Rolls-Royce and Intel have announced a new agreement that will see the companies work together on the further development of autonomous vessel systems, collaborating on designs for intelligent shipping technologies to make commercial shipping safer.

The partnership will leverage Rolls-Royce’s expertise in the shipping sector and Intel’s components and systems engineering capabilities to design new smart, connected and data-centric systems for shipowners, operators, cargo owners and ports, with a focus on safety.

The companies said that their new shipping intelligence systems will have data centre and artificial intelligence capabilities, as well as integrating edge computing to independently manage navigation, obstacle detection and communications.

“We’re delighted to sign this agreement with Intel, and look forward to working together on developing exciting new technologies and products, which will play a big part in enabling the safe operation of autonomous ships,” said Kevin Daffey, Rolls-Royce, director, engineering & technology and ship intelligence.

“This collaboration can help us to support ship owners in the automation of their navigation and operations, reducing the opportunity for human error and allowing crews to focus on more valuable tasks.”

“Simply said, this project would not be possible without the leading-edge technology Intel brings to the table. Together, we’ll blend the best of the best, Intel and Rolls-Royce, to change the world of shipping.”

Hardware
The systems developed will include Intel’s Field Programmable Gate Array (FPGA) technology, to provide a platform for edge operations such as obstacle detection and navigation, as well as Intel Xeon Scalable Processors optimised for High Performance Computing (HPC) to manage complex modelling of ship functions and support learning models for fully autonomous operations.

Rolls-Royce’s Intelligent Awareness System (IA) uses AI-powered sensor fusion and manages decision-making by processing data from lidar, radar, thermal cameras, HD cameras, satellite data and weather forecasts. That data collected by the vessels will be stored using Intel 3D NAND SSDs, acting as a ‘black box’ and securing the information for training and analysis once the ship is docked.

Even compressed, Rolls-Royce notes that the data captured by each vessel can reach up to 1TB per day, or 30TB to 40TB over a month-long voyage, making data storage a critical aspect of the system.

Rolls-Royce is driving development of autonomous ships, incorporating Intel technologies
Digital data sharing in maritime transport chains

Driving efficiency in the global supply chain depends on our ability to efficiently and effectively share data among stakeholders, and maritime needs to do better in embracing these concepts – particularly at the point where vessels and ports interact to move cargo from sea to land, writes Mikael Lind, PortCDM

Since the beginning of civilisation, maritime transport for the exchange of goods has been the backbone of economic prosperity. According to UNCTAD, over 80 per cent of the world’s trade is transported by sea, which is, by far, the most cost-effective way to move raw materials and finished goods around the world. Shipping is the engine of the global economy. While there have been significant improvements in efficiency, reliability and timeliness in the transport chain for goods shipped by land or by air, shipment by sea has not seen comparable advances in terms of integration and overall automation.

In air and land transport, there are effective complementary digital information chains, where all relevant data is shared. However, the maritime supply chain does not yet have an integrated digital information chain supporting the physical supply chain. Reduced turnaround times for carriers is just one of the potential advantages of improved data exchange between ports and vessel operators.

In air or land transportation of goods, it is now common for both the consignor and the consignee to be able to track goods throughout the transport chain. In this way, involved actors can get data regarding progress and expected time of delivery. It is then possible for them to introduce adjustments in the supply chain, if needed.

However, for goods moving on ships and through ports, there is much less precision, reliability and flexibility in delivery. Typically, many actors remain in the dark for far too long when it comes to the expected timing of future events. Many factors cause this unfortunate situation. However, fundamentally the reason is that the various actors in the maritime transportation chain are often unaware of the intentions of, the progress of, or any revisions or delays to events upon which others in the transport chain depend.

This makes planning and the accurate timing of activities difficult. Inevitably, this leads to delays, inefficient use of resources and consequently a loss of economic benefits for all those involved.

