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News from Europe's Weather Satellite Organisation

MTG on track

Meteosat Third Generation (MTG) is on track following the approval of the texts of the Programme Resolution and Programme Proposal by the 70th EUMETSAT Council meeting in Rome, Italy, on 21-22 June 2010. These texts define the scope and cost of the programme and have now been frozen by all Member States.



“The space segment will include four MTG-I imaging and two MTG-S sounding satellites.”

MTG Phase B (preliminary design) activities at EUMETSAT, part of the MTG Preparatory Programme, have been underway since the end of 2008. This phase aims to define the baseline MTG system for detailed design and production and will be concluded with the System Preliminary Design Review (PDR), currently planned for March 2011. The space segment will include four MTG-I imaging and two MTG-S sounding satellites. MTG-I will carry a Flexible Combined Imager and a Lightning Imager and MTG-S an Infrared Sounder and Ultraviolet Visible Near-infrared Sounder provided by the European Space Agency (ESA) under the Global Monitoring for Environment and Security (GMES) Sentinel-4 programme.

Following the System PDR, system activities continue in preparation of the critical design review. Space segment activities also

continue towards a space segment PDR in late 2011. At ground segment level, the preliminary ground segment design will be elaborated, including apportionment of requirements into procurements at facility level. Preparations for these procurements will begin in 2011.

MTG Phase C/D (development and testing of the system) is currently planned to begin in 2012 and to last until the end of 2017 for the first MTG-I satellite. This will be followed by Phase E (operations and utilisation, including launch and acceptance testing of the system), with routine operations from the end of 2018, while the other satellites are produced in parallel.

So far, 15 Member States have confirmed their support for the MTG programme itself, with the remainder expected to follow before the next Council, to be held on 30 November and 1 December. The 15 confirmed “yes” votes already represent over 56 per cent of the MTG programme budget.

The overall cost of the EUMETSAT MTG programme is around €2.37 billion at 2008 economic conditions, including the overall MTG system tasks, development of the ground segment, 20 years of operations, funding of the Satellite Application Facility network, the EUMETSAT contribution to the ESA Development Programme, procurement of the recurrent satellites and all launch services. The annual cost of the MTG programme to EUMETSAT Member States over the entire period of the operational service will be slightly less than that of Meteosat Second Generation (MSG), which it will start replacing in 2018.

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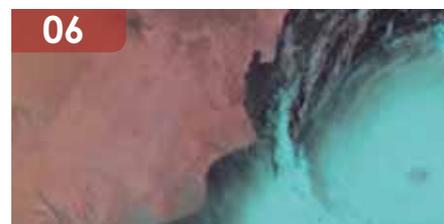
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Director-General's Desk



I have every right to feel extremely satisfied with the results of EUMETSAT's 70th Council that took place on 22-23 June. This was truly a historic Council not because of its stunning setting in Rome but rather because a number of important decisions were taken which will determine the course of EUMETSAT over the coming decades.

At Council, all our Member States voted for the Meteosat Third Generation (MTG) Programme Proposal and Resolution and 15 have now approved funding of the programme, accounting for over 56 per cent of its budget. I am confident that the remaining Member States will agree to fund MTG on time for the next Council to allow the programme to go ahead in December.

MTG will run for at least 25 years. No other international organisation has received such a long-term commitment from its members.

And this commitment does not stop with MTG. The 70th Council also agreed that a two satellite configuration be studied for the second generation EUMETSAT Polar System (EPS-SG) with distributed payloads for the two satellites. As far as the current EPS is concerned, Council approved the launch conditions for Metop-C in 2016. We are currently also on track for the launch of both Metop-B and MSG-3, which will keep the organisation busy in 2012.

