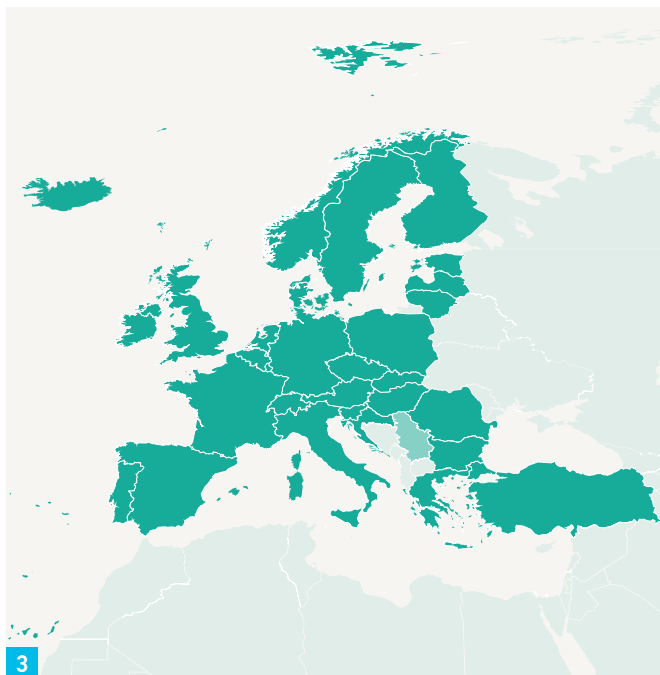


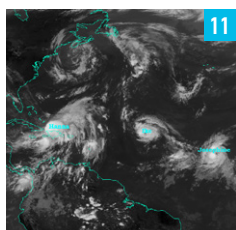
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### EUMETSAT grows to 30 Member States

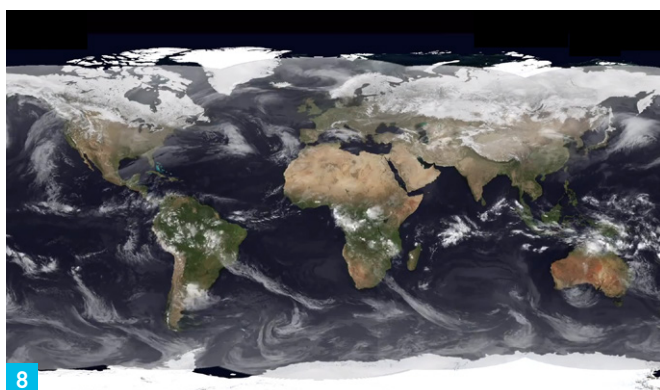
Eumetsat's family of Member States has grown to 30 with the accession of Estonia, Lithuania, Iceland and Bulgaria since summer 2013.



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### Sharing global data

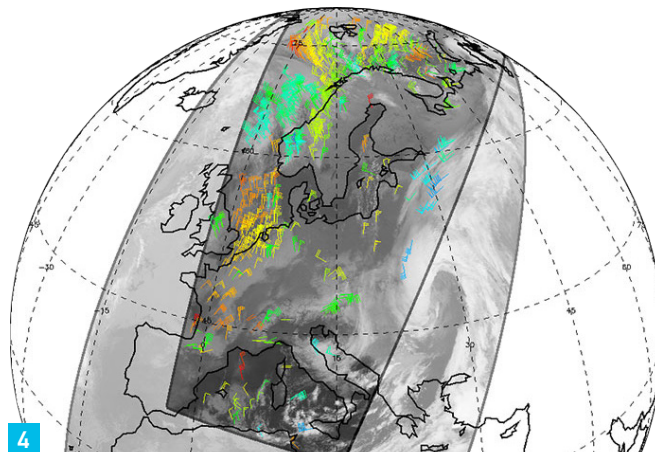
A European Space Policy Institute report confirms the benefits of the strong partnership between EUMETSAT and NOAA.



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### International Cooperation for global users

Bi-lateral and multi-lateral cooperation with other satellite operators is helping to increasing the range of data EUMETSAT can provide to a growing base of users around the world.



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### New Office Building at EUMETSAT

Work progresses on the new office building at EUMETSAT headquarters, in Darmstadt, and will provide extra, much-needed space on its completion next year.

## DIRECTOR-GENERAL'S DESK

This is the first issue of InSight, the electronic successor of the EUMETSAT "Image" newsletter, which is a selection of articles published on our web site, aimed at giving you the big picture at a glance. Thus we achieve the best possible synergy across our communication channels, and, assuming you have not printed this issue, we save trees!

Our first topic is the accession of four Member States, Estonia, Lithuania, Iceland and Bulgaria, which made 2013 a landmark in our history. This demonstrates the trust in the organisation, but also that the Meteosat Third Generation and EPS Second Generation satellite systems expected to deliver observations in the 2020-40 timeframe are worth the new cycle of strategic investments which starts now.

Trust and mutual benefits are also the key words attached to the signature of new agreements with partners, and we thought this was the right time to tell you more on the scope of our international cooperation and its value to Member States, WMO and the worldwide user community. Training and capacity building amplify these benefits, and this is our motivation for implementing a training channel on EUMETCast and for our sustained cooperation with Africa.

Thus, more than ever, EUMETSAT is a trusted global partner, in line with the strategy approved in 2011, as confirmed by our taking over the annual Chairmanship of the Committee for Earth Observation Satellites last November, which, as you will read, has a strong climate agenda.



**Alain Ratier**  
Director-General

As an operational agency, EUMETSAT strives to deliver the highest possible benefits from its seven satellites. Thus, dual operations of the new Metop-B and the ageing Metop-A satellites offer temporary additional benefits to users, through the delivery of two parallel real-time data streams and the new possibility to infer wind vectors globally from the displacement of clouds observed by overlapping images taken 48 minutes apart.

But, right now, we are concentrating on the future, seeking approval of the EUMETSAT Polar System Second Generation programme and negotiating a Copernicus Delegation Agreement with the European Commission covering operations of the Sentinel-3 and Jason-3 marine missions on behalf of the EU.

I will give you insight on these matters in the future...

## EUMETSAT GROWS TO 30 MEMBER STATES

**Starting in summer 2013, a number of important milestones paved the way towards a further expansion of EUMETSAT's family of Member States. Estonia, Lithuania, Iceland and Bulgaria have all completed the process of becoming Member States, bringing the total number to 30.**

After parliamentary ratification of its accession agreement, Estonia became the 27<sup>th</sup> Member State on 21 June, followed by the Republic of Lithuania which became the 28<sup>th</sup> Member State on 1 January 2014, after completion of its accession process on 29 August 2013.

On 30 August, in Reykjavik, the Director-General and Iceland's Minister for Environment and Natural Resources signed that country's accession agreement, which the Council had approved on 25 June. The ratification process was then completed in December.

On 19 August, the Government of Bulgaria notified its intention to accede to the EUMETSAT Convention, leading to the signature of the accession agreement with the Bulgarian Minister of Science and Education on 25 November, during the 79<sup>th</sup> session of Council. Bulgaria officially became EUMETSAT's 30<sup>th</sup> Member State on 30 April 2014.

Discussions are ongoing with Serbia which has been a Cooperating State since 2009 and is considering an extension of the Cooperating State Agreement before accession.

