delivery volumes have decreased in general, as can be seen from the chart.





The EUMETSAT Data Centre \rightarrow Archive Orders versus Data To Be Retrieved

The chart shows the dayby-day profile of pending archive orders to be processed, together with the related volume of data needing to be retrieved from the archive and processed to satisfy the queued orders.

The chart covers the period 1st November 2010 to 30th June 2012. Each line is made up of daily measurements (EUMETSAT working days only).

The distinct peaks in February 2012 were due to a large number of bulk orders being placed in that month.





The EUMETSAT Data Centre \rightarrow Archive Order Delivery-Time Trends

The 3 charts show delivery-time ranges for Data Centre orders according to 3 categories of order size (Small, Medium & Large), for each of the half-year periods shown on the horizontal axis. The left-hand scales help to show the proportions of the total orders delivered in the indicated time ranges (note: standing orders not included).

The colour-coding for the delivery-time bands on each of vertical bars on each chart is as follows:



The blue lines indicate the total orders per half year for each category (righthand scales apply). Total orders across all 3 categories were:

2010/H1: 6550 2010/H2: 8106 2011/H2: 6013 2011/H1: 6319 2012/H1: 4720



Small Orders (up to 10 GB)

Medium Orders (10 - 100 GB)



Large Orders (> 100 GB)





Helpdesk Service

EUMETSAT's User Helpdesk provides support to the users of its services, handling enquiries, registrations, user feedback comments, problems experienced and enhancement requests.

This section includes charts on the following subjects:

- User interaction history from 2002 onwards
- The countries and groups that gave rise to the largest numbers of user interactions in the reporting period

Name and Address of the

• Breakdown of those user interactions by category



Helpdesk Service \rightarrow User Interaction History

The chart here shows the number of user interactions handled by EUMETSAT's User Helpdesk in each halfyear since the beginning of 2002.

The all-time high in halfyearly levels of interactions seen in the first half of 2004 correlated with Meteosat-8 (the first of the second generation satellites) going into operational use and the users registering for EUMETCast to receive its data and derived products.

The next 2 slides focus on the user interactions for the current reporting period, in which a total of 1651 interactions were handled.



User Transactions per Half-Year Ending the Months Shown



Helpdesk Service → User Interactions 2012/H1 by Country of Origin





Helpdesk Service \rightarrow User Interactions 2012/H1 by Category

The chart shows the numbers of user interactions in the first half of 2012 for:

- Service Enquiries (7 categories)
- Service Registrations
- User Feedback

Total interactions for the half-year came to 1651.

Notes:

(1) 'User Support Enquiries' on the chart refer to those enquiries related to service messages, web information and training.

(2) 'User Feedback' includes comments on our services and suggestions for improvement





Changes to EUMETSAT's Services

Please see the 'Product Update History' and 'Product & Service News' sections on the <u>Service Status</u> page of the EUMETSAT website, <u>www.eumetsat.int</u>, using the 'View All' links at the feet of the sections to go back in time.

Note that details of all products can be found in EUMETSAT's Product Navigator, accessible via the homepage of the website.



Glossary

Special terms used in this report are explained in the table below (continued on several subsequent slides).

Term	Context in which used	Description
A-DCS	Metop/NOAA Global Data	The 'Advanced Data Collection System' instrument on Metop contributes to the Argos programme, which is a satellite-based data location and collection system dedicated to monitoring and protecting the environment.
AMSU-A	Metop/NOAA Global Data	The 'Advanced Microwave Sounding Unit-A' is a multi-channel microwave radiometer provided by NOAA, flying on Metop-A, which is used in combination with the HIRS instrument for measuring global atmospheric temperature profiles.
ASCAT	Metop/NOAA Global Data	The 'Advanced Scatterometer' is a C-band radar provided by ESA, flying on Metop-A, which measures global ocean wind vectors.
ATOVS	Metop/NOAA Global Data	Calibrated radiance measurements from the 'Advanced TIROS Operational Vertical Sounders', namely the AMSU-A, MHS and HIRS instruments, are transformed into various parameters and assembled in the ATOVS L2 product.
AVHRR	Metop/NOAA Global Data	The 'Advanced Very High Resolution Radiometer' is a multi-spectral imaging instrument provided by NOAA which produces global cloud imagery and images of land and sea surfaces.
СМА	Third-Party Data	China Meteorological Administration (<u>http://2011.cma.gov.cn/en/aboutcma/</u>)
Colinearity	Meteosat	Sun, satellite and ground station come into alignment twice a year, giving rise to disruption of uplink and downlink signals, resulting in partial loss of some images.
DCP	Meteosat	A 'Data Collection Platform' measures and transmits environmental data which is relayed by Meteosat satellite first to EUMETSAT's central operations, and then forwarded on to the DCP operator via direct, EUMETCast or GTS dissemination.