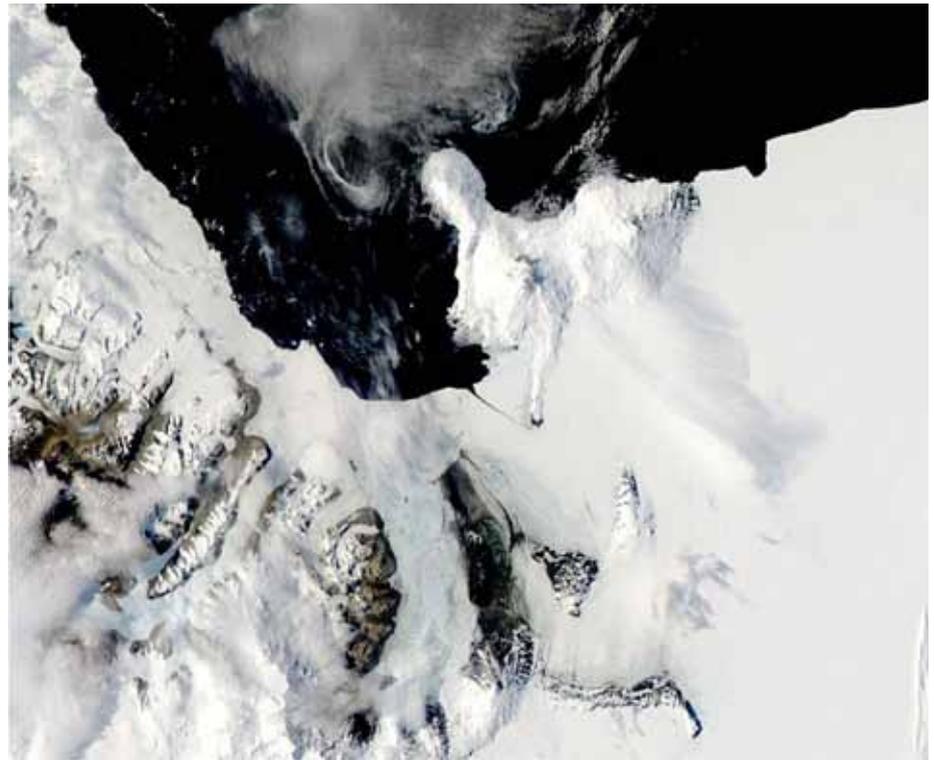
The 70th Council was also historic in that the Czech Republic participated for the first time as a full EUMETSAT Member State. Our organisation is coming ever closer to achieving its aim of mirroring the membership of the European Union.

The Council was held at the historic venue of Villa Madama in Rome as it was the last chaired by General Dr. Massimo Capaldo, who headed the Italian meteorological service. I would like to thank Massimo for his efficient chairmanship of the Council and wish him all the best for his well-deserved retirement. And I would also like to thank our new Council Chairman, Prof. Petteri Taalas of Finland, and our new Vice Council Chairman, Prof. Anton Eliassen of Norway, for taking the baton from General Capaldo.

Dr. Lars Prahm
Director-General of EUMETSAT

EUMETSAT prepares Antarctic Data Acquisition

EUMETSAT and its US partners are completing preparations for a Metop mission downlink to the ground station in McMurdo Sound, which will for the first time allow real-time data access from one of the most inhospitable regions of the world. Antarctic Data Acquisition (ADA) will allow EUMETSAT's Metop polar-orbiting satellite mission data and products to be delivered with significantly reduced latency to EUMETSAT Member States and the US National Oceanic and Atmospheric Administration (NOAA).



*Satellite view of the McMurdo station
(Source: US National Science Foundation)*

"ADA will reduce the time needed to deliver data and products, measured from the point of data sensing in the Metop orbit to its delivery to an end user, from the currently achieved orbital maximum of 115 to 65 minutes," said Andrew Monham, Metop Spacecraft Operations Manager in EUMETSAT's Control Centre Division.

The Metop mission data downlink will be supported by a 10-metre antenna operated by the US National Aeronautics and Space Administration (NASA) and National Science Foundation at McMurdo Sound at 77° South. The McMurdo ground station will provide this support in the X-band only. Mission data will be sent by combined satellite/land link for processing at EUMETSAT's central site in Darmstadt via Australia.

ADA facility implementation and preliminary testing is currently underway and the first data dump by Metop-A on McMurdo is planned for December 2010. Metop-A data from ADA will be available as early as January 2011 for system verification purposes, followed by the operations validation and the transfer of data to NOAA for test purposes in February-April 2011. The operational transfer of data to EUMETSAT users will begin in May 2011. The demonstration phase with an average of nine Metop passes per day will run from February 2011 to February 2014, after which ADA will be fully operational, with all Metop passes.

ADA will focus on supporting the prime Metop satellite, with the option to support its backup. Metop-B is currently scheduled for launch in 2012 and Metop-C in 2016.

