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# Harbours review

## Legal & Risk

Maritime cyber security, the 0.5% sulphur cap, handling dangerous goods, free trade vs. protectionism

## Logistics

Robotics and the IoT, the New Silk Road, blue economy, sustainable shipping, offshore wind energy, Top 25 container carriers

## technology

Unmanned shipping, truck platooning, big data, intelligent cargo, next-gen simulation models



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Photo: www.pexels.com



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## dear readers,

**W**e are proudly presenting this year's first printed edition of the *Harbours Review*. It is no coincidence that we've released it for Munich's transport logistic, the industry's biggest trade fair, where all our good friends as well as people we'll meet for the first time (hopefully not last) draw together in one place across several hundred metres-long passages for almost a full week of doing business, and of course for mingling, too (in this sector these two go hand-in hand). As such, you're more than welcome to catch our team at Stand 128 in Hall B3.

When thinking about what to put in this issue, we thought how to best combine present day developments with what lies ahead of us, but what's already today more or less tangible. As a consequence, we've gathered a bunch of really, really, really neat articles from top-notch authors under three banners – Legal & risk, Logistics, as well as Technology. The set comprises texts on maritime cyber security, the 0.5% sulphur cap, perils of handling dangerous goods, protectionism vs. free trade, robotics and automation (incl. unmanned ships and truck platooning), the Internet of Things, big data, what stands behind the "intelligent cargo" term, next-gen simulation models, as well as the Chinese One Belt One Road initiative, blue economy, sustainability in shipping, how can ports both benefit from and help to develop the offshore wind energy sector, and last but not least – what are the toughest nuts to crack for the Top 25 container liners. The articles part is supplemented with news and statistics, covering European ports north-south and east-west.

We wish you a pleasant reading, and please stay tuned, as the second printed edition of the *Harbours Review* will pop up later this fall.

**przemysław myszkowski and maciej kniter**

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# red-hot port matters

Photo: www.pexels.com

## Viking Grace to be fitted with a rotor sail

Viking Line and Norsepower have signed an agreement foreseeing the installation of the latter's Rotor Sail Solution of the former's dual-fuel (LNG) cruise ferry *Viking Grace*. One mid-sized rotor sail (24.0 m high, having 4.0 m in diameter) will be fitted onto the ship during 2018's Q2. According to the companies, thanks to the new equipment, *Viking Grace* will burn less fuel (approx. 300 tn of LNG/year), hence reduce its carbon emissions by some 900 tn/year. The Rotor Sail Solution (which according to Norsepower can be installed on new vessels or retrofitted on existing ships without off-hire costs) is a modernised version of the Flettner rotor, a spinning cylinder that uses the Magnus effect to harness wind power to propel a ship. The solution is fully automated and senses whenever the wind is strong enough to deliver fuel savings, at which point the rotors start automatically – optimising crew time and resource. "As an

organisation that strives to ensure that our fleet operates in an environmentally-friendly and economical way, we are proud to be partnering with Norsepower. Our cruise vessel is the first to use a combination of alternative clean fuels, modern Rotor Sails, electric propulsion, and a hydrodynamically optimised hull. We believe in the Rotor Sail Solution technology's ability to enhance our ship's performance by enabling significant reductions in fuel burn and costs, as well as carbon emissions," Ulf Hagström, Senior Vice President, Marine Operations & Newbuildings, Viking Line, said. Tuomas Riski, Norsepower's CEO, added: "This project marks the first of its kind modern auxiliary wind propulsion technology installation on-board a cruise ferry. As a Finnish-based clean technology and engineering company, we are proud to be partnering with yet another prominent shipping company as we work towards a modern era of auxiliary wind propulsion for the global maritime fleet, while supporting shipping's transition to the low carbon economy." Last year, Norsepower Rotor Sail Solution won the 2016 Innovation of the Year award at the Electric and Hybrid Marine World Expo in Amsterdam. In 2015, *Viking Grace* was also equipped with Climeon's waste heat recovery system that converts hot water into electricity, giving in return 200 tn of fuel savings per year.



Photo: Norsepower

## Bergen to invest in digitization

The Norwegian Port of Bergen has received NOK 1.7 mln (EUR approx. 191 thou.) from the State Coastal Authority for a new time savings cargo data information system. The project, worth in total NOK 4.0 mln (EUR 450 thou.), aims at time rationalization thanks to a shift from manual incoming cargo registration, to a digital system, which will reduce the number of errors.



Photo: Wikimedia Commons



Photo: Liebherr

## Liebherr to crane-supply Orion

The company will deliver a heavy-lift crane of 3.0 thou. tn lifting capacity and 170 m of height. In excess to a windfarm installation and platform decommissioning vessel ordered by DEME from COSCO (QiDong) Offshore, a subsidiary of COSCO Shipping Heavy Industry. "It is a great honour to work with both DEME and COSCO on such a revolutionary project, and fits well into our company strategy. We see a promising future in the heavy-lift sector, with growth in both the green energy sector and also offshore decommissioning," Gordon Clark, Sales Director at Liebherr Offshore Cranes, said. The delivery is planned for Spring 2019. Apart from the main crane, the order also includes two of Liebherr's RL-K 4200 knuckle boom cranes and an offshore crane simulator.

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Krakowski biznesfor  
a, oba niekomfortowe:  
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do siedziby BNP Paribas.  
o korytarzy, ale  
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## Liebherr grows in Italy

Last year, Liebherr Maritime Cranes delivered in total 17 various pieces of cargo handling equipment to Italian ports. In detail, Liebherr's Italian 2016 portfolio includes nine mobile harbour cranes, four reachstackers, three rail mounted gantry cranes, and one ship-to-shore (STS) container crane. In this respect, a LHM 550 was handed over to Compagnia Portuale based in Monfalcone. Two more cranes of the same type went to the Port of Brindisi, Peyrani could celebrate the handover for two machines at the Port of Taranto. The Bari-based terminal operator Istop Spamat S.r.l. opted for a new multipurpose mobile harbour crane LHM 550, LHM 400 from the secondary market, and two Liebherr Reachstackers LRS 545. "We are extremely satisfied with the quality and performance of our new Liebherr products. The on-time delivery and the very professional training for our staff again underlines that Liebherr is the right partner for us," Vito Totorizzo, Captain and Owner of Istop Spamat, commented. In addition, the Port of Ravenna modernised and expanded its container handling fleet. The customer – Terminal Container Ravenna S.P.A. (TCR) received one new Liebherr Reachstacker LRS 545 and three rail mounted gantry cranes. Romano Magnani, Technical Safety & Security Manager at TCR said: "Like all new products, the specifications provide for the latest available technology, with many advanced features even compared to our 2014 model. Naturally, the new crane comes with the excellent environmentally-friendly enhancements, fit for a 21<sup>st</sup> century industry, something that was high up on the list of priorities during the selection process." Terminal Container Ravenna placed an additional order for a Liebherr STS. Having personally signed the contract, Milena Fico, Director and General Manager of TCR added: "The market is very positive about TCR's customized approach to personal service and flexibility and the new investment both in yard and STS crane equipment can only enhance this further for the longer-term. We are really satisfied; as Liebherr has proven to be a reliable and cutting edge supplier able to give fast and efficient responses." Finally, TCR's operator Sapir Group S.p.A., which has been in the business since 1957, took delivery of an LHM 600. This new machine will support the already existing mobile harbour crane fleet of one LHM 550 and three LHM 400. Another reachstacker will start its operations in the Port of Salerno for the company Amoruso S.P.A. Pieter Vuylsteke, Sales Manager for the European market is delighted about the most recent entries into Liebherr's order book: "The recent boost in LHM crane orders is probably the most impressive testimonial of our continuous market penetration via our regional sales office in Ravenna. With this number of deliveries, 2016 definitely is a benchmark for our future sales ambitions in Italy."



Photo: Liebherr

## GPH takes stakes in three Italian ports

Turkey-based Global Port Holding (GPH) has acquired shares in companies managing the cruise ports of Cagliari (Sardinia), Catania (Sicily) and Ravenna (Emilia-Romagna). The harbours were previously owned by Royal Caribbean Cruises (RCC), Aloschi & Bassani, and Bassani Ravenna. However, RCC will retain a minority stake in all three companies, and the ports of Cagliari, Catania, as well as Ravenna will remain part of the company's cruise itineraries. The 2004-founded GPH, advised during the purchasing process by the International law firm Watson Farley & Williams, is one of the world's largest cruise port operators, with a portfolio of the following ports – Lisbon, Malaga, Barcelona, Valetta, Bar, Kuşadası, Bodrum, Venice, Antalya, and Singapore. "I am delighted to have advised GPH for the second time on new cruise terminal acquisitions, following that of two significant stakes in Venice's cruise terminal in July 2016. That such a leading industry player as GPH opted for WFW to advise them on both matters demonstrates the firm's respected and expanding presence in the cruise sector both worldwide and in Italy specifically," Francesco Dianti, Asset Finance Partner at Watson Farley & Williams, said.



## Amsterdam invests in wind farms



Photo: Wikimedia Commons

The Dutch Port of Amsterdam has announced a new partnership with the Rotterdam-headquartered energy company Eneco. According to the agreement, the Port of Amsterdam will acquire a 50% stake in Eneco's existing 27 MW Afrikahaven wind farm, located in the Western port area. Both companies intend to supply the green energy generated by this wind farm to local businesses and households. This is said to be the first time a Dutch port company acquires shares in the wind farm sector. The Afrikahaven plants include a total of nine wind turbines, generating enough energy to supply around 15,000 households. "This new partnership is consistent with the principles of our Vision2030 for improving the port's sustainability and our strategy of becoming a major energy hub at the regional, national, and international levels. Wind energy is one of the renewable sources in which our port is investing and for which we have ambitious plans. The Port of Amsterdam aims to increase its installed capacity in the

port area to 100 MW by 2020. Through the smart use of this sustainable energy, we can create green energy for the price of brown energy – that is, traditional fossil fuels," Koen Overtoom, the Port of Amsterdam's CEO, said. Bram Poeth, Managing Director of Eneco Zakelijk, the energy company's corporate division, added: "In taking this step, the Port of Amsterdam is assuming a large share of the responsibility for the local energy transition. The next challenge for our two companies is to persuade the local community to join us in this sustainable revolution. Our ambitious objective is to get as many businesses in the port area and local households in the Amsterdam area as possible to run on locally-generated wind energy. It's all part of our strategy to tailor our renewable energy sources to specific customers."

