

The **GEO** Quarterly

Group for Earth Observation



**The Independent Amateur Quarterly Publication for
Earth Observation and Weather Satellite Enthusiasts**

**Number 24
December 2009**



Inside this issue . . .

Ken Morgan provides an Australian perspective on the recent Lake Eyre flooding episode.

EUMETSAT held its 2009 Users' Conference in Bath, England. David Taylor attended and provides a report and photographic diary of the event.

Ed Murashie reports on an event from across the Atlantic, the Satellite Educator's Association's Satellite and Education Conference in Unionville, Pennsylvania.

There was an unusually dominating high pressure event over Greenland this summer. Robert Moore and Alan Banks provide an illustrated report on the occurrence.

Jerry Martes asks: 'Which is the best antenna for APT reception?' Jerry expresses his own thoughts and invites readers to join in the discussion.

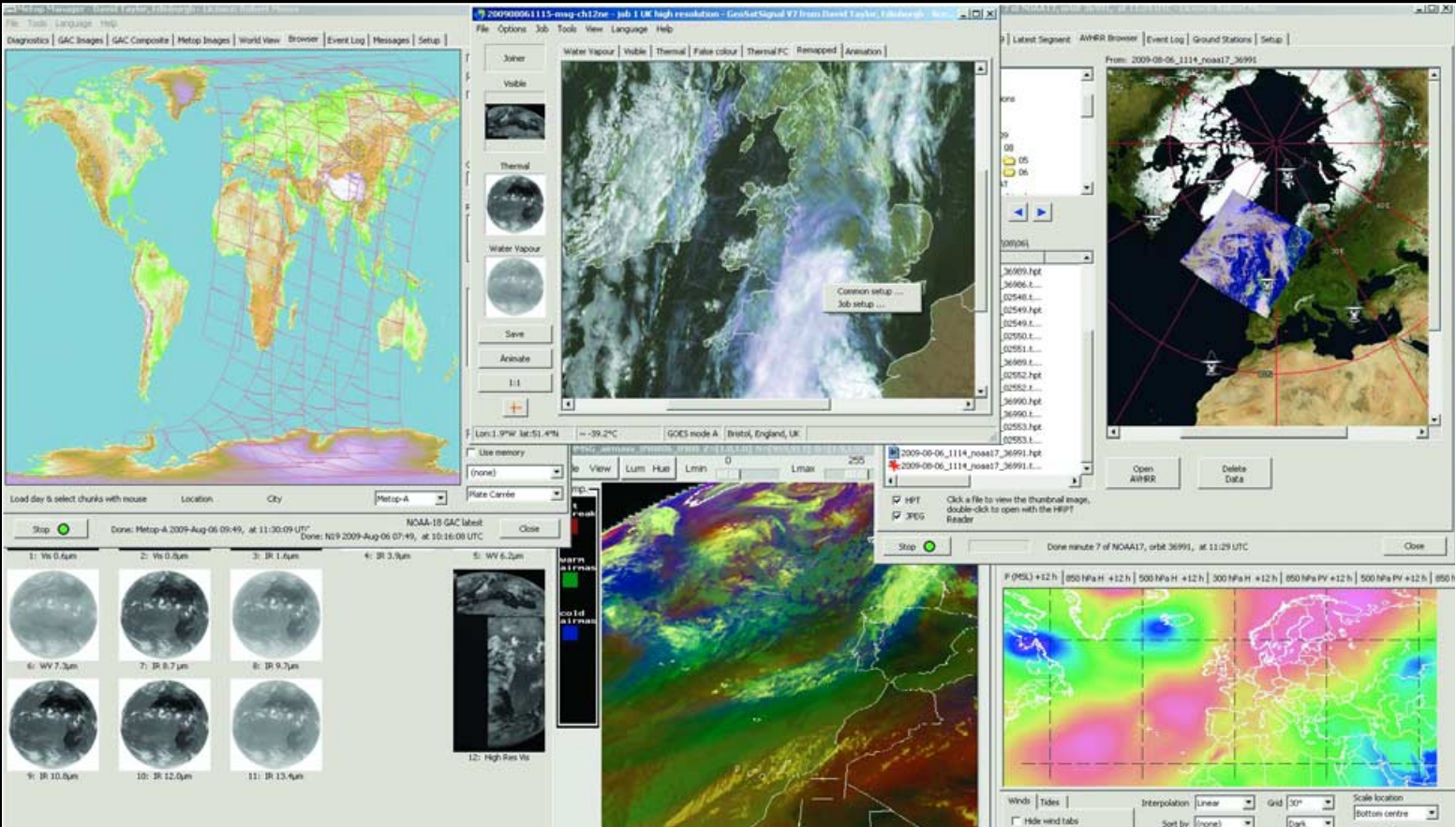
Plus features on Lake Chad, the Aral Sea, Hurricane Rick and much more ...



Eric Dean spotted an extraordinary cloud feature, which he likened to smoke from a forest fire, plunging southward from the Alps as far as Sardinia in this Meteosat-9 segment taken from the 07:45 UT image on May 29, 2009. However, by 09:00 the cloud was already thinning rapidly and by midday had largely dispersed. [Readers' comments explaining the origin and mechanism of this event will be welcomed.](#)

EUMETCast on a Widescreen Monitor

Robert Moore



At the Guildford symposium, I noticed and admired a very wide-screen monitor being used by Arne van Belle. The *Samsung SyncMaster 2429HS*, it is not as expensive as I feared and I have now acquired one of my own. This enables me to have my *EUMETCast* data continuously displayed on my desk, leaving my main PC free and uncluttered for other work. The picture above shows the screen in operation; the particular configuration of windows is not significant—it's just how the screen happened to be when I took the screen shot. Animated imagery is not recommended for the second screen unless you want to be hopelessly distracted from the work on the other screen.

My *Dell Optiplex 745 PC* has a graphics card that supports two monitors working at different resolutions; if your card does not support this facility it would be very difficult to use two screens effectively, if at all.

The Samsung has a screen resolution of 1920 x 1080. My best first experience of the screen resolution was a clear view of the Himalayas from Metop-A.

At 52 centimetres wide—just over half a metre—the image was breathtaking. And it's proving great for images of the UK and North Atlantic too.

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The GEO Quarterly

December 2009

Editorial: Les Hamilton

This issue of *GEO Quarterly* comes as our once fledgling organisation reaches maturity on completion of its sixth full year. Membership is, albeit slowly, on the increase and interest in satellite imaging—particularly APT—remains strong. Sadly, it is proving ever more difficult to encourage readers to submit articles for the Quarterly: a few stalwarts can always be relied upon but the vast majority appear reticent about sharing their interests, experiences and queries with us.

This issue coincides with my retiral as Editor. I had, as some may recall, originally planned to step down at the end of 2007 but, in the absence of a successor at that time, have been deferring my departure until now. Peter Green has offered to step into my shoes and I have been working with him since the start of this year, explaining the various processes in creating *GEO Quarterly* magazines. I will remain on hand behind the scenes to advise and help him as he assumes the editor's mantle for the March 2010 issue. Please continue to send submissions to geeditor@geo-web.org.uk, as this email address will shortly be redirected towards Peter.

It has been a privilege to serve GEO as editor throughout these years but interests change. I got hooked on APT back in 1987 when the school where I worked invested in an early weather satellite receiver for the BBC B micro-computer. I still have a general affection for APT, but the world of EUMETCast, with its veritable torrent of imagery, complex batch files and RAM drives holds little attraction for me. Like the *Ancient Mariner*, I need to cast off what has become a tiresome encumbrance to me and free myself to enjoy my many other interests, in particular bowls, tennis and hillwalking.

I would have loved to be able to sign off by making up a 'bumper' December issue but found myself hard pressed to complete even the 36-page Quarterly you now hold in your hands. Making up the Quarterly is a time-consuming enough task on its own without my having to source material for eight of these pages myself! To soften the blow, I have included considerably more colour than usual, and hope that the many magnificent images from NASA's Earth Observatory will strike a chord with readers.

Finally, on behalf of the entire Management Team, I would like to thank readers for their support over the years, and wish everyone the most pleasant Christmas and New Year.

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The GEO Report

Francis Bell



Since our Symposium last July, GEO has been active at several other meetings around the country.

Kempton

On September 27, GEO attended the *West London Radio and Electronics Show* held at Kempton. As usual we established live EUMETCast reception via a dish, quickly positioned outside the exhibition hall. On our stand we had our own literature plus posters and other materials provided by EUMETSAT. We also had on display APT and EUMETCast receivers (photo: page 6). It's difficult to be precise about numbers but we had about 200 visitors to our stand. It was great to meet two very supportive GEO members, Valerie and Eric Dean who had come from east Kent for this show.

There is a slight question mark in my mind about attending this show on a regular basis although it's very rewarding meeting people. I have a feeling that they are more-or-less the same people each time. Perhaps GEO should consider attending a more diverse range of events, generating a potential for meeting new people who may be interested in GEO's activities. The *South London Computer Show* has been suggested as a new venue for us but if any member has any idea or suggestion for GEO to attend shows, exhibitions, rallies or other events, please let me know.

Telford

The *Telford and District Amateur Radio Society* have held annual radio rallies for a long time, and for the past five years at Ironbridge, Shropshire. The town of Ironbridge is representative of the industrial revolution in the eighteen fifties and the area is now full of museum and exhibition sites. This rally was located in '*Enginuity Exhibition Hall*' which is the permanent home for large machinery associated with the industrial revolution.

GEO received an invitation to attend this rally and our stand was established between large and ancient machines. As the only GEO representative there, I was unable to run live EUMETCast reception but otherwise our stand was as attractive, colourful and informative as usual. Our stand did not look out of place between the large machinery because the whole exhibition area was filled by similar radio and computer related stands (photo on page 6).

GEO was time-tabled for both morning and afternoon presentation, and I was pleased with the number of people who speculatively took time out of their day to attend. The assumption was that those present would want to know which operational weather satellites were up in space and how to receive their signals, I discussed both polar orbiting and geostationary satellites, and how their signals could be received. I had with me an APT and DVBWorld receiver together with a turnstile antenna and a dish and detailed example images were displayed on the GEO stand in the exhibition hall. The examples I showed during my talks related to the difference in perspective and resolution between APT, with its vertical view of the Earth, compared with the more distant oblique geostationary view.

Subsequently I received an encouraging letter from the organisers saying that the feedback they had received relating to GEO's presence at the rally was very positive; they also invited GEO to return again next year, on Sunday September 5, 2010.

National Hamfest

I'm a little unsure about the antecedents of this National Hamfest,

held at the Newark showground on October 2-3. The show was organised by the *Lincoln Short Wave Club* but seemed to be sponsored by the RSGB—and there was some Irish connection. Whatever the background, GEO attended for both days.

After some negotiation relating to cable runs for our live EUMETCast reception, we were eventually provided with a stand in the main exhibition area. The exhibition hall was like a small aircraft hanger with exhibition stands lining the edges and islands in the central area. We were allocated space on one of the islands. Resourcefully, a dish was located just outside one corner of the building and the coax routed overhead to our stand. David Anderson, who attended both days with me, kindly provided two computers and ran spectacular live EUMETCast images on both days. Another computer on the stand provided archived APT images and occasionally ran a visual presentation relating to GEO activities. We had GEO literature plus materials kindly provided by EUMETSAT specially for this event. My thanks to EUMETSAT for providing their public relations materials—never mind about technical literature—all that the visitors to our stand want are the EUMETSAT pens and key-rings!

David and I judged that the two busy days we spent at this National Hamfest were very worthwhile in terms of the numbers who visited us and the interest they showed—not to mention the new members who joined on the spot. If this event is run next year GEO will try to attend, perhaps with the offer of lectures similar to those given at Telford.

GB4FUN

As well as the many open-air stands at the National Hamfest, there was the mobile RSGB exhibition vehicle GB4FUN. I found time to visit Carlo Eavis who manages GB4FUN. Regular readers will know that in the past I have suggested that any spare or unused weather satellite equipment that GEO members may have would find a good home with GB4FUN. Carlos told me he had received some equipment, for which he is grateful. However, it was clear to me from our conversation that he would prefer to have the latest APT receiver and a EUMETCast system to demonstrate to visitors. I will continue to work on this project on behalf of GB4FUN.

GB4FUN is run by the Radio Society of Great Britain (RSGB), with funding provided by its charitable arm, the Radio Communications Foundation (RCF). There can be no better way to advance the education of the public in the science and practice of radio communication, which includes satellite reception, than this vehicle visiting school and exhibitions. GEO will try to support GB4FUN as best we can. For a more comprehensive background, please visit their web site at

www.gb4fun.org

Events for 2009

At the time of writing, a date and venue for our annual symposium has not yet been fixed. Ideas are being researched and a notice will be published in good time for any meeting. We are also looking at which amateur radio and electronic rallies we should attend next year.

Our friends in the Netherlands, **Werkgroep Kunstmanen**, are holding their 2010 meetings in Utrecht on January 9, March 13, May 15, September 11 and September 13.

The British Science Festival 2009

Francis Bell

The *British Science Association* held its annual British Science Festival between the September 4 and 11, 2009, centred at the University of Surrey (UoS) in Guildford. Because of the breath of interest encompassed by the festival, other venues were involved beyond the UoS's own campus; some were still local in Surrey but there were a small number as far afield as London. Although GEO was not formally involved when I read the week's programme, I was particularly attracted to two events.

University of Surrey

The University of Surrey has a world-wide reputation for space science, including the construction and subsequent operation of small satellites. Indeed, my first interest in amateur radio satellites was stimulated by the launch and operation of UoSATS-1 and -2 in the 1980s. The ability to receive telemetry and other data from them while in space was exciting.

I also made use of their facility to send packet radio messages around the world, using their satellites' store-and-forward systems, via a BBC microcomputer and my amateur radio links. I have visited the University of Surrey several times and their Space Centre, where they build satellites on the university campus. Closely associated with the university is *Surrey Satellite Technology Ltd.* with its world-wide reputation for the construction of small satellites.

Events at the University of Surrey Venue

Three days into the festival there were lectures at UoS relating to remote sensing. Prof Sir Martin Sweeting presented his lecture covering the development of small satellites from the late 1970s to the present day.

Their first of these satellites were the UoSATS, about the size of a dustbin, but some more recent ones are about the size of a car. Prof Sweeting emphasised the flexibility of small satellite missions and told us of the four satellites SSTL had built for the *Disaster Monitoring Cluster* (DMC), a cluster of four small satellites in low Earth orbit. Each satellite can image the Earth but because they follow each other in similar orbits so that they can rapidly monitor disasters. A further speaker showed us outstanding examples of the images these satellites produce and explained the help they can be when monitoring a disaster. Images of the recent Indonesian Tsunami as well as Hurricane Katrina's damage to New Orleans during August 2005 were shown as examples.

During short sessions following each lecture, the availability of the DMC's images was questioned. The company owning and operating the satellites, *DMC International Imaging Ltd.*, currently charge for their images but many of those present at the lecture suggested they should be freely available. The debate was not conclusive. To discover more about DMC and to view some example images visit their web site at

www.DMCii.com.

The third lecture was given by Mark Doherty from ESA, who is based in Frascati, Italy. By contrast, the example images he showed us came from satellites as big as four or six double-decker buses. I have subsequently discovered that ESA has a project—*Envi-Ham*—which is making some of their satellites images freely available to amateur users,

and I am progressing my own reception of these images. If I understood Mark Doherty correctly, ESA are developing a site at Harwell, Oxfordshire but I'm still on a learning curve about this development.

The Visit to MSSL

Another venue for the festival programme was an 'Open Day' at the Mullard Space Science Laboratory (MSSL) at Holmury St Mary, which is located in beautiful countryside about 15 miles east of Guildford. MSSL is part of University College London's Department of Physics. In the 1960s this department needed more space so this additional building was purchased using a donation from Mullard Electronics. The building was formally opened in May 1967 with a staff of 66. Today the academic and technical staff number 140 and they generate an income of eight million pounds. MSSL has contributed to over 250 rocket and satellite missions in collaboration with major space agencies around the world including Cassini, Giotto and SoHO.

For MSSL's Open Day there were exhibition areas displaying their own work, together with a small number of related space industry stands. There was also a lecture stream and I was particularly interested in the lecture *The Sun and its effects on Earth's Climate* delivered by Prof Louise Harra. The lecture was fascinating. I already knew a little about solar cycles but not the detail which was presented in the lecture and the correlation with our Earth's climate.

Solar cycles can be traced back several thousand years through studies of the isotopic changes they cause on Earth. After her lecture, in conversation with Prof Harra, I questioned the belief that the current small changes in carbon dioxide levels in Earth's atmosphere are the cause of global warming. I suggested, with the background dynamics of the sun and internal processes within the Earth, that changes in atmospheric carbon dioxide levels are trivial. She smiled at me but, without commitment, agreed that a lot of people think like I do. Prof Harra is not only very knowledgeable about solar science but is also the most attractive university professor I have ever met. Please can I be one of her students!

GEO did not have exhibition space during the MSSL open day but some of our literature was on display for those interested. I gave a copy of our latest Quarterly to Prof Harra and placed another in their journal library.

BNSC

Just for the duration of the festival, a temporary exhibition marquee was located close to the lecture theatres with about 10 stands relating to science. Some of the stands were distinctly space related: for example, there was information from the British National Space Centre (BNSC); EADS Astrium; The National Oceanographic Centre, Southampton; and SSTL with their own stand.

Again GEO had no formal presence but some of our leaflets were on display.

To find out more about The British Science Association visit their web site

www.britishscienceassociation.org

QUARTERLY? QUESTION

Quarterly Question 23

The Question we posed you with last issue was: 'Can any reader, located on mainland Europe, Great Britain or Ireland, submit an APT image clearly showing detail from the eastern seaboard of Canada?' Sadly, the response has been hugely underwhelming with only three readers from a membership of over 500 contributing! We are indebted to Eric de Jong, George James and Rob Denton (with two submissions) for making the effort. Their APT images appear opposite.

Quarterly Question 24

This question was prompted by a slide and commentary during Gordon Bridge's presentation at our *Symposium* last July. Gordon briefly ran through the history of the 'European Organisation for the Exploitation of Meteorological Satellites', more usually known by its acronym EUMETSAT, and brought us up to date with the current membership, which has recently increased. There are a number of full member states who fund EUMETSAT plus some cooperating states. Germany, UK, France, Italy and Spain, in that order, are the main contributing member states and their financial contributions amount to 73% of EUMETSAT's income. However there are other members states.

The Question is

'How many countries/states are members of EUMETSAT as of July 2009?'

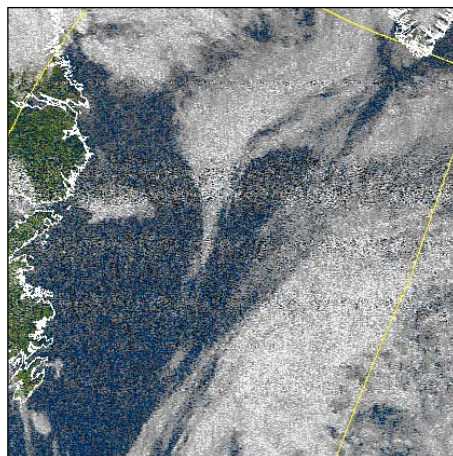
I notice there were 18 member states in 2005 but this figure has increased. I will take as my reference answer the figures shown on one of Gordon Bridge's presentation slides although the membership figures or list of current members is published elsewhere and will also be accessible on EUMETSAT's web site. The small number of cooperating states should not be counted as full members.

The reward for a correct answer is having your name published as an aware user of weather satellite data.

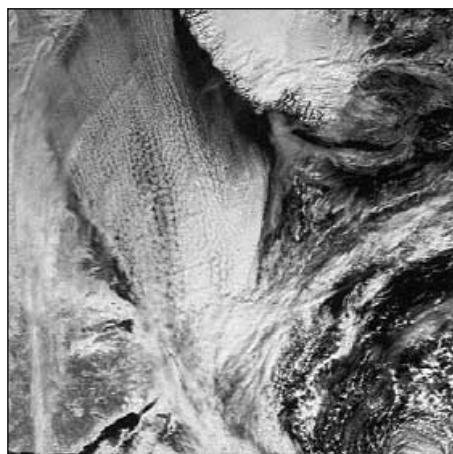
Answers to me by email to

francis@geo-web.org.uk

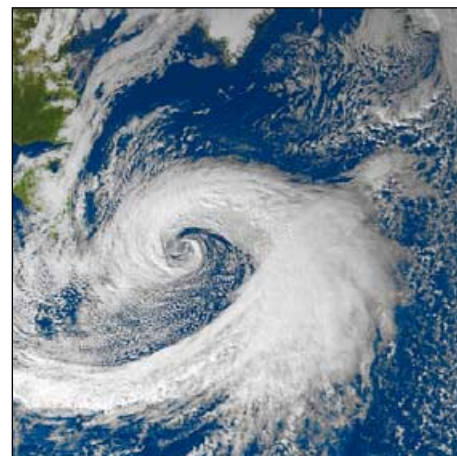
before the copy deadline date for our next Quarterly.



