Countdown to Jason-2 launch

EUMETSAT has made all final preparations for the launch of the Jason-2 ocean altimetry satellite on the morning of 15 June. Once in orbit and after it has been calibrated, the satellite will provide oceanographic products on an operational basis to the large EUMETSAT user community.

EUMETSAT’s Jason-2 teams and ground segment elements, including the earth terminal, are ready to support the satellite, which has made its long transatlantic journey to the launch site. At the end of April, Jason-2, with its Poseidon-3 dual frequency altimeter, arrived at Vandenberg Air Force Base in California, from where it will be launched with a Delta II rocket.

“Once in orbit, the satellite will provide oceanographic products on an operational basis to the EUMETSAT user community.”

Before its long journey to the west coast of the United States, the satellite underwent various tests. All environmental testing was completed by the end of 2007. This was followed by the spacecraft qualification review held at Thales Alenia Space in Cannes on 11-13 March, reported Parag Vaze, Ocean Surface Topography Mission (OSTM) Project Manager at the Jet Propulsion Laboratory in Pasadena, California. Operational readiness reviews were held at EUMETSAT at the end of March and also at the beginning of April between the four partners – EUMETSAT, the French Space Agency (CNES), the US National Aeronautics and Space Administration (NASA), and the US National Oceanic and Atmospheric Administration (NOAA), said Francois Parisot, EUMETSAT’s Project Manager for the Jason-2 mission.

Continued on page 5
I am probably repeating myself when I state that 2008 is an extremely significant year for EUMETSAT - because previous years have also been very important, enabling us to embark on our current full expansion. But it is truly now that the organisation is expanding in terms of missions, new members, greater international cooperation, and eventually even the extension of its headquarters in Darmstadt.

The imminent launch of Jason-2 will expand EUMETSAT’s role in operational ocean altimetry and the Ocean Surface Topography Mission will further increase our very successful cooperation with our international partners.

EUMETSAT is also expanding its range of Meteosat geostationary satellites. The Meteosat Third Generation (MTG) Preparatory Programme will enable us to continue providing services to European citizens over the next two decades with more highly capable satellites than those they will replace. At the same time, Meteosat Second Generation is still going strong and is expanding its services beyond its primary imagery mission to include rapid-scanning. We are thus not only providing continuity, but also constantly improving our services, in consultation with our users, which is one of our great strengths.

Both MTG and Post-EPS will allow EUMETSAT to expand its European role into Global Monitoring for Environment and Security (GMES). In addition to its important role in the European Space Policy, EUMETSAT is expanding its cooperation with partners outside Europe.

As more Member States join EUMETSAT, the organisation is expanding its membership, more closely mirroring the composition of the EU. I was pleased to be able to welcome Slovenia as our 21st Member State in February of this year and am looking forward to more new members joining EUMETSAT soon.

As EUMETSAT expands and continues to provide an ever increasing range of services, there is a corresponding increase in our space requirements. In order to enable us to continue this expansion into the future, we have secured an additional plot of land to the south of our present site, through a kind offer from the German authorities.

So EUMETSAT is successfully expanding the monitoring of the atmosphere, oceans and land from space, supporting total Earth system monitoring and the ambitious agenda we have set for ourselves in serving European citizens.

Dr. Lars P. Prahm
Director-General of EUMETSAT
EUMETSAT intensifies global partnerships

EUMETSAT is deepening its partnerships with countries and national weather services all over the world, while at the same time its Cooperating States are showing increased interest in becoming full members of EUMETSAT. This increased international cooperation is made possible by the development and launch of new weather satellites.

A case in point is the China Meteorological Administration (CMA), which plans an ambitious weather satellite launch schedule over the next decade. Data exchange begun on a trial basis between EUMETSAT and CMA in September 2007 will be extended. Further cooperation is being studied, such as using the Svalbard antenna to receive High Rate Picture Transmission (HRPT) data from the Chinese FY-3 second generation polar-orbiting satellite after its launch in May 2008 and cooperating in the processing of these data, as well as the possibility of rebroadcasting Meteosat-7 data via the Chinese FengYunCast distribution service. This enhanced cooperation is subject to approval by the 64th EUMETSAT Council on 1-2 July 2008.

