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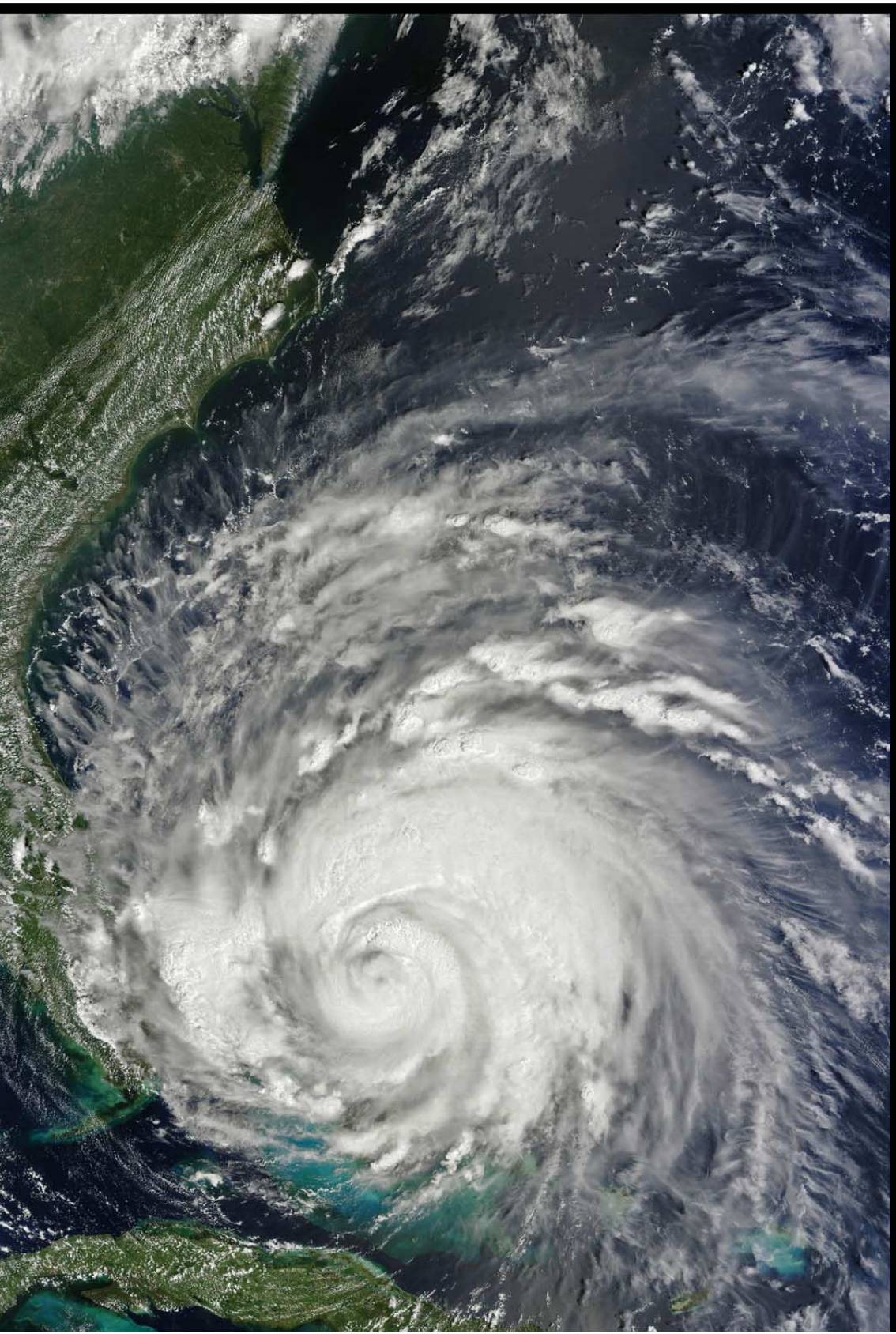
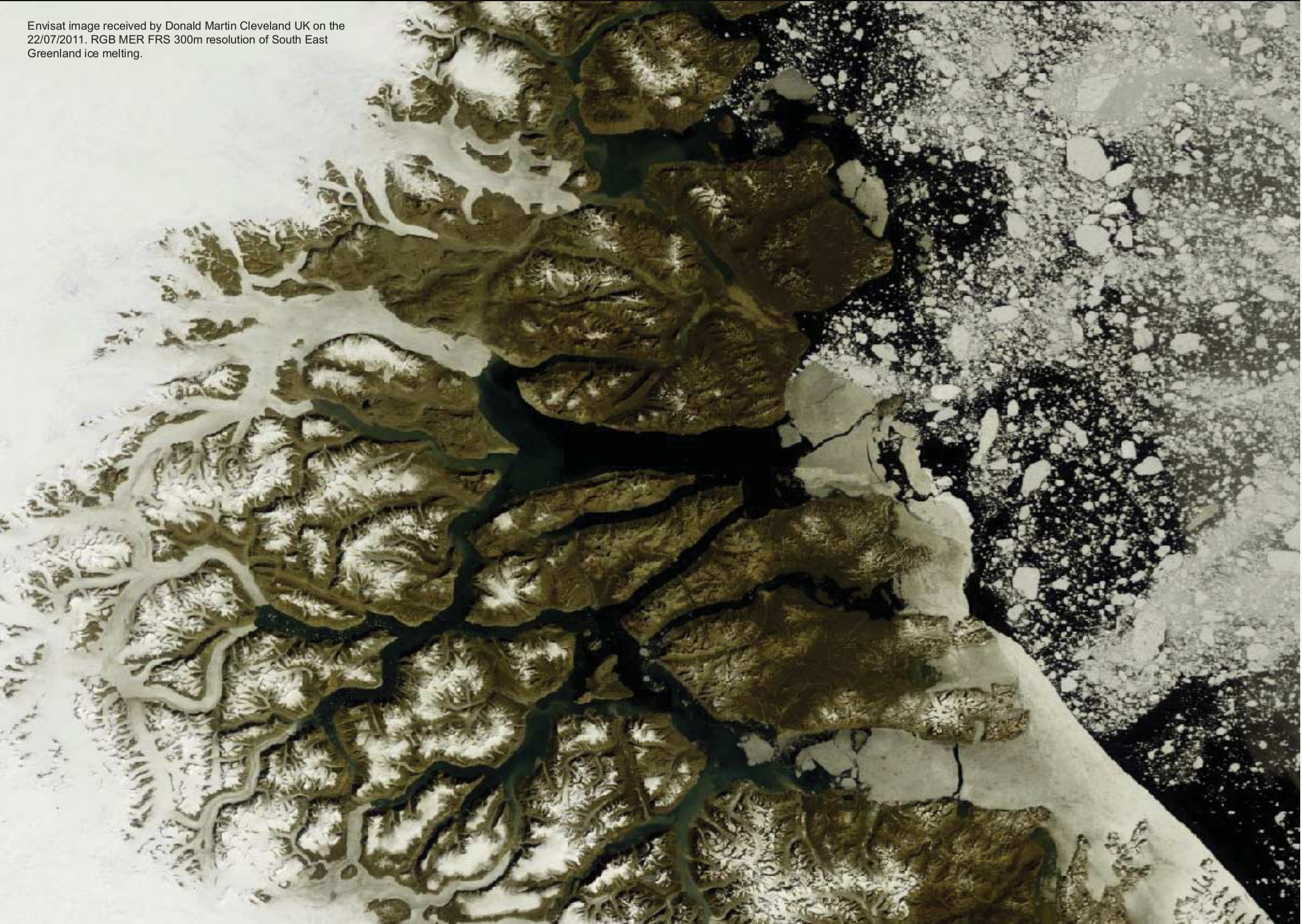


Inside this issue . . .



Envisat image received by Donald Martin Cleveland UK on the 22/07/2011. RGB MER FRS 300m resolution of South East Greenland ice melting.

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The GEO Quarterly

September 2011

Editorial: Peter Green

Although much has happened in the world of weather and remote imaging since our the last GEO Quarterly, hurricanes, tropical storms as well as our own symposium and the second GEO visit to EUMETSAT I have found it very difficult to fill the pages for this our 31st Quarterly. Simply because I have not had the copy from our membership. So reluctantly I have had to make this issue much thinner than usual.

Our magazine depends on you, the membership to send in your contributions of articles and images that you find interesting and that may be of interest to others. I am sure you will notice that this time there are very few contributors.

So if you want your magazine to be full of interesting and diverse articles, then I urge you to get writing now for the next issue the deadline is Saturday October 29th.

In the GEO Report Francis offers a disc of presentations from our EUMETSAT visit, this is in Powerpoint format,If you do not have *Microsoft's Powerpoint* software on your computer, don't despair. *Microsoft* have made a Powerpoint Viewer program available, completely free of charge. You can download it at **http://www.microsoft.com/download/en/details.aspx?id=13**

Front Cover and full page images

Front Cover

This Terra MODIS image shows Hurricane Irene poised over the Bahamas on August 25, 2011.

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Montage of pictures taken during GEO's visit to EUMETSAT, from left to right they show EUMETSAT HQ,satellite dishes and offices, GEO members assembled for the start of the days presentations,Dieter Klass making his presentation to the group,a group photo under a EUMETSAT dish, full scale engineering model of an MSG satellite.

Contents

The GEO Report

Francis Bell

My report for this Quarterly must celebrate our recent visit to Darmstadt.

Established members will know this event was advertised in two of our past Quarterlies also our website. The rationale behind the visit was to reinforce the personal contacts we enjoy with *EUMETSAT* and, importantly, to be briefed about *EUMETSAT's* planned future satellite programmes, together with information about data transmissions and how they may affect individual reception. Also, not to be dismissed, was the opportunity for GEO members from different countries to meet together, and for some, to meet the helpful *EUMETSAT* staff for the first time.

It was early 2011 that the date for our visit was confirmed, and Harriet Locke was appointed by *EUMETSAT* to oversee our visit. Harriet was brilliant in every respect, looking after the administration and planning of our visit. Via email correspondence with her I had asked for presentations relating to *EUMETSAT's* future programmes and their co-operation with NOAA, again from the perspective of how this would influence the reception of satellite data at home. I think all our delegates judged the final programme to be perfectly arranged for us.

If you want to view the visual material relating to these presentations read the notes at the end of this report; please contact me for a CD containing the full presentations from our visit.

There was no charge for the visit but delegates had to make their own travel and accommodation arrangements. The reality was that we all stayed in two adjacent hotels close to the centre of Darmstadt. This was delightful, generating the opportunity to spend time together outside the formal programme of visits. In total there were 28 GEO delegates, who came from the Netherlands, Germany, UK, Finland, Ireland, Austria, and France.

On arrival at the *EUMETSAT* HQ for the first day our welcome was genuinely friendly and, as best I could judge, *EUMETSAT* staff were pleased that we were visiting their HQ. It was Sally Wannop, head of User Services and Harriet Locke who looked after the formalities of our arrival.

The day was split into three parts:

1. The formal presentations in the Council Chamber—there were seven of these presentations

2. Tours of the technical facilities, the satellite control rooms and the Data Storage Centre

3. A brilliant lunch which gave us a break from the tours and formalities. At the end of the day a group photograph was taken, followed by a small technical meeting between some of our GEO delegates and *EUMETSAT* technical staff.

I was delighted that, during the day, I met Dr Lars Prahm, Director General of *EUMETSAT*. He has been very supportive of GEO over the years. He retired a few days after our GEO visit. I think he has been appointed head of the Danish Meteorological Services. There is an article in issue 34 of *Image* which gives the background to Dr Prahm's career and his time at *EUMETSAT*. If you don't have a copy of Issue 34 of *Image* then I have no sympathy whatsoever with you. The details of how to be included in this publication's mailing list have been reported often enough in *GEO Quarterly*.

An evening of wining and dining with GEO delegates and some *EUMETSAT* staff brought to an end our first full day.

Day two started with a visit to *EUMETSAT's* primary ground station at Usingen. Accompanied by three members of *EUMETSAT* staff, a one hour coach ride brought us to the ground station. The site is located on top of a gentle hill amid wooded countryside, on what used to be a WW2 airfield. Its geographic position and geology, I guess, makes the area ideal for locating the very large satellite dishes which stand there today. I don't quite understand the ownership of the site but it seems to be primarily run by *Media Broadcast GmbH*. As with our arrival at *EUMETSAT* HQ, the reception we received by *Media Broadcast* could not have been more friendly and welcoming. A presentation was given to us by Juergen Schaefer, Lothar Stockmann and Andreas Nowak about the role of *Media Broadcast* and its activities. Apparently *Media Broadcast* has about 60 customers and looks after thousands of TV and data satellite channels which pass through the Usingen site.

I was sincerely impressed with the VIP treatment we were given, both for the time and trouble that have been given to the presentations and then the two hour tour of the dishes and control rooms. The were dishes of every size on the site. I couldn't count them all but judged there to be over a hundred. Our tour included not only crawling around some of the biggest dishes on site but specifically visiting the *EUMETSAT* primary dishes with their control rooms. I came away from Usingen in awe of the amount of data passing through this site and the fine control which is necessary for perfect satellite communications.

I thanked the *Media Broadcast* staff who had guided us around the site and expressed some regret that we had to leave on time because of our afternoon programme which included a pre-booked tour of ESOC. I think we all agreed that another hour at Usingen would have been time well spent.

We presented ourselves at the European Space Operations Centre (ESOC) back in Darmstadt with just seven minutes to spare to enjoy a tour of their facilities which I had booked, together with a guide, several months beforehand. The style of this visit was a little different from the personal treatment we had enjoyed at *EUMETSAT* and *Media Broadcast* because we were put through a standard tour of facilities like many other groups. However, our guides were excellent and broadened our perception from weather satellites to deep space missions. A bonus for us was that at ESOC there is a GEO member, Mark Drapes. Mark works with the gamma ray and x-ray telescopes so, when we came to his area of the ESOC facilities, he was on hand to explain these and other missions with which he is involved.

Although we could look through the windows of several control rooms

within the ESOC buildings, we were not, understandably, allowed inside them. Mark stayed with us for most of our remaining time, explaining facilities as we progressed the remainder of the tour.

From my perspective, our two days were brilliantly successful from every dimension. GEO learned much about *EUMETSAT's* future programmes and I hope *EUMETSAT* learned a little more about our enthusiastic and talented GEO group, plus our equally talented friends from the Netherlands, *Werkgroep Kunstmanen,* who were well represented within our delegate group—plus of course other members of our party.

Finally some brief comment from delegates:

Hello Francis
It was a great trip.
Martin Schager, Austria.

Many thanks for all your efforts to organize this meeting. It was definitely worth attending.
Andreas Lubnow, Germany

The visiting of EUMETSAT was very interesting for me and I hope I can repeat it in the coming years.
Thomas Protzel, Germany.

Thanks a lot for organising the Darmstadt visit, it was brilliant.
Regards from Germany.

Future Events

September 30, 2011

The National HamFest in Newark. This is a very large exhibition of radio related equipment. For the third year, GEO will be attending with a stand and demonstrating live *EUMETCast* reception. For more details visit

www.nationalhamfest.org.uk

October 1, 2011

TORRO is holding a one-day meeting at Oxford Brooks University. The contact person is Jonathan Webb, whose email address is

Jonathan.Webb@torro.org.uk

There will be a small overlap between TORRO and GEO memberships which I hope can be extended.

November 6, 2011

The West London Radio and Electronic Show at Kempton. GEO will be there with our usual stand.

The EUMETSAT Presentations Disc

As stated above, and elsewhere in this quarterly, I refer to this disc containing the *Powerpoint* files relating to the seven presentations given to us at Darmstadt. I have a stock of these discs and, if you wish to receive a copy, together with a bonus publication which I will add, then take the following action.

If you live in the UK, write to me and enclose four first or six second class stamps. This is to cover some of the distribution costs. It is not for the disc which is free. **If you live outside the UK**, simply send me an email with you full postal address.

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EUMETCast-Europe Migration to DVB-S2

John Tellick

"Don't panic Mr Mainwaring – don't panic!"

EUMETCast-Europe already uses over 50% of the available Eurobird-9 transponder capacity for this service.

The maximum data rate via DVB-S is 29 Mbps.

In the next few years several new services will be coming on stream via EUMETCast with the launch of NOAA's NPP, EUMETSAT's Metop B and MSG-3.

Not to mention a few years later MSG-4 and then Meteosat Third Generation – which will comprise of a two geostationary satellite system, one satellite an imager and the other a sounder.

So, there is going to be a massive increase in data and DVB-S just won't be able to cope.

A move to DVB-S2 is the only answer since using an additional DVB-S transponder is inefficient, and there is a lack of transponders anyway, and would be costly.

The migration to DVB-S2 schedule will be driven by bandwidth requirements and the change will be during the period 2013 and 2017.

Benefits of DVB-S2

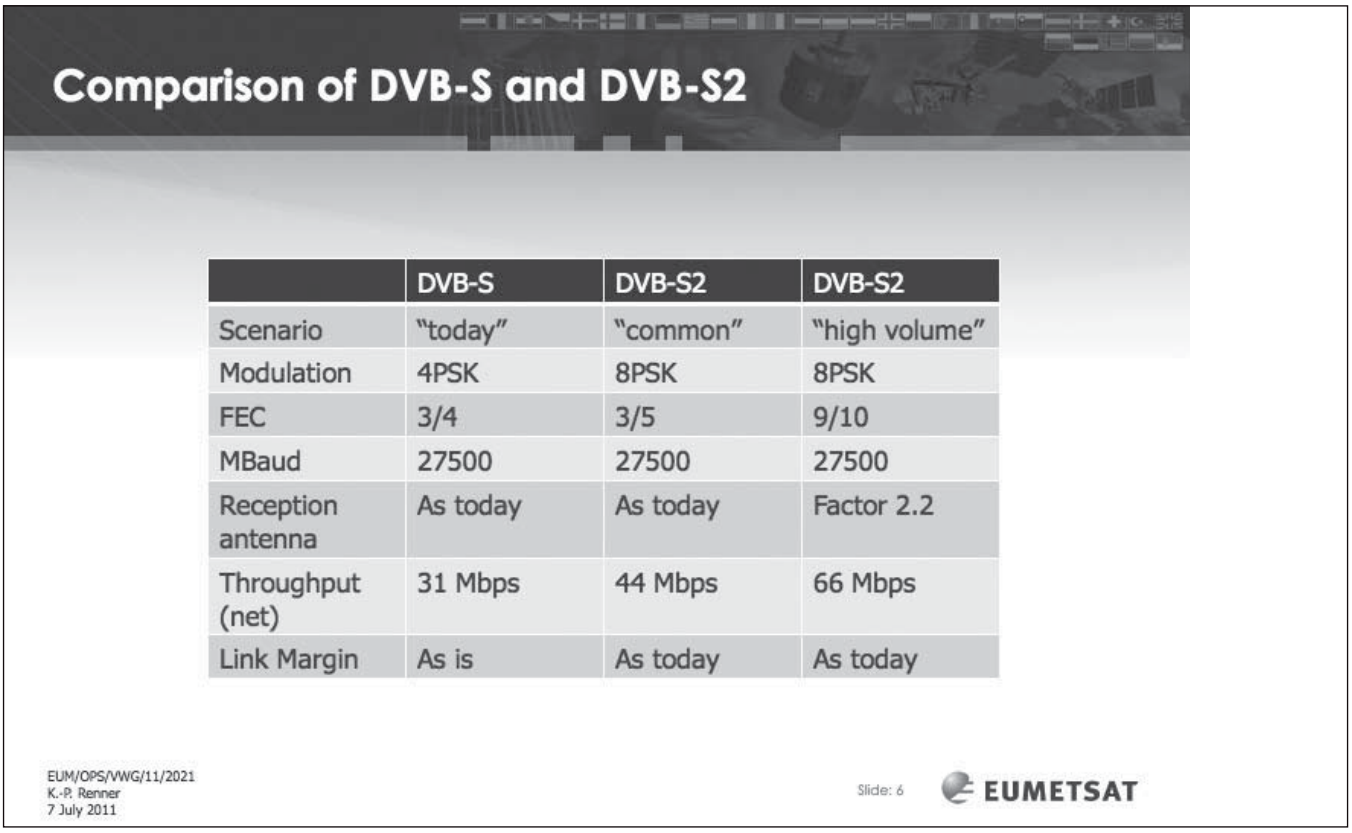
- *Most effective and most flexible usage of a transponder's resources, close to the known physical limits.*
- *The provision of high throughput.*
- *The ability to change coding/ modulation depending on reception conditions.*
- *The ability that several coding/ modulation schemes can coexist.*
- *The ability to shape the transponder depending on the characteristics of a service.*
- *Due to flexibility in throughput the most cost effective usage of transponder resources.*
- *Secure the readiness of EUMETCast for upcoming missions.*

With the flexibility of the above EUMETSAT are planning a two tier EUMETCast service.

