

*The Rising Tide of*  
MARITIME  
VSAT



*In a very short period of time, VSAT networks have pushed the maritime industry toward significant business modernization. Now with adoption moving full steam ahead, a new wave of technology and service innovation is set to make VSAT more affordable and easier to install, while delivering greater business value.*

**Not long ago, when a vessel would disembark from port, it would also unplug from the global communications network. Today, an increasing number stay connected with VSAT — providing their crew and passengers with high-speed Internet access and phone service, monitoring weather patterns to cut fuel costs, filing regulatory documents and ordering supplies from sea to save time in port, and generating business intelligence through a growing range of software applications.**

Today, more maritime vessels are online than ever before. According to Northern Sky Research's (NSR) Maritime SATCOM Markets, 4th Edition, the global addressable market for Satcoms, which today stands at 347,800 vessels, will reach 434,800 vessels by 2025 — a 2.1 percent compound annual growth rate (CAGR).

The growth rate for VSAT-equipped vessels during the same time period is even stronger — from 13,200 to 32,700, representing an 8.6 percent CAGR. Leading the way with VSAT-equipped vessels by 2025 will be the merchant segment (19,600), followed by passenger (8,200), offshore (3,650) and fishing (1,100).

The VSAT market is positioning itself appropriately to accommodate the projected demand. High Throughput Satellite (HTS) operators are debuting next-generation maritime services. Makers of maritime terminals and antenna systems are introducing more compact and powerful technology offerings that improve hardware economics. Application developers are rolling out new offerings that enable maritime operators to leverage VSAT to run safer, more intelligent and productive operations.

We are experiencing a steady rise in the amount of VSAT-connected vessels, fueling the ubiquity of 'always-on' connectivity in the maritime sector, NSR says.

## **From Cost Center to Cost Cutter**

What's driving this growth is that VSAT has fundamentally shifted from a cost center to a cost saver. Historically, maritime companies have been hesitant to invest in onboard communication technology because they were unsure of the Return on Investment (ROI). Yet, many moved to VSAT out of sheer necessity.

What these maritime operators are discovering is that VSAT service, which typically represents only about 1 percent of a vessel's operating costs, does in fact deliver a compelling ROI.

For example, large shipping vessels have adopted VSAT to retain crew. Cruise ships have equipped their ocean liners with satellite to meet the growing demand for more passengers bringing aboard more devices. And oil tankers, as well as oil rig service vessels, are using VSAT to improve safety and operational intelligence.

This has become apparent in terms of crew welfare. The need for crew to be connected back to land, especially during long voyages, is a fact of life that maritime operators cannot ignore. According to the fourth edition of The Comsys Maritime VSAT Report, many operators experience turnover rates of 35 percent, and a common reason crew jump ship is to work on a vessel with better connectivity. Replacing crew takes a major toll on acquisition and training costs, which can also include screening, visa arrangement and immigration expenses.

While crew welfare and passenger connectivity were originally the main drivers for VSAT adoption, maritime operators are now seeing a new advantage behind VSAT—new value in supporting a wide range of business applications. Maritime operators can modernize their ship management systems. That is key to improving engine and systems maintenance, navigation, weather information and cargo tracking. Those that are leveraging VSAT in this way can better monitor vessel speeds and fuel consumption, realizing benefits in fuel savings, faster repair times, preventative maintenance and on-time navigation.

*Maritime operators are now seeing a new advantage behind VSAT – supporting a wide range of business applications.*

## High Growth Ahead



### Total Market Size

VSAT services across all segments will reach \$1.8 billion by 2018 (Comsys)



### HTS VSAT Revenues

to eclipse \$1 billion by 2025 (NSR)



### HTS Demand

An additional 46 Gbps of HTS capacity will come online by 2025 (NSR)

Maritime operators also want to shorten their time in ports, which have become increasingly busier and defined by tighter security requirements. With VSAT, vessels can report in advance, and order supplies and spares ahead of time — able to unload and load more quickly and cost-effectively.

