# Fairway

SCG
MTNG

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*Newsletter of the Small Craft Group and the Marine Traffic & Navigation Group*

## Contents



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Science Technology Practice

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*I must start this edition of Fairway with a correction to my report on Capt. Richard Wild's talk to the Small Craft Group on pilotage within Harwich Harbour, printed in the Autumn 2009 edition. I added a paragraph stating that HHA asked that yachts passing through the harbour under sail at night use lower navigation lights rather that a masthead tricolour. This was to make it easier for ships and pilots to judge the distance off from the ship. I first published this in a Sailing Club Bulletin back in 2002; it would have come from another publication but at this length of time I cannot remember which. Two of the Senior Instructors at the East Anglian Sea School both agreed that this was their practice.*

*Richard Wild, however, had never heard of this, so took it to a meeting of the Haven Navigation Safety Committee. Even one member who had served on the Committee for fifteen years, and was himself a Yachtmaster Instructor, denied having heard of this. The Committee's recommendation is simply to follow the IRPCS Rule 25, which means that you may use either lower navigation lights or a tricolour, but not both, when under sail in the harbour at night.*

*John Hasselgren, 01277 231185, fairway@rin.org.uk*

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**Diary Dates**

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| Thursday & Friday 6th. & 7th. May | History of Navigation Conference,<br>RIN & National Maritime Museum.<br>Tickets, £20 from NMM. |
| Saturday & Sunday 22nd. & 23rd. May | Fly / Sail weekend,<br>Lee on Solent & Gosport.<br>Organizers, David Broughton and Peter Eddis. |
| Tuesday to Thursday 15th. to 17th. June | SeaWork, Southampton. See below. |
| Thursday 14th. October | Small Craft Group Autumn meeting,<br>Royal Thames Yacht Club, London, SW1 |
| Monday 8th. November | Visit to Trinity House, London, E1<br>Further details will be given on the RIN web site in due course. |

## SCG Chairman's Report

RIN navigators view black boxes as a valued source of entertainment and enlightenment, but, for the majority of users, the data from electronic systems is mistakenly believed to be unerringly 'accurate'. Precise, yes, often to several decimal places – but accurate? Not always. RIN has an important role to play in spreading the word about the occasional, unexpected, release of 'Hazardous Misleading Information'. In her talk to the Small Craft Group in March, Dr. Sally Basker, Director of Research and Radionavigation, General Lighthouse Authorities (at Trinity House), reminded the audience of the satellite clock failure that caused one GPS fix to be displaced by 40km. and the December 2006 solar flares that temporarily wiped out GNSS navigation down a vast swathe on the planet. There is no doubt that our civilisation is set to become increasingly dependent on GNSS as Compass, GLONASS and Galileo add to GPS. However, as this exceptionally valuable technology develops, so will the adjuncts sought by criminal – and terrorist – users. Cheap 'n' cheerful GPS jammers are already selling worldwide in their thousands. In a recent scientific test, one jammed signals over the sea to a distance of 30 km. RIN is so concerned about the potential for occasional inaccuracy that it has issued a statement to highlight that: "There is a fundamental necessity, worldwide, for robust, terrestrial-based systems to provide a concurrent, independent source of position and time information to ensure navigational safety…"

Meanwhile, the USA and Canada tell us they are saving significant amounts of cash by decommissioning their formerly robust, terrestrial-based Loran-C networks, with the explanation that these were reliant on large numbers of personnel and costly sites. It is to be hoped that these countries will now consider installing a high-tech, low-maintenance, less costly replacement. Dr. Basker foresees the future of small craft navigation in a single black box that integrates data from both GNSS and automated (enhanced) Loran. In the meantime, RIN recommends that a backup to GPS is *always* carried. Vector triangles, estimated positions on paper charts and astronavigation may be second nature to many seafarers, but very soon these traditional skills will disappear, or at a minimum they will be relegated to a historical special interest group. The RYA has just set out on an interesting voyage to update the Yachtmaster Ocean syllabus and RIN is pleased to offer its expertise in support of this venture. Sextants may be starting to lose their appeal, but please don't trash them yet.

Cynthia Robinson, scg@rin.org.uk

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## SeaWork

This Business to Business Show, at the Canary Islands Fruit Terminal in Southampton Docks, exhibits working boats, and everything associated with them. It runs from Tuesday 15th. to Thursday 17th. June. The Institute will have a small stand there. Anyone who feels that they could contribute to our presence at this event should contact Peter Eddis, who will be arranging the manning rota, at peter.eddis@googlemail.com.

## Chart Corrections

Following the introduction of a questionnaire at the Southampton Boat Show (results shown in *Fairway* No. 29, Autumn 2009) it seemed that yachtsmen were still concerned about the demise of the printed Small Craft Notices to Mariners, and were unaware how they could get the required information to correct their charts via the internet. That being so, the United Kingdom Hydrographic Office has kindly supplied the following information, which has wording very similar to that which I used when describing part of the system in *Fairway* No. 25, Autumn 2007:

*Whilst those using charts in the SOLAS regulated market area must update their products from the OFFICIAL NOTICES TO MARINERS WEEKLY BULLETIN, small craft users may find it easier to use these methods.....…*

## Using the NM Web Search tool for Admiralty Leisure Editions

It's important to keep all your charts up to date - rocks might not move but there's a host of other things under and on the sea that do! This service is updated weekly and aims to provide you with the best information available to help you navigate safely and effectively.

You can go to the Notices to Mariners (NM) Web Search website and download as one file all the corrections relevant to the charts you hold, from the date you last corrected them. The address is www.nmwebsearch.com. Please note this tool is only applicable to our Standard Nautical Chart range and Admiralty Small Craft Editions. For Folios and Tough Charts please see the section below.

When on the homepage of NM Web Search, you will be offered five options:

Search for updates by chart number.
Search for updates by chart number from a specified Notice number/year only.
Search for updates by chart number from a specified date only.
Search for individual NMs by Notice number/year.
View Update List by Chart Number.

Having made your selection, you will be asked to enter the chart number for which you want the notices. If there is any conflict you will be asked to specify from a list provided. For example, chart 323 will show as (AUS) 323 and 323 Dover Straight Eastern Part. You can continue to enter chart numbers until you have built up a list of all those that you hold. It will then give you the opportunity to save this selection for future use, and when you subsequently go back to the web site you will be given the chance to load up this previously saved list of charts.

Now complete the search request by entering the rest of the information required for the method you have chosen, i.e. date or Notice number, and in a short while you will receive a pdf document containing all the requested Notices, according to the criteria set.

A quick glance down the list may reveal the word, 'Diagram', at the bottom of a Notice. This indicates that there is a diagram to paste onto the chart. Clicking on 'Diagram' will download the diagram. Both the document and any diagrams can be saved for later perusal and printing. When printing diagrams it is essential that the scaling or fit-to-page feature is switched off otherwise the printed block may not match the scale of the chart onto which it is to be stuck.

An alternative to this is to obtain our paper publication of Admiralty Notices to Mariners where all updates applicable to our Small Craft Editions are published.

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**Admiralty Leisure Folios and Tough Charts**

You can go to the website Admiralty Leisure website and download as one file all the corrections relevant to your Folio or Tough Chart. The address is www.admiraltyleisure.co.uk/NMshome.asp. The service has been specifically designed to make updating your Admiralty Leisure Folios and Tough Charts an effortless task. Here you will find all relevant NMs released since the publication date of the chart's New Edition.
You will be offered three options:

Admiralty Leisure Folios
Admiralty Leisure Editions (provides a link back to the NM Web Search tool as above)
Admiralty Leisure Tough Charts

Having made your selection you will be asked to choose the Folio or Tough Chart number from a list for which you want the Notices. A pdf document will open containing all the updates for that chart. Both the document and any diagrams can be saved for later perusal and printing. When printing diagrams for Folios, it is essential that the scaling or fit-to-page feature is switched off otherwise the printed block may not match the scale of the chart onto which it is to be stuck.

Updates can be applied to Tough Charts using a permanent pen. If there is a block update shown in the list of NMs corresponding to your Tough Chart you can email servicedesk@ukho.gov.uk stating your requirement and we will send you an adhesive label containing the update for you to apply to the product. Please note that we can only supply blocks for current editions of Tough Charts.

*With thanks to Josephine Washington at UKHO.*

## Weather and Sailing – long report

*Back in November the Weather and Sailing seminar was run in London.* Navigation News *has already published a shortened report on the day's proceedings; here is the longer version.*

Safety, forecasts, Gypsy Moth IV, accuracy, climate change, folklore and the law – all were available at the Weather and Sailing seminar run by the Royal Meteorological Society and the Small Craft Group of the Royal Institute of Navigation. Taking place this time in London at the prestigious premises of the Royal Thames Yacht Club, the meeting was chaired by RIN President, David Barnes, who welcomed the delegates before introducing the speakers.

First on was Peter Chennell, Sea Safety Manager of the RNLI. His concern was to encourage leisure sailors to think about their safety. Sailing, he said, was dominated by the weather; we needed wind to sail, and it is wind that gives us weather. In coastal cruising we will be interested in short term conditions, long distance we look for a weather window, afterward having to take what comes. The racer round-the-buoys looks for the wind shifts, while long distance racers may well be weather-routed by a team of meteorologists.

The RNLI Sea Safety scheme has six sections, one of which is Tides and Weather. Mariners are encouraged to check the likely conditions before setting out. Experienced sailors do, many newcomers to the activity don't. The RNLI can plot a graph showing launches of lifeboats against wind strength, showing that most launches to sailing yachts occur in force 6 winds while those to motor-yachts will be in force 4. Modern yachts are strongly built and will stand more punishment than the crew, navigation has become more accurate with the introduction of GPS. Nevertheless, the weather is always a factor to be considered. Good weather makes sailing a pleasure, but bad weather can result in sailing being cancelled. It can also result in a boat being stuck and having to be left, or putting pressure on a skipper to sail due to the need to be back for work. Forecasts are good, but cover large areas and need to be interpreted.

When things go wrong, the RNLI would prefer to know early. The Coastguard will decide if a lifeboat is necessary and will co-ordinate any rescue. When a lifeboat is called out, communication will be by Marine Band VHF; once all the crew are on deck a portable hand-held set is useful; mobile 'phones are not suitable.