Thus, CMA is becoming one of EUMETSAT’s most important partners outside Europe, besides the United States. One of EUMETSAT’s objectives in 2008 is to upgrade its relationship with CMA and make it a strategic partner, said Paul Cournet, EUMETSAT’s Head of Strategy and International Relations.

During the 63rd EUMETSAT Council last December, Volker Liebig, Director for Earth Observation Programmes at the European Space Agency (ESA), referred to EUMETSAT as “ESA’s first partner in earth observation.” EUMETSAT will be a key data provider for the European Global Monitoring for Environment and Security (GMES) initiative through its Meteosat Second Generation (MSG), EUMETSAT Polar System, the new Jason-2, and future Meteosat Third Generation satellites, the latter of which may embark the planned ESA Sentinel-4 instrument.

EUMETSAT also supports an African component of GMES. It contributed to the GMES Africa event in Lisbon last December, which set the objective of submitting the first draft of an action plan for establishing a partnership between GMES and Africa to be submitted to EU and African constituencies by the end of 2008.

In addition, EUMETSAT participates in the African Monitoring of the Environment for Sustainable Development (AMESD) programme, which was launched by the African Union on 30 October 2007. AMESD, the follow-on initiative to Preparation for the Use of MSG in Africa (PUMA), is an international cooperation programme aimed at providing all African nations with the resources required to manage their environment more effectively and ensure long-term sustainable development in the region. AMESD activities include the deployment of new EUMETCast stations in Africa and the upgrading of existing PUMA stations.

Elsewhere, EUMETSAT is implementing or renewing cooperation agreements with various partners. The new cooperation agreement with Canada is being implemented this year, with a focus on potential Canadian participation in EUMETSAT programmes and on Satellite Application Facilities (SAFs). EUMETSAT held a SAF workshop at its headquarters in Darmstadt in January which included Canadian as well as Chinese and Japanese participation.

Cooperation with India includes operational altimetry. Cournet said EUMETSAT is interested in the data from the SARAL (Satellite with ARgos and ALtiKa) spacecraft, a cooperative altimetry technology mission between the Indian Space Research Organization and CNES, the French space agency.

Meanwhile, EUMETSAT’s cooperation agreement with Russia expires at the end of this year and must be extended. Cournet spoke of the possibility of Russia participating in GEONETCast, offering stations for the EUMETSAT Advanced Retransmission Service (EARS), and cooperating on training.

Finally, last December’s EUMETSAT Council launched a drive for Cooperating States to become full members. Cournet said the Czech Republic, Hungary, Latvia and Poland have indicated their interest in becoming full members in the years to come and that discussions are underway with Malta on becoming a Cooperating State. “This would result in a 15 percent increase in membership, meaning EUMETSAT membership would more closely mirror that of the EU, as desired by Member States,” he pointed out. The push for Cooperating States to become full members includes non-EU Cooperating State Iceland.

Slovenia becomes latest Member State

The procedures for Slovenia becoming a EUMETSAT Member State were completed in February 2008. Slovenia is the third Cooperating State to become a full member, after Slovakia and Croatia. As a Member State, Slovenia can now participate fully in EUMETSAT’s decision-making process, has unlimited access to all EUMETSAT data, services and products, its industry can bid for EUMETSAT contracts, and Slovenian nationals can become members of staff.
Until the advent of satellite ocean altimetry at the beginning of last decade, oceanography, the scientific study of the oceans, was restricted in its scope and accuracy. Ocean observations of limited geographical areas were conducted by ships and buoys.

This all changed with the TOPEX/Poseidon science project launched jointly by the US National Aeronautics and Space Administration (NASA) and the Centre National d’Etudes Spatiales (CNES), the French space agency in 1992. It was followed in December 2001 by the launch of the first Jason satellite, which together with TOPEX/Poseidon has provided a continuous flow of data for weather forecasting and climate change monitoring over the last 15 years.

