

Every Maritime Connectivity Mode Matters

Valour Consultancy Whitepaper



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Introduction

Sometimes, one can play a game whilst travelling on the TfL London Underground. Examining the various characters on the “tube”, you will see an assortment of coloured hats, bold and daring leopard print clothing, fanciful shoes and trainers. Concentrating on pockets, there will be a multitude of Apple iPhones, Samsung, Sony, or Huawei smartphones. Then there are headphones, ear buds, smart watches, or fitness activity gizmos.

Bar the bravery of some folks’ ability to wear eye-catching outfits, from a commerce perspective, how did all these items come to the Big Smoke (London)?

Many people will take this question for granted; some may guess aeroplanes. But we know the truth of the matter.

The commercial merchant shipping market, particularly container and cargo vessels, is constantly traversing the sea lanes around the world, delivering these items across the globe.

These vessels have been the shovels that have ploughed the path to what we call “globalisation”. From the coffee we drink, the medicines we take for ailments, and the fabric of our sofas, to the bananas we consume or all the manufacturing components and electrical subsystems in machines, computers or cars, the merchant shipping market has allowed us, the human race, to achieve some remarkable things.



Connectivity Serving the Remote and Faraway

For the satellite industry serving these merchant vessels with connectivity, it has lately been an interesting time period. Satellite connectivity usage boomed during the Covid government lockdowns. Nations and their borders were closed, and seafarers were trapped on board vessels.

However, due to national territory lockdowns, key merchant port closures, and route blocks (such as Ever Given and Suez Canal but also including energy pipelines), freight rates and vessel chartering prices skyrocketed during those periods. Although prices have returned to the status quo, some shipping entities amassed a hefty sum of money to their bottom lines during that period.

Thereafter, we witnessed the introduction of LEO mobility provider, [Starlink](#), with its maritime service commercially launching in the middle of 2022. The speed of uptake, by all types of vessels, has been rapid particularly for an industry that typically moves very cautiously into new technology.

The take-up of the new LEO service is surprising for several reasons. Starlink's LEO offers no CIRs (committed information rates) in SLAs (service level agreements) which was previously the norm within the industry, particularly for high-end merchant vessels. Initially, Starlink had no global coverage at the launch of the service although that was improved eight months later. They offer short-term monthly contract deals, rather than multi-year agreements which can provide pricing consistency for long-term budgeting. The result is vessel operators signing on with no commitment from Starlink to maintain any threshold of availability.

In addition, we have witnessed the launch of SES's latest MEO system called mPOWER. SES launched its first two O3b mPOWER satellites in 2022 and completed two further satellites launches in April this year.

Over the last few years, the use of [5G cellular technologies](#) with even faster bandwidth connectivity have grown significantly. In part, this acceleration of growth has been due to the COVID-19 pandemic. However, we are showing more bespoke use of the new technology for maritime. For example, China Mobile and Huawei have created a marine 5G network off Ningde, Fujian Province. The GSMA (Global Systems for Mobile Communications) Association state the new maritime network was set to generate 100 million yuan by the end of 2022.

With these recent developments, it would be possible to think that GEO connectivity solutions would be swapped aside immediately for these new connectivity services. Furthermore, with LEO satellite operators on the horizon like OneWeb, Telesat, Rivada and Amazon, the reign of GEO satellite connectivity is surely over?



GEO VSAT Will Always Be Relevant

Those assumptions are likely to be misplaced. VSAT connectivity, and its attendant guarantees for information rates, service levels and availability, is at the heart of the merchant connectivity market. Yes, a good portion of shipping companies will, and have already, taken up “best efforts” LEO services, however, these are on top of current VSAT connectivity systems. No enterprise-grade commercial shipping companies depend solely on LEO connectivity.

This is an interesting point to ponder and there are a few key reasons for consideration.



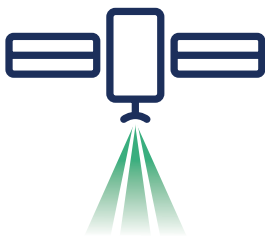
Coverage

A number of major countries have banned the new LEO services. Take Starlink Maritime as an example; China, Yemen, UAE, Turkey, some parts of Africa, and Russia have prohibited the connectivity solution within their territories. India on the other hand, which had previously banned Starlink, is now on the verge of granting licenses to the operator.