The future DVB-S2 based service.

Considering that two virtual services will be necessary on EUMETCast in the future, the following services are envisaged:

- *a common service catering broadly speaking for the Now-Casting needs and also addressing the mass amount of users, with focus on very cheap commercial-of-the-shelf equipment and small antenna sizes;*
- *Common service: 8PSK 3/5, 44 Mbit/s net rate, 80 cm dish (footprint core)*
- *a high volume service catering for the NWP needs and broadly speaking for specialised users with focus on maximum volume dissemination;*
- *High Volume service: 8PSK 9/10, 66 Mbit/s net rate, 1.8 m dish (footprint core)*
- *Both services can coexist on one transponder in any ratio. A scenario with a 50%-50% ratio was successfully tested for its technical feasibility during a live test with a full transponder in Feb. 2011. The link margin was higher than expected.*



DVB-S2 Migration User Impact

Parallel operations

- *DVB-S and DVB-S2 cannot coexist on the same transponder - the new service will start on a new transponder with parallel operation of both services for some months.*

Dish sizes.

- *The current dish sizes can be maintained for the common service.*

Front-end

- *Any digital universal LNB which is compatible with DVB-S2, but it is recommended to replace old equipment (LNB, cables) – this will improve the link margin.*

DVB card or box

- *DVB cards/boxes must be replaced. EUMETSAT intends to use the "VCM" mode, the DVB reception cards/boxes must therefore support this mode. EUMETSAT is analysing DVB equipment on the market and will make recommendations in the near future.*

Currently [July 2011] there are no viably priced DVB-S2 cards or boxes available which support the VCM standard.

EUMETSAT are therefore stating:

Do not prepare for or worry about DVB-S2 – it is too early! Tellicast Client Evolution.

History

- *Current clients version are 2.4.4.a (Windows) and 2.4.3a (Linux)*
- *Version 2.5.17 was released as trial version for Windows only, feedback has been fed into 2.6.x development*
- *Current EKU's (eToken Pro 32k) are obsolete. Will be replaced by eToken 72K which require the use of a new (standard encryption) API.*

New Features of 2.6.x

- *EUMETSAT skin includes link to a local web structure on the reception station, accessible via the Tellicast shell*
- *New icon*
- *New name (tc-client)*
- *Syntax of recv-channels.ini file changed*
- *Memory setting can be used for file database and recv.log (no need for ramdisk)*
- *"re-read configuration" can be used to activate changes in recv.ini*

The New Tellicast Client.

New Features of 2.6.x

- *File database can be reduced to hold only control information,*
- *Better performance and scalability for large file sizes than current client*
- *Support for new eToken 72K and for current eToken 32K*

Features of 2.6.x installer

- *Default installation into a dedicated directory to avoid permission problems (Windows installer only)*
- *Default recv-channels.ini file uses a dedicated default target directory structure*

The future

- *The Tellicast server/client architecture has been tested successfully up to 180 Mbps*

I would like to thank Klaus Peter Renner most sincerely for allowing me to forward this comprehensive information, which was presented at the GEO visit to EUMETSAT in July, to our members at this time.

And also to thank Klaus Peter for the technical meeting he arranged during this visit between his EUMETCast engineering team and some of the members of GEO who are currently, and have been for several years, involved in regular liaison with this team by forwarding technical feedback from testing the EUMETCast system on various platforms and detailing the results/problems encountered from its various updates and tweaks which has led to several 'fixes'.

Participating in EUMeTrain

EUMETSAT's International Training Project

Esko Petäjä

My family and I have a highly technical background. I am an engineer and work amongst engineers, my wife teaches computer science and my youngest boy has a passion for technical *Lego* kits: the house is full of them. But I think that it is important to have an alternative perspective, and in my case it is an interest in meteorology.

In an earlier article, I described my weather satellite receiving station and how my dream of receiving weather satellite pictures came true. After getting my system running and enjoying the first 'wow' effects, I became hungry to understand more from the pictures and the analysis of weather satellite data.

In GEOQ 28 there appeared an article describing *EUMeTrain*, a training course organised by *EUMETSAT*, and I was very interested. I made enquiries to find whether it was possible for private persons to participate in that course. I learned that national institutions have the first choice to send members to the course but, if places remain free, private individuals could also participate. I registered myself for the course and, after waiting a couple of weeks, was accepted at the end of March.

EUMeTrain [1] is an international *EUMETSAT* project providing training and support in the field of satellite meteorology, in combination with other meteorological data sources. The training has particular emphasis towards hazardous weather events. *EUMeTrain* provides users of *EUMETSAT* satellite data and products with training resources to assist them in making more effective use of this information, either as stand-alone material or in combination with other meteorological data sources.

The course itself was entitled the '*EUMeTrain Basic Satellite Meteorology Course*' and ran from April 1 to May 30. The registration fee was 500 euros.

The Course

The course consisted of a series of twelve online lectures given over the Internet using *Saba Centra* software, with course materials and exercises provided from the *EUMeTrain* 'Moodle' archive. There was, additionally, a three-day classroom (workshop) phase based at the Headquarters of EUMETSAT in Darmstadt.

Summary of Course Content

Lecture 1: 'Satellites - a technical invention with high impact', described the history of satellites and the purpose of *EUMETSAT's* current and future satellites. This Lecture gave me good general understanding of satellite meteorology.

Lecture 2: 'Satellite orbits', described the basics and theory of satellite orbits and the different planes they occupy. There was also a section which described station-keeping manoeuvres and activities, needed because of disturbances to satellite orbits caused (among other things) by the fact that Earth is not a perfect sphere.

Lecture 3: 'Principle of radiative transfer', described the basics of radiative transfer and how satellites make use of both visible and infrared channels. I also learned how channel combinations were the basis of colour imagery.

Figure 1 - A lesson playback *Saba Centra*

Lecture 4: 'Data acquisition, data processing and applications', dealt with how to get the satellite data, how this was post-processed to extract the required data, and the uses to which that data could be put. This lecture also explained the basics of HRIT data, and calculations from radiance to temperatures and from radiance to reflectance. Image enhancements like changing contrast or brightness were also explained.

Lecture 5: 'Spectral bands and their application', explained in detail the usage of different satellite channels and how the channels could be used in different applications. This was most interesting and gave me a full picture and understanding of RGB.

Lecture 6: 'Geostationary Satellites', explained the basics and usage of geostationary satellites such as Meteosat, GOES, FY, INSAT and KALPANA. It also explained the difference between spin stabilised and 3-axis stabilised satellites. Also, different sectors and capabilities from the point of resolution for Meteosat satellites were explained.

Lecture 7: 'Polar Orbiting Satellites', explained the basics and usage of polar orbiting satellites. The onboard AVHRR instrument was explained and also the SAF products which use data from it. The IASI and AVTOS sounding instrument were described too, and I found humidity applications based into these instruments quite interesting.

Lectures 8 and 9: 'Benefits of derived products', explained the principle of derived products, those which are created by the further processing of satellite images. Examples of this product type are SAF land and surface analysis. Data is distributed through *EUMETCast* or a data centre. Another section explained how data are used for long-term climate monitoring. In meteorology there are basic terms: 'weather' is what you see now, 'climate' is the status of the atmosphere during a longer period.

Lecture 10: 'Limitations in Satellite Image Interpretation', explained how the position of an observer can make a difference to the accuracy of satellite pictures. In Finland, where I live, parallax errors are quite big. There is also a difference between winter and summer.

Summary of the On-line Course

The online courses had given me basic knowledge of satellite imagery. I was very happy with this training and now can understand much better what I am doing and how software works.

The Workshops

I flew by *Ryanair* from Finland to Darmstadt, via Frankfurt. Even though I was not personally piloting this plane, I checked weather conditions en route (figure 2). In Finland we had rainy weather but in Germany it was almost clear sky. The visualisation (figure 2) was done by *ViewMSGProc*, software used during training.

On arrival, I booked into the Ibis hotel, just a 20 minute walk from *EUMETSAT* headquarters. After registering, I joined up with the other dozen or so participants the following morning. They came from various countries—Nordic, east-Europe and Spain—and all were weather forecasters. I was only private person on that course.

Workshop 1: Using Data Centre Application

The first lessons showed us how to use and download data from the *EUMETSAT Data Centre*. EUMETSAT has an enormous data store which contains material from different weather satellites for the past 25 years. I hadn't previously understood the purpose and benefits of being able to use that service because I have been concentrating on acquiring my data by EUMETCast.

Mainly, the data in the EUMETSAT archives is used by scientific organisations for long-term climate monitoring purposes. But it is also useful for private use if you need to track some specific weather conditions later on. I typically keep data in my own storage only seven days. Here's an example showing how I was able to track a local severe thunderstorm in my own area later on using data from data centre and using the *ViewMSGProc* software which we were trained to use during the workshop days.

The first requirement for using data from the *Data Centre* is that you are registered for it, something that is quite easy to do from your own portal area, where all the details of your *EUMETCast Key* are stored. After logging into a *Data Centre* application, you are able to start selecting the data which you want to download. This works similar to a web shop and is very easy to use.

At noon on June 1, there was heavy local thunderstorm near my home town and I was testing how it would show up in Meteosat-9 images. The first thing was to select the correct data and time using a data application and then put this into the shopping cart (figure 3). After 'checking out' I was sent a link by email from which I was able to download the data. I noticed that it takes around 10 minutes to get that email and, after receiving the email, it takes another five minutes before the data becomes available.

In figure 4, the area encircled in red shows the location of the severe storm. Animation of the image showed high sharp cloud tops typical for high CB clouds. I also photographed some of the damage caused by the storm (figure 5).

Tour of the Eumetsat Office

We took a break from the workshop for a short tour of the *EUMETSAT* office and were shown round the Data Centre, the outside areas which displays models of different satellites, and the satellite control room.

Workshop 2: Using MSG Software

Here we concentrated on learning how to use the *MSGProg* software developed by JAN Kanak of the Slovenia Hydro Meteorology Unit (SHMU).

This software is widely used in eastern European countries to present Meteosat images. The software was originally developed for *Unix* and *Linux* platforms but today it has a front-end for *Windows*. The software consists of two different sections: decoding software which encodes the files received by *EUMETCast,* and a second application which displays the decoded images and animations. The main features of the software are

- it encodes and decodes Meteosat-9 and -8 information
- it encodes into MPF data

The main screen displays file and path settings on its left hand side and there is an encoding process indicator at top right and an HRIT segment table indicator in the middle of the screen.

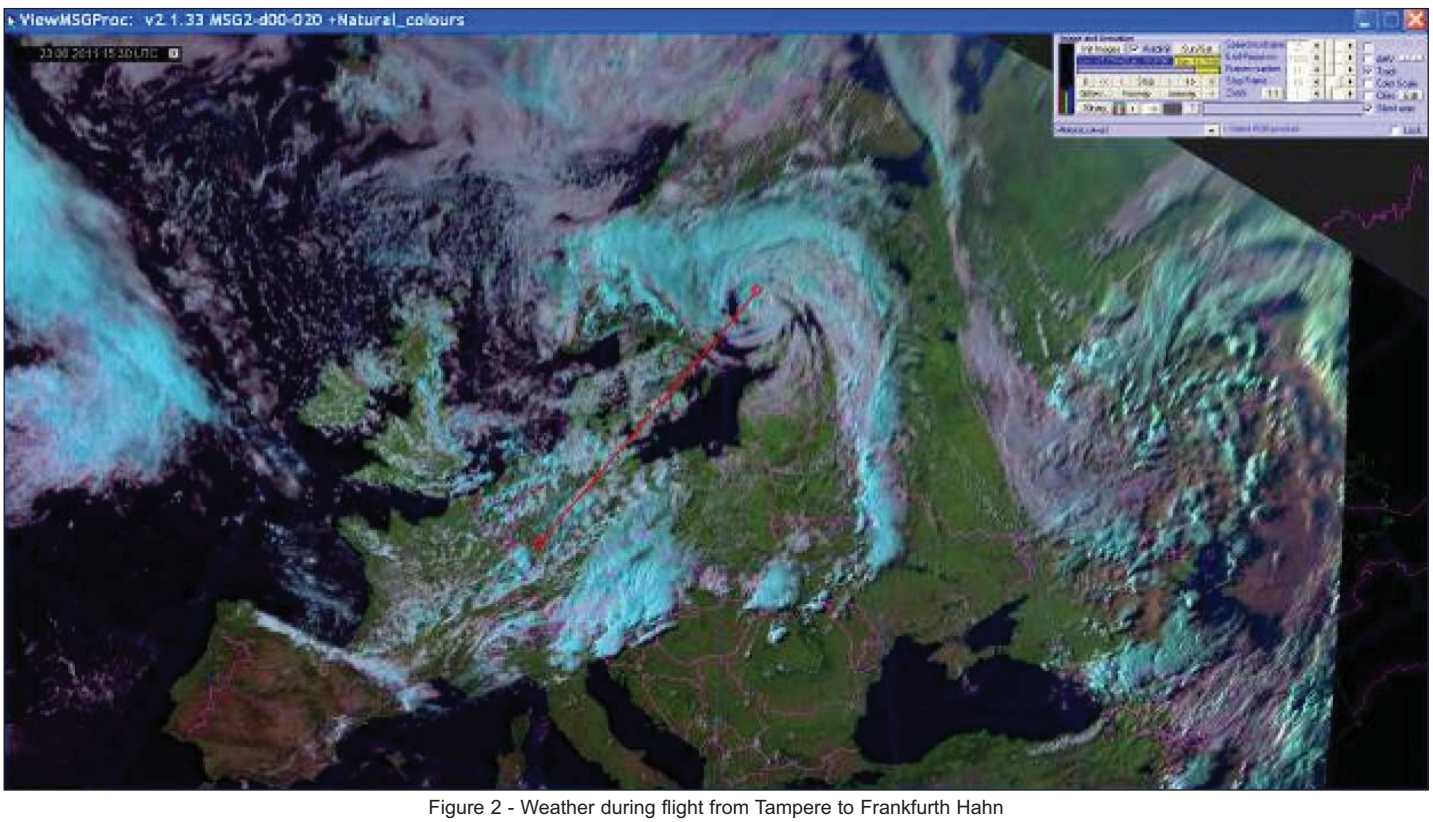


Figure 2 - Weather during flight from Tampere to Frankfurth Hahn

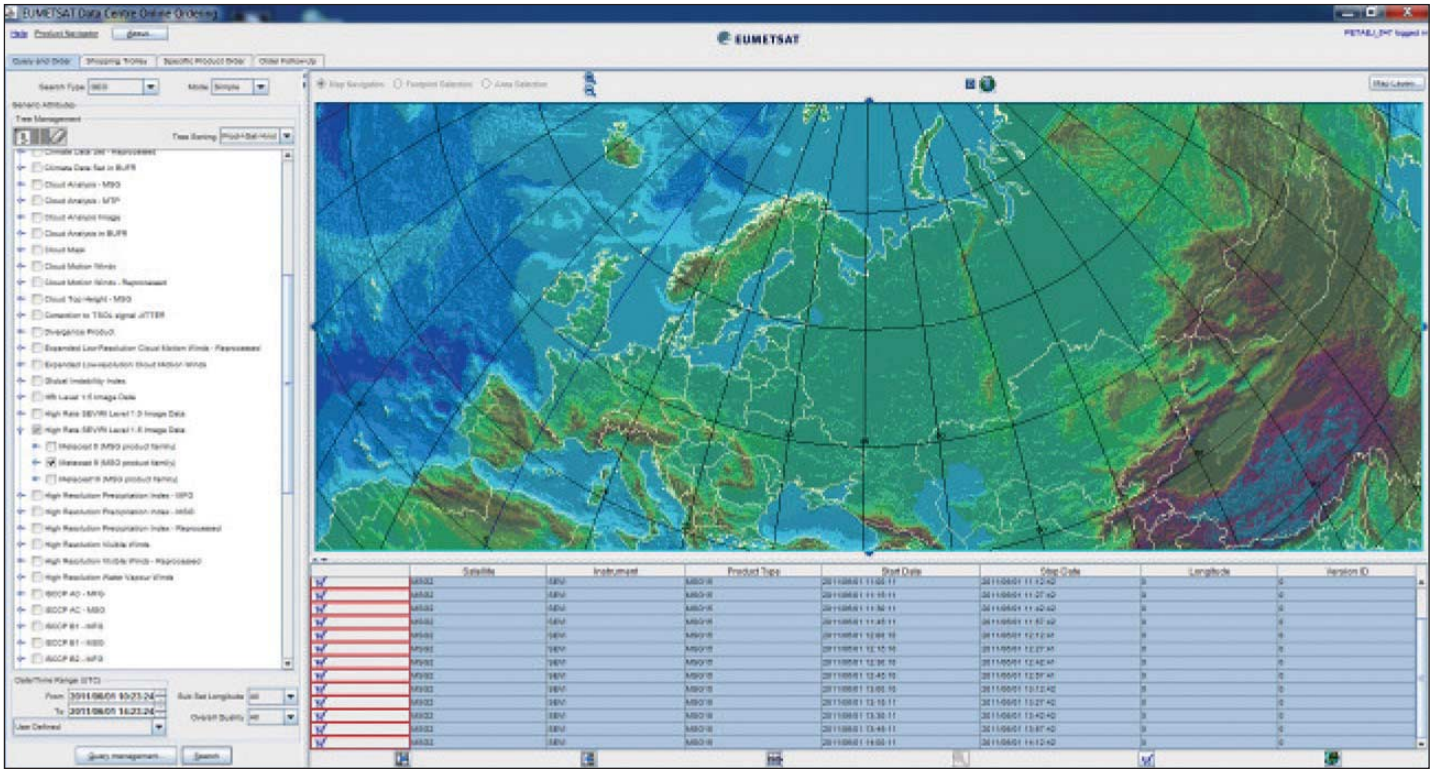


Figure 3 - Selecting the data for June 11, 2011

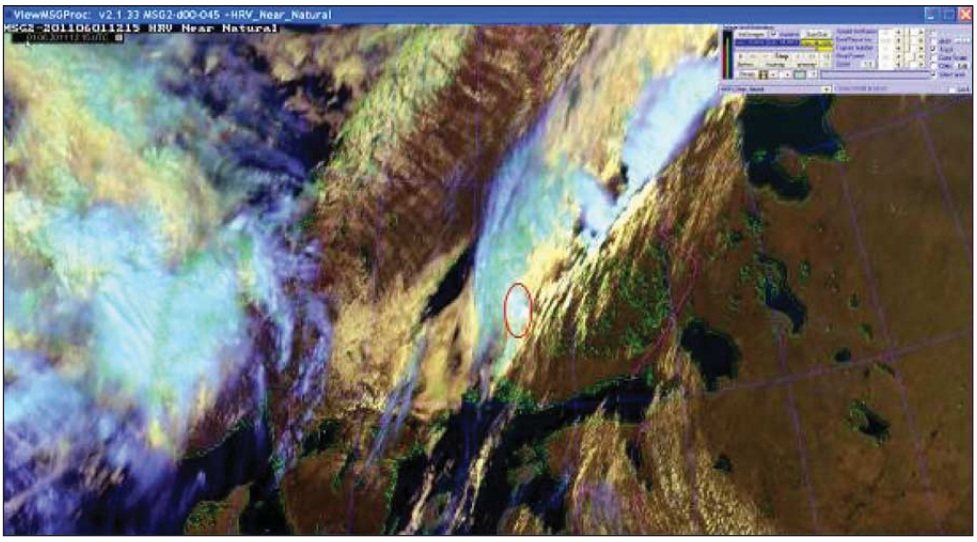


Figure 4 - A local storm over Finland captured by Meteosat on June 1, 2011

Figure 5 - A photograph showing devastation caused by the June 1 storm

After installation you must first to set the area (Domain to be used). This is done under 'Selection Domain' (figure 6). Different centre point for channels 1-11 and HRC can be selected individually: additionally, each area could have four sub areas. After this setting is done the domains are calculated. If, later on, different areas are needed, this procedure can be repeated.

A most important section of *MSGProg* is its RGB settings screen where the following features can be set up:

- RGB settings for different channels
- Colour palettes
- a List of RGB to be processed.
- merging together two already processed images.
- run with different parameters according to time

After the 'RGB Settings' are complete then processing could be done for all files (All prologues) or for only one prologue.

After processing is done then viewing of results is done using the *ViewMSGProc* software, which is able to:

- select different process types (Channel, Fog, Dust)
- show any individual file or animation

One interesting feature is its ability to show colours bookmarks, where the meaning of different colours are shown in text when the cursor moves over different areas of an image.

Practical installation and operation of MSG software

I use MSG software in two different ways. First, for downloading data from the *EUMETSAT Data Centre* and then as an analysis and visualisation tool. Software has excellent predefined RBG features that make it very useful for that purpose. And secondly, for using data from *EUMETCast.* In this case *MSG DataManager* from *Satsignal Software* can save raw data to a different location. This offers a good way to use same data twice for multiple purposes.