The second speaker was the Cruising Manager of the RYA, Stuart Carruthers, who gave details of all the various specialized weather forecasts available to sailors. These have increased in quantity and quality during the past five years. Navtex must be considered a prime system since it is IMO's Worldwide Navigation Warning Service and part of GMDSS. It runs on both International and National frequencies, with a range of up to 270 nautical miles from shore. It is the UK's chosen official method of delivering

weather forecasts. Receivers can be set to pick up whichever station is required and will store the information for digestion at a later time. The 518 kHz transmission gives gale warnings, the weather forecast, an extended three day forecast and navigation warnings, all in English. The 490 kHz transmission is available to other countries for delivery of this information in the local language. Since the 518 kHz transmission is already in English, this second frequency is used in the UK to give four inshore waters forecasts, together with a 24 hour outlook and reports from coastal stations. Additionally, it carries a Channel Islands forecast. The Coastguard broadcast inshore waters forecasts on VHF radio Channels 23, 84 or 86, after an initial announcement on Channel 16, every three hours, the actual time varying slightly in different areas around the coast. The broadcast will give a general synopsis, including strong wind warnings, four new inshore waters forecasts and a 24 hour outlook each day. There will also be two new shipping forecasts as well.

The BBC still broadcast the Shipping Forecast on Radio 4 – long wave only during the day – which will include gale warnings and four full shipping forecasts per day, with inshore waters forecasts and coastal station reports on the late night and early morning transmissions. However, these transmissions are not part of GMDSS. There are other sources of weather information available on demand, either ashore before sailing, or on board if the right equipment is carried. These include the Marinecall service and the ability to speak directly to a Met. Office forecaster, both of which are chargeable services. Additionally, there are web sites; two recommended by Stuart are the Met. Office and the BBC sites which contain all the weather information given on Navtex in text form, as well as Coastal Station Reports and synoptic charts. It is also possible to receive GRIB files, a coded form of isobar information, although this needs a mobile connexion or a SSB radio and a computer on board. Further information on this can be found on Frank Singleton's web site. Stuart left us with the thought that the forecast is a prediction and that it becomes less accurate as the time extends into the future. Also, it covers relatively large areas and may not be as accurate as wished in you own local neck of the woods.

Next up was the Institute's John Jeffrey describing the weather problems experienced when bringing *Gypsy Moth IV* home from her round-the-world voyage with various crews of youngsters. Starting with her stranding on a reef near Tahiti and her rescue, John went on to detail the several sections of the voyage that he had completed as Mate and then Skipper. From Darwin, where he rejoined her, the weather had been predictable with light winds and a lot of motoring. A near idyllic passage across the Indian Ocean from Sri Lanka to Djibouti in the North East Monsoon had seen *Gypsy Moth* off the wind for two weeks. The wind, John described, had been over the right shoulder and the sheets had hardly been touched. When sailing down 'Pirate Alley' he had been very pleased to meet an American warship. From then the wind pattern had gone wrong. All the expectations for the passage up the Red Sea were for following winds for the first half, then head winds for the second. Unfortunately the dividing line between the southerly and northerly winds had moved down to the bottom of the Red Sea, giving

head winds all the way. Once into the Mediterranean he had experienced winds on the nose. Back into the Atlantic, on passage from Gibraltar to the UK, the westerlies deserted him, needing the use of the engine to allow him to meet the deadline set by UK Sailing, the owners of *Gypsy Moth*, and have her ready to be received on the 40th. Anniversary of Sir Francis Chichester's return after his circumnavigation.

The final speaker of the morning was the former Met. Office forecaster, Frank Singleton. He told us that until 1969 the only forecast that was available was the shipping forecast broadcast by the BBC. This was painted with a very broad brush, covering large sea areas and with very limited time and words allowed. Consequently, it needed interpreting by writing it down then using the information to plot a crude synoptic chart. Now, in 2009, there are many sources of forecasts, most of which aren't readily understood by yachtsmen. Many claims are made by some of them – detailed marine forecast – outstanding accuracy – 1 km. resolution – superior forecasting. The Met. Office, Frank stressed, make no such claims. Sooner or later, all forecasts go wrong, but over the years they have improved in accuracy.

In sixty years of the use of computers, the power and speed have increased. Even so, they are not yet powerful enough to predict the weather as we experience it locally. To run the model in the computer and make a prediction needs data, lots of it. This comes from different sources. A weather buoy gives accurate information at its location; a satellite gives coarse data over a large area. All of this needs to be integrated and included in the model. The atmosphere is chaotic – all lows and hurricanes have small beginnings and Chaos Theory limits their predictability. The computer model is run several times with slightly different starting conditions and the results compared. The closer these separate runs are to one another the greater the reliance that can be placed on the forecast. To produce a forecast one day ahead uses a grid of 40 NM, up to 36 hours ahead a grid of 80 NM. This precludes the possibility of giving local detail such as winds round headlands. Even the meso-scale models cannot show details less than 10 NM. Practicality says that the volume of the data is very high, yet we need to use a worded forecast. Before criticizing the forecast, he suggested that you try writing the wording yourself.

Frank's advice is that before going sailing on Saturday, the forecasts should be checked for several days in advance. Not only that, but several sources of information should be used. The greater the similarity between all these, the greater the reliance that can be placed on them. Trends should be identified, helping to make provisional passage plans. Forecasts should be continuously monitored and plans modified. His Golden Rules include: There are no quick answers or certainties: There is inherent uncertainty in the forecast of +/- 1 on the Beaufort scale: It is better to be in port wishing to be out there that out there wishing to be in port: If there is a chance of a weather window, take it: Never sail without studying several forecasts: Never stop monitoring the forecasts.

Following lunch, despite being in the middle of a house move, Debbie Hemmings from the Met. Office Hadley Centre spoke of climate change. The average global temperature was increasing. From 1850 it had been going up, but the rate of increase had gone up more in recent times, with it being most rapid in the last decade. All the indicators showed this. Arctic sea ice in summer was decreasing by 7.4% per decade, glaciers are reducing in size, sea level is rising and the number of frost days is decreasing.

Debbie's team at the Hadley Centre uses the same Met. Office weather forecasting computer model to predict climate change, but are trying to work years ahead. In the 1960s only the atmosphere was used, with the oceans added in the mid-70s. Now the ice sheets have been included. These are broken into three dimensional blocks, but there is insufficient computing power to be able to produce high definition. The program uses about one million lines of Fortran code and takes six months to run a 250 year simulation. Runs have been made to simulate conditions over the past hundred years which have then been compared with climate records. The simulation allows the heating components to be separated out. The natural effects of the earth's orbit and the sun's activity runs below the observed records. The man made component shows an increase which accelerates over the past 40 years. When both are superimposed they show a remarkable similarity to the observations.

To make an accurate projection for the future requires an input for the likely changes in population, future technology and economic growth. When these are included in the data fed into the model, both individually and in combination, all the projections show similar results up until 2050 due to the inertia in the system, then they diverge but all show a rapid increase in temperature, suggesting we need to reduce emissions of greenhouse gases now. Failure to do so may bring some benefits. These include the possibility of using the Arctic as a trade route through the North West and North East passages, the use of sailing ships due to increases in wind and the encroachment of vegetation into the tundra regions allowing an increase of agriculture in Russia. However, the melting of the tundra will set free much methane, a serious greenhouse gas, and rising water levels will flood many lands. How well humans cope with all this depends on the location, the wealth and the supply of water and food. Long term this could lead to war.

Mike Brettle introduced a lighter note by challenging the audience to decide which of five Weather Lore sayings were backed by scientific evidence. Firstly, heavy rain reduces wave heights. This, Mike said, was backed up by tank tests in the laboratory and by satellite measurements, but only in a torrential downpour. What about the idea that the wind veers clockwise in gusts and backs anticlockwise in lulls? The problem here is to decide what is a gust and how significant is it? Research for the wind energy companies produced data that, when plotted, produced an almost ideal bell-shaped curve showing that the wind could shift in either direction in gusts and lulls. A red sky at night, sailors delight? The diary of Spencer Russell (London) for 1919 to 1924 showed that 161 red sunsets preceded 106 days without rain, a figure of 66%. During that period London had 54% of dry days, thus the old saw improved on actuality. An offshore wind always

veers clockwise when it crosses the coast. Observations in 1987 showed a scatter in the direction of a wind leaving the land, thus showing that this was untrue. It seems more likely that any effect is due to the temperature of the sea with the offshore wind backing for most of the year, except during September and October when the sea is likely to be at its warmest. A ring round the sun (or moon) means bad weather. This ring, due to cirrus or cirrostratus cloud, is often the first sign of an approaching depression. J. P. Brain (1972) found that in Bristol on only 36 occasions out of 80 did rain occur within 24 hours of the sighting. In 2000 in Bristol there were 178 rainy days. However, the idea of persistence suggests that tomorrow will be like today. If the halo is visible it is probably fine weather at present, certainly not cloudy, so if it rained the following day there was a change that may have been forecast by the sighting. But still not sufficient evidence to decide one way or the other.

The final speaker was Neil Northmore from the legal firm of Dorade Law. The law, he said, was there to provide order, structure and justice. Its operation is culturally specific and it constantly changes to reflect society. The weather is in a state of chaos and will not conform to the law. Instead, it could be described as an 'Act of God', which is a description of matters outside human control which has been around since the 13th. century. Another term used is 'Force majeure', a natural phenomenon or forces outside our control. As a result of this it is unlikely that a forecaster could be held liable for an incorrect forecast unless certain conditions were fulfilled. Firstly, is there a contract with a specific group of people? If not, there would be no case to answer. If there is a contract then meteorologists could owe a duty of care. Judicial policy will be the key factor, but proving causation (i.e. I only sailed because you said it would be safe) will be difficult. The best advice is to promote self-reliance, understand the limitations of the forecast and not rely on the law.

The Institute, and especially the Small Craft Group wishes to thank Andrew Eccleston from the School of Marine Science and Engineering at Plymouth University for his assistance in arranging the speakers, and the Royal Thames Yacht Club for allowing it to be held on their premises.

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## Disposal of outdated flares

Pyrotechnic distress signals, not old trousers. I have received a leaflet from the Coastguard about the disposal of these old fireworks.

Out-of-date flares, **from leisure users only**, can be taken to the Coastguard for safe disposal. Unfortunately, they can only be accepted by an MRCC, not your local Coastguard Station, **after making arrangements beforehand**. When contacting the MRCC to organize this you should have to hand details of the type, quantity, age and condition of the flares. The leaflet stresses that it is illegal to dispose of old flares in the general rubbish, or by firing them – except in emergency.

