



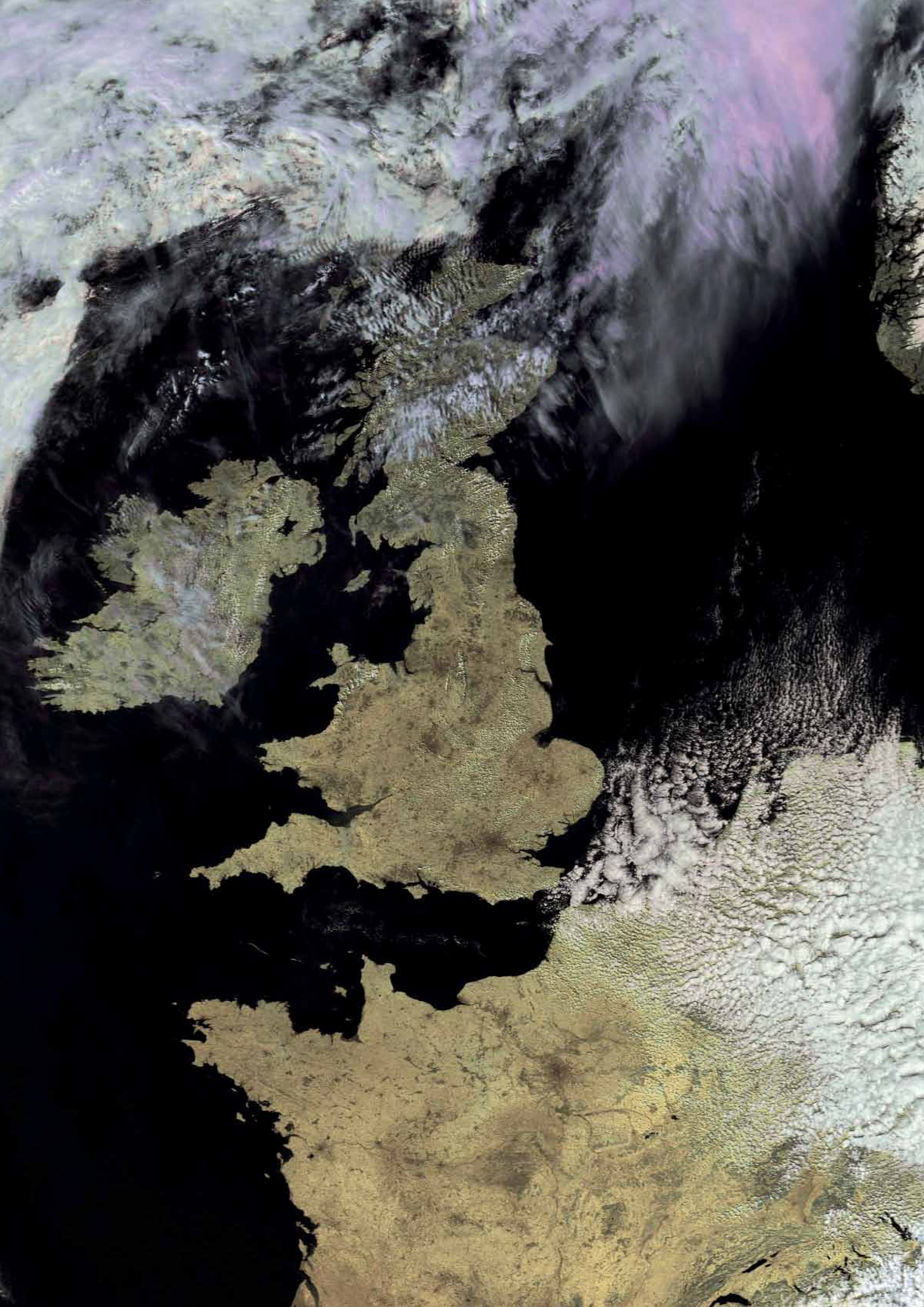
Inside this issue . . .

Last April's GEO Symposium was one of the most successful ever, with keynote speakers from EUMETSAT, the University of Leicester and two satellite DVB-S2 satellite receivers. Francis Bell reports.

On the subject of receivers for DVB-S2, Mike Stevens has been carrying out tests with a TV Tuner Card that could also provide a viable route to EUMETCast reception.

Raydel Abreu Espinet has been investigating the effects of solar flare outbursts on NOAA APT reception. His article may help to explain those 'mystery' pulses of interference that we all experience from time to time.

There are a number of short features from the NASA Earth Observatory dealing with such diverse topics as protecting Venice from rising sea levels, signs that there may be a major El Nino event brewing in the Pacific Ocean, the flooding of the Somerset Levels last winter,



Editorial

Les Hamilton

geoeditor@geo-web.org.uk

GEO MANAGEMENT TEAM

Director and Public Relations

Francis Bell,
Coturnix House, Rake Lane,
Milford, Godalming, Surrey GU8 5AB,
England.
Tel: 01483 416 897
email: francis@geo-web.org.uk

General Information

John Tellick,
email: information@geo-web.org.uk

GEO Quarterly Editor

Les Hamilton,
8 Deeside Place,
Aberdeen AB15 7PW, Scotland UK.
email: geoeditor@geo-web.org.uk

GEO Quarterly Despatch

Peter Green

Membership and Subscriptions

David Anderson,
35 Sycamore Road,
East Leake, Loughborough LE12 6PP,
England, UK.
email: members@geo-web.org.uk
Tel: 01509 820 067

Technical Consultant (Hardware)

David Simmons
email: tech@geo-web.org.uk

Webmaster and Website Matters

Alan Banks,
e-mail: webmaster@geo-web.org.uk

GEO Shop Manager

Nigel Evans (Assistant: David Simmons),
email: shop@geo-web.org.uk

International Liaison

Rob Denton,
email: liaison@geo-web.org.uk

Clive Finnis

Carol Finnis

Publisher

Published by *The Group for Earth Observation Limited*, a company in England and Wales, limited by guarantee and not having share capital.
The Company Number is 4975597.

The registered office is Coturnix House,
Rake Lane, Milford, Godalming,
Surrey GU8 5AB, England.

Printing

Hedgerow Print,
16 Marsh Lane,
Crediton, Devon EX17 1ES.
Tel: 01363 777 595

Responsibility

Every effort is made to ensure that the technical and constructional articles published in this Quarterly are correct. However, the ultimate responsibility is with the reader to ensure the safety of constructions and for any interfacing with other equipment. GEO cannot accept liability for shortcomings in any published design or any constructions carried out by members or other third parties.

Copyright GEO © 2014

The contents of this Quarterly remain the intellectual property of the *Group for Earth Observation Limited* and its contributors. Copying of text or images, either from the printed Quarterly or from any electronically stored source, is forbidden without permission from the Editor.

All too late, I realised that I had set the copy deadline for this issue only one day following the GEO Symposium. Since I felt it important that a report on the Symposium was included, I moved the copy deadline forwards by three weeks to facilitate this. Of course, this means that your magazines are going to arrive rather later than you anticipate, for which I apologise.

The main focus of attention during the past quarter has been the GEO Symposium, which took place at the National Space Centre in Leicester in late April. With the imminent change to the EUMETCast dissemination format, GEO welcomed keynote speakers from EUMETSAT as well as from the manufacturers of two DVB-S2 receivers, and this attracted a big turnout of members, making the event one of GEO's most successful. You can read Francis Bell's illustrated report on the Symposium on the following pages.

On the subject of receivers for DVB-S2, one of GEO's most enthusiastic members, Mike Stevens, well known for his frequent articles in the *Quarterly*, has been engaged in trials of the TBS6925 DVB-S2 TV tuner card manufactured by TBS Technologies of Singapore. Mike has been collaborating with TBS in helping them to develop their software and, following several updates, the card is working perfectly with EUMETCast's DVB-S transmissions. Mike describes his experiences on page 16. All that remains is to test the unit with the DVB-S2 signals once EUMETSAT starts transmitting them, and Mike promises to report on this in the next issue.

I recently received an email from Fred van den Bosch alerting me to the fact that NASA has installed four HD-cameras on the International Space Station, and that these are now streaming back live video of the Earth's surface. You can access these transmissions at the following URLs

<http://www.space.com/25797-nasa-hd-earth-from-space-video-webcasts.html>

<http://spacestationlive.nasa.gov/>

Two of the GEO Management Team have **new contact email addresses**, and readers should make sure that their address books are updated accordingly. John Tellick can now be contacted at information@geo-web.org.uk while Rob Denton's new address is liaison@geo-web.org.uk.

You will notice that this issue of GEO Quarterly is much slimmer than usual, sadly reflecting the lack of member contributions. Reports from those of you currently testing DVB-S2 receivers from various manufacturers will be particularly welcome for GEOQ 43. The **Copy Deadline for last-minute items in GEO Quarterly 43 is Sunday, August 3, but the bulk of the content material is required well before this date.**

Masthead photograph: Sunset over Netherland's 'New Wilderness, between Lelystad and Almere'

Contents

Symposium 2014 Report	Francis Bell	2
Quarterly Question	Francis Bell	6
GEO Quarterly ... the Future	GEO Management	7
Meteorology Manual by Storm Dunlop (Book Review)	Robert Moore	7
Great Lakes in Deep Freeze	Keith Fraser	8
Bouvet Island: the loneliest land on Earth	NASA Earth Observatory	10
South Pole of Vesta	NASA Dawn Mission News	12
Parting the Sea to Save Venice	NASA Earth Observatory	13
Sentinel-1A Images Pine Island Bay	NASA Earth Observatory	14
Cover and Full Page Image Details		15
Satellite Status		15
Testing the TBS6925 Tuner Card for EUMETCast	Mike Stevens	16
Richat Structure	John Tellick	17
Our Not so Quiet Neighbour	Raydel Abreu Espinet	18
Somerset Levels Under Water	NASA Earth Observatory	20
From Soggy to Foggy to Hazy, Polluted and Dusty	John Tellick	22
Sentinel 1A Images The Netherlands	ESA	24
Is an El Niño Event Developing	NASA Earth Observatory	25
Feedback		26
GEO Symposium on YouTube		27
The 'SatellitenPaul' Exhibition	Paul Geissmann	28
EO Helplines and Internet Discussion Groups		30
Copy deadline for the next issue of GEO Quarterly		30
GEO Membership Application Form		31
GEO Shop Catalogue and Price List		32

Symposium 2014 Report



Francis Bell

After eight months of planning, I was pleased with the day's events on April 26, at GEO's 2014 symposium. The feedback I have received from those who attended the event indicates it was judged a successful, informative and a very worthwhile day.

This was the seventh time GEO had held its symposium at the National Space Centre (NSC) in Leicester, a venue located close to the centre of the UK, with easy access by road rail and air. Even without the GEO Symposium, the Space Centre is worth a day's visit for anyone interested in space activities and satellite communications.

The symposium was well attended, with some fifty delegates, perhaps the attraction being the international dimension to the day with listed speakers from Canada, Israel, Germany, The Netherlands and Scotland, as well as the Space Department from Leicester University. Although the programme of speakers took some time to plan, it was satisfying when all the anticipated speakers arrived on the day. At one time I had hoped to have a speaker from NOAA to bring us up to date with their future satellite plans, as I particularly wanted to learn about the future of their 'Direct Readout Service'. However, financial constraints within NOAA meant they could not attend. As an alternative, I am hoping to receive an informative paper from NOAA relating to their future programmes, which we will publish in *GEO Quarterly* in due course.

The NSC has a conference suite just outside their main exhibition area, and this is where the GEO Symposium took place. One third of this area was partitioned off for our planned presentations and AGM; the other two-thirds was allocated to display stands and administration. The stands we deployed were devoted to:

- The demonstration of live EUMETCast reception using our portable GEO dish and the latest *Ayecka* S2 VCM receiver.
- A reception desk which was also selling the latest SDR (Software Defined Radio) dongles.
- The *GEO Shop*, selling some of the items advertised on our 'Shop' web page and in *GEO Quarterly*.
- A stand run by Aharon Fuchs selling the latest *Space Band* S2 VCM satellite receiver.
- John Tellick selling or donating some older satellite receiving equipment.
- A stand run by our Dutch friends *Werkgroep Kunstmanen*, demonstrating their latest satellite tracking equipment.
- A stand displaying the raffle prizes for later in the day.
- A stand with promotional materials supplied to us by EUMETSAT.
- Most importantly a stand for tea, coffee and biscuits.

The programme of presentations started at 10 am and was very close to that advertised with only small variations in timings. The seven speakers during the day were as follows:

Dr Neil Humpage

Dr Neil Humpage of Leicester University's Space Centre, described to us the research that the university was engaged in, not just relating to the Global Earth Radiation Budget (GERB) data coming from the Meteosat craft on a global

scale but data from Metop/AVHRR which, combined with data from aircraft, can provide fine detail about atmospheric composition to the point where even traffic hot-spots can be identified from exhaust emissions.

Klaus-Peter Renner

Klaus-Peter Renner is a senior communications engineer with EUMETSAT, and presented us with the very latest details of the transition of the EUMETCast dissemination service, not only from one satellite to another but also the change in signal format from S1 to S2 VCM. The news of this transition has been advertised by EUMETSAT for some time but it was very informative to have first hand information about these changes and the implications for amateur, educational and research groups such as GEO. I did not understand all the technical details presented but two points did register with me: first, that the volume of data being transmitted via EUMETCAST will increase by a factor of three or four, and secondly that the present S1 service will cease at the end of December 2014. This means that stations wishing to continue direct reception need to be prepared. The presentation was illustrated with 34 informative slides, one of which is reproduced at the top of page 4.

Kim-Hui Gaune

This was a very informative presentation by Kim-Hui Gaune, a EUMETSAT User Support Officer. We were informed about EUMETSAT's future service enhancements, and plans for new satellites, which include Meteosat Third Generation (MTG) and the second generation of their polar orbiting satellite programmes, showing operational phases at least up to 2039.

Their new web imager service is being beta-tested and image library entries are now regularly being tweeted. One of Kim-Hui Gaune's 25 slides relating to key features of this service is reproduced on page 4. As a postscript here, I noticed on the international news just a few days ago that contracts have just been signed for the Metop second generation satellites.

Ahron Fuchs

This well-illustrated presentation with 15 informative slides, was given by Aharon Fuchs from Israel, and related to the *Space Band SR1* receiver. Aharon spoke of the commercial background to the company manufacturing the SR1 receiver with thousands of units being in regular service around Europe. The technical specification and practical use of the receiver has been evaluated by EUMETSAT, with a positive outcome. The receiver is designed to accommodate foreseeable high speed services.

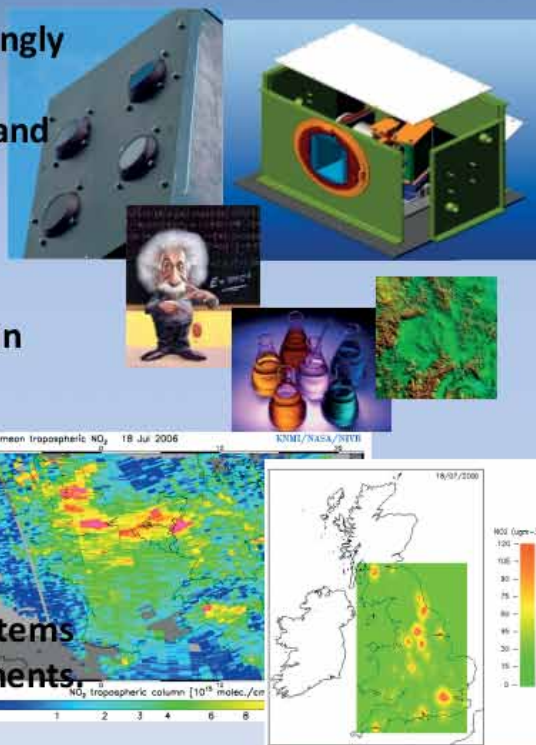
Rob Alblas

Rob Alblas, a member of the Dutch group *Werkgroep Kunstmanen*, gave us a presentation relating to satellite tracking systems, including antennas, rotors, receivers, decoders and software for the continued reception of high resolution data from weather satellites such as Meteor and Fengyun. Rob's presentation was supported by slides and, perhaps more importantly, by the demonstration of equipment on his stand in the exhibition area. One of Rob's colleagues, Elmar Bögels is pictured manning the stand on page 5, with some of the hardware and display units needed for their WRX1700 receiver. In front of him is Rob's

Core goal: To design, build and exploit increasingly powerful satellite sensors to address critical questions concerning the Earth's atmosphere and surface.

Multidisciplinary: The group links researchers in Physics, Chemistry and Geography.

Key areas: Atmosphere composition; climate processes and trends; surface temperature; vegetation and fires; integrated observing systems of satellites, ground and aircraft based instruments.



demonstration XY-rotor system. You can also see a small *Meccano* XY rotor model on the desk. The box near the rotor contains the HRPT decoder, which also includes the rotor driving electronics.

Gordon Sawatzky

Gordon Sawatzky from *Novra Technologies Inc* (Canada) provided us with an overview of the *Novra* company and its international customers, supported by 39 informative slides. *Novra* manufactures DVB satellite products with IP data delivery, but of particular interest to EUMETCast reception is their *Novra S300E* receiver, which will receive the anticipated S2 VCM signals from EUMETCast. *Novra* have had experience of the migration to DVB S2 signals since 2011, and there is continuing international evaluation of their receivers.

David Taylor

David Taylor's talk was based on the experience gain during testing two IP-based EUMETCast receivers. First, he explained how EUMETCast was sent from Germany to your station, noting how a domestic digital TV signal could also be made to carry data by adding more bits of protection, rather as a computer CD is like a protected Audio CD. A physical demonstration of the difference between broadcast UDP and point-to-point TCP ensued, showing why it was important to pick up every packet sent, and how that was the receiver's responsibility in a broadcast link.

Adding a dedicated network card to your PC was recommended. Otherwise, using the new IP-based receivers was easy, as there was only one change required on the EUMETCast reception PC, and that was simply altering

the network address. Some specific notes on the testing followed, and the talk was complementary to that given by Klaus-Peter Renner earlier in the day.