Figure 7 shows a schematic of my set-up.

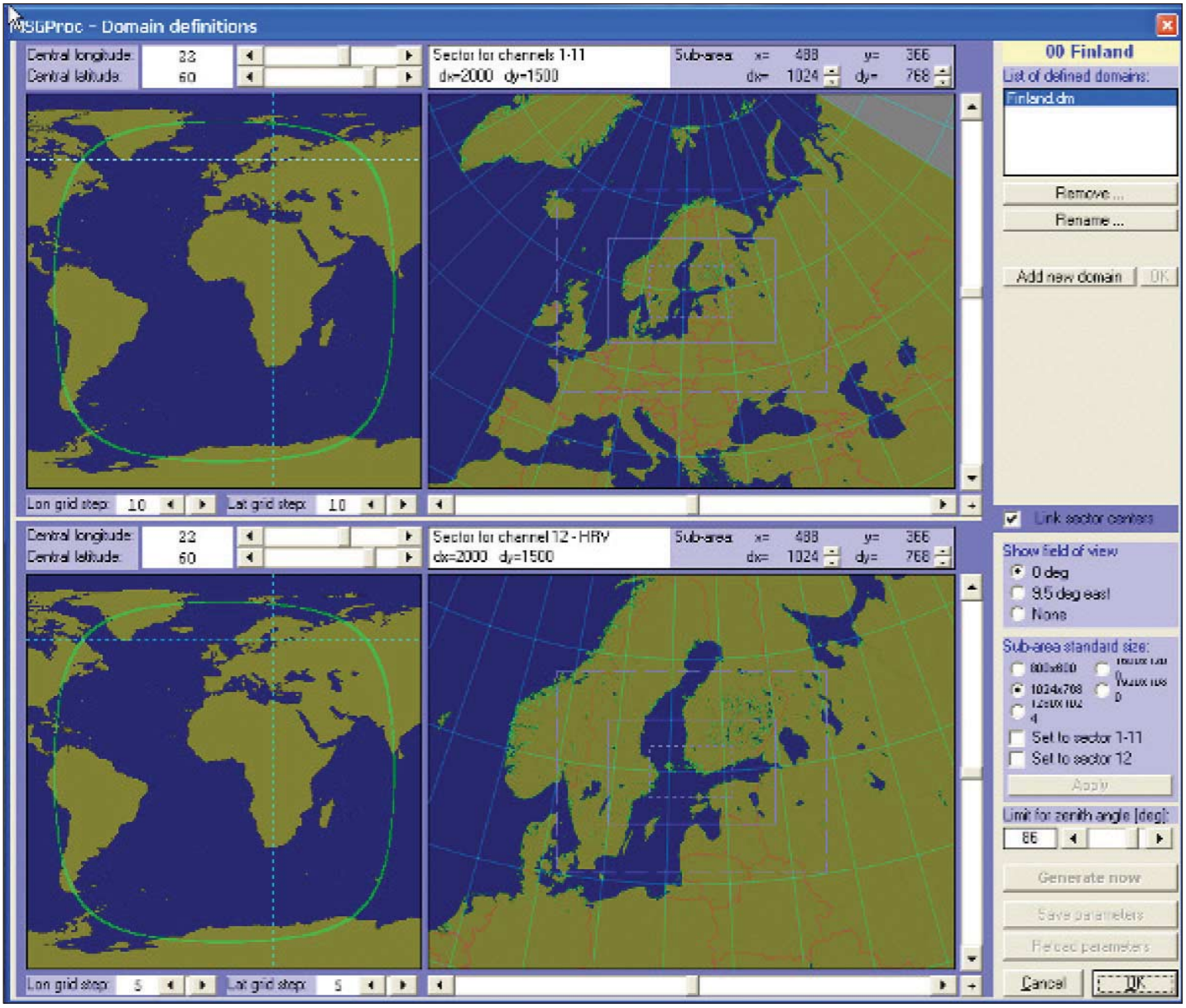


Figure 6 - The *MSGProg* Domain Selection

Workshop 3: Using McIDAS-V

McIDS-V is visualisation software which was developed in the USA for scientific purposes. It has a completely different approach to other applications. It has numerous features but, as I have not yet had time to study them fully, I am planning to describe it in a future issue of *GEO Quarterly* once I have had time to become more familiar with it.

Conclusions

First I would like to thank *EUMETSAT* and all its personnel for their excellent training and environment. Course content and the organisation of training were excellent. From my personal perspective I also learned a lot.

The purpose of EUMeTrain is to develop training methods. I must say that their training is the best I've ever seen. Organisation of practical training is done well and very accurately and the teachers are very skilled.

References

1 EUMeTrain
http://www.eumetrain.org/about.html
2 Eumetcal training
http://www.eumetcal.org/
3 Slovak Hydrometeorological institute
http://www.shmu.sk/sk/?page=1
4 Free open software for 3D geophysical analysis and visualization
http://www.ssec.wisc.edu/mcidas/software/v/

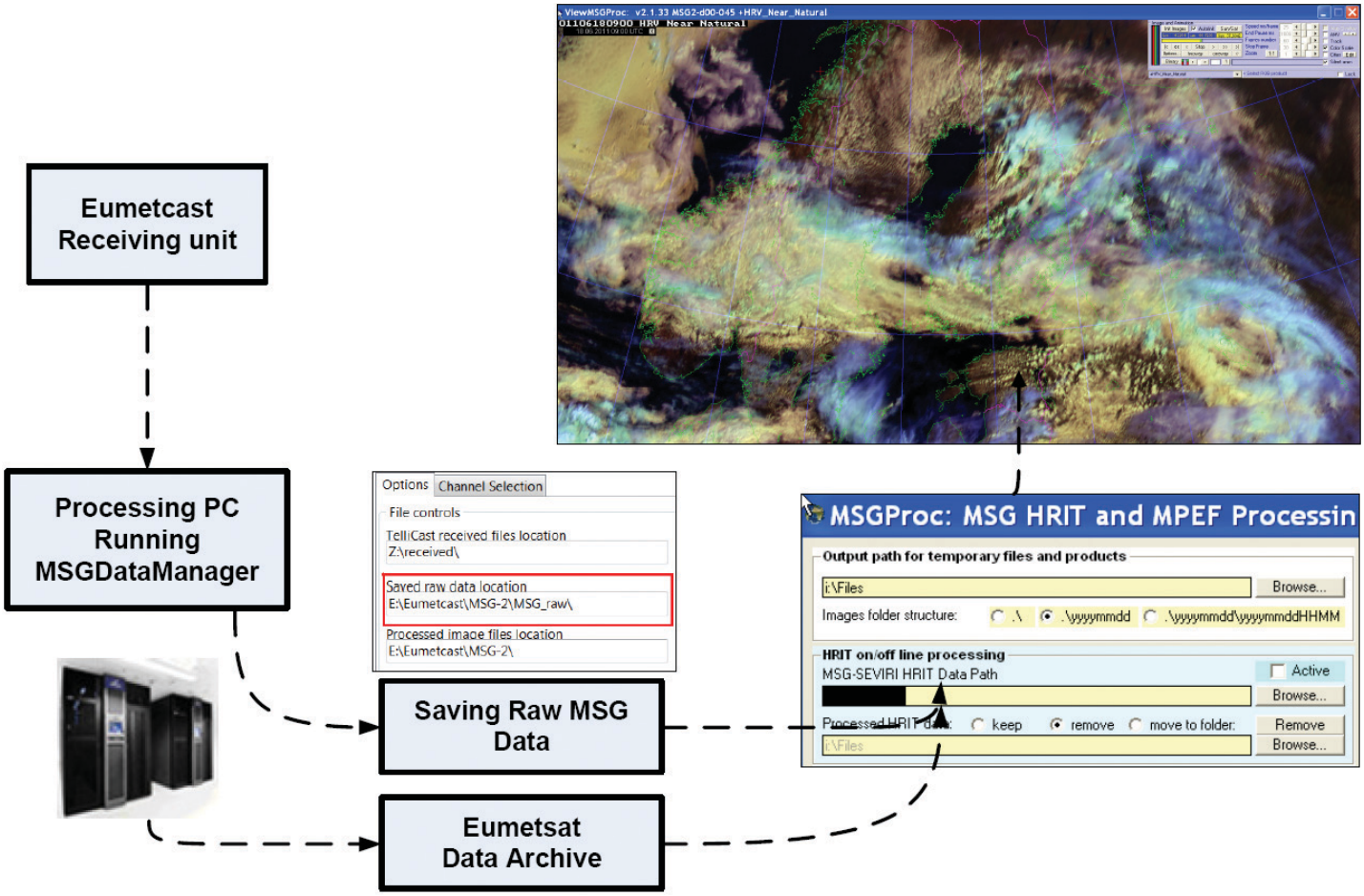


Figure 7 - A schematic diagram showing how the author integrates the various elements of his MSG activities

Official photograph from the 2011 GEO visit to EUMETSAT HQ

EUMETSAT Current and Future Satellite Operations

John Tellick

Our visit to EUMETSAT in July allowed us to discuss and get the latest situation regarding current and future EUMETSAT satellite missions.

Not that we are not already well informed – GEO has a good working relationship with several EUMETSAT departments with whom we are in regular contact.

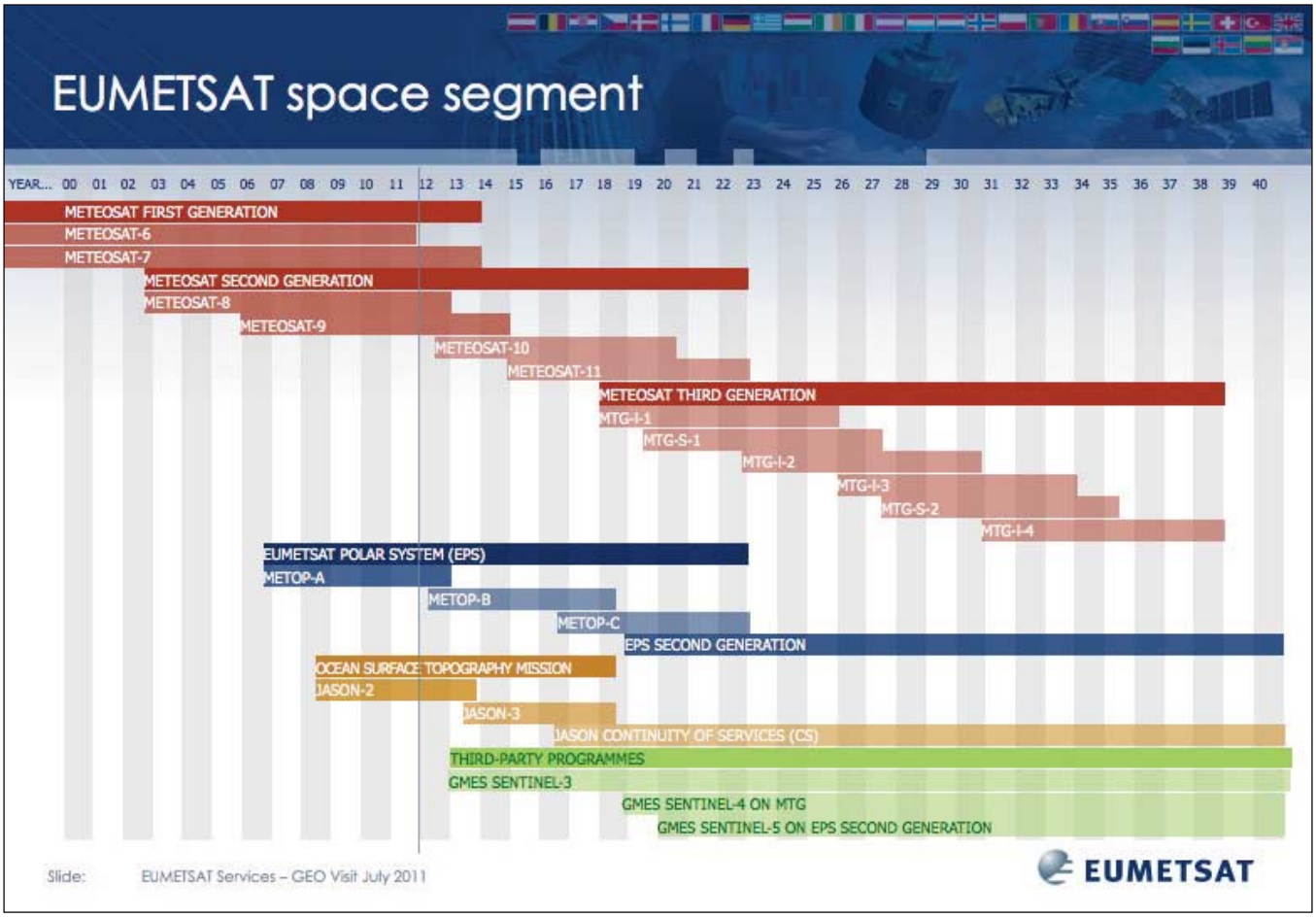
Sally Wannop gave GEO delegates a comprehensive presentation of the current situation and the increasingly busy years ahead for EUMETSAT.

Also included in Sally's presentation was information regarding the EO Portal [see GEO-30] Product Navigator/ Registrations and Web Map Services.

The slide below shows the current launch and operational period schedule for forthcoming missions.

You will see that 2012 will be a busy year for EUMETSAT with the launch of Metop-B planned for April 2012 and Meteosat-10 [MSG-3] planned launch June – August 2012.

These, and the planned launch of NOAA's NPP polar orbiter in October this year will result in an increase of



data which will relentlessly continue over the coming years with future missions.

This will require an evolution of the EUMETCast system – see detailed article in this issue of the GEO Quarterly.

Current geostationary operations are shown below and you will note that Meteosat-7's IODC operations are scheduled till the end of 2013 but approval is being sought for an extension of this important operation till 2016.

Not that it effects EUMETCast users but many will know that Meteosat-7 currently has quite an inclination which slowly increases with time. I wondered if this would still be tolerable in 2016 and asked EUMETSAT – their response is below:

The current orbit inclination of Metoesat-7 is approximately 7 degrees. The satellite is expected to reach an orbit inclination of approximately 10.4 deg on 31/12/2016. A good experience in using a Meteosat satellite in that inclination range was acquired with Meteosat-5 (max inclination: 9.1 deg) and Meteosat-6 (max inclination: 9.9 deg). Based on this experience it is expected that Meteosat-7 will provide satisfactory performance until end of 2016.

Plans are already well advanced for MTG Meteosat Third Generation scheduled to start operations from 2019.

This will be a very new venture for EUMETSAT in that the satellites will be a three axis stabilised platform instead of the revolving cylinder of M1G and MSG.

Not only that but there will be separate geostationary satellites for imaging and atmospheric sounding from the same location.

EUMETSAT Polar System, EPS – SG (second generation) is being discussed and could comprise a two satellite system with distributed payloads to be ready for 2018.

Jason-2 launched in June 2008 with partners CNES, NASA and NOAA gave EUMETSAT its first optional programme on ocean altimetry which enabled it to extend its expertise in data and product dissemination for weather forecasting and climate monitoring.

Jason-3 under development and scheduled for launch in 2013 will provide continuity after Jason-2.

Sentinel-3a/3b a third party mission where EUMETSAT will operate the satellites and generate the marine products.

ESA will generate the land application products.

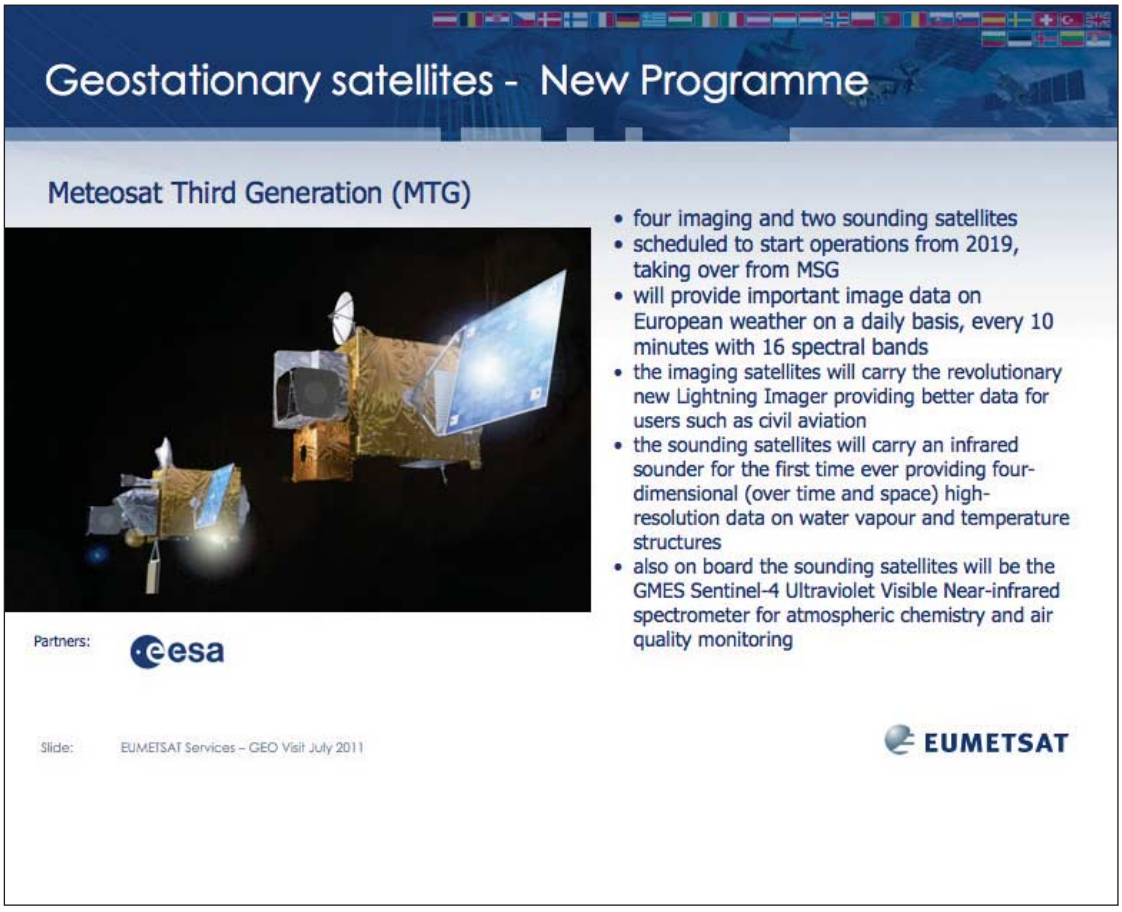
Sentinel-3a is scheduled for launch in 2013.

Looking at how far ahead the operations schedules and new projects go, I wonder in my quickly advancing years, how much of this I will see.

Unless someone out there has the illusive elixir of life?

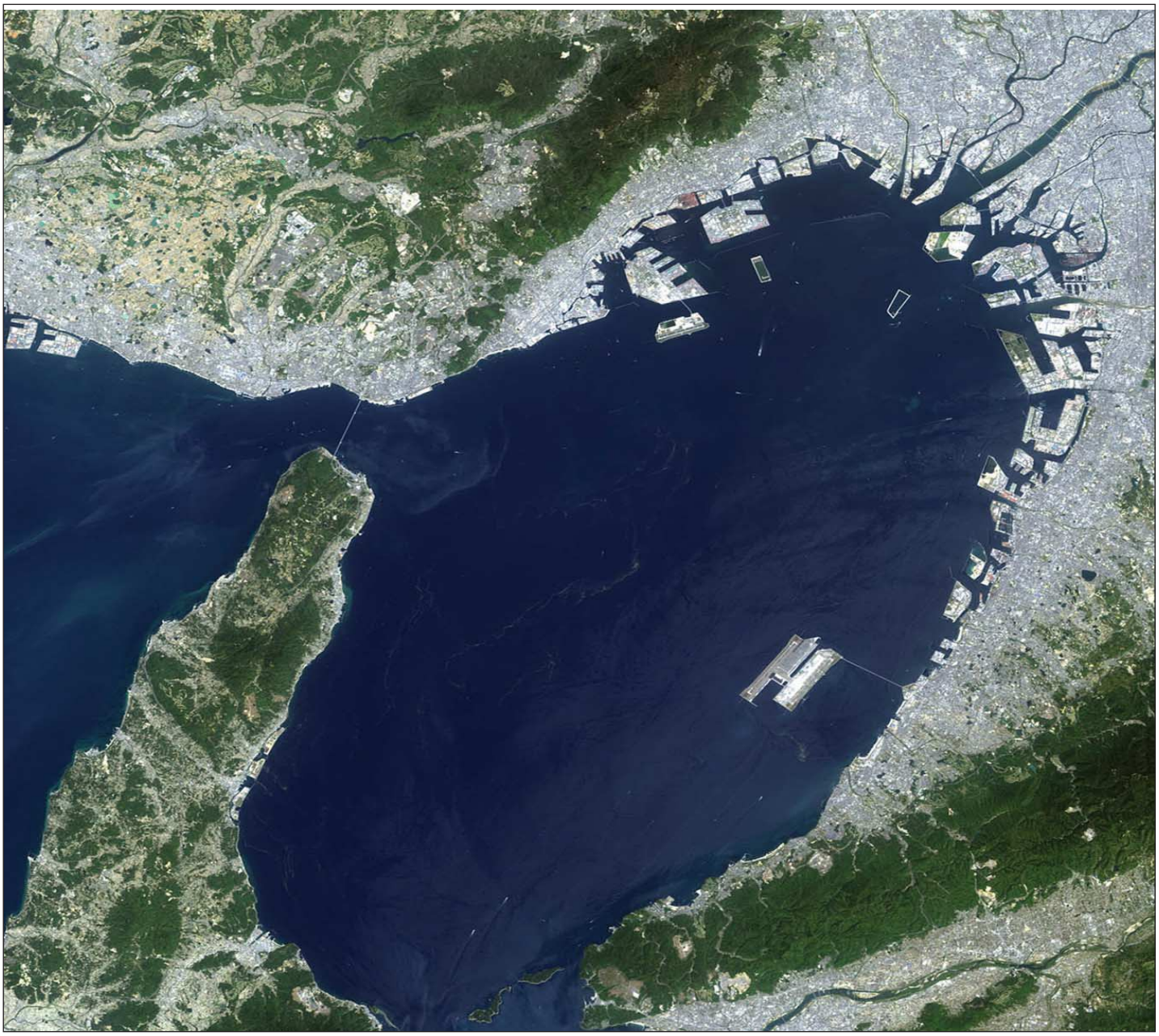
I would like to thank Sally for allowing the use of this information and also for taking the time, effort and such care of GEO delegates on our recent visit to EUMETSAT – and indeed to all those involved in making us so welcome.