Overall, maritime operators are finding that faster, more affordable satellite technology allows them to enable an 'all apps on-board' service model, regardless of segment.

## All Apps On Board

The maritime market is seeing two distinct forms of growth. Some segments are ready to adopt VSAT on a larger scale in response to improved economics and broader application, and others require faster throughput levels for increasingly higher traffic networks.

### *Bigger, Yet Better*

According to NSR, the trend in commercial shipping involves ships that are “bigger, yet better.” In other words, more shipping fleets using fewer ships, opting to increase the freight per ship. This is a trend that is likely to continue as a means of keeping CAPEX low, especially as crude oil prices stay low.

### Commercial Shipping

#### Key Applications



Crew welfare and training



Electronic charting and weather



Electronic port and customs reporting



Remote IT services



Still, commercial remains the largest growing segment, growing from only 6,100 VSAT-equipped vessels in 2015 to more than 19,600 by 2025 — a 11.2 percent CAGR. Some of the world’s largest container fleets and freight companies are deploying VSAT, having seen the value VSAT has delivered to early adopters. Key applications for growth will be crew welfare, electronic charting and weather, remote IT services and electronic port and customs documentation.

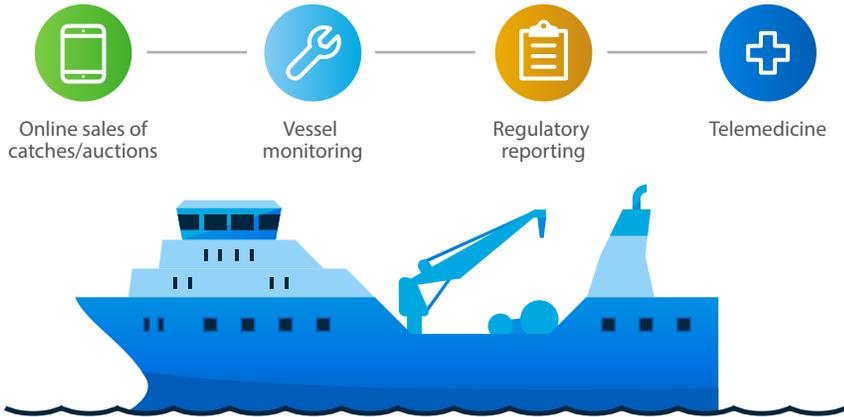
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### *A Big Catch*

Fishing is a segment where the addressable market is growing steadily, according to NSR. The expectation is that regulatory pressure on fleet, combined with smaller terminals and better pricing, will drive the market. In fact, it is anticipated that the fishing segment will experience a CAGR of 7.4 percent for VSAT-equipped vessels between 2015-2025 — the second highest amongst the four segments measured by NSR.

## Fishing Industry

### Key Applications



Historically, fishing has been a tough market to crack as most fishing vessels remain within cellular coverage or simply are not away from land long enough to justify the investment in satcoms.

Despite this fact, the market could grow based on new applications that bring commerce on board. For example, VSAT connectivity could drive online sales of catches and auctions, and be leveraged for regulatory reporting, vessel monitoring and telemedicine.

## Rigged Up

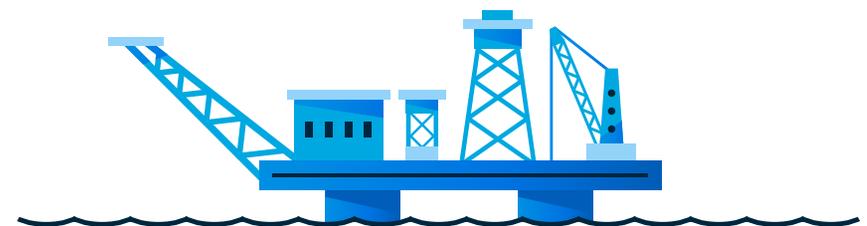
Downtime on an oil rig comes at an exorbitant cost, so the value proposition for VSAT has never been in question. These

vessels must be able to support heavy-bandwidth applications, such as the use of live video for rig monitoring and remote collaboration, and the transfer of heavy data files, such as seismic data. It also extends to asset tracking, crew training, systems automation and cloud computing.