## Megastar set sails

On January 29<sup>th</sup>, Tallink's brand-new dual-fuel (LNG) ferry *Megastar* departed for her first commercial sailing, leaving Tallinn for Helsinki at 13:30 local time. The EUR 230 mln worth GT 49,000, 212 m long, and 27 knots fast ro-pax – whose Grandmother is Finland's President, Tarja Halonen – replaced the ferry *Superstar* on the Hel-Tal route, offering space for 2,800 passengers, as well as around 2,000 lane metres for pax cars and cargo units (featuring two-level loading, enabling passenger vehicles and large freight units to enter and exit from different levels). There are four different travel classes on-board *Megastar* – the standard *Star Class*, upgraded *Comfort Class*, an exclusive *Business Lounge*, and a new area called the *Sitting Lounge*. Additionally, there's a two-deck 2,800 m<sup>2</sup> big Traveller Superstore shopping area, as well as seven restaurants, cafés and bars. A special area with a kids' playroom is available, too, while there's also a pet kennel on the garage level. "The ship is really shaped by our passengers, crew members, the Baltic Sea with its fragile environmental matters and sailing conditions, and our own experience as operators. We are excited to introduce her to the wider public and are also glad to apply several equal upgrades also to her companion on the route – *Star*," Janek Stalmeister, Tallink Grupp's CEO, commented. *Megastar* was constructed with the help of EU funds from the Connecting Europe Facility's Motorways of the Sea programme within the EUR 97.6 mln TWIN-PORT 2 project, carried out jointly with the ports of Tallinn and Helsinki. Tallink's contribution to this project amounted to EUR 16.0 mln, out of which EUR 4.8 mln came from the EU.



Photo: Tallink

## Gdańsk sea-connected to North America

A new monthly service, focused on break-bulk but also open to other general cargo such as containers or project, has been jointly introduced by Spliethoff and its subsidiary Transfennica. Starting at the Port of Gdańsk, the route includes Antwerp, Baltimore, Jacksonville, West Palm Beach, New Orleans, Houston, and optionally also East coast Mexican ports. The service in question kicked off on January 19<sup>th</sup>, when luxury yachts began to be loaded onto Spliethoff's crane-equipped side-loader *Spiegelgracht* for their journey to Florida's Port of West Palm Beach.



## FFPD co-funded by bremenports

Bremen's Senate has given its go-ahead for bremenports to become a member of the Finnaðfjörður Port Development company (FFPD). Back in May 2016, the Icelandic government signed an agreement with the municipalities of Langanesbyggð and Vopnafjörður, the engineering company EFLA, and bremenports, aimed at constructing a multipurpose deep-sea (50+ m) port in North-East Iceland. As such, the two Icelandic municipalities will form the Finnaðfjörður Port Authority (FFPA), responsible, among others, for granting licences to terminal operators. Bremenports, in turn, will aid the project with its expertise on port development. As a result, the business model behind the Finnaðfjörður port, inclusive of franchise structure, will be developed by the FFPD for FFPA's approval. Investors will be invited to take part in the port's detailed planning process. The subsequent construction of the port facilities, as well as freight handling operations, will lie in the hands of the investors, too. The FFPD will be officially founded in the first half of 2017, comprising the four abovementioned parties.



Photo: Wikimedia Commons

Since year 2004 an industrial site of 167 ha has been demarcated and outlined in the masterplan for the Finnaðfjörður area. According to it, the Port of Finnaðfjörður will offer 6.3 km of quays, partly with depths going beyond 50 m. The new Icelandic harbour will chiefly target transshipment-serving trade flows crossing the North Pole on their way between Asia and Europe. "Both the Icelandic Government and the general public regard the Finnaðfjörður Port Project as the country's most important infrastructure project right now. Shipping and logistics will increase significantly in this part of the world in the future. Iceland consequently wants to profit from this trend and establish a new port on the central Arctic shipping route," Martin Günthner, Bremen's Senator for Economic Affairs and Ports, commented. The port authority bremenports manages the German harbours in Bremerhaven and Bremen.

## Gothenburg to have a new cruise terminal

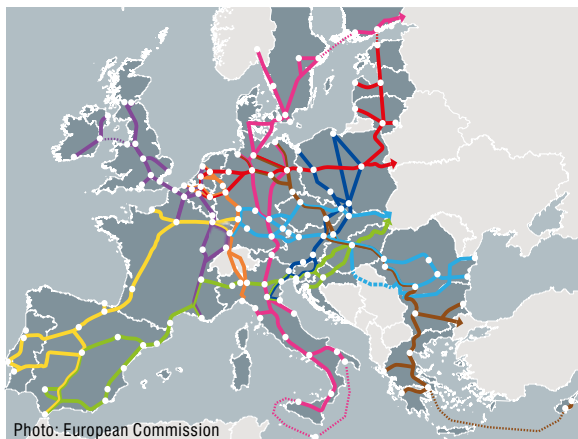
Following the transformation of Frihamnen into an urban area, the Port of Gothenburg is restoring the Stigbergskajen into a cruise reception facility named the America Cruise Terminal. This year will be the final season when cruise ships can dock at Frihamnen. The area will then form part of a major urban home and office development scheme, forcing the present cruise terminal to find a new location. As such, Gothenburg's new central cruise terminal will move to Stigbergskajen in Masthugget. The quay and part of the terminal building, the 1912-built Amerikaskjulet, are currently being restored, and will be ready to welcome vessels from spring 2018 (as of today, 17 ships are already scheduled to call at the new terminal). At Stigbergskajen, 10 m of quay will be demolished and rebuilt, followed by bollards reinforcement, as well as the construction of ramps and a bus parking space. Part of the Amerikaskjulet will be converted into a reception hall with a tourist information office, a souvenir shop, and other facilities. The maximum length of vessels calling at the America Cruise Terminal will be 225 m, 25 m more than currently at Frihamnen. However, the largest vessels will continue to dock at the terminal at Arendal. "The location is ideal as it is within walking distance of the inviting and vibrant districts of Majorna, Linné and Haga, and just a short journey by public transport or chartered bus into the city centre. Now that the beautiful and historically significant Amerikaskjulet is about to be revived as a passenger terminal, cruise guests can look forward to a warm and authentic reception," Jill Söderwall, Vice President Cruise at Gothenburg Port Authority, said. Jill also added: "It is an old quay – the first quay in Gothenburg for oceangoing traffic – and it is in considerable need of repair and renovation. We are working flat out to have the work completed before the first call in 2018. We believe that the America Cruise Terminal will lead to more cruise companies including Gothenburg on their itinerary. The extremely keen competition to attract cruise ships makes a good welcome extremely important."



Photo: Port of Gothenburg

## 2017 CEF Transport Blending Call – launched

The European Commission is opening a new Connecting Europe Facility (CEF) call for proposals, aimed at combining EUR 1.0 bln together with other EU support mechanisms. For the first time, CEF's call for proposals will be combined with the European Fund for Strategic Investments (EFSI; part of Juncker's Investment Plan for Europe), along with financing from public financial institutions (such as the European Investment Bank or National Promotional Banks) and the private sector. As such, in order to receive Connecting Europe Facility support, applicants will be asked to show evidence of the projects' financial readiness to obtain complementary funding from public or private financing institutions. The main aim of the new call for proposals is for selected projects to contribute to sustainable, innovative, and seamless transportation along the Trans-European Transport Network (TEN-T), particularly within the Commission's strategy for low-emission mobility under the so-called Energy Union. Particular emphasis will be placed on initiatives removing bottlenecks, supporting cross-border links, and accelerating the digitalisation of transport through traffic management systems, such as the European Railway Traffic Management System, Intelligent Transport Systems for roads, or the Single European Sky Air Traffic Management Research Programme. Additionally, funds will be used for developing sustainable and efficient transport systems by i.e. enhancing inter-modality and inter-operability. Support will be granted on a competitive basis, following an evaluation and selection process. The call will have two deadlines for proposals' submission, the first one on July 14<sup>th</sup>, 2017, and the second one on November 30<sup>th</sup>, 2017. Under the CEF, EUR 24.05 bln will be made available from the EU's 2014-2020 budget to co-fund TEN-T projects of common interest to the EU Member States. Of these, EUR 19.3 bln has so far been legally committed. Hitherto, projects and agreements approved for financing under the EFSI are expected to mobilise over EUR 168 bln in total investments across 28 Member States, and to support more than 387 thou. small and medium-sized enterprises. "Future mobility must be clean, connected and competitive, and requires new ways of financing. Today's call for proposal is an important first step in this regard. We will build on it, this year, in our work to implement the Low-Emission Mobility Strategy for Europe," Maroš Šefčovič, Commission Vice-President responsible for the Energy Union, said. Jyrki Katainen, Commission Vice President responsible for Jobs, Growth, Investment and Competitiveness added, "The European Fund for Strategic Investments was designed as a flexible tool to be used in combination with other EU funding sources so as to maximise their impact and help achieve Europe's broader policy objectives. I am delighted that, with today's initiative, the EFSI will complement the Connecting Europe Facility to help support the investment and jobs needed to build smart, sustainable transport networks." "Achieving our vision for seamless, intelligent and sustainable mobility in Europe requires investments that public funds alone cannot provide. That is why we are launching an innovative solution to make the best of our resources, and unlock untapped private investments, with particular focus on Cohesion countries. Today's action is a sign of solidarity on the move," Violeta Bulc, Commissioner for Transport, summed up.



