Issue 29 October 2008 EUMETSAT

image

News from Europe's Weather Satellite Organisation

Jason-2 Ocean Surface Topography Mission begins

The successful launch of the Jason-2 ocean altimetry satellite from Vandenberg Air Force Base in California on a Delta II launcher at 7:46 UTC on 20 June added ocean surface topography to the missions EUMETSAT participates in. Only 48 hours after launch, the first test product was processed using data provided by Jason-2. Products were made available to a team of scientists for more precise evaluation in preparation for their delivery to all users on an operational basis by the end of the year.

The Jason-2 satellite was successfully launched on board a Delta II launcher from Vandenberg Air Force Base, California, 20 June 2008 at 7:46 UTC (source: US Air Force photo/Joe Davila)

Only 48 hours after launch, the first test product was processed using data provided by Jason-2.

The 20 June launch was picture perfect and some 55 minutes afterwards, the satellite separated from the launcher and was injected into orbit, followed by the deployment of its solar array using a pre-defined on-board command sequence. This is the first time the entire process was monitored by an on-board camera, a video of which is available on the EUMETSAT website. Control of the satellite was then taken over by the Centre National d'Etudes Spatiales (CNES), the French space agency, which performed Early Orbit Phase operations such as configuration of the payload.

The Doppler Orbitography and Radio-positioning Integrated by Satellite (DORIS) instrument, supplied by CNES, was turned on during the evening of 20 June, followed by the Global Positioning System (GPS) platform, the gyroscopes, the stellar sensors and the reaction wheels during the night of 20-21 June.

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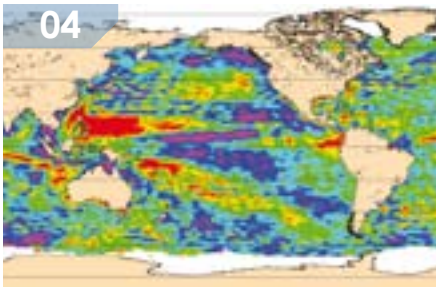
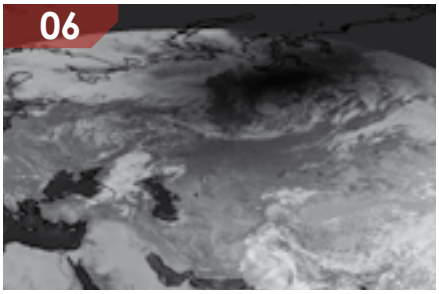




Director-General's Desk

In our last newsletter, we were looking forward to the launch of Jason-2, which once again is the front-page story of this newsletter. The successful launch of the ocean altimetry satellite has added operational oceanography to the missions EUMETSAT conducts. It will give us an important role monitoring rising sea levels, a key parameter of climate change.

We must now maintain the momentum provided by the Jason-2 launch towards declaring the Ocean Surface Topography Mission (OSTM) operational by the end of the year and ensure there is a follow-up to continuing it after Jason-2. I was very pleased that the 64th EUMETSAT Council on 1-2 July showed unanimous support for a possible follow-on programme and all Member States expressed interest in becoming potential participants.

While EUMETSAT has been busy with Jason-2 and its follow-on, I would like to emphasise this does not mean neglecting our core mission providing increasingly accurate data on weather and climate in Europe and worldwide. Meteosat Second Generation (MSG) will ensure the transition to the next generation. It was a pleasure to attend an informal meeting of space ministers in Kourou on 21 July to sign the launch contract for MSG-4, the last in the series, scheduled for launch by Arianespace no earlier than 2013.

The Meteosat Third Generation (MTG) Preparatory Programme is progressing well since it was launched at the beginning of the year. We have now arrived at the stage where we can finalise the definition of the payload to be carried by MTG, a decision so important that it will be taken at a specially convened session of the EUMETSAT Council on 9 October.

It is noteworthy to mention in this context that while EUMETSAT is handling the process, it is in fact very much user-driven – those who use the data and products provide their requirements – and the satellites are tailored to meet future needs. The fact that this works so well makes me extremely proud indeed.