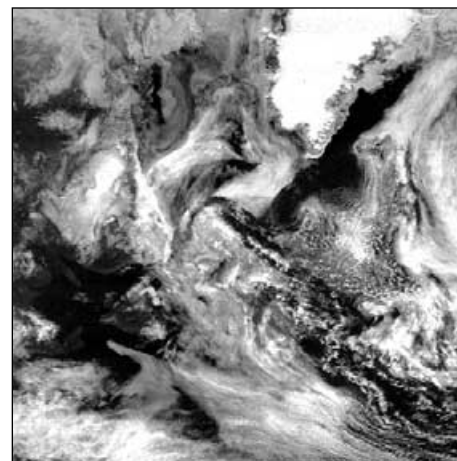
Eric de Jong from Heerenveen, Netherlands obtained this NOAA-19 image, showing the eastern tip of mainland Canada, on September 9, 2009. The satellite reached a maximum elevation of only 4° (hence the graininess of the image). Eric used an R2FX receiver with a WSP-137 aerial and Aircell 7 coaxial cable and processed the signal with WXtoimg.



Rob Denton discovered this NOAA image while hunting through his archives. It was captured on March 14, 2004, Worksop, UK (before he moved to Bulgaria) using a Dartcom System II RX and Wimo X-dipole antenna without preamp. It just shows what can be achieved with simple APT equipment.



Another NOAA image **Rob Denton** discovered in his archives. This one dates back to October 12, 2005, and clearly reveals Newfoundland and much of Labrador as the remnants of Hurricane Wilma drift eastwards across the Atlantic Ocean.



George James from Elgin in Scotland delved into a pile of old floppy discs and selected this Meteor image dating from July 1995. It shows Greenland at top right with the Labrador coast from Cape Chidley to the Gulf of St Lawrence with Newfoundland below at centre-left. Below Newfoundland, Cape Breton Island stands out lighter against the water of the St Lawrence Gulf.

Cover Images

Front Cover

Alan Banks sent GEO this Metop-A image dating from August 6 and rendered using *HRPT Reader's* vegetation mode. Alan states that what he finds interesting are the comparisons between the Nile Delta, Israel and surrounding lands; the effect of altitude in Cyprus; and the spread of vegetation in Turkey, particularly along the Black Sea coast.

Image © EUMETSAT 2009

Inside Back Cover

Mike Stevens captured this Metop-A image of western Europe on September 20, 2009 using his new RAMDisk installation. Read more on page 44.

Image © EUMETSAT 2009

Back Cover

John Tellick submitted this image of Hurricane Rick, imaged at 21:00 UT on October 18, 2009, by NASA's GOES-W satellite.

Image © EUMETSAT 2009

Free Publications

Francis Bell

I receive the following publications free of charge. Perhaps other GEO members, if interested, may wish to secure their own copies.

Space-UK

The British National Space Centre (BNSC) publish *Space:UK* three times a year. If you would like to receive the latest issue or be placed on their regular mailing list, send a request with your name and full postal address to

BNSC Publications
Polaris House
North Star Avenue
Swindon SN2 1SZ

Alternatively, you can download a PDF copy under the 'Publications' link on their website at

www.bnsc.gov.uk

Image

EUMETSAT publish their in-house 8-page pamphlet *Image* twice a year. All the article relate either to EUMETSAT news and policies or directly to weather satellites. The final page gives a global meteorological satellite update for Europe, USA, Russia, China, Japan, India and the Republic of Korea. This publication is available on-line but if you want a paper copy write to

EUMETSAT User Services
Eumetsat - Allee 1
64295 Darmstadt, Germany
www.eumetsat.int

ESA Bulletin

The European Space Agency (ESA) produce their quarterly in-house journal called the 'ESA Bulletin'. It is a substantial publication: the last issue (No 139) contained 92 pages full of news about all of ESA's space programmes, including weather satellites. I like the style of this publication because, at the beginning of each article, there is a short abstract which gives guidance about the potential interest in the full text. There is always an update on weather satellites. The 'ESA Bulletin' is available on-line at

www.esa.int/publications.

If you want the printed publication write to

Distribmail
Postbus 122
2370 AC, Roelofarendsveen
The Netherlands

Planet Earth

'Planet Earth' is the quarterly magazine of the Natural Environment Research Council (NERC), which aims to interest a broad readership. It describes new research programmes together with work in progress and completed projects. I collect my current copy from the recent Guildford based Science Festival.

The autumn 2009 issue contains 36 pages and covers such topics as 'Heat circulation in the Atlantic Ocean' and 'Holes in the Earth's Crust', along with other environmental topics.

To order the most recent copy visit

www.planetearth.nerc.sc.uk

and fill in the online order request.

MSG In Orbit in Use

In 2005, EUMETSAT produced a 128 page publication '*Meteosat Second Generation - MSG In Orbit in Use*' which I have found this to be a very useful guide to MSG and its instruments. It is divided into seven main sections:

Images from MSG
The MSG System
Forecasting the Weather
Climate applications
The atmosphere
The Surface Environment and
Conclusions.

Two examples may be taken from pages 26/27 which covers the SEVIRI radiometer with its 12 spectral bands while pages 28-29 describe the GERB instrument carried by MSG. Data from the GERB instrument is not disseminated to the public because it is a research instrument analysing the Earth's radiation budget. Members who attended our 2008 symposium will remember the outstanding presentation given by Dr John Remedios from Leicester University relating to the data being received by this instrument.

Over the last few years, EUMETSAT have provided many copies of this publication which I have distributed to GEO members at meetings, rallies and exhibitions. However, this publication is now out of print—except for about 30 copies I have in my stock. If any UK member would like to receive one of these, please write to me giving your full postal address together with six first class stamps to cover P & P and I will send you a copy. Members elsewhere in Europe may send an email request, again with a full postal address, and I will send you a copy.

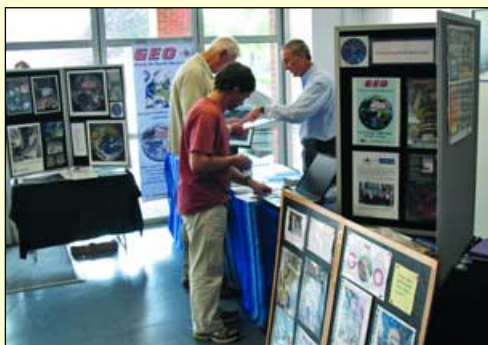
EUMETSAT's latest edition of '*MSG02-MSG: in orbit-in use*' is on CD. I have 10 copies of this CD but may be able to secure additional copies if needed. Again if you would like a copy, write to me enclosing three first class stamps or members in Europe email a request to me.

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The GEO stand at Kempton running live EUMETCast images and archived APT



GEO's stand located between museum heavy machinery at the Telford rally



A girl visiting the GEO stand at the National Hamfest. On the screen was an MSG image of the Mediterranean. She was asked to name a particular island. Impressively she got it right: Cyprus



The RSGB's GB4FUN mobile exhibition and demonstration vehicle outside the National Hamfest at the Newark show ground



One of the stands in the exhibition marquee on the UoS campus during the British Science Festival



John Tellick (right), in conversation with Ferdinand Valk, when he represented GEO at Werkgroep Kunstmanen's September meeting in Utrecht, Netherlands
Photo: Ruud Jansen



The attractive Professor Louise Harra, wearing a light coloured blouse, pictured talking to visitors during the MSSL Open Day



Francis Bell in conversation with visitors at the GEO stand during the National Hamfest
Photo: David Anderson

THE HEILTSKUK ICEFIELD

British Columbia

NASA Earth Observatory

The Heiltskuk Icefield covers an area of approximately 3,600 square kilometers in the southern Coast Mountains of British Columbia. This detailed astronaut photograph illustrates the icefield—mostly covered by snow across the upper mountain slopes—and two major valley glaciers that extend from it. Valley glaciers are large masses of slowly flowing ice and entrained debris that move downhill, carving out wide U-shaped valleys in the process. The locations of former valley glaciers can frequently be identified by the presence of these U-shaped valleys on a now glacier-free landscape.

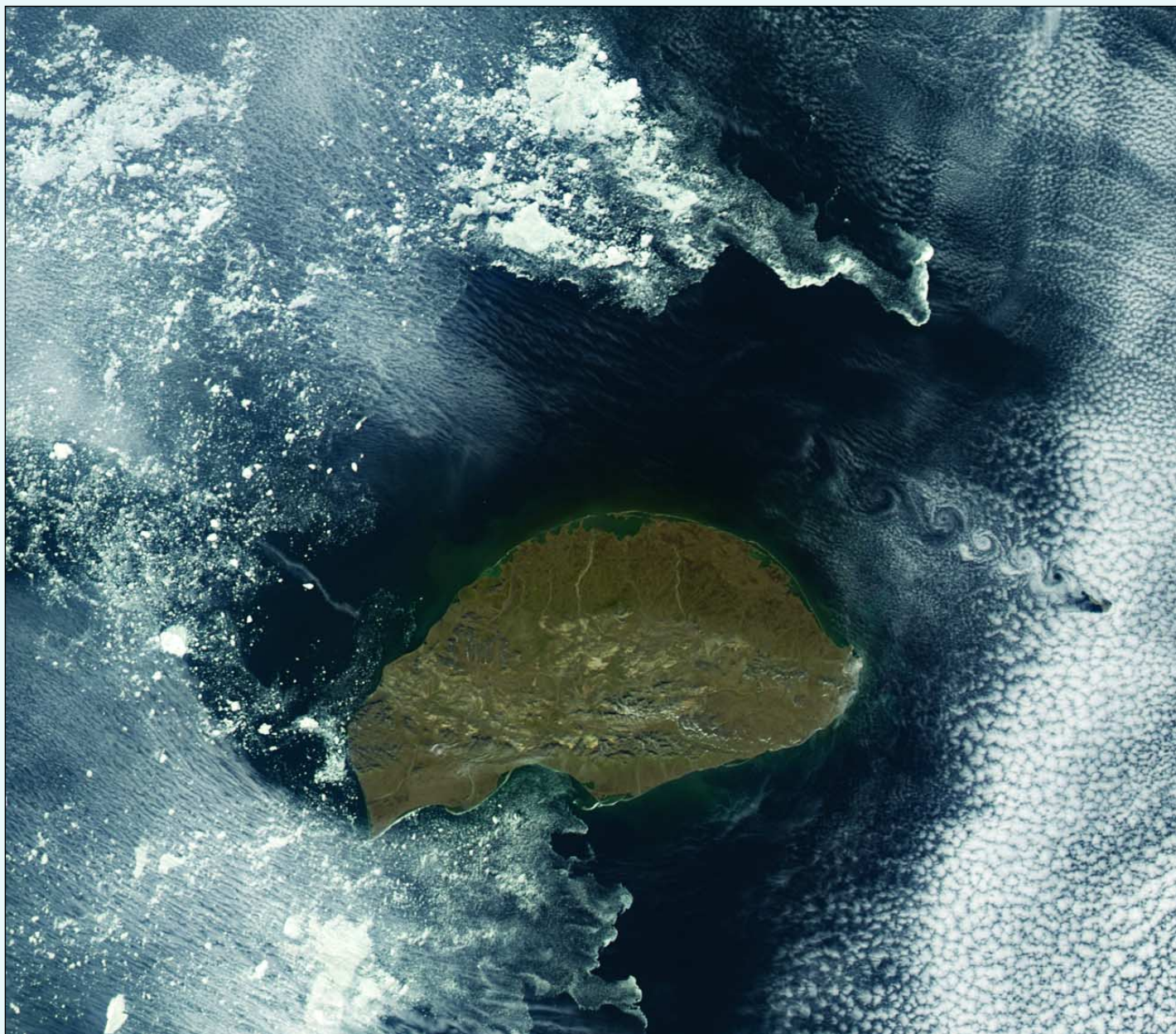
The two largest valley glaciers in the image, Silverthrone Glacier and Klinaklini Glacier, both flow towards Knight Inlet to the south (not shown). Several moraines, accumulations of rock and soil debris along the edges and surface of a glacier, are drawn out into long, dark lines by the flowing ice and they extend along the length of both glaciers. The confluence of the two glaciers illustrates how a moraine, located along the side of a glacier, can become a medial moraine in the centre of the joined ice mass. Smaller valley glaciers are visible near Mount Silverthrone.

Astronaut photograph ISS020-E-29216 was acquired on August 6, 2009, with a Nikon D3 digital camera fitted with a 400 mm lens; it is provided by the ISS Crew Earth Observations experiment and Image Science & Analysis Laboratory, Johnson Space Centre. The image was taken by the Expedition 20 crew. The image in this article has been cropped and enhanced to improve contrast. Lens artifacts have been removed. The International Space Station Program supports the laboratory to help astronauts take pictures of Earth that will be of the greatest value to scientists and the public, and to make those images freely available on the Internet.



Wrangel Island

A NASA Earth
Observatory
Report



Wrangel Island, which is part of Arctic Russia's *Chukotskiy National Park*, lies northeast of Siberia between the Chukchi and East Siberian Seas. Skies were clear on August 18, 2008, when the Moderate Resolution Imaging Spectroradiometer (MODIS) flying aboard NASA's *Aqua* satellite captured this splendid image.

Although Wrangel looks like bare rock, this mountainous island supports diminutive Arctic tundra plants. 60 kilometres to the east, along the edge of a bank of clouds, the much smaller Herald Island is spawning a stream of Von Karman Vortices, swirling eddies caused by the island's obstruction to the air flow.

The ghostly white shapes northeast and immediately southwest of Wrangel Island are sea ice. Over the course of the satellite record, Arctic sea ice has advanced and retreated past Wrangel Island many times. Between 1979 and 2000, the sea ice edge at the end of summer generally fell somewhere in the vicinity of Wrangel Island, but 2008 is not the first summer when the sea ice edge has retreated well north of the island.

The rocks that make up Wrangel Island were deposited between the late Precambrian and the early Mesozoic Era. Erosion by glaciers and the weather have reworked these rocks into sands and gravels that cover much of the surface. Barrier islands along Wrangel's northern rim results from sediments being reworked by wave action, suggesting that open water around Wrangel Island has been common enough to create these surf generated landforms.

Between 1989 and 1991, researchers collected tusks, teeth, and bones of woolly mammoth from Wrangel Island, radiocarbon dating suggesting that they lived here as recently as 3,730 years ago, some six thousand years after the species became extinct in continental Siberia. Now a World Heritage site, Wrangel is important in providing polar bear, Pacific walrus, and migratory bird habitat.

NASA image created by Jesse Allen, using data obtained from the Goddard Land Processes data archives (LAADS).

Enthusiasm Abounds at the SEA Conference

Ed Murashie

Enthusiasm! If I just had one word to describe the Satellite Educators Association's *Satellite and Education Conference XXII*, it would be enthusiasm. Everyone, from the organisers, to the presenters and participants, was excited to be there and share their work, or take back what they learned to the classrooms. But I am ahead of myself. Let me back up and explain what the *Satellite Educators Association* is and what the conference was all about.

In 1983, Helen Martin, a forward thinking math science teacher at Unionville High School, in Unionville, Pennsylvania USA, set out to engage her students by bringing cutting-edge space technology to her classroom. She was one of the first to set up a classroom weather satellite tracking and receiving station.

In 1986, Helen received a grant to support her work and expand it to share with other teachers. She started the first *Satellite and Education Conference* in 1988, hosted by West Chester University in Pennsylvania and sponsored by NOAA, GE, Ball and other companies. Her friend and fellow teacher, Nancy McIntyre, became the first conference coordinator in 1989. Together they started The School of Education's Educational Center for Earth Observation Systems in 1989 to support the conference and other grant work, such as GLOBE training [1]. Helen and others incorporated the *Satellite Educators Association* (SEA) in 1989 as a means of sharing their satellite experiences in the days before the Internet. The conference was—and still is—the premier conference bringing teachers, students, government agencies and industry together to promote satellite technology.



Dr. Paula Arvedson tending the Satellite Educators Association booth

The valuable work Helen and Nancy started did not go unnoticed by the state legislators. In 1992 Pennsylvania House Resolution No 260 was passed proclaiming the week of March 16-20, 1992, as 'Space Exploration and Technology Week' in Pennsylvania because of Helen's and Nancy's 'Exemplary programs.' In 2001, after Nancy passed away, Dr Paula Arvedson, a SEA member since 1991 and on faculty in the Charter College of Education at CSULA, took over Nancy's work. She became a conference coordinator and staged *Satellites and Education Conference XV* at CSULA, where it has been held ever since. Dr Arvedson was also elected president of the *Satellite Educators Association* [2] from 2002 to 2006 and now serves as Corporate Secretary.

This year's *Satellite and Education Conference XXII* was held from August 13-15 and was hosted by the *Satellite Educators Association* and California State University Los Angeles (CSULA). Thursday began with a tour of the Jet Propulsion Laboratory (JPL), registration, tours of CSULA's facilities and the annual *Satellite Educators Association* meeting. The evening was capped off by a catered but casual buffet dinner at Paula's home, nestled up against the San Gabriel Mountains. The guest speakers co-mingled and got to know each other before the following busy day of workshops.



Leesha Saunders working in the NOAA booth

Friday started at 8 am, just outside CSULA's *Golden Eagle Ballroom*, where everyone picked up their registration badge and conference packet. Inside the ballroom, around the walls, were exhibitors—including NOAA, SEA, JPL, Northrop Grumman, NASA/NOAA SciJinks, American Institute of Aeronautics and Astronautics (AIAA), Interorbital Systems, NASA Education and Public Outreach at Sonoma State University, the Los Angeles County Office of Education and author Robert A Black with his book 'Lunar Pioneers'. The exhibitors were on hand throughout the conference, which allowed plenty of time to meet and talk with them and pickup handouts, posters, decals and books.

SciJinks [3] is an educational website for kids of all ages that introduces them to weather-related science through games and activities and provides teachers with the resources to make the excitement happen. The **AIAA**, with their flying UFO, caught everybody's attention and drew them in while Dean Davis, a Senior Principal Scientist/Engineer for Boeing Corporation, explained the charter and fun in joining the AIAA. Dean truly is a highly energised rocket scientist and an outstanding speaker, who presented at the NOAA N-Prime Educator's Conference. **Interorbital Systems** [4], founded in 1996 in the California Mojave Desert, has large-scale plans to enter the space tourism market and is currently testing their Neptune modular rocket. One of their most interesting offerings is a *TubeSat* kit, a small version of the popular *CubeSat*, for \$8000. All you need to do is fill the 8.70 x 12.2 cm cylindrical enclosure with your imagination, and electronics weighing up to 0.75 kg. The amazing part of the deal is that the kit price includes the launch into low earth orbit starting at the end of 2010! **Sonoma State University** program [5] supports four NASA astrophysics satellites plus accompanying educational material. Besides the large

impressive display boards, they had the biggest pop-up astrophysics book I have ever seen. Lynn Cominsky, the Education and Public Outreach Lead, asked some of the toughest detailed questions about weather satellite sensors during my presentation. **Robert A Black** [6] was on hand with copies of his 'Lunar Pioneers' space travel adventure book. Mr Black was a writer for the popular kid's cable television channel *Nickelodeon* and used his talents to write this engaging book, which is grounded in real science.

Opening remarks started at 9 am, followed by the first keynote speaker, Dr. Barbara Shannon, vice chair of the *California Teacher Advisory Council*. I wish we could clone this lady. Imagine a teacher who taught in the Los Angeles schools for over 30 years and then switched into an administrator role, not to retire in office, but to get fired up and make a difference in the schools: that's Dr Shannon! She is one enthusiastic educator! Being that a large percentage of the 150 or so attendees were students in preparation courses on their way to becoming teachers, Dr Shannon stirred them up and got them excited about teaching.

One of the fun exercises was for everyone to write on a card a question that they had when attending school, but never asked. Some of us, having been out of school almost as long



Dr Barbara Shannon motivating the audience

as we were in school, wrote questions like 'Why do I need this class?' Next, we discussed this question with the person next to us and then finally a few discussed it with the entire group. Of course Dr. Shannon's follow-up question was, 'Would it have made a difference to your life if your question had been answered?' This was this kind of thinking that Dr. Shannon wanted the teachers always to be asking

themselves so that they could keep the kids engaged. Another trick she taught was to have other students assist teachers in the classroom so that more kids are involved. A sure-fire way to have a classroom full of kids lose interest and mentally wander off is to have a single teacher to single student conversation.

With everybody motivated, **Concurrent Sessions 1** started with three simultaneous talks in different classrooms: *International Year of Astronomy* by Robert Sparks of the National Optical Astronomy Observatory in Tucson Arizona, *Climate Change Info for Classroom and Home* by Ron Gird of the National Weather Service and *Receive Weather Satellites Images in Class* by yours truly, Ed Murashie. Since I was lecturing, I was unfortunately unable to attend the other outstanding lectures, but more information can be found in the conference program at

<http://www.sated.org>

I talked about the fascinating history of the U.S. weather satellite programs and how to receive the Automatic Picture Transmission (APT) images directly from the satellites [7] as they pass over the classroom. I ended my talk by mentioning where to get satellite data on the Internet, what classroom activities can be carried out with it and handed out a CDROM with educational literature, Internet links, and satellite images. At the conclusion of the session, we all reassembled in the ballroom for a Mexican buffet lunch and a chance to get to know the teachers and students.

