Issue 26 May 2007

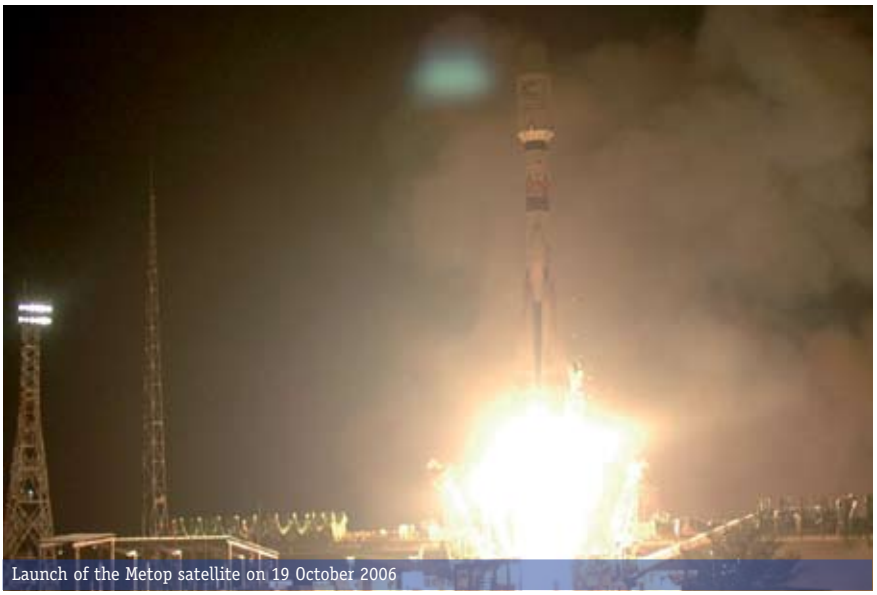
EUMETSAT

image

News from Europe's weather satellite organisation

Metop – at your service!

Soon, Europe will enter a new era of operational meteorology and climatology when all commissioning activities for Metop-A, launched on 19 October 2006, are successfully concluded and the inaugural satellite of the EUMETSAT Polar System is declared ready for operational service.



Launch of the Metop satellite on 19 October 2006

The commissioning process was conducted jointly by the teams from the Low Earth Orbit Division and the Operations Department. "The development of the EPS System was very complex and thanks to a thorough testing prior to launch, it was possible to reach a stable operational status in a very short time" reports the Programme Manager of the EUMETSAT Polar System, Marc Cohen. From an operational standpoint, Mike Williams, Head of the Control Centre at EUMETSAT, states that "Testing the satellite, instruments and ground segment went more smoothly than we could have hoped. We already expected the instruments supplied by NOAA to commission comparatively easily. The newly developed European instruments such as GRAS and IASI also went operational to schedule."

Given that the EUMETSAT Polar System and operating a satellite in polar orbit are both completely new areas of responsibility for the organisation, some technical hitches were anticipated concerning system reliability and stability, and on transferring from a simulated to a live environment. In the event, however, the system coped very well. Other key milestones included:

> "EUMETSAT is delighted to take over operations of this pioneering new satellite"

- All of Metop's passes were successfully acquired by the ground station in Svalbard, and no significant problems were encountered during the transfer of the satellite data to the EUMETSAT mission centre in Darmstadt.

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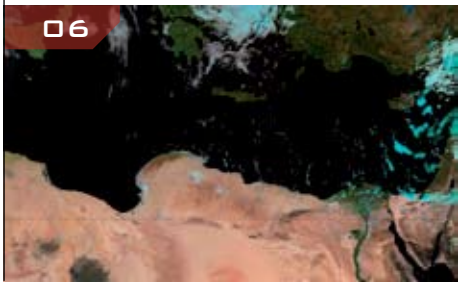
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Director-General's Desk



I am very pleased to report the significant progress made by the organisation since the last newsletter six months ago. Most noteworthy is the success of the EUMETSAT Polar System - especially its space segment, Metop, Europe's first-ever polar-orbiting meteorological satellite. You will find all the relevant details in the lead article. But may I express once again my delight at the satellite's successful launch last October - and at the swift dissemination of data to our Member States and partners, who started using the data as early as mid-January this year. Commissioning activities are about to be completed, which is an impressive achievement. It is a mark of a mature organisation capable of applying expertise gained from the Meteosat programme to the provision of additional satellite services, which next year will extend to Jason-2.