With all this going on, EUMETSAT is in a very good position to continue to provide services to European citizens over coming decades with more highly capable meteorological satellites than those they will replace.

Dr. Lars P. Prahm
Director-General of EUMETSAT

EUMETSAT supports Kopernikus

EUMETSAT is not only supporting the European Kopernikus programme, Europe's Meteorological Satellite Organisation is also helping shape what was formerly known as Global Monitoring for Environment and Security (GMES), working closely with the European Commission and the French Presidency of the EU during the second half of 2008.

"The French EU Presidency has put space at the top of its agenda," said Paul Counet, Head of EUMETSAT's Strategic and International Relations Division. This agenda included the informal meeting of European ministers in charge of space in Kourou, French Guiana, on 20-22 July 2008, the GMES Forum in Lille on 16-17 September and the European Space Council in Brussels on 26 September.

The Lille forum, where GMES was renamed, marked the launch of the first Kopernikus services in pre-operational mode. In this respect, Counet described as "essential" the decision by EUMETSAT's 64th Council meeting on 1-2 July that the organisation would provide its data and products, including real-time data, free of charge to the five GMES Core Services (three fast-track and two pilot services) in the 2008-2010 timeframe. The three fast track services are the Land Core Service, Marine Core Service, Emergency Response Support Service, and the two pilot services cover Security and Atmosphere monitoring. Further areas could be envisaged in the future, including climate monitoring.

Stressing the importance of the decision, the EUMETSAT Director-General, Dr. Lars Prahm, told Council: "This agreement probably covers more marine and atmosphere space data than the total available until now to GMES from any single source." He added that the agreement covers a "significant" 30-50 per cent of the space data needed by GMES Core Services on Marine and Atmosphere monitoring. With this decision, EUMETSAT Member States gave a clear signal that they will support GMES' move into its operational phase and that EUMETSAT should play a key role in that phase.

The 26 September European Space Council in Brussels discussed what had since become Kopernikus as one of the current priorities and recognized and welcomed the role of EUMETSAT in Kopernikus and climate change monitoring, stressing the importance of EUMETSAT's Meteosat Third Generation (MTG) programme.

The European Commission is drafting a communication on Kopernikus to be completed this year. The document will lay out the governance, long-term funding, international relations and data policy of the programme.

EUMETSAT is offering to be one of the operational entities supporting Kopernikus. With its meteorological experience and expertise, EUMETSAT is offering to support the European Commission in the definition of Kopernikus user requirements for space data for operational oceanography, atmosphere and climate monitoring. In areas where it is the operational entity, EUMETSAT is offering to establish jointly with the European Space Agency (ESA) the overall system and ground segment requirements, implement the ground segments and prepare them for operations, and operate related space-based observing systems and corresponding user services, while ESA develops and implements the space segment.

Counet described Kopernikus as "a model for international cooperation." – a model in which EUMETSAT indeed plays an important part.

Shaping the future of Meteosat

The future of the next generation of Meteosats will be determined during a special EUMETSAT Council meeting on 9 October, where a decision is expected to be taken on the payloads of Metosat Third Generation (MTG). Soon afterwards at the end of November, the European Space Agency ministerial will approve the full development programme for the MTG satellites.

Users have placed the following order of priority for the four payloads being studied for MTG:

- the main imager, called the Flexible Combined Imager (FCI), continuing and enhancing the imaging mission of Meteosat Second Generation (MSG)
- the Infrared Sounder (IRS)
- the lightening imager (LI)
- the ultraviolet and near infrared sounder (UVN) for chemistry applications developed by the Global Monitoring for Environment and Security (GMES) initiative, which has since become Kopernikus, as Sentinel 4 and flown on MTG for chemistry applications

The MTG Preparatory Programme which has been underway at EUMETSAT since the beginning of the year is considering implementing the MTG mission with four imagery satellites and two sounding satellites. The imagery satellites include the FCI and LI, while the sounding satellites would have infrared and ultraviolet sounding instruments.