Concurrent Sessions 2 started at 1.45 pm with three fine presentations: *NPOESS - New National Weather Satellite* by Thomas Lee of the Naval Research Laboratory, *Middle School and Microsatellites* by Gladys Munoz, Earth Science Teacher at NASA Explorer School, Puerto Rico and *Cleaning Up Our Oceans* by Duane Larsen of the Algalita Marine Research

Foundation. I attended the NPOESS (National Polar-orbiting Operational Environmental Satellite System) session which dealt with the next-generation weather satellites that combine the NOAA TIROS and Department of Defense DMSP satellite programmes. Thomas Lee showed us simulated NPOESS images and microwave sounder data containing interesting weather phenomena using MODIS data. NPOESS improves on TIROS and DMSP image quality by offering more wavelength channels, higher resolution and more shades of intensity. He also showed what can be accomplished by mathematically combining channels to distinguish smoke from blowing dust; he also introduced the Cooperative Program for Operational Meteorology, Education and Training [8], where you can learn more about atmospheric and related science through the ever-growing library of training modules.

During his talk, Thomas used volunteers to introduce two weather satellite concepts: image scanning and geostationary orbits. The first volunteer clasped her hands, leaving a small opening she looked through, and moved her hands from right to left as she stepped forward scanning each floor tile. Thomas cleverly equated the floor tiles with pixels displayed in a satellite image. The second volunteer circled around Thomas while Thomas moved his body so that it always faced the volunteer, simulating a geostationary satellite orbit where the satellite 'sees' the same Earth scene all the time. Excellent use of volunteers to demonstrate complex concepts.

Concurrent Sessions 3 started at 3 pm with three more fine presentations: *Using Remote Telescopes* by Robert Sparks, *TubeSats* by Randa Milliron, CEO of InterOrbital Systems and *NOAA-19 and GOES-O* by Tom Wrublewski of NOAA/NESDIS. I attended Tom's presentation because of my interest in weather satellites. Tom opened by playing the 'GOES N Stands Ready' video which can be viewed at

http://video.boeing.com:8080/asx_external/events/GOES-NStandsReady300k.asx

Tom then talked about NOAA's polar and geostationary satellites, explained their mission differences, the instruments on board and their new improvements—and how the data is used. Tom was proud to talk about the latest geostationary satellite, GOES-14's, first visible image, the first solar X-ray image (taken just the day before his talk) and the anticipated first infrared image. The most interesting fact presented was that hurricanes have a thermal infrared eye in addition to the visible eye. Scientists are finding this infrared eye to be a better predictor of the hurricane direction. More about the National Environmental Satellite, Data and Information Service (NESDIS) and their satellites can be found at

<http://www.nesdis.noaa.gov/>

The evening was topped off by the conference banquet in the *Golden Eagle Ballroom*. It was a sit-down formal affair and the dinner was delicious. Again, it was a chance to catch our breath and converse with other participants. Following dinner, we were entertained by the second keynote speaker, Dr Josh Willis, an Oceanographer with NASA at JPL. Dr Willis has two distinctions, a run-in with Rush Limbaugh [9] and being a recipient of President Obama's Presidential Early Career Award [10] for his work on the oceans and global warming. Dr Willis delivered a thought-provoking talk on a hot topic (no pun intended), global warming and the role the oceans play. The basis of the talk was that there is an energy balance between the sun's heat that warms the Earth and the heat that the planet radiates back into space.



Dr Josh Willis explaining global warming and its effects on Earth's oceans

Mankind has been adding greenhouse gases to the atmosphere which traps more energy and therefore warms the Earth. How do we know this? Scientists measure greenhouse gases contained in ice core samples and measure the ocean's temperatures and depth. One of Dr Willis' most interesting slides was a plot of the population growth versus the build up of carbon dioxide and how well the two correlated. Since the Earth is mostly covered by water, and water has a higher specific heat capacity than land or air, it takes more energy to raise its temperature compared with land and air; most of the heat absorbed by the Earth goes into the oceans. The increasing ocean temperatures have caused the Arctic sea ice to melt. However, Josh explained how sea ice melting does not contribute to increasing sea levels because sea ice already displaces sea water; land glaciers on the other hand do raise sea levels when they melt into the sea.

It is surprising to learn that the oceans have risen approximately 20 cm over the past 150 years. So is increased sea level a big deal? Well it is a big deal, especially in certain locales such as southern California, where officials have recently updated the 100 year flood plots to include major portions of low lying cities [11]. Also, the contamination of water wells with salt water is a major concern. Throughout Josh's talk with all of the bad news, I kept waiting for a glimmer of hope, but that never came. So whether you believe in global warming or not, Dr Willis' talk made you stop and think; you can listen to more of his concerns at

<http://www.npr.org/templates/story/story.php?storyId=88520025>

Saturday morning started with a cup of coffee and assorted pastries and then off to **Concurrent Sessions 4**. The choices were: *How to Teach Space Exploration* by Robert Trout, a NASA Solar System Ambassador, *Astonishing Astronomy* by Pamela Whiffen, a NASA Educator Ambassador and *Teaching Climate Change Using Problem-Based Learning* by Steve LaDochy and Pedro Ramirez, CSULA Geography Professors and Josh Willis from JPL. I attended Robert



Robert Trout exciting the audience about space exploration

Trout's session. Mr Trout is a former chemistry teacher who donates part of his time as a JPL Solar Ambassador going around teaching K-12 kids about space exploration. His admitted claim to fame is attending a *Save Star Trek* rally in 1967 and it's this enthusiasm which probably leads him to this worthy cause. He started his talk by covering space exploration from the late 1800s with George Orwell's *War of the Worlds* through to the present time with the Space Shuttle and the exploration

of the stars. He finds getting kids into the history and narrative—and asking lots of questions—gets them to put down their mp3 players and other distractions and become involved. Robert even made Tom Wrublewski and me show our age by raising our hands when he asked who remembered the movie *The Day the Earth Stood Still*: the original version, not the remake. Another motivating technique was asking the kids what their most notable space exploration events were: which invites lively classroom discussions. Robert then had the audience talk amongst themselves and then share ideas of how to effectively teach space exploration—like field trips. He finished his talk showing an amazing sequence of images of planets and stars, handing out many NASA publications and photos, and mentioning that one of his favourite websites is Astronomy Picture of the Day [12]. If, like Robert, you are inspired to teach kids about space exploration, you should consider JPL's ambassador program [13], where you provide the time and JPL supplies the NASA teaching aids and handouts. Another option for obtaining teaching aids is to contact JPL or visit the JPL Education Resource Center [14].

Concurrent Sessions 5 started at 10.15 am and included *After IRAS* by Jillian Tromp, a Physics and Astronomy graduate student from CSULA, *Magical Mars* by Nel Graham, Eagle Rock High School Los Angeles Earth Science and Science Teacher and *Eyes on the Earth 3-D* by Kevin Hussey, Technical Group Supervisor of JPL's Visualisation Technology Applications and Development Group. Being



Kevin Hussey, who presented JPL's 'Eyes on the Earth 3-D' program

fascinated by 3-D technology, I attended Mr Hussey's session. After working for JPL for seventeen years in the Image Processing Lab processing Landsat images and then animations for the IMAX movie 'Blue Planet' and others, Mr Hussey decided to give the commercial industry a try; he worked for Disney in the feature animation department developing their software. Eight years later he found himself back at JPL as manager in the visualisation lab. The one thing he learned along the way was that if you want to get through to kids, the use of video games is an ideal way.

In creating the 'Eyes on the Earth' program, a visualisation tool to help scientists to understand NASA satellite data [15], they added a game feature called *Metropolis*. In the game, ten cities are shown and then covered over with a carbon dioxide map; your job is to erase the carbon dioxide map as quickly as possible and reveal the cities. Your time is compared with the top scores of Internet players. The kids start to correlate the high concentration of carbon dioxide with the city locations. The 'Eyes on the Earth' program is amazing, not only in its feature set, which allows current satellite data to be overlaid on the globe, but also for the speed at which the globe can be manipulated. This speed is mostly due to the gaming engine Unity3D [16] that is used. Kevin was enthusiastic about his group's program and the future version of *Metropolis* for the I-phone, which will have an unusual twist, and another program called *Bird Watcher*. Stay tuned.

The concluding **Concurrent Sessions 6**, included *NASA Swift Mission Brings You Newton's Laws* by Lynn Cominsky and Kevin John from Sonoma State University California, *Endangered Glaciers: Response to Climate Change* by Angelique Hamane, Geology Professor and Shelly Shaul graduate student both from CSULA and *POES-GOES Outreach* by Tom Wrublewski of the NOAA/NESDIS [17]. Again my interest in weather satellites drove me to attend Tom's session.



Tom Wrublewski and Ed Murashie catching up during a break

Tom started by showing several NOAA videos and handing out a checklist of NOAA/NASA GOES and POES Outreach education materials. As Tom went down the list, he showed an example of the educational materials and encouraged the audience to check off the items they would like and fill out the checklist.



Dr. Richard Shope directing the Antarctic mission



Dr Paula Arvedson thanks the audience for their participation

from August 12-14, 2010 at CSULA. She then raffled off many nice prizes using the tickets that were given out in each session.

The conference was well organised, had many enthusiastic speakers and participants and was a huge success, thanks to Dr Paula Arvedson and many others. I look forward to attending next year and highly encourage others to do the same. I also want to thank the sponsors and exhibitors for their support, time and excellent handouts.

Lunch was a formal sit-down affair with a tasty chinese chicken salad followed by the third keynote speaker, Dr Richard Shope of NASA's JPL Office of Science Research and Analysis and also NASA's ArctiQuest Expeditions [18]. Richard was the most flamboyant speaker and had everyone out of their chairs, in a pretend airplane flying to Antarctica to run some experiments. When we 'landed' we put on our protective clothing and walked around the room investigating several tables with experiments and displays highlighting the many properties of water, ice and dry ice. For example, there was a tank of water with a block of dry ice bubbling, showing the sublimation property of dry ice next to a table with a large block of clear ice that was being cut with a simple piece of string. Dr Shope pointed out that many kids have never seen such a large block of ice and are just full of questions. Our experiments were directed by many of Dr Shope's eager, entertaining and knowledgeable student science coaches. Dr Shope's teaching skills masterfully combine learning with fun.

Following Dr Shope's talk at 2.30 pm, Dr Paula Arvedson thanked everyone for coming and announced that next year's *Satellite and Education Conference XXIII* will take place

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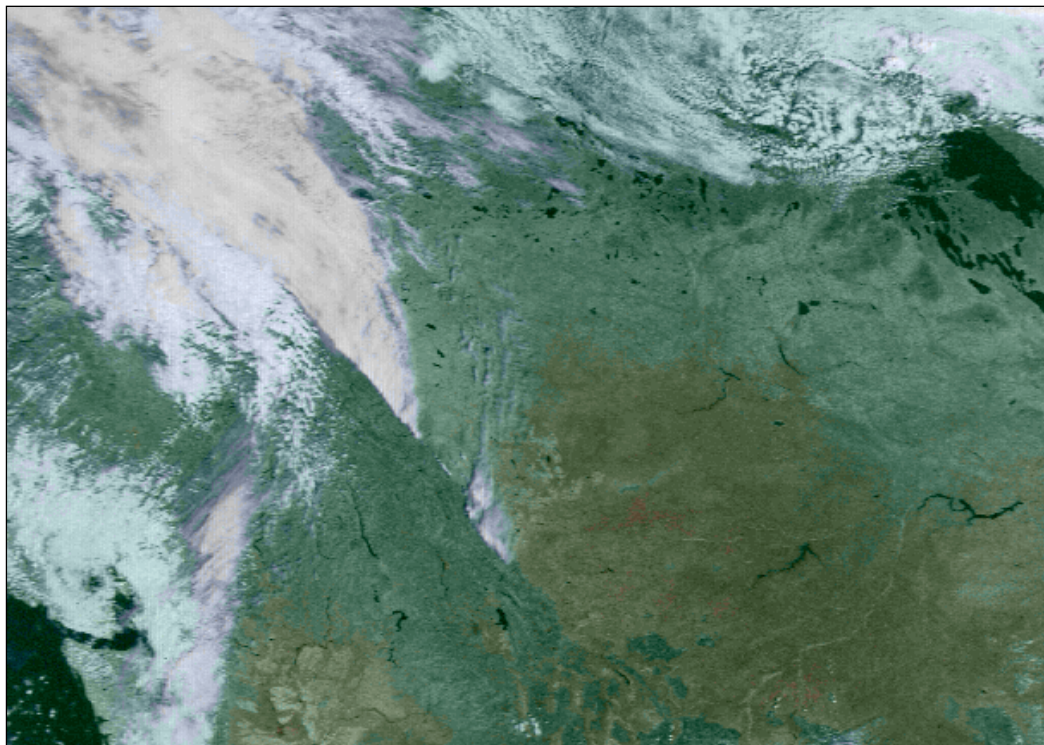
Orographic Lifting in the Rocky Mountains

Keith Fraser

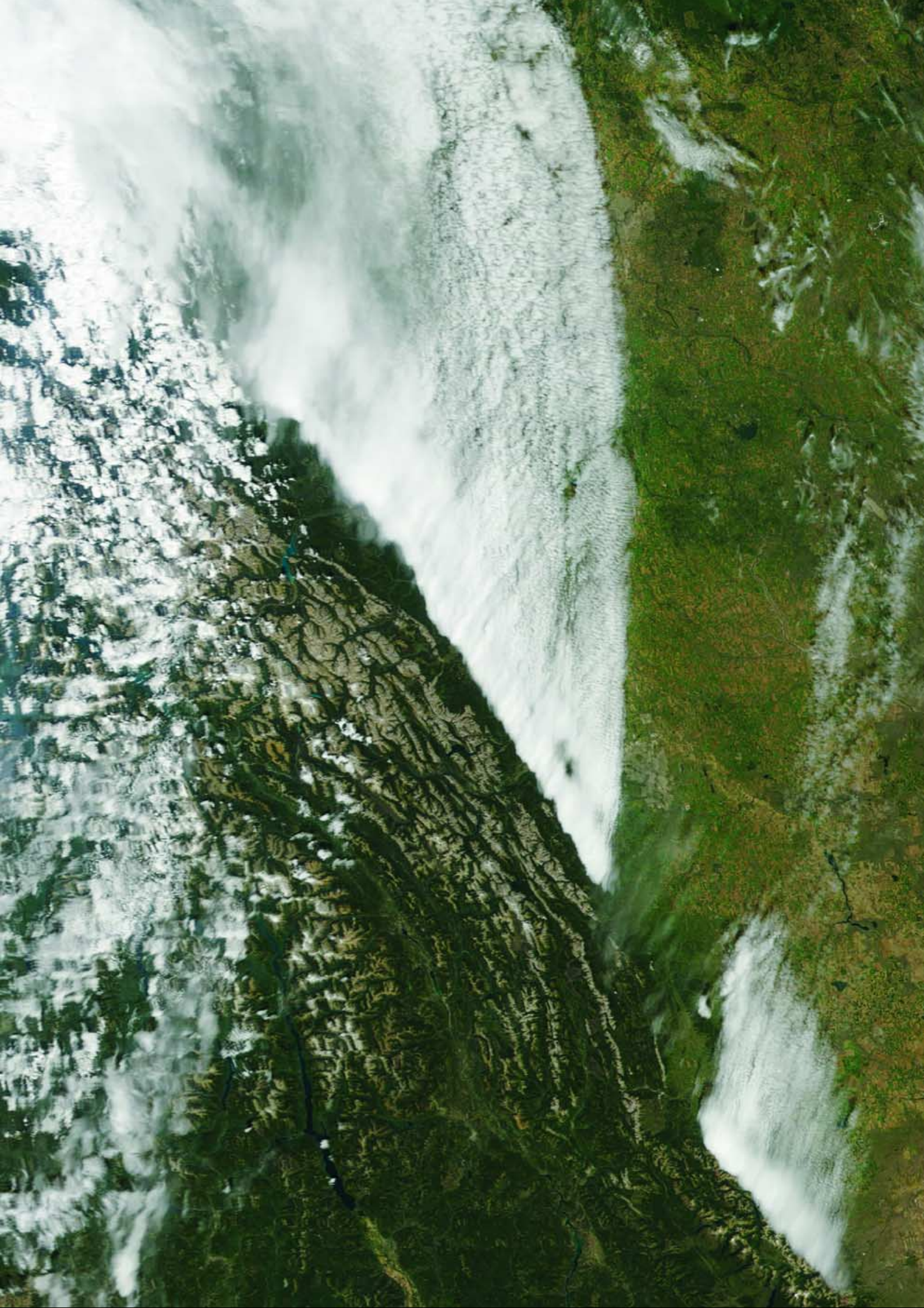
I spotted an unusual straight cloud line along the Rockies in a NOAA-17 image on August 25 this year. Intrigued as to it's cause, I contacted *Nav Canada*, whose flight service meteorologist replied that it was orographic lifting along the Rocky Mountain Trench, which runs for approximately 500 km along the eastern side of the Purcell and Selkirk ranges. The land rises eastward out of the Trench to the high Prairie, forcing the air mass to rise producing the cloud line.

I downloaded the Terra MODIS image of the region, first removing artefacts with Les Hamilton's *SmoothMODIS* software before correcting the aspect ratio of the scene with David Taylor's *CorrectGeometry* program. The result can be seen on the opposite page issue.

Terra image credit:
MODIS Rapid Response Team at
NASA/GSFC



A NOAA 17 image showing orographic lifting over the Rocky Mountain Trench at 17:17 UT on August 25, 2009



Antenna Spotting

David & Cecilia Taylor



HMCS Athabaskan at Leith Docks

During October 2009, two Canadian warships (the 5,100 tonne destroyer HMCS Athabaskan and the 3,995 tonne frigate HMCS Halifax) and two Norwegian submarines (ULA S300 and UTVAER S303) visited the port of Leith, Edinburgh. The chance of seeing these ships, and of being able to visit HMCS Athabaskan, provided the ideal excuse for us to visit one of the many fine dining establishments in the revitalised port of Leith, and subsequently to visit and photograph these vessels.

Although the popularity of the ship visits meant that we had to queue for nearly an hour, imagine our delight when, amongst all the radars, guns, and other equipment, we saw the familiar sight of a QFH antenna! Is it used for weather satellites, or maybe Orbcomm? Sadly, we couldn't find out (many of the crew were ashore), but it looked just like the APT receiving antenna sold by the GEO Shop! We're pretty sure it's for APT but would love to hear from any reader who knows for certain.

By the way: the name Athabaskan comes from a North American indigenous people located in western North America. You can see them illustrated on the ship's crest, which was made in tiles on the floor of the bridge.

More information about HMCS Athabaskan:

http://www.navy.forces.gc.ca/athabaskan/0/0-s_eng.asp

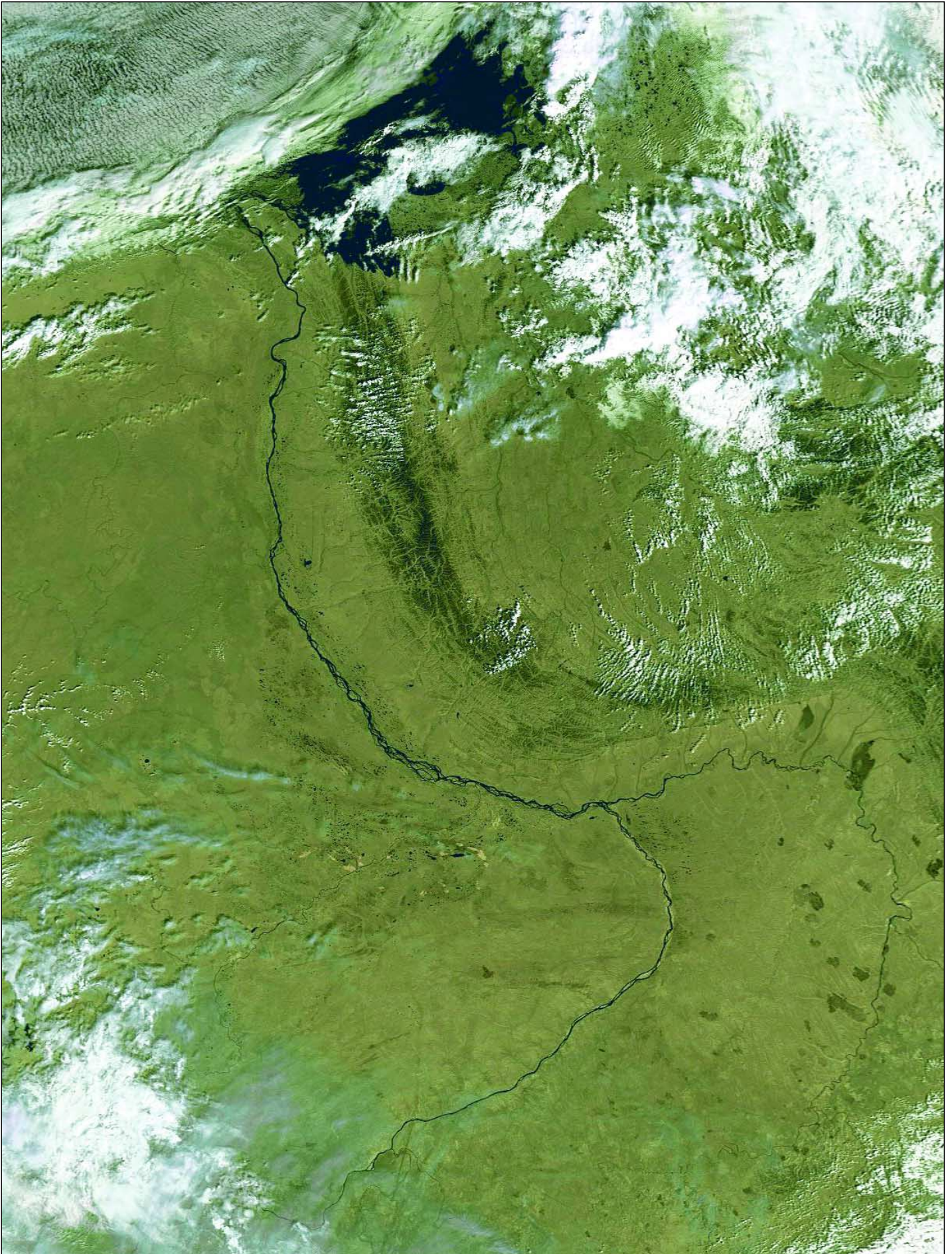
http://www.navy.forces.gc.ca/halifax/0/0-s_eng.asp

More information about the Athabaskans and their languages

http://en.wikipedia.org/wiki/Athabaskan_languages



Finding the QFH



The Lena River, some 4,400 kilometres long, is one of the largest rivers in the world. The Lena Delta Reserve (72°N, 127°E) is the most extensive protected wilderness area in Russia and is an important refuge and breeding ground for

many species of Siberian wildlife. **Robert Moore** submitted this Metop-A image he acquired on August 21, 1009, which shows the Lena meandering across the plains of eastern Siberia towards its delta in the Laptev Sea.

