Navigating New Waters
How to Leverage VSAT Innovation to Meet Growing Customer Needs
The Next Wave of Connectivity

VSAT networks rule the seas. The question is no longer whether VSAT is the right choice for onboard connectivity, but how will maritime operators get the most value from their connectivity investment as they manage larger deployments and support a growing range of applications.

Here’s what the picture looks like today: commercial shipping vessels sending diagnostic data back to shore, cruise ships connecting floating communities, yachts streaming live TV for passengers who can’t miss a play, oil rigs supporting video surveillance to keep people and operations safe. And across these sectors, the goal is a fully connected operation that accommodates passengers, crew and business operations.

With the popularity of VSAT, more vessels are coming online than ever before. According to Northern Sky Research’s (NSR) Maritime SATCOM Markets, 5th Edition, the growth rate for VSAT-equipped vessels will jump from 14,200 to over 37,000 by 2026, representing a 9.1 percent CAGR.

For VSAT service providers, the maritime market brings new opportunity, but also new challenges. Managing a global wireless network across the ocean is increasingly complex – with more vessels to manage, more applications to support and more types of connectivity becoming available. That makes it ever more difficult to ensure a reliable service and manage costs.

Thankfully, a new wave of technology innovation can help maritime service providers cast a wider net – raising bandwidth levels, expanding coverage areas, and lowering both the cost of connectivity to end users as well as their own operating costs.
Accessing High-Speed Capacity

If there’s one trend that defines a majority of the maritime market, it’s the need for high-speed bandwidth. And one critical solution is High Throughput Satellites (HTS). For end users, HTS provides higher data rates and ability to power smaller more compact terminals which is projected to make the VSAT service more economical.

NSR predicts that nearly 100 Gbps of HTS capacity will come online from GEO and Non-GEO orbits across C-, Ku- and Ka-bands, with average compound annual growth across all orbits and frequencies over 25 percent.

NSR further projects that HTS VSAT in-service units will more than double of over the next 10 years. The number of units will soar to over 22,000 units by 2026, from around 1,700 in 2016. And HTS VSAT revenues will jump from around $145 million in 2016 to more than $1.3 billion by 2026.

Several new HTS programs, based on the iDirect platform, are offering a range of business models that service providers can leverage to pursue a myriad of opportunities.

IntelsatOne Flex for Maritime is a customizable “Wholesale Mbps” service offered to Intelsat’s maritime service providers, which uses capacity from across the Intelsat fleet, including Intelsat’s next generation EpicNG satellites, the IntelsatOne global ground infrastructure and the HTS-optimized iDirect Velocity® platform, into one ecosystem. This integrated approach enables maritime service providers to gain simple access to Intelsat’s mobility network while allowing them to maintain full control over their service differentiation.

SES Maritime+ enables maritime customers to have easy access to customizable bandwidth and coverage packages, ensuring satellite capacity is effectively utilized. Vessels traversing the oceans can be serviced with seamless roaming, leveraging SES’s global fleet of satellites.

Inmarsat Global Xpress (GX) provides seamless global coverage over Ka-band based on a managed service model. With GX, service providers can procure high-speed capacity over any maritime route, delivering a consistent customer experience.

Coming on the heels of HTS is the rise of Low Earth Orbit (LEO) satellites. LEO constellations are projected to add exponentially more high-speed bandwidth to the skies. This will accelerate the need for LEO/MEO/GEO interoperability to ensure the right capacity can be delivered for the optimal applications. Operators want to create hybrid services with spacecraft operating at different orbits, perhaps with different waveforms or capabilities, leveraging the unique attributes each constellation has to offer.
Managing Service Levels in Complex Mobility Environments

As more capacity across more beams and overlapping service areas are coming online, global bandwidth management is becoming increasingly important – and future requirements call for expanded capabilities. How bandwidth is managed at a network level determines overall quality of service across vessel, ensures individual vessel Service Level Agreements (SLAs) experience, and maximizes investment in capacity.

Service providers will need a solution that can select and pool satellite capacity across multiple spot beams and satellite constellations, then leverage the combined bandwidth pool to partitioning bandwidth across their global customer deployments through the creation of SLAs that can be dynamically configured to prioritize traffic across vessels, applications and end-user types.
The Path to Inter-Provider Roaming

As the maritime VSAT market develops globally, service providers are faced with expanding their networks into new regions and scaling up their networks to support more customers. This can be costly and time-intensive. The broader satellite industry faces these same challenges, which is driving the requirement for inter-provider roaming.

