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WHITE PAPER

MARITIME VSAT

Connectivity that is made to measure

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INTRODUCTION

In the not so distant past owners and managers considering VSAT communications for the first time would once have found it an unknown proposition compared to the previous era of L-Band; and in the beginning it's fair to say it was defined by non-standard equipment and variable service packages, frequency band dilemmas, fair use policies and opaque pricing models.

However, as the maritime VSAT market has matured and competition naturally increased, owners and managers have educated themselves about the options and the result is a customer base which wants to understand the variables as well as the claimed benefits and not just leave it to the crew.

VSAT is usually sold on the basis of its ability to deliver high throughput and unlimited bandwidth for a fixed price. But until the arrival of second generation services, only the last of these was guaranteed. Even now it is how the technologies vary and how this impacts performance and user experience.

Thanks to increasing demand for crew calling and enterprise data and voice applications ship owners are increasingly interested in making the transition from L-Band or upgrading their existing low-end VSAT service. Often they are often more concerned with quality of service rather than with sheer speed alone; knowing that the data will reach ship or shore reliably are just as important.

And in general they are also less worried about whether the service is delivered over Ku, Ka, C-band or FleetBroadband; they want to provide reliable and global business and crew internet with predictable impact to the vessel operating budget.

But for an owner or manager about to move to VSAT for the first time, or upgrading their existing low-end VSAT service or even those wanting to know more, it is perhaps relevant to underline what the key differences are between a Ka-band service such as Fleet Xpress and the myriad of Ku-band services in the market.

NINE KEY DIFFERENCES BETWEEN FLEET XPRESS AND KU-BAND SERVICES

#1 CONTINUOUS CONNECTIVITY

By enabling owners to buy a VSAT service from an integrated, global and trusted provider, Inmarsat Fleet Xpress has done a lot to ensure the welcome continuity and quality of service that owners have enjoyed through its generations of L-Band products.

Fleet Xpress is designed specifically with mobility in mind and its series of spot beams means that the signal strength is not dependent on the size of the antenna, as opposed to Ku and its global beam.

The other advantage of a single network based on spot beams is that each beam has its own frequency channel so multiple users within that beam can use the same frequency and face little interference whereas on a Ku network interference can easily occur as there are only four frequency channels in a global Ku beam.

As Inmarsat operates a single network there is a seamless handover from spot beam to spot beam and then satellite to satellite with five satellites covering the world's oceans continuously and means that there is no switching between satellite providers allowing full optimisation of services across the complete network.

#2 EASY TO ADD MORE CAPACITY & INCREASE THROUGHPUT SPEED

Operating and managing a satellite network means it is easy to add additional capacity, either by launching new satellites or by buying capacity from other Ka-satellite operators.

Inmarsat launched its GX5 satellite at the end of 2019 and will launch GX 6a and 6b, the first dual Ka/L-Band I-6 satellites in 2021, GX7,8 and 9 in 2023 and GX 10a and 10b (designed to operate over the Arctic region) in 2022.

This additional capacity will increase throughput to speeds in the range of 50MB and above.

Each of the new GX7-9 satellites will deliver approximately twice the total capacity of the entire current GX network, and they will employ dynamic beamforming to simultaneously create thousands of independent beams of different sizes, bandwidth and power that can be reconfigured and repositioned across the globe in real time.

Existing Fleet Xpress customers are able to benefit from next generation enhancements using current terminals, enjoying a significant boost in performance, as well as future-proofing their investment. Backward-compatibility will also ensure further redundancy and resilience for what is already the only fully redundant network in existence.

In addition, Inmarsat is able to lease capacity from other satellite providers such as Telenor and its Thor-7 service for specific regional coverage.

In contrast, as Ku-resellers only lease capacity they do not have the ability to easily add capacity or manage spectrum as and when required.

#3 UNLIMITED GLOBAL FLEETBROADBAND BACK-UP

VSAT service interruptions can be expected on any band – typically through antenna blockage - but users of Ku services who buy metered back-up or limited back-up plans can find out very

quickly that a package of, say, 50MB means the ship can only do priority business email – the crew are unlikely to be able to access the internet. If the outage is mechanical or sustained than the bill will quickly rise as the ship goes 'out of bundle' but without enjoying the required quality of service.

Ku-band re-sellers will also typically use metered FleetBroadband or other services for VSAT back-up – though some believe, particularly smaller owners and managers that they can deliver the coverage they need from VSAT alone and do not need it, or that an unlimited back-up plan suggests that the VSAT service is unreliable.

With Fleet Xpress automatically switching to FleetBroadband as a back-up, owners and managers do not have to worry about 'bill shock' when an interruption occurs and also they have the guarantee that FleetBroadband has an up time of 99.9%.

The other advantage of Fleet Broadband as an automatic back-up means owners and managers can take advantage of its accreditation as a GMDSS service as part of the Fleet Safety suite of services, with a continuously enhanced safety network driven by the same team that has been saving lives close to 40 years through the use of Inmarsat C.

#4 CONTROLLED COSTS

A VSAT service such as Fleet Xpress look like a substantial investment on paper but crucially it allows users to fix their monthly communications costs – a key requirement whether ships are trading spot or timecharter. Much depends on the risk appetite of the owner and whether they view VSAT as a reliable service that can be managed so as to add value to shipping operations.

Owners that step up to VSAT immediately recognise the difference to L-Band and will find they can communicate in a way closer to the penetration of smartphones onshore; constantly connected and ready to receive the services that they need.

However, ship owners are price sensitive – and they also tend to know what their competitors are paying – so the main differences in contract terms will be whether the customer chooses a Maximum Information Rate (MIR) or to pay more for a Committed Information Rate (CIR) and the degree of backup they contract for.