## Car thieves using GPS jammers

Criminal gangs have begun using GPS jammers to help steal expensive cars and lorries carrying valuable loads. So a tracker device in a lorry with a valuable load, or a car with an anti-theft GPS device which should report its position if stolen, cannot locate itself - so says The Guardian newspaper.

The paper quotes the Institute's Past-President, Prof. David Last, and Digital Systems Knowledge Transfer Network's Bob Cockshot prior to today's joint meeting 'GPS Jamming & Interference - A Clear and Present Danger'.

The jammers are also said to be used by some German drivers to evade GPS-based road charging, which was introduced for trucks in 2005 - and is proposed for elsewhere in Europe. There have also been robberies where such jammers have been used against both GPS systems and mobile phones on lorries to prevent the driver from contacting the authorities.

In Europe it appears to be legal to import or own a jammer - but not to use it.

The very weak jammers are effective against GPS because the satellites are so far away - in orbits at over 20,000 km. Jammers could be built by a competent electronics expert, though the gangs appear to prefer to import them from China.

Charles Curry, of Chronos Technology - who heads a consortium which is building a GPS-jamming detection system with a £2.2m UK government grant - says that the biggest fear is that a powerful GPS jammer with an output of 20W or more might be used by terrorists near an airport.

From the Institute's web site.

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## London Boat Show

The Small Craft Group set up the Institute's stand at the London Boat Show and, with help from the Marine Traffic and Navigation Group and a few airmen, manned it for the duration. The weather didn't help with snow hampering transport. It was probably responsible also for the reduced attendance during the Show. Not only were visitor numbers down, several exhibitors were absent. This became apparent when entering ExCeL by the west entrance; part of the South Exhibition Hall had been emptied of exhibitors and turned into ticket sales booths.

Our stand, kindly funded from a donation given by Trinity House, was this time in the North Hall amongst chandlery and electronics stands. One of the principal messages on the stand was the vulnerability of GPS. "Have you a back-up?", we asked. Sadly, on the day that the stand was being set up we heard the news that the USA was going to switch


off LORAN-C, the only non-satellite system available in limited parts of the earth. The press releases stated that the final decision had been made by the Department of Homeland Security on the basis that it didn't help them to catch terrorists. To me, this seemed rather like MI5 saying that buoys weren't needed in the Thames Estuary because they didn't stop the 9/9 bombers.

The main showpiece was a Mark 12 Decca Navigator, on loan from the collection of antique navigation equipment in the corridor outside RIN's offices at South Kensington. This, with a notice asking, "Do you know what this is?", raised many memories amongst the more senior visitors to the stand. Many recollected the days when they had used one when fishing, in RN and merchant ships and in aircraft. Surprisingly, we were told by an exhibitor from an adjacent stand that, despite the signals being switched off several years ago, Decca lane numbers were still being used. His best selling GPS receiver was one that could convert latitude and longitude to give a reading in Decca co-ordinates, especially popular with fishermen in the West Country who had favourite fishing spots identified years ago with Decca and never altered to any other system. A check with the manufacturer indicated that the MCA felt that this facility should be removed due to the loss of a fisherman who, on getting into difficulties, could only give the Coastguard his position in Decca co-ordinates. They were unable to convert these into a form that they could use to assist in Search and Rescue.


A simple competition was run on the stand and many bags containing Institute magazines, newsletters and leaflets were handed out during the show. It now remains to follow up the names and e-mail addresses collected and see how successful our attendance was at recruiting new members.

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## North Sea Navigation

On a recent ferry trip across the North Sea to Esbjerg on board a DFDS ship a visit to the bridge had been arranged. At the time scheduled we were in the midst of a heavy blizzard and the Master asked if we would mind delaying the visit until the return passage when it was hoped that conditions would have improved. Once on the bridge the following day we found the Master and the Second Officer, together with an Engineering Apprentice. The Master, we discovered, had only joined the ship when we did, it being his first passage in the ship, and he was taking time to familiarize himself with her. The Apprentice was checking all the remote cameras and sensing systems for the car deck. The Second Officer was on watch.

Being a group of yachtsmen, three of whom are RIN members, two more being retired shipbrokers, we had a great interest in the navigation systems. DGPS was the main method of navigation, with one ECDIS unit. Being alone, this unit could not run without paper charts. Why only one ECDIS, which hadn't been certified? The Second Officer wasn't sure, but thought it had to do with cost and that it was the Company's decision, not the crew's. Although there was only one ECDIS it was feeding two screens displaying the chart, complete with AIS contacts, and there were two radar screens, which were not showing AIS. At the back of the bridge, though, was a chart-table with a Standard Navigation Chart. We were told that under Danish law, without full ECDIS, there was a requirement to plot a position on the chart every hour and that this was done. The chart also showed a variety of routes used in different weather conditions. The ship, the *Dana Sirena*, had originally been built for use in the Mediterranean and tended to work somewhat in heavy seas, but the main reason for these differing routes was fuel economy. Indeed, on the return to the UK the ship sailed some 40 minutes early, the small number of vehicles and passengers all being on board. This, we were told, allowed for a slower passage speed which saved a large amount of fuel oil.

I asked about back up should GPS fail. They had no other system on board other than estimated positions on the chart and radar. However, I did notice alongside the paper chart a deviation card for the magnetic compass, recently checked and signed by the First Officer.

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## Towards eGMDSS

In introducing this meeting on board *HQS Wellington* Kim Fisher said that he had originally suggested the title as a joke since everything nowadays was e something, eNavigation, eCommerce, but that the joke had returned to haunt him as eGMDSS could become a reality. GMDSS is only ten years old, but the idea goes back much further. Under SOLAS 1960 passenger ships and cargo vessels over 1,600 gt. had to carry radio telegraph and monitor 500 kHz, while smaller vessels carried radio telephone, keeping watch on 2,182 kHz. SOLAS 1974 had introduced VHF radio telephony, keeping watch

on channel 16. Watchkeeping was manual, assisted by radio telegraph and radio telephone auto alarms. The range of about 150 nm. under normal conditions was of limited use for ocean passages.

GMDSS introduced the idea of distress alerts, notified, not directly to ships, but to a shoreside Rescue Co-ordination Centre by terrestrial or satellite communications. The RCC would then alert ships in the area and coordinate rescue attempts. This involved dividing the world into Maritime Search and Rescue regions. It was intended to consign morse code, UHF transmissions, 121.5 MHz and manual watchkeeping to history, bringing in their place satellite EPIRBs, SART, NAVTEX, Inmarsat, SafetyNET, DSC and NBDP. Two other changes were brought in at the same time – distress could be applied to persons as well as ships, and the calling party selected the channel for subsequent communications.

Chris Blockley-Webb from the Navigation Safety Branch of the MCA presented a review of, and modernization of, GMDSS, stating that it was a partnership between many administrative bodies, and that it would take twenty years to achieve full implementation. He quoted nine distinct functions of GMDSS.

Ship to shore distress alerts by two separate and independent means.
Shore to ship distress alerts.
Ship to ship distress alerts.
Search and rescue co-ordination communications.
On scene communications.
Locating signals
Maritime safety information.
General radio communications.
Bridge to bridge communications.

These were gone into in some detail. Moving on to the current situation Chris Blockley-Webb described COMSAR 14/7/1 and associated papers, subscribed to by the UK, USA, Chile, France and Australia. With the plans for eNavigation, GMDSS must be part of this, but there is currently no indication of which direction it will take nor how they will be linked. There are likely to be scoping exercises at the next two COMSAR sessions, with review and modernization of the system taking place in 10, 15 and 20 years time.

Bob Ball, Electrical Superintendent of BP Shipping, had been booked as the next contributor but had been unable to attend at short notice. Instead, Kim Fisher showed a few slides that had been provided. In the first of these it was pointed out that HF radio was not well understood by deck officers, that it was more complicated to operate than Sat-C, while having the same costs, but needing greater maintenance. Sat-C, on the other hand, was already carried in all sea area A3 vessels for the receipt of SafetyNET, and was carried by most other vessels for LRIT purposes. BP Shipping advocates the dual Sat-C approach, with MF / HF fitted purely to meet legislation. They suggest that VHF

is still a good solution for sea area A1, being relatively inexpensive and simple to use, and that sea areas A2 and A3 be combined and Sat-C carriage be mandatory for this new sea area.

Peter Blackhurst, Head of Maritime Safety Services at Inmarsat, pointed out that technology was changing faster than the regulations and asked if we wanted a slimline, easy operating system that provided the necessary service or an all singing, all dancing system that was swamped with communications protocols. We already had IP Connectivity, SMS and cross-network connectivity, but were being restricted in the use of the radio spectrum. The system could be clogged by communications protocols during distress working, so it was time to look at it again.

With Inmarsat's latest I-4 satellites, offering Broadband Global Area Network (BGAN), we now had one device connecting to three networks. Messages could be streamed between the users terminal, voice and ISDN phone or a computer, via the satellite, to an Internet Provider's router. From there it could go by a Streaming IP network using a guaranteed Quality of Service line or a Standard IP Network by either the internet or a local area network. It could also use a Circuit Switched Network to deliver voice messages to a phone. These systems, and their differences, were described. Safety services supported by Inmarsat were also described, together with possible future developments for both voice and data transmission. Other technologies include the digitization of data for transmission by VHF and the use of WiMax, but all future changes needed to avoid making the earlier analogue systems obsolete. Future eNavigation may eventually use the same communications system as GMDSS.

The final speaker was Dr. Martin Ziarati , Director of C4FF and a partner in MarEdu Partnership. He pointed out that, as equipment changes and possibly becomes more complex, there is a greater need for training. Citing STWC, which was introduced 15 years ago, research has shown deficiencies, and best practices need to be used world-wide. With the loss of morse code, all mariners are expected to communicate in English, yet that is not the native language of the majority of seafarers. New automatic systems need understanding and emergency situations put people under pressure. Training is required, but how to provide it?