That said, offshore operations are feeling the pressure of reduced crude oil prices, stacking support vessels and shutting down rigs. The way forward involves cutting capital expenditures, scaling back programs and seeking more “bang for the buck” services, NSR says. This highly penetrated market for VSAT is set to be the slowest growing of all segments, moving from 2,200 in service vessels in 2015 to 3,650 in 2025 (4.5 percent CAGR).

## Oil and Gas

### Key Applications



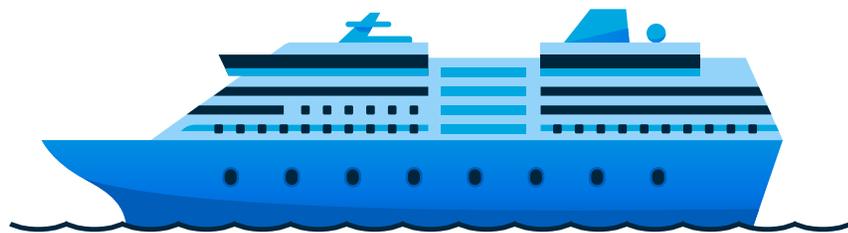
## Floating Communities

Cruise is another segment that has relied on VSAT for many years and now demands continually higher data rates. It's commonly stated that vessels today are floating communities, a dense concentration of thousands of people who want to stay connected at the same level they've come to expect on land. As traffic demands surge and the number of devices per passenger per ship increases, cruise liners are upgrading their VSAT networks to support higher-speed Internet, onboard wireless service, entertainment and streaming video.

According to NSR, superyacht and general leisure markets remain strong, with new ship orders demanding higher bandwidth options. Passenger markets are poised to move over to HTS-based offerings in GEO and Non-GEO, with

### Cruise Industry

#### Key Applications



almost 24 Gbps of demand by 2025, in addition to 79 TPEs of FSS capacity. HTS services are predicated to drive significant adoption with better coverage, more affordable bandwidth and lower-cost equipment.

## VSAT Innovation

The maritime VSAT industry is continuing to enjoy vibrant growth as its value proposition becomes increasingly attractive across all segments. However, while adoption has surged, market growth has been threatened by a shortage of capacity over the world's oceans and seas. This problem is linked to several other VSAT challenges — namely, costly service fees and the difficulty of providing integrated, global coverage.

With innovations now happening across the entire market, from the space segment to the ground infrastructure, the most significant development is the introduction of HTS capacity. Several satellite operators have launched new HTS constellations targeted specifically at the maritime sector, putting the capacity issue and its related challenges firmly in the past. For end users, HTS lowers the cost of capacity per MB, which is projected to make VSAT service more economical, along with higher data rates and more affordable, compact terminals and antennas.

NSR projects that nearly 46 Gbps of HTS capacity will come online from GEO and Non-GEO orbits across C-, Ku- and Ka-bands — with an average compound annual growth across both orbits and frequencies over 34 percent.

NSR further sees an average 30 percent CAGR for HTS VSAT in-service units over the next 10 years. The number of units will soar to over 14,000 units by 2025, from around 600 in 2015. And HTS VSAT revenues will jump from around \$60 million in 2015 to more than \$1 billion by 2025.

However, all new growth won't come from HTS's. NSR projects that FSS capacity will nearly double to 240 TPEs by 2025 compared to 120 TPEs in 2015. And will account for \$1.4 billion in retail revenues by 2025, up from \$950 million in 2015.

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.