Special Offer

Each of our speakers was kind enough to leave us a copy of their visual material with me and I have compiled these on to a CD or memory stick. For readers who were unable to make it to the symposium, this is a chance to actually look through the informative visual materials that were presented on the day. If any reader would like a copy of these presentations please contact me. If you live in the UK, write to me with your name and address, enclosing six second class stamps, and I will send you them on a memory stick. My home address is on page one of this Quarterly. If you reside outside the UK, email your request to francis@geo-web.org.uk, and I will send you a disc or memory stick: there will be no charge. There is no time scale here, but when the memory sticks run out, everything will then be sent out on discs.

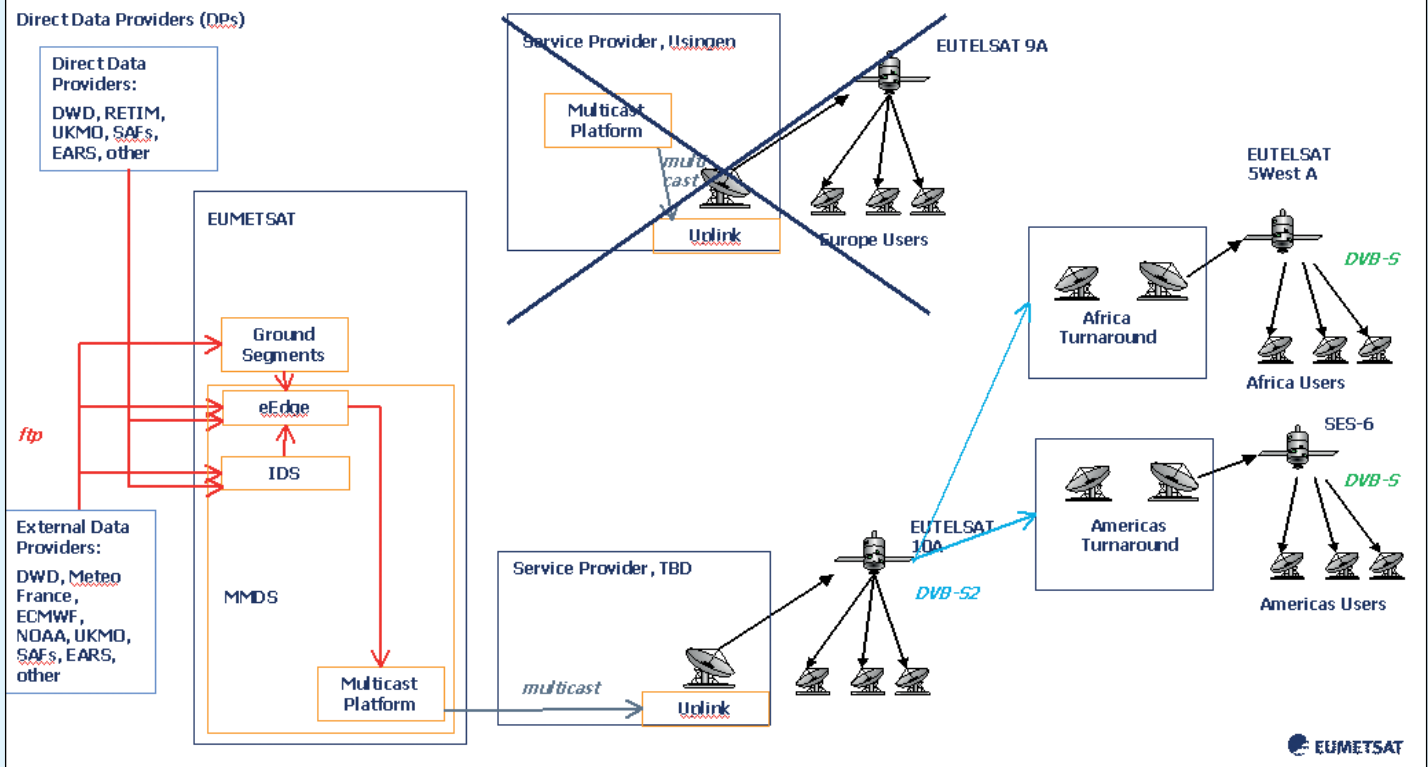
Proposed Visit to Darmstadt in 2015

During the course of the AGM, I asked our members if they would be interested in a visit to EUMETSAT's HQ next year. There was overwhelming support for this idea, so I will try to progress this with EUMETSAT.

Favoured dates may be July 2-3, 2015 but this is just my initial suggestion, not a fixed arrangement. Watch this space for information relating to any possible Darmstadt visit.

The last part of the day's programme was the members' AGM, and this will be reported in the September issue of *GEO Quarterly*.

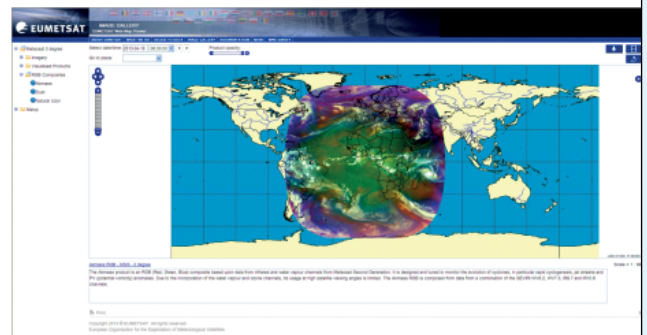
1 January 2015: end of Ku band DVB-S



A slide from Klaus-Peter Renner's presentation, illustrating the definitive scheme for the introduction of the new S2 VCM EUMETCast service.

New Web Imagery Service

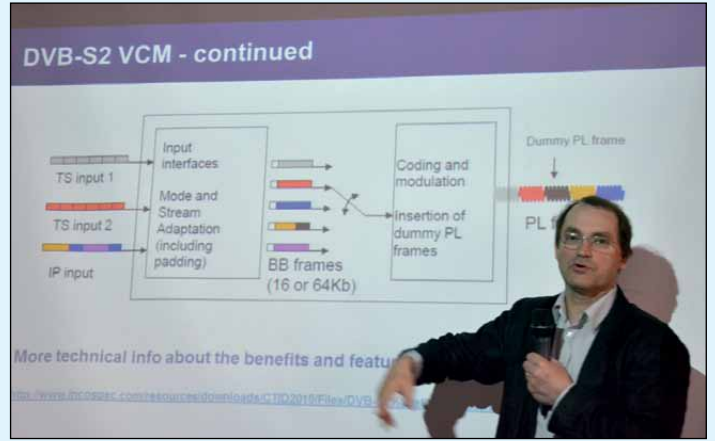
- A new service to visualise EUMETSAT satellite data has been beta-tested.
- The service makes use of the OGC Web Map Service (WMS) specification, which allows users to see satellite imagery in a standard, interoperable way.
- Key features of the WMS
 - Provides a simple view of EUMETSAT's satellite products
 - Allows easy regional selection, overlay of products on World Map background
 - Imagery available in various formats
 - OGC standards allow for easy exchange of imagery between web map viewer providers
- This new service is intended to replace the existing web imagery service
- It will mirror the contents of the existing service:
 - Meteosat and Metop imagery, RGB composites and other visualised products



This slide from Kim-Hui Gaune's presentation summarises the new web imaging service which EUMETSAT are currently beta-testing.



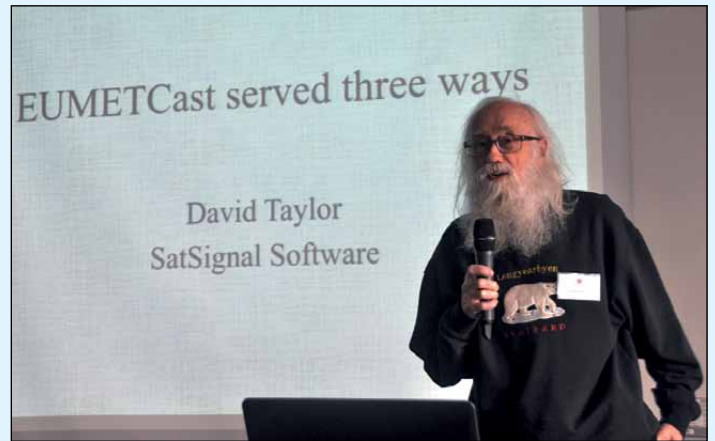
Attendees registering with Nadine Bell.



Klaus-Peter Renner presenting 'EUMETCast Europe DVB-S2 Migration'.



Rob Alblas tells about the Werkgroep Kunstmanen trip to Dwingeloo to use the Radio Telescope for direct MSG LRIT reception.



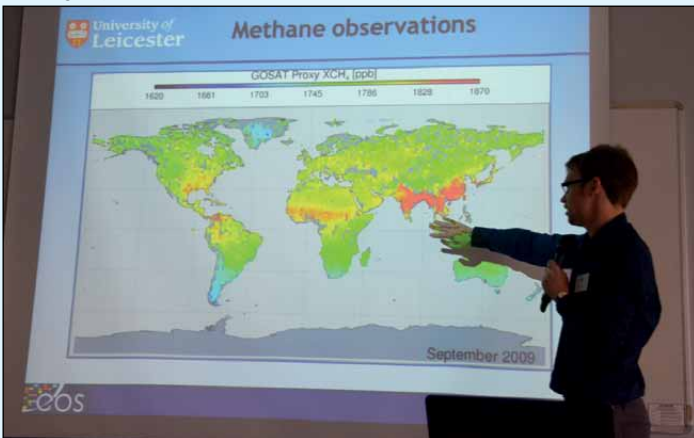
David Taylor talks about new receivers for DVB-S2. Photo: Cecilia Taylor



Elmar Bögels is seen manning the Werkgroep Kunstmanen stand, exhibiting the group's X-Y rotator and hardware to operate their WRX1700 receiver.



Two of the speakers, Klaus-Peter Renner (left) and Kim-Hui Gaune in conversation with David Simmons



Neil Humpage of Leicester University presenting 'Science from Meteorological Satellites'.



Kim-Hui Gaune speaking about EUMETSAT's future service enhancements.

Except where otherwise stated, all photographs on this page are courtesy David Taylor

QUARTERLY? QUESTION

Quarterly Question 41

My thanks to those readers who contacted me with their answer to the previous Quarterly Question, which asked for the identification, name and history of an island in the Arabian Sea / Indian Ocean. Except for its location, I knew nothing about the island until I started to research its names and background for myself. I was fascinated with the information I found, hence the question posed in the Quarterly. I obtained most of my information from Wikipedia and, for those who wish to read more about this geologically unique island, I suggest this is an informative starting point—or just Google the name of the island. Particular thanks to Nick T, David Williams and Ken Morgan (Australia); Andreas Lubnow (Germany); Adrian Chamberlain, Peter Hardy (England); and Ap van Weeren and Herman ten Grotenhuis (Netherlands) for their informative emails, which are summarised below.

Socotra

Socotra (also Suqutra or Soqotra) is a small archipelago of four islands in the Indian Ocean. The people who live there are called Socotrans, and speak their own Semitic language, *Soqotri* which has no written form. However, this language is gradually being replaced by Arabic.

The group of four islands was ruled by a hereditary Sultan from 1511, whose family line ruled more or less continuously till as recently as 1967. In 1876, Socotra became a British Protectorate, as Britain was looking for a coaling station for ships travelling to and from India. In 1967 the Archipelago became absorbed into South Yemen, the People's Democratic Republic of Yemen and, when north and south Yemen were united in 1990, the islands became part of the Republic of Yemen. The capital is a town called Hadiboh, population 8500, which islanders elsewhere consider to be a dirty, verminous place, although it is likely to have been a prosperous trading port in ancient times. In recent times, Somali pirates have used Hadiboh as a refuelling base. The primary occupations of the people of Socotra, which has a hot and rather dry climate, have traditionally been fishing, animal husbandry, and the cultivation of dates.

Socotra is considered a jewel of biodiversity with one of the most striking of Socotra's plants being the dragon's blood tree (*Dracaena cinnabari*), which is a strange-looking, umbrella-shaped tree. Much of Socotra's flora and fauna are unique to the islands, which support some 700 endemic species found nowhere else on Earth.

The *Friends of Soqotra* website produces interesting annual newsletters with colour photographs of the islands called *Tayf* which can be download from

http://www.friendsofsoqotra.org/Activities/Tayf_newsletter.html

In 2001 a group of Belgian speleologists of the *Socotra Karst Project* made a spectacular discovery. Deep inside a huge cave on the island they came across a large number of inscriptions, drawings and archaeological objects that further investigation showed had been left by sailors who visited Socotra between the 1st century BCE and the 6th century CE.

The nearest any GEO reader has been to Socotra seems to have been Ap van Weeren, who related how, as a radio-officer in the Dutch Merchant Navy between 1954 -1960, did sail past the islands.

Quarterly Question 42

In a fit of nostalgia, I was recently browsing through some of the images which I had archived during those two delightful years when the *Envi-Ham* project was retransmitting high resolution

images from the *Envisat* satellite. To everyone's great distress, after ten years of spectacular imaging, the satellite suddenly stopped working in April 2012 and has not been heard from since. However, the archive of data gathered during its lifetime is still being used by scientists today, even though no new data is being transmitted.

Two images that I received about two and a half years ago caught my eye, and are the subject of **Quarterly Question 42**. Both are images of lakes. The question is: '*What are the names of the two lakes, and significantly, what are the altitudes of their water surfaces?*'

It may help you to identify the lakes by noting that the equator crosses one of the lakes, which has a very characteristic outline, while the other lake is rated as the highest navigable lake in the world. The two lakes are located on different continents.

Please also include in your answer any other notable features for these two lakes, relating to their hydrology, geology, history, human influence, political boundaries or other interesting facts.

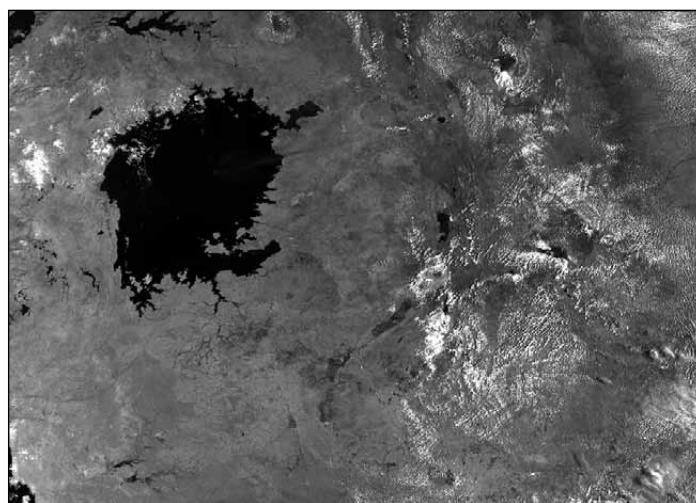


Figure 1 - The equator runs through this lake in this 2011 image,

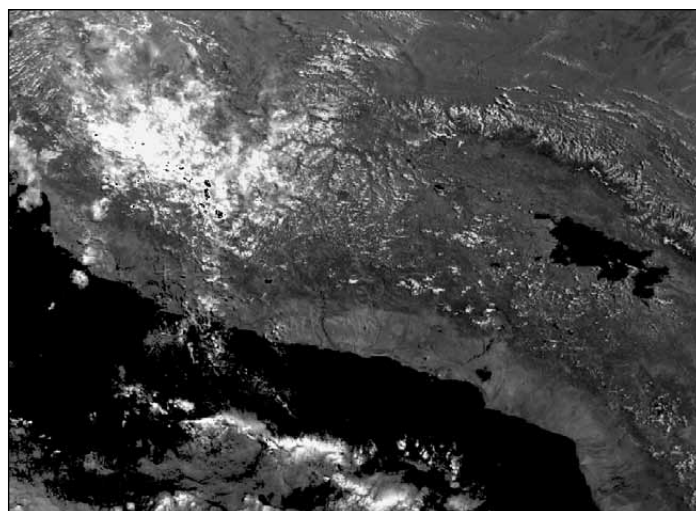


Figure 2 - This lake is rated as the highest navigable lake in the world.

The images shown above received from *Envisat* in late 2011 using a single channel generating greyscale images. From the raw data I have stored it would be possible to create a coloured image, but it would add nothing to the question; hence basic greyscale images are shown. In both cases the scale of the image is between 400 and 600 miles from left to right.

Please email your answers to Francis Bell at

francis@geo-web.org.uk

before the copy deadline for our next Quarterly, Sunday, August 3.

GEO Quarterly

... the Future

The GEO Management Team

GEO has been bringing its members the **GEO Quarterly** for over a decade now, and we have been constantly pleased to hear from subscribers just how much they appreciate receiving their glossy magazines. But much has changed since GEO was established: from a situation where *GEO Quarterly* was almost the only means through which amateur enthusiasts could keep abreast of developments in the weather satellite and Earth imaging fields, it now has to fight its corner against the advances of readily available information on the Internet.

We have reported previously in our pages of publications ceasing in paper format and being made available only as electronic documents on the Internet, or as PDF downloads. The most recent example was EUMETSAT's *Image* newsletter, as mentioned by Francis Bell in last December's Quarterly.

Here at GEO we face two problems: first, most of the content of *GEO Quarterly* these days is being pre-empted by the Internet; second, GEO membership has dropped to little more than half of what it was at its peak (just 270 at the start of this year). Publishing *GEO Quarterly* in its present form remains financially viable, but only marginally. Should the membership fall much further, subscriptions would necessarily have to increase, something we really want to avoid.

The situation is also compounded by the fact that there is little scope for new developments nowadays, and this is reflected in greatly reduced article contributions from our members. In the past it was possible to design and construct our own receivers, antennas and so on: now, all the hardware consists of commercial off-the-shelf items. There is simply very much less to write about. But because a paper magazine is printed in 8-page blocks, lack of reader input frequently leaves the Editor struggling to 'invent' interesting content to complete the page-count. Moving to an electronic format solves this issue, as the final number of pages is immaterial.

What Next?

The GEO Management Team met last March to address the future of *GEO Quarterly*, and two major decisions were taken:

- GEO Quarterly will continue in paper format till the end of 2014.
- From the start of 2015, the March, June and September Quarterlies will be issued only as electronic (PDF) documents, but the December edition will also be provided to every reader as a printed magazine, as at present.