C4FF is a training and distance learning project that operates through the internet via its web sites. It is supported by several organizations such as BTEC, MNTB, MCA, EDEXCEL and NVQ/SVQ. Where relevant, on-line simulators are used, with over 23,000 users in 190 countries. The simulators are not generic, but are specific to each manufacturer's equipment. Training is available in ten languages and, being funded by the EU, is free to the user. The web sites through which this is delivered are:

| | | |
|---|---|---|
| www.c4ff.co.uk | www.egmdss.com | www.martel.pro |
| www.maritime-test.org | www.maredu.co.uk | www.eWoggle.co.uk |

Following the presentations there were some questions:

Q: Ships used to carry a Radio Officer, who could not only use the equipment but also repair it when it failed. Who fixes this kit when it is faulty?
A: There will be a requirement to carry duplicate equipment so that one will carry on working should one become inoperative.

Q: DSC has proved unreliable. When will it be dumped?
A: For a time I worked in an MRCC. During that time there were three cases of a person being rescued and families reunited using DSC. The situation is open to discussion.

Q: Satellite communications are liable to fail. How can this be prevented?
A: If it happens, GPS satellites are likely to fail as well and the world would be in a mess. It is said that there is a need for alternatives to satellite communication. WiMax is being used successfully in Singapore and digitized VHF experiments for AIS messaging are being carried out in Norway.

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## *Galitano*

On Saturday 16th. May last year, whilst on board *Reality* getting on with some cleaning, I overheard part of a conversation between Thames Coastguard and the *Galitano*. No idea what she was, but I suspect a yacht or motorboat, and it seemed that those on board had only acquired the boat that morning. She was on passage from Gillingham Marina on the River Medway to Shotley Point Marina in Harwich Harbour in a southerly force 6. Obviously there had been previous communication, and she appeared to have asked for directions to Bradwell in the River Blackwater. Perhaps that was the only other place they had heard about.

The Coastguard had an RDF bearing on her and knew she was to the south west, but so is a lot of water, most of the Thames Estuary. They asked if she could see anything, any buoys? There was a buoy ahead and it turned out to be the North Oaze; they were about 8 miles from Sheerness. Why did they want to go to Bradwell? What were their intentions? The answer was to get to land, any land, and get out of all this.

The Coastguard were about to request the launching of a lifeboat, when a Medway Pilot Cutter in the area offered to find them and guide them back to Queenborough. The instructions from the Pilot Cutter, when they found them, were very succinct and readily understandable to those of us who sail these waters, “Steer 240˚. Can you see that big chimney? Go towards it”. They must have passed beneath the Isle of Grain Power Station chimney, some 200 metres high, on their way out and either hadn’t noticed it or didn’t think of returning towards it. Perhaps people like this shouldn’t go to sea.

John Hasselgren, 01277 231185, fairway@rin.org.uk

## TRINITY HOUSE 2010 – Aids to Navigation Review

Trinity House (TH) has undertaken a review of their Aids to Navigation (AtoN's) provided around the coasts of England, Wales and the Channel Islands. Members of the Trinity House Users Consultative Group (THUCC) were advised of this process, at the meeting held on the 06 October 2009, and members of the wider GLA Joint User Consultative Group (JUCG) were similarly advised at the meeting held on the 20 May 2009. The initial results of this review process are attached as a draft plan for consultation, your views are requested by the 29th January 2010.

In December 2008, the IMO Maritime Safety Committee (MSC) approved an E-Navigation strategy. Whilst the end result and the timeframe to complete are not certain, nonetheless navigational technology continues to advance. At the same time, the reliance on the traditional system of lighthouses around the coast diminishes. With the exception of leading lights and "PELS", landfall lights and passing lights are now less important and their primary function is for coastal navigation, confirmation of position and spatial awareness. Thus the "traditional" AtoN's can be regarded as a secondary but complementary system to the primary navigation system of GNSS.

### AIS as an Aid to Navigation

As part of a phased program TH will be deploying a number of shore and buoy AIS installations at various locations around the coast. These transmit AtoN messages (Type 21); Feedback received to date is that not all users are able to detect message Type 21, and only some users are able to fully utilize this functionality on a radar or electronic chart display, TH will continue to deploy AIS as an aid to navigation where there is seen to be added value in doing so, but the full value of this AtoN will only be realized when AIS manufacturers incorporate the necessary functionality within receivers, and the use of fully AIS-capable displays becomes more widespread. IMO's decision to mandate the carriage of ECDIS by SOLAS vessels will improve the latter situation. The deployment of AIS as an Aid to Navigation has not been included in this review.

In this Review, the following principles are applied.

- Generally, the lights system can be considered a complementary but secondary system to GNSS.
- Generally, having one light in view is acceptable.
- Generally, a maximum range of 18 miles is considered sufficient for all lights. However due to geographical locations, lights with a maximum range up to 24nm may still be required.
- Generally, rotating optics are no longer a necessary requirement, and new technology LED lights will be used when stations are re-engineered.
- Where a discontinuance of an AtoN is being considered it may be that the adjacent AtoN's require an increase in range provision.
- If practical, there can be a reduction in amount and diversity of flash characters on lighthouse lights.

- Leading and sectored lights remain important, in some locations.
- Fog signals are no longer considered to be AtoN's but are required as hazard warning signals, in some locations.
- Sequential or synchronized lights may be utilized where appropriate and after a suitable risk assessment.

**Methodology**

As in previous Reviews, the coasts of Britain and Ireland have been divided into 21 coastal areas. Areas 1 to 7 are the responsibility of NLB. Areas 8 to 14 are the responsibility of Trinity House. Areas 15 to 21 are the responsibility of Irish Lights.

- **AIS analysis has been used extensively to determine the volume, type, tracks and pattern of traffic and to carry out risk assessments.**
- A full Risk Assessment (RA) is carried out on AtoN where changes are being considered.
- A Risk Assessment may be applied either to individual AtoN or to a group of interrelated AtoN.
- The GLA's have cross checked their RAs and recommendations with each other.
- The full list of changes for consultation is attached to this document with significant proposed changes reproduced in the table below:

| | |
|---|---|
| Orfordness Lighthouse | Discontinue all Aids to Navigation at this station in conjunction with increasing the range of the light at Southwold lighthouse to 24nm. |
| Beachy Head Lighthouse | Discontinue all Aids to Navigation at this station in conjunction with increasing the range of the light at Royal Sovereign lighthouse to 24nm. |
| Hartland Point Lighthouse | Discontinue all Aids to Navigation at this station, in conjunction with increasing the range at Trevose Head Lighthouse to 24nm & Lundy South Lighthouse to 18nm and establishing a lighted buoy off Hartland Point. |
| Blacknore Lighthouse | No ongoing requirement for a long range (17nm) light at this station. |
| Skokholm Lighthouse | Discontinue all Aids to Navigation at this station, in conjunction with establishing a new minor light with an 8nm range. |
| Maryport Lighthouse | Enter negotiations to hand over station to Local Lighthouse Authority. |

The initial results of this review process are attached as a draft plan and comments are sought by the 29th. January 2010.

| Area | Name | Type | Character | Range | Fog Signal | Radio Aids | Comment |
|---|---|---|---|---|---|---|---|
| 9 | FLAMBOROUGH HEAD | LIGHTHOUSE | Fl (4) 15s | 24 | Horn (2) 90s | DGPS | 2010 Review - Reduce main light from 24nm to 18nm 2010 Review - FS site threatened may require move FS to LH & reduce range |
| 9 | GUILE POINT | LIGHTHOUSE | Oc WRG 6s | 4 | | | 2010 Review - Synchronise with Heugh LH |
| 9 | HEUGH | LIGHTHOUSE | Oc WRG 6s | 5 | | | 2010 Review - Synchronise with Guile Point LH |
| 9 | LONGSTONE | LIGHTHOUSE | Fl 20s | 24 | Horn (2) 60s | | 2010 AtoN Review - Light to be reduced to 18nm, character altered to Fl.7.5s., 2010 AtoN Review - Fog Signal to be discontinued |
| 9 | CORTON | BUOY | Q (3) 10s | 7 | Whistle | | 2010 Review - Whistle to be discontinued |
| 9 | LOWESTOFT | LIGHTHOUSE | Fl 15s | 23 | | AIS | 2010 AtoN Review - Reduce range to 18nm |
| 9 | SOUTHWOLD | LIGHTHOUSE | Fl (4) 15s | 16 | | AIS | 2010 Review - Increase Main Light Range to 24nm 2010 AtoN Review - Discontinue Red Sectors - Expand White Sectors to Cover existing arc |
| 9 | WINTERTON | BEACON | | | | RACON | 2010 AtoN Review - Discontinue Racon |
| 10 | ORFORDNESS | LIGHTHOUSE | Fl 5s | 20 | | RACON AIS | 2010 Review - Discontinue |
| 10 | KNOB NE | BUOY | QG | 4 | | | 2010 Review - Discontinue |
| 10 | KNOB SE | BUOY | Fl G 5s | 4 | | | 2010 Review - Discontinue |
| 10 | SHINGLES MID | BUOY | Fl (2) R 5s | 4 | | | 2010 Review - Discontinue |

| Area | Name | Type | Character | Range | Fog Signal | Radio Aids | Comment |
|---|---|---|---|---|---|---|---|
| 10 | SHINGLES N | BUOY | Fl (2) R 2.5s | 4 | | | 2010 Review - Discontinue |
| 10 | SHINGLES NW | BUOY | VQ | 5 | | | 2010 Review - Discontinue |
| 10 | SHINGLES PATCH | **BUOY** | Q | 5 | | | 2010 Review - Discontinue |
| 10 | TIZARD | BUOY | Q(6)+LFl 15s | 5 | | | 2010 Review - Discontinue |
| 10 | BEACHY HEAD | LIGHTHOUSE | FL (2) 20s | 20 | Horn (1) 30s | | 2010 AtoN Review - Discontinue |
| 10 | CS5 | BUOY | Fl Y 2.5s | 6 | | | 2010 AtoN Review - Discontinue |
| 10 | ROYAL SOVEREIGN | LIGHTHOUSE | Fl 20s | 12 | Horn (2) 30s | | 2010 AtoN Review - Increase Range to 24nm |
| 11 | ANVIL POINT | LIGHTHOUSE | Fl 10s | 19 | | | 2010 AtoN Review - Decrease Range to 9nm |
| 11 | NAB | LIGHTHOUSE | Fl 10s | 16 | Horn (2) 30s | RACON | 2010 AtoN Review - Decrease range to 12nm |
| 11 | ALDERNEY | LIGHTHOUSE | Fl (4) 15s | 23 | Horn (1) 30s | | 2010 AtoN Review - Reduce Main Light Range to 12nm on re-engineering 2010 AtoN Review - Main Light - Night Time & Reduced vis only |
| 11 | CASQUETS | LIGHTHOUSE | Fl (5) 30s | 24 | Horn (2) 60s | RACON | 2010 - AtoN Review - Light range to be reduced to 18nm and fog signal range to 2nm |
| 11 | HANOIS | LIGHTHOUSE | Fl (2) 13s | 20 | Horn (2) 60s | | 2010 AtoN Review - Reduce Main Light Range to 18nm |