## Swedish green project in Welsh Holyhead

Stena Line, owning the Port of Holyhead, has partnered with the also Gothenburg-based Minesto to carry out a project aimed at producing renewable electricity from the ocean. The Swedish ferry company will build an assembly plant in Holyhead, scheduled for completion in June this year, leased afterwards to Minesto which will use it for rolling out its Deep Green technology for generating electricity from slowly flowing underwater currents. In addition, Minesto's first commercial power plant array, the Holyhead Deep (recently upscaled from 10 MW to 80 MW), will be installed off the coast of North Wales, supplying as many as 80,000 Welsh households with locally-produced clean energy. "We are very pleased to have finalised this agreement with Stena Line. With its direct quay access for offshore transports to and from site we have secured a unique location that suits us perfectly. In the establishment of our technology, it is also crucial to work with professional and long-term partners such as Stena Line. We are two companies from Gothenburg, exploiting these ocean energy business opportunities together in Wales, which adds to the excitement," Dr. Martin Edlund, CEO of Minesto, said. Björn Petrusson, Chief Commercial Officer at Stena Line, added, "This investment creates value for Stena Line in several ways and demonstrates opportunities in port operations linked to ocean renewables. Our sustainability strategy has a clear focus on clean energy so participating in the development of new renewable energy sources is natural to us. This investment is good for our business and is also an investment in a better future for all of us."





## Damen Shipyards Galati delivers a W2W SOV

Bibby Marine Services has received its Walk-to-Work (W2W) Service Operations Vessel (SOV), constructed at Damen's shipbuilding yard in Romania. After sea trials, the 90 m long, 20 m wide, and having 4.6 m of draught diesel-electric *Bibby WaveMaster 1* will as of August support offshore windfarm construction as well as oil & mining projects in the North Sea. The SOV is built specifically for the transfer and accommodation of offshore personnel, having among others six elevator landings for technicians to directly access the gangway from the ship's warehouse areas (incl. two container storages, also for high cube boxes). In addition, the *Bibby WaveMaster 1* has a helideck, a daughter craft, and CTV landings with refuelling. The vessel is able to remain at sea up to one month at a time. Moreover, a range of other options is available for the SOV to undertake other tasks, such as an additional 24 tn lifting capacity deck crane, tanks arrangements suited to liquids such as glycols and low flashpoint liquids with separate delivery intakes, as well as facilities for dive support and remotely operated underwater vehicle operations. "This is an important key milestone in the delivery of the vessel. Sea trials will start soon and we will take delivery in August. We are very impressed with the quality of the build and the whole process has gone smoothly," Stephen Blaikie, Bibby Marine Services' CEO, said. Peter Robert, Director Business Development & Market Intelligence at Damen, added, "I am honestly convinced that Damen has designed and built the best vessel for the tasks envisaged and which is going to be available on the market as of end of August this year. The combination of Damen and Bibby brings together a significant amount of knowledge, which has resulted in some impressive innovation. Carrying out the integrated hardware-in-the-loop (HIL) simulator analyses of the vessel dynamic positioning and gangway systems in a time domain simulation with the actual controllers connected to it proves, in real life conditions, safe operations in the 2.5 metre wave Hs required by the tenders – the only vessel currently able to achieve this in fact. Based on this the ship-owner can guarantee site specific vessel performance and safe operations."



Photo: Damen Shipyards

## THE ALL INCLUSIVE PORT

We offer system solutions for your whole logistics chain. That makes us more than a port. It makes us a partner who can be with you all the way. Whatever your challenges, we can meet them – All Inclusive!

**High capacity = shorter laytime.**  
**Simple mathematics in Oxelösund.**  
**#efficiency**

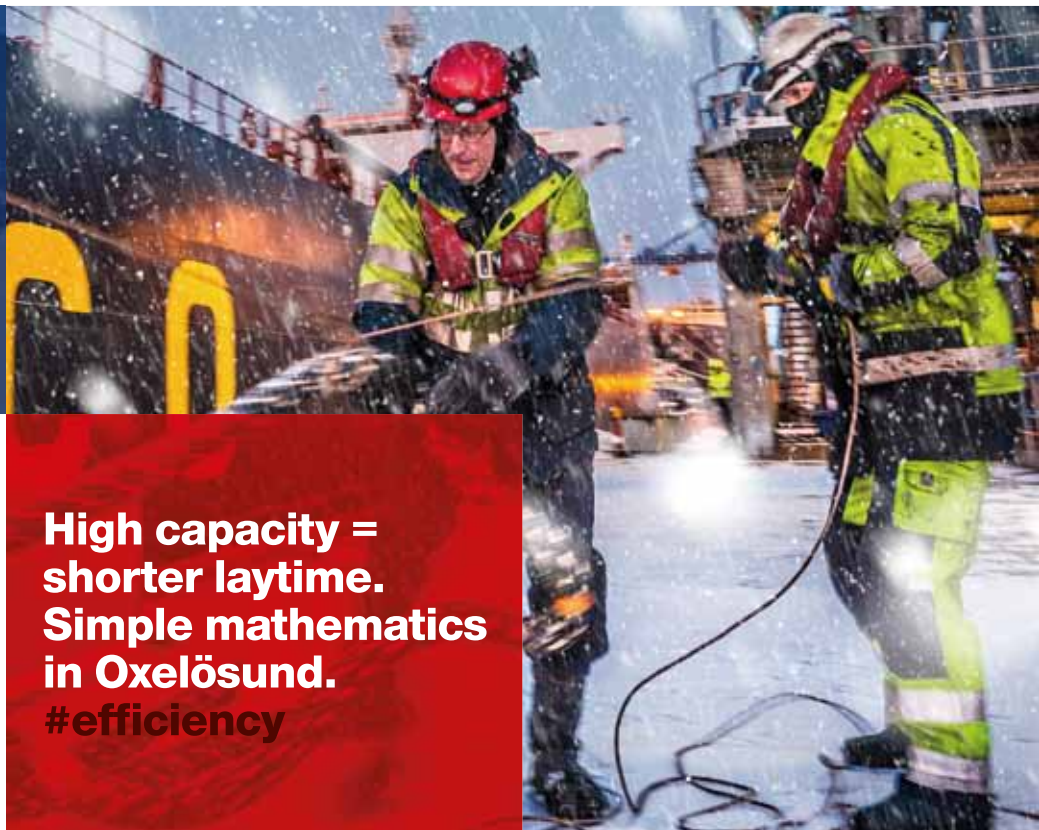


Photo: www.pexels.com

## THE PORT OF TALLINN:

10,173.3 thou. passengers served in 2016  
(+3.9% yoy)

Out of over 10.17 mln travellers going through Tallinn's quays in 2016, as many as 509.7 thou. came on-board cruise ships (+1.1% year-on-year). On the other hand, Tallinn's total freight turnover contracted last year by 10.3% yoy, chiefly because of a falling (-26.4% yoy) throughput of liquids (9.44 mln tn). Conversely, dry bulk volumes jumped up by 27.3% yoy to over 3.74 mln tn.

### The Port of Tallinn's volumes

|                                     | 2016                     | Yoy           |
|-------------------------------------|--------------------------|---------------|
| Liquids                             | 9,442.8 thou. tn         | -26.4%        |
| Ro-ro                               | 4,563.2 thou. tn         | +5.4%         |
| Dry bulk                            | 3,745.4 thou. tn         | +27.3%        |
| Containerised                       | 1,777.9 thou. tn         | +2.1%         |
| Other general cargo                 | 580.9 thou. tn           | +2.9%         |
| Non-marine                          | 8.2 thou. tn             | -53.2%        |
| <b>Total</b>                        | <b>20,118.5 thou. tn</b> | <b>-10.3%</b> |
| <b>Cargo traffic by destination</b> |                          |               |
| Outbound, of which                  | 12,095.7 thou. tn        | -17.0%        |
| Transit                             | 7,561.4 thou. tn         | -28.3%        |
| Exports                             | 4,534.3 thou. tn         | +12.5%        |
| Domestic                            | 0.0 thou. tn             | -100%         |
| Inbound, of which                   | 8,014.5 thou. tn         | +2.9%         |
| Transit                             | 4,207.2 thou. tn         | +4.6%         |
| Imports                             | 3,807.3 thou. tn         | +1.2%         |
| <b>Container traffic</b>            |                          |               |
| TEU                                 | 202,327                  | -3.1%         |
| <b>Passenger traffic</b>            |                          |               |
| Tallinn-Helsinki                    | 8,515.8 thou.            | +3.7%         |
| Tallinn-Stockholm                   | 963.6 thou.              | +3.5%         |
| Cruise                              | 509.7 thou.              | +1.1%         |
| Stockholm-Tallinn-St. Petersburg    | 163.5 thou.              | +31.2%        |
| Paldiski-Kapellskär                 | 18.8 thou.               | +6.5%         |
| Other                               | 0.5 thou.                | *             |
| <b>Total</b>                        | <b>10,173.3 thou.</b>    | <b>+3.9%</b>  |

\* No traffic in 2015

## CONTSHIP ITALIA GROUP:

6.39 mln TEU handled in 2016 (+1.7% yoy)

The Italian operator noted the biggest terminal box handling increase in Salerno – by 10% year-on-year to 375 thou. 20-foot boxes.