To overcome this, it is paramount that all the actors involved share their related intentions proactively in real-time to facilitate seamless interactions. This now takes place regularly in the non-maritime transport domains.

We acknowledge that it is often easier in those domains because most of the air and land transport chains are managed or influenced by one dominant participant. However, there is no reason why it should not be possible in the maritime transport domain too.

In the maritime transportation chain there are a significant number of different, independent actors. Typically, each of these only shares intentions and similar related data when it advances their self-interest. They wish to preserve what is seen by them as a competitive edge.

However, this only results in local optimisation at best, and a notably sub-optimal result for the full maritime transportation chain. A chain of events that data-sharing is mutually beneficial remains a significant hurdle to overcome.

Given its long history and experience with traditional procedures, it is not surprising that each actor prefers to optimise their situation and is reluctant to embark upon full disclosure. In our opinion, the time has come to eradicate silo-thinking practices. This can be achieved through data sharing and transparency.

The rewards will be substantial for the overall maritime transport chain. If maritime transport chains can realise this vision it will be vastly more efficient and competitive.

Transparent maritime transport

Advancement towards a digitally-based data-sharing environment in the maritime transport chain is progressing. The IMO has formulated its vision for a digital information environment for shipping, known as e-Navigation. This is now being taken up by an ever-increasing number of maritime States and regions.

The EU in particular has been active through various initiatives, including the Sea Traffic Management (STM) Validation Project. The aim of the STM initiative is to improve the full maritime transport chain by making digital real-time data available to all interested and authorised actors.

In support of the IMO vision for e-Navigation, the Port Collaborative Decision Making (PortCDM) concept has been developed as part of the STM project.

It is inspired by similar concepts in place in the aviation sector, where very significant improvements in efficiency and in economic benefits have been achieved. As a result, the adoption of PortCDM principles are now also being considered in the rail transport system.

PortCDM is an organisational concept. It is primarily aimed at enabling more predictable timings and operations in sea transport by building upon unified and standardised data exchange protocols among all involved actors.

PortCDM addresses the need to ensure the continuous flow of data about intentions, outcomes, and possible disruptions related to movements and service provision among all those involved in the berth-to-berth maritime transport process so as to gain a high degree of predictability in the planning and execution of all associated operations and activities.

An important driver for the optimisation of port calls is that relevant data is shared in advance. This enables better planning of berth occupation, availability of equipment, labour resources, as well as stowage planning and the subsequent distribution and delivery arrangements for goods.

PortCDM enables all the actors involved to share the same situational awareness based on input from multiple sources of up-to-date spatial-temporal data. This availability of a holistic view enables and fosters collaboration. In turn, this enables efficient and successful coordination and synchronisation, which benefits everyone, not least the end customer or recipient of the goods being transported.

Improving efficiency

The key to new levels of efficiency is to ensure that all the actors in the transport chain, from consignor to consignee, can share and access relevant data, thereby enabling:

• Enhanced predictability of operations related to a port call, based on situational awareness derived from the plans and progress of the actors involved.

• Reduced turnaround and waiting times for cargoes (vessels, trains, trucks, etc).

• Just-in-time operations both for carriers and service providers.

• Third-party development of new digital information services based on blending various digital data streams, for example to facilitate ‘green’ routing by merging vessel route and port call plans.

PortCDM builds upon real-time digital data sharing among collaborating actors, coupled with clear principles of access management and security. To expand the planning horizon for port call operations, digital collaboration is encouraged between ship-to-port, port-to-port, and port-to hinterland. Port-to-port collaboration is particularly important in shortsea-shipping because it is often too late to react to a vessel’s changed voyage plan if it is already close to arriving.

The PortCDM standard shows substantial savings from ‘green’ steaming, route optimisation, and faster turnaround times. For port call operators, an initial limited study suggests potential annual savings could be between US$67 and $12 billion, but more extensive research across a variety of ports and operations is necessary to refine this estimate.