EUMETSAT promotes data access in Eastern Europe and Western Balkans

EUMETSAT has launched a programme to support Data Access for Western Balkan and Eastern European Countries (DAWBEE). The programme is part of the EUMETSAT strategy to promote operational access to its data and supports the World Meteorological Organization (WMO) Regional Association VI (RA-VI) Strategic Plan, which calls in particular for "Improved capitalization on Region assets (ECMWF, EUMETSAT, EUMETNET, ICH) by encouraging broader use of outputs".

The programme supports the installation of a standard EUMETCast (DAWBEE) station in each of the 11 countries of RA-VI, as well as providing relevant training, with the support of experts from the region. The six RA-VI Eastern European countries are Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine, and the five RA-VI Western Balkan countries are Albania, Bosnia and Herzegovina, Kosovo (under UN Security Council Resolution 1244), the former Yugoslav Republic of Macedonia and Montenegro.

The DAWBEE project was launched after the information days organised by EUMETSAT in 2009 in Kyiv, Ukraine, for Eastern European countries and in Montenegro for Western Balkan countries, where participants from these regions requested the installation of EUMETCast stations to receive EUMETSAT data and for technicians to be trained to operate them. Most countries also requested additional training support.

In January, EUMETSAT hosted a first workshop with experts from Eastern European and Western Balkan countries, including experts from Member and Cooperating States, to define a concrete implementation plan. Participants included six experienced users from the two regions and from neighbouring countries, with whom the procurement, deployment and installation of EUMETCast stations in the two regions was planned. The workshop also identified the phases of the project: procurement, site preparation, training of trainers, installation, and training.



Following site preparation for DAWBEE stations in the 11 beneficiary National Meteorological and Hydrological Services (NMHSs), deployment and installation of these stations by experts from EUMETSAT Member and Cooperating States is taking place this autumn. Regarding training, EUMETSAT hosted a DAWBEE "train the trainer" workshop on 27-29 July 2010. The workshop was aimed at acquainting experts with DAWBEE station equipment, with an emphasis on building, deploying and operating the reception and visualisation host components of DAWBEE stations. The other workshop objectives were to support the

experts in preparing pedagogical materials for on-site training to be provided during the installation of DAWBEE stations and preparation of the schedule for deployment of DAWBEE stations.

A training event for personnel of the 11 countries' NMHSs will take place at EUMETSAT on 18-22 October 2010 to familiarise forecasters with the DAWBEE station and with satellite meteorological data.

WMO is supporting DAWBEE activity and will fund part of the training activities related to the project.



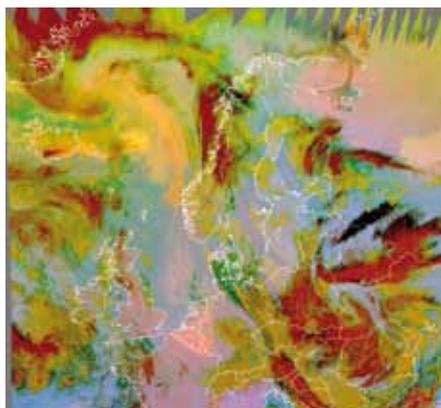
Participants in the first DAWBEE workshop, EUMETSAT headquarters, Darmstadt, 25-26 January 2010



Ash monitoring applications

The ability of EUMETSAT's meteorological satellites to monitor volcanic ash was demonstrated during the eruption of Icelandic volcano Eyjafjallajökull in April.

In addition to the existing fleet of EUMETSAT satellites, volcanic ash monitoring will also be an integral part of the capabilities of the future Meteosat Third Generation (MTG).