### Contship Italia Group's volumes

|   | 2016         | Yoy          |
|---|--------------|--------------|
| <b>Contship's terminals [thou. TEU]</b>           |              |              |
| <b>Italy</b>                                      |              |              |
| Medcenter Container Terminal (MCT)                | 2,797        | +9.8%        |
| La Spezia Container Terminal (LSCT)               | 1,172        | -2.0%        |
| Cagliari International Container Terminal (CICT)  | 671          | -2.2%        |
| Salerno Container Terminal (SCT)                  | 375          | +10.0%       |
| Terminal Container Ravenna (TCR)                  | 204          | -3.8%        |
| <b>Total Italy</b>                                | <b>5,219</b> | <b>+4.8%</b> |
| <b>Morocco</b>                                    |              |              |
| Eurogate Tanger                                   | 1,167        | -9.9%        |
| <b>GRAND TOTAL</b>                                | <b>6,386</b> | <b>+1.7%</b> |
| <b>Contship Italia Group Intermodal Logistics</b> |              |              |
| Hannibal – transported TEU                        | 271 thou.    | +9.7%        |



Photo: Contship Italia

## THE PORT OF KLAIPĖDA:

40.14 mln tn handled in 2016 (+4.2% yoy)

The Lithuanian seaport set a new historic record in freight turnover last year, beating its up-to-date all-time high from 2015, standing at 38.51 mln tn. While handlings of dry bulk contracted by 3.6% yoy to 16.62 mln tn, general cargo and liquids (incl. LNG) rose by double-digits – the former by 10.7% yoy to 12.35 mln tn, while the latter by 10.4% yoy to 11.17 mln tn. Klaipėda's 2016 container traffic totalled 443,312 TEU (+12.9% yoy).



## THE PORT OF GOTHENBURG:

538.0 thou. ro-ro cargo units handled in 2016  
(+2.1% yoy)

In addition, the Swedish port took care of 246.0 thou. new cars last year, an increase by 15% year-on-year, and the highest figure since the 2008 financial crisis. With 23.7 mln tn (+12.3% yoy), the turnover of liquids hit a new all-time high in Gothenburg in 2016.

### The Port of Gothenburg's volumes

|  | 2016               | Yoy          |
|--|--------------------|--------------|
| <b>Freight traffic</b>                 |                    |              |
| General cargo                          | 17.2 mln tn        | +0.6%        |
| Liquids                                | 23.7 mln tn        | +12.3%       |
| <b>Total</b>                           | <b>40.9 mln tn</b> | <b>+7.1%</b> |
| <b>Detailed unitized cargo traffic</b> |                    |              |
| New cars                               | 246.0 thou.        | +15.0%       |
| Ro-ro cargo units                      | 538.0 thou.        | +2.1%        |
| TEU                                    | 798.0 thou.        | -2.7%        |
| <b>Pax traffic</b>                     |                    |              |
| Ferry and cruise passengers            | 1,708.0 thou.      | -2.2%        |

## VALENCIAPORT:

4,722,273 TEU handled in 2016 (+2.3% yoy)

Both containerised imports and exports increased by 5.0% year-on-year, to a total of 1,105,978 TEU and 1,105,438 TEU, respectively. Transit box traffic rose as well, by 0.1% yoy to 2,510,857 TEU. Overall, total 2016 freight turnover at the three ports managed by Valenciaport – Valencia, Sagunto, and Gandía – amounted to 71.28 mln tn (+2.0% yoy). Out of the total figure, containerised cargo rose by 3.0% yoy to nearly 53.79 mln tn. Combined volumes of ro-ro traffic and break-bulk decreased by 0.8% yoy to 10.75 mln tn. However, the former advanced by 4.3% yoy to 8.91 mln tn. In addition, Valencia and Sagunto handled 774,708 vehicles, more by 12.4% yoy. Handlings of liquids closed last year with a decrease of 0.3% yoy, totalling 3.80 mln tn. Dry bulk also contracted – by 7.7% yoy to 2.48 mln tn. As for Valenciaport's main cargo flows directions, trade with other Spanish ports came first last year with 8.48 mln tn (+5.0% yoy), followed by China (+17.0% yoy to 6.76 mln tn), Algeria (-2.8% yoy to 5.63 mln tn), Italy (-3.1% yoy to 4.88 mln tn) and the US (-0.5% yoy to 4.37 mln tn). On the passenger side, a total of 908,145 travellers went through Valencia's quays (+21.4% yoy), out of which 504,881 came on-board ferries (+35.2% yoy), while the remaining 403,264 on cruise ships (+7.7% yoy).

## EUROGATE GROUP:

14.61 mln TEU handled in 2016 (+0.4% yoy)

Over half of the company's 2016 container handlings were made by its German facilities, summing up to 8,234,357 TEU (+/-0.0% year-on-year).

### EUROGATE Group's volumes [TEU]

|                      | 2016              | Yoy            |
|----------------------|-------------------|----------------|
| Bremerhaven          | 5,487,198         | -0.6%          |
| Hamburg              | 2,265,439         | -0.9%          |
| Wilhelmshaven        | 481,720           | +12.9%         |
| <b>Total Germany</b> | <b>8,234,357</b>  | <b>+/-0.0%</b> |
| <b>Total Italy*</b>  | <b>5,012,218</b>  | <b>+4.6%</b>   |
| Tanger (Morocco)     | 1,126,872         | -8.4%          |
| Lisbon               | 154,959           | -25.3%         |
| Ust-Luga             | 82,203            | -4.3%          |
| <b>GRAND TOTAL</b>   | <b>14,610,609</b> | <b>+0.4%</b>   |

\* La Spezia, Gioia Tauro, Cagliari, Ravenna, and Salerno



Photo: www.pexels.com

## CONTAINER RAIL TRAFFIC IN RUSSIA:

3.26 mln TEU carried in 2016 (+10.2% yoy)

With nearly 1.68 mln 20-foot boxes (+12% year-on-year), domestic routes accounted for over half of Russia's container transports carried across the country's railways.

### Container rail traffic in Russia [thou. TEU]

| Trade lane   | 2016         | Yoy           |
|--------------|--------------|---------------|
| Domestic     | 1,678        | +12.0%        |
| Exports      | 800          | +7.9%         |
| Imports      | 525          | +4.4%         |
| Transit      | 258          | +18.8%        |
| <b>Total</b> | <b>3,261</b> | <b>+10.2%</b> |

## THE PORT OF CONSTANTZA:

59.42 mln tn handled in 2016 (+5.5% yoy)

Last year, the sharpest increase was noted by Romanian Constantza in the handlings of liquids – up by 12% year-on-year to 13.66 mln tn.

### The Port of Constantza's volumes

|                          | 2016                     | Yoy          |
|--------------------------|--------------------------|--------------|
| Dry bulk                 | 35,189.4 thou. tn        | +5.7%        |
| Liquids                  | 13,662.9 thou. tn        | +12.0%       |
| Containerised            | 6,897.35 thou. tn        | +0.7%        |
| Other general cargo      | 3,675.1 thou. tn         | -8.1%        |
| <b>Total</b>             | <b>59,424.8 thou. tn</b> | <b>+5.5%</b> |
| <b>Container traffic</b> |                          |              |
| TEU                      | 711,339                  | +3.2%        |



Photo: www.pexels.com

## THE PORT OF LISBON:

10.26 mln tn handled in 2016 (-11.4% yoy)

On the other hand, passenger traffic at the Portuguese capital's port increased in 2016 by 3.0% year-on-year to a total of nearly 16.58 mln.

### The Port of Lisbon's volumes

|                                 | 2016            | Yoy           |
|---------------------------------|-----------------|---------------|
| <b>Dry bulk [thou. tn]</b>      |                 |               |
| Grains, fodder, oilseeds        | 3,310.25        | -0.5%         |
| Other                           | 1,247.0         | -24.3%        |
| Aggregate                       | 21.6            | +418%         |
| <b>Total</b>                    | <b>4,578.8</b>  | <b>-8.0%</b>  |
| <b>General cargo [thou. tn]</b> |                 |               |
| Containerised*                  | 4,018.1         | -18.3%        |
| Break-bulk                      | 232.4           | -7.8%         |
| Ro-ro                           | 5.1             | -56.0%        |
| <b>Total</b>                    | <b>4,255.6</b>  | <b>-17.9%</b> |
| <b>Liquids [thou. tn]</b>       |                 |               |
| Oil products                    | 980.8           | +7.6%         |
| Other                           | 426.5           | -13.2%        |
| Liquefied gas                   | 14.9            | -19.8%        |
| <b>Total</b>                    | <b>1,422.2</b>  | <b>+/-0%</b>  |
| <b>GRAND TOTAL</b>              | <b>10,256.6</b> | <b>-11.4%</b> |
| <b>Container traffic</b>        |                 |               |
| TEU, of which                   | 391,283         | -18.7%        |
| Laden                           | 166,898         | -18.0%        |
| Empty                           | 76,125          | -35.0%        |
| <b>Pax traffic</b>              |                 |               |
| Passengers, of which            | 16,576,572      | +3.0%         |
| In river traffic                | 16,054,071      | +3.0%         |
| In sea traffic                  | 522,501         | +2.0%         |

\* Incl. 861.6 thou. tn of containers' tare

## THE PORT OF BARCELONA:

47.51 mln tn handled in 2016 (+3.4% yoy)

With 31.68 mln tn (+7.5% year-on-year), general cargo handlings accounted for two-thirds of Barcelona's total freight traffic last year.

### The Port of Barcelona's volumes

|                                  | 2016                     | Yoy          |
|----------------------------------|--------------------------|--------------|
| General cargo, of which          | 31,680.45 thou. tn       | +7.5%        |
| Containerised                    | 20,935.1 thou. tn        | +11.8%       |
| Non-containerised (incl. ro-ro)  | 10,745.4 thou. tn        | +/-0.0%      |
| Liquids                          | 11,401.7 thou. tn        | -5.1%        |
| Dry bulk                         | 4,430.8 thou. tn         | -0.8%        |
| <b>Total</b>                     | <b>47,513.0 thou. tn</b> | <b>+3.4%</b> |
| <b>Unitized freight traffic</b>  |                          |              |
| TEU, of which                    | 2,141,396                | +14.2%       |
| Unloaded                         | 1,080,097                | +14.5%       |
| Loaded                           | 1,061,299                | +14.0%       |
| Ro-ro cargo units, of which      | 95,565                   | +20.1%       |
| Loaded                           | 50,189                   | +10.8%       |
| Unloaded                         | 45,376                   | +32.6%       |
| Vehicles                         | 916,834                  | +4.0%        |
| <b>Railway traffic</b>           |                          |              |
| TEU                              | 225,996                  | +6.0%        |
| Vehicles                         | 271,669                  | +2.9%        |
| Bulk, of which                   | 494,792 tn               | -16.9%       |
| Dry                              | 416,873 tn               | -15.7%       |
| Liquid                           | 77,919 tn                | -22.8%       |
| <b>Pax traffic</b>               |                          |              |
| Cruise ship passengers, of which | 2,683,594                | +5.6%        |
| Transit                          | 1,127,775                | -4.1%        |
| Disembarked                      | 782,196                  | +14.9%       |
| Embarked                         | 773,623                  | +13.0%       |
| Ferry passengers, of which       | 1,275,366                | +9.2%        |
| Domestic                         | 762,426                  | +7.4%        |
| With other EU Member States      | 409,759                  | +12.0%       |
| Other destinations               | 103,181                  | +12.8%       |
| <b>Total</b>                     | <b>3,958,960</b>         | <b>+6.7%</b> |

## THE PORT OF BORDEAUX:

7.84 mln tn handled in 2016 (-6.5% yoy)

With more than 4.13 mln tn (-3.4% year-on-year), liquids made up over half of Bordeaux port's cargo turnover last year.

