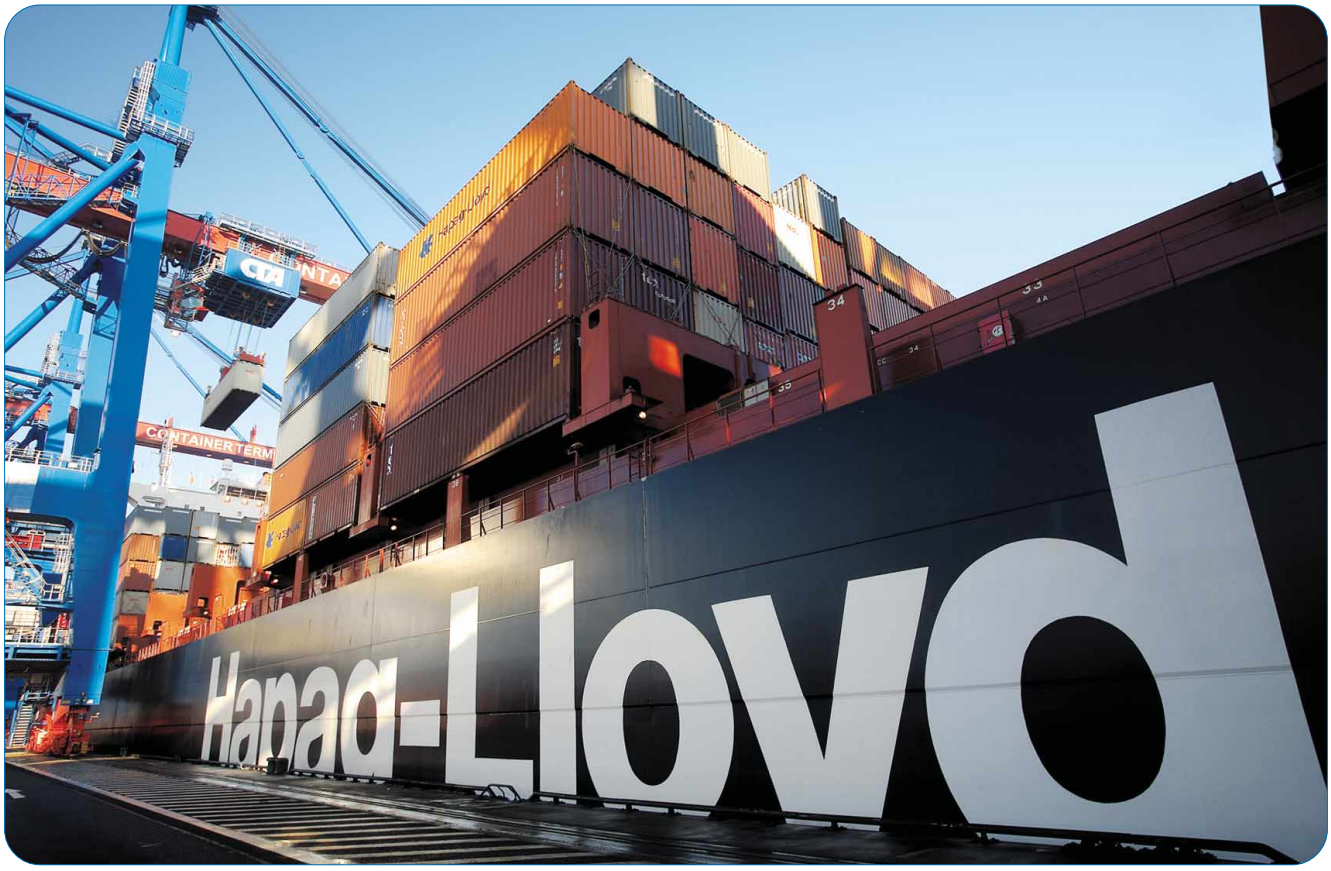

Photo courtesy Hapag Lloyd.

Maritime Ka-band – hit or hype?

The satellite industry is buzzing with the promise of Ka-band. With a new generation of Ka-band satellites already being launched, and other systems planned for the future, such as Inmarsat's Global Xpress, Satellite Evolution speaks to maritime satellite expert Alan Gottlieb, Managing Director of Gottlieb International Group to find out more about the potential and challenges that Ka-band holds for the maritime market.

Question: There is a great deal of excitement and a buzz in the industry about Ka-band and the satellites being launched to cater for demand. Do you believe that this is justified?

Alan Gottlieb: To answer your question, we need to look at the advantages and disadvantages of Ka-band from a technical standpoint and we need to view those advantages and disadvantages in terms of specific target markets. In maritime, there are essentially two types of end user markets.

