



● ● Swedish Coast Guard Kombinationsfartyg KBV 001 Poseidon. Photo courtesy of NSSGlobal

# Meeting the communications needs of a modern navy ● ●

It's a challenging time for meeting the communication needs of a modern navy. With significant changes in capital equipment as new vessels come into service and the growing operational and welfare demands on these platforms, combined with impending financial challenges as many governments deal with the impact of COVID-19 on their defence budgets.

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**Many navies throughout the world have changing** information demands to cater for defence and wider security tasks and are looking at how to best leverage a blend of commercial satcom (COMSAT) and military satcom (MILSAT) services to deliver assured and affordable solutions. Taking the Royal Navy as an example, supporting the F-35 aircraft onboard HMS Queen Elizabeth and HMS Prince of Wales, requires significantly more bandwidth and communications capabilities than previously seen in the Royal Navy. This is unsurprising, given the procurement timelines of both the aircraft and the carrier, but reflects an increasing challenge to defence – that of 'gearing' the timelines for the acquisition of combat platforms with the far quicker upgrade cycles (in both expectation and capability) of information technology and the enabling communications networks.

Closer to home, and relevant more particularly to nations who do not generate carrier task groups and for dealing with migration and border security roles, the Royal Navy's River-class offshore patrol vessels are in great demand for coastal water policing. These coastal operations in some ways present a more complex communications demand, as ships not only have to

communicate with other navy platforms, but other law enforcement agencies both on and offshore and so require a blend of technology such as satcom and mobile phone (LTE) connectivity. For many of the world's navies, coastal patrols and defences are a key objective, and we recently won a contract with the Swedish Coast Guard to deliver Ku-band VSAT solutions to support their mission.

The Royal Navy's game-changing 'Future Commando Force' transformation programme is looking at how the Royal Marines will operate, including tactics, and increased applications of emerging technology. This will change the communications demands between an amphibious force and small groups operating ashore who need to establish satcom quickly, operate drones and exploit artificial intelligence in the deployed environment. These changing concepts and the technology to support them have relevance to many nations amphibious forces and also light land forces where rapid deployment and making greater use of assets is becoming a key focus to deter and counter threats, both in projecting forces abroad and to protect sovereign territory. Many nations have long porous land borders, in addition to coastlines, and communications is key to ensuring that incursions can be seen and dealt with.

The Royal Marines and the wider Royal Navy also retain roles that push forces to NATO's northern flank and within the Arctic Circle, presenting additional communications challenges to the usual deployments able to be well served by the geostationary belt.

Most modern navies operate in coalition, forming task groups of many nations, for example in counter-piracy and regional reassurance roles. This requires shared information across multiple systems to coordinate intelligence, planning and tactical operations. Some of this will be from 'open source' and particularly well suited to COMSAT broadband solutions. There

is also a resurgence in Anti-Submarine Warfare (ASW) with a related airborne and maritime connectivity demand for Intelligence, Surveillance and Reconnaissance (ISR) in national and wider regional terms, for example as the UK brings the P8 Poseidon towards full operational capability. In addition to manned ISR, there is also increased use of unmanned air systems (UAS) which need assured communications to fly in airspace and also to offload critical information in a timely fashion. The size, weight and power (SWAP) challenges in UAS are areas the industry is addressing.

### Changing expectations

Commanders and crew are used to utilising the latest information technology ashore, to consume both entertainment and business information. Service personnel who use instant messaging and video calling, on-demand TV and computer games, increasingly expect to have similar services when deployed.

Crew communications are key for welfare, entertainment, training and education. In fact, a survey by the international maritime charity, the Sailors' Society, also found that reliable connectivity is of fundamental importance for mental wellbeing, operational efficiency and safety at sea, as well as its critical role in attracting new talent. The recent Happiness Index report on the welfare of mariners in the commercial sector, published by The Mission to Seafarers, also found that crew that have good communication with their families are much happier than those who do not. Whilst commercially focused surveys, being at sea for long periods has welfare implications for military personnel.

However, in many cases, these expectations are not met, and this is not always through an operational security constraint for a particular mission or a lack of funding. Currently, many of

the Royal Navy's frigates, destroyers and aircraft carriers have less bandwidth available to them than most domestic consumers enjoy at home or many commercial vessels afford their crews.

With bandwidth upgrades necessary to support new military equipment and meet changing threats, now is the time for navies to consider replacing direct TV at the same time, with internet services and content management solutions to enable managed Wi-Fi for mess decks and cabins, which are now common-place in commercial vessels.

