



# VSAT – at home on the high

The sea can often be a hostile, challenging and, at times, turbulent environment where many types of vessel must be equipped with reliable communications systems. VSAT services are able to fulfil these demanding requirements. Satellite Evolution finds out what solutions are available to support communications at sea.





# seas



**There is no place on earth like the sea** – nowhere quite as changeable and challenging. Calm seas may quickly become rough and clear skies stormy in a matter of minutes. The vastness of our oceans means that there is a huge area to cover – over seventy percent of the earth's surface. Connecting ships, yachts and offshore oil rigs to the land and each other is a complex task and relies on equipment that can withstand the harsh maritime environment.

The huge increase in use of the Internet and email is not just isolated to land – the demand for the services we use at home are now finding their way into the maritime market. Whether you are enjoying a cruise on the Mediterranean or are a trawlerman in the North Sea, access to the communications that you are accustomed to is a necessity whether it be for contacting loved ones or headquarters or for entertainment purposes. People at sea now expect to be able to access the same services as they do on land. When fishermen or workers on oil rigs are far away from home, sometimes for months on end, communication with the mainland, with family and friends, is crucial and is vitally important for a more contented workforce.

There is only one way to communicate effectively in these circumstances – via satellite. VSAT services have, and continue to, prove themselves to be the ideal means of connectivity at sea. Contending with hostile weather conditions, rough seas and high winds calls for a specific kind of VSAT that is ruggedised and, above all, reliable. Container ships, fishing vessels, cruise ships and military boats all require constant, always-on communications with the mainland via voice, data, fax, email and navigational systems. Perhaps the most significant point on satellite communications is that they can be deployed anywhere, whether it be deep in a remote jungle or in the middle of an endless ocean.

#### Antennas that deliver for the oil & gas industry

Crews working in the oil and gas industry have a particularly demanding and risky job. For these dedicated workers there is an essential need to have excellent communications not least for safety reasons but for business and welfare as well. Companies are developing specific products and services that are tailored for this very challenging environment.

Hughes Network Systems, Cobham PLC company, and Sea Tel, recently announced the successful completion of interoperability testing between the Hughes HX family of IP satellite broadband modems and Sea Tel family of marine stabilised satellite antennas. As a result, satellite broadband service providers around the world can now take advantage of a packaged, state-of-the-art maritime VSAT platform.

The upstream oil and gas industry increasingly relies on satellite communications for their bandwidth needs, as well as for reliable backup services on their offshore platforms. In addition, the maritime industry has seen increased use of IP bandwidth and, hence, a move towards subscription-based VSAT broadband services. Hughes and Sea Tel marry sophisticated bandwidth allocation and QoS techniques in the HX product platform with the Sea Tel Maritime Stabilised Satellite Antenna system. The Sea Tel stabilised antenna family interoperated very effectively with the HX satellite broadband platform, establishing the HX as an ideal solution for the maritime and upstream oil and gas industries.

#### A new solution from Thuraya

Thuraya's maritime communications solution is due for launch later this year. Named ThurayaMarine, it will offer a wide range of communication services including high quality voice communication, always-on Internet with ThurayaGmPRS at speeds up to 60/15 kbps, web-browsing, email and webmail, file transfer protocol, virtual private network, e-commerce, 9.6 kbps data, 9.6 kbps fax and messaging. In addition, the system offers GPS capabilities for location and position tracking plus a Thuraya Region Distress button that send multi SMS and e-mail alerts to user-defined contacts.

The solution is ideal for fishing boats, supply vessels, merchant

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Contact Ms Wati at +65 6324 9750 or [wati@availcorp.com](mailto:wati@availcorp.com)



*Agilis stabilised C-band ultra compact 1.2. metre maritime VSAT antenna.*

fleets, commercial carriers and also yachts and leisure craft. Crew may be supplied with pre-paid calling cards to keep in contact with business, family and friends whilst away on long trips. The ThurayaMarine solution enables seafarers to make voice and data calls, send SMS, faxes and emails whilst moving across the waters whether on motor or sailing boats, yachts or commercial vessels. The below the deck equipment is easy to install and use and is lightweight so it may be wall-mounted or used on a desktop. It may be easily connected to an extension phone, laptop or fax machine. It also connects to four wireless handsets for on-board mobility. The antenna is omni-directional or stabilised.

### **Stabilised antennas – beating the Zenith Paradox**

Antennas on board ships and other vessels must be stabilised in order for them to track the satellite effectively and to eliminate loss of signal. Without stabilisation, the service will not be always-on due to the zenith paradox. This happens when the vessel rolls back and forth and the satellite is located in the area between the antenna's extreme positions. This is a significant problem with the three axes system that is normally associated with maritime VSATs.