This is precisely my point about progress. EUMETSAT is well on its way to fulfilling its vision of becoming the European satellite operator of choice for all missions within the mandate of its convention. We currently operate five satellites across three programmes; we are planning the operational activities for Jason-2's forthcoming oceanography mission, and the planning process for Jason-3 has started. Also, we are already working on future programmes such as Meteosat Third Generation (MTG), which will succeed the current second generation of Meteosat satellites, and another future programme to even replace Metop. Results of the trade-off analysis on the MTG space segment configuration were unanimously endorsed at this year's special Council in April, and we anticipate further positive developments throughout the course of 2007. Hopefully next year will see the programme given the final go-ahead, with a planned launch of the first MTG satellite in 2015.

Our planet's changing climate is another topic of increasing concern, and one on which a great deal has been published recently. With Metop now almost operational we are in a position to expand our contribution to weather forecasting – especially Numerical Weather Prediction models – and to monitoring climate change. In doing so, one has to acknowledge that climate change is a long-term, global phenomenon which will require continuous monitoring throughout the coming decades. Only a global network of satellites can deliver such observations reliably over such a time span. EUMETSAT is a vital part of this network, and in an excellent position to provide the necessary data and products in support of climate change monitoring.

That is progress indeed!



Dr. Lars P. Prahm
Director-General of EUMETSAT

Continued from page 1: Metop - at your service!

- The Satellite In-Orbit Verification phase, conducted by ESA and EUMETSAT, went smoothly and to schedule; the space segment was declared ready for operational use in March.

- The Commissioning and Handover Review was performed at the end of April and concluded that the system was validated and the services to end-users were ready to go operational. End-to-end routine delivery of data to users was scheduled to begin at the end of May.

- Data dissemination via EUMETCast performed very well - this was the first time EUMETSAT's unique system was used for testing a new satellite.

Commissioning Metop-A – as with its construction and launch – was very much a joint European and US endeavour, with the European Space Agency (ESA), CNES and European Industry, NOAA and NASA all involved in testing and checking the satellite and its instruments. "The virtually hitch-free commissioning phase was a great success, and EUMETSAT was already delivering data from three instruments to end-users by the end of 2006" said Marc Cohen.

Microwave sounding data from the ATOVS suite of instruments were disseminated as part of the commissioning process. "So far our end-users are very satisfied with both the new service and the quality of the data," says Ken Holmlund, Head of EUMETSAT's Meteorological Operations Division. The European Centre for Medium-Range Weather Forecasts and the UK Met Office were the first to start assimilating AMSU and MHS data into their models in early and mid-January respectively.

Now EUMETSAT is even more efficient!

Many of EUMETSAT's key administrative processes – such as budgeting, invoice processing and accounting as well as procurement and payroll – have now been running on SAP software since January, and this despite the organisation having to face some significant challenges on the way. These were mostly due to the need to adjust processes according to EUMETSAT practice and needs as well as some last-minute glitches. Once the system development is completed, the organisation expects significant operational benefits from the SAP system in terms of lower costs, greater efficiency, better integration of systems and enhanced support for internal management decision-making processes. It will also enable EUMETSAT to harmonise more effectively with international standards of best practice and compliance. The budget cycle for 2008 is already being coordinated via the new system.

"SAP was implemented in record time," reports Jutta Merkel, responsible for coordinating the cross-organisational project team. "The project was launched towards the end of 2005, and was completed in just over a year, thanks to the hard work of the cross-organisational team of 30 staff and consultants. It is a major achievement, only made possible through the team's outstanding personal commitment - and all the more impressive because everyone continued their normal duties throughout."

The project is currently in the post-implementation phase, which is expected to last for six months, and during which additional functionalities will be introduced. Also some of the processes still need adjustments, but such activity was expected and is in fact normal when introducing changes of such magnitude. The system should be fully operational by Summer 2007, by which time the organisation will be fully reaping the benefits of the new system.

Veteran satellite bows out



Meteosat-5, EUMETSAT's longest-serving satellite, was decommissioned on 26 April after 16 years in orbit, and joins its four predecessors in the graveyard orbit, 37,000km above the Earth's surface. Given that the expected lifetime of the first generation of Meteosats was only five years – a satellite's lifetime being largely defined by its fuel reserves - Meteosat-5's long service is all the more remarkable, and symbolic of the 30 years of reliable service Europe has received from Meteosat.

Launched in 1991, Meteosat-5 provided the operational service from geostationary orbit until 1997, when Meteosat-7 took over. From 1998 to 2006, Meteosat-5 delivered the Indian Ocean Data Coverage service, and then became backup for Meteosat-7 when the latter once more took over the job. On 23 January, Meteosat-6 began its drift towards the Indian Ocean, arriving in the region on 26 April. With the Meteosat-6 and -7 satellites firmly in position at 67.5°E and 57.5°E respectively, the time had come to retire and de-orbit Meteosat-5.