Ash and Steam Plume from Soufriere Hills Volcano

A NASA Earth Observatory Report



The Soufrière Hills volcano on the island of Montserrat in the Lesser Antilles island chain in the Caribbean Sea has been active since 1995. Its most recent eruptive phase began with a short swarm earthquakes, thought to be caused by movement of magma beneath the volcano, on October 4, 2009. This was followed by a series of ash-venting events which create plumes of ash that can be deposited at significant distances from the volcano. In addition to ash plumes, pyroclastic flows and lava dome growth have been reported as part of the current eruptive activity.

This astronaut photograph from the International Space Station captures an ash and steam plume extending westwards from the volcano on October 11, 2009. While much of the island is covered in green vegetation, gray deposits that include pyroclastic flows and volcanic mudflows are visible, extending from the volcano toward the coastline. Urban areas in the northern and western portions of the island are recognisable by linear street patterns and the presence of bright building rooftops.

NASA Astronaut photograph ISS021-E-5555

Computer Controlled Tracking HRPT System

Kevin Nice

WiNRADiO Communications, the innovative and world- renowned manufacturer of computer controller radio receivers, has launched their latest innovative product. The *WiNRADiO WSS-420 Weather Satellite System* is a complete and fully integrated hardware/software system for capturing and processing data streams from polar orbiting satellites in real time.

<http://www.winradio.com/home/wss-420.htm>

This specialist satellite receiving system represents an expansion of markets for the company. Capitalising on their considerable knowledge and experience as recognised leaders in the field of PC based receivers, *WiNRADiO Communications* has utilised their experience and expertise to produce the new HRPT/CHRPT Weather Satellite System.

The *WiNRADiO WSS-420* has the following key features:

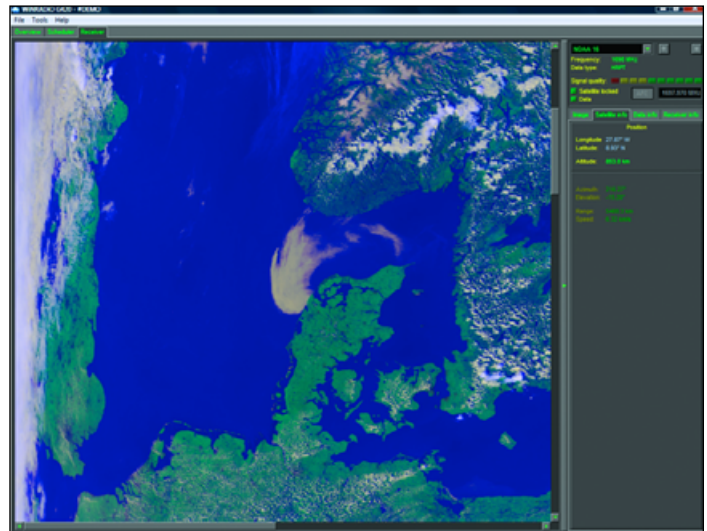
- Fully-integrated hardware/software solution
- Compact stand-alone system
- Robust rotator and tripod
- Easy installation, calibration and configuration
- Automatic satellite dish positioning
- Automatic real time orbital satellite tracking
- Automatic reception scheduling
- Full support for multi-spectral AVHRR data
- Full support for NOAA (HRPT) and Feng Yun-1D (CHRPT)
- Advanced image processing software
- Automatic updating of satellite prediction data from Internet
- Automatic application clock synchronisation via Internet
- AVHRR data export in NOAA Level 1B (HRPT) file format

The system supports HRPT data streams with 5 multi-spectral channels from NOAA satellites and CHRPT data with 10 channels from the Feng Yun-1D satellite. Data is available immediately after a satellite pass and it can be exported to NOAA Level 1B (HRPT) file format, or alternatively processed with the *WR-WSDA-420 Weather Satellite Data Analyser Software* option.



The *WSS-420* is supplied with *WR-G420* software for control of the tracking and receiving hardware. Here is the satellite prediction page in operation.

The *WSS-420* system's external hardware consists of high-quality components. The dual-axis rotator is a robust unit designed with steel gears for heavy-duty work and extended life, while offering considerable turning and breaking torque. The rotator is controller by a digital positioner unit that interfaces with the application software via the computer USB port. The control unit can position the rotator to the desired target position with an accuracy of plus or minus 0.5 degrees.



This is an HRPT pass from a NOAA series satellite displayed by the *WR-G420* software.

The antenna consists of a 1.2 m diameter parabolic steel dish with a tightly integrated prime focussed patch feeder and attached low-noise downconverter; the latter translates the 1.7GHz L-Band frequencies down to 140 MHz for the indoor receiver.

This receiver mounts internally in the PC running the system software. It has a compact form factor and fits on to a 2/3 length PCI plug-in card slot. The front-end employs digital synthesis for frequency control, while data decoding and frame synchronisation are performed in DSP firmware.

Installation and configuration is made easy by means of a user-friendly software setup wizard which will automatically detect installed and connected hardware. The setup software will also assist with rotator and receiver calibration during initial installation.

The *WSS-G420 System Application Software* can be operated either manually or in automatic control mode. When set to automatic mode the system can operate entirely unattended, taking care of tracking and reception scheduling of specified satellites and saving all received image data. Resulting images can be printed or saved in common image formats. In addition to basic image manipulation, the software provides advanced image processing functions such as RGB false-colour editing of spectral channels, noise reduction and contrast enhancement. Data output can be exported in NOAA Level 1B (HRPT) format.

All of the individual system items are available separately, including the robust Azimuth/Elevation rotator with controller and *WR-ARP-ELAZ-100 Antenna Rotator/Positioner* with *WR-RCU-100 Controller*

<http://www.winradio.com/home/arp-elaz-100.htm>

The *WSS-420 Weather Satellite System* is available from

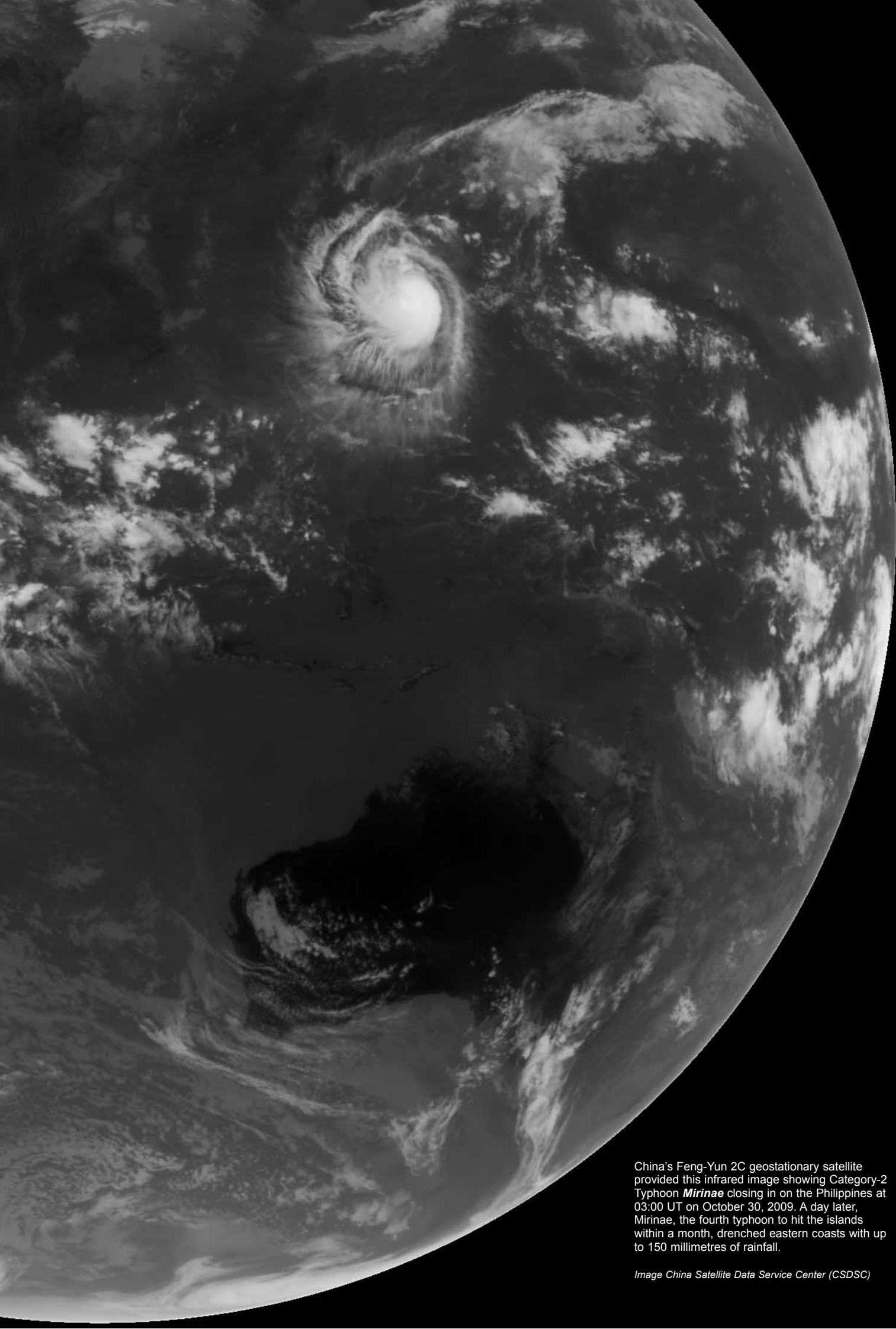
Radixon UK Ltd. Tel: +44 (0)870 446 0449

Further information is available at

<http://www.radixon.co.uk>

The Melbourne based *Radixon Group*, with branches in the UK, USA and Slovakia have been designing innovative computer based radio solutions since 1991. Their products are used by professionals and hobby users on all continents. *WiNRADiO Communications* was established to commercialise a wealth of accumulated experience in radio communications monitoring and surveillance technologies.

WiNRADiO Communications has succeeded in introducing a number of world first breakthrough technologies, and is a recognised leader in the market place



China's Feng-Yun 2C geostationary satellite provided this infrared image showing Category-2 Typhoon **Mirinae** closing in on the Philippines at 03:00 UT on October 30, 2009. A day later, Mirinae, the fourth typhoon to hit the islands within a month, drenched eastern coasts with up to 150 millimetres of rainfall.

Image China Satellite Data Service Center (CSDSC)

Create your own Satellite Predictions with WXtrack

Les Hamilton

As this is the final issue of *GEO Quarterly* under my editorship, I thought that a brief tutorial in compiling your own weather satellite pass predictions would be appropriate. Producing these lists has been one of my more time-consuming tasks over the years; I don't plan to make it a 'job for life' and I doubt anyone else is up for the challenge.

In fact, everyone involved with APT reception already possesses the necessary software to make their own predictions. Predictions published in *GEO Quarterly* are a minimum of four weeks 'old' by the time you receive them, a necessary time delay due to the publishing and distribution processes. By compiling your own you are guaranteed to have the most accurate predictions.

This will end this anachronistic waste of a page—which could perhaps be put to better future use displaying readers' APT image submissions: but that's up to the new editor.

WXtrack

David Taylor first wrote the popular satellite tracking program *WXtrack* over a decade ago. Not only does this software provide real-time tracking of satellites on a map of the Earth, it also allows the user to compile and print pass predictions for any given location—and for up to a full month into the future.

Updating Keplerian Elements

WXtrack contains files of satellite 2-line element data and will prompt you when these become out of date. Before making your list of satellite passes, click the Setup tab to display the window shown in figure 1. Use **<Options → Update Keplers>** to load the latest data.

Creating Pass Predictions

In the top-left frame are two panels: the left one, *Available*, lists all satellites 'known' to *WXtrack*; the right-hand panel, *Active*, contains all the satellites for which predictions and tracking will be displayed. A satellite's name is switched from one panel to the other by the simple expedient of double-clicking on it.

The top-right frame is the *Pass list generator*, which displays the predictions for the active satellites. The instant any satellite is added to, or removed from, the *Active* panel, you will see the pass list being updated.

Location

Of course, for best results, you want the

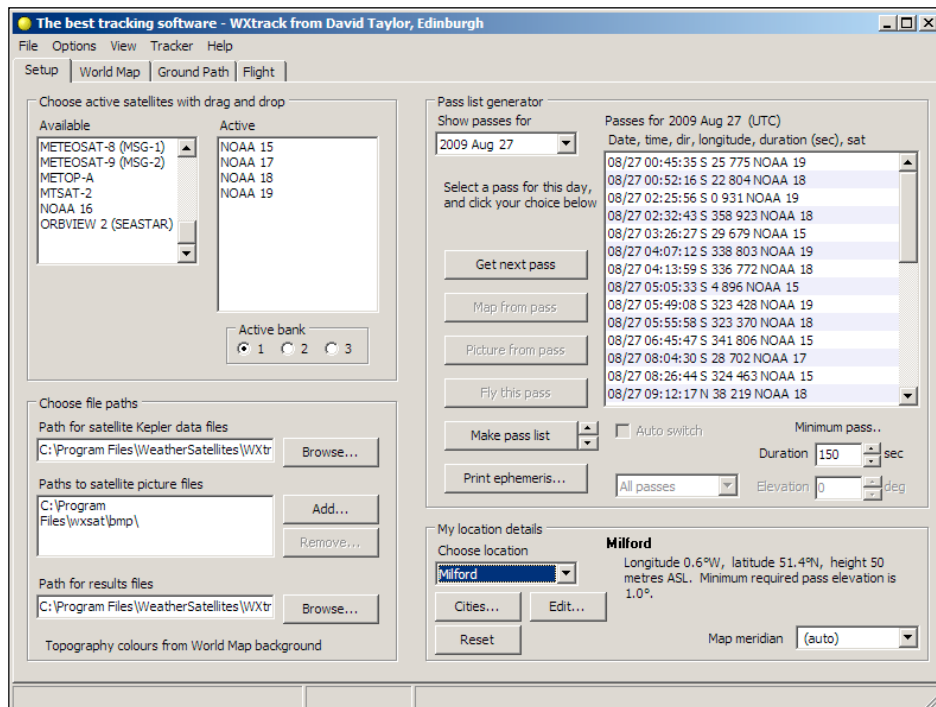


Figure 1 - The Setup Window

passes to be calculated for your current latitude and longitude. You have the option of selecting a location from the drop-down list in the lower-right panel (*My location details*) or entering your own specific station by clicking the **<Edit>** button. This reveals the popup window shown in figure 2.

Type your own location, latitude and longitude in the fields provided then click **<OK>**. If your edited location is not immediately displayed as the default, you can now select it from the drop-down list.

Printing Predictions

Passes can be printed out for as many days as desired using the **<Print ephemeris>** button at the foot of the *Pass list generator* panel. By default, just a single day is printed but, by use of the up/down arrows adjacent to the **<Make pass list>** button, this may be extended to a maximum of 28 days.

All satellites in the 'Active' list are included in the listing; if you require predictions for just a single satellite, simply remove the unwanted ones from the Active panel by double-clicking them.

Other Programs

The popular *Wxtolmg* APT capture program also allows you to make listings of satellite passes. *Wxtolmg* will prompt you if the keplers are out of date.

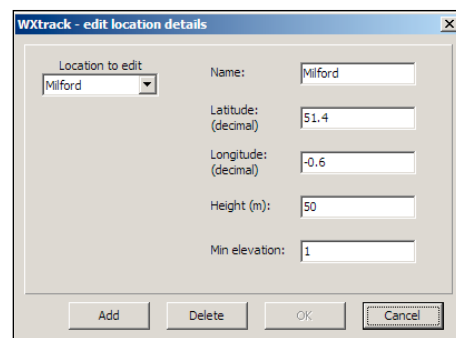


Figure 2 - The Edit Location Window

Click **<File → Update keplers>** to correct this then use the menu **<Options → Active APT satellites>** to establish the satellite(s) for which you wish predictions to be calculated. Finally, select **<File → Satellite pass list>**. You can use the 'Look ahead' selector to extend the listing to a full month; the **<Print>** button sends output to your printer.

APT Decoder can also produce predictions. Select **<Satellite → Keplerian elements>** then click the **<Download>** button to update the 2-line elements. Select your satellites by ticking the appropriate boxes in the **<Satellites → Active APT satellites>** menu then use **<Satellite → Pass list>** to display the predictions (no print option).

Which is the Best Antenna for APT Reception?

Your chance to join the discussion . . .

Jerry Martes - email: jerrymartes@verizon.net

This article was written to express facts as I see them and all disagreements about the validity of these presented 'facts' will be appreciated. I did wonder if I might have been too argumentative, but it is my intention to present data which will prompt readers to submit their own, possibly differing points of view.

The APT receiving antenna is expected to have hemispherical coverage so that it is capable of receiving signals from the polar orbiting satellites without the need for a pointing mechanism. It is probable that quadrifilar helical antennas (QFH) are used on the orbiting satellites to send the 137 MHz signals down to Earth. NOAA certainly uses a QFH on their polar Earth orbiting satellites.

The pathloss related to the distance from the satellite results in the signal being weaker when the satellite is at the horizon compared to overhead. Therefore, the APT receiving antenna will benefit greatly from having a radiation pattern with high sensitivity to signals at low elevation angles.

For many years, the QFH has been considered ideal for Earth located APT antennas. It has been my observation that, although the QFH is a decent antenna for APT, it is not ideal because it is very demanding of the builder to carefully follow 'build plans' with precision.

Many APT antenna builders enjoy the relative simplicity of the turnstile antenna. The turnstile is probably the easiest antenna concept to understand and to build at home without need for careful tuning. And, the turnstile performs nearly as well for APT as any other.

The Lindenblad antenna has been suggested for APT. The Lindenblad has no application for APT because it has an overhead null.

The double cross antenna (DCA) is an antenna design concept that provides good sensitivity to signals from low elevation satellites. The DCA is quite forgiving of variations from any specific 'plan'. It provides good sensitivity to low elevation satellites with minimum need for precision while building it.

Quadrifilar Helical Antenna

The QFH consists basically two loops, each twisted to form one half of the antenna. Each loop is formed to provide an input impedance that is compatible with the other twisted loop. So, when connected in parallel, the antenna currents are appropriate to produce a radiation pattern that is close to circular over the hemisphere.

There is a significant problem with adjusting the two 'twisted loops' so that their input impedances are compatible for producing the proper currents.

The two loops of a QFH can be twisted 90 degrees or 180 degrees as shown in figure 1.

In both cases, 90° or 180°, the QFH requires precise adjustment of the loops to provide the correct current distribution on the loops.

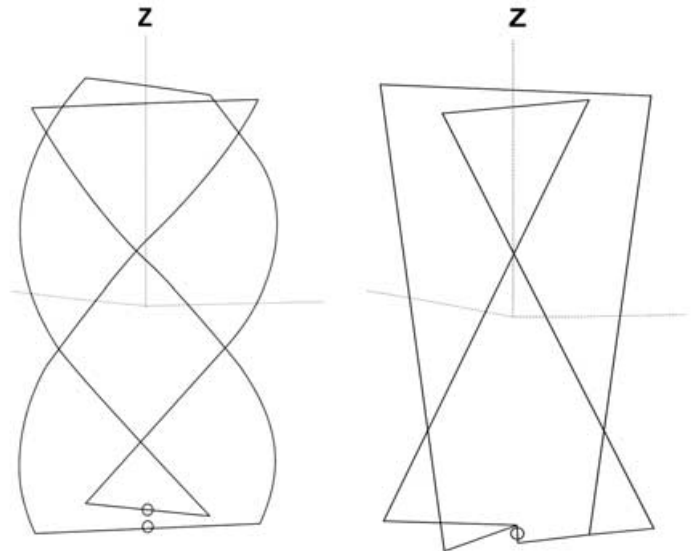


Figure 1 - Schematics for QFHs twisted at 90° (left) and 180°

Turnstile

Although the turnstile antenna is quite easy to build, it does suffer from poorer sensitivity to low elevation satellites. A turnstile is illustrated in figure 2 below

DCA

The DCA is an antenna design concept that provides the best performance for APT image reception compared with the QFH or turnstile. The DCA can be built from most conductors and low cost coax. The DCA is essentially four dipoles, each about $\frac{1}{4}$ -wavelength long and spaced to form a square when viewed from above, with the sides of the square about $\frac{1}{4}$ -wavelength, as shown below (figure 3)

It is my observation that there is a reluctance amongst the majority of APT amateurs to accept the fact that a DCA provides appreciable improvement over any other APT antenna. I have not seen any fact or data that supports the claim that any hemispheric coverage antenna performs better than the DCA for APT imaging.