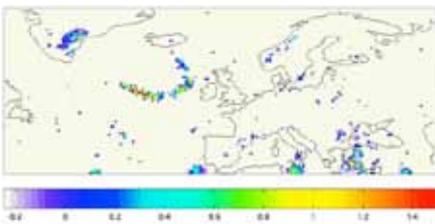
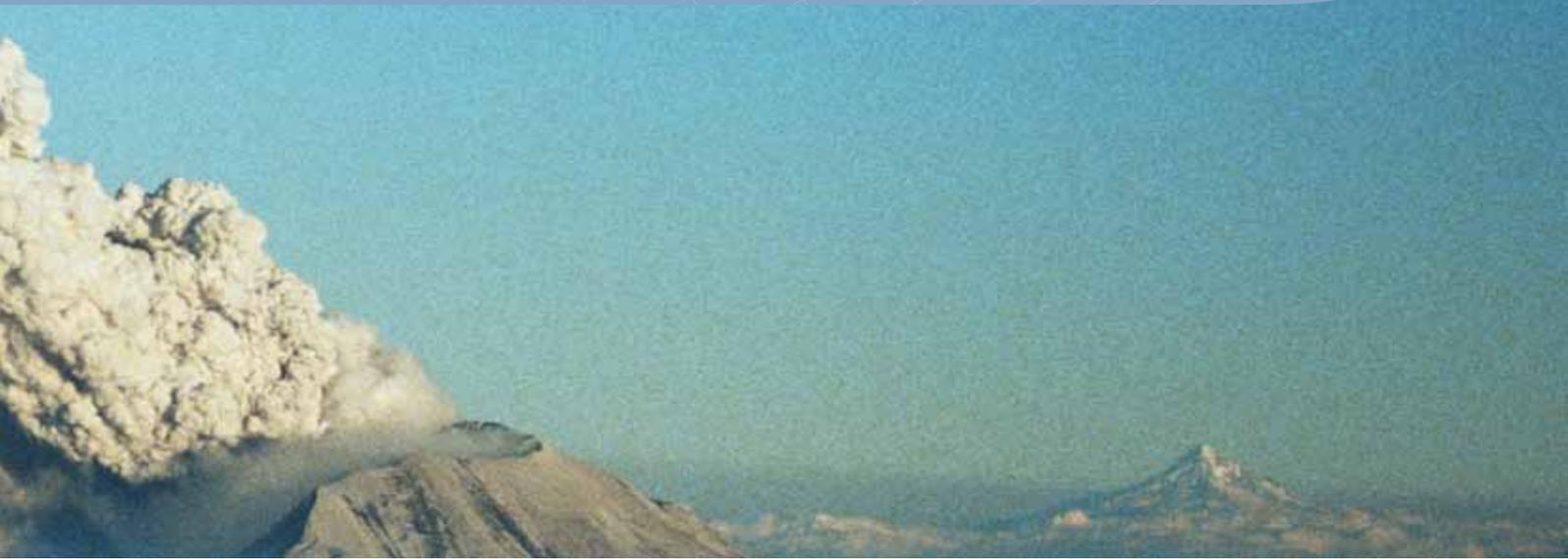
The Eyjafjallajökull ash plume (pink/light orange hue) moving steadily east over the United Kingdom, the Netherlands and towards Germany, 18 May 2010.

“The eruption of Eyjafjallajökull brought home to us the importance of ash cloud monitoring from space,” observed Marianne König, Meteorological Scientist in EUMETSAT’s Meteorological Division. EUMETSAT’s Meteosat Second Generation (MSG) geostationary and Metop polar-orbiting satellites “played a vital role in monitoring the progress of the ash cloud,” she pointed out.

Fred Prata, Senior Scientist for Atmosphere and Climate Change at the Norwegian Institute for Air Research, explained at a volcanic emissions workshop organised by EUMETSAT and the European Space Agency (ESA) in Frascati, Italy, on 26-27 May 2010: “Satellite data are extremely important for volcanic eruptions because these events can occur anywhere at any time, so you need a measurement system that can see the entire globe, all of the time. We currently have geostationary and polar-orbiting satellites in orbit that provide information every 15 minutes and almost every hour, respectively,” he said.

The workshop found consistent results between satellite and ground-based observations and the extreme accuracy of the data was confirmed in most cases by aircraft measurements, according to Ken Holmlund, Head of Meteorological Operations at EUMETSAT. “Measurements from aircraft flown by France, Germany and the UK in most cases confirmed the ash to be where the satellite data saw it and the modelling had predicted it to be.”

The silicon in volcanic ash can damage aircraft turbine blades, which led civil aviation authorities to ground air traffic for six days following the Eyjafjallajökull



O3M SAF / EUMETSAT Metop-A / GOME-2 Aerosol Absorbing Index, 9 May 2010

eruption and the cancellation of some 100,000 flights, stranding passengers around the world and causing an estimated €1.5-2.5 billion in economic damage.