The second generation of Meteosat satellites, MSG, was inaugurated with the launch of Meteosat-8 in August 2002, followed by Meteosat-9 in December 2005, and now provides even better service from geostationary orbit. For example, the on-board SEVIRI instrument, the most advanced imager in geostationary orbit, delivers superior imagery twice as frequently and at a higher resolution than the previous generation.

The improvements in service delivered by the modern fleet of MSG satellites are proving invaluable for daily weather forecasting as well as nowcasting and very short-range forecasting. Nowcasting relies on high quality images and data delivered every 15 minutes. Thanks to MSG, meteorologists can identify and monitor rapidly evolving and potentially dangerous weather events, such as the massive storm 'Kyrill' that lashed the European continent in mid-January, as well as track the volatile development of small but intense depressions which can lead to devastating windstorms.

Meteosat – 30 proud years of service

Meteosat-1 *(1977-1985)*
Europe's first operational satellite system for weather forecasting

Meteosat-2 *(1981-1991)*

Meteosat-3 *(1988-1995)*

Meteosat-4 *(1989-1995)*

Meteosat-5 *(1991-2007)*
Provided the operational service from geostationary orbit until 1997, the Indian Ocean Data Coverage (IODC) service from 1998-2006, and finally the IODC backup service for Meteosat-7

Meteosat-6 *(launched 1993)*
Provides backup to the IODC service at 67.5°E

Meteosat-7 *(launched 1997)*
Provides the IODC service at 57.5°E

Meteosat-8 *(launched 2002)*
First of the MSG series; provides backup service for Meteosat-9 at 3.4°W

Meteosat-9 *(launched 2005)*
Provides the primary operational service at 0°Longitude; SEVIRI, HRIT and LRIT data are transmitted via EUMETCast

EUMETSAT helps GMES take operational shape

A key priority for the Global Monitoring for Environment and Security (GMES) initiative has been to finalise the Fast Track Services Implementation Groups' reports on the proposed land, marine, atmospheric and emergency services. EUMETSAT has been actively supporting the groups on activities relevant to its operational mandates and aims to become one of the major satellite data providers for the marine and atmospheric monitoring services.

The organisation is currently assessing the conditions under which it would make available its geostationary and polar-orbiting satellite data, together with all products and tools developed by its network of Satellite Application Facilities (SAFs), for a range of GMES core services. The Council has also approved the secondment of a EUMETSAT employee to the GMES Bureau at the European Commission (EC).

"Together with the African Union Commission, EUMETSAT is strongly encouraging the extension of GMES to Africa under the European Union's Strategy for Africa," says Paul Counet, EUMETSAT's Head of Strategy and International Relations." In October 2006, at the opening of EUMETSAT's 7th African User Forum in Maputo, and in the presence of the President of the Republic of Mozambique, the African Union Commissioner for Rural Economy and Agriculture presented the Maputo Declaration, signed by key African decision-makers, which calls for the EC to embrace Africa in the GMES initiative.

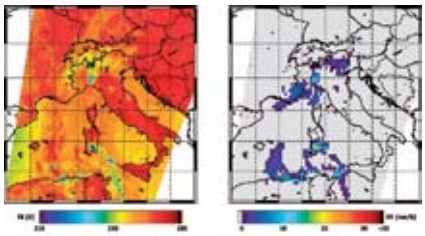
"In effect, 'GMES Africa' would be a continuation of the African Monitoring of the Environment for Sustainable Development (AMESD) project. It would enable African national and regional decision-makers to benefit from the operational use of Earth observation technologies, data and tools to help manage their environment more effectively, ensure long-term sustainable development and monitor the effects of climate change. Through GMES, African countries will also benefit from strategic global environment surveillance programmes under the Global Earth Observation (GEO) initiative, in line with the objectives of the European Commission for GEO."

Update on AMESD

In October 2006, the EC issued an invitation to tender to companies interested in managing the AMESD project from Addis Ababa, Ethiopia. A shortlist of European and African consortia has been drawn up and the successful company will be appointed in the summer, marking the inauguration of AMESD.

Recent years have seen northern and central Europe subjected to increasingly severe and devastating floods - and southern Europe to prolonged crop-destroying droughts and freshwater shortages. The Satellite Application Facility on Support to Operational Hydrology and Water Management, currently in the development phase, will help to improve flood and drought forecasting and warning systems, safeguarding life, property and livelihoods.