In addition to providing continuity from MSG in the European Meteorological Satellite Organisation's core mission, MTG will bring substantial enhancements, with more frequent images of higher spatial, temporal and radiometric resolution, more channels than its predecessor (16 compared to 12) and novel missions will be implemented for the geostationary orbit with the IRS and LI instruments, as well as an atmospheric instrument measuring in the ultraviolet and visible spectrum (UVN), according to Sergio Rota, Head of the Geostationary (GEO) Programme Division at EUMETSAT.

The requirements for MTG have been constructed by EUMETSAT in direct communication with users at National Meteorological Services, supported by remote sensing experts, and assessed regarding their feasibility, such that MTG could meet the expectations of user communities for the years beyond 2020.

A breakthrough is expected from the increased temporal and spatial resolution of the FCI measurements, where in particular the High Resolution Fast Imagery mission focusing on Europe/North Africa with a resolution down to 500 metres and a repeat cycle of 2.5 minutes will contribute the greatest benefits. Important benefits are also expected to come from the sounding missions, which will deliver information previously unavailable on dynamic features of the atmosphere moisture and temperature profiles in high vertical, horizontal and temporal resolution and support emerging operational chemistry and air pollution applications.

The LI mission will provide important support for Nowcasting and warning of severe weather and therefore contribute significantly to the risk reduction measures to be undertaken in these circumstances. It will also contribute to the remote sensing of precipitation and support environmental applications related to the atmospheric chemical processes and to the climate system.

Meanwhile, Meteosat Second Generation (MSG) continues to provide operational services at 0 and 9.5 degrees east, from where the Rapid Scanning Service began in spring this year. Work is being completed on MSG-3 and MSG-4 – the last two satellites in the second generation series - and on their instruments before the satellites are placed in storage and then prepared for launch. During the informal space ministers' meeting in Kourou in July, the Director-General of EUMETSAT, Dr. Lars Prahm, and the Chairman and Chief Executive Officer of Arianespace, Jean-Yves Le Gall, signed the contract for the launch service for MSG-4. MSG-4 is currently scheduled for launch in January 2013 from the Guiana Space Centre in Kourou, using either an Ariane 5 or a launch vehicle of the Soyuz family. The launch contract for MSG-3, also with Arianespace, has also been modified to allow for the possibility of MSG-3 being launched with a Soyuz rocket from Kourou, in addition to an Ariane 5.

The 2011 and 2013 launch dates for MSG-3 and MSG-4, respectively, are not yet definite as they depend on the in-orbit status of the satellites and their missions. Whatever the final launch dates of the last two MSG satellites and of MTG, the future of Meteosat over the next couple of decades is taking shape.

Jason-2 oceanographic products and applications Part 1

The first data from Jason-2 were acquired and processed only 48 hours after the satellite was launched.

This feature sets out to describe the products and applications that will evolve from the new Jason-2 service.

After Jason-2's first 10 days in its operational orbit, it was already apparent that the data produced are excellent – nearly as good as those from Jason-1 - despite the fact that they have not yet been fully calibrated. The principal investigators of the dedicated Ocean Surface Topography Science Team are making their first detailed assessments. Official validated Jason-2 products will be available in November and distributed to operational meteorology users in near-real time (around three hours), while climate users will have access to offline data beginning in March 2009. Nevertheless, users are already envisaging how they will use Jason-2's new and improved data and products.

Users such as the Danish Meteorological Institute (DMI), the Koninklijk Nederlands Meteorologisch Instituut (KNMI), the Dutch weather service, and Collecte Localisation Satellite (CLS) expect Jason-2 to produce higher quality data nearer to coasts and over lakes and rivers compared to Jason-1. This is thanks to the Poseidon-3 altimeter, coupled with Doppler Orbitography and Radio-positioning Integrated by Satellite (DORIS). Francois Parisot, Jason-2 Project Manager at EUMETSAT, explained that modifications have been made to Jason-2's altimeter hardware and software, reducing the time it takes to switch from idle mode over Earth to tracking mode over bodies of water. He added that the radiometer antenna has been lengthened to reduce the clutter produced by coasts.