### The Port of Bordeaux's volumes [tn]

|                         | 2016             | Yoy          |
|-------------------------|------------------|--------------|
| Liquids                 | 4,135,575        | -3.4%        |
| Grains and oilseeds     | 1,570,677        | -11.0%       |
| Fertilizers             | 547,477          | +4.0%        |
| Containerised           | 546,524          | -4.4%        |
| Other                   | 368,132          | -2.8%        |
| Granulates              | 282,072          | -33.3%       |
| Seed oil and meal       | 231,636          | -20.1%       |
| Coal and petroleum coke | 159,996          | +6.7%        |
| <b>Total</b>            | <b>7,842,089</b> | <b>-6.5%</b> |





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## Using data to identify opportunities

by Maciej Kniter

Technology is a tool for gaining a competitive edge. And indeed, some new advantages are now within reach; ones that didn't even exist a few years ago. What then, will be the tech-enriched future of ports and terminals? Is automation going to change a port's landscape? We talk with Andy Barrons and Robert Inchausti about Navis' most recent achievements and plans for the future, as well as new technologies at ports themselves.

### ■ What were your company's biggest events, projects, and achievements in 2016?

We can divide last year's activities into two sets, namely something that can be called "core business," and "new business." When it comes to the first and main group, we developed 43 N4 projects around the world, a record number and double as many as in 2015, helping to optimize operations at ports and also implementing the business intelligence capabilities of terminal operators. There's a lot of demand from customers to adopt new technologies with the obvious goal of ultimately making terminals more efficient and competitive. We saw growth in multi-purpose terminals in Africa, but also a healthy rise in China, as well as new niches emerge in North America, the Caribbean, and Latin

America. Yet when it comes to the new craft, we have invested heavily in such things as carrier solutions, specifically in storage planning, which is bringing desktop storage planning solutions into the cloud. To support this we acquired INTERSCHALT – a German company specializing in this area, which has the world's most used on-board ship computer, MACS3 – as well as a vessel performance monitoring and reporting solution called Bluetraker. These investments have helped us to integrate business processes between the ocean carriers and the terminal operators, and streamline the way information is shared. What's more, we were able to take some of the steps out of the process, e.g. automatically matching the storage plan with the vessel stability calculation on the on-board computer, so now we can provide a more integrated software solution for carriers and terminals.

### ■ What's in store for 2017? Any development plans in Europe or China?

We will continue to execute our growth strategies; in terms of our core business, we'll be working on connecting with multiple equipment control systems created by various equipment providers. We will also carry on investing in moving storage planning and execution capabilities into the cloud, and

integrating it with other processes, like stability calculation and so on. After the acquisition of INTERSCHALT in March last year, we now have a larger base in Europe, including storage planning and vessel's operations. We also have a significant presence in Rotterdam, which allows us to help our customers a lot with operational performance. In China, we are working with ZTMC, a large equipment provider and are also seeing increased interest from Chinese companies investing in terminal automation. Finally, we expect there will be more acquisitions to support our business and to extend software in some other areas.

### ■ Could you say something more about Navis' latest products, such as e.g. the Business Intelligence Portal, or the 3.3 version of N4?

Taking N4 3.3 as the first one, it is in fact a continuation of our investment in developing more capabilities for automated terminals, adding productivity and functionality (by, for instance, increasing the number of moves per hour). And this 3.3 release is the beginning of a shift in strategy, because we used to issue a release every nine months, but now we plan to do this every four or five. We have also been investing in our Business Intelligence for a number of years. The terminals will have more dashboards and data securing their operations. Our customers want



**This is what we call data alchemy – having information from various sources in one place, and then the magic happens – you can take actions that previously you were not able to do. We need to move away from this sort of one-to-one connections spaghetti. It's a big change and also a big challenge.**



to make more evidence-driven decisions and use data to identify opportunities to improve the process, and this will result in greater productivity and faster turnaround of the vessel, to name just a few benefits.

- **In the last comment for Harbours Review, Benoît de la Tour, President of Navis, said that one of the biggest challenges for shippers is collaboration. Can you elaborate on that?**

There has always been a desire and need to collaborate – that's the very nature of the industry because carriers need to work with terminal operators as closely as possible to really have a well managed and efficient supply chain. Much of this is dependent on the system, both on the carrier and on the terminal side. Essentially, we live in a world of data and there are multiple carrier systems and many terminal systems with their own data and essentially no ability to communicate short of EDI – a concept that has been around for 20 years and hasn't changed. It means that the information goes from one party to another mutually, as late as possible to ensure its accuracy, but even then it's not always accurate from an operational perspective, because only one party at a time can see what's happening at that terminal. Two sides that are communicating with one another are not able to do it on a real-time basis. Basically, if one needs to pass data, control, or make a request, they simply wait for that operation to proceed. The real challenge is: Are there systems that allow the entire supply chain and the whole set of ships going in the specific rotation to really collaborate in real-time? Decisions that are based on the latest, most accurate information can improve operational efficiency and that's what we intend to do.

- **Can you compare today with what the norm was in the Terminal Operating System 10-15 years ago, and as such give us a glimpse of what we can expect to encounter in the next decade or so?**

If we look back 10-15 years ago, that was really the beginning of the first wave of automation. Since then we've seen an acceleration in terminals around the world accounting for automation, whether it's semi (e.g. there's still a driver in a crane), or full (completely automated cranes and vehicles). It's been a 10-15-year long journey, and today there are

a number of projects around the world in Rotterdam, Long Beach, Australia, and China, where we're implementing automated terminal projects. More and more equipment types are becoming automated, so what you'll see is definitely more of this coming.

Moving forward, we can add to this artificial intelligence, big data, smart connected applications, etc. In our view, as an industry, we are just waking up and checking what values those areas can offer. We live in a world where there's a tremendous amount of data available, but it's not inter-connected and sometimes we look at different aspects of one and the same thing. We know that today just 10-20% of devices used in terminal operations are connected to the cloud where someone references and uses that data, but more and more terminals and carriers are becoming aware of the opportunity, because it gives better precision. Even though we are relatively far away today, we're very aware of what's possible and what happens in other industries, and the next 5-10 years will bring big changes that will benefit efficiency, and therefore, the industry from a commercial perspective truly must focus on making better use of data.

The trouble is that there are currently so many different systems available. If we were to depict it graphically, the best illustration will be to draw arrows from letter A to B, and the arrows themselves are the problems. We have a lot of one-to-one connections in shipping, but in fact this information is not available to other parties. We believe that there's a need for a platform available for many-to-many. Information should not only be shared with multiple parties more easily, but also one "source of truth" should be provided as well with standardized information. Coordinating a lot of processes will be much easier this way. This is what we call data alchemy – having information from various sources in one place, and then the magic happens – you can take actions that previously you were not able to do. We need to move away from this sort of one-to-one connections spaghetti. It's a big change and also a big challenge. Ships moving from one point to another house vast stores of data and ports are seeing that managing data is increasingly important and this is why we perceive digital ports as a solution. Port authorities can make better use of data, e.g. when they know that there will be a

**“Taking people out of an environment where they have a lot of machines, boxes, and so on is extremely beneficial. Nonetheless, automation requires a human factor in the end. It's simply to monitor, to adjust and we will see the development of manned control centres that will be monitoring the operating systems and making sure that everything runs smoothly.”**

long queue in a port, a ship heading towards a port may sail slower, and therefore economize on fuel.

- **It seems that cyber threats will be more ubiquitous in the future. What can be done to fight them?**

There are very real cyber threats to the industry. The most obvious approach to protect against them would be to lock up your data and not participate in sharing systems. However, this will prevent companies from being able to capitalize on new technologies to cooperate and collaborate with other players throughout the entire supply chain. Therefore, the best solution would be to establish a set of standards and rules, and this has already been done (e.g. Cloud Security Alliance, CIS Principle Security Controls, Significant Compliance, etc.). Most of the current users follow these standards so you can really share data and at the same time be secure. The key is to be aware of the threats and take appropriate measures to significantly lower the number of potential threats.

- **Navis provides software that boosts hardware. How does the human factor fit into this relation?**

Well, it's all to make people stronger, and make life more comfortable for everyone. Taking people out of an environment where they have a lot of machines, boxes, and so on is extremely beneficial. Nonetheless, automation requires a human factor in the end. It's simply to monitor, to adjust and we will see the development of manned control centres that will be monitoring the operating systems and making sure that everything runs smoothly.



Photo: MGI

# Intelligent cargo

by Marie Pavesio, *Communications & Marketing Manager at Marseille Gyptis International (MGI)*

**We have entered a new era of goods tracking right across the supply chain. Thanks to new technologies cargo has become intelligent and can be tracked wherever it is currently located in the world. Today, supply chain players need performant IT solutions that outdo the functions traditional port & cargo community systems (PCS; CCS) have been offering so far.**

**P**orts are key nodes in cargo flows. As such, supply chain players need real-time freight information on goods they're taking care of – be it somewhere in Marseille, Shanghai, Anchorage, or en route from one terminal in the Baltic to another – in order to anticipate operations and make the right decision in due course.