The SAF on Support to Operational Hydrology and Water Management



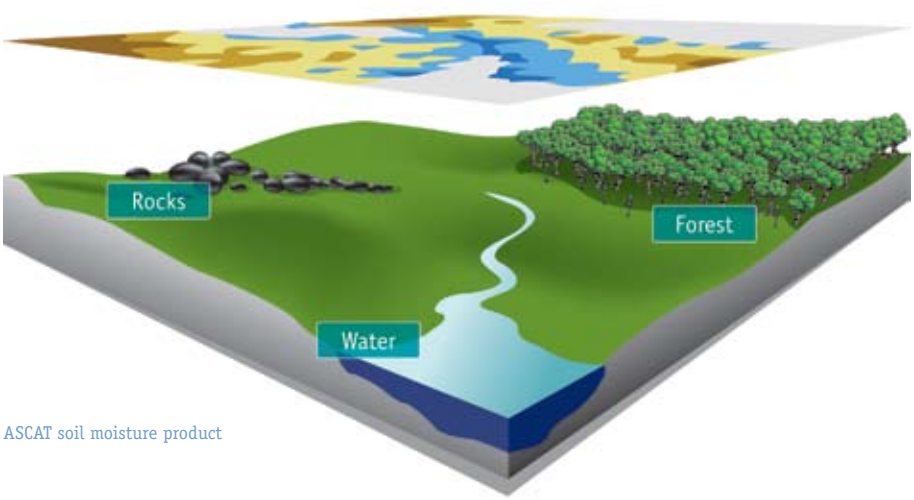
Example of precipitation retrieval from SSM/I - DMSP-F13, 26 November 2002, 06:10 UTC, SSM/I Ch. 85.5 GHz

For Europeans, weather in the new millennium has been characterised by hydrological extremes, from droughts in the Mediterranean countries to widespread flooding across the rest of Europe. Flooding alone has been responsible for hundreds of fatalities, the evacuation of nearly one million people and damage estimated at more than €25 billion. Droughts also bear significant economic and environmental costs; not only are they occurring with increasing intensity in countries such as Spain and Portugal, but other more temperate European countries have been experiencing prolonged water shortages in recent summers.

Improved flood and drought forecasting and warning capabilities have, therefore, become a matter of priority for Europe – and beyond. Accurate weather forecasts and detailed data are increasingly important to the development of complex hydrological models which enable hydrologists and meteorologists to predict and assess the risk and the impact of droughts and excessive rainfall. The accuracy of forecasting techniques can be substantially improved by using advanced data assimilation techniques to integrate diverse sources of information such as radar, rain gauge networks - and increasingly, satellite imagery.

At present, ground-based observations vary greatly in quality and coverage across Europe. Recent advances in satellite remote sensing technologies and data quality, particularly with the advent of the EUMETSAT Polar System of Metop satellites, are opening up new opportunities to fill in the 'gaps' by capturing detailed, spatially distributed information about rainfall, snow cover and soil moisture – parameters of great significance for hydrological models, Numerical Weather Prediction (NWP) and water management.

The Satellite Application Facility on Support to Operational Hydrology and Water Management (H-SAF) brings together multi-disciplinary teams of researchers and weather forecasters with expertise in hydro-meteorology, operational flood forecasting systems, flood warning dissemination and emergency planning. The five-year development phase of the H-SAF programme began in September 2005, following the EUMETSAT Council's approval of the proposal, under the leadership of the Italian Meteorological Service (USAM). The SAF consortium includes the national meteorological services of Austria (ZAMG), Finland (FMI), Belgium (KMI), France (Météo-France), the German Bundesanstalt für Gewässerkunde (BFG), the European Centre for Medium-Range Weather Forecasts (ECMWF) and the hydro-meteorological services of Hungary, Poland, Slovakia and Turkey; Romania joins the programme via visiting scientist activity.

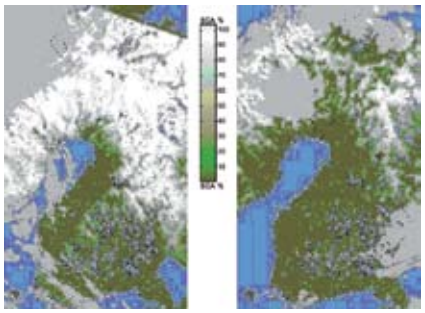


ASCAT soil moisture product



Because the needs of operational hydrology are very varied and constantly evolving, the H-SAF teams face the challenge of developing a broad spectrum of products and tools to measure and assess:

- Precipitation: as one of the most valuable sources of meteorological input in hydrological models, operational hydrology requires the best possible estimates of rainfall and its variability in time and space. Hydrologists have a particular requirement for combining satellite observations of precipitation with ground-based data, especially over sea and mountainous regions.
- Snow cover and snow water: very useful parameters for a number of reasons, including accurate, long-term snow melt forecasts for water management agencies, assimilating snow cover into forecast models and providing independent validation for the land assimilation activities of NWP laboratories.
- Soil moisture: ground-based observations in Europe are poor, owing to the very high spatial variability of soil moisture, which severely limits the usefulness of monitoring soil moisture with in-situ data.
- The quality and reliability of space-based observations, and the validation of impacts on hydrological and Numerical Weather Prediction models.