### EXPANDING EUMETSAT

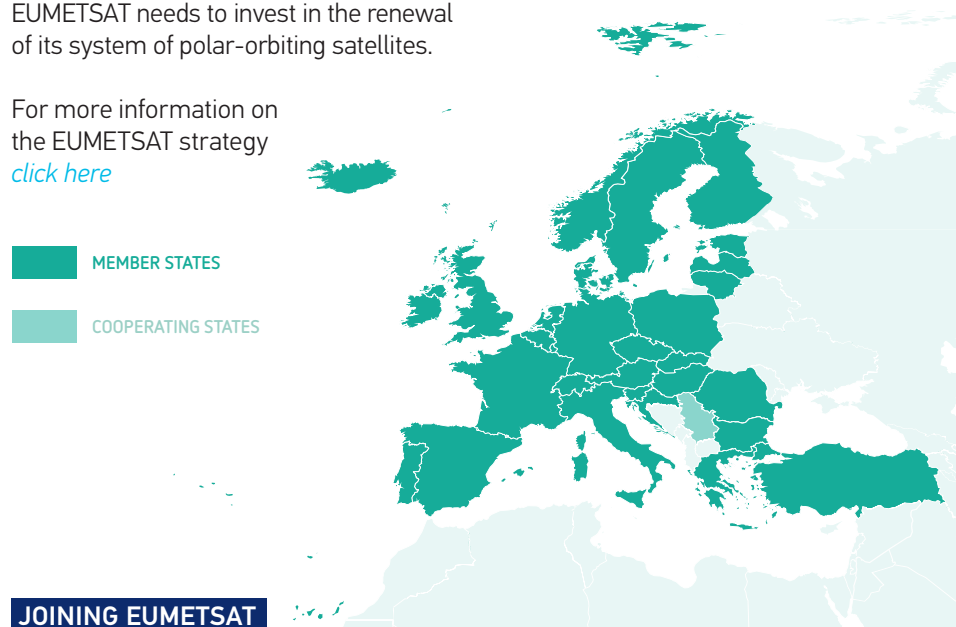
From an organisational perspective, extending the user base for EUMETSAT data and services is one of EUMETSAT's strategic objectives and the expansion of EUMETSAT's membership is an important element to successfully achieve this goal and deliver the underlying vision.

At the same time, the increasing number of Cooperating States achieving the transition towards full membership demonstrates recognition of the benefits provided by

EUMETSAT satellites as well as opportunities related to Member State involvement in the decision process, development and implementation of new satellite data services better serving their requirements. This is an essential signal to all Member States given that EUMETSAT needs to invest in the renewal of its system of polar-orbiting satellites.

For more information on the EUMETSAT strategy [click here](#)

*Map of EUMETSAT Member and Cooperating States*



### JOINING EUMETSAT

From an international law point of view, becoming a Member State of EUMETSAT means that a country accedes to the two international treaties that form the very essence of EUMETSAT: the Convention and the Protocol on Privilege and Immunities (PPI). The formal accession process starts with an accession agreement between EUMETSAT and that country.

An accession requires first of all acceptance by all existing parties to the treaty, i.e. a unanimous vote by all EUMETSAT Member States during Council. Also, in many countries legislation requires that an accession to an international treaty is ratified by their national parliament, which implies that becoming a EUMETSAT Member State is a national political decision within each country.

Once an accession is ratified, the country deposits the so called "instrument of ratification" to the depositary of the EUMETSAT Convention and PPI, i.e. the Swiss Confederation. The Depositary then informs all other members of the treaty of the accession of the new Member States.



## METOP DUAL OPERATIONS: BENEFITS AND PRODUCTS

The Metop satellites are Europe's first operational weather satellites in polar orbit providing data for weather forecasting up to 10 days and for climate monitoring. On 17 September 2012, Metop-B, the second of the series of three identical weather satellites, was launched, and joined its predecessor, Metop-A, in the same polar orbit. The following year, in April 2013, Metop-B took over as the primary operational satellite.

Although the ageing Metop-A has now exceeded its design lifetime of five years, it is being kept in orbit as a secondary satellite, for as long as it continues to bring benefits to users and does not need to be de-orbited to avoid generating debris in the precious low earth orbit. The two satellites are flying in the same mid-morning orbital plane, but are separated in time by half an orbit (48 minutes).

Dieter Klaes, EUMETSAT's *EPS* Programme Scientist said, "While Metop-A continues to function, it means that the Metop system is more robust to orbit anomalies and failures. It also means that with two satellites in operation there are more data being collected, in particular for Numerical Weather Prediction, the basis of modern weather forecasting."

Data products from instruments onboard the Metop satellites, such as temperature, humidity and wind, provide key information about the initial state of the atmosphere for NWP forecasts.

One of the key users of Metop data, the European Centre for Medium Range Weather Forecasts (ECMWF), recently assessed the *impact* of having data from single or dual Metop satellites on their NWP forecasting system and concluded that "the combined impact of both satellites is superior to using data from the instruments on Metop-A alone".

Sean Healy, Senior Scientist in the Satellite Section at ECMWF and member of the *Radio Occultation Meteorology* SAF said, "The results are very encouraging and show that the benefits of dual Metop configuration are significant in both hemispheres."

### GLOBAL AVHRR WINDS FROM METOP

The dual Metop operation is also bringing other benefits. One example is in the obser-

vation of global winds, or Atmospheric Motion Vectors (AMVs), from the AVHRR (Advanced Very High Resolution Radiometer) instrument onboard the Metop satellites.

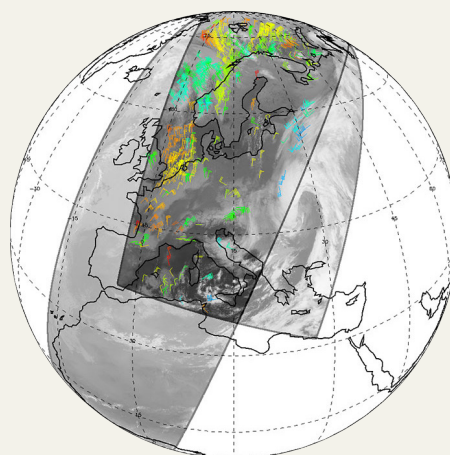
AMVs are produced from satellite images by tracking the movement of atmospheric features, mainly cloud patterns, through successive *images* to estimate wind speed and direction. AMVs are useful as input for numerical weather prediction, especially over ocean areas where other wind observations are sparse.

The AMVs collected by polar-orbiting satellites, such as Metop, are particularly important as they provide coverage of winds in the *polar regions*, which are not well observed by geostationary satellites.

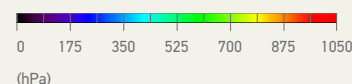
"To extract wind information from AVHRR images you need overlapping images which are separated in time to track the movement of cloud patterns. With one AVHRR instrument on Metop-A, we had overlapping image regions for orbits only over the Polar Regions, but not for the rest of the globe," said Klaes.

"...with two satellites in operation there are more data being collected, in particular for Numerical Weather Prediction, the basis of modern weather forecasting."

AMV - Pressure, 25/11/2013 at 09:49:03 - 25/11/2013 at 09:58:53



Overlapping images from Metop-A and B are used to derive global winds (AMVs). The first track, on the left side, is from Metop-A, and the second track is from Metop-B, 48 minutes later. As the Metop-B track overlaps Metop-A it is possible to generate AMVs.



## NEWS UPDATES

### METOP DUAL OPERATIONS: BENEFITS AND PRODUCTS

*"With two Metop satellites in operation flying on the same polar orbit we have greater spatial coverage and overlap over the entire globe, which gives us truly global wind coverage and double the polar wind data."*

An additional benefit is that as Metop-B is only 48 minutes behind Metop-A on its orbit, this means that overlapping imagery for AMVs is available more quickly than having to wait for a single Metop satellite to complete a full orbit (102 minutes).