Dr. Adrian Hines, Manager of Wave Forecasting Research and Development at the Met Office (UK), looked forward to receiving improved near-coastal products from Jason-2 as coasts "are the areas of key importance to many wave model users, but validation is currently difficult due to lack of observations."

The Jason-2 Ocean Surface Topography Mission (OSTM) will produce and distribute three global data products to users. It will deliver the Operational Geophysical Data Record (OGDR) to users in near-real time (three hours), while the Interim Geophysical Data Record (IGDR) and Geophysical Data Record (GDR) are offline, i.e. delivered a few days and a few weeks later, respectively. These products all cover the same key ocean parameters and use the same basic format but differ according to the auxiliary data they include and the level of accuracy, with the latter increasing over time.

OGDR is a new operational product specifically developed for Jason-2/OSTM. It will provide near-real-time data on surface wind speed and wave features and an initial estimate of sea surface height based on the data computed by DORIS. Its primary purpose is to feed data to meteorological organisations carrying out near-real-time ocean condition forecasting. OGDR will be especially useful for numerical weather prediction, including atmosphere and ocean forecasting. It will also make data on sea surface height anomalies available for ocean users. OGDR is processed at the EUMETSAT

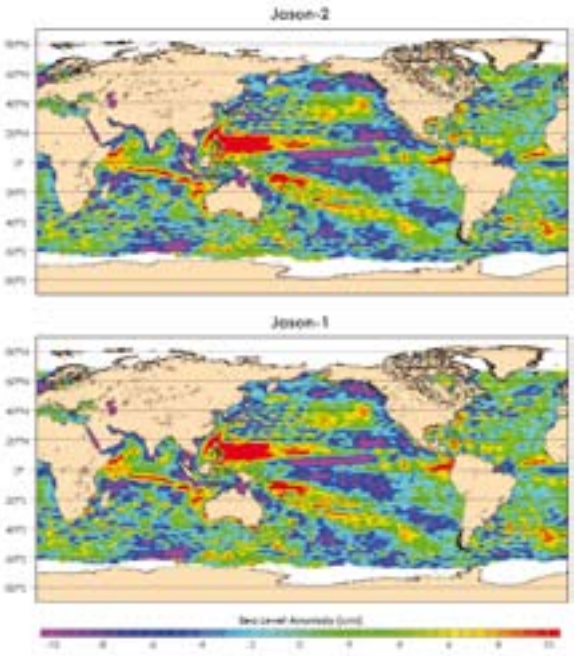
Jason-2 Ocean Surface Topography Mission begins

(continued from page 1)

On 22 June, the Poseidon-3 altimeter, Jason-2's main instrument, the NASA-supplied Advanced Microwave Radiometer (AMR) and GPS Payload (GPSP), CNES' Environment Characterization and Modelisation-2 (Carmen-2), and the Japanese Light Particle Telescope (LPT) were turned on. CNES' Time Transfer by Laser Link (T2L2) was activated on 25 June.

This allowed the processing of the first products by CNES. Only 48 hours after launch, the first waveforms were acquired from Jason-2 and CNES processed the first Operational Data Record (OGDR) test product. After the calculation of the first DORIS preliminary orbits, the first Interim Geophysical Data Record (IGDR) product was processed by CNES a week after launch. Less than a month after launch, data from Jason-2 was used to produce its first complete maps, calculated from the first 10 days of the satellite's operational orbit.

On 21 June, Jason-2 was pointed towards the Sun and the next day towards the Earth, its operational attitude. The satellite gradually used its thrusters to climb to the same orbital altitude as Jason-1 and position itself to follow Jason-1's ground track, orbiting about 60 seconds behind Jason-1. On 4 July, Jason-2 reached its operational orbit some 1,336 km above the Earth at a 66° inclination. Jason-1 and Jason-2 then began flying in formation for a few months, making nearly simultaneous measurements to allow scientists to precisely calibrate Jason-2's instruments. This will allow Jason-2 to become fully operational by the end of the year.