Snow mask maps in 5 km x 5 km grid cells over Finland and the neighbouring areas (left image: 29 April 2006, right image: 5 May 2006). In the maps, SCA coverage is presented as running colours describing SCA percentage. Cloudy areas are shown in grey and the blue areas refer to water.

H-SAF products will be primarily disseminated worldwide via EUMETCast. For further information, the SAF Hydrology Framework Working Group's Summary Report can be downloaded from the SAFs Projects page at www.eumetsat.int.

About SAFs

SAFs are dedicated centres of excellence for processing satellite data and form an integral component of EUMETSAT's distributed applications ground segment. Located at National Meteorological Services in Member States, they use the expertise of the EUMETSAT community to process application-specific data from geostationary and polar orbiting satellites for the generation of new products and tools for the meteorological and climate data user communities.



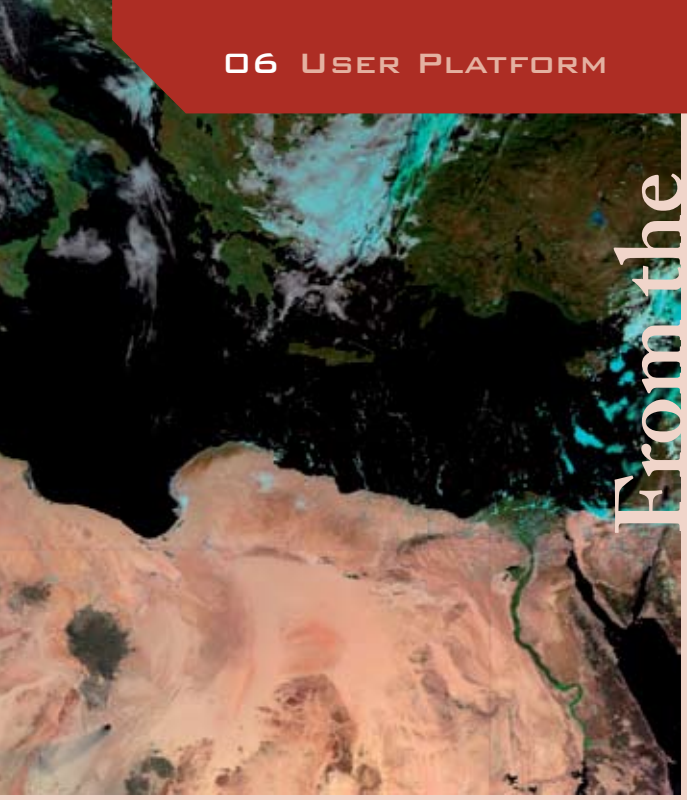
Latest news on Jason-2 and its successor

The Jason-2 satellite, which will carry the Ocean Surface Topography Mission, has passed more critical milestones over the past six months, culminating in the successful integration and validation of the platform at Alcatel in Cannes, France. The payload module, which will host the on-board instruments, has been assembled and delivery of the instruments is underway. Two instruments, NASA's GPS and DORIS, CNES's orbit determination system, were integrated in late 2006 and the Altimeter is to be delivered in June.

"Problems were encountered with some testing procedures which slowed progress a little, reducing the system schedule margin from four months to 7 weeks," says François Parisot, EUMETSAT's Project Manager for the Jason-2 mission. "But I am pleased to report that the launch remains on schedule for mid-2008."

Work on the ground segment has also made good progress. The partners successfully conducted the interface review at CNES's site in Toulouse, and links were established between the ground station at Usingen, Germany, the mission control centre at EUMETSAT, NOAA and CNES. Testing of the links will begin shortly, including the exchange of files, telemetry and telecommands. Validation of the interface, data and files will be performed later in 2007.

With Jason-2 proceeding apace, plans are already taking shape for its successor, Jason-3, to ensure continuity of data delivery. The proposal is to build it to similar specifications as Jason-2, with the appropriate adaptations and additional instruments. This would ensure a cost-effective and timely development programme, culminating in a launch in 2012 or 2013. "Timing is critical, as the Global Monitoring for Environment and Security (GMES) initiative has designated Jason-3 a priority for the delivery of marine core services," explains François Parisot. "This places the programme within the scope of EUMETSAT's own long-term interests in operational oceanography."



Data acquired from the AVHRR instrument on board Metop-A on 25th October 2006 at 08:00 UTC and processed to level 1b at 09:43 UTC.