The first Intelsat EPIC<sup>NG</sup> satellite is now operational, adding a layer of high-throughput Ku-band connectivity that is fully integrated with their existing global Ku-band mobility network. This integrated approach provides the optimum solution for throughput, scale, service delivery and economics to commercial shipping vessels and tankers operating in the North Atlantic, as well as cruise ships and other leisure vessels in the Caribbean. With the launch of Intelsat's second

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EPIC<sup>NG</sup> satellite spreads the reach of Intelsat EPIC<sup>NG</sup> to the Mediterranean, Africa and portions of Asia. Ultimately, they will launch seven Intelsat EPIC<sup>NG</sup> HTS's with global coverage of every major shipping route.

Just recently, maritime service provider Marlink selected Intelsat to deliver fast, high-quality Intelsat EPIC<sup>NG</sup> broadband connectivity to Mediterranean Shipping Company's (MSC) cruise ships. Marlink will provide global broadband connectivity to all of MSC Cruises' 12 existing ships.

Telenor is taking a regional approach with THOR 7, which will deliver a Ka-band HTS payload of up to 9 Gbps of throughput across 25 spot beams over the North, Mediterranean and Baltic Seas. Greek ferry operator Hellenic Seaways is among the recent customers to choose the service. The entire fleet, which operates domestic ferry services throughout the Greek islands with ships carrying up to 2,000 passengers, will offer Wi-Fi to passengers using high-bandwidth capacity from Telenor.

Inmarsat Global Xpress (GX) provides seamless global coverage over Ka-band based on a managed service model. Marlink and SpeedCast International are among the service providers to select the GX service, which allows them to procure high-speed capacity over any maritime route, delivering a consistent network experience.

With greater capacity being delivered, the key to capturing new opportunity exists with having the correct ground infrastructure in place. Next-generation electronically steered flat panel antennas will continue to make VSAT more affordable and easier to install. Kymeta is a great example, 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. This innovation cuts down on the need for multiple antennas, allowing for better design options and increased functionality.

Innovations like the Kymeta flat panel solution will enable the creation of connectivity solutions that can be hand carried onboard and self-installed on a commercial shipping vessel, fishing fleets and even leisure vessels which haven’t used satellite connectivity to date creating additional market opportunities. iDirect is working directly with Kymeta to enable these solutions to continually expand the market for VSAT connectivity.

## iDirect Leadership

Eight of the top-10 maritime satellite service providers, according to NSR, rely on iDirect technology. Such technology leadership comes with the responsibility of ensuring the iDirect platform provides the highest range of throughput to meet escalating customer requirements today, while continuously innovating on waveforms such as DVB-S2X to introduce future gains in performance and efficiency.

iDirect is addressing both these requirements with the release of the next-generation Universal Line Cards (ULCs) and 9-Series portfolio of remotes. Both are designed to handle today’s data throughput demands. In addition, the new Universal Line

## iDirect Leadership Position



**More than 50%**

of all VSAT remotes deployed on vessels are made by iDirect



**Satellite operators**

Inmarsat, Intelsat and Telenor launching HTS constellations targeted at maritime using iDirect

Cards are a first step in a boarder strategy to enable service providers to capitalize on the performance of HTS and DVB-S2X, enabling next-generation services that will help greatly expand the market’s future.

This next-generation of line cards are iDirect’s most powerful to date, with return line cards that will feature aggregate symbol rates up to 29 Msps, with individual carriers up to 15 Msps. The new transmit line cards are software-upgradable to DVB-S2X and will feature a powerful combination of 32APSK MODCODs and pre-distortion. With support for both Evolution® and iDirect Velocity™, and DVB-S2 and DVB-S2X networks, the ULCs provide iDirect customers a seamless migration.

The rack-mounted 9350 remote is designed to handle the ever-increasing throughput requirements in maritime. It is the fastest iDirect TDMA remote to-date, with over 150 Mbps of aggregate throughput with DVB-S2/ACM and Adaptive TDMA, and a path to well over 200 Mbps via support of Adaptive SCPC.

