



**Islander May 2008
Technology Update
Iridium, AIS & electronic charts – the next generation**

Every month, I wonder what exciting innovations are going to turn up in the world of marine technology, and so far I've never been disappointed. This month, we have three interesting new developments to tell you about...

Iridium is similar to Inmarsat, and Inmarsat appear to be quite concerned about Iridium. Iridium own a constellation of satellites with which they provide satellite communications, as do Inmarsat. However, unlike Inmarsat, Iridium can be used from pole to pole, and it has a small antenna with no moving parts. The conventional Iridium handset is portable, like a very large cell phone, with voice and data. However, the Iridium data service is notable in that it is currently the slowest around at 2.4kbps.

The reason for concern at Inmarsat is that Iridium have just released a new truly global voice and data service that offers IP connectivity up to 128kbps and uses a solid state antenna called Iridium OpenPort. Iridium are also currently in negotiations to build a new \$2.7 billion satellite constellation which will provide a further enhanced service called Iridium Next.

OpenPort

The OpenPort system is an IP data and voice system for the maritime market, which will open up new markets in the maritime sector due to its highly competitive pricing at a 50 to 90 per cent cost reduction on installation. This system has only recently been launched, and it will not be fully commercially available until later in 2008.

The service features IP connectivity for data and three built-in voice lines, with simultaneous voice and data capability. Data services will be available in different bandwidth packages up to a maximum of 128kbps. The bandwidth will be flexible so, if you want 28k, 54k, 128k, it will just be a provisioning change. This can be done on-line, and the system can then start providing the bandwidth you expect. There are no upgrades or on-site attention required.

With regard to contention ratio, Iridium is confident that they have excessive capacity. They state that they can operate with 1,000,000 subscribers. Thus if you ask for 128kbps, this is what you will get. However, they do make a proviso by saying that they cannot defy the laws of physics, so if a large number of OpenPort 128kbps systems were all on one beam then it's going to be "best effort". The main features are firstly that the coverage is global from day one, so there is no need to install it region by region - it's everywhere. Secondly, there are no moving parts in the antenna. It contains an array of antenna elements that are not moveable and



will therefore not require calibration or support. The radome is like a small closed radar radome in shape. It measures 57cm in diameter and is 23cm high and weighs 1.35kg making it extremely light weight for installation. The terminal is the same weight as the Apple MacBook Air, the world's thinnest laptop. A Cat 5 cable is all that is required.

At an expected cost of less than \$5,000 installed with such a light weight, small and maintenance free antenna it will be appealing to yachts that think 128kbps is sufficient for their needs. However, it won't compete with VSAT or Inmarsat's FleetBroadband on bandwidth speeds.

The airtime pricing has been pitched to be 20 to 30 per cent below other equivalent pricing. The exact pricing is not available yet, but will be by megabyte for data and per minute for voice. Thus you will only pay for what you use on data. The per-megabyte pricing will vary depending on bandwidth contracted and the other prices will be dependant on what other features are contracted such as numbers of voice lines. We are told the voice pricing will be similar to the current Iridium voice call services.

Clearly the revolution with this new product is the data. If broadband is not essential, then this will be a good bet for any yacht.

Next

Iridium are also finalising their plans to upgrade their satellite constellation with their second generation satellite network called Iridium Next. They believe their current constellation will be quite healthy until 2014 and OpenPort will provide the business opportunity for them until then. The new satellites are planned to be in operation between 2013 and 2016. They also state that the new satellites will be backwardly compatible with any OpenPort systems installed between then and now. Well, they would be silly not to! The Next phase will provide 512kbps to 1Mbps. I wonder whether this planned bandwidth will be a little too late by the time 2013 to 2016 comes around. With land based wireless broadband predicted to take vast leaps ahead in bandwidth up to 20Mbps in the same timescale, and with VSAT already being able to offer 3Mbps today, the launch in 5 years time may be a bit of a damp squib!

Space-based AIS in development

A large number of yachts now have an Automatic Identification Systems (AIS) installed due to carriage requirement or for safety and security. AIS is now compulsory on all SOLAS vessels.

The Automatic Identification System (AIS) is a maritime safety and vessel traffic system imposed by the International Maritime Organization (IMO). The system broadcasts position reports and short messages with information about the ship and the voyage.

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Using frequencies in the maritime VHF band, the coverage is similar to other VHF applications, and is essentially dependent on the altitude of the antenna. For ship-to-ship communications, the range is typically 20 nautical miles and for ship-to-shore up to 40 nm. The range is thus limited, and it is impossible to track a vessel once it is out of range. Thus the next most obvious move is to track the AIS transmissions from space.

A space-based AIS receiver in low earth orbit will have a range to the horizon of more than 1000 nm, giving an excellent opportunity for large-area ocean surveillance. The Norwegian Defence Research Establishment (FFI) has performed a feasibility study on reception of AIS messages from space. The results show that a ship detection probability of near 100% can be obtained for up to 1000 ships within the coverage area. It is argued that space-based reception of AIS messages is a promising way of achieving long-range identification and tracking services at marginal cost.

The next step took place on 28th April, COM DEV, a company based in Cambridge, Ontario, announced the launch of an experimental spacecraft to validate the technology and to verify the performance of its advanced space-based AIS system. This capability will enhance maritime safety and security on a global scale. The mission will also provide information related to maritime vessel densities and distribution, which will be used to optimise any future constellation system design.

The additional safety and security provided to vessels at sea by such a system cannot be undervalued. However, location data of an individual or fleet of vessels is sensitive and confidential data, and some owners may not be happy as it could fall into the wrong hands.

Electronic Charts – the next generation

The digital era of seamless global navigation has finally become a reality. The United Kingdom Hydrographic Office (UKHO) has launched a state of the art digital product **Admiralty Vector Chart Service (AVCS)**. AVCS is designed to provide the mariner with the power and utility of digital charts, fully supported by the reliability, quality and integrity of Admiralty paper charts.

The UKHO has been actively involved in charting the world's oceans and coastlines for over 200 years, and their charts are used by nearly 70 per cent of world shipping.

Through AVCS, the UKHO is meeting the International Hydrographic Organisation's (IHO) aim for a worldwide, seamless, official and consistent vector chart service. The IHO was established in 1921 as an intergovernmental organization to support safety in navigation and the protection of the marine environment.



The Admiralty Vector Chart Service (AVCS) was launched in early April this year. The performance of AVCS has been evaluated by different type of vessels from oil tankers to chemical tankers and from P&O cruise ships to the Royal Navy vessels HMS Illustrious and HMS Manchester.

AVCS has the following features:

- mariners can now easily access carriage compliant Electronic Navigational Charts (ENCs) from a single source
- overcomes the present requirement to carry, maintain and use a mix of ENC, Raster and paper charts drawn from multiple sources
- provides seamless coverage for global navigation through an integrated global set of ENCs, from national hydrographic offices across the globe
- covers the major shipping routes and world's top ports
- it is comprised only of official ENCs produced by government hydrographic offices, and is therefore fully compliant with Safety of Life at Sea (SOLAS) legislation for use within ECDIS
- is fully supported by an update service. All electronic charts are up to date at the time of purchase and comprehensive updates are issued every week at no extra cost. Updates include all Notices to Mariners, New Editions and Replacement Charts as well as any new, relevant ENCs, all within the basic subscription price. Updates are available remotely online through internet or via the Weekly Update CD.

Which brings me neatly back in a circle to the start of this article, as you can of course download your AVCS updates using your new Iridium OpenPort or your VSAT or your FleetBroadband and all without making the slightest dent in the rainforest!

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