From the archive

On 25 October 2006, the first data were received from the Advanced Very High Resolution Radiometer (AVHRR) on board the newly launched polar-orbiting Metop-A satellite. The image is an RGB combination in high resolution. It reveals high resolution features over the virtually cloud-free eastern Mediterranean sea and north-east Africa region.

Particularly striking are the highly delineated coastline, the Nile estuary and river and their adjoining fertile soils. The high reflectivity of the sandy and rocky Libyan desert reveals interesting features like the extinct Waw an Namus volcano deep in the desert (lower left of the image). A low caldera about 4 km in diameter is surrounded by a 5-10km wide black deposit of ash that stands out starkly against the surrounding desert.

By contrast, the lower reflectivity of the sea makes the Mediterranean appear dark, and cumulus clouds can be seen north of the Egyptian coast. Over the Aegean there are deeper clouds, along with some convective clouds to the east of Cyprus.

User Platform

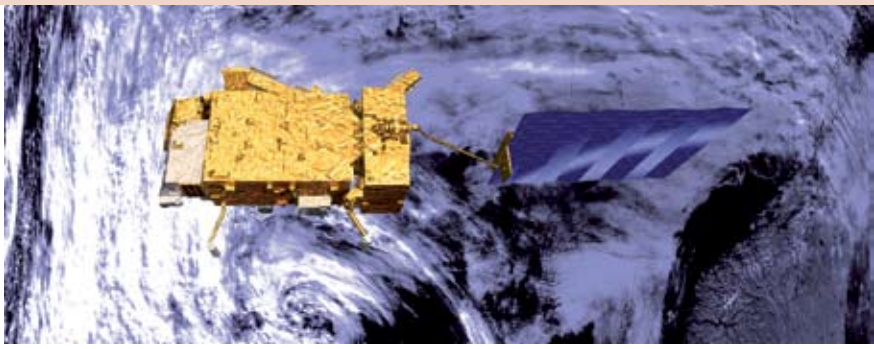
01 Data now available from Metop

The smooth-running commissioning of Metop-A has resulted in data being made available to the user community in record-breaking time. The first level 1 products from the AMSU-A instrument were disseminated via EUMETCast only 12 days after launch, followed a few weeks later by MHS, HIRS and AVHRR products. By the end of March, 500 users were regularly receiving the AVHRR global level 1 products.

EUMETSAT plans to start disseminating Global Area Coverage (GAC) data from NOAA-18 via EUMETCast in May 2007. The GAC data, comprising AMSU, MHS, HIRS and AVHRR instrument data processed to level 1, complement the Metop-A level 1 products in the provision of global environmental data.

02 LRPT service unavailable from Metop

Following investigations of the noise that appeared on the HIRS infrared channel when the Low Resolution Picture Transmission (LRPT) service was switched on - and in view of the operational importance of HIRS - a decision was made to terminate the LRPT service for the duration of the Metop-A operations to avoid any further interference to HIRS. The A/HRPT service remains unaffected and continues to operate as planned.



03 Introducing the Product Navigator

With over 140 products currently available via EUMETCast, and a further 100 in the pipeline over the next 12 months, it became evident that users needed assistance in identifying product availability, together with their geographical coverage and potential applications. Accordingly, EUMETSAT released the first version of its Product Navigator in March 2007.

The Navigator puts a vast range of essential environmental data at the fingertips of users around the globe. It provides a brief product description, information on the product format and file naming convention, plus links to more detailed information.

Users will find it much easier to search for and list all data and products from EUMETSAT's geostationary and polar orbiting satellites, as well as those of other international satellite operators. The Navigator also provides access to products disseminated via FTP Internet and the WMO's Global Telecommunication System.

To view and use the Product Navigator visit:
http://www.eumetsat.int/products/

For further information...

...contact the User Service Helpdesk:

Tel: +49 6151 807 366/377
Fax: +49 6151 807 379
E-mail: ops@eumetsat.int
Website: www.eumetsat.int



Profile: Dr. Graeme Mason

Taking EUMETSAT into a new operational era

As Deputy Programme Manager for the EUMETSAT Polar System (EPS), Dr. Graeme Mason played a key role in last October's historic launch of Europe's first operational polar-orbiting meteorological satellite and has been responsible for the instruments carried by the Metop spacecraft.

Graeme's career has been centred around space and Earth observation since his student days at the University of Edinburgh, Scotland. Before joining EUMETSAT he worked at the Royal Observatory in Edinburgh and at the Rutherford Appleton Laboratory in Oxfordshire, England. He helped to develop and calibrate the Along Track Scanning Radiometer (ATSR) instrument, which measures sea surface temperature from space, and which successfully flew on ESA's ERS-1 satellite.

