Today’s Naval Communications Landscape

Delivering secure and cost-effective communications has always been a fundamental requirement for navies, with modern fleets relying heavily on radio and satellite technologies.

Today, digital transformation and increasingly network-centric operations define the military environment, and capable networks for voice and data-transmissions have become even more important - as has the need to reduce the training and support for these systems.

For the interaction of new modern command, control, communication, computer, intelligence, surveillance and reconnaissance systems (C4ISR), today’s systems must not only be operational at any time, they must also be efficient and reliable during intense operational engagements. This means ensuring secure and stable connectivity and providing interoperability between a number of different kinds of platforms in different physical environments, from submarine to surface, land, air and space as well as between joint and coalition forces.

Furthermore, they must be robust enough to deal with a constantly growing amount of data and incorporate new assets such as unmanned vehicles.

Your questions answered

There are many facets to consider when engaging in a naval communications system programme for new platforms, or indeed when upgrading or retrofitting existing platforms. It’s not surprising therefore that we get asked many questions by our customers.

So, we approached our technical experts to see if they would identify the most commonly asked questions and to provide simple and straightforward answers to those questions. This document gives a summary of the answers they gave and covers the following areas:

- Minimising project risk
- Minehunter communication systems
- Minimising upgrade disruption
- Reducing Communication systems crewing and training
- Reducing support and training costs
- Delivering cost effective communications
- New technologies naval communications should be ready for
- The impact of digital transformation

2 Thales UK Naval Communications Systems - Q&As
Q1. How can you minimise project risk in delivering a new Naval Communications System?

A. A key way to minimise risk in a highly technical area such as maritime communications is by working with a partner with whom you can collaborate, and with whom you have an open and honest relationship. No project is delivered successfully without strong collaboration between all stakeholders – the users, the procurer, the supplier and the entire supply chain.

Time and time again experience shows us that when there is trust between stakeholders and everyone is pulling in the same direction, any emerging challenge can be overcome far more easily.

A partner with a proven track record over a significant time period, who has already faced challenges in both new builds and retrofit platforms and has the solutions to the challenges of the future, is key to minimising risk.

In essence, what is required is a partner who knows what is needed by the customer, how to engage, and how to successfully deliver and support a system throughout its in-service life.

Q2. What is so special about a minehunter communication system?

A. When it comes to smaller vessels such as Minehunters, limited space is a major challenge. A minehunter still needs much of the same types of communications equipment required on a larger vessel, but space is really, really precious.

Another challenge is achieving a low magnetic signature - a key requirement for minehunters. Care needs to be taken as to what equipment is selected, and how it is installed, as it is likely that bespoke modifications will need to be made.

The third challenge is the environment. A warship is a harsh environment for electronics, and sometimes this is more demanding on smaller ships, particularly minehunters. This applies not just to mechanical requirements like shock and vibration, but also electromagnetic compatibility: a non-metallic ship provides no significant shielding from powerful transmitters and sensitive receivers. Hence minehunter equipment must meet more stringent requirements.

Lastly, smaller vessels have fewer crew. A communications system that is easy to use may remove the need for specialists and relieve pressures on crew sizing.

Q3. How can I minimise disruption to ship availability when upgrading its communications?

A. Any naval platform can have an in-service life of up to 40 years, during which time its sensors, effectors and systems will need to be upgraded to the latest technology possibly several times. Communication systems by their very nature are extremely pervasive across any platform, spanning the majority of compartments with many kilometres of cabling.

The key challenge is to fit the latest technology with minimal disruption to the platform, both physically on the vessel and with regards to its operational availability.

It is good practice to re-use the legacy infrastructure wherever possible to significantly reduce or even remove the need for re-cabling throughout the platform, as well as using an installation solution that recognises the space, weight and power constraints imposed by the legacy system.

A partner should be selected based on the level of their knowledge and experience of all types of interfacing, systems and equipment - essential in order to design and fully validate a de-risked solution prior to its installation.

Another consideration is installing an upgrade within the fleet time support period. This will significantly minimise the disruption to the operational availability of the platform. This approach becomes easier if your partner has an on-site team of waterfront engineers who can access the platforms at the drop of a hat.

To minimise risk, a phased approach to upgrading should be considered, maintaining the availability of the on-board system by focusing on the most critical obsolescence and ensuring that the new equipment fully interoperates with the legacy equipment.