Mobile operators have mature architectures that enable a customer to roam from a home network to a guest network while maintaining home service plans. The satellite industry is developing similar capabilities whereby a satellite service provider may partner with other service providers to enable their mobility terminal to roam between autonomous networks while keeping ownership of their customers and ensuring a seamless experience as they roam across different networks.

Service providers adopting these business and technical models will maximize capital and operational resources. The roaming technology itself can evolve into multiple forms – roaming from a service provider’s regional coverage to another, or roaming from a GEO constellation into a LEO/MEO constellation.
Innovations in Onboard VSAT Technology

Satellite operators have been innovating to bring to market more abundant, and more cost-effective high-speed capacity. And ground infrastructure providers have been transforming the VSAT remote and antenna to leverage this new capacity – introducing more compact and powerful technology offerings that improve hardware economics, increase data throughput, and make installation and maintenance more efficient.

Advancement in flat-panel antennas have increased network speeds and reduced operation costs. The result has been antennas that are smaller, thinner and more aerodynamic, combined with greater bandwidth capacity. These antennas’ electronic steering capabilities also represent a significant advancement over traditional mechanical methods when it comes to ensuring constant satellite connection.

Today there are more than 10 manufacturers of flat-panel antenna models. Kymeta is a one example that is leading the way with its recent debut of a “no dome” antenna for the superyacht market. It’s a design advancement that offers superyacht owners scalable connection speeds with integrated, flat-panel antennas that can provide both Internet and live TV capabilities.

The VSAT antenna industry is further innovating by offering an ultra-compact integrated terminal (a router board embedded in flat-panel antenna) and through multi-band antennas so vessels can connect to the best available network.

The VSAT modem is a technology lynchpin for delivering and advancing maritime service. The decision to install or replace a terminal system must factor in considerable CAPEX, OPEX and product longevity. That’s why ground infrastructure manufacturers are developing software-defined modems that can be continually upgraded over-the-air to increase network capabilities and throughput levels, while dramatically extending the deployment life and minimizing installation costs and downtime.
iDirect: A Platform for Opportunity

iDirect is the clear leader in VSAT ground infrastructure for the maritime market with over 20 years of experience in mobility. Half of all VSAT terminals installed on maritime vessels are made by iDirect, according to Comsys. And nine of the top-10 maritime satellite service providers, according to NSR, rely on iDirect’s platform to deliver the services needed for the “fully connected vessel.”

We are continuing to innovate on our mobility platform leveraging DVB-S2X on our new, high-powered iQ remote series which will enable customers to scale their networks based on a significantly lower cost model.

And as we look to the future we are advancing an open, converged platform to support multi-orbit capacity and multi-waveform terminals to enable our partners to deliver the right capacity for the right application at the right cost model to ensure a high-quality and seamless user experience.

iDirect is driving the industry forward, delivering the best technology for maritime service providers to capture today’s existing demands and capture new opportunities no matter which route they choose.

The Standard of Excellence in Mobility

The iDirect platform is distinguished by a comprehensive range of advanced mobility technologies, such as:

- **Automatic Beam Switching.** A vessel can automatically connect to satellite beams as it travels across multiple footprints guaranteeing a seamless connectivity without any IP session interruptions.

- **Global Network Management System.** Service providers can easily configure, manage and control onboard remotes to ensure a high-quality connection.

- **Quality of Service.** Service providers can manage the use of bandwidth across their entire deployment to prioritize service levels based on multiple criteria, including bandwidth profiles for individual vessels or even specific onboard applications.

- **Direct Sequence Spread Spectrum.** iDirect’s spread spectrum waveform mitigates satellite interference common with ultra-small antennas or flat panel antennas, while maintaining a reliable and efficient link.

- **OpenAMIP®.** An industry-wide, open-source IP based protocol that facilitates the exchange of information between the antenna and the satellite router.

- **Advanced Security.** iDirect supports critical information security risk management principles, such as those reflected in the ISO 27001 standard and NIST Cybersecurity Framework.