

Rapid developments in information and communications technology have already transformed how shipping companies collect, process and use data. But the real digital revolution is yet to come.

Embracing the digital world



Gabriele Manno

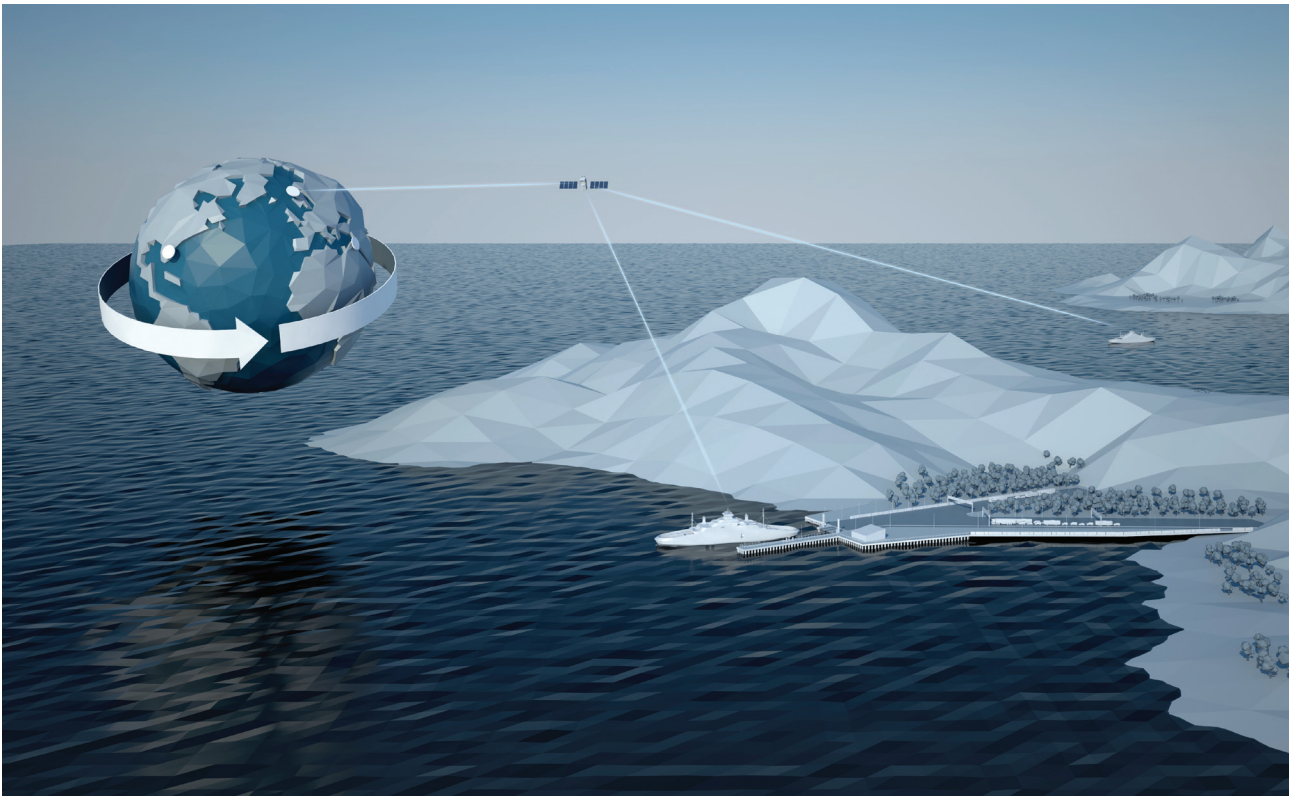
Today, we live in a world that is continuously becoming more data-driven and automated, where physical systems and people are increasingly connected and mirrored into a virtual space. Key developments in Information and Communication Technology (ICT) include sensor technologies, improved ship-shore connectivity, advanced software tools and algorithms, increased computing power and faster processing times. ICT has also enabled more far-reaching concepts (e.g. Big Data, the Internet of Things, Cloud Computing, etc.) that will provide the shipping industry with new ways to collect, sort, store and utilise valuable data.

According to DNV GL's Gabriele Manno, Digital Innovation Manager, Digital Solutions and Innovation, DNV GL Maritime, these new technologies will have far reaching consequences for

shipping. "No one is sure exactly how fast all of these technologies will mature or how they will be applied to the maritime environment," he says. "But we can say that change is inevitable."

Smart maintenance

Manno says that there are already a number of suppliers, including ABB, which have developed land-based stations to provide remote monitoring of on board systems. At present, these shore-based monitoring stations are utilised to collect data on specific systems and support on board personnel on predictive maintenance and diagnostics. In time, manufacturers, system integrators and related service providers will be able to support owners with information in real time about the conditions on board, providing specific guidance to maintenance



crews via virtual-space software and hardware.