This will have an effect on current and future subscriptions. The remaining issues for 2014 will remain available in both electronic and paper format. From 2015 onwards, the first three issues will be available in electronic format only, with the last issue of the year being available in both electronic and paper format.

The existing UK/Europe/Rest of World subscription rates will be replaced with a single rate. Existing members who have already paid for a full years paper subscription will have their existing membership extended.

While we appreciate that most readers will be sad to see the end of regular printed Quarterlies, we hope we have arrived at a solution that is the best compromise. The main bonus is that, of course, the cost of GEO Membership will drop considerably, to a figure we anticipate to be in the range of £10 - £15 for everyone.

Meteorology Manual

... the practical guide to the weather

A Book Review by Robert Moore

This is another beautifully presented and handsomely published book from Storm Dunlop. But a '*practical guide to the weather*' is not exactly how the volume seems to this reviewer. *Part 1: The Atmosphere*, assumes the reader can plunge fairly quickly into the analysis of global circulation and pressure systems. As such this section is a welcome refresher course for anyone with an interest in the weather, and who is familiar with meteorological terms, but it's a section that takes no prisoners. Dunlop's earlier *Weather and Forecasting* (with Francis Wilson, 1982) leads the newcomer more gently into these topics.

By contrast, *Part 3: Observing the Weather and Forecasting*, is a rather simplistic description of observing and forecasting that could be put in the hands of any newcomer to the study of weather, but quickly skimmed by the enthusiast. So the intended readership is not quite clear. That said, the first two parts of *The Meteorology Manual* nevertheless comprise an excellent reference book.

Of course, it goes without saying, that a Storm Dunlop book is always full of beautiful pictures: Dunlop is our pre-eminent weather-photographer. Given his interest in light and colour, it is no surprise that his chapter on light, colours and optical phenomena is a very thorough treatment of the topic, covering it in greater detail than the often rather marginal comments found in many weather books; though not in such detail as in his *How to Identify Weather* (2002). Each one of these optical phenomena tells us something about atmospheric conditions aloft—though like many of us I guess, I often just stand and stare.

Chapter 6: Clouds is an especially useful one because, whilst the author has given us useful descriptions of cloud structures in previous books, this chapter deals at some length on the processes by which one cloud structure transforms into another (and Nature getting the casual observer thoroughly confused). This part of the book may be particularly interesting to GEO readers. Whilst most of us observe clouds directly from the ground upwards, we are also privileged to observe them from satellites downwards. Certainly, when zooming in on animations—either in high resolution or in rapid scan—we see clouds forming and reforming, and weather structures changing. Identifying one cloud either from the ground or space is easy enough, but multiple clouds moving and changing are not easy to interpret. So Chapter 6 of *The Meteorological Manual* will be of value in helping us to understand what we are watching. It is a chapter that will repay reading more than once.

One niggle, directed perhaps at the publishers rather than the author, is that such a lavishly illustrated book needs special attention to the placement of text. On a number of occasions I turned over a page to find I had missed a little block of text beneath an illustration on the previous page. As the publisher of the *Spitfire Restoration Manual*, Haynes really ought to be a bit more careful.

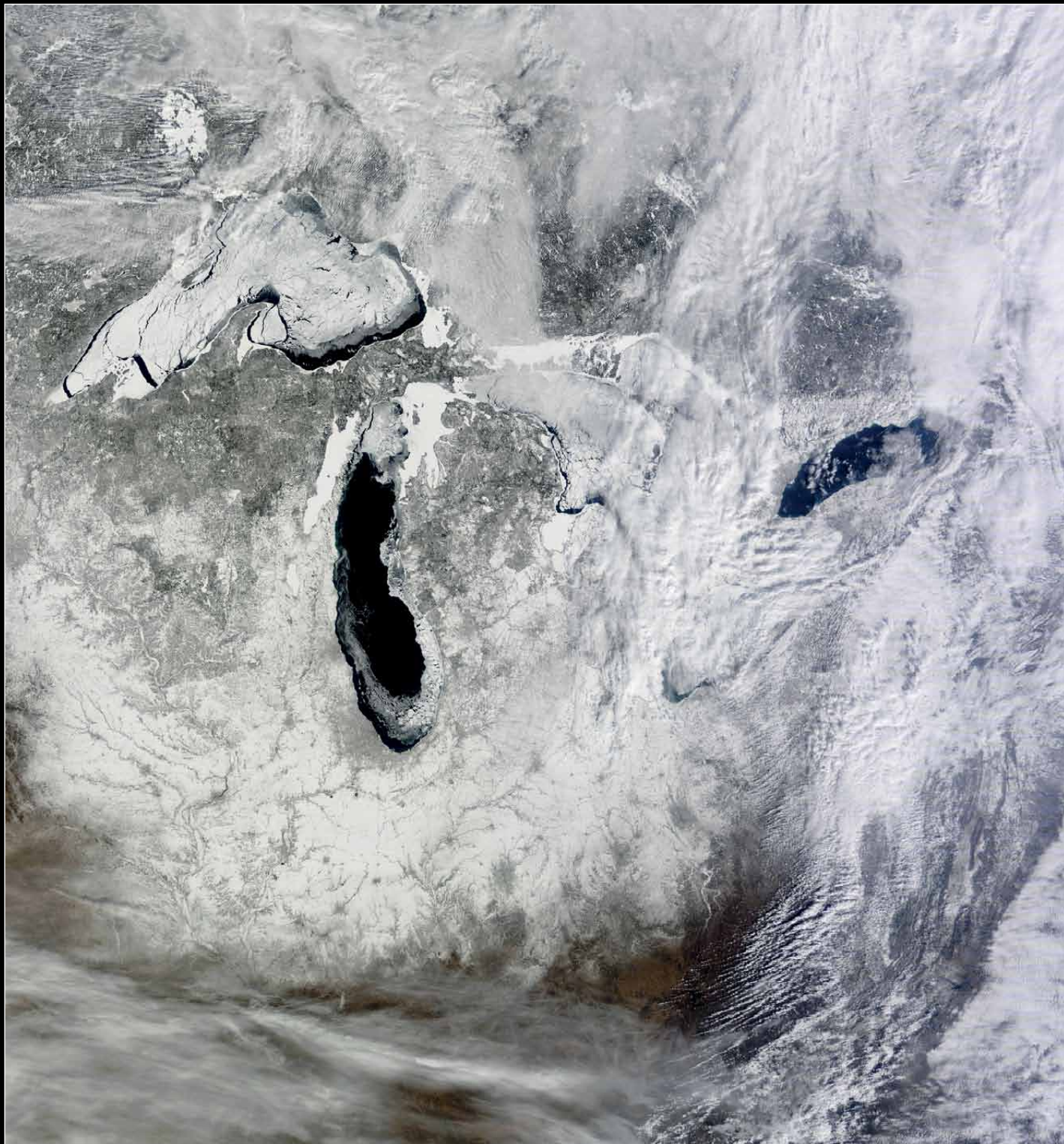
Overall, the *Meteorology Manual* is a good book—worth the price for the pictures alone—and worthy of a place in every school and public library and, I'm sure, the bookshelves of many GEO members.

Details

Meteorology Manual: the practical guide to the weather
Storm Dunlop
Haynes Publishing, 2014
ISBN 978 0 85733 272 1, 172 pp £21.99

Great Lakes in Deep Freeze

Keith Fraser



This **Terra** MODIS image dating from 16:50 UT on February 19 this year shows a very rare example of Lakes Superior, Huron and Erie frozen over, with Lake Michigan about to join them. Lake Ontario does not freeze because it is deep, and upwelling brings warm water to disturb the colder surface. Yet, even so, ice is just

beginning to accumulate at the east end of this lake. You may need to refer to your atlas to find Lake Erie, as in this image it blends in with the frozen tundra!

Image: LANCE-MODIS/NASA/GSFC



Bouvet Island

The Loneliest Land on Earth

NASA Earth Observatory



Bouvet Island, imaged by NASA's Landsat-8 satellite on May 26, 2013
Image: Jesse Allen and Robert Simmon, using Landsat data from the USGS

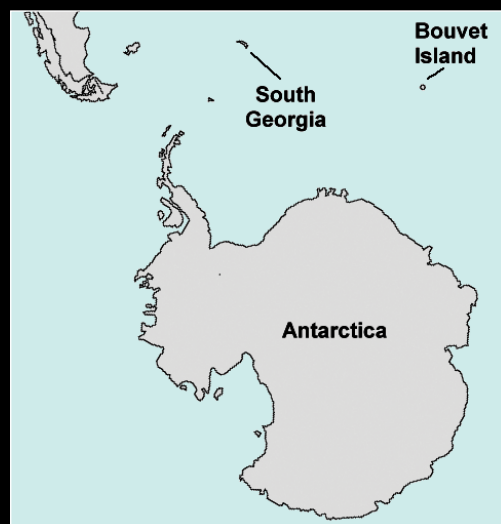
Located in the South Atlantic Ocean between Africa, South America and Antarctica, the uninhabited, 49 km² shield volcano of Bouvet Island is one of the most remote islands in the world. The nearest large land mass is the Princess Astrid Coast of Queen Maud Land, Antarctica—1,700 kilometres to the south while the closest habitation is on Tristan da Cunha, 2,260 km to the northwest.

On May 26, 2013, the Operational Land Imager on **Landsat 8** acquired this naturally coloured image of Bouvet Island. Permanent thick ice covers more than 90% of the island year round, the Christensen glacier on the north side and the Posadowsky glacier to the south. Although the ice reaches the coast as steep cliffs in many places, there are also

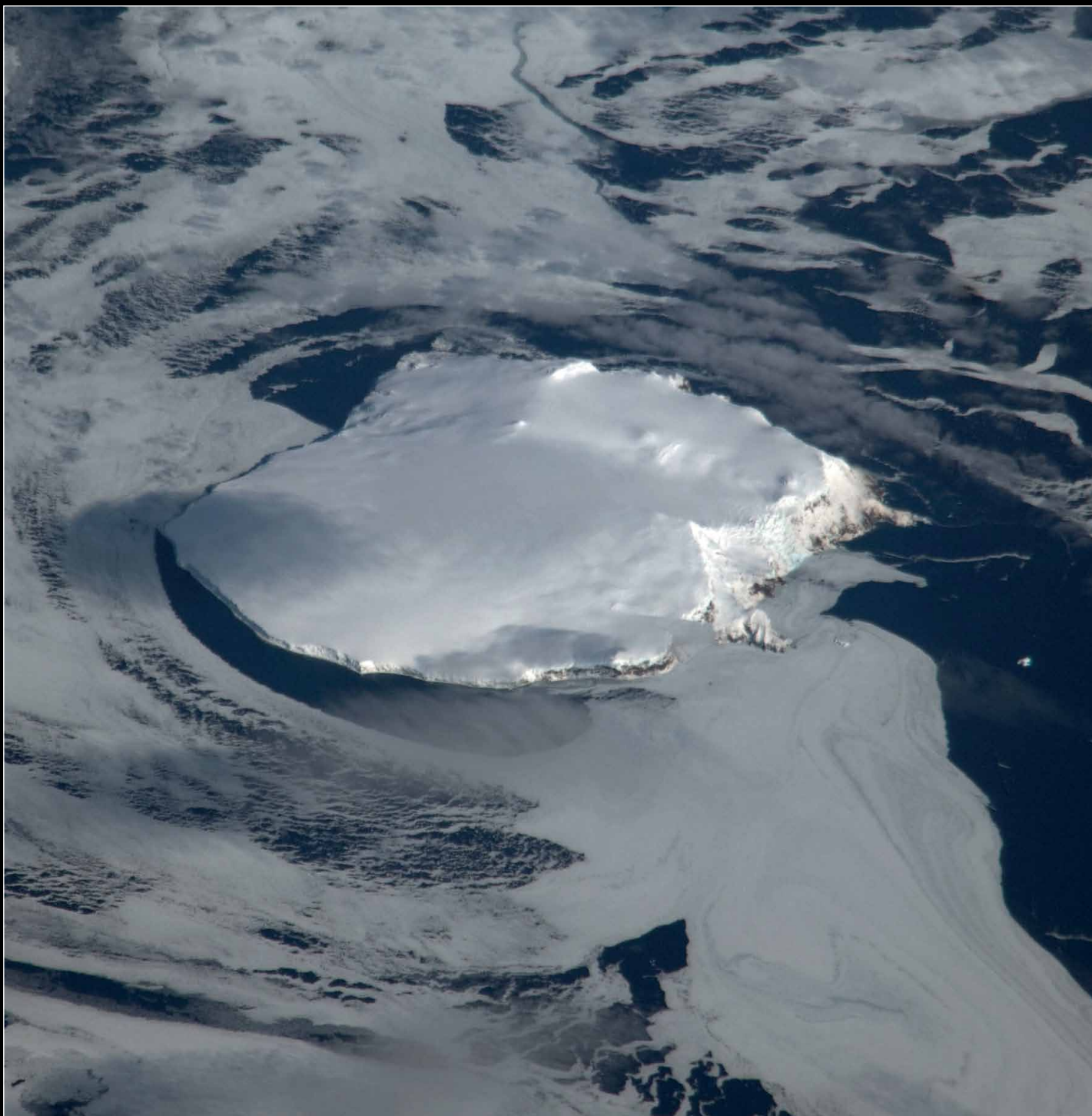
many beaches of black volcanic sand around the island.

The most prominent feature of Bouvet is the Wilhelmsplataet caldera, the large circular depression on its western side, which formed following a volcanic eruption when land collapsed into an empty magma chamber. The most recent eruption on Bouvet took place around two thousand years ago.

Bouvet island, the southernmost extension of the Mid-Atlantic Ridge, is located near the triple junction between the African, South American, and Antarctic plates. Its highest point is Olav Peak (780 m), which can be seen midway across the island near the northern coast casting long shadows into the caldera.



Location of Bouvet Island



This digital photograph, taken while flying westward over Bouvet Island, was acquired during ISS Expedition-17 on September 13, 2008.
 Credit: Astronaut digital photograph ISS017-E-16161 / NASA/JSC Gateway to Astronaut Photography of Earth

Although not particularly high, Olav's remoteness—and the fact that it had never been climbed—inspired filmmaker Jason Rodi to organise an expedition which successfully attained the summit of its broad, gently sloping cone in 2012. The prominent *Kapp Valdivia*, a cape on Bouvet's northern coastline, is a peninsula formed by a lava dome built from viscous lavas with a high silica content.

Bouvet Island was discovered by the French Captain Lozier-Bouvet in 1739 and was subsequently visited by representatives of different nations several times during the nineteenth century. The island was annexed by the Kingdom of Norway in 1927 following a Norwegian expedition's stay there. Bouvet is uninhabited, and its extremely harsh environment precludes anything but short-duration stays such as the manned weather station that was operated for two months during 1978 and 1979.

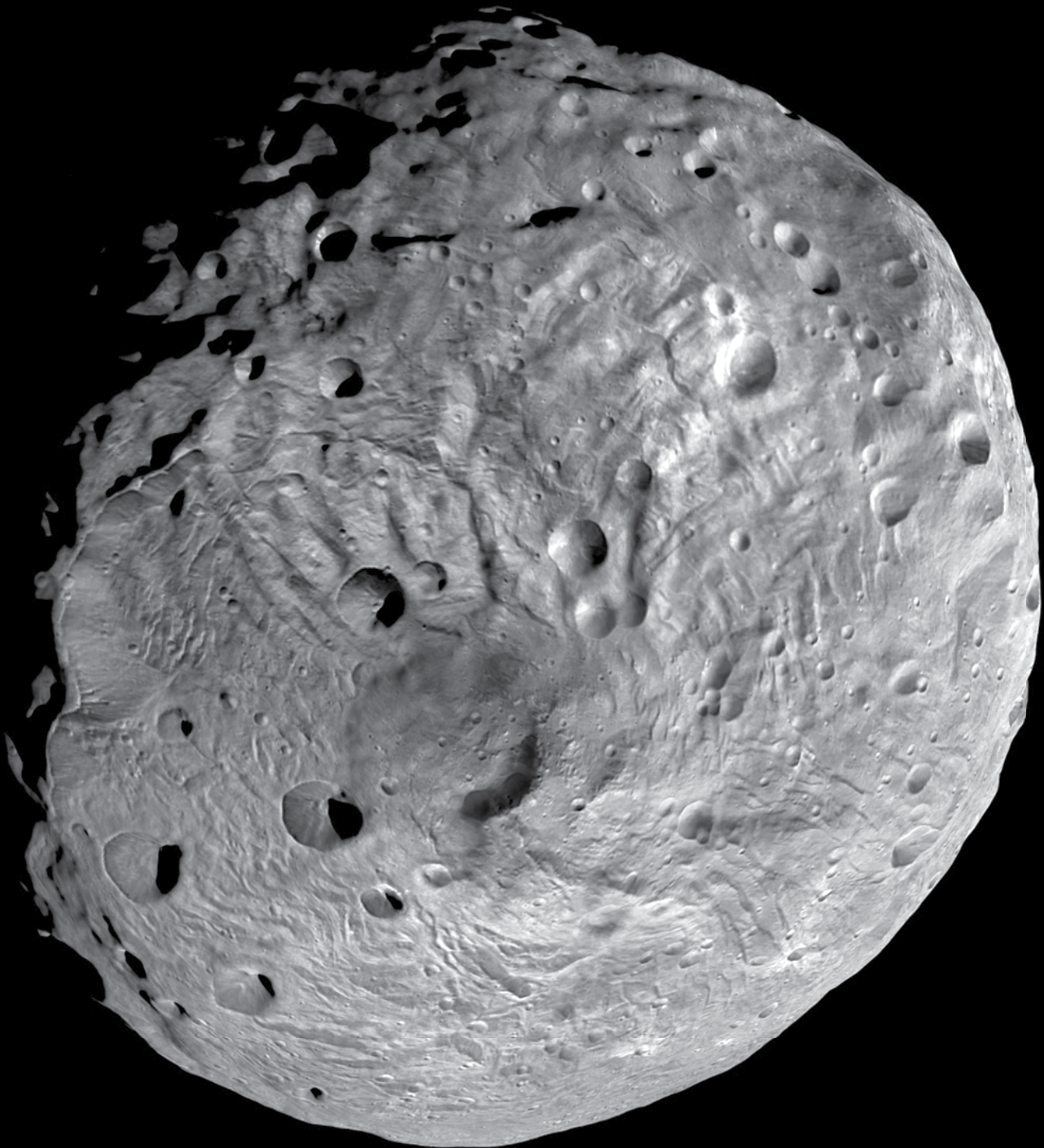
Since the 1970s, Bouvet Island has been frequently visited by Norwegian Antarctic expeditions, and in 1977 an automated weather station was constructed there. Nevertheless, the island does support some flora, though this is restricted to lichens, mosses and liverworts. Fauna consists almost exclusively of seabirds (the southern fulmar, numerous species of petrel and albatross and large breeding colonies of Macaroni, Chinstrap and Adélie penguins). The only non-bird species are the Southern Elephant Seal and Antarctic Fur Seal.