Comparison of Jason-2 and Jason-1 data shows that although Jason-2 data have not been fully calibrated, the satellite was already delivering near-perfect data in the first 10 days in orbit.

and National Oceanic and Atmospheric Administration (NOAA) ground centres and disseminated over the EUMETCast satellite broadcasting system, as well as through data networks and the Global Telecommunication System network. Key users will include the European Centre for Medium-range Weather Forecasting (ECMWF), Météo-France, NOAA, Met Office (UK), DMI, and the Norwegian Meteorological Institute, which will use OGDR to assimilate significant wave heights in their operational wave models. Peter Janssen, Head of the Ocean Waves Section of the ECMWF, said the ability to do so within two or three hours of observation would bring these models "closest to the truth."

The Met Office (UK) does not currently assimilate altimeter wave heights into wave models but plans to do so in the longer term, including through the use of Jason-2 data. Instead, it uses wave height data from the Envisat RA2 product to validate offshore wave models. The Met Office plans to review and update its validation system after it has replaced its second generation wave model with a third generation model, WaveWatch III, expected around October. Hines said: "At this stage I would like us to start to use the Jason-2 data as well as the Envisat data. This will give us a more comprehensive validation data set against which we can assess the models."

Hines also revealed that the Met Office and the UK National Oceanography Centre, Southampton, plan to submit a proposal to work on providing improved quality wave period data sets, including with Jason-2 products.

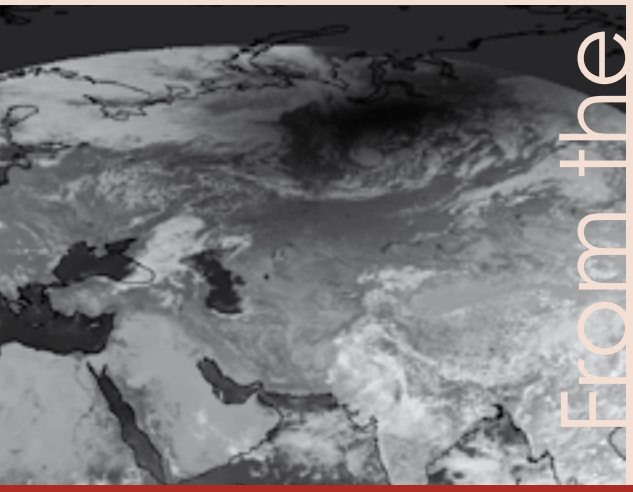
The IGDR and GDR off-line products are generated by CNES and distributed by both CNES and NOAA. IGDR provides sea surface data produced within one to one-and-a-half days of being recorded. This record includes analysed data on sea surface height, absolute dynamic topography and velocities for larger-scale ocean currents for use in medium-range weather forecasting, seasonal forecasting and ocean weather applications.

The ECMWF, NOAA's Global Modelling and Assimilation Office, Mercator Ocean, and national users will use IGDR for assimilation of sea level anomalies. IGDR will also be used by NOAA's Atlantic Oceanographic and Meteorological Laboratory in its Tropical Cyclone Heat Potential product for cyclone intensity monitoring and by the DMI and Dutch users for storm surge modelling.

The GDR provides fully-validated data produced within 60 days of the events being recorded and covers sea surface height, principally for climate monitoring and climate modelling. The main users are geophysical and operational oceanography climate researchers working for the Global Sea Level Observing System and the International Panel for Climate Change Assessment Reporting on Sea Level Rise.

In the next issue...

In the next issue of IMAGE, this series on satellite applications will continue with an examination of how officially validated Jason-2 data and products are being used following their calibration.



From the archive

This visible imagery of the 1 August 2008 solar eclipse over Siberia was taken by Meteosat-7 at 10:30 UTC. The satellite followed the eclipse as it moved from north-western to south-eastern Asia.

The total eclipse was visible from within a narrow corridor that moved across half the Earth. The path of the Moon's umbral shadow began in Canada and extended across northern Greenland, the Arctic, central Russia, Mongolia and China. A partial eclipse was seen within the much broader path of the Moon's partial shadow, which included north-eastern North America, most of Europe and Asia.