Our visit was, of course, a great success.



Osaka Bay

.. with the world's longest cable suspension bridge



This is an image of Osaka Bay and its surroundings taken by Japan's Advanced Land Observation Satellite (ALOS) in April 2009. Osaka Bay is connected to the Pacific Ocean through the Tomogashima Strait in the south and to the Harima Sea through the Akashi Strait in the west. The bluish-gray terrain in the northeastern part of the image comprises the cities of Osaka and Kobe. Awaji Island borders Osaka Bay to the west.

Clearly visible to the left of the image is the 3911 metre long Akashi-Kaikyo Bridge. The main span measures 1,991 metres, making it the longest cable suspension bridge in the world. The main tower, at 300 meters tall, is the third tallest in Japan behind Tokyo Sky Tree (634 m) and Tokyo Tower (333 m).

The Akashi-Kaikyo Bridge was originally designed to be 3,910 meters long with a distance of 1,990 meters between the towers. However, on January 17, 1995, a big earthquake struck the area, causing a landslide. As a result, the total length of the bridge and the tower's span had to be increased by one metre. About 1.4 million cubic metres of concrete and 200,000 tons of steel were used to build this bridge.

Image courtesy the Japan Aerospace Exploration Agency (JAXA)

GEO's Return to Newbury

Francis Bell

This was GEO's second attendance at the Newbury radio rally. As can be seen from the photographs this is an open air event. For these occasions, outside located in a grassy field you hope for fine weather, however, for GEO this can be mixed blessing. On the one hand sunshine and dry ground is great but it makes viewing screens of laptops and monitors difficult. This time we were prepared with a black waste collection box, courtesy Waverly Council, in which to locate the laptop.

We ran live EUMETCast all day thanks to David Simmons' laptop and my 60 cm dish. We only had battery power available but still kept running all day.

The dish was located on the edge of a fragile table but was stable enough to provide an excellent signal throughout

We had some distinguished visitors to our stand during the day plus some membership renewals and others interested enough in our activities to join on the spot.

GEO's thanks to Newbury and District Amateur Radio Society for inviting us to their rally.

Francis Bell talking to Tony Roberts at Note the crowds in the background

David Simmons (GEO assistant shop manager) left and member Tony Roberts manning our GEO stand at Newbury.

TCARC Field Day June 2011

My local Three Counties Amateur Radio club runs a field day once a year and in order to keep them briefed on weather prospects I take my weather stations and operate for the duration of the event. I do have a very lightweight APT system which I can slip into a suitcase for travel abroad but for this event just a few miles distant from home and a car for transport I decided to take a slightly more robust system. It worked well with several horizon to horizon passes of NOAAs 19 and 15 being recorded.

The site is favoured because of its elevation and clear views of the horizons.

My APT system being operated by Bob Loveland, a radio club member. Note the horizon

Club members discussions about setting up the EUMETCast system in site. Left to right: John Rivett, David Simmons and Tony Roberts

Possible Warm-Season Water Flows observed in Martian Craters

Les Hamilton

Salt Water May Flow on Mars! Observations from NASA's Mars Reconnaissance Orbiter (MRO) have revealed possible flowing water during the warmest months on the Red planet. Dark, finger-like features extend down some Martian slopes during late spring through summer, fade in winter and return during the following spring. Repeated observations have tracked the recurrence of these seasonal changes on several steep slopes in the middle latitudes of Mars' southern hemisphere.

The view opposite is one of a series of images taken by the High Resolution Imaging Science Experiment (HiRISE) camera aboard MRO. This image, taken early in the Martian summer, displays warm-season features that might be evidence of salty liquid water active on Mars today.

The set of five images, shown in figure 3, come from observations of *Newton* crater (41.6°S, 202.3°E), and stretch from late Martian spring until early autumn. The images have been adjusted to correct those taken from oblique angles to show how the scene would look from directly overhead. Repeat imaging of this region by HiRISE shows that the features appear and incrementally grow during each warm season and fade in the cold seasons.

Figure 2 is a map of Mars showing the relative locations of three types of discoveries that may be related to salt or frozen water, plus a new type of discovery that may be related to both salt and water. Colouring on the map is coded to concentrations of shallow subsurface water ice found by the *Gamma Ray Spectrometer - Neutron Spectrometer* on NASA's *Mars Odyssey* orbiter. Blue, at high latitudes north and south, indicates higher concentrations of water ice (deduced from detection of hydrogen): orange designates the lowest concentrations. Some hydrogen, possibly in the form of bound water, lies close to the surface even at mid latitudes.

The white squares in the northern hemisphere mark the locations of small fresh impact craters that have exposed water ice close to the surface and validated the neutron spectrometer data. Observations of these fresh craters were made by the *Context Camera* and the *High Resolution Imaging Science Experiment* camera on MRO.

The red squares mark locations of putative deposits of chlorite, based on observations by the *Thermal Emission Imaging System* on *Mars Odyssey*. Such salt deposits could have resulted from the evaporation of salty water.

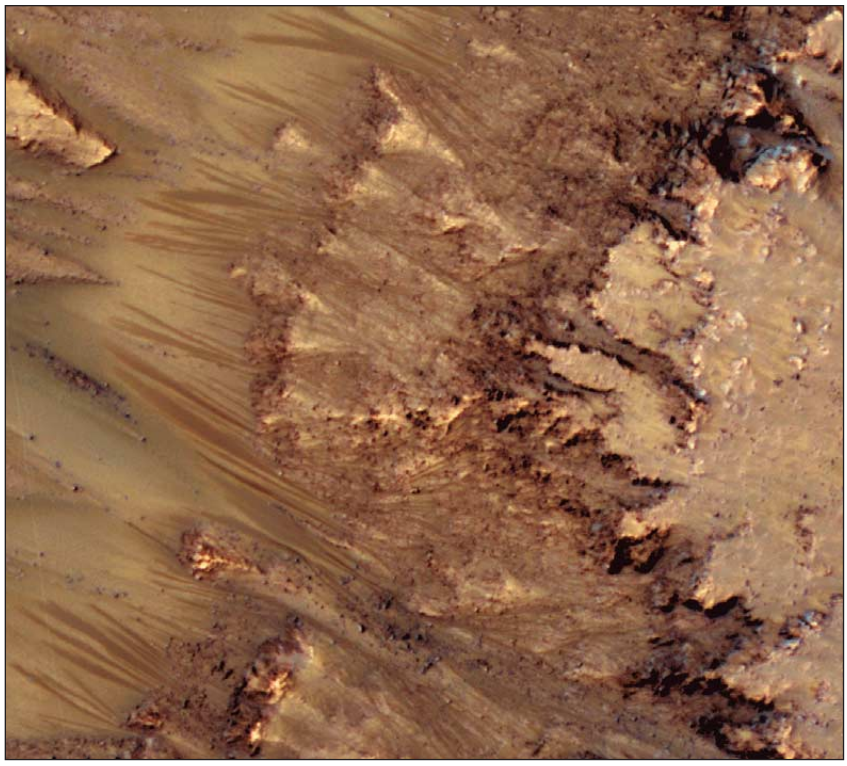


Figure 1 This summertime image of part of the wall of *Newton* crater exhibits seasonal dark features that may be evidence of salty water seeping down the slope.
Image: NASA/JPL-Caltech/Univ. of Arizona

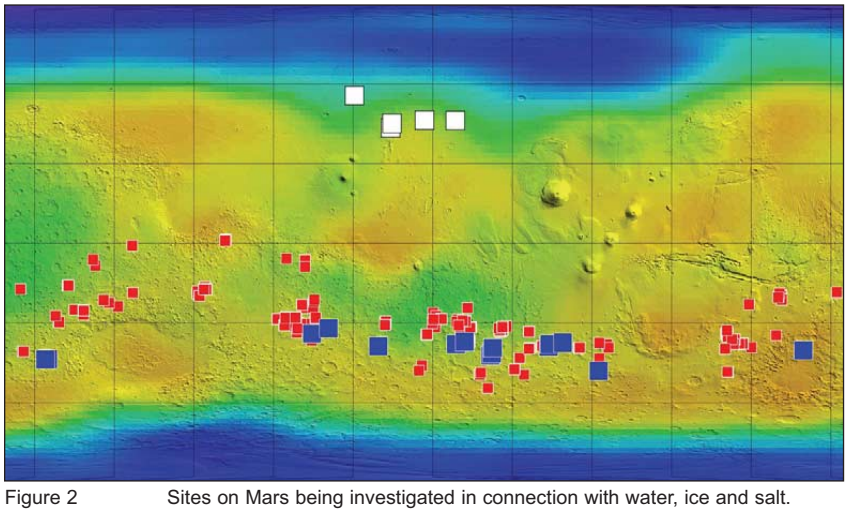


Figure 2 Sites on Mars being investigated in connection with water, ice and salt.
Image: NASA/JPL-Caltech/ASU/UA/

Observations in areas marked by the *blue squares* show relatively dark features which appear and incrementally grow down the slopes during warm seasons. Researchers hypothesise that these may result from the action of briny water.

The features that extend down the slope during warm seasons are called *recurring slope lineae* and are narrow, relatively dark markings (ranging from 0.5 - 5.0 metres in width) that appear on steep (25° - 40°) slopes at a number of locations

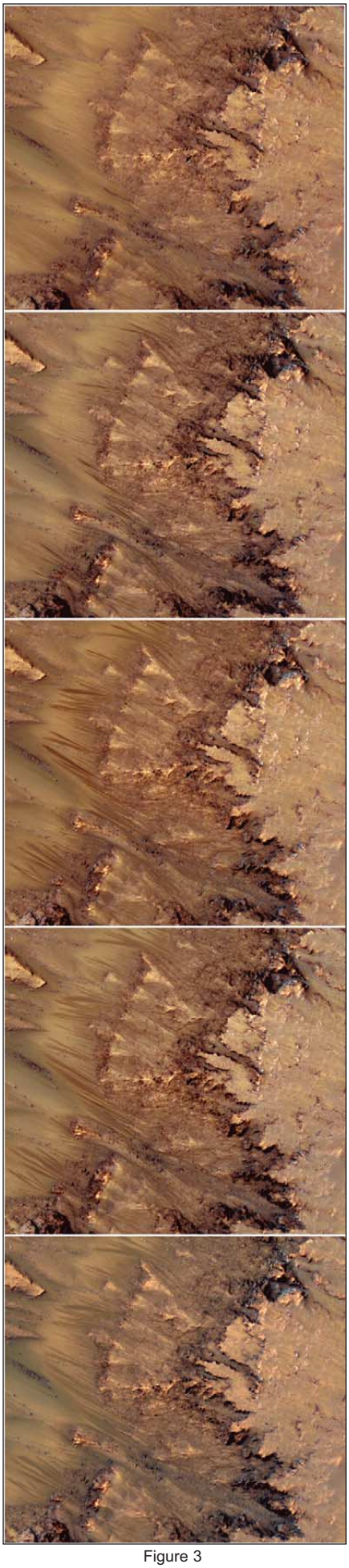


Figure 3
Seasonal changes in Mars' *Newton* crater

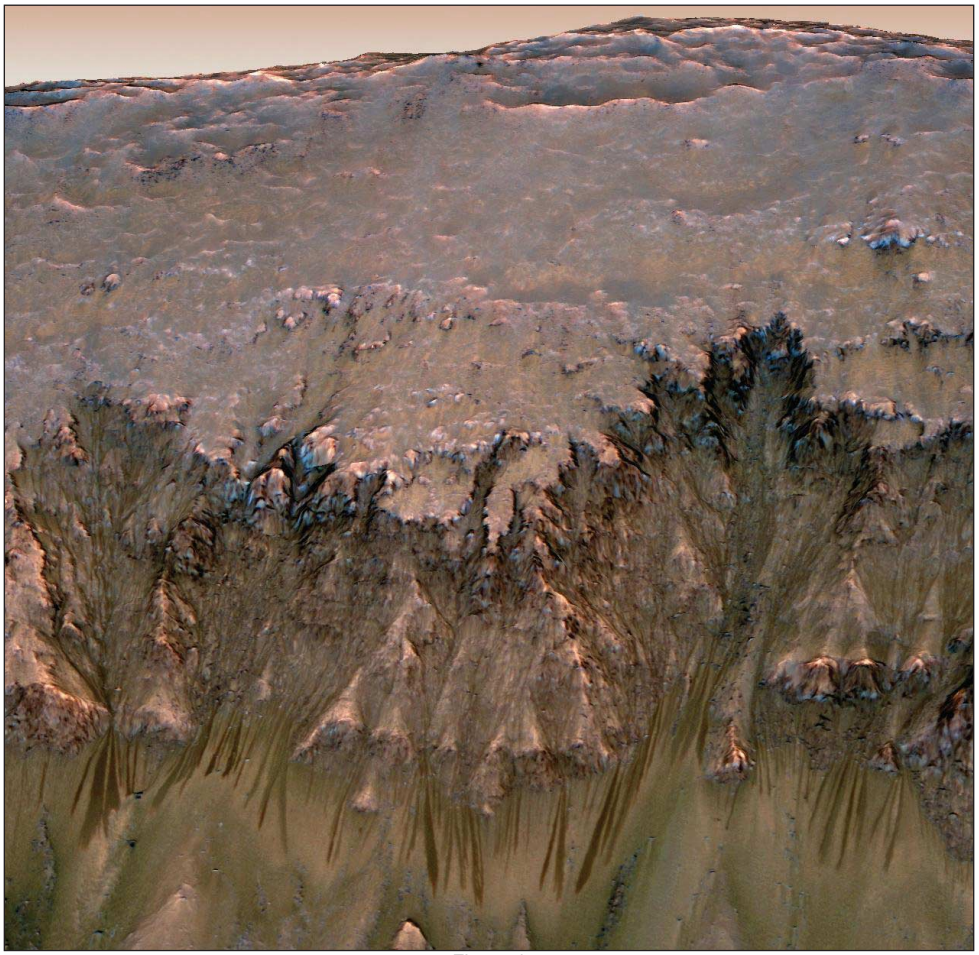


Figure 4
Oblique view showing warm season flows down the wall of Mars' *Newton* crater
Image: NASA/JPL-Caltech/Univ. of Arizona

in the southern hemisphere. They extend downslope from bedrock outcrops, often associated with small channels and in some rare locations, form in their hundreds. They appear and lengthen in the southern spring and summer from 48°S to 32°S, favouring equator-facing slopes. These times and locations experience peak surface temperatures ranging between -23°C and +27°C. The activity might be explained by the presence of liquid brines close to the surface, but the exact mechanism and source of the water are not understood.

The five images at left show a region on the inner wall of *Newton* crater which, from top to bottom, clearly displays the changes observed from spring through summer. The top frame, acquired in late spring, shows little evidence of the *slope lineae* but, by early summer (2nd frame down) they are distinctly evident. In the subsequent three-frame sequence, which lasts till midsummer, the features strengthen then start fading away again.

Oblique View

Figure 4 is an image that combines the orbital imagery with 3-D modelling, and shows flows that appear during spring and summer on the slope inside *Newton* crater. The image has been reprojected to show a view of the crater wall as it would be seen from a helicopter inside the crater. Colours have been enhanced and a synthetic Mars-like sky has been added. The HiRISE camera made the source observation on May 30, 2011, when Newton crater was enjoying its Martian summer.

Summary

Although some aspects of the observations still puzzle researchers, flows of liquid brine fit the characteristics better than alternate hypotheses. Saltiness lowers the freezing temperature of water, and the sites with active flows do receive enough warmth, even in the shallow subsurface, to sustain liquid water that is as salty as Earth's oceans—whereas pure water would freeze at the observed temperatures. And these dark flows always appear on the warmer, equator-facing crater slopes.

Other imagery related to these new findings from the Mars Reconnaissance Orbiter can be viewed at

http://www.nasa.gov/mission_pages/MRO/multimedia/gallery/gallery-index.html

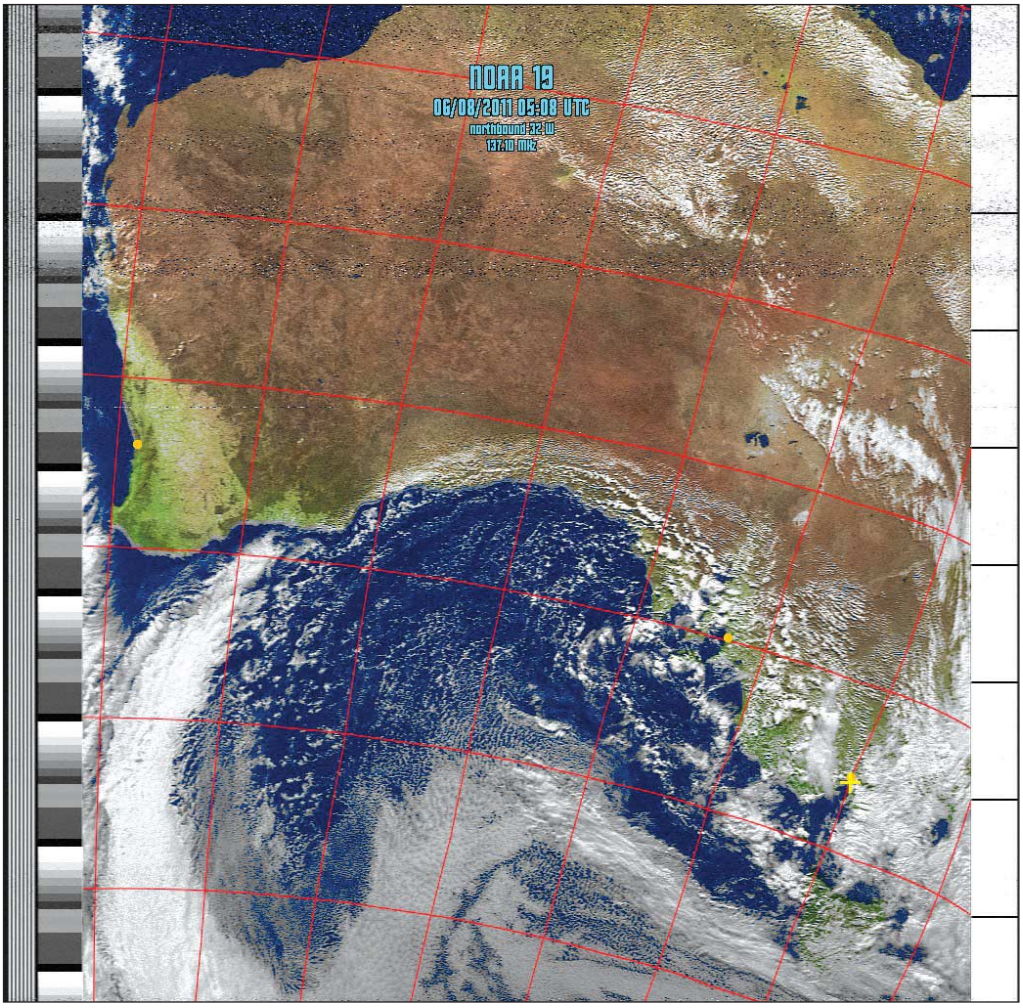
Text Source

Much of the text of this article derives from 'Science@NASA' from

http://science.nasa.gov/science-news/science-at-nasa/2011/04aug_marsflows/

Lake Eyre, image question?