Nevertheless, it indicates that there is a clear incentive for port call and maritime actors to enhance their capabilities of coordination and synchronisation using digital data streams. The benefits of PortCDM improve all commercial shipping traffic, including passenger and cruise ship operations.

Reaping the full potential of PortCDM requires standardisation at the global level. Currently, there are three important components that are supporting these global ambitions.

The first is a universal digital data exchange standard (S-100). This standard governs the intentions and outcomes of movements and services, that is being developed by the International Association of Aids to Navigation and Lighthouse Authorities. PortCDM encompasses all commercial shipping traffic, including passenger and cruise ship operations.

The second important global element is the fact that an international PortCDM Council has been established, providing guidelines for the global governance of PortCDM implemented at regional and local levels.

The third component is the universal framework for PortCDM maturity levels and common decisions on how to measure the success and impact of PortCDM, which has now been developed. This is particularly helpful for ports in deciding their strategy for becoming PortCDM compliant.

PortCDM enables shipping lines to make more efficient port visits. By enhancing coordination with ports, PortCDM allows maritime transport to be an integrated element of door-to-door transportation. In doing so, it enhances process completeness in the maritime transport ecosystem.

About the Author
Mikael Lind is an associate professor at the Research Institutes of Sweden (RISE), and the project leader for PortCDM. This article has been adopted from a piece originally published in the UNCTAD Transport and Trade Facilitation newsletter – to access that article, which contains links to various PortCDM resources, please visit https://bit.ly/2RUvyre

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**Wärtsilä to outfit UK’s largest marine simulation centre**

Wärtsilä reports that it has agreed a deal to provide a package of marine simulators for a new training facility at Solent University’s Warsash School of Maritime Science and Engineering, located in Southampton, UK.

Scheduled to complete in spring 2019, Wärtsilä says this will be the largest marine simulation training centre in the UK, and will be subject to a five-year continuous service agreement.

“We are extremely proud to have been selected to provide the simulations for this very important training facility,” said Joonas Makkonen, vice president, voyage solutions, Wärtsilä Marine Solutions.

“The quality and flexibility of our solutions are the highest on the market, and have been developed to deliver the most realistic and valuable training possible for the marine officers of the future. The digital technology used aligns very closely with Wärtsilä’s Smart Marine initiatives, whereby high levels of digitisation and connectivity are employed to deliver even greater efficiencies.”

**STM project adds Tallinn as sixth shore test centre**

The STM (Sea Traffic Management) Validation project is taking a sixth shore centre to its European testing network, with Tallinn VTS joining the project as the first shore centre to come onboard outside of the initial five-strong EU-funded group.

“We wanted to join Sea Traffic Management (STM) as soon as possible. The prerequisite for ensuring vessel traffic safety and providing vessel traffic services is to know vessels’ intentions and their exact sailing plans, and this is what the STM route and data exchange services do,” said Are Piel, head of VTS department, Estonian Maritime Administration.

“If we can predict possible conflicts between vessels early enough, it is much easier to rearrange traffic safely and smoothly.”

“It also allows providing more accurate time of arrival to thus implement a just in time concept, which reduces sailing expenses. For the implementation of unmanned vessels in future, STM-enabled systems is a must to have to provide grounds for smooth and safe vessel traffic.”

Wärtsilä has installed a standalone system for STM functions in Tallinn, with screens displaying the STM-enabled data located in the VTS centre to provide an overview of the traffic situation to all operators on the shift.

“There are three major landmarks in the history of VTS,” said Anders Johannesson, Swedish Maritime Administration, and coordinator of the validation of VTS services for the STM Validation project.

“Radar is telling us that something is coming, AIS is telling us who is coming, and STM will tell us the intentions of the ships coming towards us, which will take VTS to a totally new level.”

The five shore centres that have already been involved in the STM testing phase are Gothenburg, Sweden; the Danish national surveillance centre; the VTSs in Hirtø and Kvitsoy, Norway; and VTS Tarifa in Spain, overlooking traffic in the Strait of Gibraltar. Saab, Navico, Kongsberg and Wärtsilä are the four suppliers of STM-enabled systems.