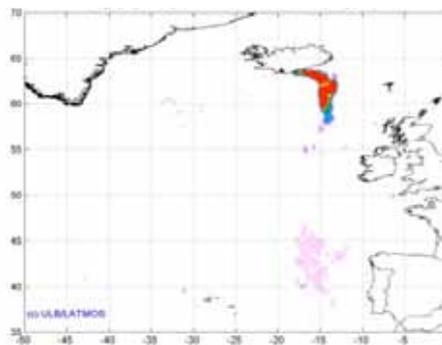
During a volcanic eruption, large amounts of ash and trace gases, especially sulphur dioxide (SO_2), are injected into the higher atmosphere in unusually high concentrations. Tracing them with satellites relies on detectors in the ultraviolet, visible and infrared spectral ranges.

In the ultraviolet spectrum, the Global Ozone Monitoring Experiment-2 (GOME-2) instrument on Metop-A can be used to derive the track of a volcano plume in several ways. First, the broad-band absorption of ultraviolet radiation by the volcanic ash is used to produce the absorbing aerosol product. Second, SO_2 can be measured using the specific absorption features of this gas in the ultraviolet spectral region. Finally, the Polarisation Measurement Devices (PMD) can provide additional information on the ash plume. All these methods show the volcano plume during Metop overpasses.

In the visible spectrum, Metop's Advanced Very High Resolution Radiometer (AVHRR)

and MSG's Spinning Enhanced Visible and Infrared Imager (SEVIRI) can see scattering by ash particles over dark or well-defined surfaces.

In the infrared spectrum, SEVIRI, Metop's Infrared Atmospheric Sounding Interferometer (IASI), and the High-resolution Infrared Radiation Sounder (HIRS) instrument on the Metop-A, NOAA-18 and -19 polar-orbiting satellites can measure absorption/emission by ash particles and absorption by SO_2 .



Eyjafjallajökull eruption, IASI Ash radiance index, 6 May 2010, provided by ULB/LATMOS.

MSG followed the progress of the ash cloud from Eyjafjallajökull in real time. A simple and effective way of identifying the location of the ash cloud is with so-called multi-channel RGB-composite images, whereby specific channel combinations can be used to identify aerosol and volcanic ash.

The Volcanic Ash Flag product derived by the Satellite Application Facility on Support to Nowcasting and Very Short Range Forecasting software package for Meteosat satellites goes one step further and

distinguishes volcanic ash from clouds by applying threshold tests using the different spectral absorption of ice clouds, water clouds and ash aerosol.

While EUMETSAT and its satellites played an important role monitoring the Eyjafjallajökull eruption, there is room for improvement in existing systems which will be carried over to future satellite programmes.

In the short term, Holmlund said, much more could be done with existing sensors and data to provide better information to the national Volcanic Ash Advisory Centres which issue atmospheric warnings for civil aviation.

"The eruption of Eyjafjallajökull demonstrated the requirement not only to describe conditions, but also to quantify them," said König, "so EUMETSAT is developing new quantitative products."

"Until now the data from the various missions have been used in isolation," Holmlund added. "We should try more to look at multi-mission approaches, bringing together all the available data in a more effective way to make better products."

Holmlund stressed "the importance of continued observations from geostationary orbit, as well as the use of observations from infrared and ultraviolet/visible sounding instruments. MTG satellites will therefore be essential for monitoring volcanic ash in the future. In addition to improved imagery at 10-minute repeat cycles, the provision of data from the MTG infrared and ultraviolet/visible sounding missions will be crucial for the derivation of quantitative products for volcanic ash modelling."

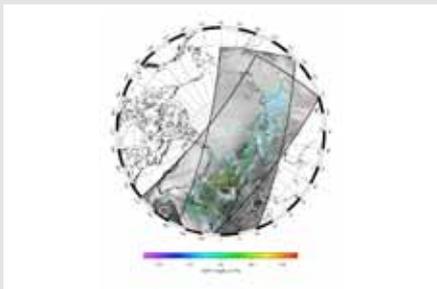
archive

This image of tropical cyclone Phet close to the coast of Oman was taken by the Advanced Very High Resolution Radiometer (AVHRR) instrument on board EUMETSAT's Metop-A polar-orbiting satellite on 2 June. The tropical cyclone brought strong winds and heavy rains to the Arabian Sea, the Arabian Peninsula and the coast of Pakistan in late May and early June 2010.