Ken Morgan



I still receive signals from the Noaa weather satellites and create images.

Attached is an image received from Noaa-19 (left) during a pass at 3.08 pm AEST on 6-8-2011.

Also attached is section of the image magnified by 2 (below).

The image shows what I believe to be the creation of large amounts of "surface-water"or lakes, in the vicinity of 20 degrees latitude & 135 degrees of longitude,(vicinity of Lake Woods).

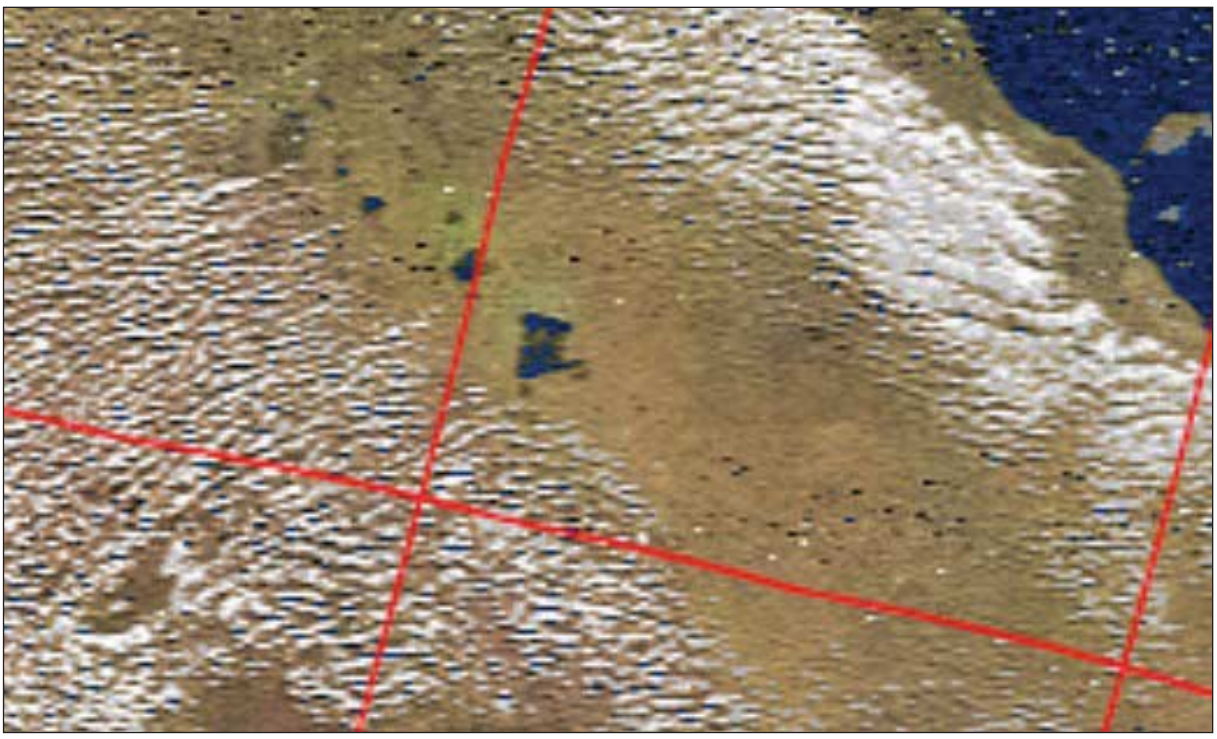
This is one place where water congregates ready to start its long journey down to Lake Eyre.

The strange thing is that so far, I cannot see confirmation of this water in passes by Noaa-18.

From the image, Lake Eyre looks quite full & healthy.

I'm still using Wxtoing, vers. 2.10.11.

I wonder whether you are interested enough to confirm this from your own sources and perhaps make a comment ?



Tsunami causes calving of Antarctic Icebergs

A NASA Earth Observatory Report

Using satellite radar data, scientists recently observed the calving of several large icebergs from the **Sulzberger Ice Shelf** on the Antarctic coast, caused by the March 2011 tsunami that wreaked such devastation to northeastern Japan. Scientists have long speculated that ocean waves could cause an ice shelf to flex and break but this is the first time that researchers have actually observed a tsunami having this effect.

Figure 1 was acquired by the Advanced Synthetic Aperture Radar (ASAR) aboard the European Space Agency's *Envisat* satellite on March 11, shortly before the tsunami reached the front of the Sulzberger Ice Shelf. Figure 2, which dates from March 16, clearly shows that large chunks of ice have separated from the ice sheet to create icebergs which now lie well out to sea. In each radar image—which allows researchers to see through cloud cover—land ice, ice shelves and the new 'bergs are bright white, while greyer areas represent smaller bits of sea ice. Open water is black.

Icebergs can form in a number of ways, but much of the time the process occurs unobserved. Often, scientists see large chunks of ice drifting in polar seas and then have to work backwards in time to figure out their points of origin. In this case, a research team led by Kelly Brunt of NASA's *Goddard Space Flight Centre* anticipated the event and looked ahead.

When the Tohoku earthquake and tsunami occurred off Japan last March, the ice researchers immediately looked towards the Antarctic as the massive waves spread out from their epicentre in the northwest Pacific Ocean. The scientists checked records for vulnerable faces of the Antarctic coast and studied models of the likely wave propagation. Within 18 hours of the earthquake, the tsunami waves had travelled 13,600 kilometres to reach the shores of Antarctica.

Using multiple satellite images, the researchers were able to observe two large new icebergs and many smaller bits of ice debris floating in the Ross Sea, just hours after the sea swell reached the continent.

The swell from the tsunami was probably about 30 cm high when it arrived at the Sulzberger Ice Shelf, but the consistency of the waves created enough stress to cause the calving. This floating ice shelf was about 80 meters thick from its exposed surface to its submerged base.

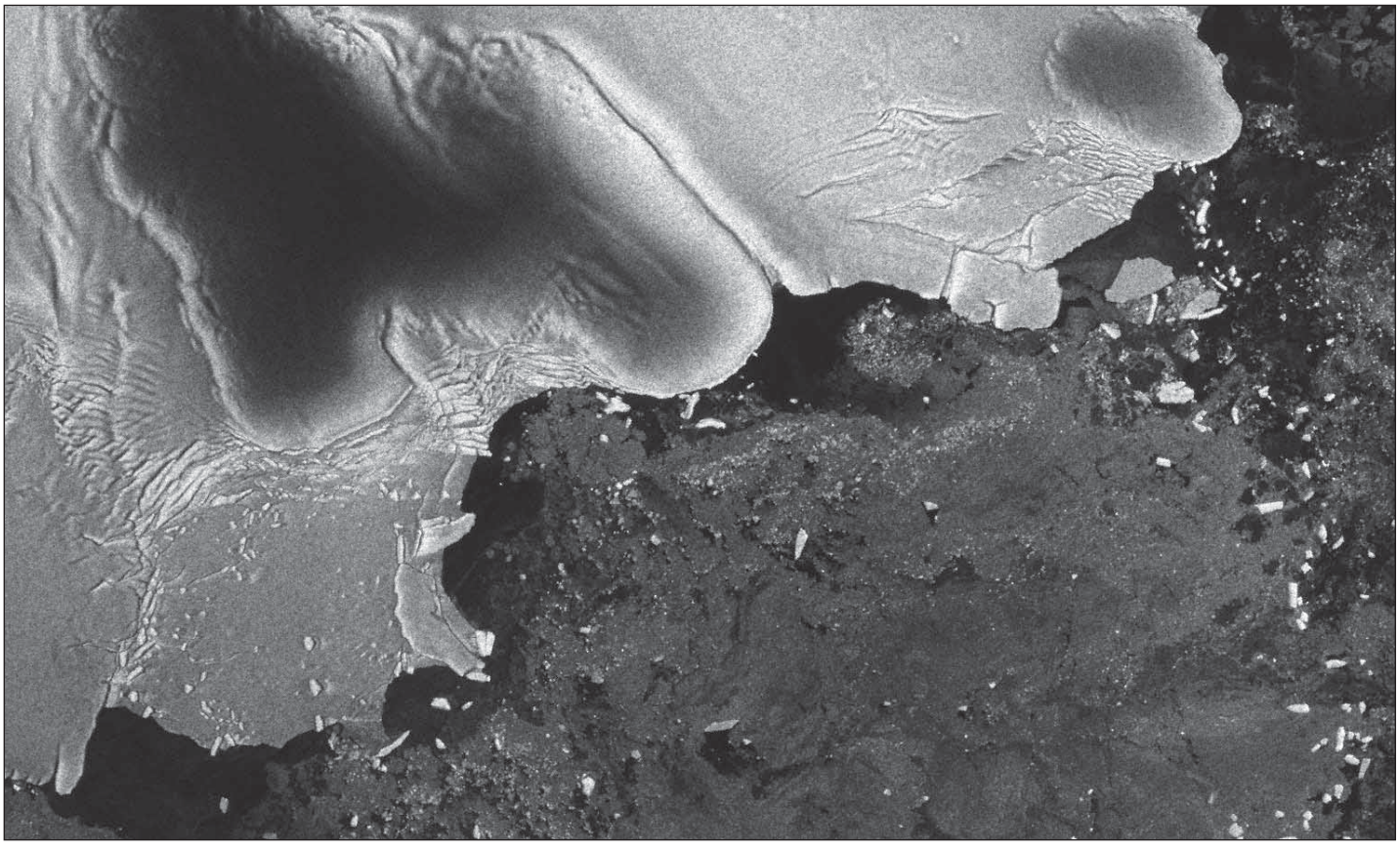


Figure 1 - The Sulzberger Ice Shelf imaged by *Envisat's* ASAR instrument prior to the tsunami, on March 11, 2011.
Image: ESA

Together, the broken chunks of ice totalled an area of some 125 square kilometres, about twice the size of Manhattan Island.

Scientists first speculated as long ago as the 1970s that repeated flexing of an ice shelf—a floating extension of a glacier or ice sheet that sits on land—by waves might cause icebergs to break off. Scientific papers in more recent years have used models and tide gauge measurements in an attempt to quantify the impact of sea swell on ice shelf fronts.

As soon as this earthquake happened, the researchers used a NOAA model showing the tsunami's projected path across the unobstructed Pacific and Southern oceans to identify the Sulzberger Ice Shelf (which faces New Zealand) as their target.

A closer look with cloud-penetrating synthetic aperture radar data from the European Space Agency satellite, *Envisat*, found images of two moderate-sized icebergs, with more, smaller ones in their wake. The largest iceberg was about 60 km^2 in surface area, itself about equal to the surface area of one Manhattan. All the ice surface together about equaled about twice this. After looking at historical satellite imagery, the group determined that the small outcropping of ice that calved had been there since at least 1965, when it was captured by USGS aerial photography.

A fortuitous break in heavy cloud cover allowed the team to spot the new iceberg in MODIS data (figure 3).

More than a century earlier, in September 1868, Chilean naval officers had reported an unseasonal presence of large icebergs in the southernmost Pacific Ocean. It was later speculated that these might have calved following the great Africa earthquake and tsunami the previous month. Now we know now that this is a probable scenario.

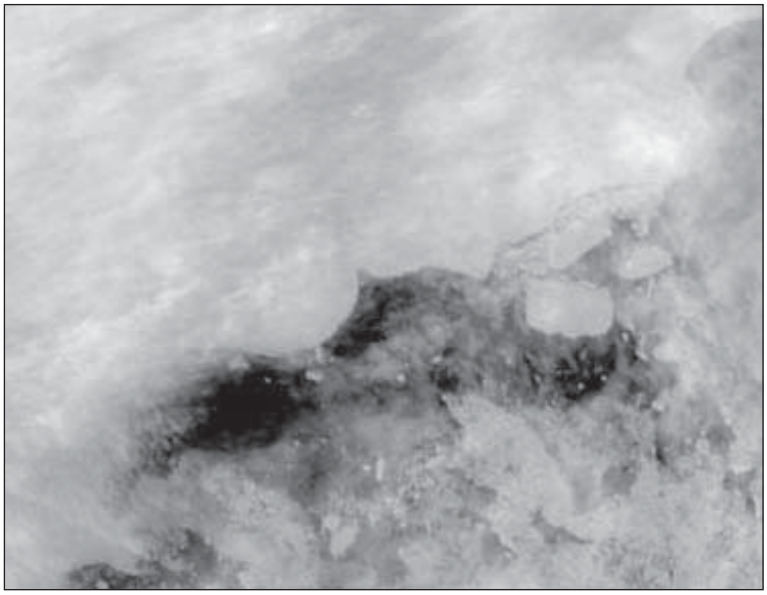


Figure 3
Thick cloud cover briefly fell away to reveal this first image of the icebergs breaking from the Sulzberger Ice Shelf. The icebergs can be seen behind a thin layer of clouds just off the ice shelf at upper right of the image.
Source: MODIS Rapid Response/NASA

References

1 Tohoku Tsunami Created Icebergs In Antarctica.
http://www.nasa.gov/topics/earth/features/tsunami-bergs.html

2 Natural Hazards: Earthquake and Tsunami Near Sendai, Japan
http://earthobservatory.nasa.gov/NaturalHazards/event.php?id=49622

3 Antarctic Icebergs Chipped off by Tsunami
http://earthobservatory.nasa.gov/IOTD/view.php?id=51665

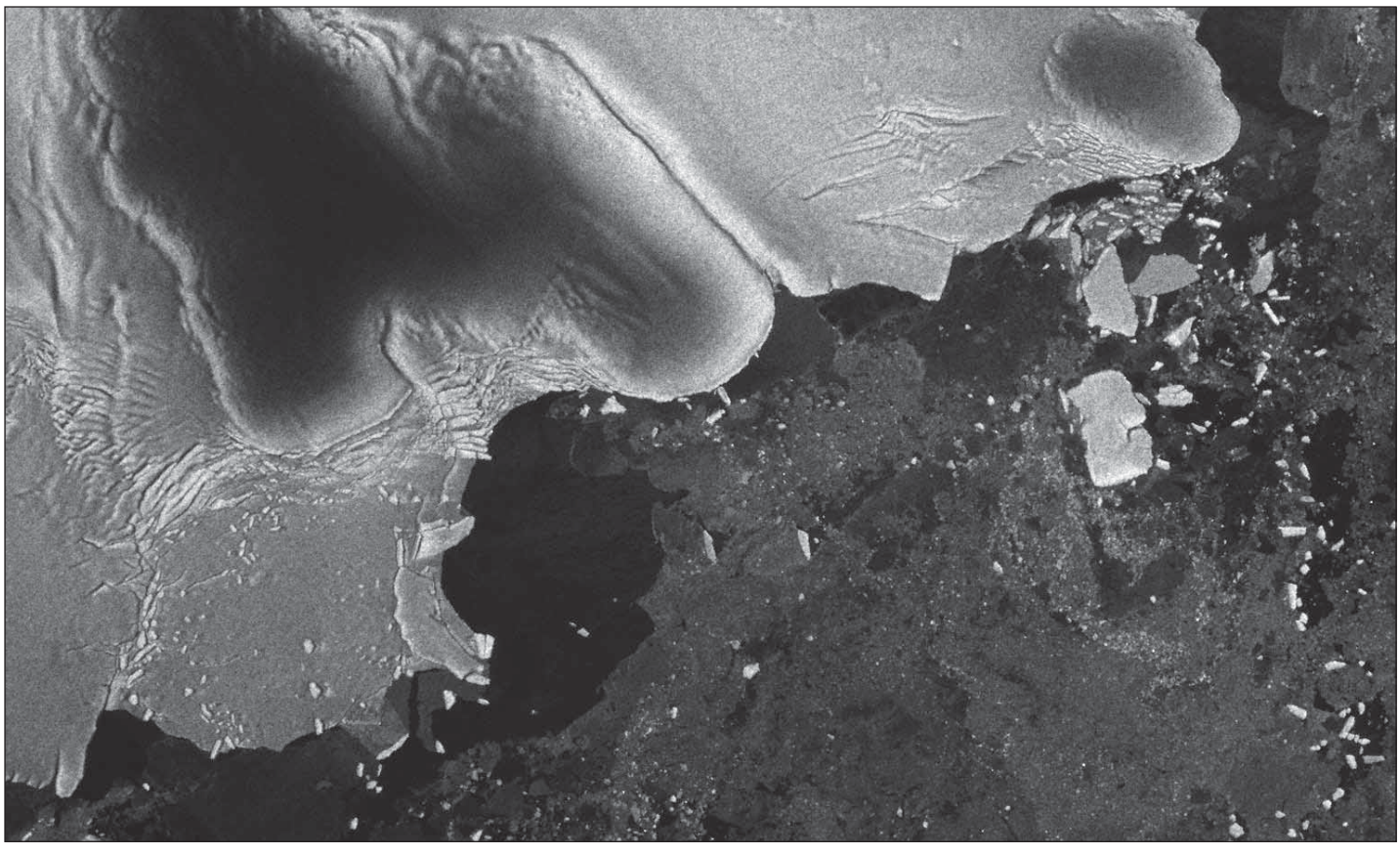


Figure 2 - The same scene, imaged by *Envisat's* ASAR instrument five days after the tsunami, on March 16, 2011.
Image: ESA

EUMETCast On-Line Registration Guide

If you require to register as a first-time user for any of the free *EUMETCast* data streams such as MSG, NOAA AVHRR, Metop etc., or need to renew an existing subscription, this **must be done on-line**.

GEO has produced a step-by-step guide to the entire process at

http://www.geo-web.org.uk/eumreg.html

This guide also contains a direct link to the official *EUMETCast* on-line **registration form**, which can otherwise prove somewhat tricky to locate.

GEO Helplines

Douglas Deans
Dunblane, Perthshire, SCOTLAND
All aspects of weather satellites from APT, HRPT to Meteosat-8 DVB/EUMETCast systems.

- telephone:(01786) 82 28 28
- e-mail: dsdeans@btinernet.com

John Tellick
Surbiton, Surrey, ENGLAND
Meteosat-8 advice - registering for the various MSG services, hardware and software installation and troubleshooting. John will also field general queries about any aspect of receiving weather satellite transmissions.

- telephone: (0208) 390 3315
- e-mail: info@geo-web.org.uk

Geoff Morris GW3ATZ
Shotton, Flintshire, NE WALES
Geoff has lots of experience with aerial, co-ax,connectors, mounting hardware etc. and has also done a lot of work with the orbiting satellites. Geoff has been a EUMETCast Meteosat-8 user for some time and is familiar with David Taylor's MSG software; he should be able to share his experiences with newcomers to this branch of the hobby.

- Tel: (01244) 818252
- e-mail: gw3atz@btopenworld.com

Mike Stevens
Portland, Dorset, England.
Advice offered on EUMETCast (MSG and Metop) and APT.

- email: stevens312@btinternet.comf

Guy Martin G8NFU
Biggin Hill NW Kent, ENGLAND
Guy is prepared to advise anyone who wishing to receive MSG/Metop using Windows 2000 or XP. Can also help with networking and ADSL router setup..

- gmartin@electroweb.co.uk

Hector Cintron
San Juan, Puerto Rico, USA
Hector is prepared to field enquiries on HRPT, APT, EMWIN and NOAAPORT

- Phone: 787-774-8657
- e-mail: n1tkk@hwic.net

Email contact can of course be made at any time, but we would ask you to respect privacy by restritricting telephone contact to the period 7.00-9.00 pm in the evenings.

Internet News/ Discussion Groups

There are a numerous Internet-based discussion groups available to weather satellite enthusiasts. You can join any of these by sending an e-mail to the appropriate address, with a request to subscribe. Indeed, a blank e-mail containing the word 'subscribe' in its Subject line is all that is required. Some of the more useful groups and their contact addresses are listed below.