Therefore, a good seaport is a bottleneck-free one, and here its competitiveness lies on three pillars. First, things that are seen with the naked eye, namely robust physical infrastructure with appropriate hinterland connections.

Secondly, an efficient IT system that connects the port community (among them terminal operators, shipping agents, ship-owners, customs brokers, freight forwarders, road, rail and river carriers, as well as customs, the port authority, veterinary and plant health inspection bodies, not to mention other government agencies) to share real-time data on cargo, hence keeping everyone updated on the “Where is my cargo?” question.

Thirdly – time, which simply equals money. Goods have to therefore

spend as little of it as possible within a port. For shippers, freight must arrive punctually at a given destination in a just-in-time manner. Exporters, in the meantime, want the cargo to leave the port when planned so that their consignees get it on time. If a shipment runs into a delay, the exporter country's competitiveness is at stake.

What happens (or not, or should) before goods arrive at a terminal can slow down port operations if the administrative and customs procedures have not been done on time, irrespective if we're talking about imports to be unloaded from a vessel or exports waiting to be stacked in the cargo hold. As mentioned earlier, many professionals from the private and public sectors are interacting with each other throughout the consignment journey. All of these players must be connected to an efficient IT system that orchestrates and streamlines flows of goods and data, so the whole supply chain becomes more productive and competitive.

Nowadays, new technologies on the market promise to take the whole thing to a completely new level – towards a global network of intelligent cargo operations.

## **What lies beyond port & cargo community systems**

Marseille Gyptis International (MGI) has just launched a new system called Ci5 that represents a 180-degree shift in vision, all in order to bring about a new era of goods tracking by connecting supply chains through a high-performance information door-to-door freight track system.

Ci5 stands for “Cargo intelligence 5,” encompassing five “arrows” (modes) of transport (air, rail, road, ocean, and waterways), as well as five continents since the solution will fit any port in the world. The new system aims at replacing the AP+ Cargo Community System, which is currently used as the French national system (implemented over the past ten years in most of the country's ports, but also abroad, and representing around 30 logistics communities).

While keeping all the best features of AP+, we have added new functions that look ahead to future usages in goods transportation. We used the so-called user-centric approach with online surveys, user and expert workshops to identify needs and define new functionalities, but also to evaluate the evolution of cargo transportation as well as explore how innovation can revolutionize the industry in terms of data gathering and sharing.

Here are some examples of the new features. First, a connection to smart containers. Thanks to the 4Trax smart container application, developed in partnership with TRAXENS, an embedded tag delivers information on the container's location, logistics status, and condition. The integration of this information in intelligent cargo systems will help to make delivery and box collection from terminals more reliable, and will help anticipate customs operations to secure shipments.

Secondly, global positioning or geofencing. Using GPS from lorries will allow to create alerts. For instance, trucks will

**Private and public sectors must be connected to an efficient IT system that orchestrates and streamlines flows of goods and data, so the whole supply chain becomes more productive and competitive.**



receive a message during delivery informing them whether the port is expecting the container they are transporting, while in the opposite direction – whether the goods have been customs cleared, and all fees paid, to swiftly leave the maritime terminal.

Thirdly, smart objects and intelligent cargo. Radio-frequency identification (RFID) tags on pallets or Quick Response (QR) codes on products can communicate information to intelligent IT systems, and vice versa. To give an example, we are working on an e-port project with one of China's harbours. The main aim is to ensure Chinese consumers that the European products they are buying, such as luxury or high-value goods, are not counterfeit and they really come from Europe. Here the QR code is placed on the goods by the exporter whilst preparing them for shipment. Afterwards extra information is added to the QR code by an intelligent IT system, such as the port of departure, container number and seals, and the customs declaration. When scanning the QR code with a mobile device (a simple smartphone will do), the clients in China can be sure that the product was shipped from a European seaport and isn't counterfeit, but a sterling product as per EU standards. This project is quite innovative since we are shifting here from a business-to-business model towards a business-to-consumer service.

### Next-gen approach in system design

We have also built Ci5 around five, as we call them, conceptual innovative building blocks. First, the user-centric and modular approach with custom displays, predictive and intuitive data entry, as well as simplified and advanced search. Ci5 is a web

application with an open source architecture, designed for use in any browser on a desktop computer, tablet, or smartphone.

Secondly, activity monitoring, which stands for operational management with door-to-door cargo tracking, an alert system for event notification and actions to be performed in the system, vessel tracking, etc.

Thirdly, fast lane, i.e. simplifying logistics processes with automatically-generated operations. Ci5 will by design manage advanced actions to streamline supply chain processes. This concept gives priority to customers who have planned their operations in advance. For instance, if you are importing fruit and vegetables, you know that cargo might be inspected by the plant health services and customs. Appointments for inspection can therefore be made before the produce arrive, speeding up the whole process in the port.

Fourthly, interoperability. The solution proposed by us will be interoperable with all supply chain information systems from private and public players, delivering a multi-port, multi-modal, multi-channel, and door-to-door platform. Moreover, with web services, users will not need to key in information several times or even connect to Ci5; instead, the information needed will be available in the user's private IT system.

Lastly, business intelligence, a strategic activity management approach with dashboards, key performance indicators and statistics.

How efficiently one combines speed, reliability and instant feedback will count more and more in the future business of moving various goods all around the world. Port community actors functioning as separate

**“While boxes and trailers will continue to be carried across the physical world, they will also move virtually, tracked by the all-seeing eye of modern IT solutions.”**

atoms, office staff trotting in haste across a terminal with paper documents in their hands, lorries queuing at gateways, containers waiting for a train, urgent veterinary permission lost in dust somewhere under the desk, all such situations will have to be no more if one seriously thinks about keeping pace with transport & logistics developments in competitiveness.

While boxes and trailers will continue to be carried across the physical world just as was the very first shipment of fur and pottery thousands of years ago, they will also move virtually, tracked by the all-seeing eye of modern IT solutions, all the more intelligent for the sake of satisfying the ever growing hunger for efficiency. ■

For 30 years now, Marseille Gypsis International (MGI) has been providing support to various transport-related communities in improving their global performance, be it efficiency of public institutions such as customs and port authorities, or increased traceability and security of supply chain operations. MGI's experts deliver value added services and know-how in the fields of logistics, professions, customs, information technology and networks, training and assistance. Back in 1989 MGI developed the Protis cargo community system, succeeded in 2005 by AP+, which in turn will be followed by the next-gen Ci5 system.

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Photos: ERTICO – ITS Europe



# Cooperative intelligence

by Lina Konstantinopoulou, Head of Transport and Logistics,  
and Carla Coppola, Manager PR & Communications, ERTICO – ITS Europe

**Along with the growing population in Europe, goods transport activities are also on the rise. According to the European Commission's *EU transport in figures. Statistical pocketbook 2015*, back in 2013, the total EU-28 freight transport performance (incl. intra-EU air and sea traffic) amounted to 3,481 bln tonnes-kilometres, over one-fifth more than in 1995.**

The freight sector therefore represents a great opportunity. The challenge is also obvious – how to efficiently take care of increased cargo flows? More hard infrastructure is a clear solution, but it's also capital intensive and has a considerable construction-to-operation lag. In turn, software-based connected freight intelligence can be a fast remedy by making bigger transport leaner, while multimodality – better inter-fitted.

The ERTICO Partnership has therefore put in place different programmes to provide focus to its related activities (projects, interest groups, events, etc.), including one strictly focused on Intelligent Transport Systems and Services (ITS) for freight and logistics.

By developing this programme, ERTICO wants to address current challenges of the so-called Cooperative-ITS (C-ITS) services, such as interoperability issues or complementarity of communications technologies, as well as to investigate the potential of new trends like Big Data and the Internet of Things for freight

transport (read also *Connecting the unconnected. The Internet of Things in warehousing and logistics*, on pgs. 46-47). The final objective is to develop the necessary interfaces for an integrated synchromodal freight transport, and to deploy C-ITS services along the TEN-T corridors using hybrid communications technologies.

To achieve this, the ERTICO Partnership is working on focused co-funded project opportunities; establishing platforms to reduce the gap between fix-term projects and long-term deployment and maintenance of services; taking part in interoperability tests to support the deployment of interoperable ITS solutions; and organising events to encourage networking amongst appropriate stakeholders in order to promote ITS.

## Augmented transportation

Freight and logistics is a domain that can truly benefit from an interconnected world. This is especially true in relation to C-ITS, which can provide substantial improvements by generating real-time information on the traffic situation; introducing traffic management measures balancing traffic loads time-wise; addressing the planning and execution level of freight distribution processes; enabling better tracking and tracing of goods across different transport networks; and by consequently optimising freight transport timeliness and efficiency as well as environmental sustainability.

ITS technologies are not only essential to the introduction of Electronic Freight

(e-freight), but they are also an innovative trend enabling sustainable logistics, intelligent cargo and efficient deployment of resources. The use of ITS and leveraging of Big Data will be of critical importance, particularly considering the challenges we now face to efficiently support both digital and physical transport infrastructure, be it the roads, ports, terminals, entire cities, etc.

The ITS Directive (2010/40/EU) also puts emphasis on the field of road transport, and here interfaces with other modes of transport through C-ITS should be a top priority for freight and logistics with core services that include tracking and tracing, fleet management, intelligent truck parking and remote freight information.

## Many islands, no bridges

Many ITS technologies are already available to manage different aspects of goods transport, from fleet to traffic operations management. However, these existing solutions are currently not linked to each other and are therefore missing the opportunity to optimise the performance which would be guaranteed by their cooperation such as, for example, offering reliable real-time information on goods transfer between transport modes.