Headquartered in Stockholm, Sweden, C2SAT develops innovative stabilised VSAT antenna systems for the global market. Its aim is to reduce costs for maritime VSAT services making it possible to access paid for bandwidth in dynamic conditions.

C2Sat has recently introduced a new series of four axes military and commercial high performance stabilised antenna systems for

always on mobile broadband connectivity. C2Sat's multiband VSAT features optional reflector sizes up to 2.4m on all frequency bands including C- and X- fitting the same mechanical rig. The four axes enable shorter geometric path and less rotation torque for each axis. Adding the fourth axis also solves the zenith paradox at high reflector elevations during dynamic conditions such as when a vessel rolls back and forth and the satellite is seen alternatively from north and south.

By using four axes, not only stabilised but also predicting the next position, the next movement, C2SAT is lifting reliability, precision and accuracy beyond all present limits. It is to be compared to a terrestrial fixed satellite service installation. Different thinking combined with proven technology made it possible.

C2SAT's worldwide patented automatic stabilised antenna system provides real two-way broadband satellite communication, making full use of the bandwidth possible. The system permits always-on-services such as monitoring, SCADA, Wi-Fi, Internet, Voice over IP, GSM on board, ATM, credit card validation, video conferencing, video telephony, live video transmission, e-mail, TV or customer-tailored services, all simultaneously in one system. C2SAT's system makes it possible to increase the number of terminals in the offshore network, utilising the same satellite link. The traffic fees are based on a maximum bandwidth.

Interactive communication between vessels, oil and gas rigs, LNGs or FPSOs in a fleet the office ashore can considerably benefit from C2SAT's system.

C2SAT makes it possible to increase the number of terminals per satellite link in the offshore network. The system's gradient tracking system identifies any selected satellite within six seconds. DVB or DVB-S2 is optional.

### **Antennas for the smaller vessel**

At CommunicAsia 2007, ST Electronics' Satellite Business Unit unveiled new additions to its range of products suitable for maritime conditions.

The Agilis stabilised C-band ultra compact 1.2. metre maritime VSAT antenna provides smaller sea going vessels with "always-on" connectivity for all their communications requirements. It provides not only secure transmission, but also a fast 512kbps inbound transmission rate and up to 2Mbps for outbound transmission. Users can expect this cost-effective compact system to provide them with continuous on-board communications through a high-performance network.

Recognising the potential in the large and untapped market base of smaller vessels, ST Electronics developed the antenna to provide these vessels with an opportunity to benefit from efficient and cost effective broadband satellite communications. The antenna is considered the smallest stabilised C-band antenna available in the market at present and will fit perfectly into the confined space of smaller vessels.

These smaller vessels have limited communication capabilities compared to the larger seagoing vessels. Communications service providers can now provide their customers with superior maritime VSAT services that will offer shipping vessels unprecedented capabilities and benefits.

### **A cost-effective solution**

SeaAccess Communications by CapRock enable ship captains and crew to browse the Internet, whether traversing the Atlantic or crossing the Mediterranean for a fixed monthly cost. And the benefits are not just limited to crew retention—vessel owners and operators are also recognising the benefits of extending their corporate networks and applications to individual vessels at sea.

Shipping companies that operate tankers, cargo vessels and container ships that use traditional pay-by-the-minute satellite solutions are burdened with unpredictable communication costs. The often high fees associated with these solutions also limit companies'



abilities to utilise their corporate IT infrastructure in full. IP-based VSAT services enable unlimited voice and fax, corporate networking, always-on Internet connectivity and data streaming applications for a fixed price that can be consistently budgeted.

Since deploying its first VSAT over twenty-five years ago, CapRock has established the reputation as the leader in serving the communication needs for those working in remote, at-sea environments. From captains sending real-time electronic cargo manifests to crew calling friends and family back home, SeaAccess is increasing the efficiency of marine operations and boosting the spirits of those onboard.

## Extending the office to the sea

In today's world, business never stops and the technology is now available to enable even those at sea to continue with their day-to-day business with all the facilities and convenience of an office on land.

Marlink, a leading supplier of integrated satellite communications equipment and network services, has introduced VSAT@SEA, the company's a new line of global maritime broadband satellite services enabling "always-on" at sea connectivity at a fixed monthly rate. Marlink's VSAT@SEA will feature three standard service configurations that include a minimum guaranteed committed information rate for IP-based communications providing resource-efficient means for conducting ship's business and enabling free Internet access and calling for crew members and passengers.