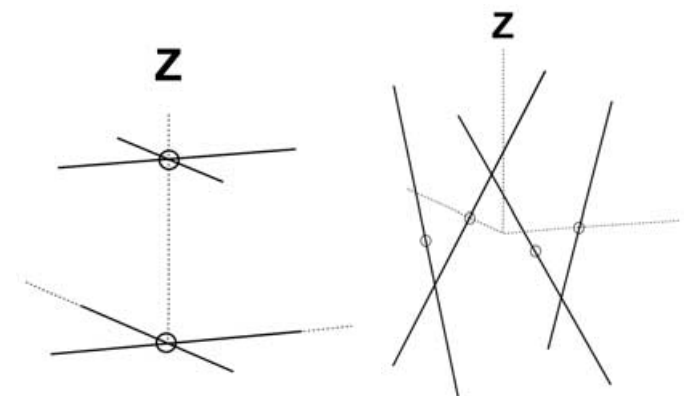


Figure 2 - Schematic for a turnstile

Figure 3 - Schematic for a DCA

Lake Eyre Fills

... an Australian View

Ken Morgan VK3CEK

Located some 450 kilometres north of Port Augusta (at the top of Spencer Gulf), South Australia, Lake Eyre is Australia's largest lake, some 9500 square kilometres when filled. The north arm alone is larger than Belgium. The filling of the lake and the resultant explosion of insect, fish, animal and especially bird life is a tremendous occurrence in Nature. A selection of *Landsat* images of this event are available on the Internet at

www.lakeeyreyc.com/Status/latest.html

Boats have actually sailed on Lake Eyre, and a club exists called The Lake Eyre Yacht Club.

www.abc.net.au/local/stories/2009/25/2501193.htm

I had determined to collect suitable NOAA images in an endeavour to show the lake and describe how it filled. This laudable exercise was delayed by work on an HRPT project, but has been re-ignited by Les' article in *GEO Quarterly* 23.

For the greater period of time the 'Lake' is a smooth white plane of salt extending as far as the eye can see. So smooth, it was selected for Donald Campbell's attempt on the land speed record with the famous Bluebird on July 17, 1964.

www.dhub.org/object/208607,donald

Extraordinary rains in the north of Northern Territory and Queensland during summer 2008-09 resulted in floods in those areas, with the filling or creation of a series of lakes in the Northern Territory. Some lakes are named, and a good map will show at least Lake Woods, Anthony Lagoon and Lake Sylvester. While great quantities of water fell over northern Queensland and found their way to Lake Eyre, NOAA APT images do not show up any lakes there.

The enormous quantity of water further results in the filling of what are depressions or low-lying ground, sometimes referred to as 'downes' on maps. For most of the time these are dry and do not appear on satellite images: however, when filled, they do show up. A close examination of the images reveal a 'stain'—a light yellow colour that gradually extends from the newly filled lakes in a south-south-east direction across the Simpson Desert, over various downes and small lakes. This extraordinary water movement continues until named or recognised rivers commence filling and running. The Diamantina, Warburton, Georgina rivers and Cooper Creek are all well known.

With water movement over a number of months, the North and South arms of Lake Eyre gradually fill. Underground life stirs, fish appear and birds flock in. The miraculous event occurs! The amount of water and life, the size of the event is hard for the mind to grasp. The paradox is that while these great floods occurred 'up' in the north, 'down' in the south, we experience drought and bushfires!

Figure 1 comes from a NOAA-18 pass on August 13, 2007, well before the flooding event. It shows no lakes in the area of interest. Figure 2, an image from a NOAA-18 pass on August 7, 2009 shows the lakes and 'stain' caused by the advancing floodwaters. It also shows Lake Eyre, partly clouded over. Figure 3 comes from a NOAA-18 pass during February 2009, well into the flooding episode. It clearly shows lakes forming in Northern Territory, and a close examination shows the 'stain' appearing

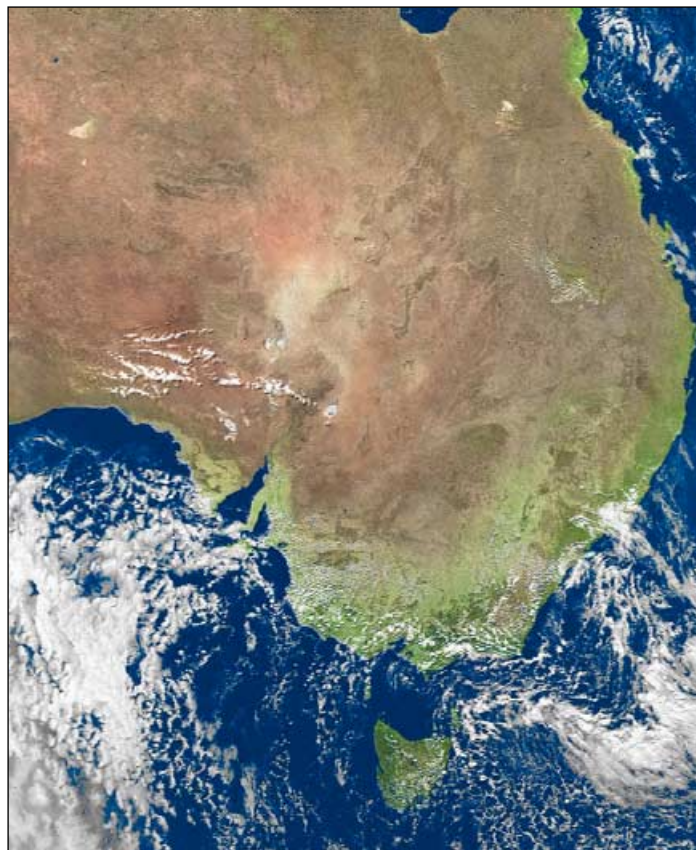


Figure 1 - NOAA-18 captured this image on August 13, 2007, well before the floods commenced.

around them. Figure 4 is one of my earliest NOAA-19 images, from May 20, 2009, and shows the lakes, stain and the north and south arms of Lake Eyre. Lines of latitude and longitude have been included for locating places when working with a map.



Finally, the map above shows Australia relative to Europe to help in appreciating the distances the waters travel.

My APT images were obtained with a tall narrow QFH antenna, a Timestep Proscan receiver and Wxtolmg software.

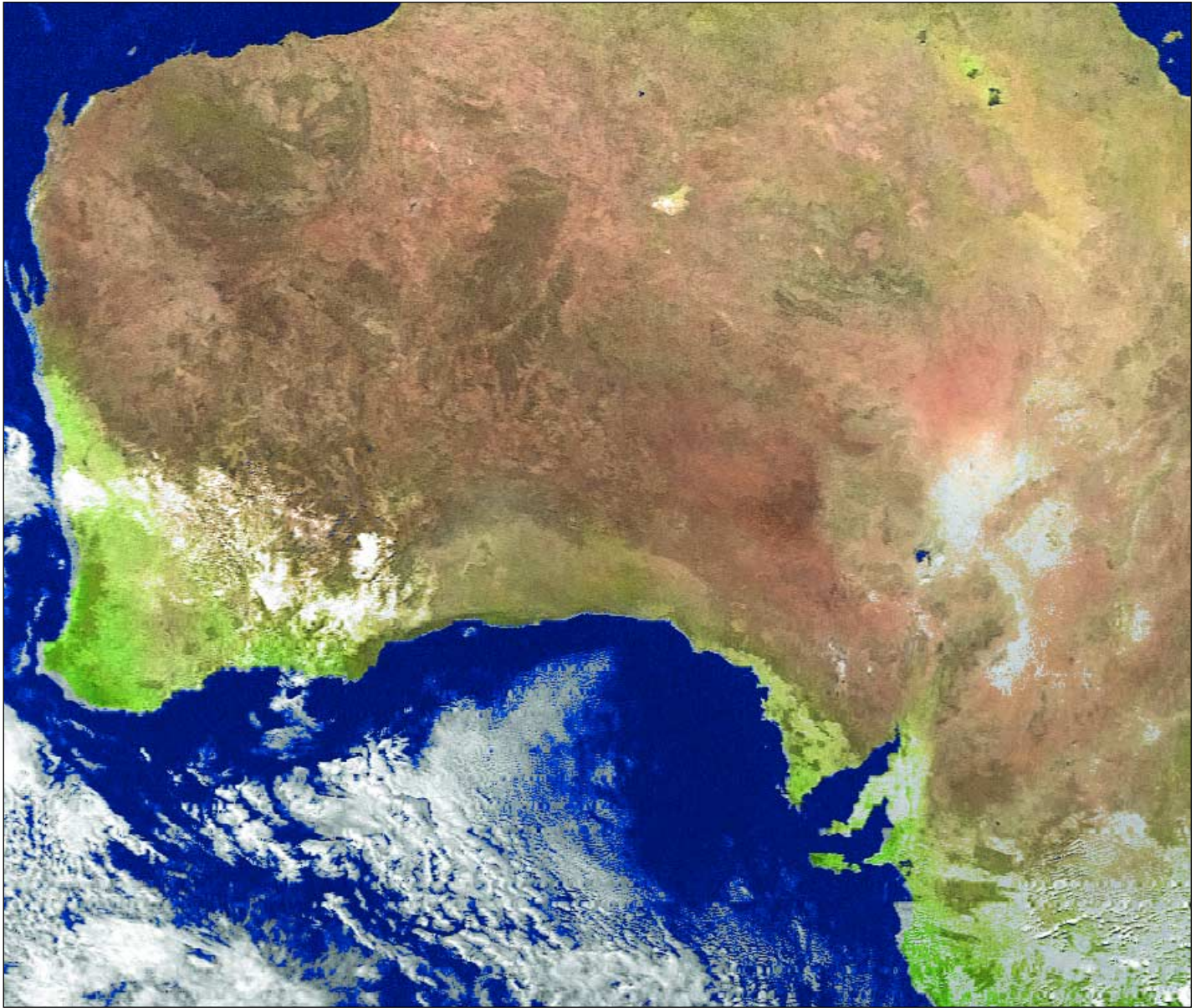


Figure 2 - This NOAA-18 image dating from August 7, 2009 shows Lake Eyre as its waters recede

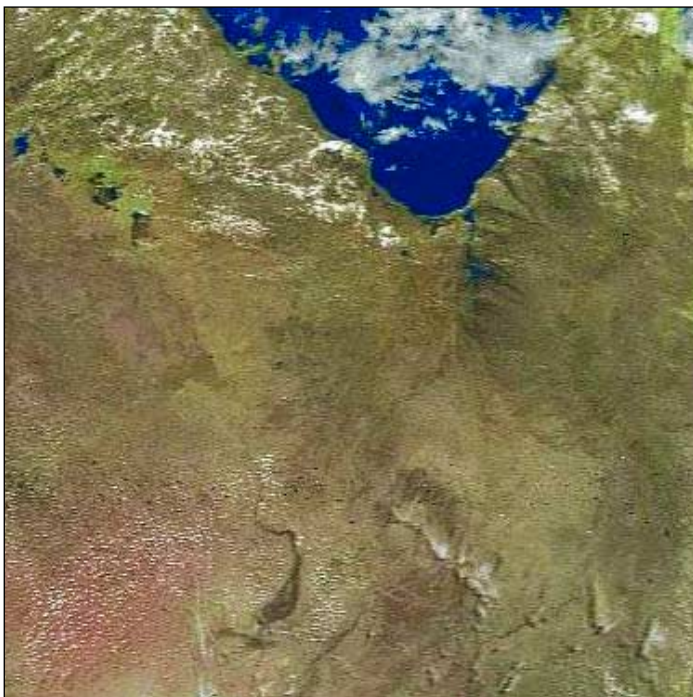


Figure 3 - Floodwaters on the move: NOAA-18 on February 28, 2009

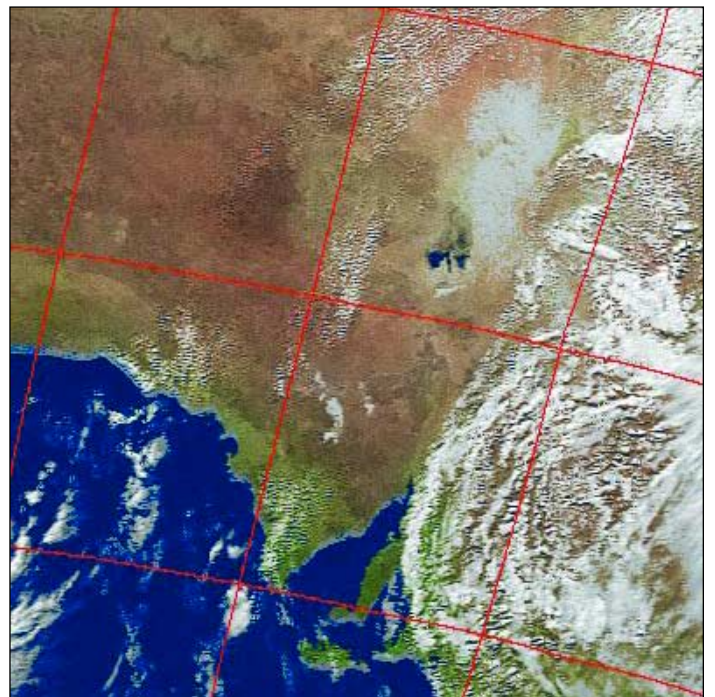


Figure 4 - Floodwaters filling Lake Eyre: NOAA-19 on May 20, 2009

Sarychev Peak Eruption

Kuril Islands

A NASA Earth Observatory Report



A fortuitous orbit of the International Space Station revealed this striking view of Sarychev Volcano (Kuril Islands, northeast of Japan) in an early stage of eruption on June 12, 2009. Sarychev is one of the most active volcanoes in the Kurils and is located on the northwestern end of Matua Island. Ash from the multi-day eruption has been detected 2 400 kilometers of the volcano requiring commercial airline flights to be diverted away from the region to minimise the danger of engine failures from ash intake.

This detailed astronaut photograph is exciting to volcanologists because it captures several phenomena that occur during the earliest stages of an explosive volcanic eruption. The main column is one of a series of plumes that rose above Matua Island and appears to be a combination of brown ash and white steam. The vigorously rising plume gives the steam a bubble-like appearance.

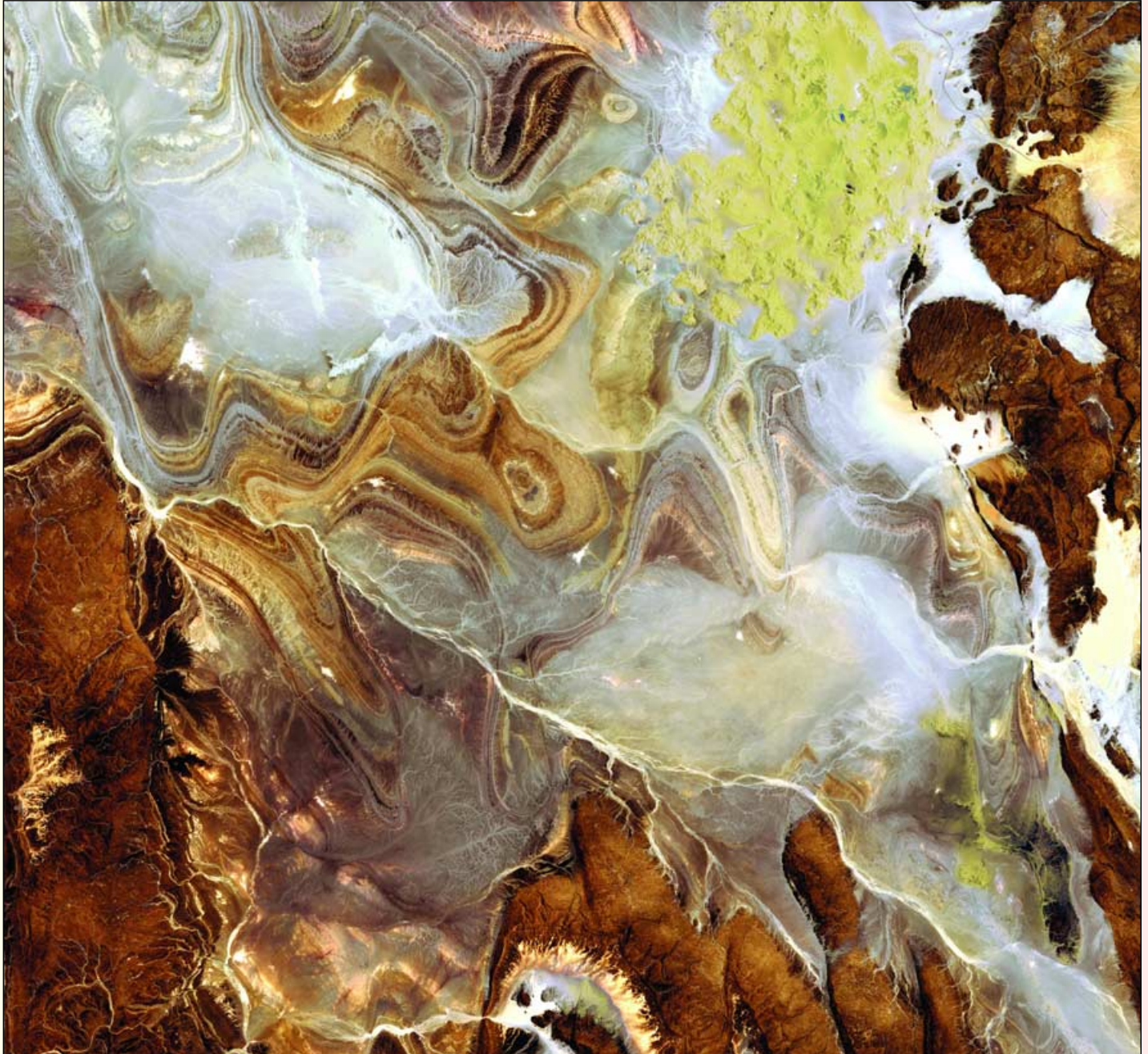
In contrast, the smooth white cloud on top may be water condensation resulting from rapid rising and cooling of the air mass above the ash column. This cloud, which meteorologists call a pileus cloud, is probably a transient feature. The structure also indicates that little to no shearing wind was present at the time to disrupt the plume. By contrast, a cloud of denser, gray ash, probably a pyroclastic flow, appears to be hugging the ground, descending from the volcano summit. The rising eruption plume casts a shadow to the northwest of the island (image top). Brown ash at a lower altitude of the atmosphere spreads out above the ground at image lower left. Low-level stratus clouds approach Matua Island from the east, wrapping around the lower slopes of the volcano. Only about 1.5 kilometers of the coastline of Matua Island (image lower centre) are visible beneath the clouds and ash.

NASA Astronaut photograph ISS020-E-9048

LAND OF TERROR

Algeria's Tanezrouft Basin

ESA - Observing the Earth



This image from **Japan's Advanced Land Observing Satellite** (ALOS) shows the extraordinary landscape of the Tanezrouft Basin, in south-central Algeria. The region is known as 'Land of Terror' because of its lack of water and vegetation.

Most of the Sahara is covered by bare stone and pebbles rather than sand and, with little vegetation present, the landscape is modified by strong, nearly constant wind erosion. This basin is characterised by dark

sandstone hills, steep canyon walls, white salt flats, stone plateaux, sandstone outcrop patterns of concentric loops and sprawling seas of multi-storey sand dunes known as *ergs*. The yellow cluster of dunes at upper right is known as Erg Mehedjibat.

The Algerian Sahara makes up more than 90% of the country's total area. Major oil and natural gas deposits lie beneath the Sahara's surface, contributing to Algeria's position as one of the wealthiest African

nations. As large as the whole of Western Europe, Algeria is the second-largest country in Africa, after the Sudan.

ALOS captured this image on June 24, 2009 with its Advanced Visible and Near Infrared Radiometer type-2 (AVNIR-2) instrument, designed to chart land cover and vegetation in visible and near infrared spectral bands with a resolution of 10 metres.