Over the past decade, there have also been remarkable new developments in technologies that facilitate C-ITS; still, these are far from being used to their full potential despite the benefits they could bring. To enhance large scale deployment, we need

“Over the past decade, there have been remarkable new developments in technologies that facilitate C-ITS; still, these are far from being used to their full potential despite the benefits they could bring.”



to build on the existing infra-equipped cities and roads and connect to available services and knowledge of the current C-ITS TEN-T corridors projects such as the French SCOOP@F and the Cooperative-ITS corridor Rotterdam-Frankfurt-Vienna, and also to local pilot deployments of projects like Compass4D and CO-GISTICS. All these European and local activities are based on mature technologies and European standards. Nevertheless, their ongoing work on the deployment of C-ITS services in the different pilot areas has shown the need to have common specifications for existing services and applications, and also to optimise the costs compared to service reliability and effectiveness.

Interactive freight transport within corridors (vehicle-to-vehicle, V2V, and vehicle-to-infrastructure, V2I, communication) and implementation of C-ITS and e-freight solutions targeting interoperability and intermodality through a given route is necessary. Corridors need to be connected in a consistent way, from TEN-T level to last-mile deliveries, all in order to allow services to be interoperable, seamless and achieve the best economies of scale, and the scope of truly multimodal networks.

### Work to do!

The European project CO-GISTICS (co-funded under the Competitiveness and Innovation Framework Programme of the European Union) is the first activity that focuses entirely on cooperative ITS applied to logistics. Deployed in seven European logistics hubs (Romania's Arad, France's Bordeaux, Spain's Bilbao and Vigo, Germany's Frankfurt, Greece's Thessaloniki, and Italy's Trieste), CO-GISTICS is a consortium of 33 partners including local authorities (cities, regions, and ports), fleet operators, logistics clusters, and service providers.

CO-GISTICS will test and pilot seven ITS services (incl. intelligent cargo) combined with existing freight services to reduce fuel consumption and CO<sub>2</sub> emissions and to better manage transport flows in ports and cities. CO-GISTICS fleet (truck and vans) includes 325 vehicles, three ports (Bordeaux, Thessaloniki, and Trieste) and the airport in Frankfurt.

The main challenge is to move from non-interoperable ICT/ITS isolated software solutions or platforms to seamless cross-border services for freight and logistics or passengers. In addition, these isolated solutions are not linked to traffic management services and therefore cannot provide real time information, skipping the opportunity

to exchange information across the whole supply chain, hence not exploiting the full capacity of loadings to increase energy efficiency. Linking the physical infrastructure to its digital part will be the next big challenge.

Apart from CO-GISTICS, the InterCor initiative is a Connecting Europe Facility three year-long proposal study with a EUR 30 mln budget that seeks to enable vehicles and the related road infrastructure to communicate data through cellular, ITS-G5, or a combination of cellular and ITS-G5 (hybrid) networks on a road corridor through the Netherlands, Belgium/Flanders, the UK and France, in order to achieve safer, more efficient and more convenient mobility of people and goods. The intended outcome of this study is to streamline and pilot selected Day 1 Services in four Member States and to facilitate the first assessment of C-ITS services on freight and logistics, building on a common hybrid communication architecture and taking into account commonly agreed specifications from existing C-ITS corridors' first results. ERTICO is leading the interoperability activities and is supporting the technical coordination of this corridor.

Another barrier to an integrated intermodal freight transport system is the fragmentation and lack of connectivity of ICT-based information systems. ERTICO is therefore launching the AEOLIX project which will develop the necessary platform for a collaborative IT infrastructure between different actors to create an operational connection of logistics information systems in Europe. The final scope is to better manage and synchronise freight activities and facilities to support a more sustainable and efficient movement of goods across Europe.

To overcome the fragmentation and lack of connectivity of ICT-based information systems for logistics decision-making, as well as to fill in information gaps between logistics actors, a demand-driven architecture for a collaborative IT infrastructure for operational connection of logistics information systems is required. AEOLIX will be able to connect any logistics actor and with any system or platform to better manage, (re)plan and/or synchronise facilities in the supply chain. This will create visibility of information across the whole transport route, enabling more sustainable and efficient goods transport throughout Europe.

Sharing knowledge and best practices between cities is fundamental to understanding the needs and trends of urban freight; this is why ERTICO is also taking part in the NOVELOG project which

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provides guidance to public authorities on the choice of the best urban freight and service transport solutions. NOVELOG will facilitate stakeholders' collaboration as well as the development, field testing and transfer of best governance and business models to implement effective and sustainable policies and measures.

Altogether 12 cities are participating in NOVELOG, of which Athens, Turin, Graz, Rome, Barcelona and Mechelen are adopting the project's approach to improve their urban freight delivery systems. Currently, a set of available data has been collected and analysed with the aim of understanding cities' supply chain needs and gaps, as well as service trips activities, regulations, and technological methods. NOVELOG is also committed to creating a set of Urban Freight Transport (UFT) tools, facilitating cargo flows within cities, while the Understanding Cities instrument is ready to be presented to city authorities and UFT stakeholders.

In a future connected Europe, implementation of the new C-ITS solutions mentioned here is necessary to foster the continent's competitiveness on a global level, as to guarantee safe and secure movements of people and goods across borders, and to have a positive impact on the environment. ■

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Photos: European Truck Platooning Challenge

# The emergence of truck platooning

by **Davide Brizzolara**, Support Manager, and **Andrea Toth**, Communications Officer, ERTICO – ITS Europe

**Self-driving vehicles have become one of the most provocative topics in the past years, and while many of us have toyed with the idea of owning a driverless car, other less apparent but potentially breakthrough ways of how road automation would impact our lives, as well as the environment, seem to go unnoticed.**

According to Eurostat, commercial road transport is a massive industry, accounting for over 2,200 billion tonne-kilometres yearly, making up over 75% of total industrial transportation in Europe. With limited space and growing demand, it is clear that trucking will face serious challenges in the years to come. Fuel costs, chronic driver shortage in the EU, congestion, and eco-concerns are well on the Top 10 list of issues to be addressed. Truck platooning is one possible solution to many of these.

## Platoon, attention!

In the most basic scenario platooning means at least two trucks travelling with synchronicity, following each other with a human driver behind the steering wheel. The essence of achieving synchrony lies in Vehicle-to-Vehicle (V2V) communication, enabling the rear truck to know what is happening in the front one. This means equipping them with wireless connections, but also radars, and GPS, so that the trucks can monitor their surroundings as well as talk to each other in real-time and respond

to changes instantaneously, and ideally without driver intervention. The leading truck determines the speed, position, and trajectory, while the rear ones follow in near perfect unison, thus forming a platoon. In some simpler cases, only the speed is regulated, and the rear driver needs to steer.

Effects of truck platooning reach far beyond driver relief though. When the trucks are connected and track each other automatically, the minimum safety distance between the two decreases to a few metres enabling the trucks to leverage on aerodynamics. The aerodynamic drag affects both the front and rear lorries, albeit differently; by reducing the driving distance, the front truck produces less turbulence behind, whereas the rear trucks benefit from reduced headwind. Some studies show that the drag can be reduced by as much as 40% for the following vehicles in the platoon. Given that up to 50% of fuel consumption is spent on overcoming the air drag, the significance of such reduction can have a great impact on fuel saving (up to 15%), various reports from i.e. Japan and the US show.

As projects from around the globe have documented impressive results relating to platooning, it has become clear that there is merit in the technology and further opportunities to be exploited. Following one of the pioneers, CHAUFFEUR in 1998, a more recent German national project, KONVOI, tested a platoon of four trucks following each other on the motorways in 2009. Sweden's SARTRE (Safe Road Trains for the Environment) came shortly

thereafter, experimenting with packing three Volvo passenger cars behind two trucks on public roads in 2011. In 2015 and 2016, we saw more and more real life tests of platoons across the continent, from Daimler placing automated trucks in Germany to the UK's Department of Transport planning to deploy ten lorry platoons on the nation's roads.

## Going green and safe with less hassle

It is clearly of interest for EU Member States and industry alike to invest in the idea of addressing the aforementioned challenges by increasing safety, managing congestion, and reducing emissions. On the private side this means better competitiveness through lower fuel bills, while on the public – time savings and improved air quality (read more on road transport's mortality and morbidity billions of dollars' impact on human health in *Baltic Transport Journal* 4/14's *Driving out of last breath. Cost of air pollution from road transport*).

Transport in the EU is responsible for over 24% of greenhouse gas emissions, almost 72% of that derives from road transport. A quarter of this comes from heavy duty vehicles, including trucks, busses, and coaches. And while other emitters have gradually been decreasing their footprint, transport has continued to grow. As mentioned above, depending on the following distance, speed, and terrain, it is estimated that fuel savings can vary between 9% and 15% for heavy duty vehicles in a platoon compared to them travelling independently. Achieving this

“ Depending on the following distance, speed, and terrain, it is estimated that fuel savings can vary between 9% and 15% for heavy duty vehicles in a platoon compared to them travelling independently.





## How automation will enable a new generation of freight transport in the very near future

be uniform, so that it would function with various manufacturers' trucks; the whole platoon idea wouldn't make sense if companies A, B, and C have their own systems non-compatible with others since logistics companies solely use one vehicle brand. Luckily, the industry seems to understand this harmonization requirement. Secondly, (cyber)security. It is hard to imagine Europe-wide platooning not being coordinated with the use of the Internet. However, local V2V communication does not ensure that a platoon could not be hacked; motorcycle gangs have attacked lorries in the past, now we can have hackers riding alongside a platoon and ordering one of the vehicles, e.g. with hi-tech equipment or luxury cars, to re-route or stop in order to be intercepted by old-fashioned thugs.

### Technology leaps but regulation needs to catch up

One of the focal points of the 2016 Dutch EU presidency is its dedication to automation manifested in organising the European Truck Platooning Challenge. This happened in Spring 2016 and brought together various automated trucks from across Europe to the Netherlands using the main EU ITS Corridors like the Nordic Logistic Corridor, and the route between Rotterdam, Frankfurt, and Vienna. Dozens of truck platoons arrived in Rotterdam at the beginning of April proving that indeed platooning is a reality today (though still in need of some adjustments, e.g. one of the platooning trucks received a speeding ticket along with a photo of its driver reading a book, while the lorry itself safely kept moving forward). An important accomplishment for this challenge was the start of an international dialogue between the automotive industry, research institutions, and multiple governmental authorities, bringing truck platooning one step closer to reality.