User Platform

New products

A Metop Advanced Very High Resolution Radiometer (AVHRR) Polar Winds product is now available on EUMETCast.



The basic principle of deriving wind speed and direction from satellite image data is to track the movement of meteorological parameters like cloud patterns from subsequent images of the same geographical area. For polar-orbiting satellites like Metop-A, overlapping of subsequent swaths occurs over the North and South polar areas only. The wind vectors are derived from atmospheric motion estimation between successive passes of the Metop-A AVHRR over the polar regions. The area covered is above 65°N and below 65°S. The polar winds product complements the Meteosat wind products, albeit with different characteristics related to the repetition rate as well as the instruments. As there are relatively few other measurements of winds over the polar caps, the new polar wind products have a demonstrated positive impact for global and regional Numerical Weather Prediction.

Enhancements to the Metop/NOAA Regional Data Service include the addition of EARS-ATOVS data from the station

at Muscat, Sultanate of Oman. EARS (EUMETSAT Advanced Retransmission Service) provides users with quick access to data from EUMETSAT's Metop and US National Oceanographic and Atmospheric Administration (NOAA) polar-orbiting satellites received via a network of local stations that now has been extended to include Muscat. The data provided by EARS include image, sounder and scatterometer data, primarily in support of Numerical Weather Prediction and Nowcasting at National Meteorological Services. EUMETSAT's cooperation with Oman has resulted in the sultanate providing fast access to Metop-A data from a region important to European forecasting.

Improving global data access

EUMETSAT continuously strives to make its data available to users on a global basis and has teamed up with international partners to access their data to distribute them via its EUMETCast dissemination system. The aim is to make available data accessible to users in need and minimise duplication of effort at best value.

Following discussions between EUMETSAT and the Japan Meteorological Agency (JMA) during the 37th meeting of the Coordination Group for Meteorological Satellites on 26-30 October 2009 related to data exchange, EUMETSAT implemented Meteosat-7 data reception to JMA via the Regional Meteorological Data Communication Network (RMDCN). This was undertaken within the scope of the existing cooperation agreement between EUMETSAT and JMA and more specifically because Meteosat-7

direct dissemination is not available in Japan due to the westerly position of the spacecraft.

RMDCN aims to form the World Meteorological Organization (WMO) Information System (WIS) Core Network extending to major centres in the Asia-Pacific region. This data exchange can also be seen in the context of the emerging WIS where EUMETSAT fulfils its role as a Data Collection and Production Centre (DCPC) that disseminates data to the major Global Information System Centre (GISC) JMA over the WIS Core Network.

Website updates

Readers may have noticed the recent changes to the EUMETSAT website. One new section which may be of particular interest to data users is "Service Status", where the most dynamic information content has been brought together in one "dashboard" page. Information on product enhancements, service schedules, service outages, product quality monitoring and spacecraft orbital information are now just a single mouse-click away.

For further information, contact the User Service Helpdesk:

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Profile:
Joaquín González Picazo

Engineering support

EUMETSAT's System Engineering Support (SES) Division which Joaquín González Picazo has headed since June 2009 uses its engineering expertise to support the definition, development, verification, validation and operations of systems, meeting user and operational requirements.

Joaquin said the first two missions of SES are to provide system, ground segment and launcher engineering support to the preparation of future programmes in their planning and definition phases, and to the implementation of future programmes as well as the operations of and maintenance of current programmes. This includes support of the future Meteosat Third Generation, next generation EUMETSAT Polar System and GMES Sentinel-3.

But he would like to see a greater focus on the third mission of his division, which is to propose and promote relevant standards and commonalities between current and future programmes, taking into account the system and ground segment maintenance and upgrade plans of the Operations Department.

There must be a balance between future needs and existing requirements and their natural evolution, according to Joaquin. He sees the "core role" of SES as contributing to "synchronising" the views and needs of the different divisions of EUMETSAT and identifies "natural interfaces" with the organisation's programme divisions, Programme Preparation and Satellite Application Facility Network, Meteorological, Maintenance and Engineering, Control Centre, Meteorological Operations, and User Services divisions.