Image: JAXA, ESA



Figure 2 - Greenland, imaged by Robert Moore
Image © EUMETSAT 2009

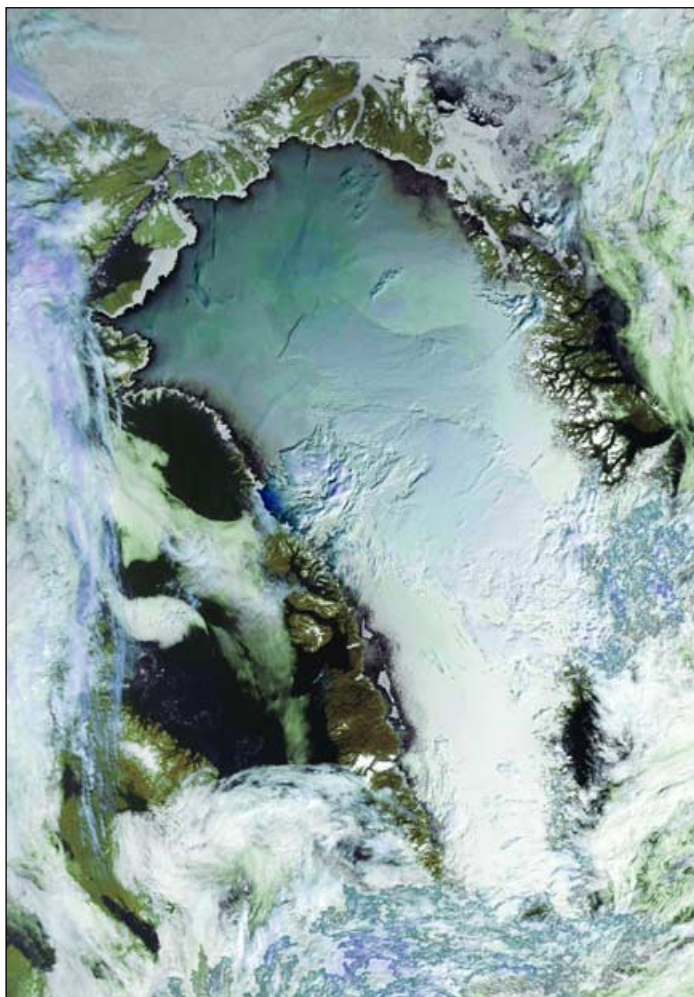


Figure 3 - Greenland, the same image after use of Photoshop
Image © EUMETSAT 2009

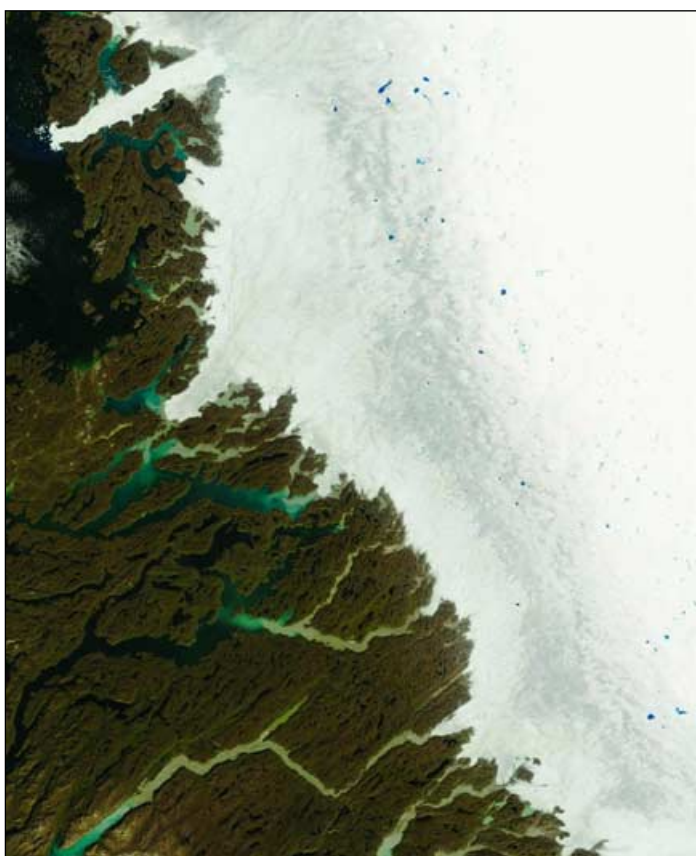


Figure 5 - The Ilulissat Icefjord and Icesheet Melt pools (August 11, 2008)
Terra Image: MODIS Rapid Response Team at NASA/GSFC



Figure 6 - The Ilulissat Icefjord and Icesheet Melt pools (August 9, 2009)
Terra Image: MODIS Rapid Response Team at NASA/GSFC

August High Pressure Regime over **GREENLAND**

Robert Moore and Alan Banks

On August 8, 2009, NOAA-17 provided an unusually fine image when a 1017 mb high pressure area centred over Greenland held back the usual cloud cover. It is evident that the ice and snow had receded from the edges of the land and that glaciers and rivers are very easy to spot. Notable among the glaciers, shown even more clearly in the Channel-04 image opposite, is the Petermann Glacier. This, the most northerly glacier in the world, is currently being studied by *Greenpeace* as part of their programme monitoring oceanic warming.

<http://www.meltfactor.org/blog/?tag=petermann-glacier>

The Petermann Glacier is located off the extreme northwest coast of Greenland, as highlighted in figure 2.

Corresponding colour composite images appear overleaf. Snow and ice obviously result in a somewhat dazzling image (figure 3) but reducing the brightness in *PhotoShop* brought out a number of surface features (figure 4).

A striking feature of Greenland images that day were the very obvious melt pools along the western edge of the ice cap which seemed more extensive than those of the year before. Melt pools are of interest as they are pools of melted ice and snow that form on the ice sheet when it is warmed in spring and summer. The pools are darker than ice and snow and absorb more solar radiation than the surrounding ice and snow—a factor which further accelerates the melting process.

It was reported in 2002 by Zwally and colleagues that increases in ice velocity during the summer are correlated with the timing and the intensity of ice sheet surface melting. Using periodic global positioning satellite measurements from 1996 through 1999, the researchers discovered that the ice flow speeds up from 31.3 cm per day in winter to a peak of 40 cm per day in the summer when surface melting is greatest. The report concluded that surface meltwater travels quickly through the 1200 metre thick ice to the bedrock where it makes the ice slide faster. This process was known for decades to enhance the flow of small mountain glaciers, but was not previously known to occur in large ice sheets.

Meltwaters make their way from the surface to the bedrock by draining into crevasses and large tunnels called moulins, the latter often as wide as ten meters in diameter. More meltwater underneath the ice sheet provides lubrication to allow the ice sheet to move faster toward the coastline of Greenland. Over time, as ice melts from the top of the ice sheet, the ice thins and spreads out toward lower elevations closer to the coast.

The meltwater also carries heat from the top of the ice to the base of the ice that sits on the bedrock. More recent studies now show that this is a relatively minor contributor to the retreat of glaciers in Greenland. The enhanced calving of glaciers where they terminate at the ocean has a much greater effect and this seems to be exemplified in the MODIS images of Ilulissat Icefjord.

These images (figures 5,6) have been obtained from the MODIS Rapid Response archive at

<http://rapidfire.sci.gsfc.nasa.gov/gallery>

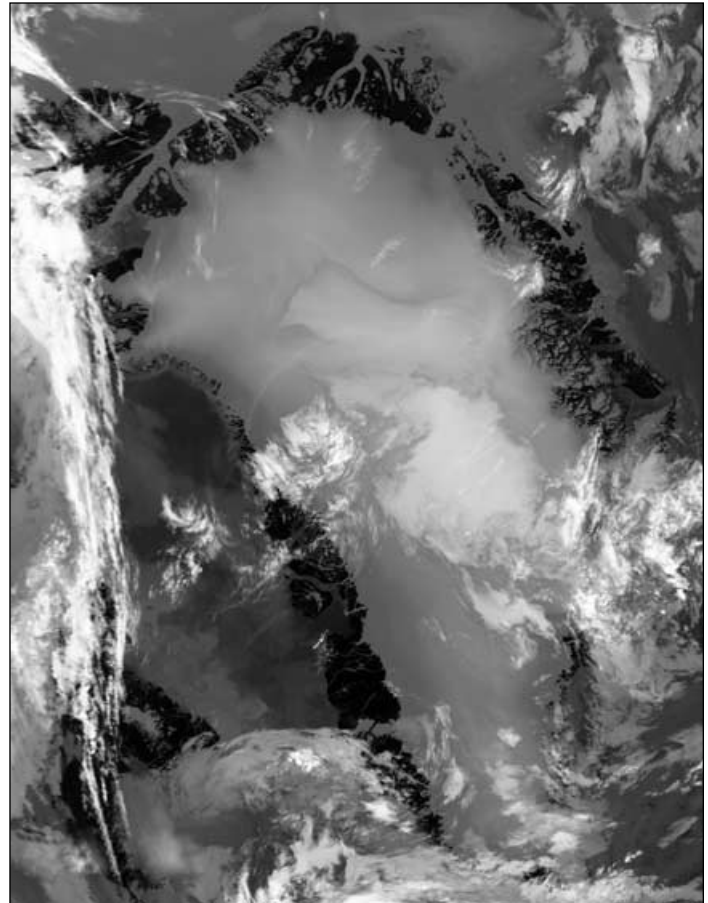


Figure 1 - The Channel-04 image enhances detail of Greenland Image © EUMETSAT 2009

and come from two passes of the *Terra* satellite that covered much the same area but a year apart: August 11, 2008 and August 9, 2009. It was immediately apparent that the extent of melt pools was very similar in each image but that the Ilulissat Icefjord was much more broken up this year compared with 2008. The Glacier and Icefjord—which are located on the mainland of Greenland, east of the prominent Disko island—is at the top left of both images.

NOAA-17 is now a relatively ancient satellite and its performance can be erratic, but on this pass it provided an unusual, spectacular and very interesting view of a part of the world which, whilst seldom seen, is plainly of great importance to our understanding of the changes that are taking place in the climate of the northern hemisphere: and, indeed, of the whole planet.

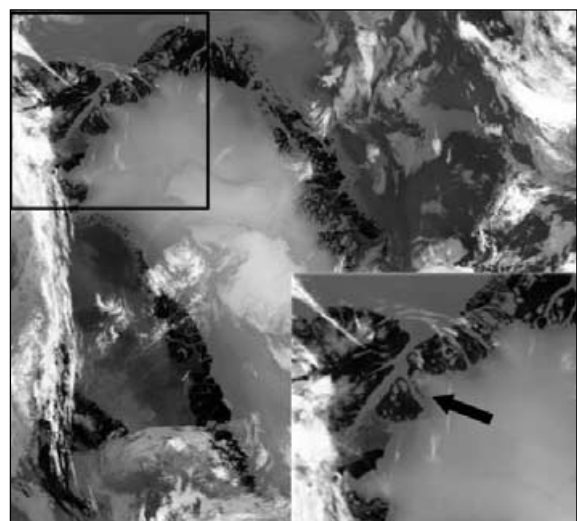


Figure 2 - Locating the Petermann Glacier

WEATHER SATELLITE LAUNCH GENERATES UFO REPORTS

Peter Wakelin

The US Air Force launched a weather satellite from Vandenberg, California at 1612 UTC on October 18. It was the 18th in the *Defense Meteorological Satellite Program* (DMSP) which evolved from a programme that began in 1962. The early craft, known as Program 35 weather satellites, were primarily used by the US National Reconnaissance Office to scout cloud-free regions for spy satellites but the programme was transferred to the Air Force when it was found to be invaluable in supporting war operations in Vietnam.

DMSP-F18 was the first DMSP to be launched on the Atlas V 401 rocket with a Centaur upper stage, a combination which is vastly more powerful than is necessary to put this satellite in to an 850 km sun-synchronous orbit. This excess power was put to good use after the satellite was released by propelling it into a hyperbolic orbit (relative to Earth) and an elliptical orbit about the Sun so there is no danger of a collision in Earth orbit creating a debris hazard in the future.

Being a classified launch, only a limited amount of information was released but amateur satellite enthusiasts were able to derive accurate orbital elements prior to launch and watchers in Africa and Europe saw the rocket and payload, and heard radio transmissions from both the DMSP and the Centaur on the first orbit. The 320-second burn to take the Centaur out of Earth orbit started on the second orbit when northbound over north Africa and venting of remaining propellant occurred several minutes later at 1914 UTC high above Europe. Britain was clouded out but the expanding cloud of propellant, illuminated by the sun, was widely observed from further east.

However, it was some 30 minutes earlier, whilst crossing South Africa, that some very strange sightings were widely reported. The media and police were inundated with reports of strange happenings in the sky.

Greg Roberts, now living near Capetown, is a satellite observer of fifty years' experience and reported: "I've just seen the most spectacular space event ever! I had my camera set on a predicted position for DMSP-F18 and, shortly before the expected time, I

started seeing a series of rings that got progressively brighter—and then the rocket came into view looking like a brilliant, conical light with DMSP-F18 to the side of it..."

Despite having a field of view of only two degrees, Greg managed to get a good series of images as it quickly crossed the sky. Being a warm, spring evening this event was widely observed and it even had professional astronomers baffled. What was not made public before the launch was that some of the excess propellant would be used to conduct a series of tests relating to liquid-fuel management during zero-G coast phases. What was observed was intermittent activation of thrusters in a 'pulsed chilldown demonstration'. Greg described them as 'puffs' which expanded outwards from the rocket in concentric rings. Another observer reported as many as nine or ten rings visible at one stage.

Greg's three images were of about 2.5 s exposure time with the camera system steady so stars show as very short trails compared with those of the fast-moving rocket and satellite. In Figure 1, one pulse has just ended and the cloud is expanding away from the rocket. The ring generated by the previous pulse is visible. DMSP-F18 is nearby. Figure 2 was exposed between pulses; the two previous ones are still visible. Another pulse occurred about three seconds after this image was taken. A pulse is in progress at the time of Figure 3's exposure.

Mitchell Krog is responsible for Figure 4. With little interest in satellites, he was busy pursuing his astronomical interests when he spotted this strange object moving across the sky and swiftly turned his camera towards it. The wider field of view and shorter focal length compared with Greg's system resulted in quite different images. This one was taken with the rocket crossing the star-rich Sagittarius region of the Milky Way.

Acknowledgements

I am grateful to Ted Molczan for analysing available launch information and making two-line elements available prior to the launch; Jonathan McDowell for the historical information on the DMSP programme; Greg Roberts for Figures 1, 2 and 3 and finally, Mitchell Krog and *Living Canvas Photography* for Figure 4.



Figure 1



Figure 2



Figure 3



Figure 4

The Northern Aral Sea Rides Wave of Optimism

A EurasiaNet Photo Story by Joanna Lillis - Photos by David Trilling

The rusting portholes of the Lev Berg, once a proud vessel in the Aral fishing fleet, stare out across the garbage-strewn expanse of the dry Aral Sea bed. The rotting, graffiti-covered hulk of this ship, resting in what used to be the harbour of Aral (formerly Aralsk), is a testament to the environmental devastation that ill-conceived irrigation policies inflicted on the region. But amid such evidence of despair, fragile signs of hope are starting to appear.



The Lev Berg sits rusting in the dry harbor of the town of Aral

Today, the shrinking sea is a source of health risks. But not so long ago it was a font of bounty. Locals talk wistfully of the time when the sea was associated with prosperity. 'It was like a fairy tale', Arman, a middle-aged resident, recalled to *EurasiaNet*. 'Everything was different. The air was different; the climate was different; there were more people here. Now what's changed? Everyone's left, gone to live elsewhere. The weather's changed—dust and wind and that's it.'



Much of the former seabed is now thickly encrusted with salt

The namesake of the rusting vessel in the erstwhile harbour, Lev Berg, was a Soviet geographer famed for his studies of Central Asian lakes. He would be turning in his grave if he saw the current state of the Aral Sea, now shared between Kazakhstan and Uzbekistan: what was in 1960 the world's fourth largest lake is now a shadow of its former self. Starved of water as the Syr Darya and Amu Darya rivers were diverted to feed thirsty crops such as cotton and rice, the sea contracted by 70% from 1960

to 2004. Overall, the sea level has dropped by 20 metres, and in the late 1980s the Aral split into two parts.



A camel herder heads to a well for water

Kazakhstan's former fishing village of Bogen once enjoyed near mythological status in the Soviet Union, its fishermen lionised during World War II for supplying truckloads of their catch to soldiers fighting on the eastern front. Bogen is now well inland, and camels roam what was once the seabed. On a late March afternoon it was engulfed in one of the dust storms that have become more common since the Aral started drying. These storms kick up cloud of salt, dust and toxic substances across inhabited areas. 'This is how we live here', said an elderly resident who worked in the local fish factory before it closed down, as he stood in line to pump water from the village well. 'You see how it all goes up when the wind blows.'



A dust storm in Bogen

Although conditions in the vicinity of the sea are currently grim, there is a whiff of hope in the air: a 13-kilometre dike opened in 2005 is leading to a recovery of the Northern Aral Sea (NAS) in Kazakhstan. Fired up by this success, officials are working to launch the project's second phase, intended to further expand the NAS. Optimists say that within a few years the sea could again be lapping at the shores of the town of Aral, bringing environmental recovery and new economic opportunities.

This dike was combined with new hydro-facilities along the Syr Darya which have

increased the flow into the NAS and are also rehabilitating surrounding wetlands. The project cost Kazakhstan's government \$86 million, of which \$64.5 million came from a World Bank loan. Today, the NAS's surface area is 50% larger than it was at its lowest point. 'The facility is working in line with the design—preserving the NAS at the level of 42 meters', Serikbay Smailov, chief consultant and coordinator at the Agriculture Ministry's Water Resources Committee in the regional centre of Kyzylorda, told *EurasiaNet*.

The shrinking of the Aral led to increased saline levels, killing the fish in the sea. Now, however, saline levels have halved and fish are being re-introduced in the hopes of reviving the fishing industry. Catches have risen from 52 tons in 2004 to 1,490 tons in 2008. 'Last year there were a lot of fish', said Tolyk, a fisherman from Bogen who is looking forward to fishing in the Aral Sea again when the fishing season starts shortly. In the town of Aral, where a new fish processing plant with an annual capacity of 6,000 tons has opened, traders are happy to cash in on increased catches. 'Fishermen brought a lot of fish last year. I hope they'll bring more this year', said Sagyda, who runs a fish stall in the market.



The spillway below the 13-kilometer dike at the southern edge of the Northern Aral Sea

A feasibility study has been completed for the second stage of the project, which would take five to six years to implement. It is now being examined by government agencies and the World Bank. 'This study makes proposals to improve the water management of the Kazakhstani part of the Syr Darya', World Bank task team leader Joop Stoutjesdijk told *EurasiaNet*. The proposed measures include building a dike to separate Saryshaganak Bay (sometimes called Saryshaganak)—on which the town of Aral stands—from the NAS, boosting its recovery, and improving structures along the Syr Darya to expand the flow of water.

Smailov says implementation of the second phase should bring the sea back to the town of Aral, which now stands 35

kilometers from the shore. It will involve constructing a canal from the Syr Darya into the Saryshyganak Bay, which is at a higher elevation than the existing NAS. The new dike will maintain the water there, and another canal will channel it to the town of Aral. If plans for the second phase are approved, the World Bank expects a government request for funding around July and could make a loan available within a year, Stoutjesdijk said.

Amid the optimism in Kazakhstan, it is easy to forget that the NAS recovery does nothing to help the larger, still shrinking Southern Aral Sea, which is receiving little water from the Amu Darya. 'In the late 1990s-early 2000s, the arguments made in support of damming the Small or Northern Aral were to preserve that part and abandon the largest portion of the Aral (Southern) to its fate of disappearance', Amanda Wooden, Assistant Professor of Environmental Studies at Bucknell University, told *EurasiaNet*. 'A larger population surrounds the Southern Aral than the Northern Aral, thus any acceleration of negative impacts from the damming of the Northern Aral—for example, more rapid desiccation of the southern part and its ramifications for ecosystem and human health—raises distributive justice questions. If the southern lake declined more rapidly, there would be additional impacts in an already severe situation for the population in the disaster zone.'



A billboard in Aral announces, 'Good news, the mother sea is coming!'

The subject is likely to cause hot debates at a meeting of the International Fund for Saving the Aral Sea in Almaty, scheduled to open on April 28, to be attended by heads of Central Asian states. For people living around the Northern Aral Sea, the prospect of its return is exciting, and the slogan on a poster hanging over a street in the town of Aral sums up the optimistic mood. 'Good news', it says, 'the mother sea is coming.'

Credit

This article originally appeared on *EurasiaNet*

<http://www.eurasianet.org/departments/insight/articles/eav042409.shtml>

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Unusual Cloud Feature off the QUEENSLAND COAST

Ken Morgan and Mike Willmott

If you have been receiving and examining APT images for some time, then your computer screen must occasionally display an image that really puzzles you. This happened for me on January 4 last year with the 10.08 am AEST NOAA-17 image displayed opposite.

I wondered what combination of temperature, pressure or wind movement could possibly have produced such a corkscrew effect in the cloud formation driven eastward over the Coral Sea from the east coast of Queensland.

Eventually, I approached Mike Willmott, a friendly meteorologist at the Melbourne Bureau of Meteorology and emailed the image to him. Here is his explanation.

'The cloud formation that you have provided in your beautiful imagery (figure 1) was caused by a cold frontal band interacting with a trough from the tropics.'

'As you may be aware, there are many waves within the atmosphere, at many different scales. At the time your image was taken, there was a long wave trough over the Pacific Ocean and another over the coast of Western Australia. This positioned a long wave ridge over the eastern states. This means that a high pressure centre was fairly dominant over the Tasman Sea and was providing a strong boundary between the air from the tropics and the air from the Sub Tropics.'

'This boundary of the converging air masses produces a significant trough in an east-west direction—the alignment of the cloud band. Since, at lower wavelengths, a front was moving out of the long wave trough off Queensland at the time of the image, the tail of the front (remembering that a front is the boundary between two air masses) provided enough energy to assist the uplift of moist air into the upper atmosphere to create the cloud band.'