User Platform

EUMETCast-Europe transition from HOT BIRD™ 6 to EUROBIRD™ 9

During the last quarter of 2008, the EUMETCast Europe service will move from HOT BIRD™ 6 at 13°E to EUROBIRD™ 9 at 9°E. In order to prepare the user community for this change, there will be a period of parallel service from both satellites from 17 November to 17 December 2008. This time period is set aside for users to make the transition to the new satellite. To avoid loss of data, it is recommended that EUMETCast-Europe users complete this transition by 12 December 2008. The EUMETCast-Africa and EUMETCast-Americas services will not be affected by this change.

Further information on the transition schedule, the EUROBIRD™ 9 reception parameters and the antenna repointing requirements is available from the EUMETSAT website: *www.eumetsat.int*

Product Navigator supports EO data discovery

During the fourth quarter of 2008, EUMETSAT will release a new version of the Product Navigator which allows users to discover the data collections available via EUMETCast and the EUMETSAT Archive. This new Navigator is the first step in a two-year initiative to develop a EUMETSAT Earth Observation Portal. The next steps in the project will include the implementation of integrated functionality to support archive data ordering and subscription to dissemination services and finally catalogue interoperability with partner agencies.

The new Product Navigator maintains the same functionality as the old version but is now compliant with the ECINSPIRE Directive using ISO standards. Users can search the database with a simple search, an extended search or browse the collections by thematic selection. The Product Navigator holds over 200 collection entries and provides information on the product provider, data format, delivery mechanism and data access. The new version will also be disseminated via EUMETCast.

To discover data at your fingertips, go to: *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

New EUMETSAT brand identity

EUMETSAT recently launched a new logo as part of the introduction of a more up-to-date brand identity used commonly throughout the organisation.The new logo is part of an overall branding strategy aimed at bringing unity to EUMETSAT's identity and at the same time making it more modern to reflect the progress of the organisation.

The new logo - which consists of an updated icon (globe), custom-made logotype and new English and French taglines succinctly describing the European Meteorological Satellite Organisation's mission, will be introduced using a phased-in approach to keep the costs of rebranding to a minimum. The new identity will also be used for branding other areas of EUMETSAT, such as the SAF Network, which will also begin to appear in the coming months.

EUMETSAT
Monitoring weather and climate from space
Surveiller le temps et le climat depuis l'espace

New climate monitoring brochure

EUMETSAT has just published a new brochure outlining its contribution and that of its Member States and partners to global climate monitoring and the challenges involved. The new publication can be downloaded from the publications area of the EUMETSAT website: *www.eumetsat.int/Home/Main/Publications*

Profile: Gretchen Lindsay

Maintaining the transatlantic bridge

As the US National Oceanic and Atmospheric Administration (NOAA) liaison to EUMETSAT since last November, Gretchen Lindsay ensures smooth transatlantic relations between the two organisations. She does so on both the personal and organisational levels.

"The basis of what I do is talk to people – discuss ideas, listen to opinions, understand challenges," she explains. "I try to share with EUMETSAT the issues that NOAA faces and also keep NOAA up to speed on the issues that EUMETSAT faces. I look for opportunities where each organisation can benefit from what the other is doing."

> "The basis of what I do is talk to people..."

Gretchen's work "involves helping to coordinate projects between the two organisations, like activities with the Initial Joint Polar System and the future Joint Polar System." It can also "involve independent research and analysis, participation in technical meetings, writing a paper to capture the opinions developed in a joint meeting, or most simply, ensuring that the right people are talking to each other."

Gretchen identifies NOAA's primary objective in its cooperation with EUMETSAT as maintaining the dialogue between the two organisations "from the lowest working levels to the most senior levels." Further objectives are gaining efficiency through cooperation, such as reducing costs, access to data, and measurement coverage and timeliness, and harmonising actions "to positively influence the international space-based environmental monitoring community so that the global architecture is as robust and productive as possible in terms of meeting user needs."