### Choosing the right services and equipment

Maritime platforms need both choice and resilience, often achieved through a variety of communications solutions ranging from GMDSS (Global Maritime Distress) COMSAT on L, C, Ku or Ka-bands and, in many cases, ships have MILSAT on X, Mil Ka or UHF. Whilst ships thus have a mix of operational, tactical and welfare networks, the throughput of these systems can be limited, or they are allocated to specific tasks.

Having more commercial bandwidth alongside military satcom helps both crew and combat missions because, if the right systems are in place, they have the ability to prioritise bandwidth based on the task in hand and the electronic environment. Many navies already leverage COMSAT, and several are now benefitting from the latest commercial services, including for example NSSLGlobal's Cruise Control+ and Crew Unite services. In addition, hybrid solutions are increasingly required, such as the award-winning FusionIP service where one single 60cm dome integrates the best of two worlds; LTE and satellite broadband, allowing ships to automatically switch between 4G/3G and satellite networks to achieve optimum data speeds and cost efficiency.

What's also required to benefit from changes in technology



● ● FusionIP radome on ship. Photo courtesy of NSSLGlobal

more cost-effectively and rapidly is a flexible network infrastructure and antenna mounts, so that systems can be upgraded with ease. This includes both specific Mission Task Equipment (MTE) for certain deployments and future technology to accommodate rising demands. Increasingly in polar regions, naval vessels also need to utilise low Earth orbit (LEO) satellites, using networks such as the Iridium Certus platform providing global L-band coverage and with greater throughput than previous systems.

Of course, how these capabilities are delivered is more than just satcom bandwidth and terminals, and for many commercial customers and most military customers the use of Virtual Private Networks (VPN) for security and also regional hubs for control of data and information often form core parts of requirements, and something NSSLGlobal and other providers are familiar with.

### Looking to the future

In order to meet the future needs of navies, it's going to be necessary to balance the laws of physics with meeting expectations. The further forward you go or the smaller the vessel, the more crucial that size, weight and power becomes. Future navies and commando forces will require assured and affordable services that require the minimum number of terminals, modems, boxes and cables, combined with flexible service plans whilst being able to work on the broadest number of bands and constellations as possible. Multiband terminals are becoming fairly commonplace, but clearly working on multiple orbits presents additional challenges. But for small craft, vehicles and small teams easy to use and small form factor capabilities are key.

### Approach

Many defence organisations are considering how to improve contracting mechanisms in order to deliver innovative new solutions. The challenge for long term programmes is that what people need is often hard to determine, especially if they don't understand what they could have. Some in defence still view satcom as expensive and only for specialist uses. Yet we live in a world where millions of consumers get their broadband from space (at superfast speed), and people on super yachts and commercial vessels can stream video content. These networks

have been delivered by industry, not to meet statements set out in a thick requirements document, but to win business based on analysis of the market and understanding of what consumers need.

Thinking across programmes is also key – and looking at what the front-line command and deployed user needs. Take Intelligence and Surveillance (ISR) for example; it needs sensors on platforms (including the person as a platform in some cases) to collect data, that needs delivered to places and people with the right tools to analyse, add value, layer over other sources (government, allies or open) and get it back to commanders and users. That seems to work on smartphones with apps to navigate cities and find places to eat but presents challenges for defence CIS programme architectures across the deployed and fixed space. It isn't simple - maritime threats from sub-surface and fast boats, the complexity of joint and coalition operations and a complex and lengthy ship acquisition and refit programme, but it means you then see satcom as part of the enabling network woven across much of this and to a deeper level.

My time in uniform, at Viasat and now at NSSLGlobal shows me that leveraging multiple satellites and really understanding user demand and actual usage allows cost effective capability to be delivered – whether this is to super-yachts, oil tankers or Royal Navy vessels. In addition, how adding value services to what may initially be seen as a 'connectivity' problem is actually what customers really need.

Defence solutions are often a combination of hardware, software, government and private sector products and services and thus a more collaborative approach is needed with the industry to ensure more cost-effective improvements can be delivered iteratively in a timely fashion, rather than following more rigid approaches that allow for little adaptability.

Focusing on the end customer, whilst clearly understanding the technology that enables solving his problem, is perhaps the key to looking at these programmes across an end to end architecture which extends to and from space, and across a fixed and mobile infrastructure.

With more flexibility to acquisition approaches and more regular dialogue with industry, navies will be better positioned to shape and exploit industry developments to meet the operational, tactical and welfare expectations and demands of commanders and crew.

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● ● UK Carrier Strike Force QE, Northumberland Dragon. Photo courtesy of NSSLGlobal



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