References

- 1 Bouvet Island, South Atlantic Ocean
<http://earthobservatory.nasa.gov/IOTD/view.php?id=35526>
- 2 A Thousand Miles from Nowhere
<http://earthobservatory.nasa.gov/IOTD/view.php?id=83203>

THE SOUTH POLE OF VESTA

NASA Dawn Mission News



This image, obtained by the framing camera aboard NASA's *Dawn* spacecraft, shows the south pole of the giant asteroid **Vesta**. Scientists are discussing whether the circular structure that covers most of this image originated during a collision with another asteroid or by internal processes early in the asteroid's history. The image was recorded when *Dawn* was 2,700 kilometres above Vesta, and has a resolution of approximately 260 metres per pixel.

The *Dawn* mission to Vesta and Ceres is managed by NASA's Jet Propulsion Laboratory, while UCLA has overall responsibility for the *Dawn* mission science.

http://www.nasa.gov/mission_pages/dawn/multimedia/pia14712.html

Parting the Sea to Save Venice

A NASA Earth Observatory Report

The sea has protected Venice since the fifth century, when people moved to the fish-shaped islands of Rialto for safety from mainland invaders. Over the next thirteen centuries, the seafaring city-state grew in power and strength. The art, architecture, and history amassed in the small 'floating city' of Venice has earned it a place on the UNESCO list of World Heritage Sites.

But the tide has turned, and the sea that once protected Venice now threatens it. Nestled in the Venetian Lagoon, the 118 low-lying islands of modern-day Venice are separated from the Adriatic Sea by a 45 kilometre chain of barrier islands. The Adriatic connects to the lagoon via three inlets—the Lido, Malamocco, and Chioggia.

The sea now imperils Venice because of three conflated issues: groundwater pumping and offshore gas drilling have caused the city to subside; sea level has been rising; and natural tidal protections like mud flats and marshes have been disrupted over the past century. River courses have been made rigid, inlets have been widened, and the lagoon has been dredged to create shipping channels; adjustments to make boating and shipping safer have helped make the land more vulnerable.

Venice now regularly experiences *Acqua Alta* (high water), when the tide inundates the streets and squares, menaces the historic architecture and forces citizens to don galoshes. In 1900, such events occurred ten times per year. Now, *Acqua Alta* happens more than 60 times annually.

In November 1966, two days of heavy rain coincided with high tides, a static low-pressure system and a severe *Sirocco* wind to drive two metres of water into Venice. The flood destroyed millions of dollars of artwork, wrecked businesses and left thousands of citizens homeless. The event prompted many people to think that the city was doomed unless some sort of intervention were made.

After decades of debate, construction on a major engineering project called MOSE began in 2003. The project acronym stands for *MOdulo Sperimentale Elettromeccanico* (Experimental Electromechanical Module), and alludes to the parting of the Red Sea by Moses. The concept behind MOSE is to temporarily separate the Venetian Lagoon from the Adriatic Sea when unusually high tides occur through a series of 78 gates that seal the lagoon's three inlets.

Each 300 tonne gate measures approximately 30 metres tall by 20 metres wide and 5 metres thick. During normal tides, each of these massive gates lies on a concrete foundation on the seabed with one end hinged to steel and concrete pilings. When high tide exceeds 87 centimetres above mean sea level, compressed air is pumped into the gates until they slowly pivot upwards, a process that takes about one hour. In a high-tide event, the gates will probably remain in place for four to five hours until the waters subside; then they will be filled with water and lowered back to their seabed berths.

The natural colour Landsat images above show some of the MOSE engineering efforts that are visible above the water-line near the Lido Inlet. Figure 1 was acquired on June 20, 2000 by the Enhanced Thematic Mapper+ on NASA's *Landsat-7* satellite; figure 2, from the Operational Land Imager on *Landsat-8*, dates from September 4, 2013.

In 2013, a curved breakwater stands just south of the inlet's southern jetty. On the lagoon side of the Lido Inlet, a new man-made island has appeared, housing the buildings and plants that operate the gates, which lie underwater in two arrays to either side



Figure 1
The Venice lagoon prior to MOSE developments, in 2000.

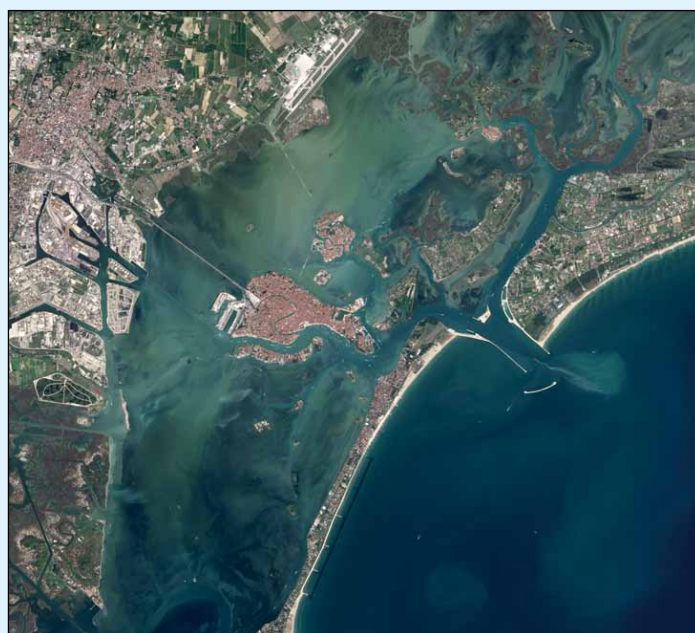


Figure 2
Some of the MOSE engineering efforts visible above water in 2013

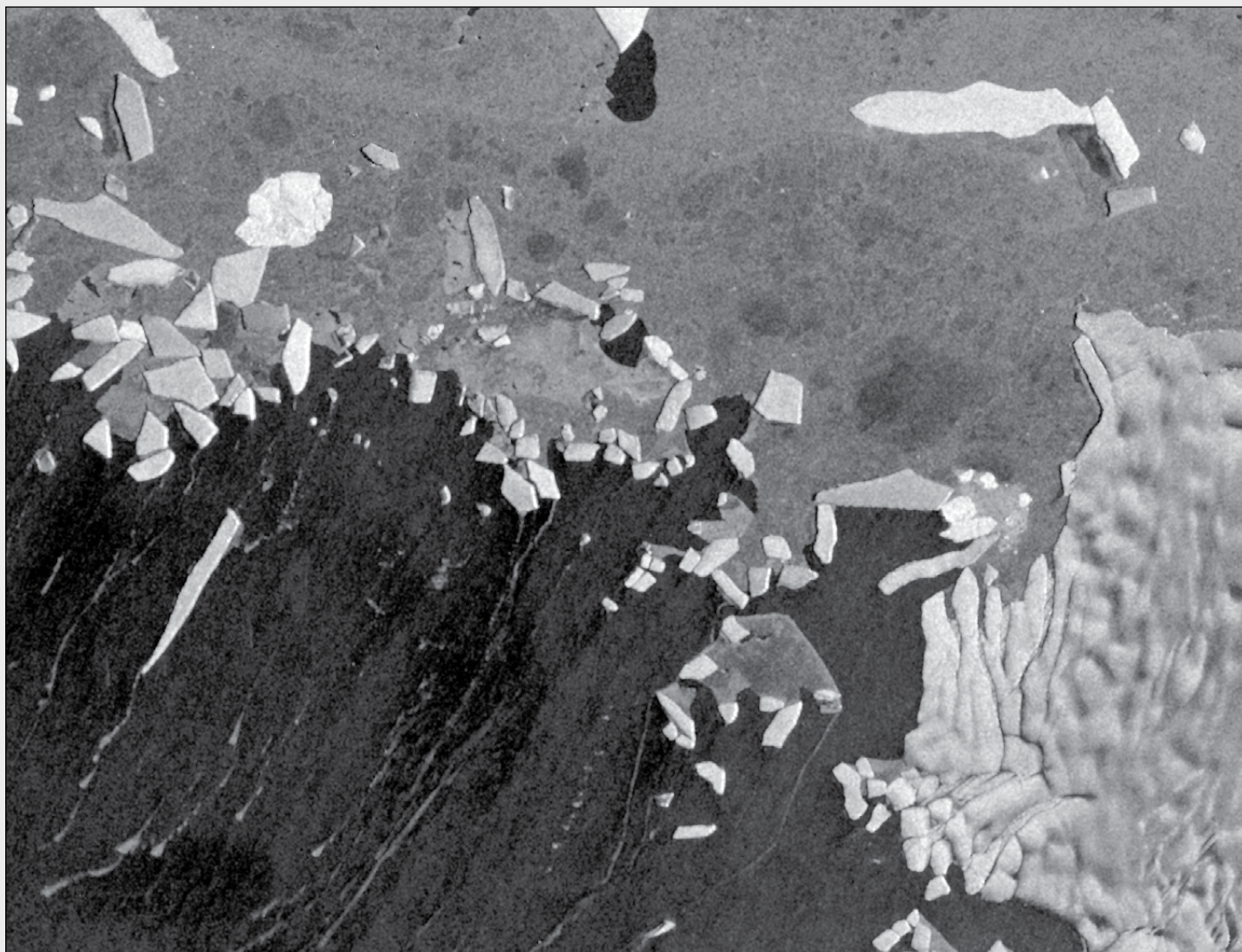
of the island. On the north side of the inlet, a man-made harbour for small vessels includes a small lock system that allows boats to pass from the lagoon to the sea when the gates are raised.

Since the beginning of MOSE construction, five million cubic metres of sediment have been excavated from areas adjacent to the lagoon's three inlets. The \$8.8 billion dollar project has encountered some scientific, environmental, and political objections about disrupting the natural water exchange between the lagoon and Adriatic.

NASA Earth Observatory images by Jesse Allen and Robert Simmon using Landsat data from the U.S. Geological Survey.

Sentinel-1A Images Pine Island Bay

A NASA Earth Observatory Report



Sentinel-1A, the first of two SAR satellites that the European Space Agency is adding to its fleet, launched successfully on April 3, 2014. Its twin, Sentinel-1B will orbit on the opposite side of Earth so that, between them, the two satellites can image the entire surface of the planet in six days. The satellites will be used to map sea ice and glacial ice, monitor the wind and waves on the ocean, and detect changes in the shape of the land. SAR instruments are useful for disaster mapping since they can see oil slicks on the ocean's surface, floods through clouds, and the deformation of the ground after a landslide or earthquake.

Sentinel-1A carries an advanced synthetic aperture radar (SAR) instrument, which makes it particularly well-suited for measuring ice. Unlike passive instruments that simply record reflected or emitted energy, SAR instruments actively direct their own energy, in the form of microwaves, towards Earth's surface, then measure those waves that are reflected back. Because microwaves are not impeded by clouds, SAR can acquire images at any time of the day or night, and through clouds: so SAR can image the ground even on a cloudy day.

The image presented here is one the first acquired by Sentinel-1A, and was received just ten days following launch, before the satellite had actually reached its final operational orbit. In this image, bright

icebergs spread across Pine Island Bay, resembling shards of broken glass. The 'bergs appear to be crumbling off the snout of Thwaites Glacier, one of the fastest-moving glaciers in Antarctica, a small part of which is visible at lower right of the image.

Differences in brightness in this image are an indication of how well different ice surfaces reflect microwave energy. Sea ice contains inclusions of seawater, which scatter the microwave energy so that relatively little is returned to the satellite. As a result, sea ice is dark. Glacial ice from Antarctica—and this includes the icebergs that break off from it—is composed of compacted snow. Air bubbles trapped in this ice reflect microwave energy extremely well, with the result that much more of the microwave signal makes it back to the satellite: thus this ice appears bright. Open water absorbs the radar signal, so it appears black.

The reflected microwaves also show the structure of the ice surface. The glacier—essentially a densely packed river of ice—is bumpy and cracked. The sea ice is blotchy, with dark-colored thin patches and brighter veins of thicker ice. A brush of gray on the water hints at a very thin layer of ice forming as cooler autumn temperatures come to Antarctica.

Image ©2014 European Space Agency (ESA)

Currently Active Satellites and Frequencies

Polar APT Satellites			
Satellite	Frequency	Status	Image Quality
NOAA 15	137.6200 MHz	On	Good
NOAA 18	137.9125 MHz	On	Good
NOAA 19	137.1000 MHz	On	Good / [1]
Meteor M N1	137.1000 MHz	Sporadic	[1]

Polar HRPT/AHRPT Satellites				
Satellite	Frequency	Mode	Format	Image Quality
NOAA 15	1702.5 MHz	Omni	HRPT	Weak
NOAA 16	1698.0 MHz	RHCP	HRPT	Good
NOAA 18	1707.0 MHz	RHCP	HRPT	Good
NOAA 19	1698.0 MHz	RHCP	HRPT	Good
Feng Yun 1D	1700.4 MHz	RHCP	CHRPT	None: Device failure
Feng Yun 3A	1704.5 MHz	---	AHRPT	[2]
Feng Yun 3B	1704.5 MHz	---	AHRPT	[2]
Feng Yun 3C	1704.5 MHz	---	AHRPT	[2]
Metop A	1701.3 MHz	RHCP	AHRPT	Good
Metop B	1701.3 MHz	RHCP	AHRPT	Good
Meteor M N1	1700.0 MHz	---	AHRPT	[2]

Geostationary Satellites				
Satellite	Transmission Mode(s)		Position	Status
Meteosat 7	HRIT 1691 MHz / WEFAX 1691 MHz		57.5°E	On
Meteosat 8	HRIT (digital)	---	3.5°E	On [3]
Meteosat 9	HRIT (digital)	LRIT (digital)	9.5°E	On [4]
Meteosat 10	HRIT (digital)	LRIT (digital)	0°W	On
GOES-12	GVAR 1685.7 MHz	---	60°W	On
GOES-13 (E)	GVAR 1685.7 MHz	LRIT 1691.0 MHz	75°W	On [5]
GOES-14	---	---	105°W	Standby
GOES-15 (W)	GVAR 1685.7 MHz	LRIT 1691.0 MHz	135°W	On [5]
MTSAT-1R	HRIT 1687.1 MHz	LRIT 1691.0 MHz	140°E	Standby
MTSAT-2	HRIT 1687.1 MHz	LRIT 1691.0 MHz	145°E	On
Feng Yun 2D	SVISSR	LRIT	86.5°E	On
Feng Yun 2E	SVISSR	LRIT	104.0°E	On
Feng Yun 2F	SVISSR	LRIT	112.0°E	On

Notes

- 1 LRPT Signals have been reported from Meteor M N1 but are sporadic with periods off. This satellite's carrier frequency can cause interference to NOAA 19 when the two footprints overlap.
- 2 These satellites employ a non-standard AHRPT format and cannot be received with conventional receiving equipment.
- 3 Meteosat operational backup satellite
- 4 Meteosat Rapid Scanning Service (RSS)
- 5 GOES 13 and GOES 15 also transmit EMWIN on 1692.70 MHz

**Follow GEO on
Twitter and Facebook**



Receive the latest news from EUMETSAT, ESA, NOAA, NASA, and the Met Office etc. through their Twitter feeds ...

<http://twitter.com/geowebuk>



facebook

Visit GEO on facebook and link to dozens of news items from NOAA, NASA, ESA, EUMETSAT and much more ...

<http://www.facebook.com/groupforearthobservation>

Cover and Full Page Image Details

Front Cover

After months of dreary winter stormy weather, high pressure finally reached western Europe in early March. This splendid image showing the Iberian peninsula completely free of significant cloud was acquired by the MODIS instrument aboard NASA's **Terra** satellite on March 8.

Image: LANCE-MODIS/NASA/GSFC

Inside Front Cover

Mike Stevens sent in this 12:55 UT **NOAA 19** image from April 15, showing the UK enjoying a largely sunny day. The image was particularly interesting to your Editor, who spent that day walking from Valthe to Exloo in the Dutch province of Drenthe. Broken cloud can be seen forming over the North Sea and sweeping southwards over the Netherlands. It proved an interesting day: very breezy, and alternatively sunny and overcast in 5- to 15-minute spells, with the cloud sweeping past rapidly and producing the occasional short, sharp shower.

Image © EUMETCAST 2014

Inside Back Cover

It's May 3, the Saturday of the May Day holiday weekend, and the weather is kind to England. A weak Atlantic depression lurks to the west in this afternoon image from **NOAA 19**, as parts of the country bask in temperatures of 20°C.

Image: NOAA Class Archive

Back Cover

NASA's **Terra** satellite captured this fascinating cloud pattern over the remote Indian Ocean island of Kerguelen on May 21, 2014.

Page 9

André T'Kindt acquired this attractive APT image of the eastern Atlantic from the 14:14 UT **NOAA 19** pass on April 8 this year.

Page 21

This remarkable image of Europe on a clear, largely cloud-free night, was acquired by the **Suomi-NPP VIIRS Day-Night Band** at 01:30 UT on March 13, 2014. In addition to the lights of cities, illumination from the Moon allows one to visualise cloud and snow on the Alps. Besides the city lights of all the larger cities and towns, it is also possible to distinguish some of the land features (such as the Alps) or clouds, illuminated by an almost full Moon.

Image: Martin Setvak, Czech Hydrometeorological Institute (CHI)

Page 29

Mike Stevens provided this revealing NOAA-19 image from May 23 this year showing the Caspian and Aral seas. It appears that the eastern lobe of the Southern Aral Sea has now totally dried up, a shocking revelation.