APT Decoder
This is a group where users of Patrik Tast's APTDecoder can share information and problems.

http://tech.groups.yahoo.com/group/APTDecoder/

GEO-Subscribers
This is GEO's own group, where members can exchange information and post queries relating to any aspect related to weather satellite reception (hardware, software, antennas etc), Earth observation satellites and any GEO-related matter.

http://tech.groups.yahoo.com/group/GEO-Subscribers/

Satsignal
An end-user self help group for users of David Taylor's Satellite Software Tools (SatSignal, WXtrack, GeoSatSignal, HRPT Reader, GroundMap, MSG Data Manager, AVHRR Manager and the ATOVS Reader).

http://tech.groups.yahoo.com/group/SatSignal/

MSG-1
A forum dedicated to Meteosat Second Generation (MSG), where members share information about the EUMETCast reception hardware and software.

http://tech.groups.yahoo.com/group/MSG-1/

METOP
A forum for users of high-resolution AHRPT data from the MetOp satellite, available via EUMETCast.

http://tech.groups.yahoo.com/group/METOP/

AVHRR
A forum for users who download high-resolution EARS-AVHRR data from the NOAA polar orbiting weather satellites via EUMETCast.

http://tech.groups.yahoo.com/group/AVHRR/

ATOVS
A Group for discussions about using ATVOS data. Data from the whole world is available from CLASS (www.class.noaa.gov) and for an extended Europe, via EUMETCast.

http://tech.groups.yahoo.com/group/ATOVS/

Weather Satellite Reports
This group provides weekly reports, updates and news on operational aspects of weather satellites.

http://tech.groups.yahoo.com/group/weather-satellite-reports/

WXtoImg
Users of the WXtoImg software package for capturing and imaging NOAA APT can air their problems, discuss its features and ask questions about it.

http://groups.yahoo.com/group/wxtoimg-l/

The Copy Deadline for GEO Quarterly No 32 is Saturday, 29th October, 2011

The Editor is always delighted to receive articles and images for inclusion in *GEO Quarterly*. These can relate to any aspect of Earth Imaging, especially

- Technical articles concerning relevant hardware and software
- Construction projects
- Weather satellite images
- Reports on weather phenomena
- Descriptions of readers' satellite imaging stations
- Activities from overseas readers
- Letters to the Editor
- Problems and Queries for our experts to answer

Contributions should of course be original and, where possible, should be submitted to the editor in electronic format (floppy disc, e-mail attachment, CD, DVD). But of course we will also accept handwritten and typed copy should the need arise.

Please note, however, that **major articles** which contain large numbers of satellite images, photographs or other illustrations should be submitted **as early as possible**, so that they can be prepared and made up into pages in time for publication.

Images and Diagrams
Images can be accepted in any of the major bitmap formats: **JPG, BMP, GIF, TIFF** etc. Images in both monochrome and colour are welcomed. Line drawings and diagrams are preferred in Windows metafile and postscript formats. We can also scan original photographs, negatives and slides.

Gridding, Overlays and Captions
Please note that readers' satellite images should be provided **without** added grid lines, country outlines or captions **unless** these are considered essential for illustrative purposes within an article.

If your article submission contains embedded images and diagrams, please note that you must **also submit the individual, original images**, in one of the formats described above: these are essential for page make-up purposes.

Submission of Copy
All materials for publication should be sent to the editor,

Peter Green
'Hollowtree'
Eggesford, Devon EX18 7QX, England.
Tel: 01769 580 700

The most efficient way to do this is as **email attachments** to the following address

geoeditor@geo-web.org.uk

And finally . . .
if you do have material ready for the next issue of GEO Quarterly, please submit it **as soon as it is ready**—do not wait till the deadline above: this will simply create an editorial log-jam and delay publication.

Group for Earth Observation

Membership Application Form

Current Subscription Rates

United Kingdom ... £20 Europe ... £24 Rest of World ... £28

You can make your annual GEO Membership payment by any of the following methods:

- **PayPal** - Visit the GEO Shop website at ***http://www.geo-web.org.uk/shop.html*** and add your subscription to your basket
- UK residents may pay by means of a **personal cheque** or **Postal Order** made payable to '*Group for Earth Observation*'
- Payment by **direct bank transfer** can be arranged. Please email francis@geo-web.org.uk for BIC and IBAN details.

Name (please PRINT clearly)

Address

Town/City

Postcode/ZIP Callsign

Country

Telephone Number FAX

Email Address (please print **very** clearly)

Declaration

I wish to join GEO, the Group for Earth Observation, for a period of one year.

I sign below to confirm that I have no objection to my membership details being held on a computer database and understand that these details will be used *exclusively* for internal GEO administration purposes.

Signature

Date

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Loughborough LE12 6PP, UK

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GEO Shop

Manager: Clive Finnis
email: tech@geo-web.org.uk
FAX: +44 (0) 1202 893 323

The 'Pager-Hardened' R2ZX

APT Weather Satellite Receiver

This upgraded version of the German-built R2FX receiver has been developed specially for the UK market and is available solely from the GEO Shop. If you are in an area suffering from pager interference on the NOAA-18 frequency of 137.91 MHz, this receiver should be the answer to your problems - see the R2ZX review in GEO Quarterly No 14.

UK member's price - 210.00 UK non-member's price - £224.00

We still stock the **original R2FX** receiver which has proved itself to be a top-quality receiver throughout Europe and the world at large. Members in the UK find that the R2FX gives perfect reception of NOAAs 12-17, and in favourable locations (pager-free) of NOAA-18 also.

UK member's price - £180.00 UK non-member's price - £194.00

John Silver's Lightning Radar Board

This is a DIY kit for constructing the circuit boards needed to develop your own system to detect and track thunderstorms in your vicinity, using a computer and readily available free software. Full instructions (which appeared in an article in GEO Quarterly 17) are included.

UK members price - £55.00
UK non-members price - £65.00

The Bias-Tee allows a mast head preamplifier to be used with the 'Antenna 2' input of an R2FX or R2ZX. Only the 'Antenna 1' input normally feeds power to a preamp. The Bias-Tee now allows you to power twin preamps and maintain the receiver's Antenna Diversity feature.

UK members price - £24.00
UK non-members price - £24.50

John Silver's APT preamplifier was featured as a constructors' kit in GEO Quarterly No 12 (December 2006). Now we are able to offer this high-linearity LNA to GEO readers, ready built.

UK members price - £35.00
UK non-members price - £40.00

DVB World DVB-S2 USB Receiver

This superior 'free-to-air' **USB2** DVB satellite TV and data receiver is recommended for trouble-free *EUMETCast* reception on the Windows Vista platform. This plug-and-play unit comes with comprehensive installation instructions and a CD-ROM of driver software. It is very similar to the Dexatek unit reviewed by David Taylor in GEO Quarterly No 17

UK members price - £90.00
UK non-members price - £95.00

Universal Ku-band Satellite TV LNB 0.20 dB

(or equivalent)

This is a quality high specification Universal LNB for use with the SkyStar 2 PCI card, *Dexatek* and *DVBWorld* USB receivers and digital satellite TV receivers.

UK members price - £12.50
UK non-members price - £19.00

GEO PIC 1.0 for the RX2

Programmed with the new channel frequencies required for NOAA-18.

UK - £7.00
UK non-members price - £7.00

Current Price List

	Members Prices UK	EU	RoW	Non Members UK	EU	RoW
APT Equipment						
R2ZX APT Receiver (no PSU)	210.00	214.00	222.00	224.00	228.00	236.00
R2FX APT Receiver (no PSU)	180.00	184.00	192.00	194.00	198.00	206.00
BNC Lead (0.25 metre)	5.35	6.10	6.60	7.35	8.10	8.60
UK Power Supply Unit (12 volt)	9.50	-	-	12.00	-	-
Dartcom High Quality QFH Antenna	275.00	355.00	-	295.00	375.00	-
John Silver Preamplifier (built)	35.00	36.00	37.50	40.00	41.00	42.50
John Silver Lightning Radar Board	55.00	68.00	61.00	65.00	68.00	71.00
Bias Tee	24.00	24.50	25.00	28.00	28.50	29.00
GEO-PIC 1.0	7.00	7.80	8.40	7.00	7.80	8.40
Martelec MSR40 EPROM	10.00	10.75	11.25	10.00	10.75	11.25
EUMETCast Equipment						
DVB-S2 USB Receiver	90.00	95.00	-	100.00	105.00	-
Telestar 80 cm dish with LNB	69.50	-	-	76.50	-	-
Telestar Ku band universal LNB	12.50	14.00	-	19.00	20.50	-
Technisat Satfinder Alignment Meter	26.50	29.50	-	29.50	33.50	-
Miscellaneous						
GEO Quarterly Back Issues (subject to availability)	3.50	4.20	5.10	n/a	n/a	n/a
GEO Quarterly (PDF issues on CD) Annual compilations 2004-2009 (state years required)	8.00	8.80	9.30	n/a	n/a	n/a
GEO Membership (4 x *GEO Quarterly*)	20.00	24.00	28.00	20.00	24.00	28.00

All prices are in £ sterling and include postage and packaging

Ordering and Shipping

We will ship by post, so please allow a few days for items to arrive in Europe and perhaps a few weeks for the Rest of the World.

Orders should be sent to:

GEO Shop,
44 Disraeli Road
Christchurch BH23 3NB
Dorset, England

If you are paying by credit card, you can FAX us your order to:

+44 (0) 1202 893 323

And remember, you can now order through the GEO Website using ***PayPal***.

Not a GEO Member?

GEO can provide most of the items advertised—with the exception of GEO Quarterly back-issues and CDs—to both members and non members. However, non-members cannot benefit from the discounted prices available to members.

Why not join GEO and take advantage of the discounted prices we can offer you as a member?

Subscription Rates (12 months/4 issues of GEO Quarterly) are just £20 (UK), £24 (EU) and £28 (rest of world).

TechniSat SatFinder Antenna Alignment Meter

This sensitive meter is a great help in setting up and aligning the dish for maximum signal. The meter comes with full instructions.

UK members price - £26.50
UK non-member's price - £29.50

Telestar 80 cm dish and Universal 0.2 dB LNB

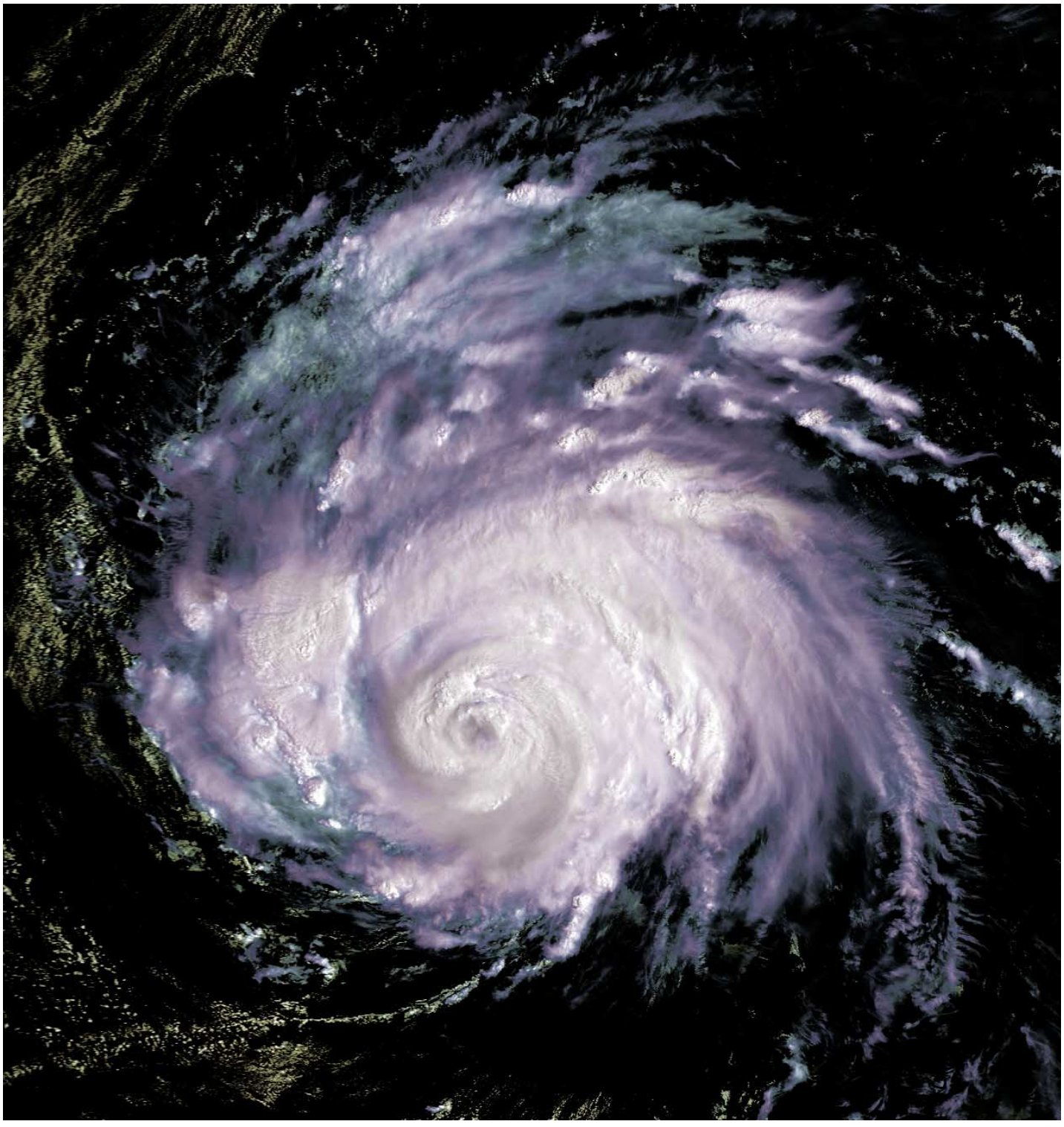
(or equivalent)

This quality solid steel offset dish, designed for digital and analogue reception, is coated with electrostatic polymer. The bracket has been heat dipped and zinc treated for maximum corrosion protection. Complete with LNB.

UK members price - £69.50
UK non-members price - £76.50

Hurricane Irene

John Tellick

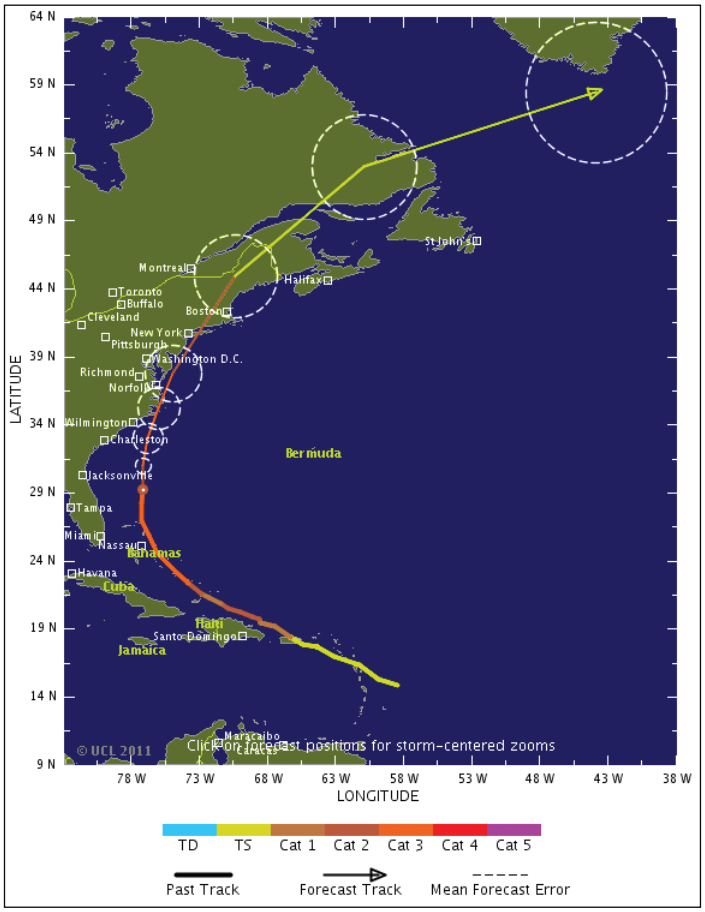


26th August 2011

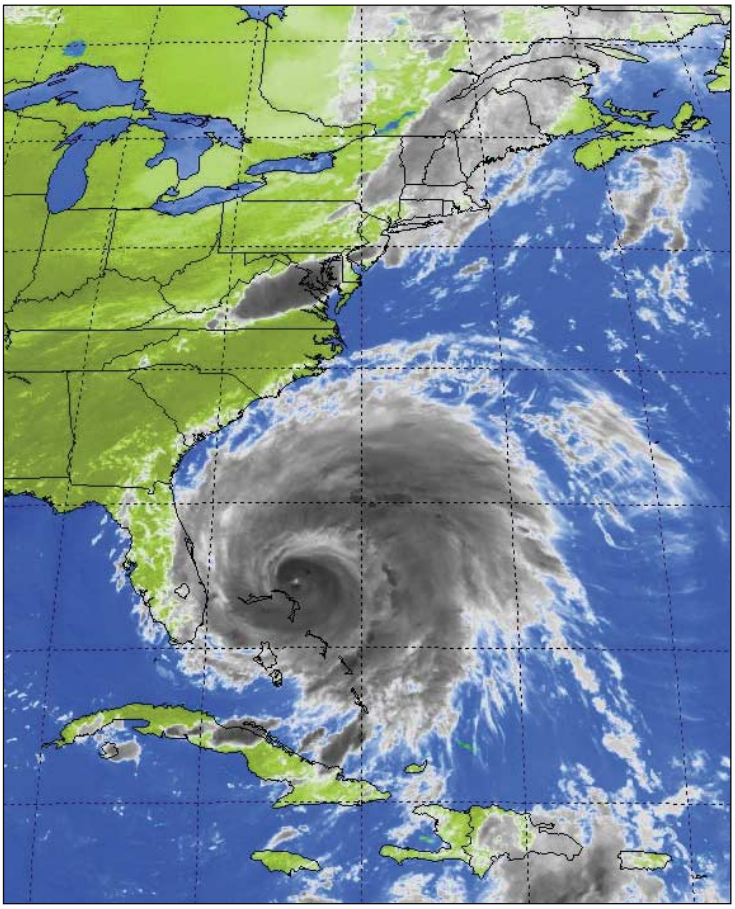
Hurricane Irene – the first hurricane of the 2011 Atlantic season is getting quite a bit of coverage not just for its intensity – which was 'only' category 3, but since it is forecast to travel across quite a stretch of Americas eastern seaboard passing Washington, New York and Boston.

Meanwhile, Typhoon Nanmadol, category 4 with its eye just off the coast, continues to batter the Philippines. Adjacent to this typhoon is a tropical storm TS Talas.

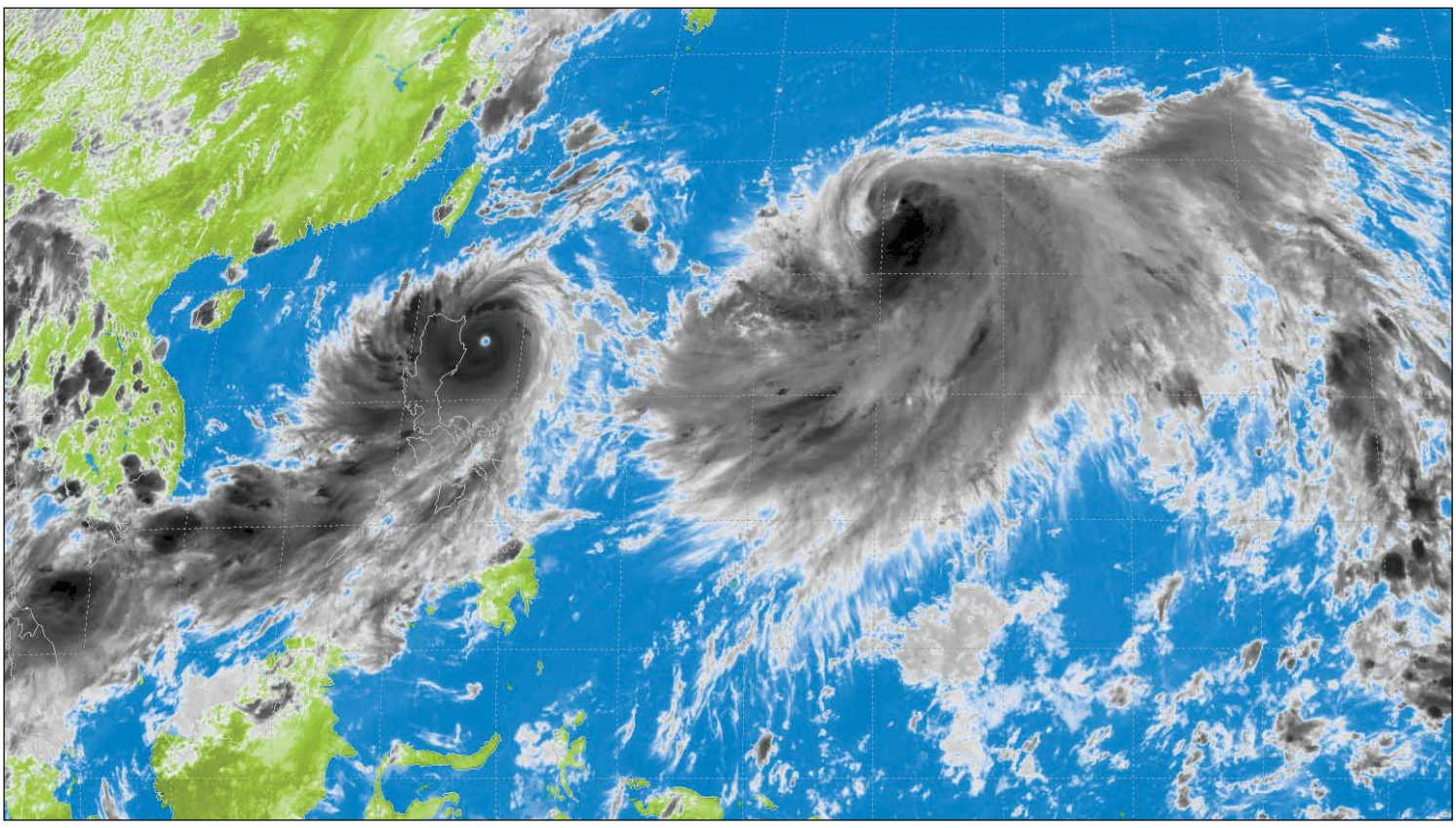
Note, the IR images for Irene and Nanmadol have had the cloud 'counts' reversed which I believe shows up the structures much better.