#### GOME-2 – MORE DETAILED DATA

Having two Metop satellites in orbit also creates an opportunity to collect more detailed data from the onboard GOME-2 (Global Ozone Monitoring Experiment) instrument. Since 15 July 2013, GOME-2 on Metop-A has been operating in a "reduced swath" mode of 960 km resulting in a ground pixel size of 40 x 40 km, half that of the GOME-2 instrument on Metop-B which still operates in "normal" mode, with a swath width of 1920 km and a ground pixel size of 40 x 80 km resolution.

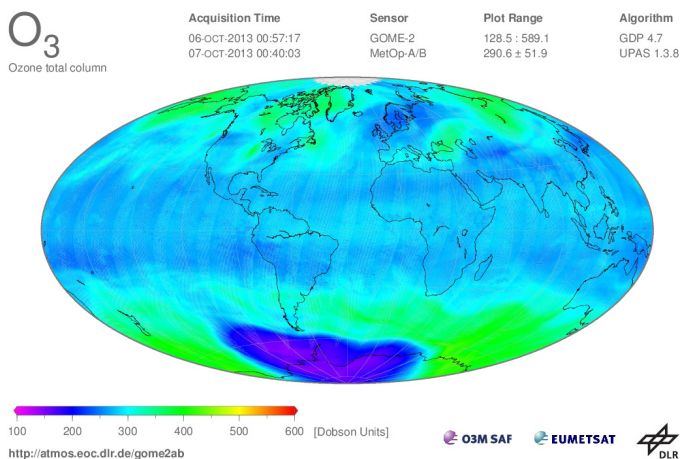
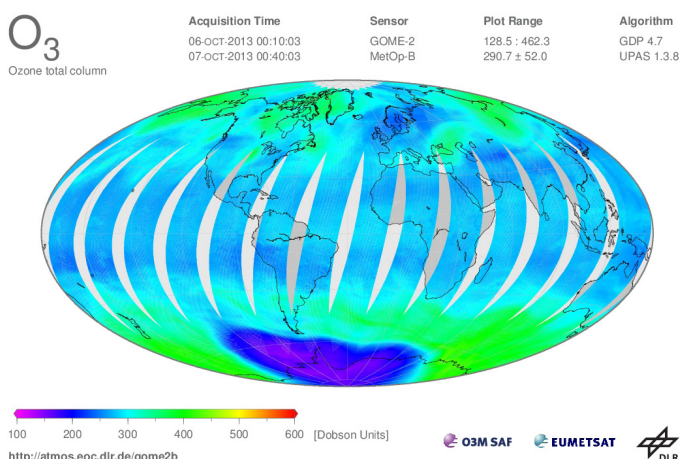
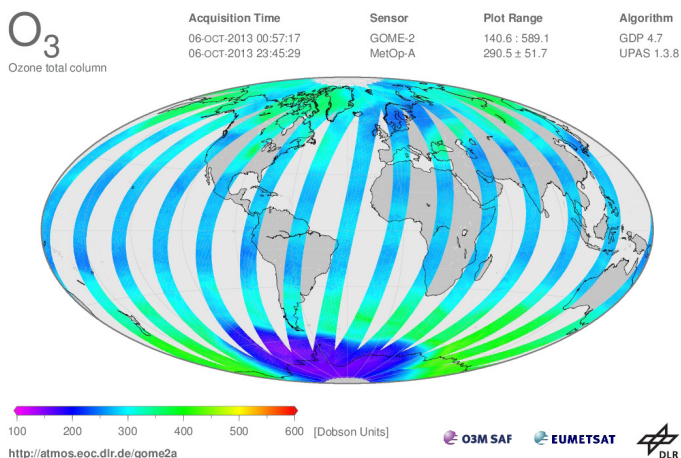
Rose Munro, EUMETSAT's Atmospheric Composition Manager said, *"This operational configuration has several benefits. The provision of data from two GOME-2 instruments ensures full daily coverage, without the gaps in equatorial regions which occur with only one instrument in operation."*

*At the same time the smaller ground pixels from GOME-2 on Metop-A, with more cloud-free scenes and improved resolution, are better adapted for monitoring atmospheric composition in the troposphere."*

#### INTO THE FUTURE

The third in the Metop series, Metop-C is scheduled for launch in 2018 and it will then take over from Metop-B to ensure continuous coverage from the polar orbit beyond 2020.

*Ozone from Metop-A operating in reduced swath mode (top), Metop-B in wide swath mode (middle) and bottom Metop-A and B combined.*





## ONLINE TRAINING SUPPORTS GLOBAL USE OF SATELLITE DATA

**The full benefits of strategic investments in advanced operational satellite systems can only be realised if user communities are in a position to properly exploit the wealth of EUMETSAT data, products and services. It is therefore of crucial importance that users, not only within EUMETSAT Member and Cooperating States, but also in WMO Member countries, especially in Africa, have access to and can properly apply the full range of what EUMETSAT offers.**

Training activities are key in this context and in summer 2013, EUMETSAT's Council agreed to a new training plan for the next five years. Building on past experience, gathered throughout the last two decades, the Training Plan seeks to account for important new developments influencing training activities in the coming years.

One key to the future lies with cost-effective online training – also known as distance learning – involving the development of dedicated online courses, case studies and training materials.

At the same time, classroom training continues to provide value, and efficient training should therefore rely on an optimised combination of online training and more traditional methods.

In addition, an emphasis will be on further evolving training technologies, regional and global partnerships in training, to serve as many trainees as possible.

### ONLINE LEARNING

Distance learning has been an element of EUMETSAT's training since the mid-90s. It started with only a few modules, which were available on CD. Today, EUMETSAT's online resources include a comprehensive [training library](#) and a dedicated training website, the [Training Zone](#).

EUMETSAT also organises a growing number of dedicated online training events each year, reaching out to hundreds of people in more than 70 countries.

### BENEFITS

As well as offering an efficient and cost-effective way of using valuable resources, online training delivers a number of specific benefits for the users:

1. Easier access for students and trainers – users can easily join at their work place without having to travel, or even log on from home, all of which is less disruptive to official duties compared to offsite courses;
2. Wider access – where previously 20 classroom-based students could be reached at one time, now hundreds can be instructed online;
3. Quicker, timely delivery – topical case studies can quickly be incorporated ;
4. More flexibility – the structure of the learning can be adapted to meet individual needs, e.g. lectures or interactive sessions;
5. More collaborative – experts and resources from the around the world can be called upon;
6. Online communities – EUMETSAT has recently helped set up a CM SAF forum, where knowledge is shared.

EUMETSAT trainer Vesa Nietosvaara, says: *"Being close to the work environment and not being away for offsite courses significantly extends our training audience. For example, during the Precipitation Week training course in February 2013, participants logged on from countries as far apart as South Africa and Russia."*

*"Being close to the work environment and not being away for offsite courses significantly extends our training audience."*

### ONLINE TRAINING SUPPORTS GLOBAL USE OF SATELLITE DATA

In addition, online training gives users the opportunity to turn around their new knowledge very quickly and gives them more flexibility, with respect to their professional obligations.