Joaquin stresses the importance of his staff keeping up to date with the knowledge it has gained and maintained. He gained his own knowledge and experience in industry before joining EUMETSAT, already having been assigned to projects when he was in his university's systems, signals and radio communications department, working on electronic intelligence (ELINT) systems, microwave landing systems, satellite reception systems, professional and direct-to-home systems. Before joining EUMETSAT as a consultant on the integration of the Meteosat Transition Programme, Joaquin worked on the ground segment of the

Hispasat communications satellite and on the definition, design and implementation and initial exploitation phase of a satellite communications system for Spanish forces in the former Yugoslavia (UN Protection Force). He has spent 16 years at EUMETSAT in SES and its predecessors, the Technical Support Division and the Ground Segment Division.

As the activities of SES span both the Operations and Programme Development departments, Joaquin and his division are in a good position to promote EUMETSAT's cross-organisational issues initiative. This initiative and its over 20 recommendations is on the verge of being approved by EUMETSAT's senior management. Joaquin said the themes of the cross-organisational issues initiative are already in place in the different parts of the mission statement of the SES Division.

He emphasizes the need for "multi-programme solutions" and commonality, naming as existing examples the EUMETSAT Data Centre and data dissemination and reception, two systems managed by the Operations Department nowadays. "The Data Centre is a common system used by all operational programmes and it is planned to be used by all future programmes," Joaquin points out. Regarding data dissemination and reception, he said, "It makes sense to minimise the number of physical means of access/delivery of data and protocols between EUMETSAT and the users, especially at end user premises." But he recognizes "the need for separate mechanisms for redundancy according to user requirements".

Identifying and creating a common, shared infrastructure "takes time", Joaquin concedes, but he foresees "continuous implementation" that will require the contributions and participation of different areas and parts of the organisation. In the areas pertaining to SES, he and his division have their work cut out for them.



Career path

- **2009:** became Head of System Engineering Support (SES) Division at EUMETSAT
- **2003:** became SES Division's Ground Segment Engineering Group Manager
- **2002:** became Deputy Head of SES Division
- **2001:** became Telecommunication and Station Engineering Team Leader in Technical Support Division (TSD)
- **1995:** joined EUMETSAT as Ground Stations Engineer in EUMETSAT's Ground Segment Division/TSD
- **1994:** participated, as consultant from Rhea group, in the Meteosat Transition Programme as Ground Segment System Engineer (assembly, integration and verification team)
- **1992:** became Ground Segment System Manager at INISEL Espacio
- **1990:** joined Inisel Espacio as Ground Segment System Engineer in Hispasat programme
- **1989:** joined the Satellite Communications Department of the Spanish PTI, Compañía Telefónica Nacional de España, as Satellite Communications System Engineer
- **1988:** joined Electrónica de Mando y Control in Madrid as Design, Research and Development Engineer for ELINT systems for Spanish Air Force
- **1986:** began work on Ph.D. and became responsible for research and prototyping project in Systems, Signals and Radiocommunications Department of the Escuela Técnica Superior de Ingenieros de Telecomunicación (ETSIT) Madrid
- **1986:** received Ingeniero Superior de Telecomunicación (Honours) degree from ETSIT Madrid, Universidad Politécnica de Madrid