| Area | Name | Type | Character | Range | Fog Signal | Radio Aids | Comment |
|---|---|---|---|---|---|---|---|
| 11 | PORTLAND BILL | LIGHTHOUSE | Fl (4) 20s | 25 | Horn (1) 30s | | 2010 AtoN Review - Reduce FS from 3nm to 2nm |
| 11 | SARK | LIGHTHOUSE | Fl 15s | 20 | Horn (2) 30s | | 2010 AtoN Review - Reduce Main Light Range to 18nm |
| 12 | BERRY HEAD | LIGHTHOUSE | Fl (2) 15s | 19 | | | 2010 AtoN Review - Decrease Main Light Range from 19nm to 16nm |
| 12 | ST ANTHONY | LIGHTHOUSE | Iso WR 15s | 16 | Horn (1) 30s | | 2010 AtoN Review - Decrease Main Light Range from 16nm to 12nm<br>2010 AtoN Review - Decrease Red Sector Light Range from 14nm to 9nm |
| 12 | START POINT | LIGHTHOUSE | Fl (3) 10s | 25 | Horn (1) 60s | | 2010 AtoN Review - Decrease Red Sector Light Range from 12nm to 9nm |
| 12 | TATER DU | LIGHTHOUSE | FL (3) 15s | 20 | Horn (2) 30s | | 2010 AtoN Review - Decrease Main Light Range from 20nm to 16nm<br>2010 AtoN Review - Decrease Sector Light Range from 13nm to 9nm |
| 12 | GODREVY ISLAND | LIGHTHOUSE | Fl WR 10s | 12 | | | 2010 AtoN Review 2010 - Reduce range of Main Light to 8nm<br>AtoN Review - Reduce range of Red Sector Light to 8nm |
| 12 | PENINNIS | LIGHTHOUSE | Fl 20s | 17 | | | 2010 AtoN Review - Reduce Main Light Range from 17nm to 9nm |
| 12 | TREVOSE HEAD | LIGHTHOUSE | Fl 7.5s | 21 | Horn (1) 60s | | 2010 AtoN Review - Increase Range to 24nm<br>2010 AtoN Review - Change Character to Fl 15s |
| 13 | BLACKNORE | LIGHTHOUSE | Fl (2) 10s | 17 | | | 2010 AtoN Review - Discontinue station |

| Area | Name | Type | Character | Range | Fog Signal | Radio Aids | Comment |
|---|---|---|---|---|---|---|---|
| 13 | HARTLAND POINT | LIGHTHOUSE | FL (6) 15s | 22 | Horn (1) 60s | | 2010 AtoN Review - Discontinue station<br>2010 AtoN Review - Deploy lighted starboard lateral buoy with WAB |
| 13 | LUNDY SOUTH | LIGHTHOUSE | Fl 5s | 15 | Horn (1) 25s | | 2010 AtoN Review - Increase Range to 18nm<br>2010 AtoN Review - Change Character to Fl W 10 secs |
| 13 | SKOKHOLM | LIGHTHOUSE | Fl WR 10s | 19 | | | 2010 AtoN Review - Discontinue Station<br>2010 AtoN Review - Establish new light - Fl ev 10s - W 360 deg - 8nm Range |
| 14 | SOUTH STACK | LIGHTHOUSE | Fl 10s | 24 | Horn (1) 30s | | 2010 AtoN Review - Reduce FS Range from 3nm to 2nm |
| 14 | BAR LF | LIGHT FLOAT | Fl 5s | 12 | | RACON | 2010 AtoN Review - Enter negotiations to hand over to Port of Liverpool |
| 14 | HE 1 | BUOY | Q (9) 15s | 5 | | | 2010 AtoN Review - Enter negotiations to Hand over to Port of Liverpool |
| 14 | HE 2 | BUOY | Fl G 2.5s | 4 | | | 2010 AtoN Review - Enter negotiations to Hand over to Port of Liverpool |
| 14 | HE 3 | BUOY | QG | 4 | | | 2010 AtoN Review - Enter negotiations to Hand over to Port of Liverpool |
| 14 | HOYLE N | BUOY | VQ | 5 | | | 2010 AtoN Review - Discontinue in line with construction of Gwynt-Y-Mor OREI |
| 14 | MARYPORT | LIGHTHOUSE | FL 1.5s | 6 | | | 2010 AtoN Review - Enter negotiations to hand over to Maryport Harbour Authority |

**Comments on Trinity House 2010 – Aids to Navigation Review**
**From the Royal Institute of Navigation**

The Royal Institute of Navigation thanks Trinity House for the opportunity to comment on this review and it is hoped that the points included in this response will be useful in planning the future course of Aids to Navigation. It is a relatively brief response but the Institute would be happy to detail its views, perhaps at a face-to-face meeting with Trinity House staff. Comments received from Institute members have been taken into account in the preparation of this report.

The Institute agrees that GNSS is the primary electronic position fix system for marine use. For many years, GPS data has proven to be of good accuracy, availability and continuity. Later in 2010 it is expected that the GLONASS constellation will be recompleted. The latest receiver chips now have combined GPS/GLONASS operation and for effectively zero cost will give new equipment enhanced GNSS integrity. Furthermore, during the next 5-10 years it is expected that the Galileo and Compass systems will become fully operational, further adding to the integrity of GNSS. Of course, coastal differential stations and space based augmentation systems have already provided higher integrity and accuracy to GPS and/or GLONASS received signals.

However, the Institute concurs with the GLAs of the UK and Ireland and many other bodies that GNSS will remain vulnerable to interference, jamming and solar radiation effects. eLoran offered a potential secondary electronic position fix system that may have been able to reduce the need for lights and other AtoNs for coastal navigation, when supported by developments coming out of IMO's eNavigation programme. Now the decision has been made that Loran- type systems will not be supported in the US, the likely adoption of eLoran in other regions must be in severe doubt. In particular, the US decision is likely to negatively influence potential government expenditure on this technology within the UK and Europe.

This means that position backup is going to continue to be a combination of visual aids, radar and estimated position techniques, long into the future. There is no doubt that there will be development of these basic techniques to fill the void left by eLoran. It should be realized that the AIS function on AtoNs is primarily for identification and does not provide independent position fix data. In particular, AIS does not replace the need for lights or racons on AtoNs.

The lack of the expected route to eLoran and eNavigation means that the light system needs to be retained into the foreseeable future because it provides an important backup to GNSS. In parallel with this it is important that Trinity House relooks at the possibilities given by racons. Conventional racons are very useful as they provide an independent position fix. The range and bearing to a single racon fixes the position of an observer. It is clear that further enhancements to racon and radar technology can make

this process automatic and highly accurate and so in coastal regions it can offer the possibility of a true secondary position fix system.

In general, the Institute concurs with the stated principles contained within the Trinity House document, with the exception of Principle 2: "Generally, having one light in view is acceptable". Taking into account the points made above, the Institute would prefer that there was a minimum of two lights visible, wherever possible. It is, of course, recognized that in some lesser used areas the coverage will be restricted to just one. Also, it is recognized that the main purpose of some lights is to provide clearing information. Obviously a minimum of two lights is necessary for position determination in the event of GNSS unavailability

There is obviously a need to keep lights suitable for taking manual visual fixes. Of course, it is possible that in the future there will be opportunities for more automation and electronic aiding in this area. However, in general, it is important that lights come on before there is any sign of darkness and do not turn off until there is good natural light. Longer flashes would be preferred by many. To enable the use of a hand bearing compass for taking bearings of LED lights there should be more than one flash. Consideration should be given to including a reduced range fixed light added to the main light to improve the ability to take bearings. This maybe replaces the loom, which has proven to be useful to mariners taking a conventional fix on rotating lights.

Lighted visual aids are particularly important where there are exclusion zones, such as close to wind and sea driven generators. The same is true for harbour entry and in other congested or channelized areas.

The Institute has no formal comment to make on the detailed list of changes included within the consultation document but urges Trinity House to bear in mind all the above points when each case is being reviewed. However, one professional member has expressed surprise at the proposed removal of the buoyage marking the Knob Channel (Area 10), unless it is clear that this channel is no longer being used for commercial traffic. The approach is covered in Sailing Directions Dover Strait Pilot NP28 Ed 8 2008 Paragraph 11.104. There is also concern at the loss of Beachy Head light which might be overcome by increasing the range of Newhaven breakwater light to enable clearance of Beachy Head when Royal Sovereign is lost.

If Trinity House wishes any clarification of these points please contact in the first case: The Director, Royal Institute of Navigation, 1 Kensington Gore, London, SW7 2AT.
Compiled by: Robin Payne, representative at JUCG and THUCC, and Prof. Andy Norris, Chairman of the Technical Committee, Royal Institute of Navigation. 28 January 2010.

The above review and reply has led to items about this on both BBC television and radio. The Institute's own Director, Peter Chapman-Andrews, appeared on the BBC1 'Breakfast' show on 17th. March discussing the review. It also featured on the satyrical 'The Now Show' on Radio 4 on Friday 19th. March. How's that for publicity?

# THE ARCTIC – THE WHITE FRONTIER

Captain Michael Lloyd, Senior Advisor, Witherby Seamanship International Ltd.

*Captain Michael Lloyd is one of the four authors of the new Ice Navigation Manual shortly to be published by Witherby Seamanship International Ltd. His experience together with that of the other authors ensures that this new book is the most comprehensive guide to Ice Navigation ever published covering all aspects of navigation and seamanship in ice covered waters. This article follows his excellent talk at a Joint Informal Meeting onboard HQS Wellington in February.*

The Arctic consists of ocean of over 14 million square kilometres (5,427,000 sq. miles), almost the size of Russia, surrounded by continental land masses and islands. The central Arctic Ocean is ice-covered throughout the year and snow and ice are present on land for most of the time.