A South African participant stated:

*"The interactivity of the participants within these presentations is a nice feature - as are the recordings. If you miss a presentation, it is still possible to learn about the various topics that were covered in the week, or even just to recap what was said during the presentations. This type of learning environment is really useful, especially since it allows for participants from all over the world. It was great!"*

### COLLABORATION AND PARTNERSHIPS

On a higher level, training in all forms is a key component of capacity building and as such should be seen as part of an integrated cooperative effort, mobilising training expertise, resources and funding across partners – in particular the European National Meteorological Services, their EUMETNET grouping, ECMWF and EUMETSAT – as well as the SAF network and the network of international training experts established in the context of the WMO Virtual Laboratory (Vlab).

Key elements of this partnership are:

- The [COMET Programme](#) in America
- [EUMETCAL](#) (The European Virtual Organisation for Meteorological Training) programme of EUMETNET supported by EUMETSAT
- WMO, through its Education and Training Office and [Virtual Lab](#)
- [EUMeTrain](#) (EUMETSAT supported training project)

EUMETSAT promotes training on the use of satellite data, products and services in Member and Cooperating States, Africa, the Middle East. On a case by case basis, parts of South and Central America are also covered. In addition, the organisation encourages partnerships where the scope of a training activity is too large for one entity alone, e.g. the ASMET training modules for Africa and the EUMeTrain Project for Europe.

### ONLINE TRAINING ACTIVITIES IN 2013

A number of activities conducted throughout the year clearly demonstrate the wide variety of online training that is now available:

- **Precipitation Week (4-8 February 2013)** – a training event with eight invited experts on remote sensing techniques for precipitation. Speakers were from Spain, South Africa, Italy, EUMETSAT, USA and France. Hundreds of participants took part in the live sessions.
- **EUMETSAT Satellite Applications Course** – this blended course covered the fundamental remote sensing principles to help forecasters understand what information is available in satellite imagery. It covered two main areas: the principles of remote sensing for satellite meteorology and the idea behind the creation and use of RGB images for weather forecasting. The English online phase was held 1-31 May and the French online phase on 1-31 October.
- **CM SAF Online Event** – On 1 October 2013 the EUMETSAT Satellite Application Facility on Climate Monitoring (CM SAF) introduced their current activities, focusing on the recently released CM SAF Clouds, Albedo and Radiation dataset from AVHRR (CLARA).
- **Aviation Week (11-15 November 2013)** – (in French) organised by WMO Virtual Laboratory (VLab) and Centre of Excellence in Casablanca with technical support from EUMETSAT.
- **Virtual Round Table events** – Competence Requirements for Aeronautical Meteorological Personnel all held online in English (on 27 March and 24 September), French (on 15 May and 26 September), Spanish (on 8 May), Russian (on 5 June) and Portuguese (on 2 October), organised by WMO Virtual Laboratory (VLab) with presentations and technical support from EUMETSAT.
- **Direct Readout online events** on 7-8 May focused on the direct readout capabilities of polar orbiting systems organised by VLab.

"This type of learning environment is really useful, especially since it allows for participants from all over the world. It was great!"

### ONLINE TRAINING SUPPORTS GLOBAL USE OF SATELLITE DATA

EPS Metop - instrument, products and service was delivered by Dieter Klaes, 7 May; EPS Direct Readout and Processing Tools were presented by Nigel Atkinson, 8 May.

- Monthly weather briefings – live online meetings, where the current weather is discussed.

#### ACCESS TO EUMETSAT TRAINING

Accessing the wide array of EUMETSAT online training opportunities is easy: the training channel on EUMETCast ensures easy access even in areas with limited access to the Internet and also delivers resources together with data. The majority of EUMETSAT's online courses are available for open registration and most of the resources are freely available to be reused or repacked.

Training resources and details about courses and resources can be found in the [Training](http://www.eumetsat.int/website/home/Data/Training/index.html) section of the website (<http://www.eumetsat.int/website/home/Data/Training/index.html>) and also on the [EUMETSAT Users' Twitter feed](#).

In addition, the [Training Library](#) area of the website (<http://www.eumetsat.int/website/home/Data/Training/TrainingLibrary/index.html>) contains more than 100 freely-available online resources, including downloadable course notes, exercises, Powerpoint presentations and webcasts.

The [Training Zone](#) is a dedicated site EUMETSAT uses for holding a number of online courses; sharing training resources and providing details about all our current courses. Registration with the user service is necessary.

Mark Higgins, Vesa's fellow EUMETSAT Trainer, concludes, *"As the number of products EUMETSAT produces increases so does the need for training resources to help people fully exploit the data. Overwhelmingly the response we get from people who use our training courses and materials is 'this is great, give us more.'"*

*"As the number of products EUMETSAT produces increases, so does the need for training resources to help people fully exploit the data."*

### INTERNATIONAL COOPERATION: BENEFITS FOR GLOBAL USERS

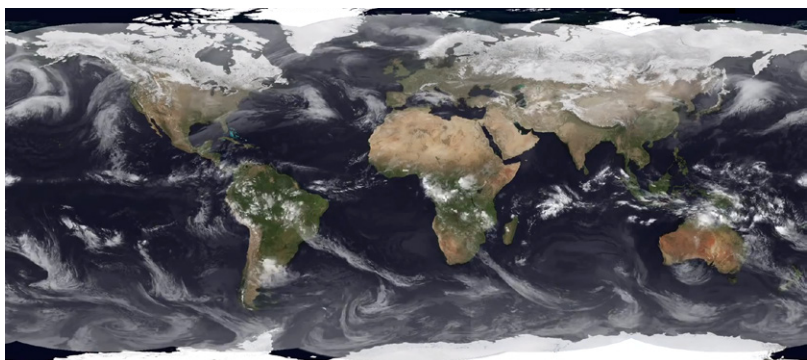
**Bilateral, as well as multilateral, cooperation with other satellite operators around the world is an important part of EUMETSAT's activities as it ensures access to additional data for EUMETSAT's user community and also broadens the user base as EUMETSAT data become available to additional users around the globe.**

This in turn enhances the benefits to EUMETSAT Member States as well as the value of the space component of the [WMO Integrated Global Observing System \(WIGOS\)](#).

*"Regular interactions with international partners are key to implementing the international cooperation dimension of the [EUMETSAT Strategy](#) and I am pleased that there have been a number of major achievements in 2013,"* said Paul Counet, EUMETSAT's Head of Strategy and International Relations.

#### USA

Over the last three decades, the partnership between EUMETSAT and NOAA has been in continuous development. It has taken a strategic dimension by providing back-up arrangements and data exchange for geostationary satellites as well as full sharing of a low Earth orbit satellite system - the Initial Joint Polar System - to deliver global measurements that are essential for weather forecasting and environmental and climate monitoring.





## INTERNATIONAL COOPERATION: BENEFITS FOR GLOBAL USERS

The partnership also extends to the ocean surface topography mission implemented by the [Jason satellite series](#), which is crucial to sea level monitoring in our changing climate, to seasonal forecasting and to the development of operational oceanography in support of [the marine service](#) of the EU-led Copernicus programme.

In light of the value of the data collected by the Jason satellites, NOAA and EUMETSAT agreed with CNES and NASA to extend the current Jason-2 mission until June 2015 and confirmed their intention to further extend operations as long as the spacecraft is healthy. NOAA also confirmed in April that despite severe budget constraints in 2013, its committed contribution to the follow-on Jason-3 programme was secured, including funding of the Falcon 9 launch service.

The benefits of EUMETSAT-NOAA partnership were highlighted in an independent study from the [European Space Policy Institute \(ESPI\)](#) presented at the EUMETSAT Meteorological Satellite Conference in Vienna, on 17 September 2013.