Gretchen sees the current priorities as being to sustain cooperation on the existing joint constellation with EUMETSAT in the mid-morning orbit and NOAA in the afternoon orbit and ensuring continued cooperation on polar programmes through the Post-EUMETSAT Polar System (Post-EPS) and the US National Polar Orbiting Operational Environmental Satellite System (NPOESS) era, and creating a joint, operational Ocean Surface Topography Mission (OSTM) following Jason-2.

In future, Gretchen would like to see NOAA and EUMETSAT extend programmatic cooperation into geostationary satellites and "solidify their recognition within the international community as the standard for cooperation on operational satellite systems."

Gretchen "thoroughly" enjoys the environment at EUMETSAT, finding people "engaging, smart and insightful," with "a sincere dedication to the mission. She even considers the decision-making process to be very effective: "Ideas generated at the lowest levels are vetted through the science and operational working groups, evaluated by the policy and financial committees, and then if the ideas are found to be worthwhile, they are put in front of the delegates for a vote."

She was pleasantly surprised to discover how similar NOAA and EUMETSAT are, with both organisations committed "to providing the best possible, affordable, satellite-based weather information and staffed by dedicated and talented operators, engineers, technicians, scientists, and administrative personnel." She also finds similarities in the political environments both organisations operate in: "The EU and the EUMETSAT delegate body in the case of EUMETSAT and the US and Congress in the case of NOAA."

Gretchen was surprised that living and working in Europe (specifically Germany) is "very similar" to the United States. But "the big difference I see at EUMETSAT is that people eat lunch together in the cafeteria. In the US, there is a tendency to eat at one's desk."

Career path:

- **2007**: became NOAA liaison to EUMETSAT
- **2004**: became Senior Project Engineer in charge of strategic and policy planning at the Aerospace Corporation
- **2003**: awarded M.A. in International Studies by Denver University
- **2002**: Technology and Diplomacy Fellow, American Institute of Physics, US State Department, Washington, DC
- **1996**: became Project Engineer in charge of environmental user requirements development in the Aerospace Corporation's Space Operations, Requirements, and Technology Group
- **1996**: awarded Ph.D. in Space Physics by the University of California, Los Angeles
- **1991**: joined the Aerospace Corporation as Satellite Sensor Performance Analyst
- **1987**: joined US Air Force as Satellite Operations Officer for the Defense Meteorological Satellite System
- **1986**: awarded B.S. in Aerospace Engineering by the University of Colorado at Boulder

Private life:

Married. Tutors children in reading, mathematics and science. Trains horses and competes in US events.