The past and forecast track of hurricane Irene dated 26-08-11
Credit: Tropical Storm Risk website www.tropicalstormrisk.com



Hurricane Irene passes over the Bahamas
Credit NOAA/EUMETSAT



Typhoon Nanmadol batters the Philippines with TS Tallas adjacent
Copyright MTSAT/EUMETSAT

Progress 44 fails to reach orbit

John Tellick

Following the recent retirement of the Shuttle and the situation regarding travel and cargo to and from the ISS now relying on the Russian Progress and European ATV craft, this information from ESA:

25 August 2011

Bound for the International Space Station, Progress 44 was launched from Baikonur Cosmodrome at 15:00 CEST yesterday but failed to reach its target orbit and crashed in Siberia, Russia. Five minutes and 50 seconds after launch, an "off-nominal situation" was reported, with a loss of telemetry.

The spacecraft was carrying 2.9 tonnes of food, fuel and supplies for the Space Station, including a few spare parts for two instruments on board Europe's Columbus laboratory.

Thomas Reiter, ESA Director of Human Spaceflight and Operations, is following the latest development very closely and will assess the consequences to the ESA upcoming missions.

Specialists are now investigating what could have caused the incident, the first with a Russian cargo vessel in the last 30 years. The causes and consequences of the failure on the Station will be examined in the coming days and assessed among the Station partners.

Progress craft photo

An earlier Progress supply craft approaches the ISS for docking
Copyright ESA

NPP – NOAA's 'new generation' of Satellites

John Tellick

Hopefully a few weeks after you read this the first of NOAA's 'new generation' of polar orbiting satellites will have been successfully launched.

I say 'new generation' but it is not quite as had been expected.

Those of you with long memories will recall many years ago it was agreed that Europe would share the morning/ afternoon polar orbiter service which NOAA alone had provided.

A joint project was undertaken for a new complimentary generation of all digital polar orbiters via a sharing of American and European sensors on similar platforms providing LRPT in the 137 – 138 MHz band and AHRPT in the 1.69GHz band.

This in Europe led to what we know as Metop.

However, things changed across the Atlantic and the military and civil meteorological data imaging services were combined and America embarked on development of a 'new' system called NPOESS.

But, the data format would not be complimentary with Metop in that NPOESS would disseminate LRD – similar to AVHRR – in the 1.69 GHz band and HRD at 7.812 GHz.

Owing to NPOESS dissemination requiring new ground segment capability a test satellite was required to be flown [due for launch 2005] before the 'full system' satellite was launched in order to setup and prove the ground segment.

This was called NPOESS Preparatory Project - NPP.

Owing to many delays, and problems – both technical, political and funding and finally a change of heart to split the military from the civil, NPOESS has really died a death and been replaced by a new project called JPSS.

As we know the current generation of NOAA polar orbiters had all been launched and with no 'real' replacement in sight [JPSS was many years away] there were fears that there could be a gap in polar orbiter data.

Fortunately NPP construction had advanced and could provide a viable stop-gap satellite and is due for launch Sept/Oct 2011.

And, following successful commissioning will replace NOAA-19 as the operational afternoon satellite joining Metop-A's morning service.

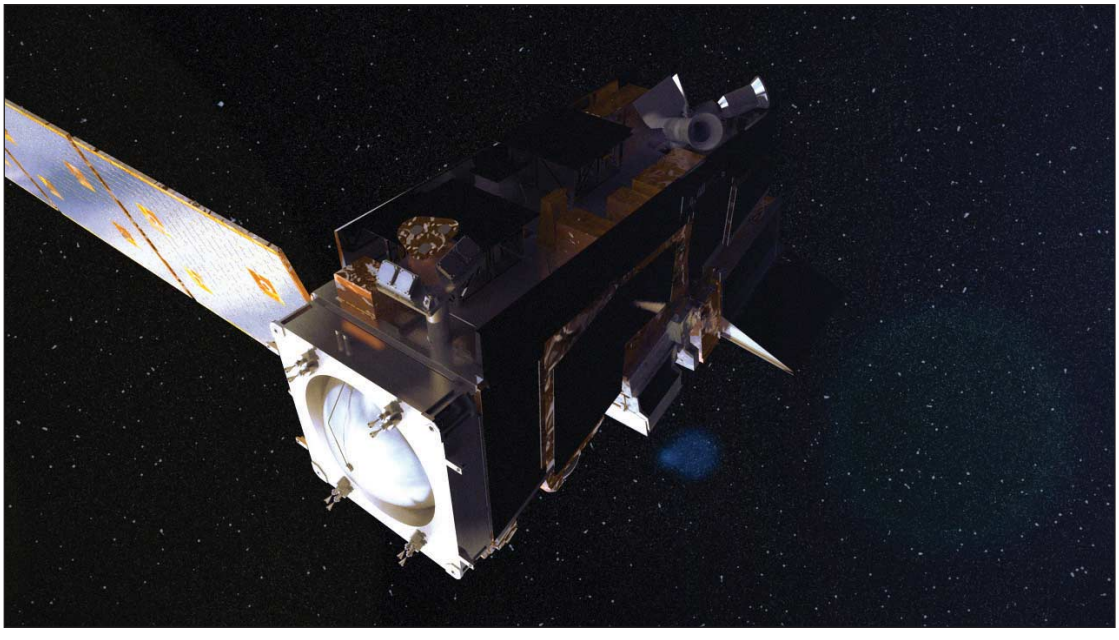
Owing to the NPOESS delays and project changes etc, JPSS-1 will – for expediency - be a clone of NPP.

JPSS-2 will be NOAA's new (new) generation polar orbiter but is still under development so full details of hardware and data transmission are not yet known.

Both NPP and JPSS-1 will fly a 22 channel VIIRS radiometer with a resolution of 1.6 km – 400 m.

Downlink frequency will be 7.812 GHz.

There will be no dissemination in the 1.69 GHz band.



EUMETCast will carry dissemination from NPP's VIIRS imager – exactly what channels is not yet known.

NPP - NPOESS Preparatory Project.

NPOESS - National Polar-orbiting Operational Environmental Satellite System.

JPSS – Joint Polar Satellite system.

VIIRS – Visible/Infrared Imager Radiometer Suite.

HRD – High Rate Data.

LRD – Low Rate Data.

Farewell to the Shuttle

John Tellick

5:57 a.m. EDT on July 21, 2011, space shuttle Atlantis landed for the final time at NASA's Kennedy Space Center ©NASA

At 5:57 a.m. EDT on July 21, 2011, space shuttle Atlantis landed for the final time at NASA's Kennedy Space Center after 200 orbits around Earth and a journey of 5,284,862 miles on the STS-135 mission and final flight for the Space Shuttle Program.

And so ended another era.

I imagine like me, many of you who grew up during the Cold War, space race, Moon landings, the MIR space station, Concorde, satellite TV, etc, this was a poignant moment.

Suddenly 'we' were without a reusable cargo spacecraft - and the retirement of Concorde ended the supersonic air travel era.

I feel man, in these two respects has rather 'gone backwards' without a replacement for either?

Though both were marked by tragedies I think they remain an icon of man's achievement.

Sadly, I fear, for many younger people these days with all their 'pocket technology' space is perhaps rather mundane.

Not so for me (apart from not being able to get to grips with modern technology) I still get a buzz seeing the ISS coming over or watching an Ariane V or Soyuz launch.

Travel to and from the ISS (which is now fully built) will now be via the 'less luxurious and comfortable' Soyuz system – back to Earth with a bump on a parachute.

Supplies now solely via the Russian Progress vehicle and European ATV.

I somehow think that the sheer scale of technological advances we (of a certain age) have lived through during the last 60 years will not be replicated during the next 60.

ESA reports:

Space Shuttle Atlantis on its last mission, brought three decades of flights of this unique spaceplane to a close.

The boxy black and white craft is the queen of technological marvels from the late 20th century. From its first launch in 1981 the Space Shuttle has been the way to fly to space for many of humankind.

It has transformed spaceflight: it dispatched and partially even returned many satellites and deep-space probes, it helped to end the Cold War by docking with Russia's Mir space station and it made assembly of the International Space Station possible.

Impressively, the Hubble Space Telescope was delivered into orbit, repaired and maintained by Shuttle on five missions.

With some 2.5 million moving parts, the orbiter with three main engines fuelled from the huge external tank, and the complementary twin solid rocket boosters form a package that is perhaps the most complex technological system ever built.

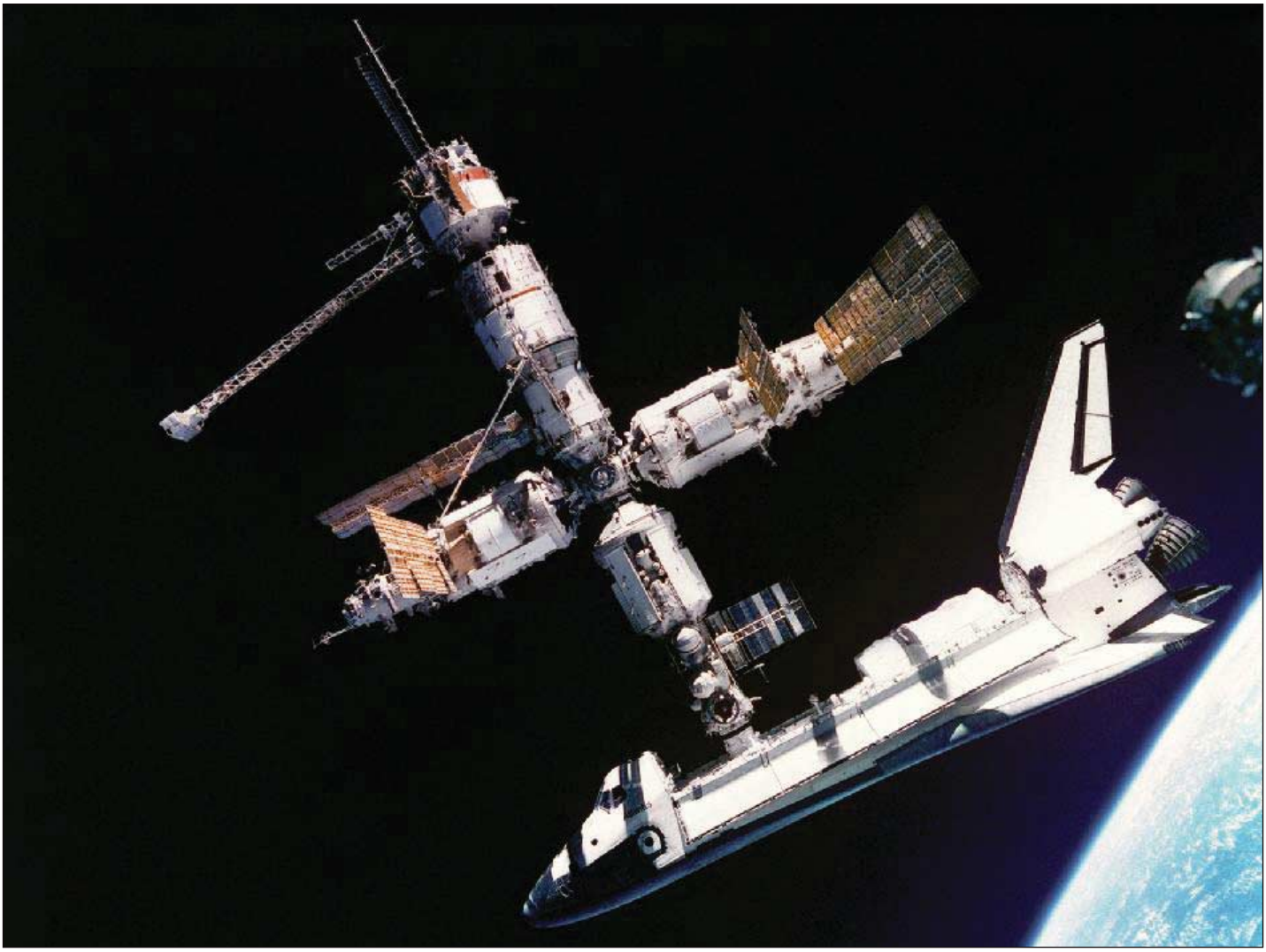
Shuttle mission STS-31

The Hubble space telescope is released from the cargo bay of Shuttle Discovery into Earth orbit during this mission from April 24 – 29 1990.

Hubble Space Telescope photo ©NASA

Shuttle mission STS-61. This mission – December 2 – 13 1993 'grabbed' the Hubble Space Telescope for the first servicing mission when corrective optics were installed to 'correct Hubble's vision.' ©NASA

Shuttle missions successfully 'launched' – deployed - many satellites during its lifetime.



Atlantis at MIR space station ©NASA July 4, 1995

Atlantis First to Dock with Mir

Space shuttle Atlantis is docked to Russia's Mir Space Station and was photographed by the Mir-19 crew. Cosmonauts Anatoliy Y. Solovyev and Nikolai M. Budarin, Mir-19 Commander and Flight Engineer, respectively, temporarily undocked the Soyuz spacecraft from the cluster of Mir elements to perform a brief fly-around. Solovyev and Budarin had been delivered to the Mir Space Station by the STS-71 ascent trip of Atlantis.

'Facelift' for Atlantis

Shuttle Atlantis sits atop the Shuttle Carrier Aircraft at Kennedy Space Center's Shuttle Landing Facility.

Atlantis is being prepared for its ferry flight to Palmdale, Calif., for its Orbiter Maintenance Down Period (OMDP) at Palmdale's Orbiter Assembly Facility, where it will remain until August 1998.

There, modifications and structural inspections will be conducted in preparation for Atlantis' future missions to support International Space Station assembly activities.

Photo credit: NASA/KSC Nov. 11, 1997

STS-132 launch photo Great low angle shot of the launch of Shuttle Atlantis on STS-132 mission

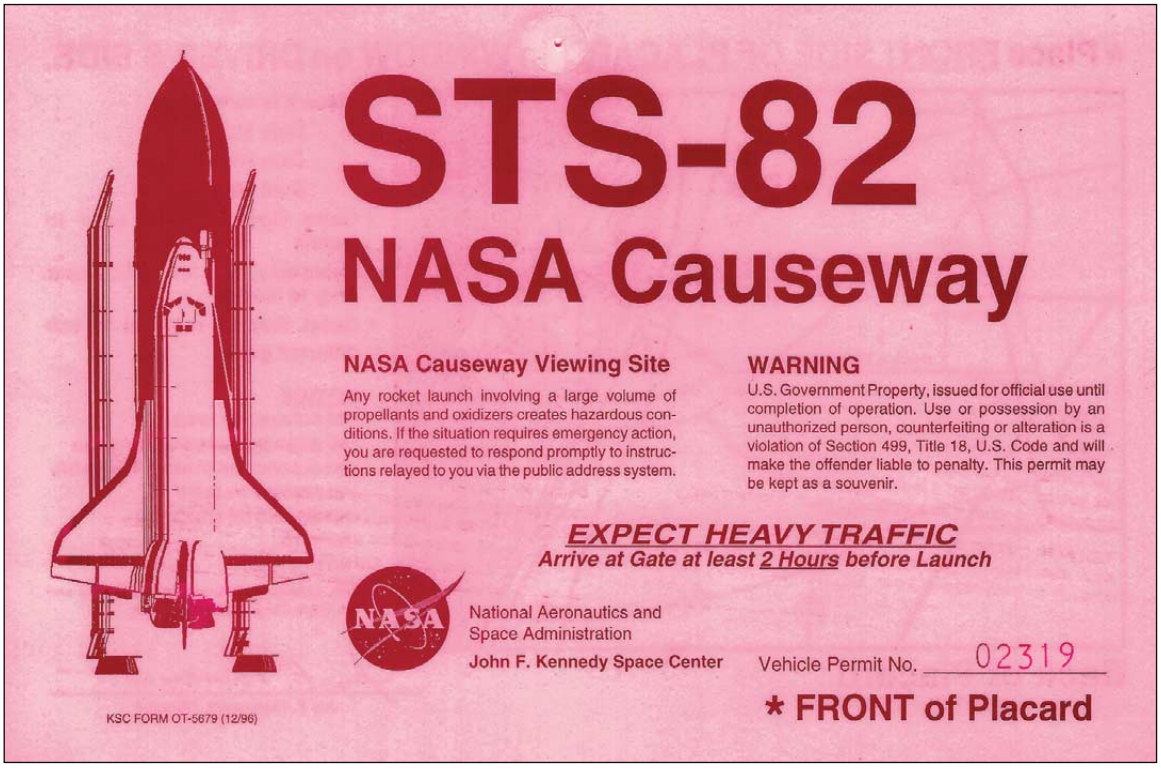
Back to the Beginning

Workers at Kennedy Space Center in Florida accompany shuttle Atlantis as it is towed back to its processing hangar after landing at Kennedy's Shuttle Landing Facility, completing its 13-day mission to the International Space Station and the final flight of the Space Shuttle Program.

Photo Credit: NASA/Bill Ingalls
July 21, 2011

Shuttle docked with the International space Station © NASA

Below is a Placard sent to our Editor Pete Green and his wife that enabled them to experience the launch of STS-82 the second in a series of planned servicing missions to the orbiting Hubble Space Telescope (HST).



STS-82 was a Hubble Space Telescope servicing mission by Space Shuttle Discovery. The mission launched from Kennedy Space Center, Florida, on 11 February 1997 and returned to earth on 21 February 1997 at Kennedy Space Center.

We were able to combine this amazing and unique experience with a holiday in Florida (well it was a good excuse to see a Shuttle launch) Ed

This MODIS image acquired on August 17, 2011 by NASA's Terra satellite shows Novosibirskiye Ostrova (the New Siberian Islands) which lie 75∞N in the Arctic Ocean, off Eastern Russia. Frequently hidden under cloud and often locked in by sea ice all year round, the current summer has provided a rare glimpse of this island group.