*"The ESPI study highlights the fact that the EUMETSAT-NOAA partnership brings substantial benefits to Europe, the United States, and user communities worldwide. Working together, both organisations have been able to establish state-of-the-art observing systems at lower cost and user communities have benefitted from more data, increased accuracy and a better timeliness and robustness of the observing systems,"* said Counet.

Based on these achievements, a new long-term agreement was signed on 28 August by EUMETSAT's Director-General, Alain Ratier, and the nominated [NOAA Administrator, Kathryn D. Sullivan](#), establishing a policy framework to further develop EUMETSAT-NOAA cooperation for decades to come.

*"This partnership with our EUMETSAT colleagues allows us to continue collecting and sharing vital space-based observations, resulting in a better understanding of our global environment,"* said Sullivan.

On 26 July 2013, EUMETSAT also signed a new Memorandum of Understanding with NASA on its participation to the [Global Precipitation Measurement Mission \(GPM\)](#).

## CHINA

EUMETSAT and the China Meteorological Administration (CMA) have been cooperating since 1998, with a focus on scientific operational and training activities. On 25 June, EUMETSAT and CMA signed a new cooperation agreement that provides a more strategic dimension to the existing cooperation model, extending it to the coordination of polar-orbiting and geostationary orbits of both parties.

*"The cooperation between EUMETSAT and CMA was first formalised in 1998 and has developed significantly over the years to the point where we now exchange enhanced sets of meteorological, climatological and environmental satellite data for our respective user communities, as well as the global user community through [GEONETCast](#),"* said Counet.

Data from China's second generation meteorological polar-orbiting satellite, FY-3B, are available to EUMETSAT's users and data from recently-launched FY-3C is expected to be added during the course of 2014. This data is used in the Numerical Weather Prediction forecasts produced by the national meteorological services of EUMETSAT's member and cooperating States, and by the [European Centre for Medium-range Weather Forecasts \(ECMWF\)](#).

The future cooperation will build on commitments from both organisations to operate satellite series into the 2020-2030s, and beyond.

## INDIA

EUMETSAT has had a cooperation agreement with the Indian Space Research Organisation (ISRO) since 2000. An agreement to secure the continuation of this successful cooperation, which includes the exchange of data and products from both organisations' meteorological and ocean-monitoring satellites, was signed in 2014.

*"One example of the benefits of this cooperation is that ocean wind data from the scatterometer onboard ISRO's Oceansat-2 satellite is now available via EUMETCast. In combination*

*"The cooperation between EUMETSAT and CMA... has developed significantly over the years."*

*"...user communities have benefitted from more data, increased accuracy and a better timeliness and robustness of the observing systems."*

## INTERNATIONAL COOPERATION: BENEFITS FOR GLOBAL USERS

*with ocean wind data from the Metop satellites this greatly increases the global coverage and accuracy of ocean wind data that is available for users,"* said Livio Mastroddi, EUMETSAT Director of Operations and Services to Users.

In addition, EUMETSAT will also continue to support the SARAL (Satellite with ARGOS and ALtika) ocean altimetry mission. SARAL is a joint mission of ISRO and the French Space Agency, CNES, and was launched by ISRO on 25 February 2013. EUMETSAT's contribution is to host and operate the European near real-time processing centre.

This trilateral cooperation delivered its first benefits to users in 2013 with the start of real time dissemination of altimeter products from the SARAL satellite, after full validation of the EUMETSAT ground segment elements. Ocean altimetry data from SARAL complements Jason-2 data as SARAL follows a different orbit and the combination of their data provides better coverage and sampling of the global ocean circulation.

In the framework of trilateral cooperation, EUMETSAT and CNES also implemented the network connectivity and software needed to acquire and redistribute the data from the [SAPHIR humidity sounder](#) onboard the ISRO-CNES Megha-Tropiques satellite - a mission to study the water cycle in the tropics.

### JAPAN

EUMETSAT has had a bilateral cooperation agreement with the Japan Meteorological Agency (JMA) since 2007. The two organisations met on 9 July in Tsukuba, Japan, to review ongoing cooperation and data exchange and discussed the status of satellite programmes, in particular the next generation of Japanese geostationary satellites, [Himawari 8 and 9](#), which are planned for launch in 2014 and 2016. JMA and EUMETSAT are also considering a long-term scheme for exchanging visiting scientists.

EUMETSAT also met with the [Japan Aerospace Exploration Agency \(JAXA\)](#) in the same week and an important result was the confirmation that EUMETSAT will be able to redistribute data from the [GCOM-W1 water cycle mission](#) to the national

meteorological services of its member and cooperating states, as well as to ECMWF. GCOM-W1 data will be particularly important for Numerical Weather Prediction (NWP) modelling. In return, EUMETSAT will coordinate a regular feedback mechanism on the use of GCOM-W1 data by the Member States.

Furthermore, JAXA and EUMETSAT agreed to continue close coordination under the aegis of the CEOS, which EUMETSAT will chair until November 2014, to be followed by JAXA until November 2015. One cooperation element is the participation of JAXA at the WCRP/EUMETSAT Climate Symposium in Darmstadt in October 2014.

### KOREA

EUMETSAT and the Korea Meteorological Administration (KMA) share a longstanding cooperation agreement, and the two organisations met in July 2013 in Seoul, South Korea, for discussions on joint activities related to data reception, science and training. As part of the implementation of the cooperation, a KMA Delegation paid a visit to EUMETSAT Headquarters on 21 November to exchange programme-related information and discuss data access, user services as well as data and licensing policy. A project was also established with KMA to assess terrestrial dissemination of some EUMETSAT data to the Asia-Pacific region using the GEANT network.

### RUSSIA

EUMETSAT and the [Russian Federal Service for Hydrometeorology and Environmental Monitoring \(ROSHYDROMET\)](#) enjoy a working relationship that began in 1997. The two organisations met in October 2013 to discuss joint activities related to the EUMETSAT Advanced Retransmission Service (EARS) project, with the objective of upgrading and further developing the number of [EARS stations](#) on the Russian territory operated by ROSHYDROMET.

Another important joint milestone was achieved in the autumn, with the start of real time dissemination of imagery from the [Electro-L N1 geostationary spacecraft](#) via EUMETCast.

## SHARING GLOBAL DATA

Weather forecasts around the world are becoming increasingly more accurate, thanks, in part, to the global availability of satellite data. Without the collaborative relationships EUMETSAT has with space and weather agencies around the world, we'd only be able to see what is happening in 'our part' of the atmosphere.

A recent [European Space Policy Institute \(ESPI\)](#) report looking at the social benefits of the [NOAA/EUMETSAT](#) relationship found that working together has allowed our user communities to benefit from more data; increased accuracy; greater timeliness, and more robust systems. Together, these elements have translated into an increased ability to protect human life, property and infrastructure and added value to the US and European economies.