Rising sea levels?
These data suggest mean sea level has been rising by about three millimetres a year since 1993, twice that estimated by tide gauges for the previous century, indicating a possible recent acceleration in the rate of sea level rise. Jason-2 will confirm whether sea levels continue to rise, said Anny Cazenave of the Laboratoire d’Etudes en Géophysique et Oceanographie Spatiales (LEGOS), who describes continuity in measurements as “fundamental.” She also stressed the importance of having many altimetry satellites in orbit for cross-calibration. Satellite altimetry data are currently provided mainly by Jason-1, but also by ERS-1 and Envisat. The data are used to study ocean dynamics and geophysics in applications including climate prediction, monitoring mean sea level, global warming, El Niño and La Niña phenomena, marine currents and ocean circulation, and tide, wind, wave and marine meteorology models.

Improved products
Jason-2 will not only provide the vital continuity required to accurately measure rising sea levels; it will produce even better products than Jason-1 (which already has better instruments than the larger and more expensive TOPEX/Poseidon). Jason-2’s main instrument, the Poseidon-3 dual frequency radar altimeter, was supplied by CNES and is derived from Jason-1’s Poseidon-2 altimeter. Coupled with the Doppler Orbitography and Radio-positioning Integrated by Satellite (DORIS) receiver, it will improve measurements over coastal areas, inland waters and ice.

Jason-2 will also provide improved products, said Francois Parisot, EUMETSAT’s Project Manager for the mission, citing as an example the Operational Geophysical Data Record (OGDR). This new operational product specially developed for the Jason-2 mission will provide near-real-time (NRT) data within three hours on surface wind speed and wave features and a first
estimate of sea surface height based on the data computed by DORIS. Its primary purpose is to provide data to meteorological organisations carrying out Nowcasting and operational wave forecasting. It will be especially useful for the European Centre for Medium-Range Weather Forecasts (ECMWFM) numerical weather prediction, including atmosphere and ocean forecasting. But it will also make data on sea surface height anomalies available for ocean users.

When delivered in NRT, these data form the basis for operational oceanography, i.e. ocean monitoring and prediction. Operational oceanography is one of the two applications of Jason-2’s Ocean Surface Topography Mission (OSTM).

From ocean monitoring to seasonal forecasting
The other is seasonal forecasting. Data resulting from continuous sea surface measurements will help to predict the likelihood of seasonal disruption in rainfall and temperature for periods of up to nine months. By using altimeter information, it is possible to initialize the thermal structure of the upper ocean, which is essential for seasonal forecasting and potentially anticipating hazardous weather situations. This in turn is needed to extend the early warning periods for all sorts of severe weather phenomena.

Medium-term OSTM data will also be used by the ECMWF to improve its numerical weather prediction modelling techniques. Real-time ocean data will be analysed in eight-hour and 12-day cycles to build ocean and wave as well as atmospheric models for three types of forecast: medium-range, predicting the weather up to 15 days ahead, monthly (30 days ahead), and seasonal (up to 12 months ahead).

Jean-Michel Lefèvre of Météo France said Jason-2 and other altimetry satellites will fill in the gaps in data measurements. “Currently, there are very few in-situ wave measurements in the open ocean as most buoys collecting them are close to coasts,” he explained. “Ocean altimetry allows wave measurements in the Atlantic before they reach the French coast.”

Magdalena Balmaseda of the ECMWF said measurements from altimeters, buoys and moorings are complimentary. A study she has been conducting comparing the three data sources has shown that the assimilation of altimeter data increases seasonal forecasting skills, especially in the Atlantic and the eastern Pacific. Jason-2 will therefore play a vital role in retaining and improving these skills.