First, there are the sophisticated, high-end fleet owners that basically want an "office at sea" with all of their fleet configured as nodes on their own Virtual Private Network or VPN. They want guaranteed bandwidth and a solid, reliable service that is capable of running sophisticated applications in a heavy duty commercial environment. Usually, these are the companies that own large or mid sized fleets of ships.

Secondly, there are the casual users: those who don't really care about putting their vessels on a network. They may have a few large vessels but simply want to provide the crew with some Internet and some voice communications.

So, is the buzz really justified? To answer your question, it really depends on the level of reliability required by the user and the cost of service. That's why there is a market for both Cadillacs and Volkswagens. The real question is not whether the buzz is justified but where in the market, based on the technical and pricing issues, does a Ka- service most likely fit.

Question: What are the advantages and disadvantages of maritime Ka-band?

Alan Gottlieb: Ka-band does have a lot of available spectrum and that means high capacity. While high capacity does offer the ability to serve many users, the high throughputs often claimed are not a unique advantage of Ka. In fact, Ku can deliver equivalent throughputs. While the higher frequency of Ka does result in higher antenna gain, the advantage is essentially cancelled out by the higher Path Loss (signal degradation) associated with the higher frequency of Ka. So, the unique throughput capabilities claimed by proponents of Ka tend to be more marketing hype than actual fact. With the appropriate reflector size and power amplifier outputs, Ku satellites can deliver the same Effective Radiate Power and throughputs. However, before addressing other critical issues

Alan Gottlieb, Managing Director of Gottlieb International Group.

associated with a Ka-band service, we need to focus on one clear advantage: the ability to use small antennas.

The small Ka antenna can be half the cost of a 1.0 or 1.2 metre Ku-band terminal and can be installed by the crew when the ship is in motion. This means a large fleet can be retrofitted quickly and at little or no installation cost. With 1.0 or 1.2 metre Ku-band antennas, when you are retrofitting, you need a crane and more time to install. Since containerships and tankers are only in port for a matter of hours, installing Ku systems can be logistically difficult necessitating the need to wait for dry-docking before a system can be installed. However, while the small Ka antenna will be less expensive than a 1.0 metre or larger Ku unit, it will likely cost considerably more than a Fleet Broadband 500 antenna. This is because the narrow beam associated with the Ka frequency requires much more accurate pointing than an L-band unit. Consequently, the antenna needs to be manufactured to much more precise specifications than the current Fleet Broadband L-band antennas. So, end user cost will likely be much more (assuming no provider subsidies) than the currently discounted $10,000 to $12,000 for FB 500 units. While antenna size is a big plus for Ka, Rain Fade, is the big minus.

Ka is much more sensitive to rain or snow than Ku-band. Obviously, when ships traverse the globe they encounter a lot of rain and snow and heavy rain in tropical regions. With a Ka-band service, when it starts to rain, the bit rate could drop dramatically as the rain intensity increases. This can cause extreme disruption of interactive applications such as access to databases on-shore or remote PC maintenance, applications that are becoming more prevalent. As the intensity increases and bit rate drops, less essential applications like video and Internet access will be shut down by bandwidth management software. While this might seem inconsequential, it could be serious and especially disruptive of a telemedicine application and video based security applications.

At higher levels of rain intensity, the link could ultimately fail entirely necessitating a switchover to Fleet Broadband. As Fleet Broadband bandwidth is a contended service, should the failure occur in a heavily trafficked area, bandwidth could drop right down to levels unable to support the most critical of applications. A further drawback to Ka over ocean is the low efficiency resulting from the need to cover vast areas of ocean, many of which have minimal vessel traffic.

Consequently, Ka will not likely be less expensive. Over North America, for example, Ka coverage tends to be much more efficient since the individual cells can be smaller and still contain large numbers of subscribers. However, in the open ocean you might have to provide service to a single ship in one larger cell or single ships in multiple cells resulting in an inefficient use of capacity. With Ku, the coverage area of a beam is much wider and able to contain many ships resulting in higher efficiency of the network. What all of this means is that a Ka over ocean service will have lower utilisation rates and a higher cost per MHz deployed. Furthermore, Ka satellites tend to be more expensive than Ku satellites. Finally, assuming

Photo courtesy Hapag Lloyd.