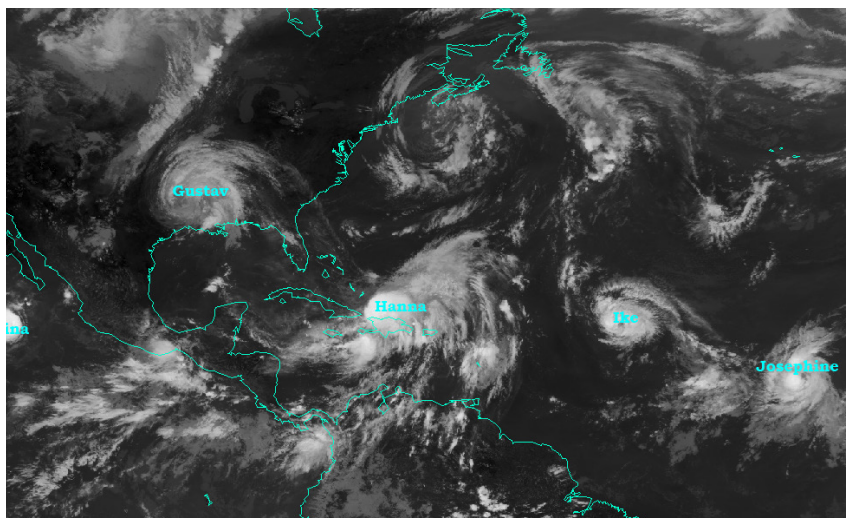
At the Signing Ceremony for the [NOAA-EUMETSAT Long-Term Cooperation Agreement](#) on 27 August, EUMETSAT Director-General Alain Ratier said: *"The partnership between EUMETSAT and NOAA has continuously developed over the last 30 years and taken a strategic dimension, bringing substantial benefits to Europe, the USA and the worldwide user communities. With this agreement, we have established a policy framework to further develop our cooperation into the next decades."*

So what exactly do we share?

- Data
- Training
- Expertise

### GEOSTATIONARY AND POLAR DATA

Global forecasts are only truly global because the global models get global data from satellites. By sharing satellite systems and data NOAA and EUMETSAT are able to provide twice as much of the information which is vital to help warn and protect citizens around the world. In particular, NOAA and EUMETSAT share an integrated Initial Joint Polar System, where EUMETSAT covers the morning orbit with its Metop satellites and NOAA the afternoon orbit with its NOAA-19 and Suomi-NPP satellites.



- As part of the IJPS, the [Metop Global Data Service](#) comprises orbit dumps from both our Svalbard ground station and the American McMurdo ground station.
- The [Regional Service](#) collects and shares Metop and NOAA's NPP Suomi data from a network of AHRPT stations, located within the North Atlantic, Europe and Indian Ocean regions.
- Hourly and three hourly [data from the NOAA GOES-W & GOES-E](#) geostationary satellites, are made available via EUMETCast and Direct Dissemination.

### WHY SHARE SYSTEMS AND DATA?

According to a [recent study](#) of the [UK Met Office](#), satellite observations account for 64% of the error reduction that all observations (in situ, satellite, others) bring to Day 1 numerical forecasts. The Initial Joint Polar System accounts for as much as 45% of this error reduction, and, if one considers the contribution of satellite data alone, the IJPS represents 72% of the overall error reduction brought by satellite observations.

Whilst confirming that the observations of both European and American polar satellites have the highest positive impact on the skills of medium range numerical forecasts, another study by [ECMWF](#) shows that the contribution of the IJPS is higher than the sum of the respective contributions of the EUMETSAT and NOAA satellites.

*"IJPS (Initial Joint Polar System) data play a critical role in maintaining the current rapid*

*An active hurricane season: Ike and Josephine follow close on the heels of Gustav and Hanna. 02 September 2008 18:00 UTC*

*"The partnership between EUMETSAT and NOAA ... (brings) substantial benefits to Europe, the USA and the worldwide user communities."*



rate of improvement of our medium-range numerical weather forecasts," said Erland Källén, Director of Research at ECMWF.

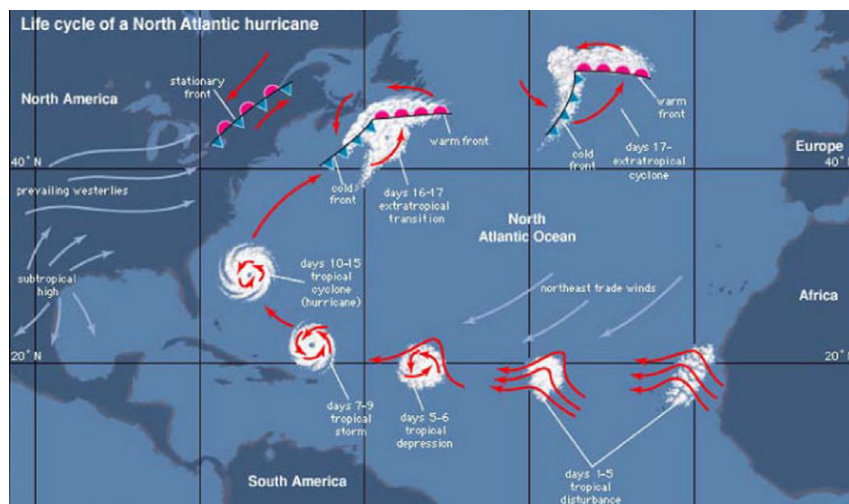
Also speaking at the signing Dr Kathy D Sullivan, Acting Under-Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator, said: "Our agencies' work together produces life-saving products and services to the people, communities, and businesses in each of our nations. Data from Metop satellites are critical inputs for NOAA's National Weather Service (NWS) Numerical Weather Prediction (NWP) models. Metop data supports U.S. military operations, maritime commerce, energy, agriculture, aviation, and other critical sectors of the economy."

Atlantic hurricanes are perfect examples the type of weather systems where a combination of data from European and US satellites can give a complete picture of an event.

Tropical waves play a role in about 70% of all Atlantic basin Tropical Cyclone formations. Many, especially in the middle of the hurricane season (Aug/Sept), start as tropical waves or disturbances off the coast of West Africa. These tropical disturbances can be seen by SEVIRI on [Meteosat](#) long before they ever become hurricanes. By monitoring and tracking them hurricane forecasters can get visual, early signals on whether a Tropical Cyclone may occur. Infrared data on sea surface temperature (EUMETSAT and NOAA) and wind data from scatterometers (EUMETSAT and [ISRO](#)) are also used by the forecasters.

If these disturbances become more organised and form into Tropical Depressions, again, they can be seen on satellite imagery. As they move further west NOAA's satellite data is used. Having detailed imagery of the hurricane helps agencies, governments and the public better prepare for the, often devastating, weather conditions.

Then as hurricanes weaken and move further north-west, Meteosat data is again used to track the path of what could end up as an Atlantic storm battering Ireland and the UK. (see lifecycle image).



### TRAINING

EUMETSAT's trainers travel the world working with forecasters, scientists and users on how to interpret satellite data. Just one example of where NOAA and EUMETSAT share training is in the area of marine safety forecasting.

As members of the [Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology \(JCOMM\)](#) EUMETSAT and NOAA run joint training sessions on using satellite wind and wave data for marine safety forecasting. Accurate data is vital for high seas and coastal forecasting and industries such as oil, fishing and tourism.

The next conference is being held in Pretoria for African forecasters, because South Africa has the responsibility for marine safety forecasting as far down as the Antarctic shelf.

### WHY HOLD JOINT TRAINING?

Volker Gärtner, Head of User Support & Climate Services, who is responsible for training, said: "Meteorology is a global discipline. The weather doesn't know national boundaries, so working with colleagues around the world comes naturally to us."

"In courses such as these we are able to bring together the world's best experts and learn from the participants what they need. We can then feed that knowledge back into the products and services EUMETSAT and NOAA provide."

### The lifecycle of a North Atlantic hurricane

"Data from Metop satellites are critical inputs for NOAA's National Weather Service Numerical Weather Prediction models."

"The weather doesn't know national boundaries, so working with colleagues around the world comes naturally to us."