The Arctic Circle starts at 66 degrees 32 minutes north which marks the latitude above which the sun does not rise on the winter solstice, the 21st of December and does not set on the summer solstice, the 21st of June. North of this latitude are the continuous periods of day and night which last up to 6 months at the North Pole. The central surface is covered by a permanent drifting polar icepack that averages about 3 metres in thickness. This is surrounded by open seas during the summer, but more than doubles in size during the winter and extends to the encircling landmasses; the ocean floor is about 50% continental shelf with the remainder a central basin interrupted by three submarine ridges. (Alpha Cordillera, Nansen Cordillera, and Lomonosov Ridge)

**Arctic Claims**

Under the law of the Sea, outside a nations 12 mile sovereignty, there is a 200 mile limit which is a nations exclusive Economic Zone (EEZ) that, while not giving sovereignty, allows a nation to control economic activity within their EEZ.

The continental shelf commences where the land meets the sea and ends at the upper edge of the continental slope. In the Arctic Ocean, there is no gradual sloping of the continental shelf that could cause dispute as to where this ends; therefore theoretically, the vast part of the Arctic Ocean is in international waters with no nation able to make any claim over any other. This area is referred to as the Arctic Commons.

Unfortunately, the situation is complicated by another clause in the Law of the Sea which states that countries can claim undersea jurisdiction if they can prove that ridges are directly connected to their section of the continental shelf, in other words, possibly accepting that the ridge can extend the continental shelf. The nations involved in these

claims are Russia, Canada, Denmark and the USA and to a lesser extent, Iceland and Norway.

There are three ridges in the Arctic Ocean, Alpha Cordillera, Nansen Cordillera, and Lomonosov Ridge and it is the Lomonosov Ridge that is causing the greatest contention. This ridge runs for 1,800 kilometres across the seabed of the Arctic Ocean from the islands off Siberia to Greenland. Russia claims that this is an extension of its continental shelf; however Denmark also claims that it is an extension of the Greenland continental shelf. To further complicate the issue, Canada is now carrying out surveys to prove that the ridge has an offshoot that reaches to its continental shelf as well. We therefore have three nations claiming the North Pole.

**Oil and Gas**

By using a probabilistic geology-based methodology, the United States Geological Survey has assessed that 1,550 trillion cubic feet of gas, enough to meet the world demand for 14 years, and 83 billion barrels of oil, enough to meet the world demand for 3 years, lie in the Arctic Circle although BP claim the amount is closer to 200 billion barrels. Most of this is offshore in less than 1500 feet of water. Much of the oil is in US claimed waters and most of the gas in that claimed by Russia.

**The Weather**

Within the Arctic Circle, winters are cold and stormy. In winter, strong winds with snowstorms are mixed with calm periods. In wind speeds of 60 km/h or more, blowing snow makes it difficult to see more than a few metres. Katabatic winds occur when cooled dense air flows down slopes. This is common over the Greenland ice sheet. In some places these winds are channelled by mountain valleys or flow down steep slopes. In these conditions, the winds can often exceed 100 kilometres per hour.

Polar cyclones generally only last for around 2-3 days, with the most severe having average wind gusts of 200 km/h (120Mph). Although cyclonic activity is most prevalent in the Eurasian Arctic with approximately 15 cyclones per winter, polar cyclones also occur in Greenland and the Canadian Arctic. The results of recent studies of the Arctic weather claims that the shrinking of the sea ice around the North Pole will cause more storms to form over the increased open water with hurricane force winds. Snow cover lasts about 10 months and ships' superstructures are subject to icing from October to May. The maximum snow cover is in March and April with about 20 to 50 centimetres over the Arctic ice.

The wind is little different than that experienced in the North Sea where winter winds of over 100 knots are not unknown. The problem is the sea state and the snow. In the North Sea, the winds blow over a comparatively short distance, whereas in the Arctic, the winds have a greater fetch which will increase as the ice melts. The seas therefore have a longer time to build up into long deep swells and waves similar to the Atlantic. With the

winds come driven snow which reduces the visibility to metres and this can persist for some days. The wind also causes spray which in turn leads to ice accretion. As example, over 300 tons of ice can accumulate on a ship's forepart in one night of bad weather in freezing conditions.

Another effect of the wind is the wind chill factor, which governs the sustainability of those exposed. When judging wind chill factor, the speed of the boat or ship must be added to that of the wind. Thus a ship making 20 knots against a 20 knot wind produces 40 knots of wind. At a temperature of -20˚C the wind chill factor therefore increases to -55˚C.

Ice islands occasionally break away from northern Ellesmere Island, and icebergs are formed from glaciers in western Greenland and extreme northeastern Canada, however small ice floes can be abundant at any time. On average in the Northern Hemisphere, sea ice is at a minimum in September, and at a maximum in March. In the Southern Hemisphere, these times are nearly opposite; minimum in March and maximum in September.

**Potential**

Speaking at a meeting of the Arctic Council in Yakutsk, Vladimir Morgunov, assistant to the Russian Economic and Trade Minister, said: "The Arctic Council states should take steps that would enable them to minimize the damage caused by potential negative effects while taking maximum advantage of positive effects of the global warming". The Northern Sea Route may be completely ice-free by 2020-2035 if arctic ice continues to thaw at a present pace. In that case a short transportation route going across Russia will connect Europe with Southeast Asia. According to Mr. Morgunov, "the route will have great potential for cargo traffic".

A fully opened Northern Sea Route could shorten the journey for goods and raw materials from Northeast Asia to Europe by 40 percent. Russia is also preparing legislation to impose tight controls over navigation through its northern coasts as the reduction in Arctic sea ice makes the route more commercially appealing to shipping. These controls include the ability to refuse military vessels, impose fees on shipping using the route and a requirement for vessels to be escorted.

**Pollution**

One of the major concerns of the Arctic council is pollution. Interestingly they are more concerned at the pollution from the oil and gas field support ships than from these facilities. While coping with oil pollution in the Arctic is a major problem that still has to be dealt with, there is another pollution concern waiting in the wings.

Between 1964 and 1986, some 7,000 tons of solid radioactive waste and 1,600 cubic metres of liquid waste was pitched into the Kara and Barents Seas from the base in Murmansk which serviced the Soviet fleet of nuclear powered naval and merchant ships.

Nuclear reactors from at least 18 nuclear submarines and icebreakers were also dumped in the Barents sea.

The availability and condition of ports in the Arctic must also be considered as the shipping activity in the Arctic increases. Presently there are only 13 sizeable ports in the arctic circle which is not many considering that the Arctic is 5 times the size of the Mediterranean and the vast number of support vessels that will be needed for the economic exploitation that is surely coming. The majority of these ports are in need of repair and upgrading. There are no facilities for dealing with oil spills and the fleet of ice breaker are ageing.

Finally the navigational and hydrographical services are very poor. Charts are sparse and limited in their accuracy.

Taking all the factors into account the exploitation of the Arctic will be no easy task and will require extraordinary new capabilities in all the marine fields of navigation, seamanship, ship and port design and above all else, training for those who are to venture there.

But we have the technology, the ice is melting and the ships are going. The vast storehouse of mineral wealth of the Arctic, which is estimated conservatively at 2 trillion dollars, is waiting to be shared by those who are ready to provide the knowledge, ships and the men. Other nations are already starting to prepare. We must hope that our own Marine industry realises the potential.

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## Small Craft Group Annual General Meeting

The Chairman, Cynthia Robinson, opened the meeting, held at the Royal Thames Yacht Club by welcoming the members present. Apologies for absence were taken and the minutes of the previous meeting were discussed. At this stage the Secretary, Peter Eddis, acknowledged a mistake in which page two of the minutes had been omitted from the copies distributed to the meeting. Page two was read out from his own copy and the Minutes were agreed. Cynthia then expressed her grateful thanks to two members of the Committee, Bob Harrison-Page and Robin Payne, who were standing down following years of valuable service.

Next came the election of the new Committee. The members of it are:

Cynthia Robinson, Chairman. Peter Eddis, Secretary.

| | | |
|---|---|---|
| Paul Bryans. | Carl Calvert. | Peter Chapman-Andrews (ex officio). |
| Roger Grimsdick | Keith Langridge. | John Hasselgren, (Editor, Fairway). |
| Simon Jinks. | | |

Simon Jinks is a new member of the Committee. A short CV can be read below.

In her Chairman's report, Cynthia talked of her involvement with other Committees of RIN. Some matters had come from these. A couple of years ago there had been a Member-get-Member campaign. This arose from the facts that 54% of members join to learn more, 35% for contact with other members, but 65% had joined because of a recommendation from an existing member. This is still relevant today. Roger Grimsdick has been working with Yacht Clubs, but individual visits and talks take up time so the Committee is looking at the possibility of producing video information or using YouTube to deliver talks. She also represents individual members at the Way Ahead Group. Other members of the Group represent commercial, academic and service interests.

Paul Bryans is aiming to run another of the very successful Electronic Navigation Seminars. Originally, most manufacturers were sceptical, but at the end they were almost demanding a repeat of it. Surveys show that yachtsmen desire interaction with the manufacturers. On one occasion a manufacturer sent a technician to sort out a problem with an installation, only to have him fail to use the equipment due to sea sickness. The biter bit! It is hoped that the Institute's new web site, with Keith Langridge as its co-ordinator, will play a major part in this, with members taking part in forums.

Cynthia the reviewed the activities of past year, starting with the talk by Sir Robin Knox-Johnston, now a year ago. The Group had represented the Institute at SeaWork, the Southampton and London Boat Shows, had organized the Electronics Workshop, Weather and Sailing seminar, and the Autumn meeting when Capt. Richard Wild, a Senior Harwich Pilot described some of the problems when ships and yachts share confined waters.

Future events involving the Small Craft Group would be a repeat of the Fly / Sail weekend (22/23 May), SeaWork (15/17 June), Southampton Boat Show (10/19 Sept.), the Autumn meeting (14 Oct.), a visit to Trinity House HQ in London (8 Nov.) and the London Boat Show (7/16 Jan.). *(Further details can be found in the Diary dates section. Ed.)* Members were reminded that the new web site was now working and that most events would be publicized on it. There was also a monthly or bi-monthly e-mail sent to members reminding them of the Institute's events, although this covered all aspects and not solely Small Craft Group activities. However, if the Institute doesn't have your e-mail address, or if you have changed it and not notified Colin Hatton, this form of communication wouldn't work.