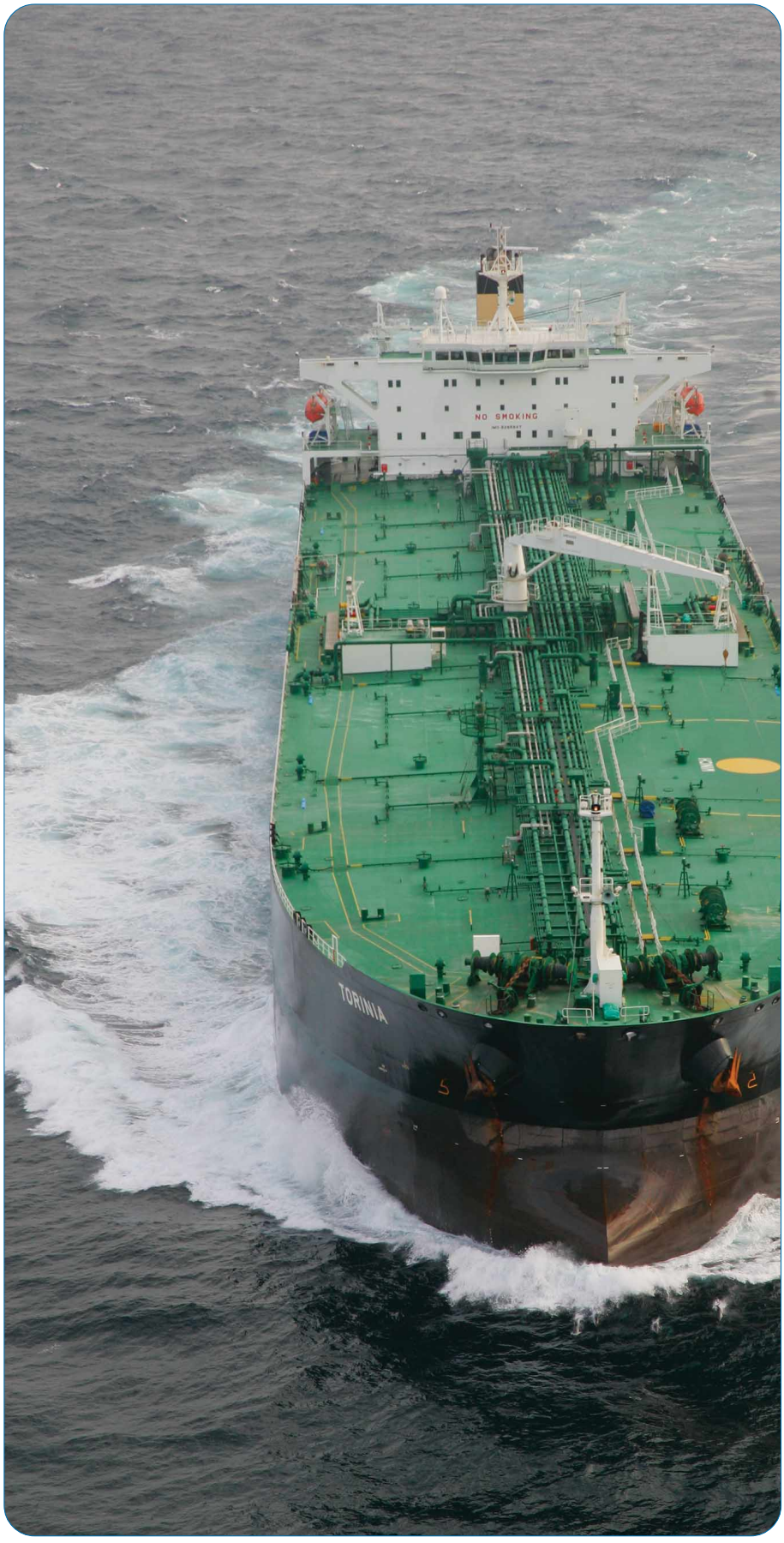

Photo courtesy Shell.

Inmarsat is the only maritime Ka provider, an in orbit back up satellite will be required to assure Continuity of Service further increasing costs. In contrast, as there are many Ku satellites and service providers, failure of a single Ku satellite is not usually a problem.

Question: Inmarsat is hoping its new satellite initiative, Global Xpress will revolutionise maritime communications. Do you see the venture succeeding?

Alan Gottlieb: For Inmarsat, this was something that they had to do. Major market leading shipping companies are switching to VSAT – witness the recent VSAT purchases by Frontline TeeKay, Tsakos and even the new VSAT tender by Hapag Lloyd. These ships are using up to 50 Gigabytes per/month of capacity making Fleet Broadband impractical. Considering the lack of available Ku and L-band capacity, there was nowhere else they could go for spectrum. They needed to compete with Ku with their own VSAT offering and Ka was the only alternative. Will their venture succeed? To answer your question, let's look separately at the technical and business issues.