## EXPERTISE

Sharing expertise and knowledge gives both organisations the ability to plan for long-term space-based observing systems for operational meteorology and operational monitoring of the oceans, the composition of the atmosphere, and climate monitoring.

These include:

1. Geostationary satellite systems – including the exchange of information and user requirements; mission objectives, and standards for future systems.
2. Polar-orbiting satellite systems – to continue and enhance the current cooperation covered by the Initial Joint Polar System (IJPS) and Joint Transition Activities (JTA) agreements for a shared polar-orbiting operational satellite system.
3. Ocean Surface Topography Mission (OSTM) – including preparation for *Jason-3* and *Jason Continuity of Services (Jason-CS)* satellites, and long-term continuity of Ocean Surface Topography Missions beyond Jason-CS.
4. *Climate monitoring* – establishing sustainable long-term data records based on global datasets in support of climate monitoring activities and a global architecture for climate monitoring from space.
5. Scientific Cooperation – for instrument calibration; the definition of requirements for future space-based observing systems; preparation for the use of the resulting data, and scientific algorithm development.

## EUMETSAT'S CHAIRMANSHIP OF CEOS: FOCUSING ON CLIMATE

After taking over the annual chairmanship of the Committee on Earth Observation Satellites (CEOS) in November last year, EUMETSAT will focus squarely on two main issues – climate and the implementation of changes to *CEOS* governance.

In relation to its focus on climate, EUMETSAT has already taken two important steps, according to EUMETSAT's Head of Strategy and International Relations, Paul Counet.

*"We are facilitating the process of setting up a joint Working Group on Climate between CEOS and the Coordination Group for Meteorological Satellites (CGMS), which first met in March 2014 at EUMETSAT, and we are organising a *climate symposium*, with the World Climate Research Programme, to be held in Darmstadt on 13-17 October," Counet said.*

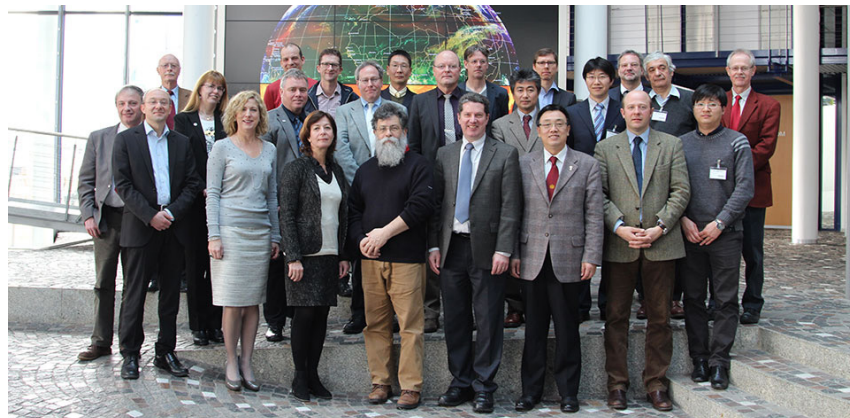
### THE JOINT CEOS-CGMS WORKING GROUP ON CLIMATE

This Working Group will support the development of the space-based architecture for climate monitoring from space - developed by CEOS, CGMS and the World Meteorological Organization (WMO) - as the main mechanism for representing and analysing the contribution of space agencies

to the observations and monitoring pillar of the Global Framework for Climate Services (GFCS).

*"Work towards the establishment of a Joint Climate Working Group began in 2012 by assessing the feasibility of transforming the existing CEOS Working Group on Climate into a joint CEOS-CGMS Climate Working Group," Counet said.*

*The Joint CEOS-CGMS Climate Working Group met for the first time at EUMETSAT Headquarters in March 2014.*





## EUMETSAT'S CHAIRMANSHIP OF CEOS: FOCUSING ON CLIMATE

*"A concept paper was presented to the CEOS Strategic Implementation Team (SIT) in 2013. Then terms of reference and a set of transition arrangements were developed and endorsed by the CGMS Plenary in July 2013 and by the CEOS Plenary in November 2013, allowing the joint working group to come into effect."*

The approved terms of reference identify three main objectives for the joint working group:

- provision of a structured, comprehensive and accessible view as to what Climate Data Records are currently available from satellite missions of CEOS and CGMS members or their combination;
- creation of the conditions for delivering further Climate Data Records, including multi-mission Climate Data Records, through best use of available data to fulfil Global Climate Observing System (GCOS) requirements (eg. by identifying and targeting cross-calibration of reprocessing gaps or shortfalls);
- optimisation of the planning of future satellite missions and constellations to expand existing and planned Climate Data Records, both in terms of coverage and record length and to address possible gaps with respect to GCOS requirements.

The Joint CGMS-CEOS Climate Working Group met for the first time in EUMETSAT Headquarters from 5-7 March 2014 and agreed on a three-year work plan.

### THE CLIMATE SYMPOSIUM 2014

EUMETSAT will host the symposium together with the World Climate Research Programme (WCRP), which is a joint programme of the WMO, the [International Council for Science](#) and UNESCO's Intergovernmental Oceanographic Commission (IOC), and with the support of the European Commission (EC), ESA and other partners.

*"In the context of the release of the 5<sup>th</sup> Intergovernmental Panel on Climate Change (IPCC) Assessment Report, the main goal of the symposium is to provide a forum for discussing the current state of climate science and observations so that we can evaluate recent achievements and ascertain critical objectives to be achieved*

*with satellite-based climate information,"* said Dr Johannes Schmetz, EUMETSAT Chief Scientist.

*"The symposium will also consider how Earth observation contributes to future developments in climate prediction and climate change projection and we want to identify gaps in the current space-based climate observing system."*

The outcome of the Climate Symposium will support the definition of requirements by GCOS and will then be considered by the new CEOS-CGMS Climate Working Group.

*"A major topic will then be to assess how the proposed architecture for sustained climate monitoring from space, developed under the auspices of CEOS, CGMS and WMO, could be used to generate information in response to the scientific challenges identified in the IPCC report,"* Schmetz said.

### IMPLEMENTATION OF THE CEOS GOVERNANCE

Cementing new governance procedures will be another EUMETSAT priority during its chairmanship of CEOS.

During the 2011-2013 chairmanship of NASA of the CEOS SIT, a two-year CEOS self-study was undertaken with the aim of optimising the CEOS working arrangements to meet current and anticipated challenges.

The study's conclusions and the definition of new governance processes were endorsed at the CEOS Plenary in November last year.

*"Implementing the new governance processes will help ensure that there is a clear set of activities and goals, coupled with streamlined organisational arrangements,"* Counet said.

*"This will include the delivery, during the EUMETSAT Chairmanship, of the first CEOS three-year workplan, which will encompass all CEOS activities."*

To conclude its chairmanship, EUMETSAT, with the support of the Norwegian Space Agency, has arranged for the 2014 CEOS Plenary to take place on 29-31 October in Tromsø, Norway.

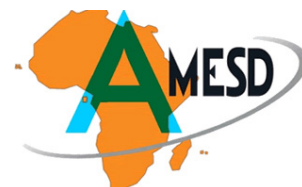
*"Implementing the new governance processes will help ensure that there is a clear set of activities and goals, coupled with streamlined organisational arrangements."*



## WEATHER, CLIMATE AND ENVIRONMENT MONITORING IN SUB-SAHARAN AFRICA

### EUMETSAT PROVIDES BENEFITS THROUGH DATA AND TRAINING

From 2006 to June 2013, the seven-year *African Monitoring of the Environment for Sustainable Development (AMESD)* project, supported by EUMETSAT, has significantly boosted access to Earth observation data in sub-Saharan Africa. Financed by the European Development fund and implemented by the African Union Commission (AUC) and five Regional Implementation Centres, AMESD aimed to provide decision-makers with access to continent-wide environmental information derived from Earth observation satellites to better shape and assess the impact of their decisions on the environment and their economies.