Commitment

In addition to this, the monthly contract periods of Starlink essentially mean the company can very quickly change the terms and conditions of service and probably most importantly the pricing. We will see other LEO providers, such as OneWeb, offering much more variety and longer-term agreements on their customer contracts, not to mention that OneWeb thus far seems to be nearly exclusively partnered with GEO operators in its go-to-market strategy. However, Starlink’s short-term contracting is quite disconcerting to shipping entities used to plotting out costs in years, rather than months.



Capacity

Another key factor to consider is possible capacity constraints in the future of LEO connectivity. Like the other factors mentioned, this is exceptionally an issue with Starlink and its no-SLA approach. With more people, houses, RVs, vessels, and planes, as well as much more future consumption of its bandwidth, it’s easy to see how certain areas will see a drop in service levels.

Alternative Options – “Backstops”

When considering the key question of why not to use solely a LEO provider, the answer is represented most prominently in the offshore energy sector. These companies do not rely on a single source of connectivity precisely for the aforementioned reasons. A “fingers crossed” approach will not suffice for critical communications.

L-band services have often been a backstop for GEO VSAT to ensure connectivity is always absolute. To this day, for some oceanic regions, if a vessel operator wants to ensure constant connectivity, they will buffer an additional layer of L-band service plans to their GEO VSAT services in a “just-in-case” scenario.



This point may sound contradictory to the purpose of why GEO VSAT will remain prevalent. The first reason is our new (compared to L-band) reliance on connectivity. Given what we know is possible, it is no longer satisfactory to have connectivity for only the direst of circumstances. Business operations and crew demand more with every passing year. VSAT connectivity is a key component of hybrid connectivity solutions of the future, linking Cloud and traditional telco principles and platforms into no-longer-siloed satellite systems.

Areas such as [the Malacca Straits](#), the Gulf of Mexico, and areas of the South China Sea will always be choke points for connectivity. With such high levels of demand from vessels operating in those regions, users will take whatever service to cover a connectivity break. This could be LEO VSAT with GEO VSAT as a secondary choice and L-band as the ultimate backstop. Furthermore, vessels will likely be using 5G connectivity when within range of a port or coastline. A good example is the trials of the technology in [Singapore Port](#) or [Port of Livorno](#).

The Increasing Requirement for Crew Connectivity

Now, the next question is why these vessels will need that abundance of connectivity?

Previously, the occupation of being a seafarer required withstanding weeks or months away from their friends and families. With the deployment of L-band connectivity services on vessels, an odd message, email, or even a weekly telephone call would be permitted. In 2012, only 12% of world seafarers had free access to the Internet and expectations for connectivity were low. This has now changed.

Today, a vessel (shipping company) will not be able to find officers or even other seafarers unless the vessel has Internet connectivity. The situation of seafarer recruitment has become so critical that some shipping companies are speculating about the need for [autonomous vessels](#) much sooner rather than later. However, this doesn't resolve the issue of now.

In our previous whitepaper, "[Maritime Merchant Connectivity Boom](#)", the satellite operator, Inmarsat Maritime (now part of Viasat) reported data consumption of its Fleet Xpress vessels expanding by a factor of three between 2020 and 2021. As the majority of the company's maritime business is merchant, it is easy to correlate this with the increased usage of merchant seafarers. This trend reflects the recent updates to the Maritime Labour Convention 2006 (MLC), which covers the right to Internet access for crew on merchant vessels. The MLC is an international treaty designed to protect seafarers' rights and has been ratified by more than 100 countries, which represent over 90% of the world's merchant fleet.

We are not saying that seafarers will necessarily soon be able to play the video game Counterstrike at sea, but it's commonly agreed they need some resemblance of life at home whilst being away, such as messaging, video calling friends and family during off periods, accessing social media, or connecting to ErgData (Concept2's exercise mobile app) to upload the crew's latest rowing, biking or skiing workout data. Current data suggests that such access is essential to retention. Discussions with some of the top commercial merchant operators have highlighted their dismay at keeping seafarers if their vessels don't have adequate connectivity for the vessel's crew and business operations.



Bigger Vessels

This is an interesting part; the general trend is merchant ships have become bigger as to maximise economies of scale and cost efficiencies. The newer container vessels' capacity has almost doubled the previous capacities of a decade ago. As of August 2023, there are more than 114 ultra large cargo ships in active service with a capacity of 20,000 TEUs or greater, (TEU - 20-foot equivalent containers), and there are roughly more than 6,000 container vessels active worldwide, according to the [Clarkson World Fleet Register](#).