Private life

- travelling, history, sea swimming, basketball, frontón

Global meteorological satellite update

	Satellite	Launch date	Orbit type	Additional information
Europe	● Meteosat-6	20 Nov 1993	GEO 67.5°E	provides data collection platform acquisition support and the backup service for Meteosat-7
	● Meteosat-7	2 Sep 1997	GEO 57.5°E	provides Indian Ocean Data Coverage services
	● Meteosat-8	28 Aug 2002	GEO 9.5°E	provides the Rapid Scanning Service and the backup service for Meteosat-9
	● Meteosat-9	21 Dec 2005	GEO 0°	provides the primary operational service
	● MSG-3 and -4	2012, 2014	GEO	MSG-4 launch date to be revisited following the launch of MSG-3
	● MTG-I-1 to -4	2017 - 2030	GEO	
	● MTG-S-1 and -2	2019 - 2027	GEO	
	● Metop-A	19 Oct 2006	SSO mid-morning	primary satellite of the JPSS
	● Metop-B and -C	2012, 2016	SSO mid-morning	Metop-C launch date to be revisited following the launch of Metop-B
USA	● Jason-2	30 Jun 2008	LEO 66° inclination	
	● Jason-3	mid-2013	LEO 66° inclination	
	● GOES-11 (West)	3 May 2000	GEO 135°W	
	● GOES-12 (S. America)	23 Jul 2001	GEO 60°W	
	● GOES-13 (East)	16 May 2006	GEO 75°	
	● GOES-14	27 Jun 2009	GEO 105°	stored in orbit
	● GOES-15	4 Mar 2010	GEO 90°	
	● GOES-R	2015	GEO 135° or 75° W	
	● GOES-S	2016	GEO 135° or 75° W	
Russia	● NOAA-15	13 May 1998	SSO early morning	secondary satellite for Metop-A
	● NOAA-16	21 Sep 2000	SSO afternoon	secondary satellite for NOAA-18
	● NOAA-17	24 Jun 2002	SSO mid-morning	secondary satellite for Metop-A
	● NOAA-18	20 May 2005	SSO afternoon	backup spacecraft for NOAA-19
	● NOAA-19	6 Feb 2009	SSO afternoon	primary spacecraft of JPSS
	● NPP	Oct 2011	SSO afternoon	
	● JPSS-1 and -2	2014, 2018	SSO afternoon	result of NPOESS restructuring
	● DWSS-1 and -2	2018, 2023	SSO early morning	result of NPOESS restructuring
	● Meteor-M N1	17 Sep 2009	SSO morning	commissioning phase
	● Meteor-M N2	2010	SSO morning	
	● Meteor-M N3	2012	SSO morning	
	● Electro-L N1	2010/2011	GEO 76°E	
	● Electro-L N2	2011	GEO 4.5°E	
● Electro-M N1	2015	GEO		
China	● Fengyun-1D (FY-1D)	15 May 2002	SSO early morning	primary polar-orbiting satellite
	● FY-2C	19 Oct 2004	GEO 123.5°E	primary geostationary satellite
	● FY-2D	15 Nov 2006	GEO 86.5°E	backup for FY-2C
	● FY-2E	23 Dec 2008	GEO 105°E	
	● FY-2F and -2G	2011/2013	GEO	
	● FY-3A	27 May 2008	SSO	first of the second generation of Chinese polar-orbiting meteorological satellites
	● FY-3B	2010	SSO	
● FY-3C to -3G	2013-2021	SSO	planned for biennial launches in the 2013-2021 timeframe	
Japan	● MTSAT-1R	26 Feb 2005	GEO 140°E	
	● MTSAT-2	18 Feb 2006	GEO 145°E	backup for MTSAT-1R
	● MTSAT follow-on	2014		
	● Himawari 8 and 9	2014/2016	GEO 140°E	
India	● KALPANA-1	12 Sep 2002	GEO 74°E	(formerly METSAT) India's first exclusively meteorological satellite
	● INSAT-3A	10 Apr 2003	GEO 93.5°E	
	● INSAT-3D	2010		planned to have 19-channel sounder
	● OCEANSAT-1	26 May 1999	LEO	
	● OCEANSAT-2	23 Sep 2009	LEO	
	● SARAL	2011	LEO	
	● Megha-Tropiques	2011	LEO 20° inclination	Joint mission with CNES
South Korea	● COMS	26 June 2010	GEO 128.2°E	South Korea's first geostationary meteorological satellite
	● COMS follow-on	2017	GEO 128.2° or 116.2°E	
	● in service	GEO	Geostationary satellite	
	● planned	LEO	Low-earth orbit	
		SSO	Sun-synchronous orbit	

Annual Users Conference



EUMETSAT held its 2010 Meteorological Satellite Conference in Cordoba, Spain, on 20-24 September 2010, hosted and co-organised by the Spanish State Meteorological Agency, AEMET. The annual event brought together some 400 of the world's top scientists and researchers from 40 countries. The main theme of the conference was atmospheric composition, and sessions covered a wide range of subjects, including climate monitoring, Nowcasting and ocean observations.

Events Diary

- **Altimetry for Oceans and Hydrology**
18-22 October 2010,
Lisbon, Portugal
- **Group on Earth Observation ministerial**
3-5 November 2010,
Beijing, China
- **38th Meeting of the Coordination Group for Meteorological Satellites**
8-12 November 2010,
New Delhi, India

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

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