Image © EUMETSAT 2014

Testing the TBS6925 Digital Satellite TV Tuner Card

for future EUMETCast DVB S2 VCM transmissions

Mike Stevens

This is not an article recommending you to go out and buy this unit. It's not an article saying this is the best thing since sliced bread. I'm not even saying this is going to work. This is simply about trying to keep alive a hobby that I and many others enjoy. I felt, rightly or wrongly, that there was just not enough information forthcoming to allow me to decide on which direction to go. Our friend, David Taylor, has been testing a unit that sounded complicated by its nature to link into the Network, and at a price of around £400 which I felt was going to be beyond the pockets of many members.

So I decided to make some investigations of my own, contacted the **TBS Technologies** ^[1] company in Singapore, and started a dialogue with them regarding how I could receive these new *EUMETCast DVB-S2 VCM transmissions*. TBS they were very helpful, and told me the problems that had been passed to them. That's how I came in contact with our friend in France, Jean-Pierre, who had been testing two products from the company for several months: the *TBS-5925 USB Box* and the *TBS-6925 PCI Card*. Jean-Pierre had put in a lot of work and had a lot of success, especially with the PCI card.

I emailed Jean-Pierre several times and he sent me a lot of useful information which proved very helpful, and it was at that point that I decided to try the PCI card. I decided to volunteer my services to TBS in testing a *TBS-6925 card* here in the UK, and I was prepared to take a gamble and pay for a unit; but to my surprise, they offered me a unit free of charge to test provided I kept them informed of my progress and reported any problems with DVB-S and DVB-S2. I agreed of course. It was an amazing opportunity.

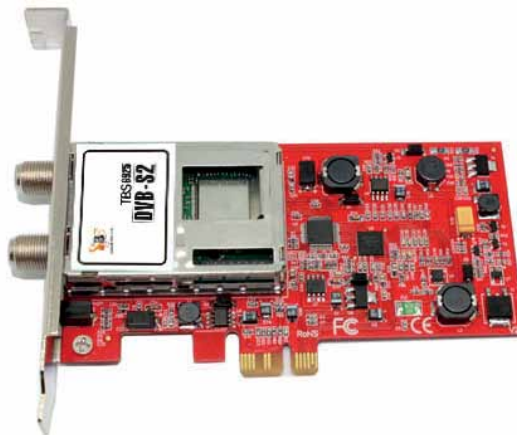
The unit was promptly dispatched by *Singapore Post* and took seventeen days to reach me. I had to pay VAT of £3.58 + £8.00 Overseas Handling Charge because the card came from outside the EU Zone; so I paid the money at the Post Office and was given my parcel.

The unit was well packed and was wrapped in anti-static bag. I was particularly pleased to find that the unit came with an extra mounting bracket so that it could be fitted into the latest small tower computers. In my case, I left the original mounting bracket on as it was going into a standard size PC—so a good start.

My first installation was into my *Windows XP PC* where it proved very easy to fit. Once in place it was a case of loading the software, which I noted to be the latest release dated February 2014, the same version as Jean-Pierre had sent me. I loaded it and it worked fine, but I have to say that you do need at least 4 GB of RAM to have all your *Satsignal* software running.

Next, I tried the card in my *Windows 7 PC* and installed everything again in the same way as before. No problems were encountered as all the software was installed. Set-up was easy, and on this PC I have 8GB of memory, so there were no problems running all programs.

So far, with DVB-S transmissions, the card is working very well. I have been monitoring for loss of segments but there are none. And as far as loss of Packets is concerned, and there are a lot fewer Packets lost using the *TBS-6925* than with my *DVB World* unit, so that's a bonus. I was able to run MSG Data Manager, Metop A/B and MODIS plus all the world Satellite Data with no problems. One other point is that the *Quality and Signal Strength* on the *TBS-6925* are far better than with my *DVB World* box, both well up.



The illustration above shows the *TBS-6925 card* and the one below the unit installed into the PC.



The final question is: 'will this card work with the new transmissions from EUMETCast on DVB-S2'? That, of course, is the final test, and what all my efforts have been about. Since I installed the TBS-6925 into my Windows 7 PC, the company advised me of two software updates, which I installed—and the new up-dates have worked with no problems. The guys in Singapore advised me that all the problems were software based and **not** due to the hardware, and they are keen to sort out problems very quickly.

I was told to be careful not to mislead readers, because a TBS unit tested by EUMETSAT had failed, but that was before the software up-dates and that's no longer the case. Of course, what I have described are only my test results. You must draw your own conclusions. I am sure that between JP, Ernst and myself, one of us will succeed in getting this unit to work and give the members a unit to receive the new transmissions that will cost below £200. That is certainly what we are aiming for.

I hope my next article, which will be a lot more descriptive than this one, will contain all the information on receiving the new transmissions in DVB-S2, as we need an alternative to the expensive models that are being recommended by EUMETSAT at the moment. All we need is a receiver that will receive the Basic Service. If this does not work then we shall have to look around again. Whichever way this goes, I will let readers know.

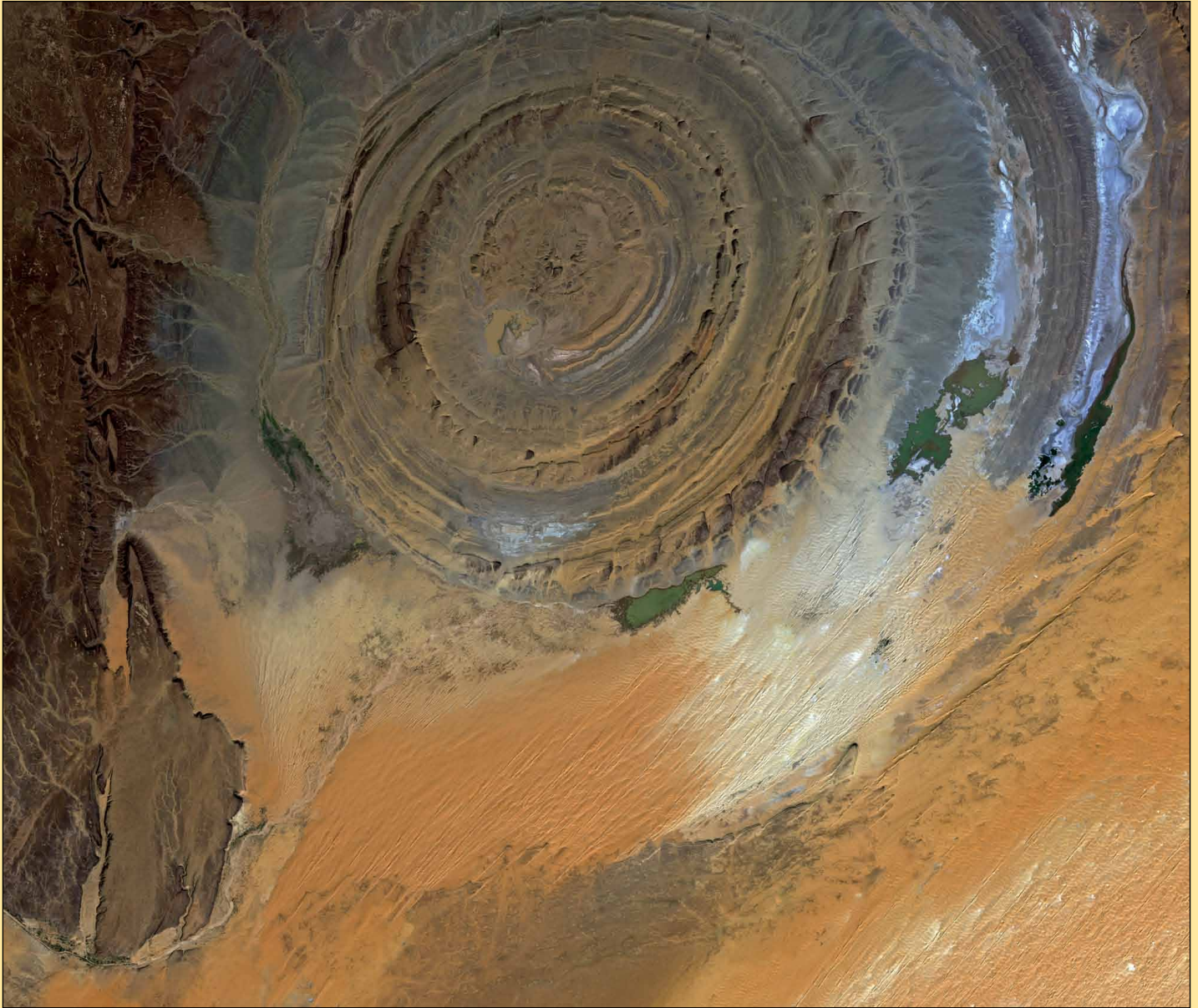
Reference

1 TBS Technologies - <http://www.tbsdtv.com/>

The Richat Structure

Earth's Amazing Bulls-Eye

John Tellick



This image, acquired by the Advanced Visible and Near Infrared Radiometer on Japan's **ALOS** satellite on November 23, 2010, shows the 40 kilometre diameter **Richat Structure**, a giant, geological wonder located in the Sahara Desert of Mauritania. Easier to observe from space than from the ground, this bulls-eye feature has been a familiar landmark to astronauts since the earliest missions, having first been observed from space by Gemini-4 astronauts James McDivitt and Ed White in June 1965.

Initially interpreted as the result of an asteroid or meteorite impact because of its high degree of circularity, the structure is now known to be a highly symmetrical and deeply eroded geologic dome. Concentric bands of resistant quartzite rocks form ridges, with valleys of less-resistant sedimentary rock between them. Despite extensive field and laboratory studies, no credible evidence has been found for the shock metamorphism and deformation that would be indicative of an extraterrestrial impact.

The dark area on the left of the image is part of the Adrar plateau of sedimentary rock which stands some 200 metres above the surrounding desert sands. A large area covered by sand dunes, called an erg, can be seen at lower right, while sand can be seen encroaching into the structure's southern side. On the southern side of the bulls-eye, can be seen individual trees and bushes as tiny dots. These follow a river-like structure that appears to have been dry when this image was acquired, a few weeks after the rainy season. Some areas to the south and east of the Richat appear to be covered with temporary lakes, which are dry for most of the year.

This geological feature will be very familiar to members who regularly download EUMETCast NOAA-19, and Metop imagery—though not in such high resolution. It joins the equally familiar feature of the Manicouagan meteor impact site in Quebec, especially visible under snow in winter.

Image © JAXA/ESA

The Sun - Our not so quiet Neighbour

Interference in APT signals due to Solar Flares

Raydel Abreu Espinet, CM2ESP
cm2esp@gmail.com

When radio enthusiasts talk about solar activity and its effects, people usually think about High Frequency Radio. So, by consequence, we usually don't pay too much attention to its impact on VHF and satellite downlinks. However, our closest star may have one or two surprises waiting for us, as we are going to find out in the rest of this short article.

But first, let's take a very short solar astronomy overview. From time to time, small dark areas are seen on the solar disc. These areas are sunspots, temporary phenomena, produced by high magnetic activity within the sun's photosphere, and creating areas of reduced surface temperature^[1]. When the energy stored in twisted magnetic fields above a sunspot is suddenly released, a huge explosion occurs on the Sun, producing a Solar Flare, accompanied by a burst of radiation over a very wide range of the electromagnetic spectrum (from radio waves up to X-rays and Gamma radiation).

X-Ray flux monitors installed in the GOES satellite fleet maintain a record of the flux of these X-Rays and allow scientists to classify them^[2]. Radio-astronomers also detect and study those emissions in the radio bands with radio-telescopes. But this radio emission is strong at low frequencies and decrease gradually at higher frequencies. That's why, at relatively high frequencies (above 100 MHz), more gain is required to observe these events, and radio-telescopes usually use big Yagi antennas phased together for VHF/UHF and parabolic dishes for gigahertz ranges. But particular very severe flare events can be strong enough to be detected with simple equipment, and can in some cases even disrupt and badly affect communications here on Earth.

Flare

During March 29, 2014 at 17:44 UT, I started to record a 12° NOAA-19 pass to the east of my location, using a homebrew QFH antenna in conjunction with an old preamp and a RTL-SDR dongle running the SDR# software (figure 2). Just a couple of minutes into the pass I noticed a huge increase in the noise coming from the received audio. At first I thought this was fading due to an obstruction in the line of sight—maybe due to a nearby building.

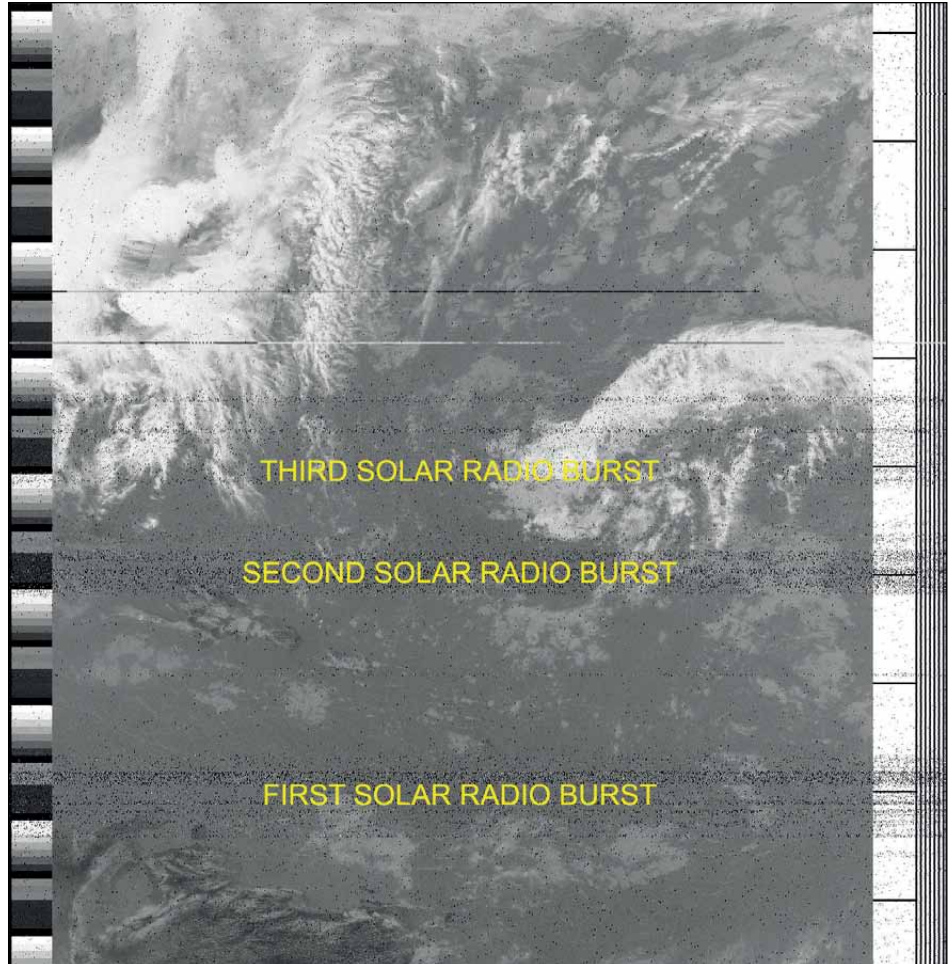


Figure 1 - The decoded NOAA-19 audio and resulting picture, in this case showing only the IR Channel 4. The three solar radio bursts which affected the image are indicated.

However, after checking the SDR# window, it was clear that the satellite signal was still strong, around -10 dB, a normal value comparable with many previous recorded passes. But the noise floor was between 12 dB and 15 dB, higher than the usual -50 dB.

Making use of SpectrumLab^[3] audio spectrum analyser software, the incoming audio was studied: it showed no signs of the common 60 Hz AC noise that sometimes occurs in highly populated urban areas such as where I live. A few seconds later, the noise decreased a little bit, only to return again a couple of minutes

later. Again, there was no evidence of AC noise, and a quick inspection of the real-time picture recording in WXtoImg (figure 1) showed interference bands, but not with the typical characteristics of the noise produced by internal combustion engines from cars and motorcycles.

So, a little bit baffled after a third noise surge occurred several seconds after the second one had subsided, I continued the recording, regretting the bad luck of having a noisy picture without explanation.

Nearly fifteen minutes later, while checking my emails, I noticed an alert

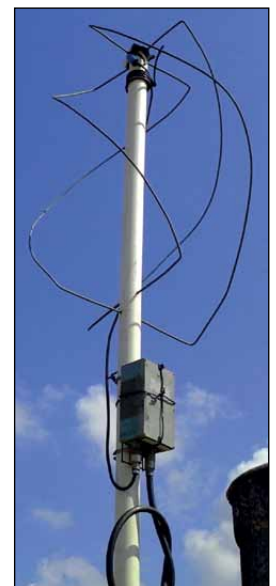


Figure 2
A homebrew QFH antenna and its 136-138 MHz band preamp attached.

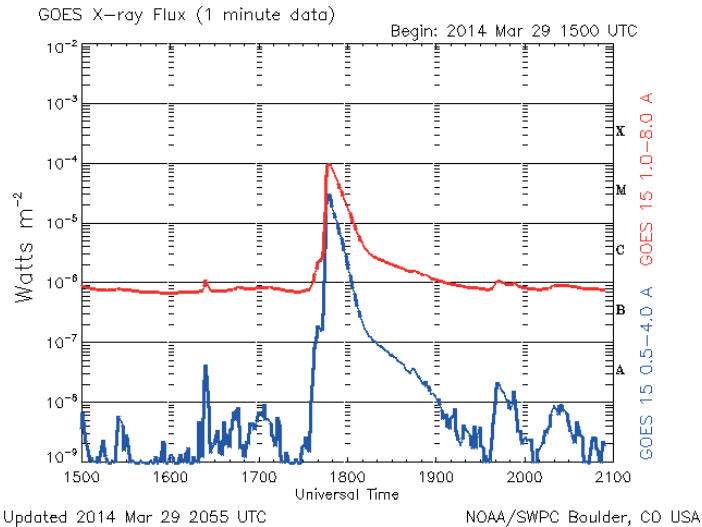


Figure 3

A 6 hour 1-minute data of the X-Ray flux measured by GOES-15. This shows an X1 event with a maximum at 17:48 UT
Image Credit, NOAA.

issued by NOAA’s Space Weather Prediction Center (SWPC) email service to which I am subscribed [4]. This informed of an X-Ray event in excess of M5 detected by the GOES-15 observatory. Being intrigued by such a coincidence, I quickly checked the real-time X-Ray plot from SWPC [5]. The graphic clearly showed that an X1 Event had occurred, reaching a maximum at 17:48 UT. The noise that appeared in my image at 137.100 MHz fitted well within the time range (figure 3).