Option 1 will provide vessels with two Voice over Internet Protocol (VoIP) phone lines coupled with a guaranteed 32kbps committed information rate for IP-based communications at sea. Additionally, this option is designed to provide a maximum bandwidth rate of 128kbps ship-to-shore and 256kbps shore-to-ship capacity.

Option 2 will furnish ships at sea with three VoIP telephone lines along with a two-way guaranteed data rate at 64kbps and featuring a maximum bandwidth rate of 256kbps ship-to-shore and 512kbps return speed.

Option 3 will deliver four VoIP telephone lines per vessel combined with a guaranteed rate of 128kbps with maximum data rates ceilings of 384kbps and 1024kbps, respectively.

VSAT@SEA offers a voice quality that meets the expectations of modern mariners in addition to the guaranteed bandwidth for linking the vessel to the rest of the inter-company network. The vessel effectively becomes an extension of the home office as well as a more comfortable 'second home' for the crew. Business at sea is business as usual and life at sea has become closer to home.

The Marlink VSAT@SEA line of services are designed to efficiently meet the expanding maritime requirements for communications for cruise liners and ferries, research and production vessels, shipping companies and pleasure boaters, that rely on fully-managed broadband service for business-essential communications at sea.

Marlink is planning commercial availability of VSAT@SEA during the 4th quarter of 2007.

## An advanced management system

Stratos Global has a long history as a provider of maritime communications. By maintaining a strong relationship with fleets and ship managers, they continue to ensure that their solutions meet the highest standards of maritime reliability and convenience. While fleet management has never been easy, the constant stream of new regulations and technologies is making your job tougher than ever. Cut-throat competition means fleets are merging – and the result is large organisational structures that require ever-more sophisticated management systems.

Stratos decided that the only way to meet these challenges was with a unified technological solution that seamlessly and cost-effectively integrates all operations on land and at sea. To meet the demands of the maritime market Stratos delivers a wide portfolio of

satellite services, such as Inmarsat, Iridium, Globalstar, and Maritime VSAT. In addition to satellite services, Stratos also deliver a wide range of value-added services for:

- Traffic and cost control,
- Messaging (e-mail, fax, data replication),
- Internet access and data optimisation, and
- Security services.

Vessels must stay in contact with headquarters, suppliers, clients and crew relatives. Stratos provides many services to ensure that ships form an integrated part of the company network. StratosITek is a cost-effective, IP-based satellite solution that provides a high-speed, always-on connection to the Internet and the international Public Switched Telephone Network (PSTN), as well as corporate intranets, on a global scale. What's more, StratosITek terminals are not fixed permanently in one location.

Unlike traditional broadband satellite services, StratosITek can be moved from site to site on land, or mounted on yachts, cruise ships and other vessels at sea. StratosITek may be used as a primary communications platform and as a completely independent backup solution for existing networks, and combines secure, reliable connectivity with excellent coverage in a flexible package that is scalable to meet almost any requirement on land or at sea. The solution



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is capable of linking up hundreds of sites and provides complete support. As a convenient, single-product solution StratosITek offers:

- Internet Connectivity – both of Stratos' network operations centres in the US and UK have dedicated connections to the Internet backbone.
- Virtual Private Networks (VPNs) – StratosITek can provide secure connectivity between remote sites and corporate intranet over the public Internet.
- Private Intranet Access – for greater security, encrypted end-to-end links from remote sites to private networks.
- Telephony and Voice – Voice-over-IP (VoIP), for land-based and maritime users including passenger and crew calling; prepaid phone cards.
- Multicast Content Distribution – uses satellite's inherent strength as a broadcast medium to efficiently distribute media rich content.
- Emergency Backup and Recovery – StratosITek provides an excellent backup solution for existing terrestrial and satellite networks.
- Other Applications – StratosITek can support almost any IP-based application, including traditional retail applications, such as credit authorization and polling, and monitoring and control applications such as SCADA, as well as emerging applications, such as telemedicine and distance learning.

The StratosITek technology is based on a robust, IP-optimised platform that has been field-proven throughout the world. A typical remote site is equipped with a satellite antenna and associated radio equipment for two-way send-and-receive communications, as well as an indoor unit that connects seamlessly to PCs on a LAN using a standard Ethernet interface. The maritime remote site configuration is ideally suited for moving platforms such as ships, barges, yachts and other vessels. The terminals compensate for the pitch, roll and yaw of the vessel and allows the system to track the satellite with no degradation in service.