Based on the technical aspects of the service, where does Global Xpress fit into the market? For the high-end maritime user, the bottom line requirement is reliability at reasonable cost. Conversely, the casual user with less stringent requirements is ready to sacrifice some degree of reliability for low cost. The end user doesn't really care whether its Ku, C, L-band or Ka.

So, in recapping our technical analysis, unless Inmarsat has some remarkable, new technological advance, the Rain Fade and associated bandwidth fluctuation issues associated with Ka pose serious questions to the high end user. Furthermore, there is some question is to whether the capacity of the multi-cell infrastructure will support the offering of Committed Information Rate which is a common requirement at the high end of the market and whether Inmarsat will provide an in orbit back up satellite, an essential element to assure Continuity of Service. Given these issues, I believe that it may be very difficult to convince the large fleet owners to switch from Ku to Ka-band. Ka acceptance, in my view, is much more probable in the large casual user maritime segment, assuming, of course that Inmarsat prices the service attractively. In terms of business issues, Inmarsat faces daunting challenges in the marketing of its service to the maritime environment.

Selling VSAT is not like selling traditional by the byte or by the minute Inmarsat services and will be especially daunting to most of Inmarsat's re-seller network. It is a systems integration business characterised by very long consultative sales cycles and intense price competition. The cost of an extended consultative sales cycle is very high

and sales personnel in most resellers are not trained for it. For the resellers, cash flow will slow down substantially due to the long sales cycle.

Unlike the L-band world, Inmarsat and its resellers will face an army of well-financed Ku satellite operators and vendors who will not easily seed their markets to the communications giant. Furthermore, existing Ku vendors will be unlikely to displace their Ku offerings due to long-term lease commitments and the fact that they will have no control over the Ka bandwidth management, an issue that will limit their opportunity to maximise profit through efficient bandwidth management and control of oversubscription.

So, to answer your question I believe that maritime acceptance will be confined to the casual user segment, and success in maritime will have to be based on selling large numbers of casual users the service at an attractive price point. However, it is important to note that Ka will be very popular in aviation, military and in areas where Rain Fade is not an issue. So, success in these areas could compensate for lack of penetration in high-end maritime markets.

Question: How is the maritime VSAT market evolving at present?

Alan Gottlieb: We are beginning to see a real change. To date, most companies simply sold hardware and bandwidth. This is changing based on the needs of the market and the desire of providers to differentiate them in what is now a crowded market. Most users, except for the most sophisticated IT departments, have no concept of what they need to do to manage and install and maintain a fixed broadband VSAT service. There's a lot more involved than just an antenna and bandwidth.

You have to be able to manage that bandwidth, you have to have an IP switching device, a device that switches between Ku-band and Ka-band and Fleet Broadband and you need to be able to provide Fleet Broadband as a backup. You also need a VPN and Filtering so that no junk passes over the network and you need to control access to the systems. You can't have people pulling down explicit content, for example. So access has to be regulated as well. Consequently, installing VSAT aboard a vessel is much more complicated than Fleet Broadband. The other vitally important requirement noted by end users is a single point of contact for when things go wrong. If something doesn't work, the customer wants to make one phone call to one entity. In sum, just selling a "plug" isn't enough anymore. The market will belong to the best solutions providers.

Question: What challenges exist for those who are selling a maritime VSAT service? There is a lot of competition out there.

Alan Gottlieb: The challenge is that you have to educate the customer and justify the increased cost of a VSAT service. Because Inmarsat has been so expensive, companies have come up with all kinds of ways of limiting usage including special e-mail and compression software. Most spend less than $1,000 per/month. So, the real challenge is to justify an increase from the current $1,000 to $3,000 - $4,000 per/month for a VSAT service.

To do this, salespeople need to be trained in all of the applications that become possible and how these applications will ultimately justify the installation of fixed priced broadband. Furthermore, salespeople must win the confidence of the customer though a long and sometimes frustrating sales cycle. We have already trained one major vendor's sales force in the consultative selling process and the justification for VSAT.

Question: How do you envisage the future of maritime satellite communications?

Alan Gottlieb: In terms of growth, the market will continue to grow and ultimately most large vessels will have VSAT systems. While Tankers and Offshore Service Vessels are the primary early adopters and will have the highest VSAT penetration rates, large Containership fleets will follow. Factory fishing vessels are also early adopters, but smaller fishing vessels will likely retain Iridium and FB 150 services.

To conclude, while adoption of VSAT has been slowed by the economic recession, an increase in economic activity supported by crew welfare and new, efficiency enhancing applications will continue to fuel adoption of fixed-priced broadband at sea.

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