So now, without doubt, it was clear that the noise that badly affected the received picture quality from NOAA-19 was produced by a solar radio burst [6], an important reminder that our nearest star is not a passive neighbour, and can sometimes affect the satellite downlink when we less expect it.

Usually, for amateur radio-astronomy, a very wide AM demodulator is used without automatic gain control. But there is currently no method to predict the occurrence of a solar flare. Therefore, this particular event was only detected with less efficient conditions because it incredibly strong at VHF frequencies, and happened while a satellite pass was being recorded.

Further Studies

In order to be able to extract some more information about this solar radio emission event, I tried to develop a method to study the demodulated audio from the NOAA-19 FM transmission.

Considering that a strong FM signal when demodulated has some frequency components which are ‘quiet’ in the specific regions where signal audio is not present. If there is a way to remove the satellite audio components from the recording, then the quiet sections represent the normal satellite signal and the ‘noisy’ parts are proportional to the decrease in the signal to noise ratio of the incoming signal and therefore equivalent to the increase of solar radio emission.

Now, with a plan of action identified, the audio recording made by *WXtoImg* was processed by the free audio editing tool *Audacity* [7]. A notch filter on 2400 Hz was applied in order to remove the video information from the signal. The filter was as wide as required to remove also the sync pulses from both transmitted channels. The resulting signal contained only the frequency components between the range of 0-1200 Hz and 4000-5000 Hz. The upper limit of 5000 Hz is imposed by the *Nyquist-Shannon* sampling theorem [8] because the recording sample rate of *WXtoImg* was 11025 Hz. An additional amplification of the resulting audio was done to boost the peak amplitude up to -1.5 dB to enhance the audio features (figure 4).

Now, using only the relevant parts of the recording, the audio was played while a simple but yet very useful tool for amateur radio-astronomy named *Radio SkyPipe* [9] from RadioSky Publishing was used to record the audio mixer output. The recording from *SkyPipe* produced a graphic consisting of 8 data samples per second, each sample corresponding to the average of 5 measured values of mean audio amplitude at an interval of 25 milliseconds (figure 5).

The analysis of the graphic shows three peaks from the main solar radio burst event. The studied burst shows a peak maximum near 17:46:20 UT. Two spikes from local noise sources are also present but they are unrelated to the solar event.

But was it a really strong event? The answer is yes, as shown in the following table compiled by NOAA’s SWPC and sent by its email services [4]. The event in question is clearly

Continued on page 19

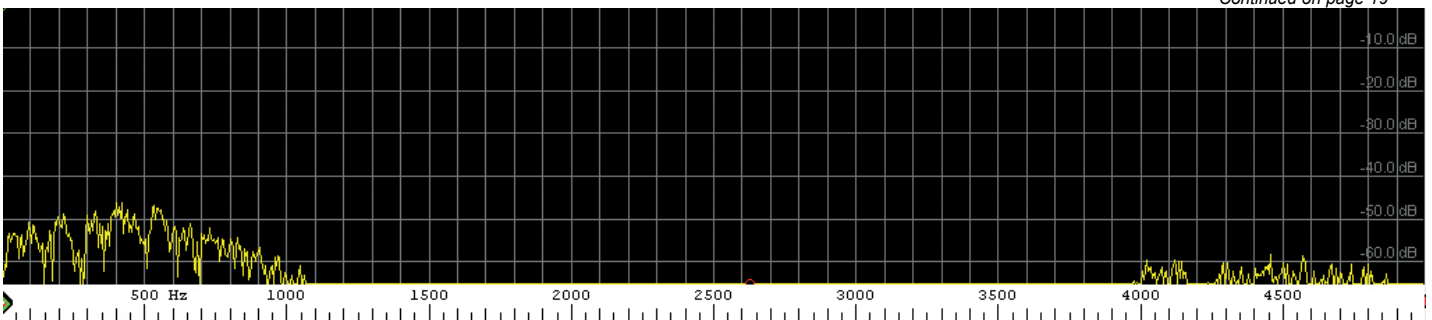


Figure 4 - The filtered audio after removing most of the satellite signal in *SpectrumLab*

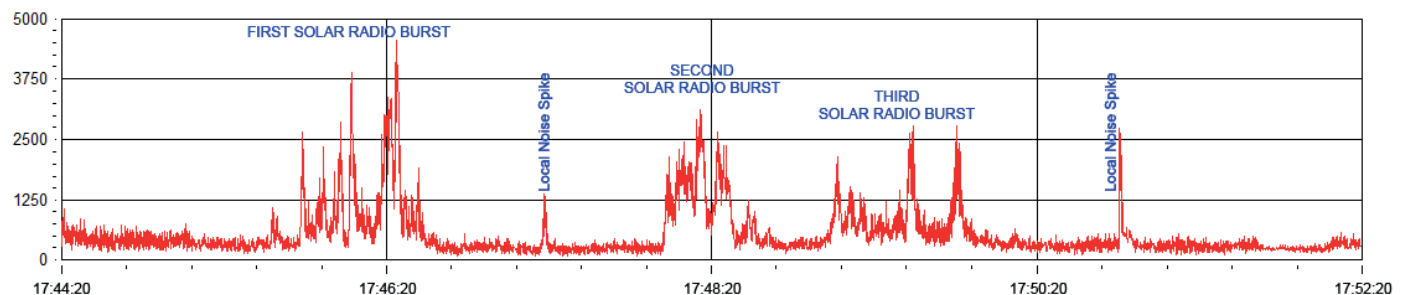


Figure 5 - The graphic from Radio SkyPipe. Three major solar bursts are easily identified. There are also two spikes related to local noise sources.

Somerset Levels Under Water

An edited NASA Earth Observatory Report



Image 1 - Flooding around the River Parrett immediately southeast of Bridgwater on February 16, 2014.

The Somerset Levels, a low-lying tract of land in southwestern England stands just a few metres above sea level: in fact, some of the lowest areas actually dip below sea level. A natural marshland, the Levels have been drained and reclaimed for agriculture since at least the Middle Ages, but predominantly in the 18th and 19th centuries. However, the marshy character of the land still reasserts itself on occasion.

During the three month period from December 2013 till February 2014, a series of storms dropped 632 millimetres of rain on southern England, the wettest winter since records began in 1910. Since January, both the River Parrett and River Tone have spilled over their banks and flooded large areas of the Levels, and by mid-February an estimated 17,000 hectares (66 square miles) and 150 homes had been swamped.

The Advanced Land Imager (ALI) on NASA's *Earth-Observing-1* satellite acquired image 1 on February 16, 2014; image 2 shows the Somerset Levels as seen by *Landsat-8* on November 4, 2013.



Image 2 - This image shows the same stretch of the River Parrett as it appeared before the flooding, on November 4, 2013.

On February 16, brown, sediment-laden water covered large tracts of farmland just to the southeast of the town of Bridgwater—which remained dry, but villages such as Moorland, Westonzoiland, Burrowbridge and Othery were wholly or partially flooded and accessible only by boat. Neither the *King's Sedgemoor Drain*, an artificial channel which diverts overflow from the River Cary into the River Parrett, nor pumping efforts by the authorities were able to stem the rising waters enough to prevent severe flooding.

Although the Somerset Levels have a long history of flooding, this latest episode has re-ignited a debate about the usefulness of dredging, a process that involves deepening and widening river channels by removing silt. Some observers argue that dredging the river more regularly would prevent damaging floods from occurring. Others say that regular dredging does little to prevent floods, causes ecological damage to ecosystems, and is too expensive to pursue.

NASA images by Jesse Allen and Robert Simmon, using EO-1 ALI data provided courtesy of the NASA EO-1 team and Landsat data from the U.S. Geological Survey.



From Soggy, to Foggy, to Hazy, Polluted and Dusty

in Southeast England

John Tellick

It seems that the British have a considerable preoccupation with the weather—always a topic of conversation. This is quite understandable given the fact we can experience '4 seasons in a couple of days' owing to our location.

Britain is of course an island, with the vast Atlantic Ocean to the southwest, the Arctic not that far away to the north and the land mass of continental Europe to our south and east. The direction from which the wind arrives influences our temperatures—both in winter and summer—considerably.

Considering 'how far north' we are, winter temperatures are higher than one might expect given our latitude, thanks to winds from the warm mid Atlantic and the influence of the Gulf Stream. And summers can be fairly benign. However, should a north easterly or easterly wind arrive in winter, the temperatures plummet, especially if the wind comes 'straight out of Siberia.' In summer, with south easterly to southerly winds, the temperature can soar.

The Wettest Winter

Having just experienced the wettest winter on record, and perhaps the stormiest, with 30 storms from mid November to March (15 of them severe) thanks to the jet stream 'being in the wrong place', March suddenly turned into early summer. Temperatures reached 20°C in the southeast on several days as a large area of high pressure developed over Europe as the jet stream at last moved to the northwest, keeping Atlantic depressions at bay (figures 5,6).

At this time of the year, the seas around Britain are still cold, and sea mist can be quite common during a period of settled warm weather. This was the case for several days in early March, leading to a big difference in temperature between the coast and just a few miles inland. I was down on the East Sussex coast on March 14 when, just a few miles inland, it was sunny with clear skies and the temperature a comfortable 17°C. However, on Hastings seafront it was cold, dismal, windy and very foggy with a temperature of only 7°C.

The sea mist along the coasts of East Anglia, Belgium, Netherlands and both sides of the English Channel in early

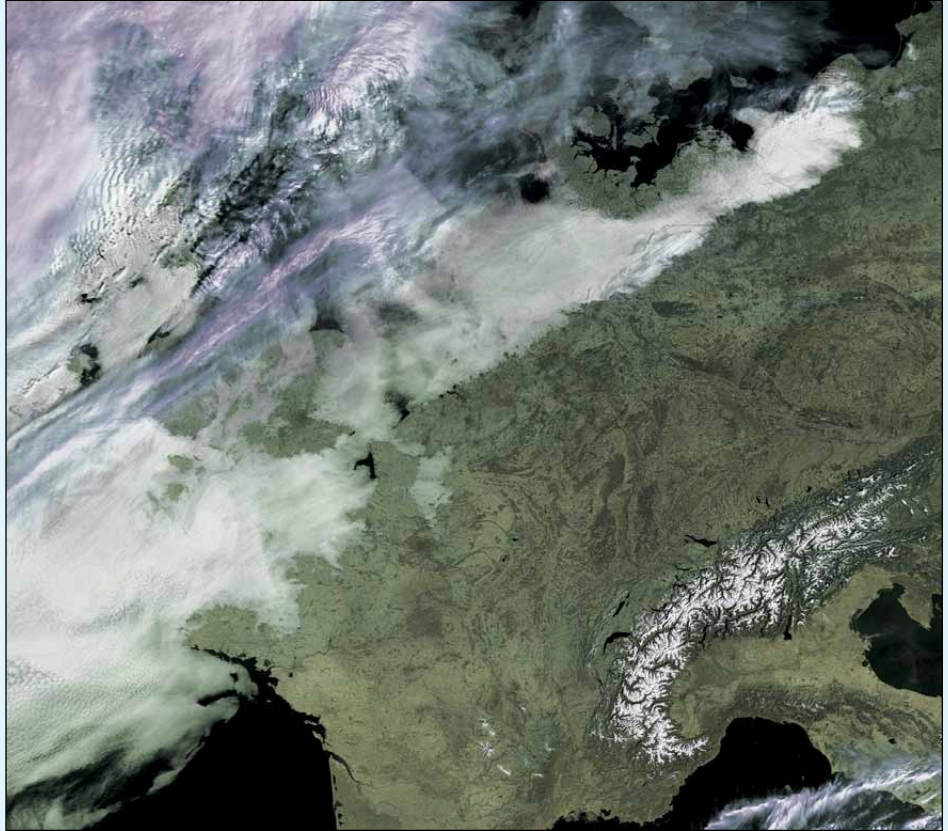


Figure 1 - A Metop-A image from March 14 showing coastal fog bordering the English Channel

March shows up well on the Metop satellite image above (figure 1) with regions with clearer skies just inland. It's interesting to compare this image with one from a similar latitude across the Atlantic in Canada's Newfoundland, Ottawa and Labrador provinces which were still in the grip of winter (figure 2).

Air Pollution

Moving on a couple of weeks, we found the warm settled conditions in south and southeast England leading to local air pollution and poor air quality.

This situation was compounded by pollution from the near continent—Germany, Holland and Belgium—blown in on an easterly airflow. Added to this, dust from the Sahara, generated by high winds over the desert, was blown across western Europe by south-southeasterly winds. The outcome was that London and many parts of southeast England suffered severe levels of pollution and poor air quality for several days, while motorists found their cars covered by a layer of Saharan dust, particularly following light showers of rain.

A EUMETSAT image from March 29 (figure 3) shows the origin of the Saharan dust storm, while the DEFRA/Met Office image (figure 4) shows the air quality indexes.

March temperatures in southeast England were considerably above the seasonal average during the day but, with clear skies at night, some areas experienced frost and foggy mornings.

A brief period of seasonally average temperatures followed till the region again experienced a couple of weeks of sunny weather in early April, though some days were tempered by cold northeast and easterly winds. Owing to reduced ozone levels in the atmosphere, sun worshippers were warned of high UV radiation levels—unusually so for this time of the year.

In southeast England, bluebells were most profuse and beautiful in woods and gardens a full month earlier than normal.

Is it any wonder 'the weather' is such a topic of conversation?

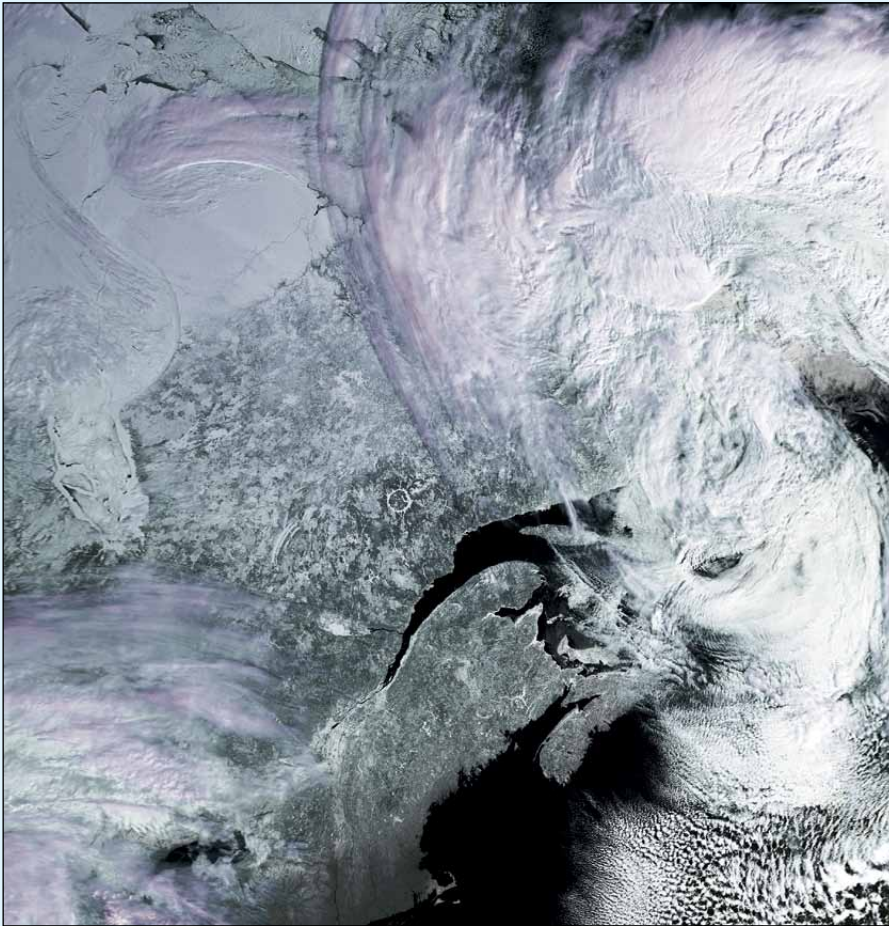


Figure 2 - A Metop-B image from March 27 showing eastern Canada and the USA still firmly in winter's icy grasp.
Image © EUMETSAT 2014

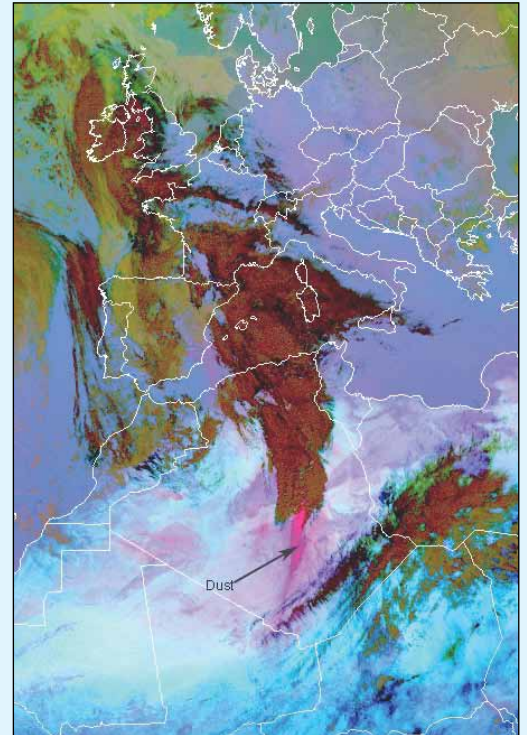


Figure 3 - A Meteosat imulti-channel image showing the dust blowing from the Sahara on March 29.
Image © EUMETSAT 2014