Owners buying MIR plans from a VSAT provider need to understand that this means the best speed the service might achieve, not what it will reach consistently. A CIR means a guaranteed throughput but in either case, how the service is delivered will vary for a number of reasons.

The Fleet Xpress CIR option improves the user experience by offering a Service Level Agreement to provide an agreed level of network availability– something shipowners recognise as having a greater value in the long term.

Choosing an MIR plan does not necessarily mean sacrificing quality for cost but it is a 'best effort' service similar to L-Band with availability of the service based on priority according to package used. CIR users will get priority in the beam but if an MIR vessel is one of a few in the same location, they will receive their MIR at high-throughput speeds.

#5 NETWORK OWNERSHIP AND CYBER RESILIENCE

Typically, Ku-band providers are re-selling transponder capacity leased from satellite network operators and will only buy what they think they can sell. It's hard for them to know if they can re-sell the capacity as ships will be constantly moving in and out of the beams.

As a result if resellers try to manage their exposure by taking a small lease they may not even be able to deliver the minimum bandwidth they have promised because their traffic is not prioritised by the satellite network operator.

It is also harder for Ku-band providers using multiple satellite operators to guarantee that the network is 100% secure against cyber threats due to handovers between operators and beams.

By contrast, Inmarsat owns and operates the Fleet Xpress satellite network, ground infrastructure and manages end-to-end service delivery globally. Its investment in network security as it is used by all major governments' means users can trust that their communications are in a cyber secure environment that has been ISO27001 certified.

#6 SEPARATING VOICE SERVICES FROM DATA PLANS

Typically, most Ku services will route voice calls as part of the vessel data plan, with calls taking up on average 25kbps, which means that the more simultaneous voice calls the lower the CIR and a dramatic slowing of throughput speeds. In contrast, Fleet Xpress voice calls are routed independently through Inmarsat's unique voice network, so the minimum CIR is guaranteed irrespective of the number of voice calls the vessel receives at the same time.

#7 COVERAGE FLEXIBILITY

The wide adoption of Fleet Xpress is also making redundant the debate as to whether Ka or Ku-Band is the more reliable frequency band. Ultimately customers are less interested in this issue than the VSAT re-sellers since both services can be affected by weather.

Inmarsat raised eyebrows when it announced it would use the higher frequency Ka-Band for its first VSAT service, with questions asked around whether Ka was more susceptible to rain fade in bad weather. Ka is far from an untested platform – it has been used by the military for more than a decade – hardly an undemanding customer group.

Subsequent research has concluded that there is less than 1% difference between the impact of rain fade on Ka and Ku-band VSAT.

Inmarsat's decision was a simple choice: go up in frequency to get more bandwidth availability. Because its GX satellites and ground network infrastructure are the most sophisticated yet deployed, it can increase signal power remotely and overcome much of the interference. In addition, because Inmarsat owns and operates its own Teleports it is able to re-route traffic as required – something most VSAT re-sellers cannot claim.

All VSAT systems have some marginal coverage areas but only Fleet Xpress has the ability to redirect coverage by steering its satellite beams to areas of greatest demand, be that over the English Channel of the Malacca Straits.

#8 SMALLER ANTENNAS

The power of Fleet Xpress has also designed to be delivered in the most efficient way via a 60cm antenna instead of the 80cm antenna normally supplied with VSAT.

Some re-sellers have suggested that the extra size means the user will get better reception but this is not the case; throughput speed depends on the SLA with the provider.

Indeed, the reverse is true because a low cost SLA over a leased transponder to an 80cm dish means network availability could begin to fall long before the ship reaches the edge of a Ku global beam area.

Also a smaller antenna can be beneficial for tankers and gas carriers with less 'hot work' on deck and installation can normally be completed without a crane. It also is a benefit for tugs and workboats where real estate is at a premium.

#9 FUTURE PROOFING FOR CONTINUED DIGITALISATION OF SHIPPING

The rapid growth of Fleet Xpress from launch in 2016 to over 8,500 installed vessels today is proof that the digitalisation of shipping and the quest for further efficiencies through technology is truly underway.

According to recent research carried out by Vanson Bourne on behalf of Inmarsat the average owner or manager will spend around $2.5m on applications and IoT in the next five years.

Driving that change will be the need to comply with regulations such as the emissions sulphur cap that came into force this year. With shipping undergoing a digital revolution satellite operators are at the heart of enabling the move to digital.

Fleet Xpress is the only satellite service to have its own certified application provider programme for its Fleet Data and Fleet Connect solutions, allowing suppliers to owners and managers such as engine manufacturers, shipyards or application developers to either have a dedicated API (Fleet Data) to access data or have their own dedicated bandwidth (Fleet Connect) to the vessel that does not cost the owner or manager a penny with both allowing data to be transmitted from the vessel to shore in real-time.

As data becomes the most important commodity in shipping, a satellite network that facilitates the flow of data to and from the ship and also helps make sense of that data will be vital.

IN CONCLUSION

However impressive the service, the maritime market remains a tough sell, not least because of the slim margins most of the industry has experienced for the past decade.

Even a critical service like connectivity has in the past tended to be a 'dollars and cents for minutes and megabytes' market and owners were all too keen to trade-off between providers for small gains.

Despite its high cost compared to terrestrial services, maritime satellite has been a market dominated by cost competition and as a result, not all providers sell their services on the basis of value creation.

It is probably too early to say that VSAT is a commodity but it is beginning to be widespread enough for users to understand the difference between what low cost and high-end services will give them.

So perhaps owners and managers who want to move towards smarter shipping should not consider VSAT as a commodity at all but rather a made-to-measure service.

As the industry moves closer to data dependency it needs a platform that can deliver – and keep delivering, whatever the demands placed upon it.

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