Glossary (continued)

Term	Context in which used	Description
Formats	Meteosat (IODC)	This refers to the High-Resolution Image (HRI) formats disseminated via Meteosat's direct dissemination broadcasts.
GOME-2	Metop/NOAA Global Data	The 'Global Ozone Monitoring Experiment-2' instrument flying on Metop-A is a scanning spectrometer used to measure profiles of atmospheric ozone and other trace gases.
GRAS	Metop/NOAA Global Data	The 'GNSS Receiver for Atmospheric Sounding' instrument flying on Metop-A is a radio occultation instrument which determines atmospheric profiles using GPS signals.
GTS	General	The 'Global Telecommunications System', established by the WMO, is used by national meteorological services to exchange meteorological data and products. See also 'RMDCN'.
HIRS	Metop/NOAA Global Data	The 'High Resolution Infrared Radiation Sounder' measures incident radiation in for determining the atmosphere's vertical temperature profile and water vapour from the Earth's surface to an altitude of about 40 km.
IASI	Metop/NOAA Global Data	The 'Infrared Atmospheric Sounding Interferometer' is a multi-purpose sounding instrument used for global measurement of temperature, water vapour, trace gases such as ozone, nitrous oxide, carbon dioxide and methane, as well as surface temperature, surface emissivity, and cloud characteristics.
ЈМА	Third-Party Data	Japan Meteorological Agency (<u>http://www.jma.go.jp/jma/indexe.html</u>)



Glossary (continued)

Term	Context in which used	Description
Level 0	Metop/NOAA Global Data	An instrument's raw data which has been demultiplexed from the total set of data dumped from one orbit of the Metop satellite.
Level 1.0	Meteosat	The raw image data acquired from a Meteosat satellite and preprocessed at the ground station, which is then received by a EUMETSAT image-processing facility, to be geometrically rectified and radiometrically corrected.
Level 1.5	Meteosat	Level 1.0 image data that has been corrected for radiometric and geometric non-linearity and is accompanied by the appropriate ancillary information that allows the user to calculate the geographical position and radiance of any pixel.
Level 1A	Metop/NOAA Global Data	Instrument data in full resolution with radiometric and geometric (i.e. Earth location) calibration computed and appended but not applied.
Level 1B	Metop/NOAA Global Data	Calibrated, earth-located and quality-controlled product, in the original pixel location, packaged with ancillary, engineering and auxiliary data.
Level 1C	Metop/NOAA Global Data	In the case of the IASI spectra, Level 1B data after the application of the apodization function.
Level 2	Metop/NOAA Global Data	Earth-located values converted to geophysical parameters at the same spatial and temporal sampling as the Level 1B and 1C data.



Glossary (continued)

Term	Context in which used	Description
MHS	Metop/NOAA Global Data	The 'Microwave Humidity Sounder' is a 5-channel microwave instrument developed for EUMETSAT to measure profiles of atmospheric humidity. Five flight models in total will be flown on the 3 Metop satellites, plus NOAA-18 and NOAA-19.
NOAA	Third-Party Data	National Oceanic and Atmospheric Administration (<u>http://www.noaa.gov/</u>)
Nominal RCs	Meteosat (0° SEVIRI)	SEVIRI repeat cycles consisting of geometrically and radiometrically-corrected data in all 12 channels, with less than 18 missing detector lines in the scanned Earth area for any given spectral channel (54 for HRV), where less than 12 of those lines (36 for HRV) are adjacent to each other.
`On-Time'	All	The data or product has been generated or received `on-time' at a specified location (e.g. at generation facility or EUMETCast user station respectively) within the relevant timeliness constraint.
ООР	Metop	'Out-Of-Plane' manoeuvre, i.e. one conducted with a Metop satellite in order to adjust the inclination of its orbit.
Perfect Formats	Meteosat (IODC)	High-Resolution Image (HRI) formats which have no missing lines and are based on the latest scanned image according to schedule.
Perfect Images	Meteosat (IODC)	Rectified images which are 100% complete.



Glossary (continued)

(end of report)

Term	Context in which used	Description
PGF	On Metop performance charts	The Metop 'Product Generation Facility' is the part of the EPS CGS (Core Ground System) which generates Level 0 data and controls the generation of Level 1 and 2 products by the relevant PPFs (Product Processing Facilities).
Repeat Cycles (or RCs)	Meteosat (0° SEVIRI)	The period in which the MSG SEVIRI instrument performs one scan and then is repositioned ready for the next repeat cycle. A nominal repeat cycle (a scan of the entire Earth disc) has a duration of 15 minutes.
RMDCN	General	The 'Regional Meteorological Data Communication Network' is used by WMO Region VI to carry GTS traffic within Europe. See also 'GTS'.
RSS	Meteosat (9.5° SEVIRI)	Rapid-Scan Service (for MSG), where the repeat cycle has a duration of only 5 minutes, covering the latitude range of 15 to 70°N.
SEM	Metop/NOAA Global Data	The 'Space Environment Monitor' consists of a pair of instruments which provide data to determine the intensity of the Earth's radiation belts and the flux of charged particles at the satellite's orbiting altitude.
SEU	Satellite or instrument outages	'Single Event Upset', the term used to refer to an effect on onboard electronics caused by charged particles (e.g. solar), possibly resulting in a switch-off of an electronic system.
SEVIRI	Meteosat Second Generation (MSG)	Spinning Enhanced Visible and Infra-Red Imager