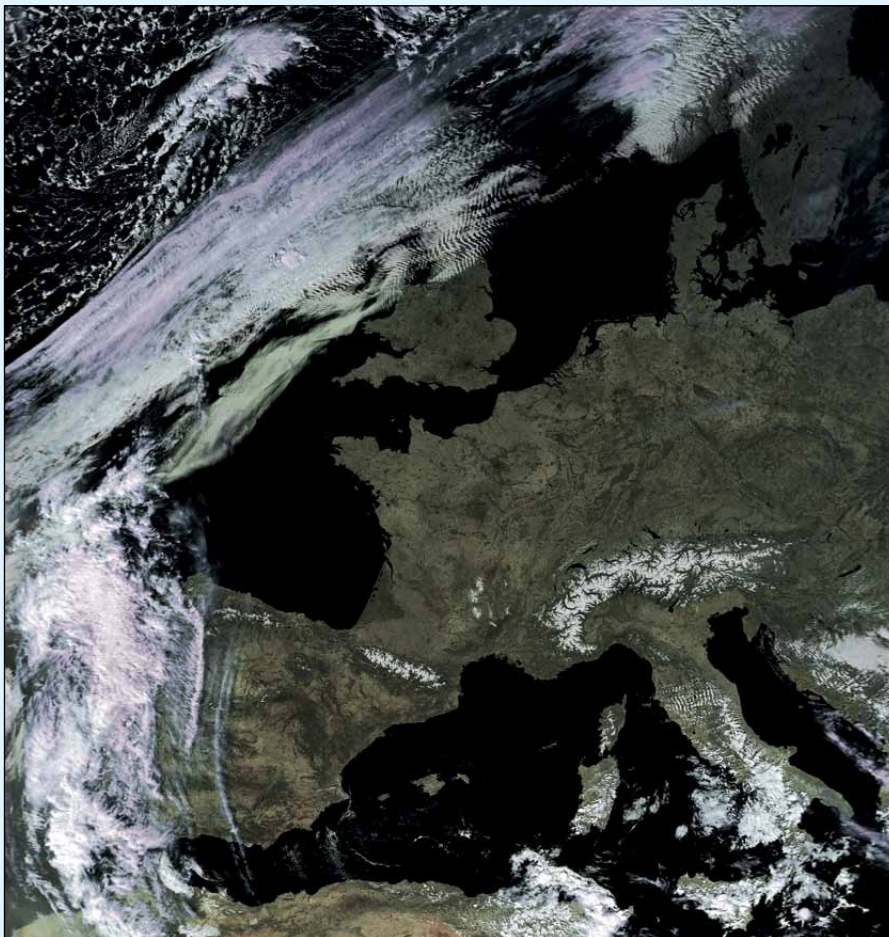


Figure 6 - A NOAA 19 image showing high pressure over Europe on March 9, 2014.
Image © EUMETSAT 2014

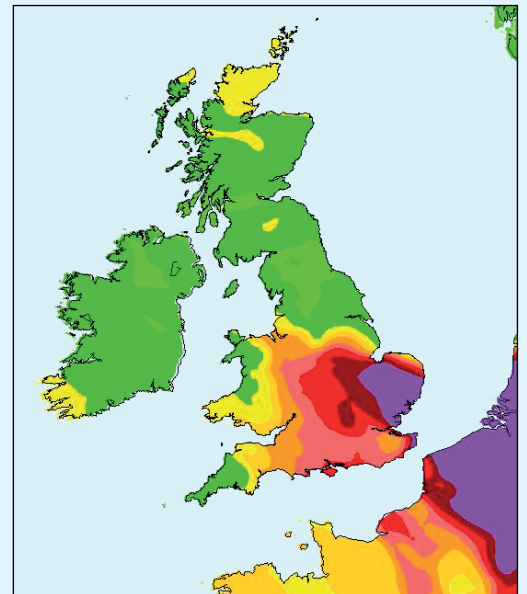


Figure 4 - Air Pollution Index Map for March 29
credit: Met Office/DEFRA

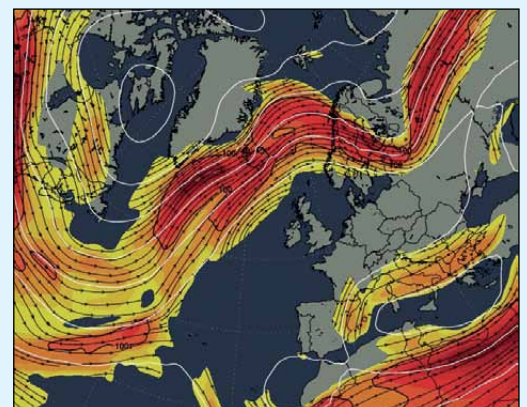


Figure 5 - Chart showing the Jet Stream position on March 11, allowing high pressure to build to its south
Credit: NetWeather.tv

Sentinel 1A Images The Netherlands

ESA: Space in Images



This image over the west coast of the Netherlands is one of the early radar scans by the **Sentinel-1A** satellite, which was launched on April 3, 2014. The satellite's advanced radar can provide imagery under all weather conditions and regardless of whether it is day or night. It can scan Earth's surface in a range of different modes, enabling it to monitor large areas in lower resolution or to zoom in on a smaller region for a sharper view.

Visible features in this image include the port of IJmuiden at upper left, sitting on the Noordzee Kanaal, which stretches across the scene to Amsterdam at centre-right. The Amsterdam canal ring shows up well as do the runways of Schiphol airport immediately to the southwest of the city (at bottom centre of the image). The large city between Amsterdam and the North Sea is Haarlem.

Sentinel-1's radar will be used for monitoring changes in agricultural land cover—important information for areas with intensive agriculture like the Netherlands, and surveillance of the marine environment, including monitoring oil spills, detecting ships for maritime security, and measuring wave height.

This image was acquired on April 15, with the radar operating at a resolution of about 10 m/pixel.

Sentinel-1A is the first in a fleet of satellites being developed for Europe's *Copernicus* environmental monitoring programme. The satellite is not yet in its operational orbit, but early images like this have given us a taste of what's to come.

Image © ESA

Is an El Niño Event Developing?

A NASA Earth Observatory Report

Data from ocean-observing satellites and other ocean sensors indicate that El Niño conditions appear to be developing in the equatorial Pacific Ocean. Conditions in May 2014 bear some similarities to those of May 1997, a year that brought one of the most potent El Niño events of the 20th century.

During an El Niño, easterly trade winds in the Pacific falter and allow giant waves of warm water—known as Kelvin waves—to drift across from the western Pacific toward South America. Surface waters in the central and eastern Pacific become significantly warmer than normal, altering weather patterns and affecting fisheries along the west coasts of the Americas. El Niño can also have a significant influence on weather and climate world-wide.

The maps show the ten-day average of sea surface height centred on May 2, 1997 (figure 1), and May 3, 2014 (figure 2). Shades of red and orange indicate where the water is warmer and above normal sea level; shades of blue-green show where sea level and temperatures are lower than average. Normal sea-level conditions appear in white. The 1997 map was assembled from data collected by the *TOPEX/Poseidon* satellite, while the 2014 data comes from the *Ocean Surface Topography Mission/Jason 2* satellite. Observations confirm that a deep pool of warm water has been sliding eastward since January.

The height of the sea surface is a good indicator of the amount of heat stored in the water. As the ocean warms, its surface rises due to thermal expansion; as it cools, its falls again. Above-normal sea surface heights in the equatorial Pacific indicate El Niño conditions, while below-normal heights are termed La Niña.

The current situation in the tropical Pacific Ocean looks similar to that in early 1997, which led to one of the strongest El Niño events ever observed, with extreme weather impacts on several continents. Then, North America had one of its warmest and wettest winters on record, particularly in California and Florida; Peru, Mexico, and the rest of Central and South America endured devastating rainstorms and flooding; Indonesia and parts of Asia experienced disastrous droughts.

During the 1997/1998 El Niño event, sea surface maps derived from data from the *TOPEX/Poseidon* satellite (a predecessor of *Jason-2*), indicated a Kelvin wave, with sea level some ten centimetres higher than usual, moving along the equator from Australia towards South America. The same pattern is currently repeating in 2014, as a series of Kelvin waves, generated by localised westerly bursts of wind in the western Pacific, have been heading eastwards since mid-January 2014.

Ocean and atmospheric scientists at NOAA and NASA are carefully monitoring the Pacific trade winds. The tipping point for declaring a significant El Niño will be an even longer lasting, larger collapse in Pacific trade winds, possibly signalling a shift in weather all around the Earth. Excitement built after a third weakening of the Pacific trade winds took place in mid-April, and on May 8, the *National Centers for Environmental Prediction* forecasted a 65% chance of El Niño developing during the summer of 2014. It will become much clearer over the next few months whether these recent developments are the forerunner of a major El Niño—or, any El Niño at all. If El Niño does return, the American West and Southwest could, next winter, at last gain relief from their long-lasting drought.

Data courtesy NASA JPL Ocean Surface Topography Team.
Maps by Marit Jentoft-Nilsen and Robert Simmon.
Caption by Michael Carlowicz.

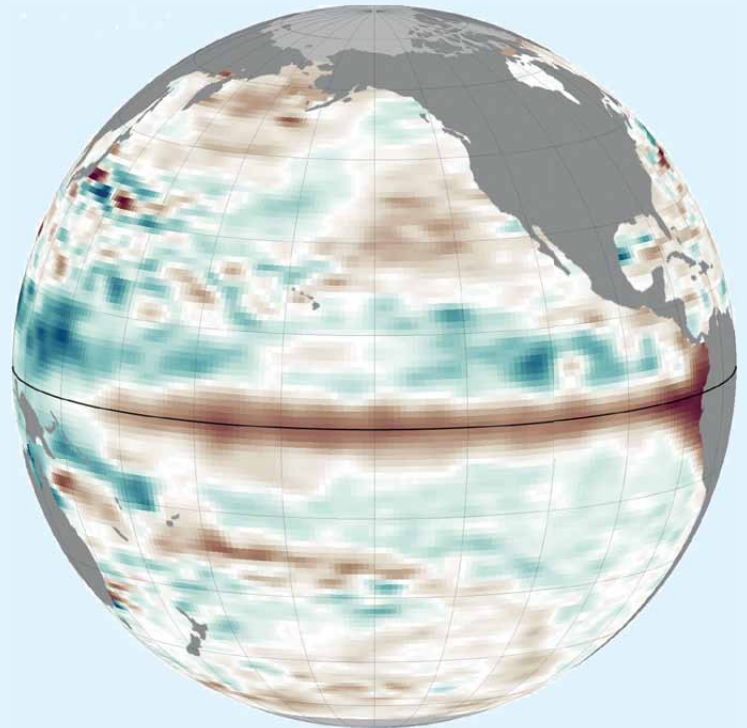


Figure 1 - Pacific Ocean Sea-surface map from May 2, 1997

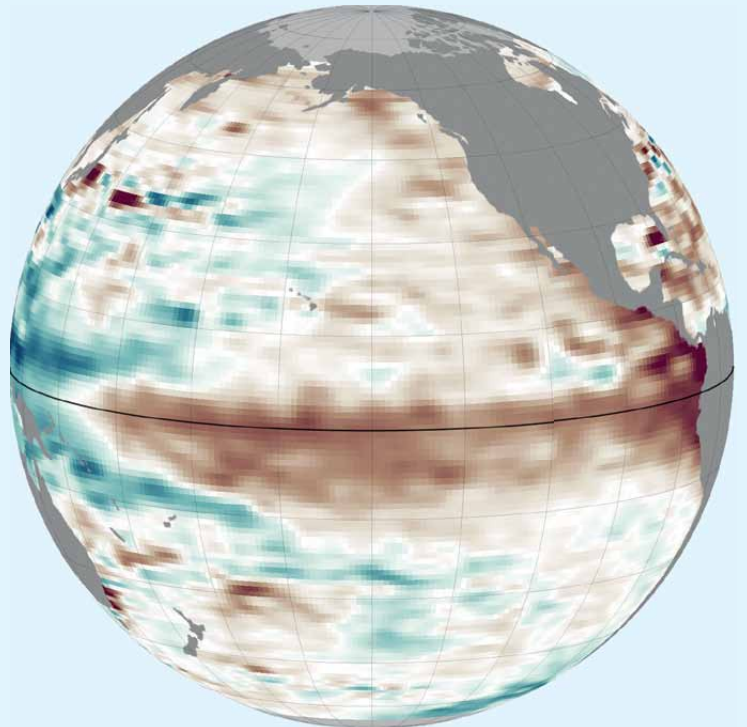


Figure 2 - Pacific Ocean Sea-surface map from May 3, 2014

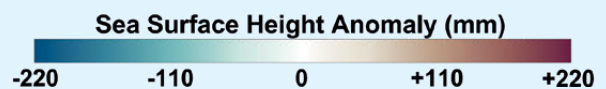


Figure 3 - Key to Sea-surface maps

FEEDBACK

*The column for Readers'
Letters, Queries and Discussion*

Email: geoeditor@geo-web.org.uk

Hello Les,

I am very happy to tell you that finally the magazine arrived today. The printing quality is wonderful and every one here at home has enjoyed the magazine. Once again thank you very much for the good job on keeping this great magazine running and specially for all the help you gave me and the nice opportunity to contribute to it. Please send my greetings and to all the assistants at the Symposium next April.

Raydel Abreu, Cuba

[Raydel is not a GEO member, but was invited to contribute the article on SDR in GEOQ 40, and courtesy copy of the magazine was therefore sent to him - Ed]

Hi Les,

I have just read your plea for contributions for future GEO Quarterly issues and I do sympathise with your predicament. I have long held the view that the Quarterly is very interesting and a good read (and I really do appreciate all the effort you and your predecessors put into its production). **But**, I do not think it is something that is 'cast in stone' and must be produced at any cost for the group to survive, every quarter.

If the members, me included, do not have anything to contribute that they think will be interesting to others, then so be it - I really enjoy receiving the many images from EUMETSAT every day but cannot often see the need to write about them. If I do have a question about a particular weather effect then the Internet, with help from Google can usually provide the answer. If not, then *GEO Subscribers* and other groups certainly will.

Until the change in EUMETCast delivery system, later this year, to DVB S2 VCM comes into effect, we are all using very much the same equipment and there really isn't much to talk about! After that change I am sure that there will be a big change in the numbers that continue to receive the data, and the *GEO Subscribers* group will be alive with chat and advice!

So I guess what I am saying is *please* do not beat yourself up about the lack of articles - please hold and use what does come in and produce an occasional magazine for us, to your normal very high standard. Do not worry if it takes 3, 6 or more months to make it worth while! Like the rest of us, you do have a life outside the Geo Quarterly and you should not feel burdened by it. Thanks, Les, for all your efforts.

*Regards,
Nigel Heasman, Cyprus.*

Symposium 2014

Venue was easily accessible, appropriate sized rooms, good parking. Timings were good, sufficient time for plenty of coverage without becoming super-saturated with information! Speakers all extremely knowledgeable in their respective fields, and able to deliver their material clearly, using excellent slides, and dealt well with Q & A s at the end of each session.

Members' knowledge and experience of the multifaceted art of satellite imaging and processing varies, from relative beginners, to those with deep first hand working knowledge of some of the areas involved. Much of the content is quite technical, and concise accurate information is essential to understand sufficient to cope with the pitfalls, trials and tribulations of what is, at present, far from being a plug and play system! None of us can be an expert at everything, so the meetings provide a worthwhile experience in seeing other members' experiences, problems, solutions, advice

and so on. As a self-confessed dabbler in many hobbies, I have found imaging fascinating, and try my best to maintain a healthy interest, follow what is going on, and how it can be done, even if I do not have the technical know how, or the time, to do everything I would like. GEO provides that source of information, and joining is to be highly recommended to would-be imagers!

I am still coming to terms with present MSG technology, so the several talks aimed at introducing the new S2 decoding we are going to have to use from next year were invaluable, and the speakers were very clear to understand, in a quite technical area.

One area I feel there could be more information about is the interface between meteorology, weather events, statistics and forecasting, and all the wonderful data that is available from EUMETCast. Not just the pretty photos, but quantitative uses, supporting old-fashioned ground station measurements! Perhaps a speaker with advice on how to use the sea of data available, alongside regular weather records, for instance. Maybe we all want different things though!

Hope some of my ramblings prove useful....

*Colin Prior,
Halesowen, West Midlands*

Dear Francis,

Thank you for sending the EUMETSAT memory stick of presentations of our day in Leicester. I thought it was one of the very best, with plenty of really interesting subjects covered. It was always going to a 'not to miss' event, with presentations from EUMETSAT on the necessity for a change to transmission parameters, and from the receiver manufacturers on their products. I purchased an *Ayecka* receiver on the day, and it is now working perfectly on my Linux reception station. It was really simple: no need to install drivers with Linux as they are available in the kernel. Thanks to you and all the other friends who made the day such a huge success.

Tim Holdsworth

Dear Francis

Thanks for sending the USB memory stick with the symposium presentations. Also, thanks to all for organising the Symposium. It was a great day, and we enjoyed meeting up with everyone and listening to the speakers. Frustrating as it is to have time for hobbies at the moment, I have hopes I'll get our act together for the new EUMETCast system. I even found what looks like a suitable dish in one of the sheds.

Ann and Phil Webber

Dear Francis,

I wish to record my thanks to you and the GEO team for all your hard work which ensured a successful symposium at Leicester. I greatly enjoyed all the presentations and appreciate all the work that continues to ensure that GEO membership benefit from all GEO's team work.

Keith Lawton

Dear Francis,

Thank you for sending me the presentation files on the EUMETSAT memory stick, I really appreciate your efforts on behalf of the GEO membership.

Brian Davis

The Sun - Our not so quiet Neighbour

Interference in APT signals due to Solar Flares

Continued from page 19

identified, and the time of maximum is near that of the detected interference in the NOAA-19 transmission on 137.100 MHz.