Global meteorological satellite update

Europe	
Meteosat-6	is located at 67.5°E and acts as a standby spacecraft, providing DCP acquisition support during Meteosat-7 eclipses
Meteosat-7	is located at 57.5°E and will provide IODC services until at least the end of 2010
Meteosat-8	has been providing rapid scanning service at five-minute intervals from 9.5°E since May 2008 and is the backup service for Meteosat-9
Meteosat-9	provides the primary operational service from 0° Longitude
MSG-3 and -4	are scheduled to be launched in 2011 and 2013, respectively
Metop-A	has been the primary mid-morning satellite of the Initial Joint Polar System (IJPS) since 21 May 2007
Metop-B and -C	are scheduled to be launched in 2011 and 2015, respectively
Jason-2	the follow-on satellite from the Jason-1 Ocean Surface Topography Mission was successfully launched on 20 June 2008 into a non- sun-synchronous orbit at 66° inclination
USA	
GOES-10	is operating at 60°W to support the South America mission
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	is stored in orbit at 105°W
GOES-O, -P, -R	scheduled to be launched in 2008, 2009, and 2014, respectively, to be located at 135°W or 75°W
NOAA-15	is a secondary polar-orbiting early morning satellite
NOAA-16	is a backup afternoon polar-orbiting satellite for NOAA-18
NOAA-17	is a backup mid-morning polar-orbiting satellite for Metop-A
NOAA-18	is the primary afternoon polar-orbiting satellite and is the first spacecraft of the Initial Joint Polar System (IJPS)
NOAA-N'	is scheduled for launch in 2009
NPP	is scheduled for launch in 2010
NPOESS-1 and -3	are planned for launch in 2013 and 2020, respectively (afternoon orbits)
NPOESS-2 and -4	are planned for launch in 2016 and 2022, respectively (early morning orbits)
Russia	
Meteor-M N1 and **N2**	are planned for launch in late 2008 and 2010, respectively (morning orbit satellites)
Electro-L N1	is planned for launch in late 2008 and will be positioned at 76°E
Electro-L N2	is planned for launch in 2010 and will be positioned at 14.5°E
Electro-L N3	is planned for launch in 2015 and will be positioned at 76°E or 14.5°E.
Kanopus-V N1 and **N2**	are planned for launch in 2008 and 2009, respectively
Resurs-P N1 and **N2**	are planned for launch in 2010 and 2012, respectively
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	acts as backup for FY-2C at 86.5°E
FY-2E, -2F and **-2G**	are planned for launch in late 2008, 2011 and 2013, respectively
FY-3A	launched on 27 May 2008, is the first of the second generation of Chinese polar-orbiting meteorological satellites
FY-3B	is planned for launch in 2009
FY-3C to **-3G**	are planned for biennial launches in the 2013-2021 timeframe
Japan	
MTSAT-1R	is stationed at 140°E
MTSAT-2	acts as backup for MTSAT-1R at 145°E
MTSAT follow-on	is planned to be launched in the 2013-2015 timeframe
India	
KALPANA-1	formerly METSAT, is India's first exclusively meteorological satellite, positioned at 74°E
INSAT-3A	is operating at 93.5°E
INSAT-3D	is planned for launch in 2009
OCEANSAT-2 and **-3**	are planned for launch in 2008 and 2012, respectively
SARAL	(Satellite with ARgos and ALtika) is planned for launch in 2010
Republic of Korea	
COMS-1 and **-2**	(Communication, Ocean and Meteorological Satellite) and COMS follow-on are planned for launch in 2009 and 2014, respectively, and will be positioned at 116.2°E or 128.2°E

Editor: Claudia Ritsert-Clark
Content: Nicholas Fiorenza
Design: Stephen Killick, Matthias Scherer, Nadine Vinci

Please send all correspondence to:

EUMETSAT User Service
Am Kavalleriesand 31
64295 Darmstadt, Germany

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

Annual users conference

The Darmstadtium, site of this year's annual users conference, features futuristic architecture

EUMETSAT held its 2008 Meteorological Satellite Conference at the recently inaugurated Darmstadtium conference centre in Darmstadt on 8-12 September 2008, with the support of the Deutscher Wetterdienst (DWD). The annual event brought together over 420 of the world's top scientists and researchers from around 40 countries, and covered a wide range of subjects, such as nowcasting, climate monitoring with operational satellites, advanced sounding and sensor calibration, to name but four of the 10 session topics. Special features included a dedicated exhibition on the EUMETSAT Satellite Application Facilities (SAFs), offering each consortium, in addition to the scheduled verbal and poster presentations, the opportunity to interact with users and to show examples (and even real-time data) of the relevant SAF products. Jason-2 was also given prominence during the week and, in particular, the Ocean Surface Topography Mission. Contributions to the programme from EUMETSAT partner organisations included a presentation from NOAA on the future global cooperation.

Events Diary

- **The 8th EUMETSAT User Forum in Africa**
  6-10 October 2008, Accra, Ghana
- **Coordination Group for Meteorological Satellites**
  3-7 November 2008, Maspalomas, Spain
- **Committee on Earth Observation Satellites Plenary Meeting**
  10-13 November 2008, George, South Africa
- **Observing and Forecasting the Ocean - Ocean Surface Topography Science Team Meeting, GODAE Final Symposium, International DORIS Service Workshop**
  10-15 November, Nice, France
- **Fifth Plenary Session of the Group on Earth Observations (GEO)**
  19-20 November 2008, Bucharest, Romania

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