A fascinating documentary on this can be found on the UK's BBC iPlayer – "[Why Ships Crash](#)", which addresses primarily the Ever Given's crash in the Suez Canal. With vessels becoming larger, controlling speed, trajectory, and external conditions requires much more understanding. Therefore, extra training is required to improve vessel optimisations and efficiencies. This training needs to be continuous for the ship's officers and crew, both on land and at sea, requiring strong connectivity systems on board a vessel.

Trends at Sea That Rely on Connectivity

Reliable connectivity with a certitude of service quality makes a big difference to tasks as simple as patching up or updating a computer operating system, which today are found in GEO VSAT solutions, although these could easily be hybrid in the future. Certain tasks such as Teams meetings, it could be argued, would be better undertaken on a LEO VSAT connection which offers lower latency. However, GEO VSAT is also making relatively great strides with two-way (symmetrical) connectivity. But without connectivity, most of these requirements are a null point.

There are two major trends at sea that rely on connectivity.

The first is *digitalisation to enable an office at sea*. Turning these enormous, previously unsophisticated, floating metal boxes of transportation into remote offices requires incorporating the same kind of IT infrastructure and systems used on land, at sea. This consists of ensuring the necessary IT hardware and software on board a vessel and that onshore IT teams can access and manage the network solutions on board the vessel. Or that seafarers on board have the necessary training to understand and conduct this undertaking themselves.

The other trend is [smart shipping solutions](#) which entail utilising data to improve vessel optimisation, adherence to regulations, benchmarking, and automating actions. This creates efficiencies such as shortening journey time, reducing fuel consumption and emissions, or making the vessels a safer environment. Surprisingly, these technologies rely little on the speed of the connection, nor large volumes of data capacity. They typically run perfectly well on a basic L-band or GEO VSAT solution.

The implementation of SD-WAN technologies in merchant shipping is becoming ever more crucial, as specific priorities and tasks are assigned to different connectivity technologies.