### Broadband at sea – meeting the demand

The demand for broadband is as great at sea as on land and recent developments in antennas now mean that broadband is readily accessible at sea and at a lower cost than in the past. Positioned to meet the exploding demand for affordable broadband service at sea, KVH Industries has introduced a new type of satellite communications service that enables small, 24 inch antennas to provide affordable, "always on" broadband data connections to vessels.

The new mini-VSAT Broadband service uses sophisticated spread spectrum technology to provide vessels with data reception rates as fast as 2 Mbps and data transmission rates as fast as 512 kbps via a 24 inch KVH-developed marine terminal. The mini-VSAT Broadband service is fast, "always on", and available in a variety of pricing packages that offer significant cost savings for heavy data users on commercial and leisure vessels.

To support this service, KVH, under a joint development agreement with ViaSat, Inc., developed the TracPhone V7 two-way broadband satellite terminal.

The system combines KVH's market leading antenna technology with ViaSat's ArcLight spread spectrum mobile broadband technology. KVH created the 24 inch diameter antenna, the smallest stabilised satellite antenna available for providing broadband data connections to vessels. The TracPhone V7 is very compact and lightweight. ViaSat developed a new maritime version of its ArcLight spread spectrum modem currently used on business jets and by the military. The two companies jointly integrated these key technologies to enable the TracPhone V7 two-way broadband satellite terminal.

The terminal's size and weight means that it may be installed on vessels as small as 50 feet in length and therefore will reduce installation costs that are usually associated with larger antennas. How-

ever, the solution will support high data rates at a reduced cost. Those working or travelling onboard will be able to use the reliable solution for ship operations, business connections and crew morale. Key features of the TracPhone V7 and mini-VSAT Broadband service include integrated hardware, service, activation, and support for simple installation and operation; true broadband connections at sea with data rates as fast as 512 kb/s (maximum upload) and 2 Mbps (maximum download); affordable, flexible airtime subscription plans; commercial-grade, 24 inch antenna that is 85 percent smaller by volume and 75 percent lighter than those used in existing 1-meter VSAT systems; and voice over IP telephone service with multiple, simultaneous lines and GPS-based, automatic system configuration and antenna skew adjustment to support seamless roaming between regions and among satellites.

The TracPhone V7 and the mini-VSAT Broadband service became available from September 2007 with coverage of North and Central America and the Caribbean. Later in 2007, coverage will be expanded to include the North Atlantic shipping routes and all of Europe.

### HD at sea? – bringing the home comforts to the waves

Yes, Hi-Definition has reached the sea. It is now possible to enjoy crystal clear picture quality whilst on the waves. Sea Tel has introduced the newest and smallest in its Coastal Series of TV-at-Sea antennas. The Sea Tel Coastal 14 antenna is compact, with a 14 inch diameter dish inside an attractive white radome that is just 18 inches tall and weighs only 23 lbs.

The feature that sets the Coastal 14 antenna apart from the competition is its ability to receive a Hi-Definition signal. All the user needs is an HD-Ready TV, HD-receiver, and programming to get Hi-Definition viewing with digital sound. Now smaller yachts can enjoy HDTV-at-Sea with the same quality and reliability found in Sea Tel's larger antennas.

Sea Tel's C14 has many of the same features as the Coastal 18 including a wide coverage range and built-in GPS for fast satellite acquisition. Other features include DVB (digital video broadcasting) signal identification, Sea Tel's proprietary antenna control and fast-track signal lock software, plus high-performance stabilisation and satellite tracking even in inclement weather. The Coastal 14 will support a single receiver with two or more TVs and its programming is limited to North America at present.

### Versatility

The maritime industry depends on the versatility of VSAT antenna systems to provide the wide range of communications services that modern shipping demands. The advent of stabilised antennas gives added reliability that is so crucial in the maritime environment. The broad range of services available to crew rivals the services available in the home or office and enables companies to keep in constant touch – to treat their ships, containers, yachts or rigs as an extension of the office.

Headquarters can track their fleet and can send and receive information instantaneously thus improving situational awareness and swift decision-making. Entertainment such as the Internet and TV ensure that crew far from home are kept busy during their recreational time and also are able to contact friends and family over satellite links.

Safety on the open seas is also a huge consideration and effective communications are essential in the event of an emergency. GPS also helps in search and rescue missions.

So whether a crew is conducting a diving operation, repairing underwater pipelines, working on an oil rig or even just taking out a yacht on holiday, crew and passengers may be safe in the knowledge that communications on board are reliable, secure, cost-effective and wide-ranging. It is another example of VSAT's ability to adapt to all conditions and environments – even the often-hostile seas and oceans of the world. ●