'The circulations at the various levels within this cloud band are indications of vorticity at each level. If you had observed the previous or subsequent orbits you would have seen that there was also some input of moisture from the tropics caused by a tropical disturbance from the Inter Tropical Convergence Zone (ITCZ). The ITCZ is the boundary between air from the northern hemisphere and air from the southern hemisphere. This disturbance was also lying along the same trough line and was also able to feed moisture into the system. The system persisted for a few days because it was caused by long wave systems rather than the shorter wavelength systems which will move around the long waves.'

Mike concluded with the suggestion that the IR channel would provide an idea of the temperature of each level of the system. This would indicate at what level in the atmosphere the vorticity centres were occurring and also give an indication of the type of cloud that was present. Following this suggestion, and choosing MCIR from WXtoImg's 'Enhancement' menu, I reprocessed the audio file to create figure 2, which clearly shows a semi circular cloud formation over Queensland and northern New South Wales.

Equipment

Homemade tall narrow QFH antenna, Timestep Proscan receiver, WXtoImg software.

Location

Brighton, Melbourne, Australia (37.9°S, 145°E).

Acknowledgement

Mike Willmott is a senior meteorologist, Applications Sub-Section, Space Based Observations Section, Bureau of Meteorology, Melbourne, Victoria 3001, Australia.

Audio File

Interested readers can download the audio (WAV) file from

<http://mdrc.org.au/VK3CEK/download/01032308.wav>

and replicate these results in WXtoImg. You will, of course, have to alter the station location to latitude: -38°; longitude 145°; altitude: 23 metres.

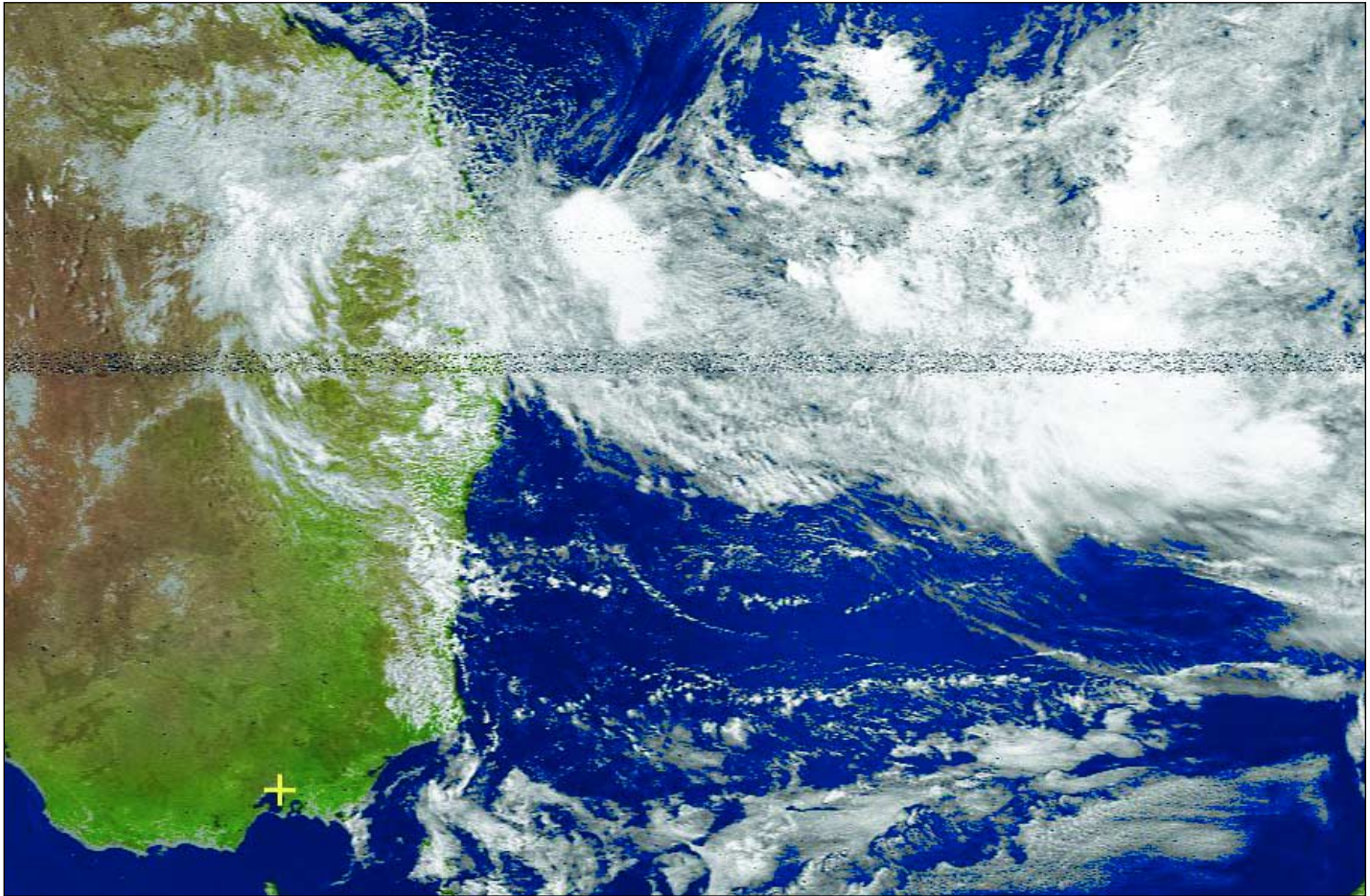


Figure 1 - The channel 2+4 colour composite

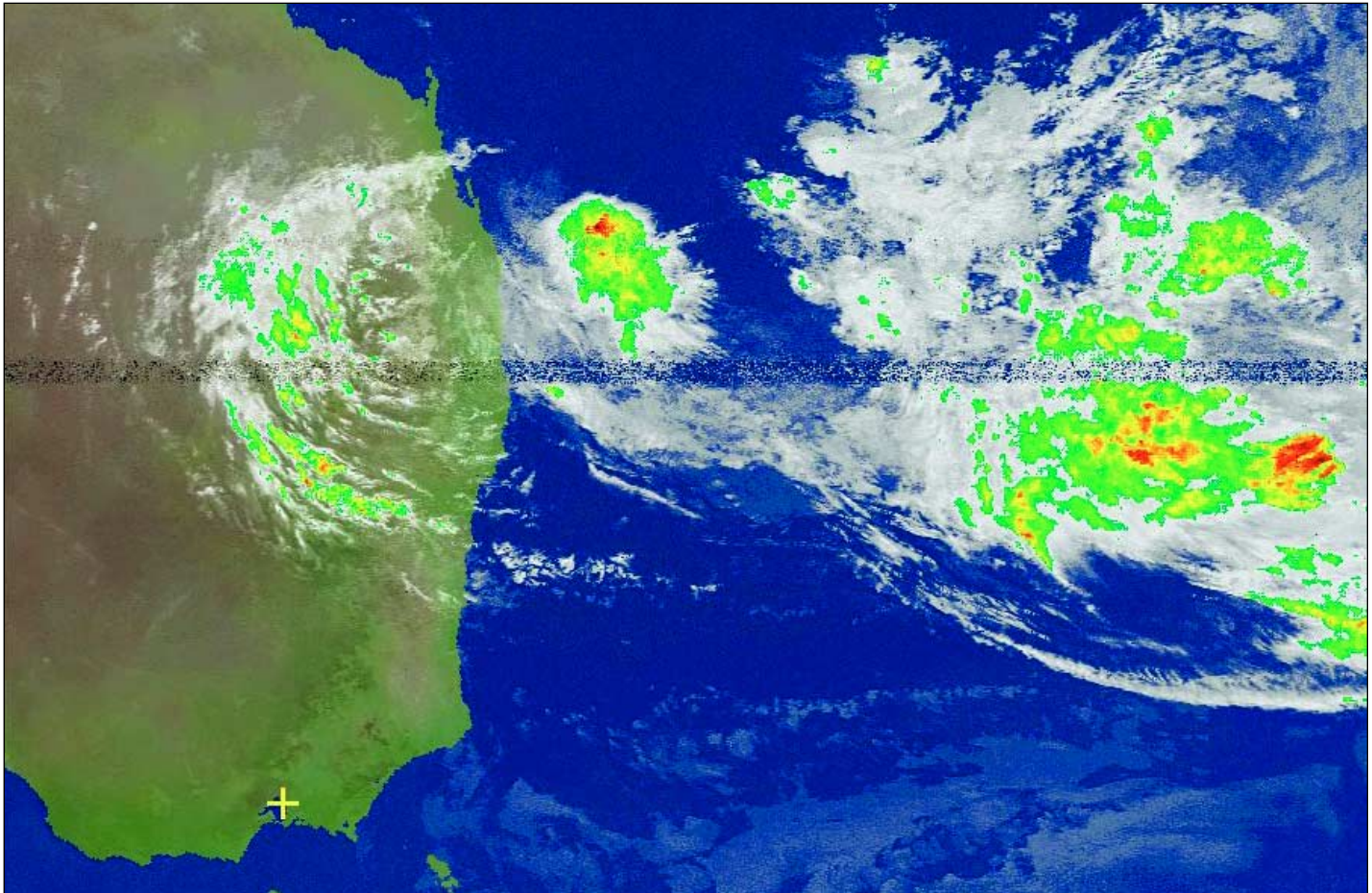
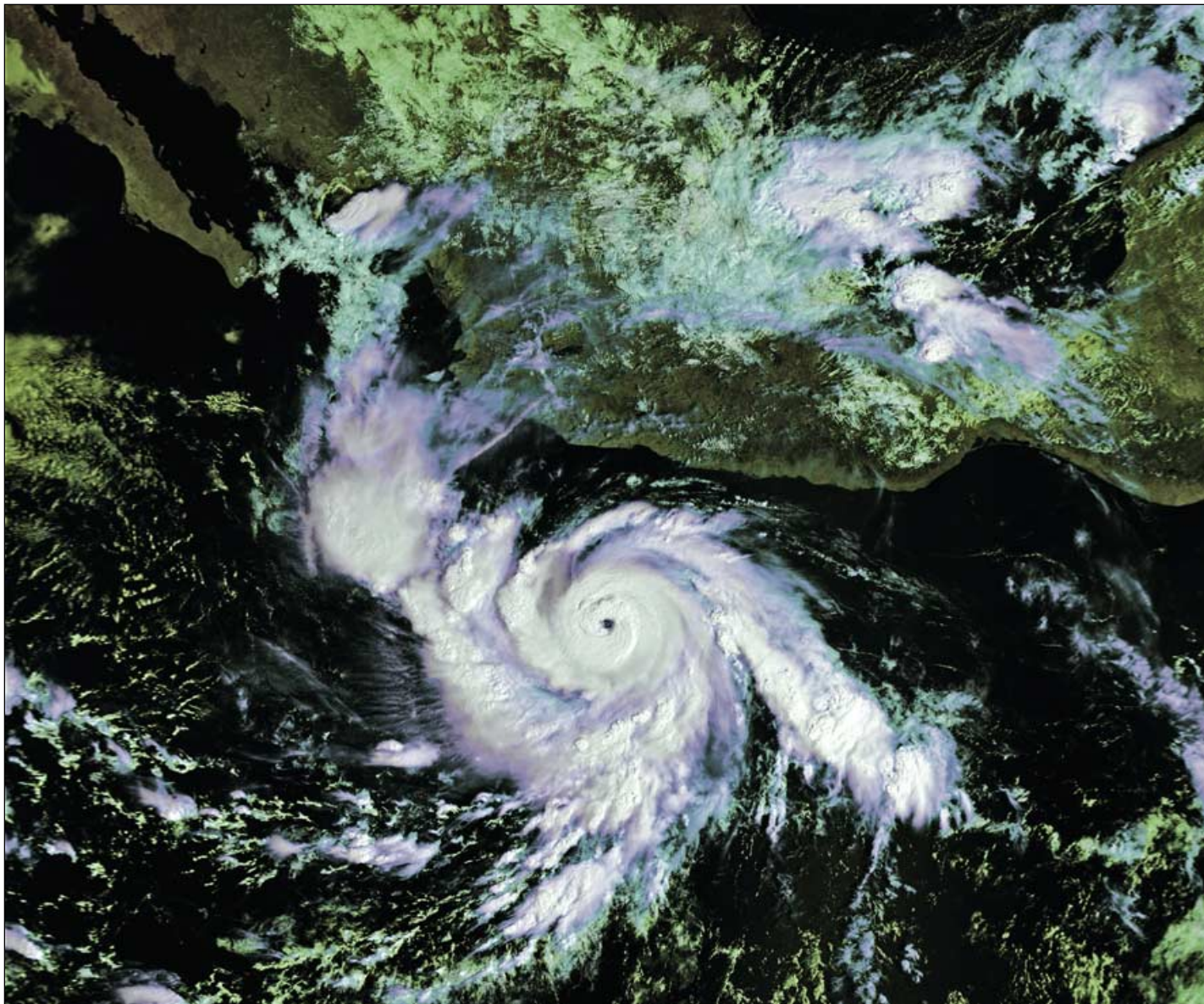


Figure 2 - The same image with WXtimg's 'MCIR' enhancement applied

HURRICANE RICK

John Tellick



We are of course all used to seeing meteorological satellite images from both geostationary and polar satellites. But which is better? I suspect some would say polar orbiters every time given their detail and lack of parallax distortion. Actually, I believe that, from a meteorologists' point of view, they complement one another.

Geostationary satellites are brilliant at covering large areas—even entire oceans—24 hours a day, allowing you to monitor and track weather systems. In the case of Meteosat-9, images are produced every 15 minutes in twelve spectral channels. Their main drawback is that they are unable to 'see' the polar regions which are very important for 'global weather.'

Polar orbiting satellites, only a few hundred kilometres above the Earth, give a far more detailed 'picture', although their swath width limits the area covered. And since the Earth rotates under their orbits, time-wise coverage as with geostationary imaging is not possible.

Yet it seems to me that they have two big advantages: firstly they cross the poles on every orbit, scanning these regions frequently; additionally, they have the ability to 'sound' the atmosphere, extracting useful data which, in the current new-generation European Metop satellite, is achieved across a vast spectrum of channels.

The visible light image on this page shows hurricane Rick, and was acquired from

Metop A's global AVHRR data stream on October 17, 2009. On the back cover is another image of Rick as seen from NOAA's GOES-W one day later.

Hurricane Rick tracked along the SW coast of Mexico and at one stage became a maximum Category-5 hurricane with wind speeds in excess of 250 km/h (155 mph). Rick fortunately lost intensity before making landfall to the south of Mazatlan in Mexico and then tracking northeast into the States.

Both images were received via EUMETCast-Europe using David Taylor's MSG Data Manager and Metop Manager and processed with his GSS-7 and HRPT Reader software.

Images © EUMETSAT 2009

Lake Chad

Anders Höök

For me, APT still is the main part of the hobby but I also find experimenting with antennas interesting. So far I have not dared to plunge into the computer work that seems to be connected with *EUMETCast*. However, now and then I look at what is to be found in the Modis Rapid Response System and also the NOAA CLASS archive.

The Aral Sea is of special interest for me, not least after the article in GEO Q16 (December 2007), but also before that. My own interest is because I quite often see the sad developments on my own images; and it is sad to see how the eastern basin of the south Aral Sea now seems to have dried out completely. Figure 1 is a reasonably good image of the Aral Sea I obtained recently.

While searching on the web, I happened to stumble upon a site: 'Lake Chad: almost gone'.

<http://www.grida.no/publications/vg/water2/page/3262.aspx>

More material is to be found in *Wikipedia*

http://en.wikipedia.org/wiki/Lake_Chad

Lake Chad is far outside the reach of my APT system, so I have turned to MODIS, where I picked the image shown in figure 2. The river Komadougou Yobe is easy to see, running towards the northern part of the lake. It is more difficult to see the Chari River and its tributary Logone River which are



Figure 1 - This NOAA-19 pass on October 19, 2009 was decoded and processed with Patrik Tast's *APT Decoder* software and shows the Aral Sea and part of the Caspian Sea

the main inflows running into the southern part of the lake. A small area of water surface can also be seen in the southern part of the lake.

Even if it is not exactly the same story for Lake Chad as for the Aral Sea, there are similarities. Lake Chad has shrunk tremendously during the past 30 years. According to Wikipedia, it was the fourth largest lake in Africa in 1960, with an area of more than 26 000 km². Now it's area is less than 1 500 km² with an average depth of only 1.5 metres. This seems to be due to both decreased rainfall and the fact that large amounts of irrigation water are diverted from both the lake and the rivers feeding it.

As with the Aral Sea, a plan has been proposed to divert water from other rivers into Lake Chad. The *Lake Chad Basin Commission* proposes diversion of water from the big Ubangi River, a tributary to the Congo River which forms part of the boundary between the Central African Republic and the Democratic Republic of Congo.

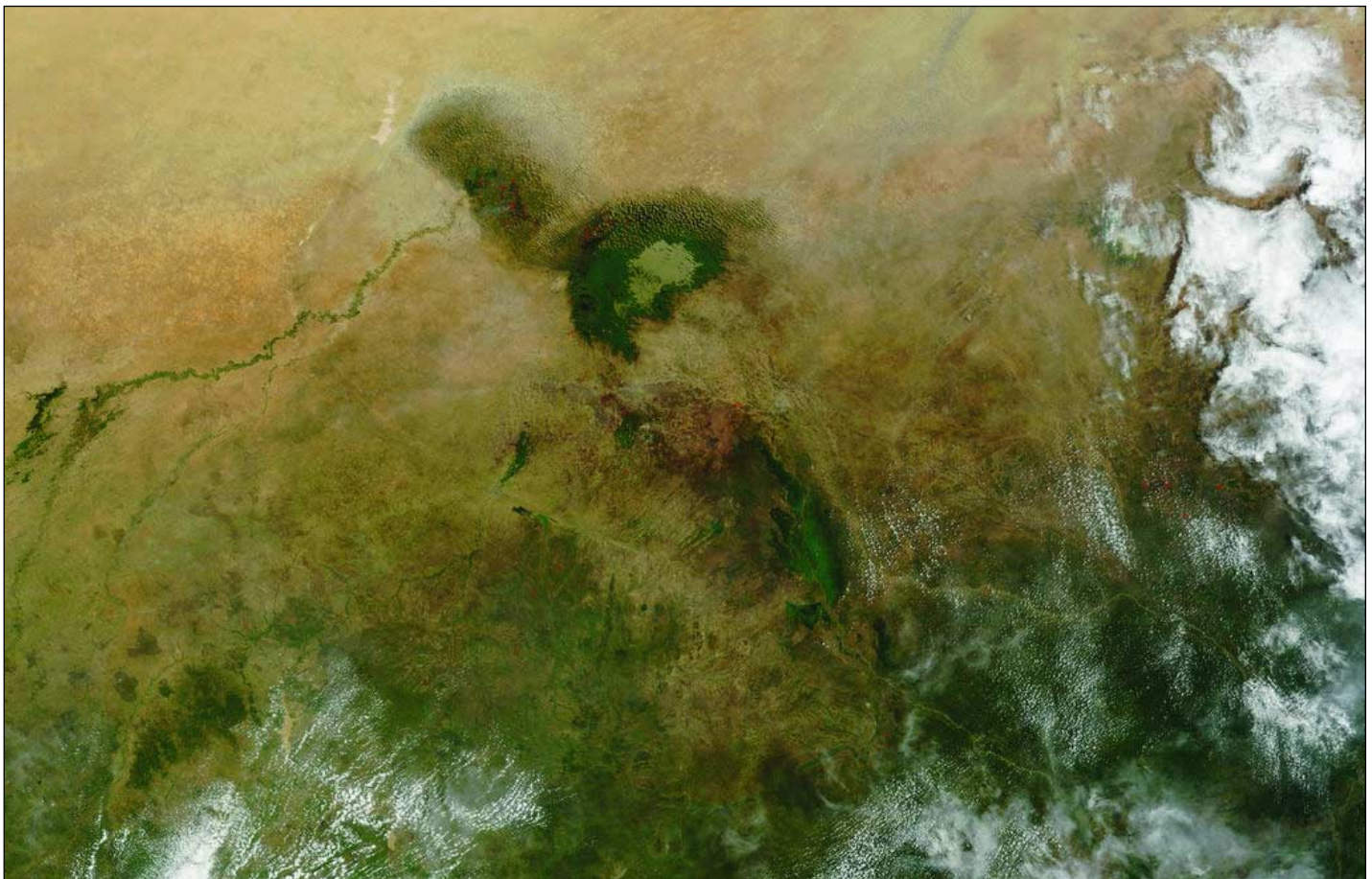


Figure 2 - This MODIS image from NASA's Terra satellite dates from October 18, 2009 and shows the terrain surrounding Lake Chad
Image: MODIS Rapid Response Team at NASA/GSFC - Processing: SmoothMODIS and CorrectGeometry software

EUMETSAT User Conference - Bath, UK

September 21-25, 2009

A report and photo diary from David Taylor

The conference was held in the world-famous Assembly Rooms, not a location you might associate with a high-tech satellite users' meeting! But apart from an initial sound problem, the venue proved excellent both from a scientific and a social standpoint (below).