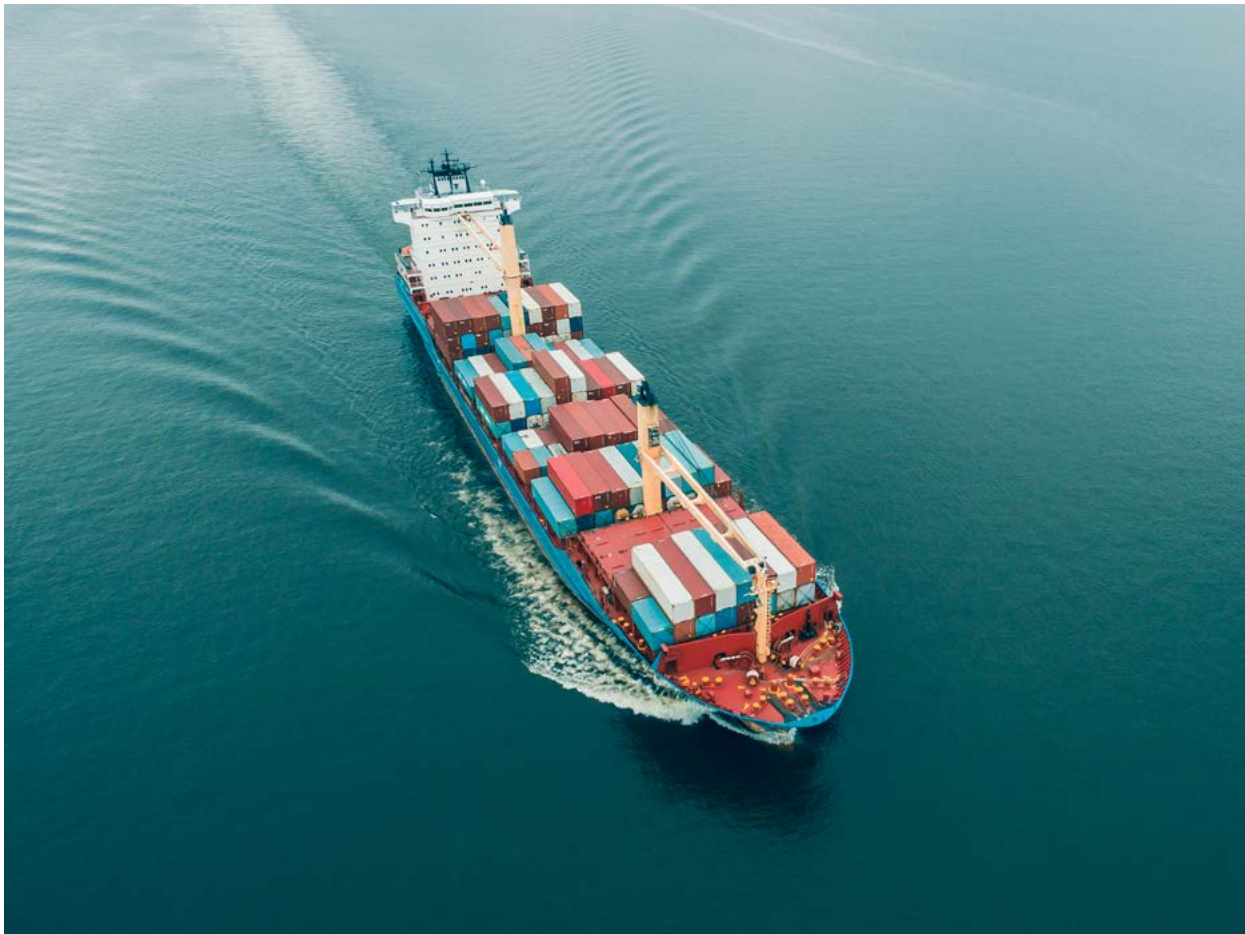


Other Connectivity Technology Considerations

The evolution and implementation of cellular networks, particularly 4G, have become a critical solution for offloading big data tasks prior to active LEO services. Previously, 3G networks were too inconsistent and patchy in their deployments around the world for merchant shipping companies to consider using. The consistency of 4G network services worldwide made the technology valuable for global maritime users, when within range of the coastline. As LEO services have arisen, cellular operators have noted a decline in vessel cellular usage in 2022 and 2023. In Valour Consultancy's latest maritime cellular report, revenues for cellular airtime data packages declined by 17 per cent in 2023 from 2022.

Nonetheless, it is expected that cellular data usage will pick up again as 5G networks are deployed to greater effect in the future, be it in shipping terminals or ports, or within range of the coastline. Also, the growing network of radio link technologies for passenger vessels could be another option.

Each technology typically flows in and out depending on which is the most prevalent, useful, and cost-effective per task.



Conclusion

To reiterate the key points of this piece, yes LEO VSAT services are and will continue to make a huge impact on the maritime sphere as with others, bearing in mind that there are some major differences amongst LEO offerings, but generally still as a complement to other service.

The price of data and also burst bandwidths of services have been a game-changer. But this does not mean that the GEO VSAT era is over. By the end of 2023, there will be more than 48,000 vessels with GEO VSAT systems onboard, excluding government-owned or subsidised, and military vessels. This market will not disappear overnight, as shipping company operators continue to rely on the Quality of Service measures which only GEO VSATs are offering.

Nor do we see traditional mobile satellite services (MSS) going away. For example, there are still more than 40,000 vessels using MSS connectivity services worldwide as of today. Some may consider that L-band is obsolete connectivity, but it continues to present a fundamental and life-saving connectivity solution for seafarers.

Key sea regions around the world will always need capacity. These busy waterways like the Malacca Straits, South China, Sea, Bosphorus, and Gulf of Mexico will source connectivity wherever they can.

Delivering connectivity to provide crew welfare will remain paramount. To do this, a hybrid connectivity system will be vital. Companies such as Inmarsat Maritime, Intelsat, Eutelsat, SES, Iridium, and others will remain a key fulcrum to undertake this.

If you would like to learn more about maritime connectivity, please contact a member of our team [here](#).

Joshua Flood
Senior Research Consultant
Valour Consultancy

ST Engineering iDirect is the leading technology supplier to the maritime markets. Nine out of ten of the top ten maritime service providers rely on our technology. Today we are developing the next generation of advanced mobility for maritime networks.

As the satellite industry becomes more integrated with the broader telecommunications ecosystem, we are working towards platforms and products which can unify service across orbits, constellations and other access technologies such as cellular. These hybrid networks can offer global coverage, accessible via integrated and interoperable terminals. Service orchestration for real-time and onboard decision making coupled with software-defined elements such as the satellite to the modem will create a step change in flexibility.