“Developments in ICT are enabling owners to move from the existing scheduled maintenance approach, a process often driven by supplier recommendations, to condition-based maintenance, a process driven by the actual condition of on board components and systems,” he says. “This significantly reduces costs related to maintenance and more importantly, improves safety performance. Crew access to real time data and shore-based support will improve situational awareness and reduce operational risk.”

Leveraging big data

Improved connectivity and sensor technology is also providing owners access to more data, which can be analysed and shared with other

stakeholders. By combining data streams from multiple sources, the sheer volume of information available will enable the industry to make more informed decisions, faster, leading to more efficient and responsive organisations. The network of connected physical objects able to collect and exchange data, known as the Internet of Things (IoT), is growing, encompassing buildings, products, even clothing. In time, these databases will be accessible through vast information management systems, which, combined with fast computing and advanced software via distributed networks, will help owners integrate more closely with suppliers.

Shipping in the cloud

Manno points to a number of developments in this area now taking place on

land. “We are seeing how many land based industries are developing and utilising connected, cloud-based data services to optimise efficiencies in everything from factory operations to maintenance, supply chain networks to purchasing,” he says. “By some estimates, about fifty billion devices will be connected by 2020, sending terabytes of data about every aspect of operational efficiency to computers to be analysed.”

Companies developing the tools to manage all this information are springing up all over the world. For example, PTC, a US-based software company, has developed a number of IoT services to collect and capitalise on the information now being generated by customers, suppliers and products themselves. One service developed by PTC, called ThingWorx, is the world’s

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first open platform to build and run applications for the connected world.

Another example is the industrial cloud Platform-as-a-Service (PaaS) that helps collect and analyse data. “It’s an open platform, a bit like Apple’s the App Store, a market where developers can create and monetize innovative new industrial apps,” says Manno. “At present, most available services cater to land based industries, but we expect developers to produce apps to meet the specific needs of the shipping industry as well.”

Sharing data

While shipping is often criticized for being slow to adapt to new technologies, today’s tough markets are a good incentive to innovate to gain a

competitive advantage. Besides, in an increasingly connected world, the shipping industry can no longer afford to act independently – increased public scrutiny of the industry has resulted in more attention from government agencies, seeking to improve safety and environmental performance.

For example, the MonaLisa 2.0 Project, developed by the Swedish Maritime Administration in cooperation with the EU, is a sea traffic management system designed to provide vessels with the ability to see each other’s planned routes, (helping navigators to avoid congestion in areas with high traffic), steer clear of environmentally sensitive areas, and share maritime safety information. The information exchange between vessel

and ports will also improve planning and performance regarding arrivals, departures and turnaround times.

The unmanned vessel

Looking ahead, perhaps the greatest potential impact connectivity will have on shipping will be to dramatically reduce – and perhaps eliminate – crewing on merchant vessels. “As sensor and software technologies and connectivity become more robust, remotely operated vessels, or even unmanned vessels, could become a reality,” he says. “We are also likely to see many of the traditional activities performed on board shifted to shore-based centres, which will be responsible for vessel condition monitoring, control and logistics.”



Weighing the risks

Manno acknowledges that (like self driving cars or pilotless commercial aircraft), unmanned vessels remain controversial, but notes that the benefits may well outweigh the potential risks. “By some estimates, 90 per cent of maritime accidents are due to human error,” he says. “By removing the human element, owners can eliminate on board safety risk and significantly reduce potential damage to the vessel, cargo and the environment.” Manno adds that removing the human element will also lower construction and operational costs.

To see how this innovation might look, DNV GL developed a fully functional, scaled down 1/20 model of a remote controlled, battery operated short-sea concept vessel. Known as

the ReVolt, this unmanned concept vessel was designed to be a cost-effective transportation alternative to alleviate The EU’s highly congested road network. “While some technologies need to mature before the concept is commercially viable, the ReVolt proves the concept,” says Manno.

A brave new world

For Manno, the shift towards a more connected, data driven shipping industry may take time, but is inevitable. “For companies today seeking to lower maintenance costs, reduce component failures and get just-in-time access to parts, embracing connectivity is a no-brainer,” he says. “The challenges are that many owners don’t yet have the competence to manage such

complex systems. Furthermore, the absence of industry standards and concerns about security has lead to a kind of organisational inertia.”

Manno points out that shipping has been more or less unchanged since it transitioned from coal fired engines to oil in the 1920s. “Shipping is by nature traditional and conservative, but once owners understand the benefits of these new technologies, shifting to a new, more connected and data driven business model will be irresistible,” he says. “As for the vessel operator of the future, they will know more about software, predictive algorithms and virtual reality than engine parts or piping. And the best part is, they will be able to go home to their families at night!”