Predicting future usage is key to upgrading satcoms

One of the greatest challenges facing shipowners considering whether or not to revamp their shipboard systems is assessing how business and related communications requirements will change in the future

by Richard Deasington*

Richard Deasington: "Greater access to communications can deliver a significant return on investment"

For years, ship operators and owners had little choice when it came to onboard connectivity. There were essentially only two options: inexpensive, pay-per-use narrowband connectivity and expensive, high-speed private VSAT networks. The former was designed for very limited and intermittent usage. The latter were tailored for the largest deepsea vessels.

In recent years, these models have proved inadequate to meet the growing needs of a large majority of ships. Specifically, maritime companies that subscribe to narrowband, pay-per-use connectivity are seeing their monthly service fees steadily increase, due to a growing range of factors such as less time spent in port, resulting in a greater need for phone and Internet connectivity to shore.

Now suddenly, the maritime industry is witnessing a wave of innovation on the communications front. Service providers are rolling out new cost-effective broadband options as replacements for narrowband connectivity. They are also introducing flat-fee subscription plans to rejuvenate the pay-per-use service model.

The new challenge for operators and owners is therefore deciding whether they really need broadband capabilities, and if so, how to choose the best technology to meet both their business needs and operating budgets. More specifically, they need to answer this question: do the onboard applications currently running or planned for installation require broadband data speeds and constant network access, or can they be most cost-effectively supported by a traditional narrowband connection?

To arrive at the correct answer, owners need to consider three core criteria: current and emerging application requirements, technical capabilities associated with different connectivity options and total cost of ownership. This article will examine these factors and show how companies can calculate the best choice for their business.

Owners can begin by determining their current communications levels and associated costs. Those subscribing to a pay-per-use service can easily check their monthly invoices to track costs and compare them to flat-fee service options. Based on standard list pricing, if an owner is paying more than US$2,000/month on a connectivity service, he is likely to benefit for a flat-fee broadband service.

If monthly charges are low or show little change, there are several other points to consider. Are there onboard restrictions in place on Internet and phone use? Are connectivity fees being capped at the expense of crew welfare or business productivity? Are plans to run critical onboard business applications being deferred because the bandwidth to support them is unaffordable?

For many owners, choosing the right communications strategy also depends on what future requirements they may need to support. A distinct point exists at which many owners need to look at flat-fee, broadband networks as a business enabler, not just as a faster way to connect to shore.

The primary consideration shifts from, "How much will this cost us to upgrade?" to "How much will this cost me in opportunity if we do not upgrade?"

Greater access to communications can deliver a significant return on investment and answer many of the critical business questions often faced by owners today – eg, how to increase productivity. Broadband networks can transform vessels into high-functioning remote offices. They enable crew to maintain greater contact with headquarters to share business and operational data; with vendors to order supplies; and with port authorities to speed up pre- and post-arrival reporting. These productivity gains can make a significant impact on a company's bottom line.

Can operational costs be reduced? More time at sea leaves less time in port for maintenance, repair and the exchange of information. With broadband, crew can utilise voice and high-speed Internet connectivity to consult with experts, receive support in real-time and solve mechanical and technical problems.

A broadband connection enables critical management tasks to be handled from shore, decreasing the need to have specialists on board or transported to the vessel. Broadband networks can also deliver real-time, accurate weather and navigation data. This saves not only time, but fuel – heavy costs which can far outweigh a vessel's communications spend.

Is the crew happy? Crews today demand greater access to e-mail, phone and the Internet for entertainment, managing personal affairs and staying in touch with family and friends on land. Newer generations of communications-savvy crew are even harder to please and the costs of replacing crew lost by attrition continue to rise. Broadband brings greater levels of communication on board to address this critical issue.

Today, many different ways are available to upgrade to or install a higher speed marine network. Key considerations include data rate, signal strength, antenna size, geographical coverage and payment model. The best way to begin exploring this is to understand the difference between the three main satellite bands on which communications services are based. Each has its distinct advantages related to these criteria.

L-band systems are the industry's incumbent connectivity technology and are installed on most vessels. Such systems have several advantages. L-band antennas are compact

(600mm diameter or less), easy to install and provide global coverage. While L-band data rates have traditionally been in the low narrowband range, today they can reach up to 432 kbps, just short of 512 kbps broadband specifications. L-band service is offered on a pay-per-use basis, which means vessels that require limited connectivity can control their costs.

L-band coverage continues to be an adequate solution for many vessels that require basic voice service and limited data connectivity. However, the pay-per-use model often cannot handle economically the traffic requirements of many vessels as they modernise their communications and scale their use of enterprise wide applications. Its cap on data speed means that ships will struggle using L-band for bandwidth intensive and real-time applications.

Another challenge to L-band is service availability. L-band capacity must be shared by every vessel within a specific satellite beam's footprint without the ability for service providers to segment shared capacity. In high traffic areas, this frequently results in network contention and service degradation. Data rates can fall significantly, depending on how many vessels are attempting to access the satellite beam.