A new generation communication system can significantly enhance a vessel’s capability. Choosing a partner for your upgrade who can minimise disruption and has the experience to provide a solution that maximises your operational availability, should be a priority.
Q4. How can navies reduce communications crewing and training?

A. Modern technology’s ability to automate tasks often reduces complexity and burden for operators. Naval communication systems are no different.

In the past, it could take years for an operator to acquire the skills master a communications system, ensuring that once a communication channel was established, it could be maintained and kept stable.

However, with radio equipment and HF in particular, the last few years have seen significant advancements that have made life easier for the operator. The overall training burden has become easier, and the number of crew required to operate a system has reduced.

Some of these key technologies include 3G ALE (Automatic Link Establishment), which automatically adjusts the radio equipment depending on the environment – ensuring the link remains stable. Automatic Repeat Requests (or ARQs) then ensure that once the link is established, any message is received in full by the receiving party.

In addition to this, the multi-crew task has now been reduced to a single man operation, where the user can interface with a configuration and management system often located centrally in the ship and can maintain and operate all the equipment from a single point.

Q5. How can navies reduce communication systems support and training costs?

A. The core components of any naval communication system are the elements that allow the crew to talk to each other and to operate the equipment around them.

Large variances across the fleet have traditionally increased the training burden and therefore reduced the ability to flexibly manage crew members between differing platforms.

Today, with a new generation of sailors being recruited and trained, navies are recognising the requirement for equipment to have an intuitive interface that can be instinctively operated by those who are familiar with smart phones and tablet technology.

Scalability is equally vital to these systems, allowing the same system to be fitted on any size of platform from an aircraft carrier to a minehunter. As a by-product this reduces the training burden, but also reduces the cost of spares through a reduction of holding and of logistics required to manage the spares pool.

Q6. What does a cost effective communications system look like?

A. The most cost-effective communication system isn’t necessarily the one with the lowest purchase price.

The whole-life cost of a system must be considered along with factors such as installation, training and the cost of replacement. The cost of disposal of the incumbent system should also be allowed for, even if it is many years after the original purchase.

By selecting suppliers already in use, a purchaser can benefit from several key advantages such as a reduction in overall training burden, and a reduction in the spares holding as a result of the commonality of hardware across platforms.

In addition, using a known supplier greatly reduces the risk of the programme where that supplier is already familiar with the key requirements. This often leads to a reduction in Non-Recurring Effort (NRE) and once high enough, volumes can lead to lower initial cost.

Of course, there will be occasions when a change in supplier is required in order to achieve a new capability. Taking the above factors into account can help you evaluate whether a switch is cost effective.
Q7. What new technologies should my new naval communications be ready for?

A. Current naval communication and information systems are often a collection of standalone, air-gapped systems and networks - which can make some tasks more straightforward. However, it can also mean there are limitations, in terms of flexibility, adaptability and maintenance.

If possible, one common goal is to converge networks onto a single IP network. However, a consequence of convergence is that it can create serious cybersecurity challenges in ensuring that the integrity and availability of the system and the confidentiality of the information is not compromised.

Away from networks and infrastructure, there are also new waveform technologies such as wideband HF using new standards like HF XL, which provide increased bandwidth without making unattainable radio spectrum demands. This can be exploited to enhance resilience alongside satellite communication and other new bearer technologies such as high capacity line of site and 5G satellite links.

Q8. How does digital transformation affect my communications system?

A. Today, we have far better computing power and connectivity than at any time in our past. However, if we just use it to make things a bit faster, a bit smaller, to improve graphics and to be more efficient, then that is just modernisation. It is not transformation.

Firstly, transformation is about the information itself; bringing together multiple, disparate information stacks together into a single information environment. Achieving this is a key enabler to the likes of AI, big data, Internet of Things (IoT), and cloud-native products and concepts. Through this digital transformation, 'Information Advantage' can be gained by increasing the interconnection between sensors and systems. This enables large pools of data to be gathered, creating a Single Information Environment to which Artificial Intelligence, Machine Learning and other cloud assets can be applied to accelerate decision making. And not just within the Naval domain: dynamic information exploitation shared with Land, Air and Space is made possible, enabling true Multi Domain Integration.

Secondly, transformation is about information security. How can you trust the information and how do you protect your IT and OT (Operational Technology) systems?

Thirdly it’s about connectivity. Seamlessly selecting the right bearer, equipment and technology; but also reducing the burden on the end users to let them do their jobs more efficiently and effectively.

To find out more about Thales Naval Communications and Information systems capabilities, click here.