Countdown to Jason-2 launch
(continued from page 1)

At the end of April, Jason-2 was transported by road from Cannes to Toulouse. From Toulouse, it was flown by 747 aircraft to Vandenberg, with a refuelling stop in Boston.

Jason-2 is the continuation of the existing successful cooperation between the United States and Europe. It is a global endeavour with responsibilities for satellite development and launch shared between CNES and NASA. EUMETSAT and NOAA will be responsible for satellite operations once Jason-2 has reached its orbit 1,336km above the Earth at a 66º inclination. Data processing will be carried out by CNES, EUMETSAT and NOAA, depending on the type of product, with EUMETSAT acting as an interface for near-real-time product distribution to European users.

In the next issue...
GEONETCast - delivering environmental data to users worldwide

GEONETCast is a low-cost global environmental information delivery system which transmits satellite and in-situ data and products from the Global Earth Observation System of Systems (GEOSS) to worldwide users through communications satellites, using a multi-cast, broadband capability. GEONETCast is the EUMETSAT contribution to GEONETCast. GEONETCast now offers near-global coverage, as shown below:

GEONETCast enhances access to a wide range of information for users who may not have previously had access to such resources. The GEONETCast data streams contain a wide variety of data to support the nine Societal Benefit Areas of the Group on Earth Observations (GEO). GEONETCast has the ability to reach developing country users with limited or no access to high-speed Internet.

A key event in the GEONETCast calendar in 2007 was the GEO Ministerial Summit held in Cape Town, South Africa, in November. The Summit included the GEONETCast Global Village exhibition, which included live transmissions by EUMETCast Africa of a wide range of environmental products from data providers in Europe, including EUMETSAT and its Satellite Application Facilities (SAFs); the Americas, including the US National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) and the Brazilian National Institute for Space Research (INPE), and from the China Meteorological Administration (CMA). EUMETSAT’s continued cooperation with GEONETCast partners NOAA and CMA is expected to result in a wider range of environmental products on EUMETCast in the coming years.

EUMETCast News

EUMETSAT has now completed the planned introduction and dissemination of the baseline Metop level 1 global products. Additionally, EUMETSAT has introduced Advanced TIROS Operational Vertical Sounder (ATOVS) and Infrared Atmospheric Sounding Interferometer (IASI) level 2 sounding products (higher level processed products containing geophysical parameters). More level 2 products, for example those generated by the SAFs, are being progressively released on EUMETCast.

New images and derived products on the web

Since December 2007, EUMETSAT has been running in parallel new Derived Image Products and Real-time Images sections of the EUMETSAT website. The new Real-time Image service includes Advanced Very High Resolution Radiometer (AVHRR) images from the Metop-A polar-orbiting satellite. It is planned to replace the old product and image service with the new service in Spring 2008. To view the new service, visit the Image Gallery section on the EUMETSAT website.

Delay in customer satisfaction survey 2007

Unfortunately, EUMETSAT was unable to provide registered users with the online survey to meet the end of 2007 deadline, as announced in IMAGE 27 in October 2007. The survey has been issued to registered users.
Profile: Silvia Castaner

Ensuring EUMETSAT obeys the letter and the spirit of the law

As Head of the Legal Affairs Division (LAD) in EUMETSAT’s Administration Department, Silvia Castaner and her all-female team, affectionately known as “LADies,” deal with all legal matters concerning the functioning of EUMETSAT. This can range from staff matters to preparing the organisation for new programmes and Cooperating States for accession.

The accession of the three largest Cooperating States – the Czech Republic, Hungary and Poland – has been keeping Silvia busy lately. She has travelled to their national capitals to negotiate their full membership. As full Member States, these three countries will account for 3-3.5 per cent of the EUMETSAT budget, “not an insignificant amount,” Silvia points out.

The accession of ten Cooperating States “will require changes in Council decision making but not necessarily changes to the Convention, which can cope with larger membership,” Silvia explained. One possible solution she sees is formalising the mechanisms on entry into force of programmes already used in the past – most recently with the Meteosat Third Generation (MTG) Preparatory Programme – whereby EUMETSAT is allowed to proceed once all Member States have approved the contents of the programme and only a small part of the funding requires finalisation of national approval procedures. Silvia could imagine this ad hoc approval procedure becoming standard procedure to avoid “reinventing the wheel every time.”