**UK invests £1 million in autonomous shipping**

The UK’s Maritime & Coastguard Agency (MCA) and Department for Transport (DfT), in collaboration with the Natural Oceanography Centre’s (NOC) Marine Robotics Innovation Centre, have successfully secured £1 million to fund research and development into autonomous and ‘smart’ shipping.

The funding, awarded by the UK Government’s Department for Business, Energy and Industrial Strategy’s Regulators’ Pioneer Fund, will be used to create a Maritime Autonomy Regulation Lab, where regulators from the MCA and DfT can work with academia and support industries to promote on-water testing and flagship projects, with the aim of helping the UK to grow its presence in the sector.

“Emerging technology will help the UK’s maritime sector evolve to be more efficient, safer and greener,” said UK Shipping Minister, Nusrat Ghani.

“Technology and innovation is a key part of Maritime 2050, which will set a vision for how our maritime sector will grow and ensure we are ready to maximise its potential. This £1 million funding will support us to work alongside industry and researchers to ensure our approach to the regulation of autonomous shipping is informed and aligned with developments in technology.”

**Hapag-Lloyd agrees navigation data management deal**

Hapag-Lloyd has appointed Poseidon Navigation Services as the supplier of all chart management services for the fleet managed by Hapag-Lloyd Hamburg, as part of a deal that includes Poseidon’s Challenger software platform to manage weekly updates for all Admiralty products, both paper and digital.

The system provides updates for Admiralty Paper Charts and Publications, AVCs, ADP and e-NP digital products, allowing the user to more effectively manage onboard holdings, and receives updates either by a direct web sync or via a weekly e-mail of required files.

“Using our Challenger software platform ensures that all vessels remain compliant at all times,” said Thomas Gunn, managing director at Poseidon Navigation Services.

“After in-depth discussions with Hapag-Lloyd, we were able to demonstrate the many benefits of our Challenger software and to be able to provide a bespoke digital solution for all their fleet of vessels.”

“Both myself and all the team at Poseidon Navigation Services are delighted to be working alongside the involved parties at Hapag-Lloyd.”

Challenger has already been approved for use by all major authorities, including the UK Maritime & Coastguard Agency (MCA) and the UK Hydrographic Office, and flags including Germany, Panama, Marshall Islands, Singapore and the Isle of Man.

**ChartCo to integrate MeteoGroup weather data**

ChartCo reports that it has agreed a new partnership with MeteoGroup to deliver its weather, route and passage planning, environmental compliance and navigation data, functionality which will be supplemented with MeteoGroup’s services to minimise fuel consumption and emissions by calculating and recalculating optimum routes, and anticipating oncoming weather and sea conditions.

MeteoGroup offers a custom software development kit (SDK) based on its SPOS (Ship Performance Optimisation System) product, which will be used to connect to the OneOcean platform. ChartCo will also offer further MeteoGroup services to its customers under the terms of the agreement.

“Our quest was to build a flexible, cost-effective, integrated weather offering suitable for a wide range of vessels,” said Martin Taylor, CEO of ChartCo.

“I still find it incredible that the majority of vessels only have access to the very basic weather warnings from their Navtex system. This partnership supports our commitment to support the shipping industry with reliable, up-to-date services to a wide range of sectors within commercial shipping. We are really excited to now be able to offer our shipping and offshore customers the best, and safest, weather services within our solutions.”

“MeteoGroup has shown deep domain knowledge and technical competence while developing a specific solution for our ChartCo OneOcean platform. Their well-executed, agile work process, governance and planning has resulted in an excellent synergy with our products. Our MeteoGroup-powered solution provides a consolidated service that takes more weather feeds, more often, than any other provider, including data from the ECMWF, the UK Met Office and NOAA’s NCEP.”