The opening day's *Icebreaker Cocktail* was held at the Roman Baths, in the renowned Pump Room.



Another contrast—an *Astrium* satellite model in the famous Pump Room proved an object worth photographing!



EUMETSAT Director General Dr Lars Prahm addresses delegates at the *Icebreaker Cocktail*.

After the drinks there was a chance to socialise in the fascinating atmosphere of the Roman Baths.

Fortunately, it wasn't raining (we were a weather conference after all!) and I heard no reports of anyone falling into the water.



A most useful presence at the conference was the EUMETSAT Help Desk, where Pamela and IT Consultant Olaf were on hand to demonstrate the User Registration and Product Navigator services.

They answered my queries, and I was delighted to see how suggestions from users had been used to improve the Product Navigator.

And yes, EUMETSAT user services made sure of their copy of the *GEO Quarterly*. While there wasn't enough room for a GEO stand to allow demonstrations of live reception, there was a good stock of GEO flyers and some sample GEO Quarterlies for the delegates.



Coffee breaks in the *Octagon* were a very busy and crowded time, as you could not only enjoy the excellent beverages and snacks, but make sure you saw all the posters as well. Often, the poster authors were on hand to answer questions, and I had interesting conversations about the next generation of polar orbiting satellites and the extension of communication facilities at McMurdo base in Antarctica—which will halve the delay in getting polar orbiting data to the users.



This is a view of the 'Tea Room', the smaller of the two rooms being used for sessions. There was a mixture of common sessions in the large hall (the 'Ballroom') and parallel sessions in both rooms. Try not to get too distracted by the architecture and decoration!



Wireless Internet was laid on to allow visitors to use their own portables to keep up with email. And for those who didn't have a laptop, a small number of PCs were provided. I hope the view over coffee in the *Octagon* wasn't too distracting!



The conference dinner was held at Longleat House, with drinks in the gardens beforehand.

Report on Proceedings

We had flown to nearby Bristol and spent a day sightseeing there on the Saturday prior to the conference, including a visit to the impressive SS Great Britain—Brunel's steam-powered trans-Atlantic ship. After more sightseeing on Sunday in Bath, my first visit there, it was time to attend the *Welcome Drink* at the Assembly Rooms to meet up with many old friends and make some new acquaintances. The main theme of this year's conference was climate change, and of course, there were the usual regular topics as well.

Future Satellites and Applications

My impression from the first session, '*Future Satellites and Applications*', was that things are ticking along nicely and were largely a continuation of what I reported last year. In Europe, plans for the next generation of geostationary satellites include extending the sensing by the use of complementary satellites, one for imaging and another for sounding. These will be 3D-stabilised rather than spinners like the present Meteosat first- and second-generation birds: hence they will pose some new challenges for the operators. The first ITTs (Invitations to tender, requests to industry for proposals with real costs) should be sent out around mid-2009. The Metop-A HRPT direct transmission service has been extended to try and maximise the coverage whilst minimising the risk of radiation damage to those components which are particularly susceptible.

Coffee and tea breaks were held in another of the famous rooms—the Octagon. This was also the location for the posters which you could browse at leisure, and perhaps ask questions directly to the posters' authors. There were so many posters, in fact, that two sessions were displayed, with a mid-week changeover. Overlooking the Octagon was the small PC area, where delegates could check back on their e-mail at home, or perhaps make last minute updates to their presentations!

The US is preparing future geostationary and polar orbiting satellites, although I gather that the imager for the new geostationary satellites has been rather delayed. The US has a future NPOESS program, and as this is still some years away, there is also NPP - NPOESS Preparatory Program. Korea is planning launch one of its COMS (Communications, Ocean, and Meteorological Satellite) before the end of 2009, and should provide HRIT/LRIT from 128°E. Canada is considering coverage from a pair of satellites in a highly elliptical 12-hour orbit (something like Molniya orbits) to try and achieve near continuous coverage of the northern regions.

The Icebreaker Reception at the Roman Baths

The *Icebreaker Reception* is a regular feature of the EUMETSAT conferences and provides the chance to meet up over a drink or two in pleasant surroundings. This year it was held in the Roman Baths (which gave the town its name) and, following drinks and canapés in the Pump Room (where one would normally take a highly refined tea!), we had the chance to tour the remains of the Roman Baths, which are remarkably well preserved (or restored) in places. You might even catch a glimpse of some Romans if you wait long enough...

During this event I was introduced to Jarno Schipper who invited those interested within GEO to attend some online discussions, held every few weeks, about interpreting weather satellite data and combining it with other sources and forecasts.

Do visit their Web site at

<http://www.satreponline.org/>

and look for the *Weather Briefings* page.

On the *Today's Images* page you will find a set of data combining multiple satellite channels and NWP (Numerical Weather Prediction) data. Do take a look. I joined in one session recently and found it most enlightening to see how some of the more unusual (to me) products could be used to assist image interpretation.

Calibration and Validation

One topic, which came up again and again, was calibration of the data from satellites and validation against ground measurements. For example, although the satellites can measure radiation in a certain band, and hence the equivalent black body temperature can be computed, this gives a surface measurement: the actual air temperature can be up to 20° Celsius different!

As algorithms are refined and the problems better understood, old data may need to be re-processed to provide measurements more comparable with today's ideas, and hence provide the longer-term data required to assess climate change. Access to that old, raw data may not be so easy. Inter-satellite calibration between geostationary satellites from different agencies, and between geostationary and polar-orbiting satellites, is also an important issue. This issue is sufficiently important that the World Meteorological Organisation (WMO) have a project devoted to this

<http://gsics.wmo.int/>

and Tuesday afternoon was devoted to presentations relating to the GSICS (Global Space-based Inter-Calibration System).

On Wednesday evening, most delegates chose to attend the conference dinner—held in the grounds of Longleat house. Door-to-door coaches were provided and the food was specially chosen to be typical of the region. There was Pimms as an aperitif and the wines, which were English, were surprisingly good. Who knows: with climate warming we may see more of a shift towards serious wine growing in England.

Personally, I was somewhat surprised by the discrepancies in ground measurements reported compared to the values derived from satellites. It does bring into question the accuracy of the data which goes into the climate change models, particularly where data from completely different satellites is combined over long time periods. At least people are now aware of these discrepancies and are working together to resolve them.

There were parallel sessions on Nowcasting, Atmospheric Composition, Hyperspectral Sounding, and Numerical Weather Prediction, which I did not attend.

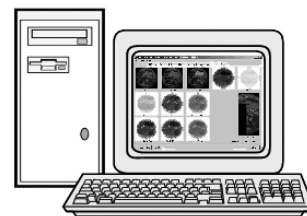
Outside the Lecture Halls

The promised live demonstration by the UK Met Office did not materialise, which left rather a gap. There would have been room for the stand which GEO had offered in the 'Card Room', which had access to a private, south-facing courtyard just outside. Still, there were ample GEO flyers for the delegates and sample *GEO Quarterly*lies that they could browse.

One most useful feature of this year's conference was the EUMETSAT User Help Desk, staffed by Pamela and the IT contractor Olaf (who is responsible for quite a lot of the Web site design). It was an ideal opportunity to give your input as a user of either the new electronic registration service or the product navigator.

The next EUMETSAT Meteorological Satellite Conference will take place from September 20-24, 2010, and will be held at Cordoba in Spain. See you there?

Computer Corner



Douglas Deans - dsdeans@tiscali.co.uk

By now readers will be aware that circumstances regarding the release of *Windows 7* changed between the penning of my last column and its publication. Despite the idiotic rules of the European Commission there was a change of direction by Microsoft, lumbered with the European competition nonsense. *Windows 7* was released in Europe without the special 7E edition which would only work as a clean install, as explained in my last column. The European release is now the same as all others; it contains a choice of browser, including, of course, IE 8 and so now is also available in an update option. Common sense has prevailed.

Now that the pre-launch excitement of *Windows 7* has passed and the software, by the time you read this, launched and available to all, I intend, as promised in my last column, to return to looking at computer issues more related to our hobby. I should just say that, by the time this is published, I expect to have been using *Windows 7* myself and hopefully having the same positive experience reported by many of the beta-testers. I will certainly return to this topic in subsequent columns as Operating Systems, whether we like it or not, are much needed for our hobby. The chance to buy a new, and well reported, Operating System for £44, was just too tempting. As both 32-bit and 64-bit discs are provided I currently face a dilemma as to which I will install. It will be the Quarterly after this before I can report what I finally decided.

As regards my request for help and information from members in my last column, I have to report that so far there has not been a single reply. It is tempting to conclude that none of the 500 members read the column: however I will soldier on regardless.

This quarter I intend to re-visit the debate of whether to use one or two computers for *EUMETCast* systems. I have tried both and as always the outcome is never as clear cut as you might think. Hopefully I can provide a few pointers that may be helpful.

Computers for EUMETCast

The old discussion as to whether to use one or two computers for a *EUMETCast* system has been about for some time and the continual addition of new data only adds to the importance of the question. As I have used both, I offer some thoughts and experiences that may help decide what would best suit you. Although a two-computer system is recommended by EUMETSAT, the decision is perhaps not as clear cut as you might think, particularly with the powerful home computers now available.

The first thing you must consider is just what data you are proposing to take. There are gigabytes available every hour but considerable amounts of this are probably only of interest to meteorological professionals or the real amateur enthusiast. I suspect that the majority will be looking for the image products but even here decisions are important as the global 5-channel HRPT data from Metop has large files of over 28 MB. In addition, a few lost segments may be annoying to one person but of little concern to another.

If you are coming into the hobby for the first time and already have a good specification computer then my advice would be to give it a try and see how it performs for your particular set up and choice of data. The real issue of using only one computer comes down to the other uses you make of it. If, like me, you are a bit of an enthusiast then you may have five other programs running just dealing with *EUMETCast* data processing alone. Add to this mail downloading, visits to the Internet, preparing GEO columns in Microsoft Word (more people should do this), and the usual mishmash of security programs, and quickly you can see how busy the computer can be. It is easy to think that modern computers are excellent at multi-tasking—and they are—but it only takes a small interrupt or delay to cause loss of data, even when using a RAM Disk. In other words, whilst the reception process itself can be run on a very minimal computer, a powerful computer alone may not allow lots of additional tasks without some data loss. However,

everyone's computer system and program mix is different so there are too many variables to be specific about this. Best to just try it and see how it works.

A two-computer system usually resolves those issues by leaving the 'receive' computer to concentrate solely on the *EUMETCast* system. As I said before, an inexpensive lower specification computer can be ideal for this task. The important thing here is not so much the computer specification but the fact that it is only performing the *EUMETCast* receive task.

Against that you have to consider the need for networking and the cost of running two computers not inconsiderable with today's fuel charges, even with a lower specification 'receive' computer.

What sort of electrical costs can we expect running our computer systems? You might well be surprised! I know I was. Some time ago I did some tests on my two computer set up, and again just recently did some checks on my single computer system. Ironically, just as we retire and find the time to really enjoy our hobby, we may also experience a drop in our income and have to be a bit more careful with fuel usage particularly with current levels of tariffs.

My single computer checks were carried out using a kWh meter on my system, comprising an AMD 64-bit dual-core 6400 processor with an NVIDIA GeForce 8600 GT graphics card and the usual accessories. My monitor, a 22 inch LCD with an automatic switch-off after 5 minutes, spends about 70% of its time off. Also connected in the circuit was the DVBWorld DVB box and my router. My 12 hour test came up with a figure of 2.51 kWh giving a 24 hour value of approximately 5 kWh. A quick calculation on average electricity charges provides a quarterly cost of about £50.

In my house (detached 4 bedroom), and gas heated, that is close to a third of my electricity costs. Of course, if you

do not run all day (I only run for about 14 hours per day) you have to adjust accordingly, and if you run a second computer for receiving (likely to be less powerful and cheaper to run) you must add this cost as well. Whilst a lot cheaper than having golf as a hobby, nevertheless it is worth remembering that for some it may be an important issue when considering the use of one or two computers. A few lost segments may be a worthwhile penalty to keep down running costs.

So there are a few brief things to be considered. Further information, which may help your own personal decision, can be found on David Taylor's website at

<http://www.satsignal.eu/wxsat/atovs/index.html>

and there is a wealth of knowledge in the *GEO Quarterly* articles.

.... and finally

This will be my last column under the leadership of Les Hamilton, Editor, who is retiring to pursue other activities.

Les and I go back quite a long way to the days of that other remote imaging group which shall remain nameless. I took over from Les when he ran the then called Shareware Corner and distributed lots of floppies from the

shareware library. How times have changed.

Les became make-up editor during 2000 and by June 2002 took over as editor whilst still undertaking the make-up editor's job, positions he held with that publication and subsequently GEO until the present date. It is easy to forget that Les has actually been doing two extremely demanding jobs for such a long time with little or no help.

I would like to take this opportunity to put on record my thanks not only for all the work and effort that Les undertook for the whole weather satellite fraternity but for his help and guidance as editor in my own endeavours at publications and columns in the magazines.

You will be sorely missed Les and I hope that you will now find more time to enjoy your many other interests and hobbies which I know have had to put on back burner for long periods.

Good luck to you and please do not edit out my last few paragraphs under your stewardship!

I look forward to working with the new editorial team.

Software Updates

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

David Taylor's latest releases

ATOVS Reader	v 1.2.0
AVHRR Manager	v 1.6.6
BUFR Viewer	v 1.1.2
CMA Viewer	v 1.2.0
DWDSAT HRPT Viewer	v 1.1.2
GeoSatSignal	v 7.1.2
GRIB Viewer	v 2.3.4
GroundMap	v 2.1.2
HDF Viewer	v 1.4.2
HRPT Reader	v 2.9.2
Kepler Manager	v 1.3.2
MapToGeo	v 1.1.6
Metop Manager	v 1.4.2
MSG Animator	v 2.5.33
MSG Data Manager	v 2.5.34
PassControl	v 3.2.4
SatSignal	v 5.1.4
Sea-Ice & Viewer	v 1.4.2
Wxtrack	v 3.8.2

To learn more about those programs and to download the latest updates please go to

<http://www.satsignal.eu>

FEEDBACK

The Column for Readers' Letters and Queries

email: geoeditor@geo-web.org.uk

NOAAPORT

I wonder if there is any GEO interest in the new effort Patrik Tast has been exploring. He has written a program that allows me to decode the NOAAPORT signal to make images. He is still refining the program, but it already does the production of images. That's all I was interested in.

I won't bother with any detailed explanation of NOAAPORT. I think many readers will already know more about NOAAPORT than I do.

Last year, when I realised that NOAA sends weather data from a geosynchronous satellite that was within my view, I decided to try receiving those signals. I gathered together some free components that are considered obsolete, but which can be obtained free around here, and constructed a C-band TV receiving system. I use a 2.5 meter diameter antenna with the TV feed components. The receiver is in a PCI slot in a *Windows* computer. My interest in this hobby is strongly regulated by 'build it yourself for minimal \$\$'. I have less than \$100.00 invested in this NOAAPORT receiving system. The *Twinhan* PCI TV can be purchased for \$60.00; the antenna with the C-Band feed is often available free because fewer people use them and want to clean their yards of an unused 'eyesore'.

Once I was able to receive and decode the NOAAPORT data, I streamed the data to Patrik, who wrote a program to decode the them. Patrik has published a web page describing how you can make images from NOAAPORT signals at

<http://noaaairport.poes-weather.com:8081/>

I have attempted to locate other hobbyists here in the North American region but have had little success. It may be that there is no significant interest in building low cost NOAAPORT stations around here. It seems that most of the GEO activity is located in Europe. Of course, the NOAAPORT satellite is not visible from Europe so, probably, this project isn't of any significant interest to GEO readers.

If anyone in the North America area (or elsewhere) would be interested in NOAAPORT imaging, please get in touch with me at

jerrydart@verizon.net

Jerry Martes KD6JDJ
California, USA

Installing the 'Dataram' RAM Disk

..... my final challenge

Mike Stevens (G4CFZ)

Following everything I've written previously about life without a RAMDisk, who would have thought I would go this far. But I am not one to be beaten and, let's face it, most members are using the system very successfully indeed—although others are just too scared to even take it on because it is too daunting. Well finally I did; I felt it had to be attempted, and you have to experiment and try to conquer these things. I will say this: I did try the AR-Soft RAMDisk, but at each attempt, on two separate PCs, it took out all my memory banks. I'm not sure why this happened but it was a costly experience. However, that's in the past and I decided to look forward. Here's how I approached the problem.

My last experiment, where I added an extra hard drive in my *E-Machine* PC is still running very successfully with just the odd loss of segments usually about one per orbit on Metop, but not all the time. So I decided to experiment with a RAMDisk; but which one, given the problems I have had in the past? The first thing I did was a Google search, and was surprised at the amount of information available. There were around twenty pages on RAMDisks, some free and others costing quite a bit of money. The site that really interested me most was

www.dataram.com

which, incidentally, is also linked from David Taylor's excellent website; so in I went to find out more information.

The first thing to do is to locate and download the software that suits your system. Mine is a *Windows XP Home Edition 2002* with Service Pack 3, for which the appropriate free software was *Dataram RAMDisk*. There is also another Windows XP program, *Cenatek RAMDiskXP/2000*, which has to be purchased and registered as it runs out after a 30 day trial period.

I installed the *Dataram* software and, being very cautious, followed the instructions to the letter. Once all was finished, the first thing I did was to open up the RAMDisk user manual and print it out. You need to have a good read of this item before you run the RAMDisk program. The *Dataram* manual is very good, introducing the RAMDisk and providing screen by screen definitions and settings. I found it very explicit and easy to read, giving full explanations into the working and configuration of the system. You can also visit David Taylor's website and read his explanation and instructions at

www.satsignal.eu/wxsat/Dexatek/RAMdisk.html

Configuring the RAMDisk

When you run *Dataram RAMDisk*, the first screen displays four tabs, the first being **<Settings>**. First, I defined **<Disk Size>** as 250 Mb, then I selected **<FAT16 Partition>** and **<Windows boot sector>**. This completed, the RAMDisk can be started. The program should then indicate to you that the RAMDisk has successfully started.

The next step is to take an image or copy of the disk. To do this, move to the **<Load and Save>** tab and click on **<Save Disk Image Now>**. This will take a second or two; once that is done the final step is to tick the **<Load Disk Image at Start-up>** box and that's it. You are up and running.

At this point I checked that the RAMDisk was showing up in *'My Computer'* on my PC, and there it was, showing as *'Local Disk (G:)'*. It had automatically been assigned to the next letter following my *Lacie* external hard drive, used for picture storage, which is drive F:. To keep everything standard, I changed the RAMDisk drive letter to 'Z' to help in identifying it. This is done by opening up **<Control Panel>** and navigating to **<Administrative Tools → Computer Management → Disk Management>**, right-clicking on the drive you wish to change, then selecting **<Change drive letter ...>** and selecting the letter 'Z'.

Once the RAMDisk driver has been started up it will thereafter run all the time, even when you switch off or reboot your PC; it will only stop is if you specifically command it to do so by hitting the **<Stop>** button, which removes the RAMDisk from memory and returns it to Windows.

System Restore

The next procedure is very important if you are using Windows XP, because XP has a feature called 'System Restore', which can return your PC configuration to an earlier state to help overcome problems. You have to go into the Registry to modify it, or serious problems could occur, but luckily there was an excellent article written by Arne van Belle on page 39 of the September 2006 *GEO Quarterly* which explains this in full. The problem arises because XP does not recognise RAMDisk and treats it as a hard drive. When I had one of my PCs fail with the *AR-Soft RAMDisk*, System Restore took my PC right back to its first start point: so it is an important step.

Tellicast

I now had to add a line in the *Tellicast rcv-ini* file to insert the drive letter for the RAMDisk, which is 'Z'. I opened up the

rcv-ini file, and, in its [locations] section added the following entry

file_database_directory=Z:\receiving

then saved all the program files and went to operation mode.

On switching on *Tellicast* all went well and everything behaved normally as files started to load into the correct sections. I checked to see if the RAMDisk was operating well with the *0.fsy* file active and it was, so I left the system working for 24 hours to see the results. This is when things became very interesting indeed.

A day later the results were amazing. I wasn't so surprised, given that many members have been discussing it for a long time, but I was pleasantly surprised with my pictures. Metop Manager, SVHRR Manager and NOAA-GAC had all performed perfectly with all segments intact. MSG-Data Manager, the one I monitor regularly had loaded perfectly without a single missing segment, and MSG-RSS was also in good shape, no segments missing here either.

All in all a perfect display of *EUMETCast* reception and I'm very pleased with the results. It's taken me a long time to reach this point. After the earlier set of problems I feared yet more—but not so.

Conclusion

I now have a system working to full capacity with no loss of segments. Picture quality is excellent as the Metop-A image opposite shows, and the one thing I was worried about regarding memory problems has not occurred.

A good result, and running the two systems side by side does reveal which is the better one. I am pleased that I experimented with RAMDisk. It is everything that members have said it is.

So come on guys give it a go. If I can do it so can you. I know this article has probably been read by some who are thinking: 'well I know all this'. But think of readers starting out with *EUMETCast* for the first time, who don't yet know how to get the best out of their system, but who wish to try out a RAMDisk and don't know where to start. This is for them.

My thanks and appreciation to David Taylor for allowing me to use some of his material and to Douglas Deans for help and advice on some technical matters; also to Arne van Belle for his article.

Happy weather watch from Portland.