Quarterly Question

Francis Bell

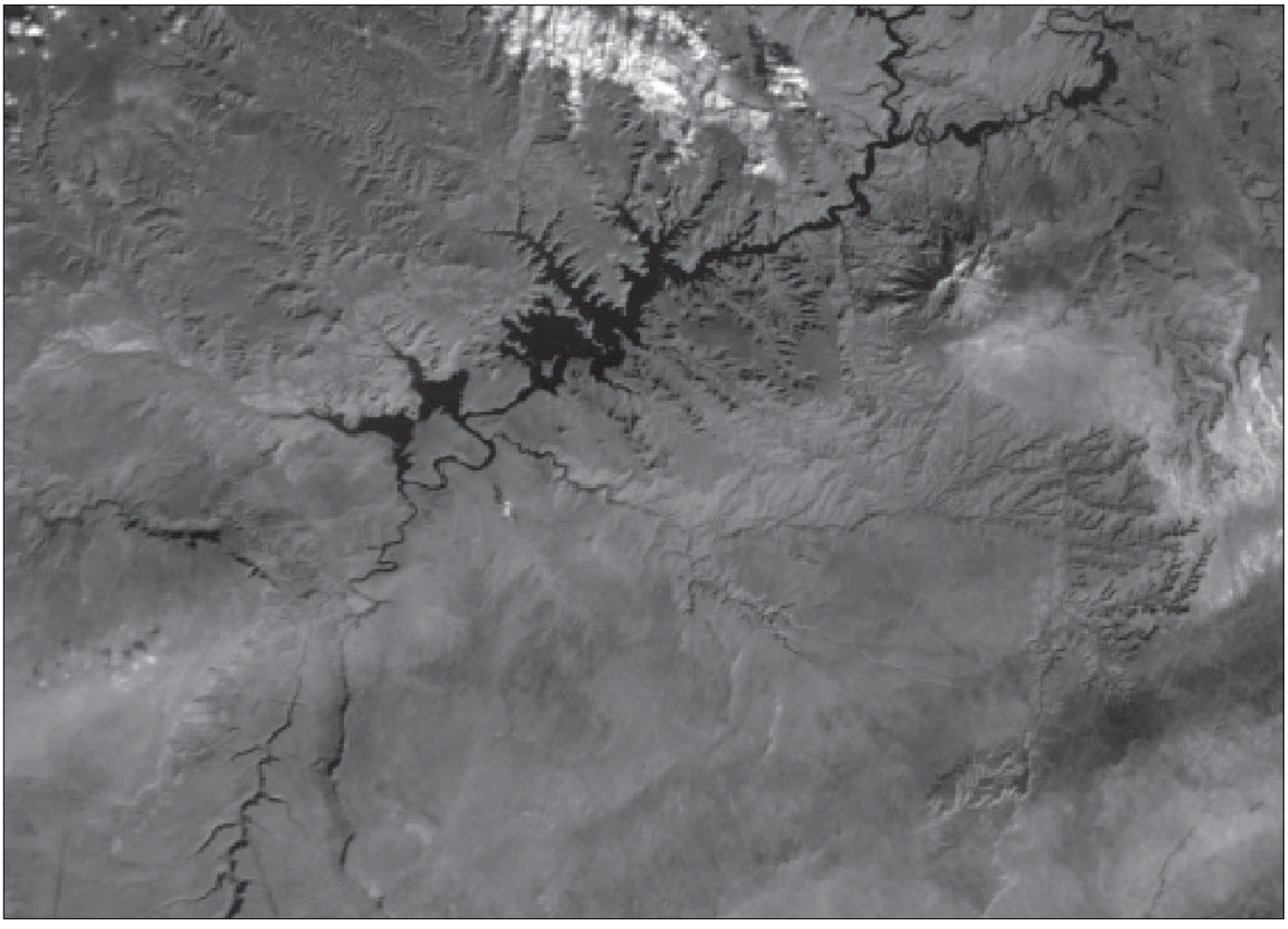
Our June 2011 Quarterly Question related to the sun angle as observed in Alexandria on the day of their summer solstice. The question was provoked by the historical work of the classical scholar Eratosthenes (276-195 C) who is credited with the first calculation of the earth's circumference. The answer to the question was 8.1 deg. that is 900/40,000 x 360.

My thanks to Elmar Bogels, The Netherlands who was the only member to submit an answer. It seems our membership are more interested in satellite images rather than mathematics so I will resort to another image for this Quarterly Question.

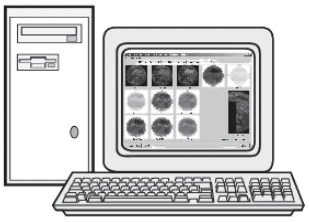
With reference to the image below what is the name of the major lake shown in the upper centre of the image?

The image is one I received at home from the Envisat satellite using the Envi-Ham reception system. See previous issues of GEO's Quarterly which will tell you how to receive these images. The scale of the image is approximately 300 miles from east to west and about 200 miles north to south. It shows and area of mid-western USA. The lake looks distinctly artificial. The image colour are artificial. The question is: name the lake shown on the image? You may wish to name a structure associated with the lake but this cannot be resolved on the image as shown.

Answers to francis@francisbell.com before the copy deadline for our next Quarterly. Prize a postcard from tropical Bali.



Computer Corner



Douglas Deans – dsdeans@btinternet.com

Those of us who read computer magazines will have noticed an increasing reference to Microsoft's next operating system, Windows 8. It seems just a few months ago that Windows 7 was delivered to my house on launch date but on checking I now realise that by October I will have been using it for two years so perhaps talk about the next version does not, on reflection, seem so ridiculous. By the way the pre-order deal of both a 32 bit and 64 bit copy of Windows 7 on DVD for under £40 still astounds me when I see the normal cost. I wonder if Microsoft will be so generous next time round.

So what is being said about Windows 8? Well it is still in early development but it is already clear that the tablet market, which is apparently exploding this year, is going to influence things quite dramatically. I have never owned a tablet although recently did upgrade both my own and my wife's mobile phones to smartphones which use the Android software..... a brave step for OAP's !

It looks as if there will be two interfaces, one the standard Windows desktop but also a new interface to allow users to access apps (why do I hate this word !). So although old style desktops will still be able to run Windows 8, the trend is to more portable computers often with touchscreens and the new OS will better serve those types of devices as well as the more conventional computers.

To quote Microsoft, the new OS will support web-connected and web-powered apps which have been developed using HTML5 and JavaScript.

There is still much to be decided before the release which Microsoft expects to be sometime in 2012.

It does seem that future Operating Systems will need to be multi-functional to cater for our insatiable appetite for portable communication devices of all sizes.

I have been very pleased with Windows 7 but do not see the need for any further upgrades for some time to come. However should I have any problems with my hard drive, such as failure, I will certainly use my 64 bit copy of the software rather than the 32 bit currently in operation. That would be a useful upgrade.

I was surprised to learn that my Perthshire town of Dunblane is on the list for upgrade to BT's Infinity Broadband. There have been some variations in the date for the service but it now seems to have settled with completion due by December this year. Being a rural Perthshire town we were quite late in getting broadband in the first place so to be well up the list for the 40 Megabits/sec service is surprising news. It may well be of interest for others to check their own locations. BT provide a coverage map where you can select your own area and find the latest news. Simply go to BT.com/infinity and select 'find your area', where you will see the country divided into about 11 regions. Select the appropriate one and you will be given a list of where the service is already available and a timetable of rollout for the following year. It is listed by telephone exchange and those may not always match geographical areas.

Infinity launched in January 2010 and is BT's new super fast fibre optic broadband service. In most basic terms exchanges are supplied by fibre optic cable and existing pillars located throughout the town are also upgraded to a fibre optic service. Existing copper cables serve from pillars to premises and in some instances that can still be a lengthy service.

I know that many people served by cable are highly critical of BT's new service but it has to be remembered that many areas in the UK including towns and cities as large as Dunblane have not been cabled and never will be, so this new service will offer those areas their chance for faster Internet.

There does seem to be some very reasonable packages being offered for the new Internet service but time alone will tell. As I hope to subscribe to this myself, I will keep readers informed as to how this progresses and if and when it becomes available.

It may be an interesting exercise to others to hear a consumer's honest appraisal as to how the service is provided and the quality of it thereafter. I do appreciate that many, including myself, will not receive the full 40 Megabits/sec as distance from exchange and more particularly from your local pillar all has effect. At the moment on average I get about 6 Megabits/sec from a possible maximum of 8 Megabits/sec. In fact when I tested my telephone number with BT, the projected figure for the new service is 37.5 Megabits/sec. We shall see although I would be delighted if that came to fruition. I do know that unlike previous services it does require a BT engineer to set it up in your house (currently free of charge). So watch this space.

EPS-15

Continuing with my channel by channel analysis of the Eumetcast system, I propose this quarter to look at EPS 15. As a reminder to readers, for a further explanation of EPS, Eumetsat Polar System, see my column in the previous quarterly (GEO Quarterly No. 30, June 2011). Last quarter I dealt with EPS 10 which amongst other files includes global full resolution 5 channel HRPT data from Metop. Unfortunately NOAA satellites are not able to provide global HRPT AVHRR data but are able to provide global GAC data. I tend to consider GAC as the digital equivalent of APT (but without the flaws of a analogue system). GAC spatial sampling is 5.4km across track and 3.2km along track at nadir.

Global GAC data from NOAA 19 is provided on Channel EPS-15.

There are approximately 480 files per day with an average file size of 1.0MB.

A typical file takes the following form :-

AVHR_GAC_1B_N19_20080109092203Z_20080109110703Z_N_O_20080109113424Z

David Taylor's Metop Manager also handles the NOAA GAC files (and many other data formats) and includes a fascinating tab providing a GAC composite.

Continued on page 33

FEEDBACK

The Column for Readers' Letters and Queries

email: geoeditor@geo-web.org.uk

Dear Dr. Prahm,

Group for Earth Observation Visit 7th and 8th July 2011

I wish to thank you and your staff for our recent GEO visit to EUMETSAT's HQ. Every aspect of the visit was perfectly arranged by your staff and the content of the seven presentations we received was just as we had asked for.

I hope the information exchange between ourselves as an amateur, educational and non-commercial interest group and EUMETSAT's staff will prove to be of mutual benefit in the future.

Sincere best wishes for your new role which I understand is to head the Danish Meteorological Service. Perhaps our paths will cross again at some time in the future.

Kind regards

Francis Bell

Director Group for Earth Observation

Dear ...Marianne Koening, Dieter Klaes, Peter Albert, Sally Wannop, Mikael Rattenborg,Francois Montagner

Group for Earth Observation Visit 7th and 8th July 2011

I am writing to you to express our group's gratitude for your time and commitment in contributing to the presentations which were given to our group during our visit to your EUMETSAT HQ. I understand the encroachment on your time, not only during the day in question and your presentation but also in the background when preparing materials.

It was the unanimous view of our group that our two days were delightful and informative from every perspective. I hope the information exchange between EUMETSAT and ourselves will prove constructive in years to come.

A few days ago I separately wrote Dr. Lars Prahm expressing our thanks for our very successful visit. Perhaps we may meet again - in four years time?

Yours sincerely,

Francis Bell

Director Group for Earth Observation

Media Broadcast GmbH,
Erdfunkstelle,
D-61250 Usingen
Germany

30th July 2011

Dear Juergen Schaefer, Lothar Stockmann and Andreas Nowak

I am writing to you on behalf of our GEO group who visited your site on the 8th July 2011. We all enjoyed our morning with you and a unanimous vote of thanks is offered to you and your company Media Broadcast for the hospitality and presentations we received. The technical tour of the site was of interest to us all. I appreciate that yourselves and other Media Broadcast staff gave up time to ensure the success of our visit. I also understand that it is unusual for visiting groups such as ours to be given such a high profile tour of your site and VIP treatment: we all feel privileged from this perspective.

We will publish a report of our visit in our next quarterly magazine which I'm sure will have some nostalgic photographs recording our visit. I will send you a copy when it is published - September 2011.

My only regret is having to leave your site soon after 12.00 noon. I'm sure another hour on site would have been appreciated by all our group but our 1.30 pm appointment with ESOC in Darmstadt dictated our time scales. Yes: we did make it back to ESOC with just seven minutes to spare.

Again our thanks to all Media Broadcast staff.

Yours sincerely

Francis Bell

Director Group for Earth Observation

Dear Darmstadt Delegates,

This is a follow up after our GEO visit to EUMETSAT, Usingen and ESOC.

I judged the visit to be very successful, worthwhile and enjoyable. EUMETSAT learned a little about GEO, it's memberships' talents and we most importantly learned about EUMETSAT's future programmes - the main directive for our visit. There we other benefits, for example GEO members from several different countries meeting together, exchanging ideas and enjoying each other's company. I hope everybody returned home safely.

At the end of our first day with EUMETSAT I asked if it was possible to have a copy of the PowerPoint presentations which had been the visual backgrounds to the presentations made during the day . Obliging this was done on the spot and I have these on a USB memory stick. Subsequently others have asked EUMETSAT for this material. I have asked EUMETSAT to write 100 discs containing the presentations and this has now been done . The arrangement is that I distribute the discs on behalf of EUMETSAT thus saving them administrative time. A bonus being that I have a supply of discs available on request for other GEO members who did not manage to attend our meeting there. The discs should be in my possession within one or two days. Please respect the copyright of the authors' of these presentations.

If you would like a disc send me an email with your up to date postal address.

The trade off. I would like to increase my library of photographs of our visit. I wish to make a slide show which I can have of display and rallies,talks and exhibitions which GEO attends. I have my own photographs of course but additional ones would be appreciated. I have the group photographs but anything else you could add would be great. If you can please

attach to your email disc request some photographs, say up to three, or whatever you think - JPEG format favoured. If you do not have photographs I will send you a disc on request anyway. My email address is francis@francisbell.com

Another request. If you can would you please write a paragraph, just a few hundred words about some aspect of your time in Darmstadt and send this the Peter Green, GEO's editor. Peter can use his editorial judgement whether to print it in our Quarterly. Peter's email address is geoeditor@geo-web.org.uk

A recommendation. Visit the EUMETSAT web page it gives a beautifully written brief account of our visit .

http://www.eumetsat.int/Home/Main/News/CorporateNews/808635?l=en.

Francis Bell

Dear Editor

Hoping everyone had a great time in Darmstadt. For me it was my second visit, but just as interesting as the first. I would just like to say that I would not have been there were it not for the kindness and generosity of one GEO member Mr.Brian Davis .I don't embarrass him by writing this but I would like to thank him for him sponsoring me . I thoroughly enjoyed myself especially at a time when adversity was at it's hardest. Thanks Brian for getting me out to Darmstadt when I really needed a break.

What a great time, especially with our Dutch friends who entertained us. Andrew has never stopped talking about it. Everyone got on so well with each other.

Eumetsat made us so welcome once again and this time it was a special surprise to be shown round the visitors centre at Usingen ground station.

Another great success story for GEO.

Best Wishes

Rob Denton G4YRZ

Dear Editor

Like most GEO members the main purpose of my visit to Darmstadt was to visit EUMETSAT and Usingen. But once again I was greatly impressed by the city because it seems to be the embodiment of modernity: broad clean streets, efficient public transport, with high tech. Industries and scientific activity at the very core of the city's thriving economy. The city has three universities, including the Technical University which claims to be the MIT of Europe. All these activities have plainly attracted fine architects to create an array of interesting, spacious and often beautiful modern buildings. As a student of migration I am sure that Darmstadt has its run-down sections, housing low-paid service workers, and there will probably be a few homeless people in the city. But I saw no one sleeping rough.

The city lacks the architectural heritage that might draw the kind of tourist traffic that one sees in nearby Heidelberg, part of the heavy price Darmstadt paid for its early enthusiasm for Nazism. But none of the ashes from which Darmstadt emerged after the war can now to be seen, only a fine modern city with which we can compare few in the UK.

Robert Moore

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If you run 24/7 then you have a world view of the weather at GAC resolution. An example of this, taken from my own computer can be seen on the inside back cover.

This now means that to date I have dealt with Channels 1, 2, 3, 4, 5, EPS-10 and EPS-15.

There has also been an addition to the data in Channel 4 which I have already detailed in a previous quarterly. You will remember in the March journal of this year (GEO 29) I described the various datas sent on Eumetsat Data Channel 4. The pick of the data was the MODIS Aqua radiance data (and geo-location data) producing some stunning images. Eumetsat have now added Terra data to the channel effectively doubling the coverage and, of course, doubling the number of files to just over 150 each day. Remember some of those files containing visible imagery are well in excess of 70 MB so if you are already taking a large quantity of data, it may be time, once again, to review your RAMdisk size.

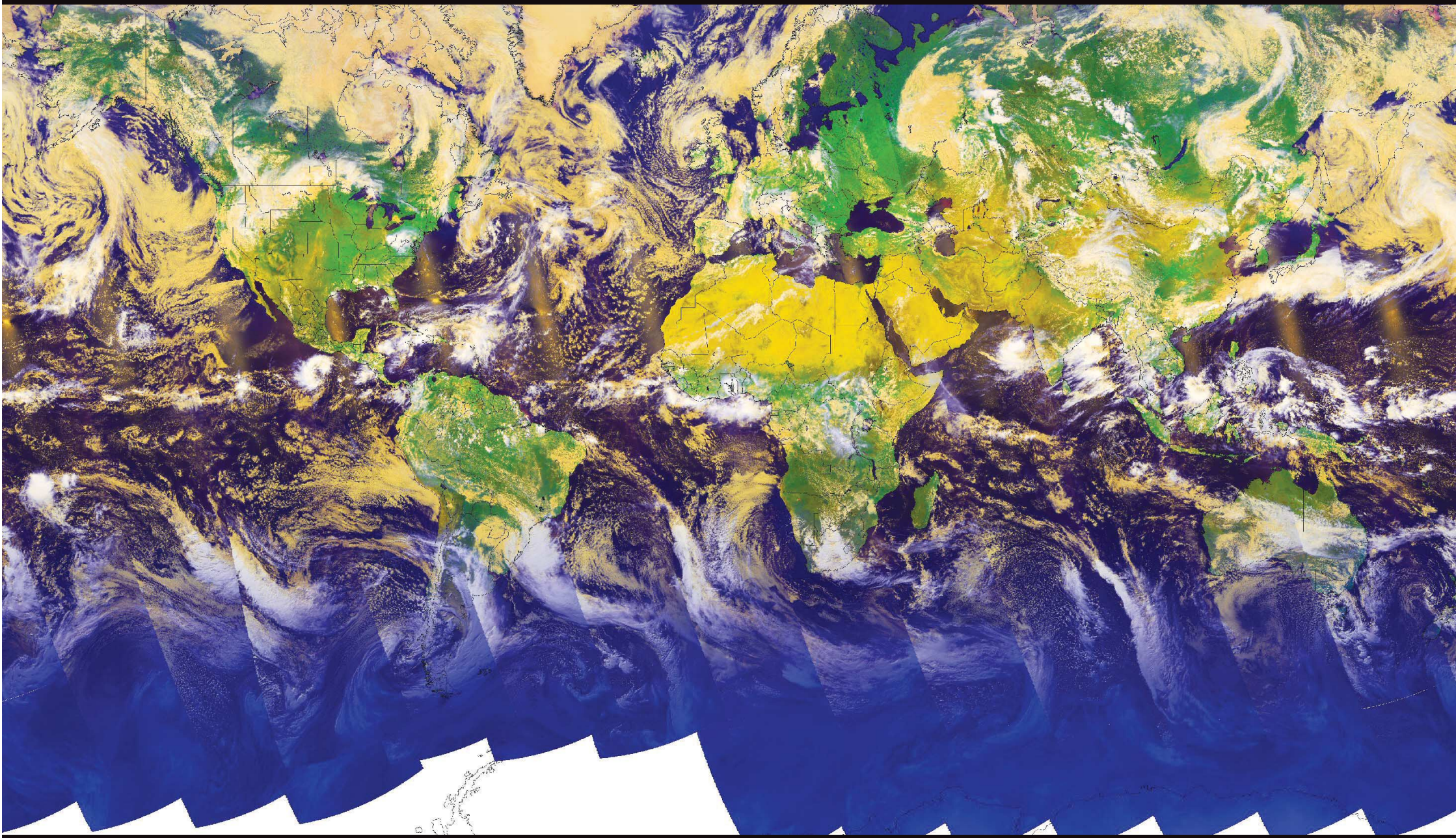
More and more data is being added to the system although a considerable amount of it is very specialised meteorological data, often for Nowcasting, sometimes for South African or South American regions. It is perhaps just as well, from a computer point of view, that some of the data is of limited use to amateurs.

Program Updates

David Taylor's programs (latest releases).Just a reminder that the list below is for fully tested releases and does not include the latest beta (or alpha) versions currently on test. Those can also be downloaded from David's site.

http://www.satsignal.eu

ATOVS Reader	v 1.2.2
AVHRR Manager	v 2.0.6
BUFR Viewer	v 1.1.8
CMA Viewer	v 1.2.0
DWDSAT HRPT Viewer	v 1.2.4
GeoSatSignal	v 7.2.2
GRIB Viewer	v 2.3.10
GroundMap	v 2.1.6
HDF Viewer	v 1.4.4
HRPT Reader	v 2.10.0
Kepler Manager	v 1.4.2
MapToGeo	v 1.1.8
Metop Manager	v 1.4.10
MODIS L1 and Fire Viewer	v 2.0.2
MSG Animator	v 2.5.46
MSG Data Manager	v 2.5.46
PassControl	v 3.3.2
SatSignal	v 5.2.2
Sea-Ice & SST Viewer	v 1.4.2
Wxtrack	v 3.8.12



Global GAC data from NOAA 19 is provided on Channel EPS-15

Quarterly Envisat Image

My entry for this Quarterly Envisat Images is one I received on 5th August 2011 from Envisat using the Envi-Ham project and my one metre satellite dish. The image shows an area of desert in Egypt centred approximately 21 deg. N - 23 deg. E. The scale of the image is about 40 x 40 miles. The image is only a very small subset of the full frame as received. To create the image as shown I used three of the twelve available channels and allocated them Red Green Blue colours using the VISAT-Beam software issued to me freely by ESRIN.

The image shows an area which today is desert but thousands of years ago would have been an extensive fresh water lake. Today the lake's residual ground water is being used for irrigation systems as identified by the dark geometric areas seen image left.. It is interesting to note that the discovery / identification of ground water reserves in this and other areas of Egypt resulted from analysis of similar satellite images. More recently satellite radar images of Egypt have been used to identify otherwise hidden archaeological sites. I cannot receive these radar images but am in wonder of my access to the detail revealed by Envisat's 'visible' channels.

Francis Bell