C-band systems are another traditional connectivity method. Based on high-speed VSAT networks, C-band systems can reach data rates of 4 Mbps or more, with service offered on a flat-fee basis. C-band antennas range in size from 1.8 to 2.4m and require substantial deck space and installation procedures.

Traditionally, C-band has been the only choice for high-speed, global coverage. Today, C-band networks provide a reliable choice for broadband connectivity, especially on passenger ships and other very large vessels. Yet, even though overall costs have decreased, these types of networks remain out of reach for the majority of mid- to small-size ships.

Ku-band systems represent an innovative and increasingly popular choice for maritime companies. Like C-band, Ku-band service can exceed data rates of 4 Mbps and is offered on a flat-fee basis. Ku-band antennas, though, are smaller – between 60cm and 1.8m – and are quicker and cheaper to install.

The challenge of a Ku-band system is that Ku beams are not completely global. Nevertheless, they cover coastal shipping lanes and extend into deep waters, which is sufficient to accommodate most routes; however, as a replacement for C-band, Ku-band typically needs the support of an L-band system to extend its range. As a result, many service providers today are beginning to integrate these technologies.

To choose the right communication strategy, owners need to calculate the total cost of ownership related to each option. They need to estimate hardware, installation and monthly bandwidth costs, and then apply them to projected usage levels.

Hardware costs typically include installation and other related technology fees; they are amortised over 36 months, which is the standard length of a service contract. Bandwidth is commonly priced on a megabyte basis and varies widely, depending on total usage.

When addressing cost, there is a misperception that VSAT service is more expensive than traditional pay-per-use L-band connectivity. Certainly, C-band and Ku-band hardware is costlier than L-band hardware, and installing a C-band system is significantly more involved but what many may not realise is that VSAT service fees are often substantially less than those for L-band.

For example, current list pricing shows that L-band service can span a range from US$11.00/Mb to US$4.50/Mb, based on monthly allocation. C-band and Ku-band costs can range from US$2/Mb to US$0.75/Mb, based on the same parameters.

To calculate usage levels, owners need to quantify how much bandwidth is consumed on each vessel in an average month, based on everyday use of applications such as e-mail, voice calls and video.

My company, iDirect, has worked with key partners and IT specialists to determine four general usage profiles from low to high. Based on these usage profiles and standard list pricing for hardware and bandwidth, it was able to determine the return on investment for L-band, C-band and Ku-band systems.

If the average vessel in a fleet sends and receives less than 150Mb of data each month (which would be considered very basic daily usage of e-mail and very limited Internet access and VoIP traffic), L-band holds a cost advantage over Ku-band and C-band.

If the average vessel in a fleet sends and receives more than 150Mb of data each month, Ku-band becomes more cost-effective. If the average vessel sends and receives more than 380Mb of data each month, C-band becomes more cost-effective than L-band.

In general, once a ship requires more than very basic connectivity, a flat-fee VSAT model becomes more cost-effective than a pay-per-use model. Above 150 Mb/month, L-band costs rise sharply and can double and even triple the cost of a VSAT system. The cost advantage for VSAT becomes even greater as VSAT equipment costs continue to decrease.

Yet, perhaps the greatest challenge is to assess how business and related communications requirements will change in the future.

For some owners, a communications upgrade is an unnecessary cost. For others, upgrading is key to becoming a more productive, profitable and stable business. In each instance, though, it is a critical decision that must be done with diligence and a thorough understanding of all the available options. ***MEC***

MARITIME NETWORK OPTIONS

	L-band	Ku-band	C-band
Antenna size	0.6m or lower	0.6m-1.8m	1.8m-2.4m
Frequency	Less than 2 GHz	12-18 GHz	3-6 GHz
Data rate	Up to 432 kbps	Up to 4+ Mbps	Up to 4+ Mbps
Beam coverage	Global	Coastal, regional	Global
Typical pricing model	Pay-per-use	Flat-fee	Flat-fee
Main application	Traditional choice for vessels that require limited connectivity	Emerging choice for majority of small to medium vessels that require broadband access	Traditional choice for large vessels that require broadband access
Shortcomings	Pay-per-use model not cost effective for growing network usage	Smaller beam footprints but can be overlapped to accommodate most vessel routes	Weaker signal than Ku-band but has a larger coverage range
Usage range	Ideal for vessels that send and receive less than 150 Mb/month	Ideal for vessels that send and receive more than 150 Mb/month	Ideal for vessels that send and receive more than 380 Mb/month and need C-band capabilities

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This article is based on a paper published and downloadable from the iDirect website, entitled* The VSAT Advantage: a cost analysis of VSAT broadband versus L-band pay-per-use service.** ***The paper examines in further detail the costs associated with today's maritime connectivity options and how they match to IP communications trends associated with modern ships.