Under Any Other Business, Keith Langridge, co-ordinator of the SCG pages on the web site, said that the forum facility wasn't being used, and urged members to get to grips with it. He would like to see a Frequently Asked Questions section that was available to anyone visiting the site, and the Forum section open to members only. Kathy Hossein felt that these pages needed to be seen to be active, or they will not be used. Keith

Langridge would investigate the possibility of a counter being added to the web site so that we have a record of how often it was used.

**Simon Jinks, CV:**
Simon formerly managed the RYA Yachtmaster programme for sail and motor-cruising and teaches and examines instructors for the RYA. He is a former Technical Consultant for *Yachting Monthly* and *Sailing Today,* and current contributor to *Motor Boats Monthly* and the RYA. Simon's specialization is in Commercial Codes of Practice and Training and Accreditation programmes. Previous to this, Simon taught all types of practical and shorebased courses and ran a busy RYA training centre.

Currently, he is working on a Sport England strategy for increasing adult participation in cruising and also forming a company with a marine lawyer called SeaRegs LLP, dealing with technical support and safety documentation for organizations and commercial operators.

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## eNavigation
## Enhancing Safety, Security & Protection of the Marine Environment

Following the AGM, Dr. Sally Basker, Director of Research and Radionavigation at the General Lighthouse Authorities spoke about the direction in which radionavigation is heading.

Starting by describing how the GLA is composed of Trinity House, Northern Lighthouse Board and the Commissioners of Irish Lights, she said that she had to report, not to one Chief Executive, but three. Their statutory responsibilities were to mark wrecks and remove if necessary, to provide aids for general navigation and the superintendence and management of all aids to navigation; basically emergency response, prevention and inspection. To emphasize this she showed charts detailing shipping density around the UK, AIS plots of a grounding on the Varne Bank and a photograph of the East Goodwin Light Vessel with a chunk bitten out of it in a collision. Other necessary work included moving the First World War submarine UB 38 and marking the several windfarms (up to 7,000 turbines) being constructed around the UK, and the South West wave hub.

In an overview of eNavigation, Sally said that this was being driven by increases in population, mass market consumerism and energy requirements. In turn these led to an increase in exports and imports, with low tech. products being replaced with high and the need for more and greener energy. All of this meant more and larger ships and more crowded waters. We were told that 21% of all insurance claims at sea were for collisions and groundings, and were shown examples. eNavigation is an initiative to cope with these problems by:

- Facilitating safe and secure navigation of vessels
- Facilitating communications, including data exchange, between vessels and shore

- Integrate and present information onboard and ashore that maximizes navigation safety benefits and minimizes any risk of confusion
- Facilitate global coverage with consistent standards and interoperability.

This will be achieved by the use of global voice and data communications, electronic positioning and timing and electronic charts.

Use will be made of virtual Aids-to-Navigation. This new concept will allow the GLA's members to mark new hazards on a ship's electronic chart within the required six hour time slot, prior to deploying a real buoy. Collision avoidance is another concern addressed by the idea of eNavigation. The majority of accidents are due to human error. The use of existing and new vessel sensors will improve situational awareness and provide decision support to the crew. By this means it will be possible to place a virtual ring round a vessel and to trigger an alarm should another one seem to be encroaching inside it. Passage planning would be simplified by making the necessary information more accessible, having it organized and clearly presented in a standard and unambiguous form.

Looking at a slightly different field, Sally pointed out that navigation technology, and GPS in particular, had migrated into the consumer field with items like the iPhone. Although the equipment had been made simple to operate, may of the problems and complaints about "GPS" were in fact due to poor mapping or to poor input. She quoted one journey by land to Capri which ended up in Carpi at the other end of Italy, presumably with no checks being made on the way there.

With greater dependence on GMDSS, a flawed hero, it had nevertheless revolutionized PNT, its performance had improved but it was likely to change its relationship with us, going from enabler (easier navigation) to enforcer (possible road pricing). Its known vulnerabilities have brought about innovation with DGPS, increased sensitivity and EGNOS / WAAS. Jammers, though, still present a very real difficulty. These are available and are being used by criminals, especially on the Continent in the theft of expensive cars and valuable lorry cargos. Not only do they defeat the tracking systems, they also prevent the use of mobile phones.

Examples of the failure of GMDSS were given. *THV Alert* complained in 2007 that its GPS receiver was becoming irregular. It was discovered that its antenna cable had become a jammer instead of just a passive aerial. In December 2006 a solar flare produced ten times more radio noise that the previous highest recorded figure, even though it was at solar minimum. This had blocked GPS over most of the sunlit side of the earth, as well as causing failure of the electricity supply. Off Flamborough Head she herself had taken part in jamming tests. A 1.5 watt jammer had successfully defeated GPS for 30 kilometres out to sea. As the test vessel approached the jammed area the side lobes produced false information, the receiver believing the signal to be good but

producing a position in error by up to 22 kilometres. What has continued to work during this jamming was eLoran.

Enhanced Loran is an internationally standardized positioning, navigation and timing service. It meets the accuracy, availability, integrity and continuity performance requirements for aviation non-precision instrument approaches, maritime harbour entrance and approach, land vehicle navigation and location based services. It is also a precise source of time and frequency for, say, telecommunications. Being independent of and dissimilar to GNSS eLoran becomes a complement to satellite systems, enabling users to retain the benefits of GMDSS whilst having a check on its integrity and a back up during disruption of satellite services. eLoran is high powered (250 kW), low frequency (0.1 MHz) and ground based. This alone makes it very difficult to jam or to spoof. Pseudo-ranges can be interoperated with GPS making it useable indoors, useful in search and rescue and in large warehouses. It is also able to broadcast Co-ordinated Universal Time and differential Loran corrections.

The UK's eLoran station is based at Anthom, in Cumbria, and from a map shown by Sally, works in conjunction with stations in the Faroes, Norway, Germany and France. It was moved from Rugby during 2007 and is housed in four steel transport containers welded together, the antenna being mounted on top and the system runs unmanned. This is very different from the USA's Loran C stations, now being closed, which are based in large buildings and are heavily manned. Before the end of 2007 signals had been tested and verified, with a service being operated at the beginning of the following year.

What of the future? Even though Loran C is closing down, there are those in the USA who believe that something like eLoran is essential, and the caesium clocks from Loran C are being removed for maintenance and storage. Norway, Russia, China and Japan are looking to eCHAIKA, a similar system. Current research in the UK is carried out in consultation with the International Lighthouse Authority and the development of eLoran is 50% funded by a grant from the Department of Transport. Sally Basker's estimate is that coverage of the whole of Europe with eLoran would cost about the same as that of building and launching one Galileo satellite.

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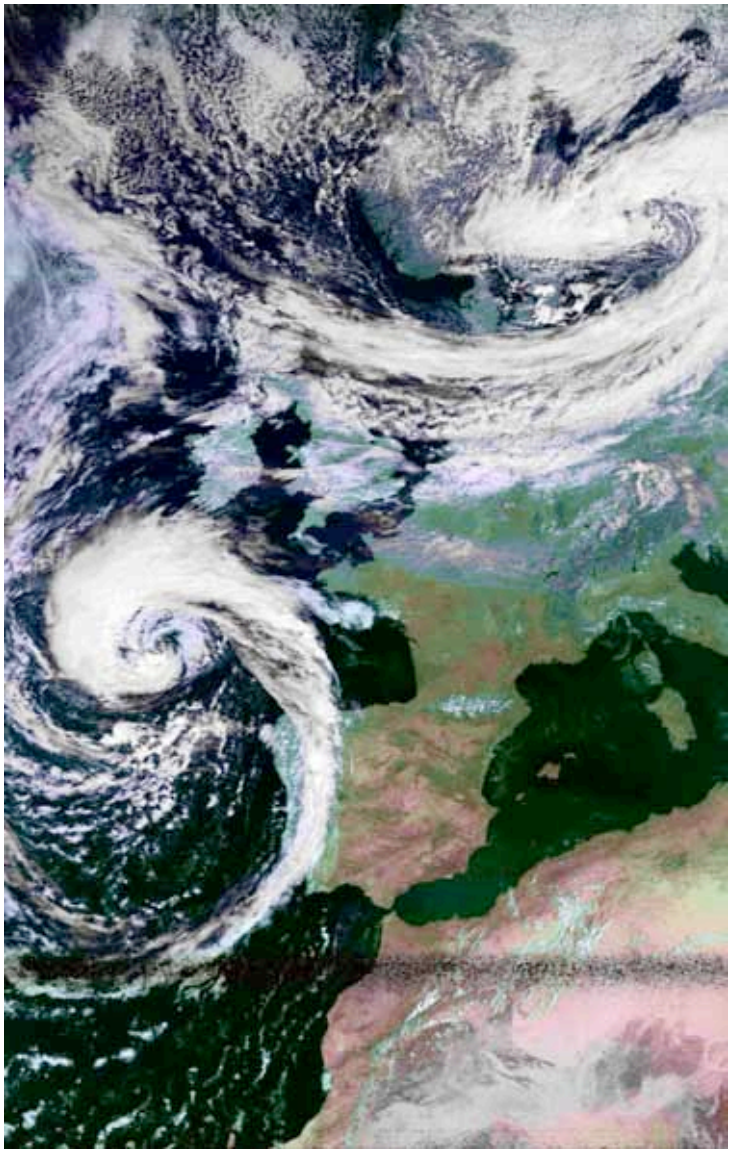
## Satellite Weather Reception
## A short description of what is available to the amateur.

If, like me, you are fascinated by the ever-changing weather – not just in the UK, but worldwide – then you are already aware that a major source of weather data comes from satellites orbiting the earth. Currently, weather information is transmitted from two entirely different 'types' of satellite i.e. the LEO (Low Earth Orbit) NOAA National Oceanographic and Atmospheric Administration) satellites which are in sun-synchronous orbit around the poles. At the time of writing, there are four such satellites, traveling at approximately 32,000 kph at a height of some 840 kilometres. This means that each orbit takes approximately 100 minutes and, because of the earth's rotation, the swathe of



earth photographed by the satellite's cameras (visible light and infrared) progresses westwards with each successive orbit. Consequently, a limited amount of data can be received by an observer in a particular location. Some time ago (Autumn 1997) I wrote a small piece in Fairway Edition 6 describing the receiving equipment I had built for the reception of the data which can be input to a computer via the sound card to produce excellent coloured cloud images. The transmissions are all in the VHF 137MHz band and are referred to as APT (Automatic Picture Transmission). Since then, apart from building a new receiver, little has changed and I still receive data on a regular basis. The data I receive is free and unencrypted, and the whole setup, excluding the PC, cost me just over £100. Suitable software is also available at no cost from various sources but the main ones are David Taylor who is a prolific writer of all kinds of programs (see www.david-taylor.myby.co.uk/), Christian H Bock with his WXSat program, and Central North Publishing Ltd. with the WXtoIMG program (see www.wxtoimg.com/). I use a program from David Taylor called WXTrack which, among other things, predicts the satellite positions on a world map and is a very useful tool. I do not currently have access to the very high resolution data which is also available but that is an option for the future.