Graeme joined EUMETSAT in 1991 to take charge of the organisation's first direct procurement of space hardware, the Microwave Humidity Sounder (MHS) instrument. Five MHS flight models were delivered under his supervision, and two of them are currently operational on the Metop-A and NOAA-18 satellites. As Deputy Programme Manager for EPS with responsibility for Metop's on-board instruments, Graeme has worked closely with EUMETSAT's partner agencies: ESA, CNES, NOAA and NASA. He was also interim Ground Segment Manager for the EPS ground segment for 12 months.

One of the career high points for Graeme was his role as EUMETSAT's representative in the bunker at last October's launch of Metop-A from Baikonur, Kazakhstan, which he describes so vividly on this page! Moving on after this highlight, he will take up the role of Head of the Systems Engineering Support Divison at EUMETSAT from June 2007.

Career path:

- **2007:** became Head of the Systems Engineering Support Division at EUMETSAT
- **2001:** became Deputy Programme Manager for the EPS Programme
- **1998:** assumed responsibility within EUMETSAT for all instruments on the Metop satellites
- **1992:** received his doctorate in Atmospheric Physics from the University of Oxford
- **1991:** joined EUMETSAT to manage the definition and procurement of the Microwave Humidity Sounder (MHS) instrument
- **1985-1991:** worked at the Royal Observatory, Edinburgh, the Rutherford Appleton Laboratory and at the University of Oxford
- **1984:** graduated from the University of Edinburgh with a degree in Astrophysics, followed by a Masters degree in Astronomical Technology in 1985

Private life:

Dr. Mason is married and enjoys jogging, golf, listening to music and walking the dog.

'Groundhog Day' in the Metop Bunker . . .

Soyuz Launch Pad No. 6, Metop-A's launch-site, is located in a remote western section of the Baikonur Space Cosmodrome writes Dr. Graeme Mason. Reaching it from the city of Baikonur takes about one hour in a recklessly driven mini-bus, and involves navigating 70km of ferociously rough roads and four security checks.

A series of concrete bunkers surround the launch pad, housing the Soyuz launch control, rocket fuelling and fire and safety teams as well as the payload customer. The Metop team's bunker was located 8m underground and about 200m from the launch pad. Our three-fold role was to interface with Starsem, the launch service provider, and their Russian partners at the launch pad; to relay information to and from the EPS/Metop launch directors (Marc Cohen and Peter Edwards) 50km away at the Starsem integration facility; and to switch on and operate the front-ends of the satellite electrical ground support equipment and the telemetry / telecommand communication equipment to Darmstadt. In the event of any launcher problems or a launch abort, we would be the first to know.

The first members of our team arrived 16 hours before the launch to switch on the equipment, initiate the countdown procedure and validate the communication links. The windowless bunker (thankfully equipped with air-conditioning and a fridge) was permanently manned throughout the countdown sequence, with team members taking turns to stretch their legs and grab lungs-full of fresh air. We followed the activity on the pad via the CCTV monitors next to the large countdown clock.

Once the countdown had begun there were long, slow periods with little to do, punctuated by short bursts of intense activity. Repeating the same activities day after day - and enduring the regular launch aborts and postponements – instilled a sense of déjà-vu reminiscent of the film 'Groundhog Day'.

Four hours before the nominal launch the Russian-chaired State Commission met to review the status of all elements, weather included, in preparation for authorising the fuelling of the launcher. Once fuelling began, the pace of activity and sense of anticipation in the bunker accelerated rapidly – only to be punctured by the disappointment of a yet another launch abort announcement!

Eventually, after spending eight 10-hour plus days in the bunker (including four launch aborts, one postponement for bad weather and two rehearsals) Metop-A was launched skywards on 19 October 2006 at 16:28 UTC – causing the bunker to shake slightly with the low growl of the Soyuz engines, and thereby ending 'Groundhog Day' for us all.

Global Meteorological Satellite Update

Europe

Meteosat-5	was relocated to a graveyard orbit and switched off on 26 April 2007
Meteosat-6	was relocated to 67.5°E on 26 April 2007. It acts as standby spacecraft, and provides DCP acquisition support during Meteosat-7 eclipses
Meteosat-7	is now located at 57.5°E and will provide the IODC service until at least the end of 2008
Meteosat-8	provides the backup service for Meteosat 9 from 3.4°W
Meteosat-9	provides the primary operational service from 0° Longitude
MSG-3 and -4	are to be launched 2011 and 2013 respectively
Metop-A	was successfully launched on 19 October 2006, became operational on 15 May 2007, and is the primary mid-morning satellite of the Initial Joint Polar System (IJPS) since 21 May 2007. Metop-B and -C, planned for launch in 2011 and 2015, are currently in storage.
Jason-2	the follow-on satellite from the Jason-1 Ocean Surface Topography Mission is planned for launch in mid-2008 and will be located in a non-sun-synchronous orbit at 66° inclination