Radio Events Observed 29 Mar 2014				
A. 245 MHz Bursts				
Start	End	Peak Flux	Time of Peak	Duration
09:45	09:45	180	09:45	0 sec
16:20	16:20	270	16:20	0 sec
17:45	17:51	110 000	17:47	6 sec
18:52	18:52	450	18:52	0 sec
19:52	19:52	370	19:52	0 sec
21:29	21:29	100	21:29	0 sec
B. 245 MHz Storms				
No noise storms observed				

Table credit: NOAA

NOAA instead monitors the sun on VHF at 245 MHz. Different frequencies observed at the sun correspond to different levels on the solar corona. That explains why a time difference for the maxima can be expected on different wavelengths, while the solar explosion evolves and the plasma and particles become excited at different levels.

Postscript

Steven Ross from *Weatherscience.net* sent me an image from the same NOAA-19 pass (figure 6) which clearly shows the same noise events on his data.

<http://www.weatherscience.net/>

Conclusions

As we have seen, our closest star is not a passive neighbour. Sometimes, without the possibility to effectively forecast it, a major solar flare can produce a short but important influence on the reception of satellite downlinks. Big events like the one presented here (and bigger ones) have occurred, and it is quite certain they will happen again in the future. Amateur observers can witness a solar radio event with even very modest equipment. However, this incredible coincidence seems to pop a question: 'Might similar events have been inadvertently recorded in the past by other satellite imagery enthusiasts?' I guess the answer is definitely 'yes' ...

References

- <http://en.wikipedia.org/wiki/Sunspot>
- <http://spaceweather.com/glossary/flareclasses.html>
- <http://www.qsl.net/dl4yhf/speclab/>
- <https://pss.swpc.noaa.gov/LoginWebForm.aspx>
- http://www.swpc.noaa.gov/rt_plots/xray_1m.html
- <http://www.ips.gov.au/Category/World%20Data%20Centre/Data%20Display%20and%20Download/Spectrograph/Solar%20Radio%20Burst%20Classifications.pdf>
- <http://audacity.sourceforge.net>
- http://en.wikipedia.org/wiki/Nyquist%E2%80%93Shannon_sampling_theorem
- <http://www.radiosky.com/skypipeishere.html>

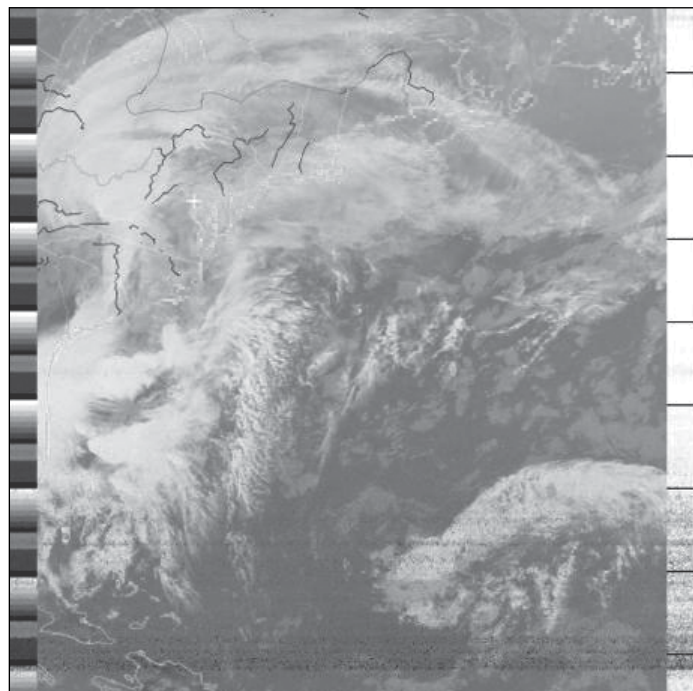


Figure 6
The same NOAA 19 pass acquired from the USA
Image: *Weatherscience.net*

GEO Symposium on YouTube

For the first time this year, videos of the presentations that took place at GEO's Symposium have been posted on **YouTube** for you to enjoy. You can search for them in YouTube under "GEO Symposium 2014", or by entering any of the URLs listed below. Note that the longer presentations have been broken into a number of videos.

Presentations

Werkgroep Kunstmanen (Rob Alblas)

<http://www.youtube.com/watch?v=l6NzUebo9Ho>

The Basics of EUMETCast (David Taylor)

<http://www.youtube.com/watch?v=Wb-tBo7zKKM>

<http://www.youtube.com/watch?v=4ZljXdD2rh4>

The EUMETSAT Help Desk (Kim Hui Gaune)

<http://www.youtube.com/watch?v=Wb-tBo7zKKM>

Science from Meteorological Satellites: MSG/GERB to Metop/AVHRR (Neil Humpage)

<http://www.youtube.com/watch?v=jYEkopH6OP8>

<http://www.youtube.com/watch?v=AphpeAt2z0U>

<http://www.youtube.com/watch?v=OIOukwbac0M>

<http://www.youtube.com/watch?v=4aJmELHcVnk>

The new EUMETCast S2 VCM dissemination standard (Klaus-Peter Renner)

<http://www.youtube.com/watch?v=iv7EUUDP9xs>

<http://www.youtube.com/watch?v=ZaOZIOAkDuc>

http://www.youtube.com/watch?v=D8TzIGFda_c

The Ayecka SR1 receiver for S2 VCM reception (Aaron Fuchs)

<http://www.youtube.com/watch?v=s686mQIHuiQ>

The Novra DVB S2 Receiver (Gord Sawatzky)

<http://www.youtube.com/watch?v=qMqsJf4Gzko>

The 'SatellitenPaul' Exhibition

in St Gallen, Switzerland

Paul Geissmann

For four weeks between April 17 and May 17, the town of St Gallen in northeast Switzerland was the scene for a remarkable exhibition staged by Paul Geissmann. Paul is an avid weather satellite enthusiast, and supports an interesting website dealing with his activities at

<http://www.satellitenpaul.ch/main.html>

Paul wrote an article about his passion in a local newspaper, and this led to matters blossoming way beyond his expectations. Paul takes up his story ...

The beginning of an exhibition is almost always due to an accident. A newspaper reporter comes along and sees all sorts of satellite disks and antennas emanating from a rustic Swiss barn. And so a small article written in a local newsletter started a chain reaction, a tipping point. Suddenly, I found that my somewhat remote satellite station was on the radar of several newspapers, private groups and organizations, all wanting to visit and learn more.

Because of this increased interest, I approached the *Raiffeisen Bank* in Wilkeln, St. Gallen, Switzerland regarding the possibility of putting together an exhibition in their building. Not only did the Bank express interest in hosting such a venture, but enthusiastically also offered to cover the necessary exhibition costs.

As a result, the exhibition *SatellitenPaul* was born, and for a full month, visitors to the *Raiffeisen Bank* were treated to a display of scale models of weather satellites, large high-resolution photographs of the world globe captured from weather satellites, and various literature and take-away materials.

The exhibition photography displayed at the venue was in the form of satellite world globe snapshots, were acquired by myself during February 2014, using software created by David Taylor. The photography included ten different 80 x 80 cm high gloss, high resolution global views.

The display also included three scale models of weather satellites obtained from my good friend Men Schmidt, an optical specialist for NASA and ESA. A fourth weather satellite model on display, approximately 1.2 meters tall and 80 cm in diameter, was borrowed from Meteosat-7, Meteo Group, Switzerland in Appenzell.

The EUMETSAT Help-Desk (Debbie, Pam, and Maria) was happy to participate as well. They provided various giveaways and promotional items, including world globe pictures, pens, and USB sticks. *Meteo*



The display of satellite models and imagery in the *Raiffeisen Bank*.



A table-top model of Metop-A

Switzerland contributed gifts for the visitors too, in the form of educational pamphlets about the weather.

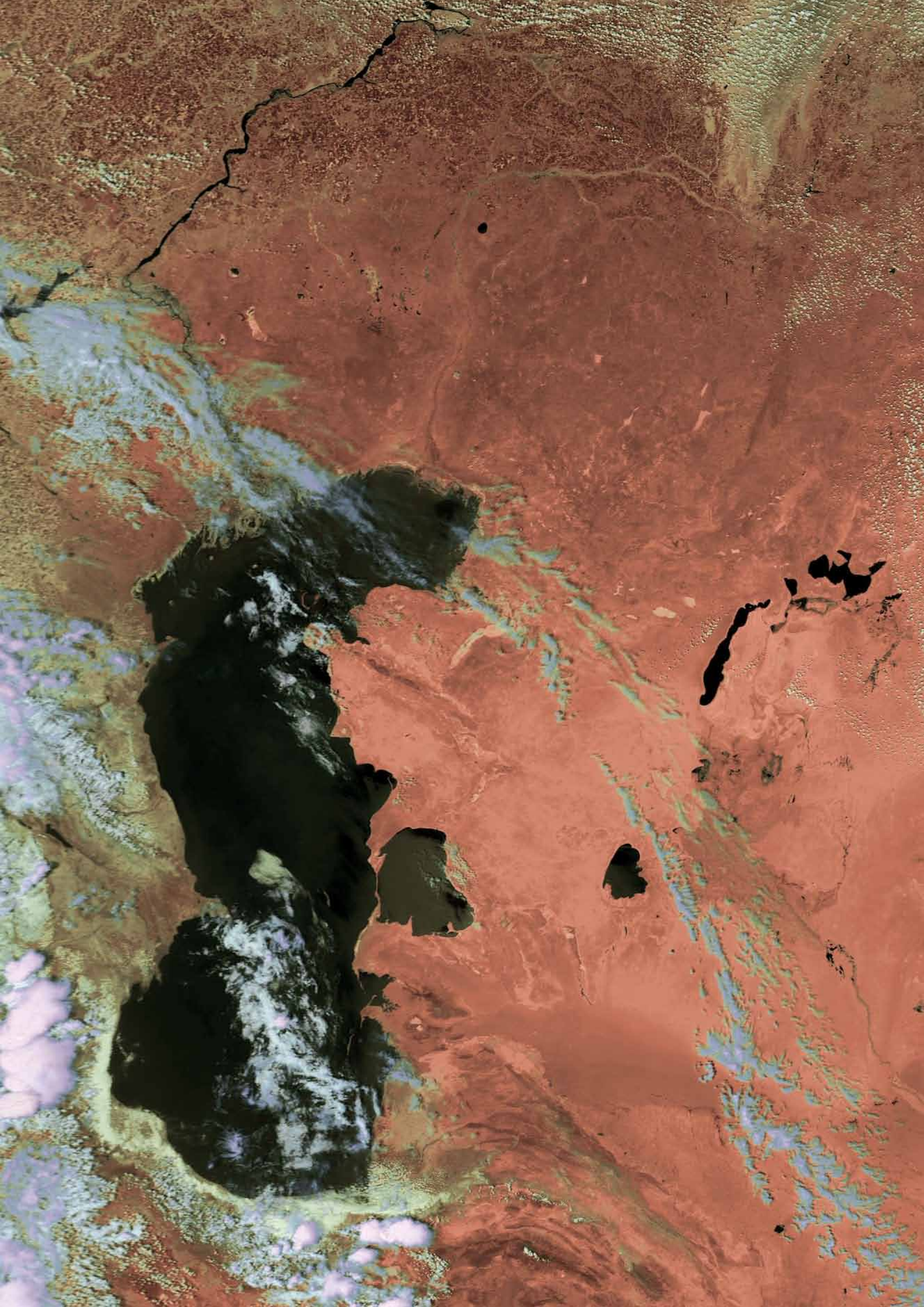
The highlight of the *SatellitenPaul* exhibition occurred on May 10, with shuttle bus escorts to my satellite station every half hour from 11 am till 3 pm for a close and personal tour. Visitors were also treated to a lunch consisting of bratwurst and drinks, complements of *Raiffeisen Bank*.



The wall display of high-resolution photographs



The author, pictured beside the Meteosat-7 model



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-9 DVB/EUMETCast systems.

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

John Tellick

Surbiton, Surrey, ENGLAND.

Meteosat-9 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, coax,connectors, mounting hardware etc. and has also done a lot of work with the orbiting satellites. Geoff has been a EUMETCast Meteosat-9 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@btoopenworld.com

Mike Stevens

Portland, Dorset, England.

Assistance with reception of *EUMETCast* to include *Metop-A* and *Metop-B*; also MSG Data reception and set-up within the PC, and assistance with dish alignment and set-up.

- email: mikeg4cfz@gmail.com

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 restricting telephone contact to the period 7.00 - 9.00 pm in the evenings.

Weather Satellite Reports

If there is a single Internet Forum that is relevant to all weather satellite enthusiasts, it must surely be Douglas Deans' *Weather Satellite reports*.

Here you will find every conceivable type of information about weather satellites, whether polar or geostationary, APT, HRPT, LRIT or whatever.

Absolutely everything is covered, and the information is updated every week. Special additional bulletins may be issued if an important change takes place mid week.

You can read the bulletins from this URL

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

or, even better, elect to have the reports sent to you by email every Monday.

Internet 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/>

Copy Deadline for GEO Quarterly No 43 is Sunday, August 3, 2014

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 (e-mail attachment, CD, DVD). But of course, we would also accept handwritten or typed copy.

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 WMF, EPS or 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 copies of the original images** in one of the formats described above: these are essential for page make-up purposes.

Submission of Copy

Materials for publication should be sent to the editor,

Les Hamilton
8 Deeside Place
Aberdeen AB15 7PW
Scotland

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

geoeditor@geo-web.org.uk

Particularly large attachments (8 MB and above) can be transmitted via *YouSendIt*

www.yousendit.com

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 Annual Subscription Rates (4 issues)

Tick United Kingdom ... £25 Europe ... £35 Rest of World ... £40
 a
 box Electronic Membership (downloadable PDF Quarterly) ... £15

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)

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

Address

Declaration

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

Town/City

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.

Postcode/ZIP

Callsign

Country

Signature

Telephone Number

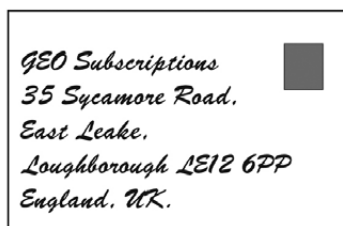
FAX

Date

Your subscription is valid for one year from your date of application and entitles you to all the privileges of membership of the Group for Earth Observation, including four issues of GEO Quarterly. Please note that your subscription will commence with the issue of GEO Quarterly that is current at the time of your application. Back issues, where available, may be ordered from the GEO Shop.

Please send your completed form to:

David Anderson (GEO subs),
 35 Sycamore Road,
 East Leake
 Loughborough LE12 6PP, UK



The Group for Earth Observation Limited is a company in England and Wales, limited by guarantee and having no shares. The company number is 4975597. The registered office is Coturnix House, Rake Lane, Milford, Godalming GU8 5AB.

For our full range, visit **GEO Shop** at - <http://www.geo-web.org.uk/shop.html>

R2FU Weather Satellite Receiver for NOAA APT



This state-of-the-art, USB powered APT receiver for the NOAA satellites is also controlled via a USB port, so no longer requires a serial interface like its predecessors. It also features hardened filtering to overcome UK pagers.

UK members price - £210.60
UK non-members price - £230.60

DVBW DVB-S USB2102 Receiver



This DVBWorld **DVB-S USB-2** receiver is recommended for trouble-free **EUMETCast** reception. It is supplied with a GEO set-up CD containing software and instructions.

UK members price - £60.00
UK non-members price - £70.00

DVBW DVB-S2 USB2104 Receiver



This DVBWorld **DVB-S2 USB-2** receiver is also available for those who wish to receive FTA satellite HDTV on their computer (but not recommended for **EUMETCast** reception).

UK members price - £75.00
UK non-members price - £85.00

Sandpiper Turnstile Antenna



This high-quality turnstile antenna has been specially manufactured for GEO, for use in APT reception from the NOAA polar orbiting weather satellites.

UK members price - £65.00
UK non-members price - £77.50

Telestarr 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 - £72.00
UK non-members price - £79.00

Current Price List

	Members' Prices			Prices for non-Members		
	UK	EU	RoW	UK	EU	RoW
R2FU APT Receiver	210.60	216.00	224.00	230.60	236.00	244.00
BNC Lead (0.25 metre)	5.50	6.25	6.75	7.50	8.25	8.75
UK Power Supply Unit (12 volt)	10.50	-----	-----	13.00	-----	-----
Sandpiper Turnstile Antenna	65.00	-----	-----	77.50	-----	-----
Dartcom High Quality QFH antenna	280.00	360.00	-----	300.00	380.00	-----
Bias Tee	25.00	25.50	26.00	29.00	29.50	30.00
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
DVB-S2 USB Receiver (DVBW 2102)	60.00	65.00	-----	70.00	75.00	-----
DVB-S2 USB-S Receiver (DVBW 2104)	75.00	80.00	-----	85.00	90.00	-----
Telestarr 80 cm dish with LNB	72.00	-----	-----	79.00	-----	-----
Telestarr Ku band universal LNB	13.70	15.20	-----	20.20	21.70	-----
Technisat Satfinder Alignment Meter	26.50	29.50	-----	29.50	32.50	-----
GEO Quarterly Back Issues (subject to availability)	3.80	4.60	5.60	n/a	n/a	n/a
GEO Quarterly (PDF on CD) 2004-2013 (Annual compilations - state year)	8.00	8.80	9.30	n/a	n/a	n/a
GEO Membership (4 magazines p.a.)	25.00	35.00	40.00	25.00	35.00	40.00

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 by email to

tech@geo-web.org.uk

or made through the GEO Website at

<http://www.geo-web.org.uk/shop.html>

Goods are normally shipped within 28 days, subject to availability.



Not yet 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: but non-members cannot benefit from the discounted members prices.

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

Subscription Rates (12 months, 4 issues, including P&P) for GEO Quarterly are

£25 (UK)
£35 (EU)
£40 (rest of world)

GEO Quarterly - Back Issues (Only available to GEO Members)



Paper copies of back issues of GEO Quarterly may be available, but it is advisable to check before ordering.

UK members price - £3.80

Annual compilations of GEO Quarterly back issues in PDF format are available on CD. Be sure to state the year of each annual compilation that you wish to order.

UK members price - £8.00

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

GEO PIC 1.0 for the RX2



Programmed with the new channel frequencies required for NOAAs 18/19.

UK members price - £7.00
UK non-members price - £7.50

GEO Bias Tee



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 - £25.00
UK non-members price - £29.00