The AUC's Rural Economy and Agriculture Project Coordinator Jolly Wasambo said the installation or upgrading of 107 *EUMETCast* stations in 47 sub-Saharan African countries along with the project's training and capacity-building elements, were among its most important achievements.

*"AMESD made very good progress in ensuring training for hundreds of African experts in managing and maintaining these stations as well as in accessing data to analyse and produce products and services,"* Wasambo said.

*"Policy experts and decision makers were trained in how to apply Earth observation services and data for policy decisions. So, in general, AMESD has improved access to data through installation of infrastructure, capacity building and defining some of the services which are crucial for Africa."*

AMESD built on the *Preparation for Use of MSG in Africa (PUMA)* programme, which aimed to enhance weather forecasting capabilities through the use of satellite data and products.

#### AMESD ACHIEVEMENTS AND THE EUMETSAT CONTRIBUTION

Achievements realised during the project's five-year operational phase included:

- 107 EUMETCast stations installed or upgraded in 47 sub-Saharan countries ensuring operational access to Earth observation data, bringing the total number of stations in Africa to more than 220;

- PUMA stations at the NMHS upgraded to support weather forecasting at national level;
- four training centres equipped to allow for AMESD continental training and continuous training on Earth observation, including satellite meteorology;
- more than 1,000 African experts trained in more than 80 sessions, creating a critical mass of technicians with skills in station maintenance and operation, Earth observation (EO) data, satellite meteorology, e-Station software suite, EO data processing and the production of an environmental monitoring bulletin;
- more than 60 African experts trained as trainers to carry out sessions at national level;
- 12 regional environment services produced by the five Regional Implementation Centres;
- two AMESD fora and one policy workshop organised, contributing to the creation of frameworks for the use of satellite data in support of policy and decision making.

EUMETSAT provided satellite data and products free of charge to the project, primarily to participating countries' National Meteorological Services and to Regional Implementation Centres and their partners. The organisation's main contribution was through supporting the AUC in procuring the EUMETCast stations and implementing the training.

*"AMESD has improved access to data through installation of infrastructure, capacity building and defining some of the services which are crucial for Africa."*

### WEATHER, CLIMATE AND ENVIRONMENT MONITORING IN SUB-SAHARAN AFRICA

#### CONTINUING THE INITIATIVE

The *MESA (Monitoring of Environment and Security in Africa)* project is now taking forward AMESD activities, expanding the scope towards Climate Services.

Wasambo said access to satellite data was critical for effective decision-making.

*"As African economies grow, the need for data derived from satellites is critical as the impact of climate change on the continent would be grave without changes to the status quo,"* he said.

*"We will be losing the most productive systems in Africa, which are agriculture and eco-systems, if climate change is not checked, is not monitored and policies are not based on reliable information."*

EUMETSAT's International Relations Officer, Vincent Gabaglio, said that through AMESD, the capacity of the African regional centres was increased to serve their member states, and their region, in a more adequate way than before.

Gabaglio said: *"Ultimately, the AMESD and MESA services that have been created in the regions help government officials to better plan for food security, water management, natural resources conservation and fisheries. This leads to improved management of African resources and more sustainable development."*

*"EUMETSAT contributed but also benefits from the AMESD and MESA project, as it serves the vision of the organisation and the strategic objective to expand the user base towards users in Africa in line with WMO (World Meteorological Organisation) regional plans and in support to AU policies."*

*"EUMETSAT contributed but also benefits from the AMESD and MESA projects."*

#### WHO WAS INVOLVED

The five Regional Implementation Centres involved in the AMESD project were: the AGRHYMET (Centre Regional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle), the CICOS (Commission Internationale du Bassin Congo-Oubangui-Sangha), the ICPAC (Intergovernmental Authority on Development, Climate Prediction and Applications Centre), the Botswana Department of Meteorological Services and the Mauritius Oceanography Institute.



*The AUC's Rural Economy and Agriculture Project Coordinator Jolly Wasambo (front row, fourth from left), who visited EUMETSAT last November, said the AMESD project made very good progress in training hundreds of African Experts.*



## NEW OFFICE BUILDING AT EUMETSAT

**Additional office space is needed at EUMETSAT's headquarters in Darmstadt, Germany, to accommodate personnel currently located offsite and to host the teams responsible for new mandatory satellite programmes, in particular EPS Second Generation. EUMETSAT's *Member States* have therefore agreed to the expansion of the existing headquarters to include a new office building, as from mid 2015, and work on the site has already started.**

The new building will provide additional work spaces for up to 160 people and is based on a flexible concept allowing for future extensions should they be required.

The building consists of two separate functional elements – an office and a canteen unit – with separate entrances. The canteen area on the ground floor will replace the existing canteen in the main building and be large enough to seat up to 250 people.

On top of the staff restaurant there will be three full floors and a smaller fourth floor, which will accommodate offices, meeting rooms and the necessary technical installations.

An important element of the new building are measures to increase energy efficiency, these include a modern heating system based on district heating in combination with a heat pump.

In addition, exhaust air from the building's venting will be directed towards the heat exchangers of the pumps to increase their operational efficiency when generating additional heat in winter and cooling in summer.

Bernd Kaufmann, Head of General Services at EUMETSAT said, *"The new office building will be constructed in line with modern building requirements thus increasing overall energy efficiency and reducing the carbon footprint of EUMETSAT."*

Once the construction has been completed in mid 2015, a number of EUMETSAT teams that are currently situated offsite in rented office space will also be able to return to the site.



### WORK STARTS

Preparation of the site for the new building has already started, thanks to the Federal Government of Germany and the Land of Hessen, who ensured that EUMETSAT could use the required additional land adjacent to the current headquarters.

*"The new office building will be constructed in line with modern building requirements thus increasing overall energy efficiency and reducing the carbon footprint of EUMETSAT."*

### EUMETSAT HEADQUARTERS MILESTONES

**August 1986** – EUMETSAT takes up work in temporary accommodation in Darmstadt-Eberstadt.

**June 1995** – EUMETSAT moves to a permanent home with the inauguration of the new headquarters building (building phases I and II) in the present location. The operations wing (phase II) has been occupied since September 1994 to facilitate preparation of the new ground segment.

**December 1998** – The North Wing (building phase III) is inaugurated. This building extension was needed to accommodate MSG and EPS ground segment installations as well as office space for the programme divisions.

**June 2005** – The South Wing is inaugurated (building phase IV). The South Wing was built as dedicated office building with the possibility to use the ground floor for operational installations. Teams, which had been accommodated in several office container buildings located on and off the EUMETSAT premises finally move into a proper office environment.

**April 2012** – The Technical Infrastructure building, inaugurated on 20 April, is purpose-built to accommodate all EUMETSAT ground systems, increasing overall security, efficiency and resilience. The process of progressively migrating existing operational systems to the TIB starts in summer 2012. 2013 sees the installation of the Copernicus Sentinel-3 and Jason-3 ground segments and the migration of the Data Centre. End of 2013 a big tape library for archiving satellite data is installed on the fourth floor of the building.