USA

GOES-9	is currently stationed at 160°E
GOES-10	was relocated to 60°W to complement the coverage of South America
GOES-11 (West)	is operating at 135°W as the GOES West operational satellite
GOES-12 (East)	is operating at 75°W as the GOES East operational satellite
GOES-13	was launched in May 2006 and is stored in orbit at 105°W
GOES-O, -P, -R, -S	will be launched in 2008, 2009, 2014 and 2016 respectively, to be located at 135°W or 75°W
NOAA-12	is a morning polar-orbiting satellite providing only real-time data coverage
NOAA-14	is a morning polar-orbiting satellite providing only real-time data coverage
NOAA-15	is the backup polar-orbiting early morning satellite for NOAA-17
NOAA-16	is a backup afternoon polar-orbiting satellite for NOAA-18
NOAA-17	is a morning polar-orbiting satellite
NOAA-18	is the primary afternoon polar-orbiting satellite. It replaced NOAA-16 and was the first spacecraft of the IJPS.
NOAA-N'	is scheduled for launch in 2009 to take over the afternoon orbit
NPP-NPOESS	is scheduled for launch in 2009 to take over the afternoon orbit
NPOESS-C1 and **-C3**	are planned for launch in 2013 and 2020 (afternoon orbits)
NPOESS-C2 and **-C4**	are planned for launch in 2016 and 2022 (early morning orbits)

Russia

Meteor-M N1 and **N2**	are planned for launch in 2008 and 2009 respectively (morning orbit satellites)
Electro-L N1	is planned for launch in 2007 and will be positioned at 76°E
Electro-L N2	is planned for launch in 2009 and will be positioned at 76°E or 14.5°E

China

Fengyun-1D (FY-1D)	is the primary polar-orbiting meteorological satellite operating in a sun-synchronous early morning orbit
FY-2C	is operating at 105°E as the primary geostationary satellite
FY-2D	was launched on 8 December 2006 to act as backup for FY-2C at 86.5°E
FY-2E, -2F and **-2G**	are planned for launch in 2008, 2010 and 2012 respectively
FY-3A	the first of the second generation of Chinese polar-orbiting meteorological satellites, is planned for launch in 2007
FY-3B and **-3C**	are planned for launch in 2009 and 2011 respectively

Japan

MTSAT-1R	is stationed at 140°E
MTSAT-2	acts as back-up for MTSAT-1R at 145°E
	The MTSAT follow-on satellite will be launched in the 2013-2015 timeframe

India

KALPANA-1	(formerly METSAT), India's first exclusively meteorological satellite is positioned at 74°E
INSAT-3A	is operating at 93.5°E
INSAT-3D	is planned for launch end 2007/1st quarter 2008

Republic of Korea

COMS-1 and -2	(Communication, Ocean and Meteorological Satellite) are planned for launch in 2008 and 2014 respectively and will be positioned at 116.2°E or 128.2°E

Maputo User Forum



The 7th EUMETSAT African User Forum took place in Maputo, Mozambique on 16-20 October 2006. Organised in cooperation with the National Meteorological Institute of Mozambique (INAM), the biennial forum is part of EUMETSAT's initiative to strengthen links with the user community in Africa. Over 150 participants from 56 countries representing African regional bodies, government agencies and regional scientific institutions participated in this important forum which helped to reinforce the well-established dialogue between EUMETSAT and the African user community in order to optimise the use of EUMETSAT satellite data in Africa. The forum also provided the opportunity for delegates to receive the latest information on EUMETSAT's programmes, which play a crucial role in the mitigation of natural disasters as well as climate and environmental monitoring.

Events Diary

- **The 2007 EUMETSAT Annual Meteorological Satellite Conference, to be held jointly with the 15th American Meteorological Society (AMS) Satellite Meteorology and Oceanography Conference**
  24-28 September 2007, Amsterdam, The Netherlands
- **First IASI International Conference**
  13-16 November 2007, Anglet, France
- **SpaceOps Symposium 2008**
  12-18 May 2008, Heidelberg, Germany
- **The Committee on Space Research (COSPAR) 37th Scientific Assembly and 50th Anniversary Assembly**
  13-20 July 2008, Montreal, Canada
- **The 2008 EUMETSAT Annual Meteorological Satellite Conference**
  22-26 September 2008, Bratislava, Slovakia

For further information about these events visit:
www.eumetsat.int

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