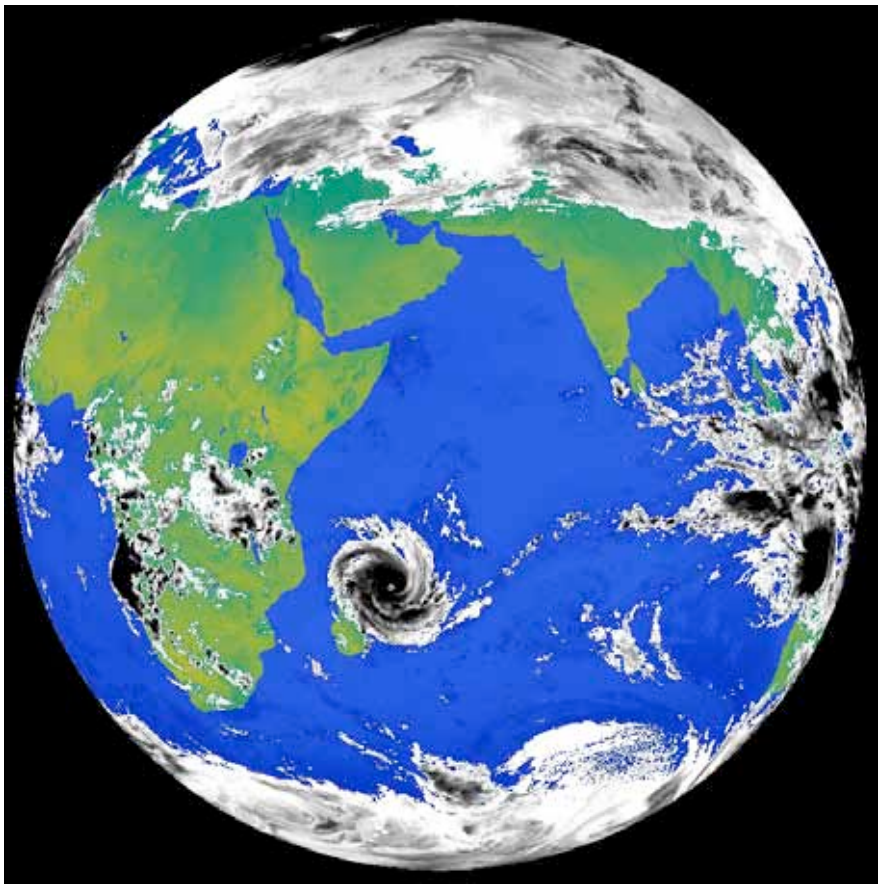
At this point, I should mention a marvelous organization called GEO ( Group for Earth Observation). Membership of GEO is an absolute must for anyone wishing to receive their own data. The website is www.geo-web.org.uk/ where you can find real help in getting started, both as the written word or by contact with other members. GEO not only publishes an excellent quarterly publication, but can supply all the equipment needed to set you up with your own weather station. Annual membership is £20 which entitles members to purchase items at a discount.

Once you are hooked on receiving APT data from the polar orbiting satellites, you may wish to progress to receiving high resolution world-wide data from a commercial geostationary satellite called MEDIA BROADCAST situated at 0° Latitude and 9°E longitude. This requires a satellite dish, a modern PC fitted with a circuit board such as

the Technisat 'Digital-Sat-Receiver', suitable software (not free this time) and a licence (also not free) from an organisation called EUMETSAT based ) at Darmstadt in Germany. Go to:

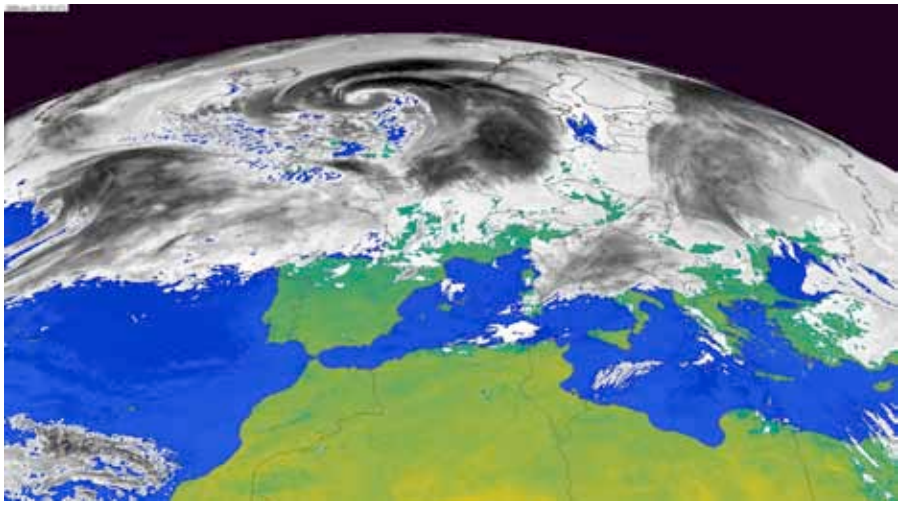
www.eumetsat.int/Home/Main/AboutEUMETSAT/index.htm?l=enbase

to find out all about EUMETSAT which is a large and helpful organization, covering all aspects of weather forecasting and climate monitoring. Achieving the final outcome of stunning cloud pictures from the whole earth's surface seems a little daunting but the results are worth all the hassle, and GEO is there to help. The satellite which looks down on our region of the earth is called MSG-1 (MeteoSat Geostationary) and it transmits an enormous amount of information continuously. For example, visible, infrared, and water vapour images are transmitted every 15 minutes. Also, data from other geostationary weather satellites positioned around the world are uplinked to MSG and retransmitted so as to be available to us in Europe. The reason that we receive the data from a commercial satellite is that a power amplifier in MSG-1 failed, making direct transmission to the earth receiving station impossible. Consequently, the data is routed to earth via a nearby commercial satellite – originally Hotbird 6, but now Media Broadcast. Subsequently, it was decided that later versions of MSG (MSG-2, the current satellite in use) would use the same modus operandi - which is a blessing for amateurs who would otherwise not have access to the data.



David Taylor has written a suite of software, modestly priced, which enables the collection of the data (MSG Data Manager), the display of stunning high resolution images (GeoSatSignal) and the animation of images to show cloud movement (MsgAnimator). A one-off licence fee is payable to Eumetsat who provides the licensee with a 'USB Dongle' for enabling decryption of the data.

In my own home setup, I use a small Sky dish connected to a Technisat receiver in a dedicated PC running MSG Data Manager due to the enormous throughput of data. (In fact, I do use it for other programs without problems). The PC is networked to a second general purpose PC running GeoSatSignal and MsgAnimator. Occasionally signals



disappear owing to the fact that Eumetsat switches reception between MSG-1 and 2 but this is easily sorted. I have been able to include examples of the received images in Fairway, but as the printed version will only show them in black and white please go to the following website where I have uploaded some typical examples in colour.

www.picasaweb.google.com/johnbarfoot2/FairwayArticlePics?authkey=Gv1sRgCPGXva2epfvfcA

If you wish to know more, contact me at my email address, sounio@aol.com.

John Barfoot FRIN

*Geostationary pictures are courtesy of Eumetsat.*

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## MarTEL - SOLVING POOR COMMUNICATION AT SEA

According to the International Maritime Organisation (IMO), more than 80% of accidents at sea are caused by human error, the majority of which are related to poor standards of maritime English and in response to this problem the Centre for Factories of the Future (C4FF) and their European partners have devised a new programme called MarTEL.

The creation of an international maritime English standard has been needed for quite some time to preserve life at sea and reduce the huge financial costs incurred as a result of accidents caused by poor vocational language skills.


In November 2002 a Liberian tanker, *Prestige*, broke up and sank with 77,000 tons of oil on board just 120 miles off the Spanish coast. The resultant oil spill left thousands of fishermen out of work and contaminated more than 100 beaches making it an environmental disaster.

It caused untold damage to the environment which could have been avoided had proper communication been followed throughout. During this

incident the emergency situation was badly handled by the ship's crew and there are plenty more examples of this problem occurring, including the 1990 *Scandinavian Star* ferry disaster which claimed the lives of 158 people.

Although the Standard Maritime Communication Phrases (SMCP) were in place in 2002 when the tanker broke up off northern Spain, communication procedures broke down in the heat of the crisis — contributing to its deadly effects. MarTEL can solve many of these problems and make a difference to the maritime community. It will offer a new and innovative approach to maritime English language testing across the European Union, that is free of charge.

At first maritime English may not seem to be of great importance; however the issue takes on greater significance when one considers the fact that 75% of seafarers presently employed aboard merchants ships or at work in most European Ports do not come from European Union countries, and have been educated in institutions outside of the Union thus are not fluent or even able to speak English at all.

Merchant shipping is an international industry and accurate communication is vital. It is widely accepted that English is the language of the sea, therefore a seafarer's ability to communicate to an acceptable standard of English is essential.

The MarTEL project, which was supported by the Leonardo da Vinci programme, has created a standard form of maritime English at three different levels, complete with teaching and online testing facilities. The standards are at Cadet, Officer and Senior Officer Levels.

It has been developed by a consortium of highly experienced European partners, each from a different but related background that complements the project perfectly. The consortium includes maritime universities and training institutions as well as private companies which have specific experience or expertise in the project's area.

The project's standards are being transformed into internationally recognized qualifications and the first months in 2010 proved to be a productive period in evaluation and piloting of the MarTEL, with the official launch of the standards to take place in spring 2010 with expected improvements in safety at sea for European seafarers in the near future.

More information about the MarTEL Maritime Tests of English Language are available at www.martel.pro

Dr. Martin Ziarati, Director, Centre for Factories of the Future
Mr. Steven Carpenter, Journalist, Centre for Factories of the Future