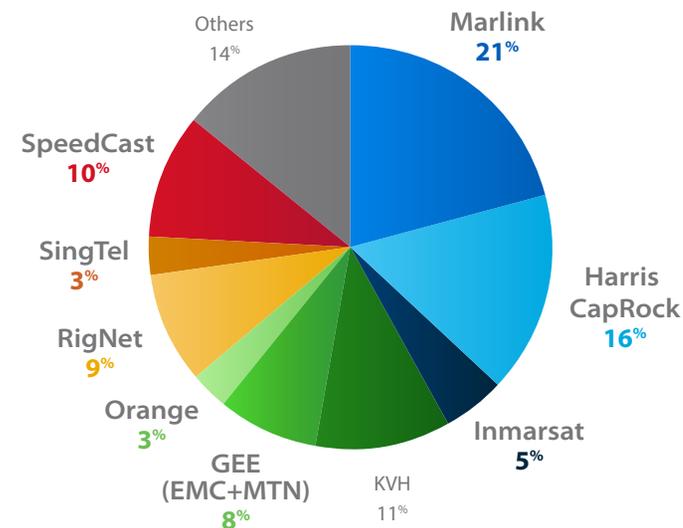
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Such capabilities are designed to handle extreme throughput requirements from superyacht to cruise markets. For ship operators, that means the ability to offer a greater level of differentiation and services.

In addition, iDirect is adding to its industry-leading mobility functionality, allowing service providers to meet the rigorous demands of mobility markets, along with the capabilities to handle thousands of applications running across the network.

For instance, Fast Beam Switching and Beam Switch APIs are new features on the Evolution remote and hub side that reduce the amount of time required for a mobile terminal to switch between beams. Automatic Beam Selection (ABS) and Global NMS allow for global connectivity with no manual intervention across multiple satellite footprints, ensuring a consistent connection as vessels pass from beam-to-beam or from satellite-to-satellite around the world. Global Tracking features allow for the monitoring and management of each travelling remote, and Spread Spectrum includes waveform technology that supports very small antennas on maritime vessels.

## Leading the Way



Eight of the top-10 satellite service providers in maritime by revenue use technology from iDirect. (NSR)

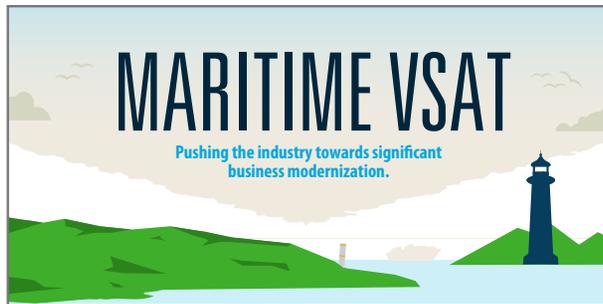
## Industry Progress

After nearly two decades of steady growth, VSAT connectivity is generating significant new value across the maritime industry through a range of business, operations, crew and passenger applications. At the same time, VSAT economics are improving from both a hardware and service perspective.

Having more connectivity onboard is a major development — especially when you consider that maritime companies transport nearly all goods produced around the world, advance global energy production, increase our food supply, provide a home away from home for crew and passengers, and ensure safe passage for millions.

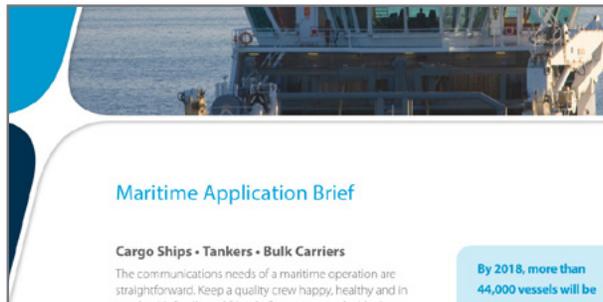
## For Further Reading

[View the Maritime Applications page.](#)



### *Maritime VSAT Infographic*

This infographic depicts the major factors that are pushing the maritime industry towards significant business modernization.



### *Maritime Applications Brief*

Get a more detailed look into the applications that are driving a greater investment in VSAT across maritime.



### *VSAT Partners Talk Maritime*

Read the full Q&As with each of the nine iDirect satellite partners featured in this eBrochure.