The legal set-up of programmes also represents “a huge chunk of work” for Silvia and her LADies. This includes approval of the Jason-2 follow-on programme and related agreements, cooperation with the European Space Agency (ESA) on MTG, the concept for cooperation with the US National Oceanic and Atmospheric Administration (NOAA) on the Post-EUMETSAT Polar System (Post-EPS) programme, and agreements with the European Commission and ESA on the Global Monitoring for Environment and Security (GMES) initiative.

“My work is linked directly with EUMETSAT’s organisational objectives.”

The LADies also draft the rules for sharing EUMETSAT data as well as negotiate and implement data licence agreements, over 2,000 of which have been signed, generating over €1.5 million a year for the organisation.

What Silvia likes about her job is that it “is linked directly with EUMETSAT’s organisational objectives.” These objectives are not limited to dealing with external partners: “EUMETSAT also has to get staff matters right,” she said. The LADies keep stock of EUMETSAT regulations, including the staff rules, and of the Directory of Instructions governing the internal functioning of EUMETSAT, and Silvia herself works on such issues as social security, pensions and following up EUMETSAT’s Staff Satisfaction Survey.

Meteorology loses “clerk of weather”

EUMETSAT and the rest of the international meteorological community were saddened by the sudden death of Brendan E. McWilliams at the age of 63 on 22 October 2007 in his native Ireland. He served in a number of national meteorological posts in Ireland, the last of which was Deputy Director of Met Éireann, the Irish Meteorological Service, in 1990-1998. Before joining EUMETSAT in 1998 as Director of Administration, whose remit includes the publication of IMAGE, McWilliams was the principle delegate of the Republic of Ireland to the EUMETSAT Council. He was a member of the working group which paved the way for the creation of EUMETSAT in 1986, and in 2004, he retired from EUMETSAT, where he had also served as a member of the Management Board.
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**
  - 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 scheduled to be launched in 2011 and 2013, respectively

- **Metop-A**
  - became operational on 15 May 2007, and has been the primary mid-morning satellite of the Initial Joint Polar System (IIPS) 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 is planned for launch in 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

- **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 (IIPS)

- **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 2008 and 2009, respectively (morning orbit satellites)

- **Electro-L N1**
  - is planned for launch in 2008 and will be positioned at 76°E

- **Electro-L N2**
  - is planned for launch in 2010 and will be positioned at 76°E or 14.5°E

- **Electro-L N3**
  - is planned for launch in 2015

- **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**
  - is the first of the second generation of Chinese polar-orbiting meteorological satellites and is planned for launch in May 2008

- **FY-3B**
  - is planned for launch in 2010

- **FY-3C to -3G**
  - are planned for biennial launches in the timeframe of 2013-2021

**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

**Republic of Korea**

- **KALPANA-1**
  - (formerly METSAT), India’s first exclusively meteorological satellite, is positioned at 74°E and is working satisfactorily

- **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**
  - is planned for launch in 2010

- **COMS-1 and -2**
  - (Communication, Ocean and Meteorological Satellite) are planned for launch in 2009 and 2016, respectively, and will be positioned at 116.2°E or 128.2°E

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Events Diary

- **SpaceOps Symposium 2008**
  - 12-16 May 2008, Heidelberg, Germany

- **Jason-2 launch**
  - 15 June 2008, Vanderberg Air Force Base, California, USA

- **Committee on Space Research (COSPAR) 37th Scientific Assembly and 50th Anniversary Assembly**
  - 13-20 July 2008, Montreal, Canada

- **2008 EUMETSAT Annual Meteorological Satellite Conference**
  - 8-12 September 2008, Darmstadt, Germany

- **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**
  - 10-15 November 2008, South Africa

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