However, while technological innovations are known to rise and mature more rapidly, societal acceptance and regulation need to follow pace in order for real-life deployment to be viable. In Europe, the Netherlands recently passed legislation to allow platooning on public roads, but harmonisation across other Member States is still in its infancy. As such, a number of issues needs to be addressed by policymakers and legislators, including how long and heavy a platoon can be; during which times platoons are allowed to drive on public roads; can the regulations on driving and resting times be adapted to

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the driver in the rear vehicle; can the second driver rest or simply be absent on parts of the road network. For instance, Member States define the safe distance between vehicles in different manners; some use metres, whilst other – seconds.

Bringing together the various stakeholders from industry through research institutes to policymakers to form a common standpoint on automation in Europe and beyond is the key to success. Vehicle and Road Automation Networking, a support action funded by the European Commission and coordinated by ERTICO – ITS Europe, set out to do exactly that: Start and maintain a discussion among the key players to enable the deployment of automation on Europe's roads in the safest, most reliable, and most efficient way possible.

What truck platooning means today though, and what it could mean tomorrow, goes beyond vehicles following each other. It is a new way of approaching freight all together, bringing collaboration to a new level, increasing efficiency, and serving as an alternative to more harmful practices. The technology is out there; however, it is clear that there are still some pieces of the puzzle missing before we will see platoons on Europe's roads. ■

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would be a major step towards a better eco-economy of road haulage, while improvements in engine design have already saved 1-2% on fuel and are regarded as very balance sheet-friendly.

When it comes to labour, there are two main angles we need to look at: safety and cost. As human factors such as inattentiveness or fatigue account for a great majority of road accidents, it is easy to see the benefits of machines aware 24/7 with a fraction of human reaction time needed at all times in relation to road safety. As for costs, once we reach levels of automation where rear truck drivers can rest while driving in the platoon, it is clear that trucking unions will request to be allowed to spend more time on the road rather than at resting points.

Every automation solution provokes a debate on machines and software overtaking jobs which previously required a human worker, platooning being a case in point. However, when looking at the entire supply chain, delivering goods from location A to B (the latter often being historic city centres), a driver would still be required to make the last mile delivery, after detaching from the platoon on a slip road to continue the journey unaided. Given the ongoing shortage of truck drivers in Europe, platooning can in fact make the profession more appealing to newcomers, because it wouldn't require anymore exhaustive driving with one's own hands, particularly at night. In turn, for other road users, truck platooning would not disrupt the traffic flow on busy highways, as the V2V software would be flexible enough to re-arrange the platoon in order for others to safely overtake the trucks (hiding in the middle between two lorries, if required) or to take an exit. In essence, we should see more efficient road use, less disruptions, and faster deliveries.

One great benefit that platooning already provides today is it can be implemented with the current infrastructure. Relying on V2V communication, behemoth investments in creating suitable infrastructure for the technology to function can be eliminated. However, two things must be dealt with in this regard. First, truck platooning technology has to



# Demystifying big data

by **Maxime Flament**, *Head of Connected and Automated Driving*,  
and **Andrea Toth**, *Communications Officer, ERTICO-ITS Europe*

**Big data tends to be looked upon as the silver bullet for a handful of industries. But there's a big problem with so much attention and publicity, namely the inevitable pressure that comes from the need to live up to it. This is a pity because big data can, in fact, help a lot. It's maybe not a magic weapon, yet has all the potential to be a good tool in better understanding the complex world we're living in.**

**T**here are plenty of ways we can describe the 21<sup>st</sup> century's economy – from clichés like the globalised economy or the sharing economy, to more exciting phrases like the attention economy. But perhaps one of the most fitting expressions is the information economy. It hints to multiple aspects: A shift from traditional industries to ICT-based commerce, attaching value to information, an enabler for better decisions, and finally, on a more microeconomics base, it is the fuel driving a competitive edge among companies.

## **Four Vs fuelling the information economy**

Information derives from data, therefore the better quality of the data we gather, the better quality of the information and knowledge we can potentially possess. However, it's not solely the volume of data that will ensure its quality; it's also the veracity (levels of uncertainty of reliability), velocity (speed of flow and processing), and variety (different forms and sources). The combination of these four Vs is what ensures that the information we acquire is accurate, of high quality, and can serve as a good enough base for analysis. Next, it's up to us to make better decisions based on the knowledge we have extracted so meticulously.

We've never had so much data available as we do today, whether it is in our personal or professional life, as a company or a city, or an intergovernmental organisation, the amount of data humanity as a whole is generating is absolutely colossal. Perhaps the most mind-blowing fact comes from a 2013 study, quoted by most journalists, marketers, and data scientists, stating that 90% of all the world's data was created in the past two years. That's a lot of information, which is great at first glance, but if we cannot make sense of it, it's pretty much useless.

And here come big data technologies, which are nothing more than tools making it possible to collect, synchronise, interpret, analyse, and visualise all the data we can gather. It may even seem out of date to call them big data because what we're truly searching for is smart data.

## **Big data in big (and small) cities**

By nature, public authorities usually lag a bit behind commercial businesses when it comes to adopting innovative technologies and new business models. But as cities are facing the pressure of a growing urban population, it seems inevitable to look towards novel ways of managing overpopulation, congestion, and pollution. Whether the solution lies in town planning, improving public transport services,



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or envisioning fleets of driverless vehicles (read *Baltic Transport Journal* 5/15's *Re-inventing urban mobility. Self-driving car fleets*), they all require large amounts of real-time, accurate, and accessible data.

Smart cities are one of those vaguely defined concepts that we keep hearing about incessantly. In fact, you may not even know it and you're living in one. At their very core, smart cities utilise the power of data and connectivity to enable a better functioning environment. Like managing traffic lights in line with the street's flow, or introducing a smart parking system.

Nevertheless, city-managing mobility is a tough one. The larger the city, the bigger the problem. Though restricting access, such as introducing traffic fees, could have its merits, a future solution may want to focus less on private cars and more on other players in the traffic system. The road, the buildings, the busses and taxi fleets are all part of the same city, the same problem, and could potentially be part of the solution. Thousands of sensors are constantly recording massive amounts of data which can help not only in predicting traffic trends, but also with making emergency events more seamless.

Having better functioning public transport can contribute to decreasing congestion and better traffic management on its own. However, in too many cities, current solutions for public transport are "just not good enough" to substitute a car. It isn't very easy to appeal to the better side of people: Yes, we recycle, and sure, if we like to, we bike around, but honestly, cars are still more convenient in comparison to other modes. Using big data applications could potentially improve the public transport system with minimal investment. It could help with balancing supply and demand such as by tracking passenger flow and managing the fleet accordingly. Or provide customized solutions to users, and incentivize or penalize the use of a specific route choice as opposed to another.

Before you can map out trends and advise, you first need to gather, validate, link, and store the data, which is an ongoing challenge for many cities with a limited budget. But big data solutions don't have to be expensive at all, while their specific return-on-investment can considerably outweigh the initial set-up capital and operational expenses required, including time (and traffic jam stress) savings for citizens, decreased road-caused pollution hence health and environmental benefits (read about trillions of US dollars of mortality

and morbidity costs from ambient air pollution in *Baltic Transport Journal* 4/14's *Driving out of last breath. Cost of air pollution from road transport*), better logistics, public money set free for other investments (e.g. green areas instead of new traffic lanes or parking lots), and so on and so forth. In this regard, the EU-funded Big Data Europe project has recently unveiled its open source platform to tackle challenges related to big data in the transport domain. The project has a wide scope in tackling issues relating to seven societal challenges, the one regarding transport focuses on traffic management in cities.

### My car my data?

Whether it is parking, traffic management, public transport enhancement, or another way of improving urban mobility, the options all fit into one giant ecosystem. You can always develop bits of the puzzle and bring new actors in on the fly.

Connecting all these parts is where, among others, the Internet of Things (IoT) comes in (read more in the article *Connecting the unconnected. The Internet of Things in warehousing and logistics*, on pgs. 46-47). Motion sensors fitted on a delivery bike, a tram, or a piece of clothing transmit so much data that the dynamics of a city can be mapped out. The more dots we connect, the more accurate we become, the greater the potential to serve a public good. And there are plenty of connected things available already – they just need to start talking to each other.

Data privacy is a hot topic in whichever industry you tap into. When you look at transport it seems obvious to look at navigation or speed, but it's not limited to what the car provides on its own – it's also data transmitted via your smartphone, your online posts, your tweets, etc. There's been an unresolved debate for a long time on ownership of data shared online, and regulation has an important role in defining how to deal with privacy in the first place. Even defining who owns the data (i.e. whose privacy needs to be protected) is not as straightforward as it may seem.

At the same time, getting access to sufficient amounts of data for the big data effect to kick in is important and restricting access, in some cases, does more harm than good. In that sense, the type of data benefiting the society can be looked upon as an enabler for a greater public good.

Clearly, it's controversial, and this is not the only industry where legislation quickly becomes obsolete, not being able to keep

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up with the technological advancements. Laying down a set of key principles and processes could be more beneficial than defining specific instances (which could become pointless in a year or two).

### Disrupting the world day by day

Data production will likely not slow down: Being connected, being mobile, being a data producer and user simultaneously is the reality today. There are always other competitors though in the runner up for "the next magic disruptor," and many of them tend to dismiss big data as a buzz word or a momentary fad.

Maybe it is, and maybe it has been hyped up too much and now has to live up to revolutionary qualities impacting our everyday lives. In reality, revolutions don't come so often, and it can make us cautious when we run into headlines of big data every other day, or even worse, bored and immune (e.g. virtual reality was such big excitement in the mid-1990s, and a total disaster at that time, which required another two decades to come to the surface again). Maybe we should let it be what it is: A great technology with the promise of helping us to make decisions a bit easier, a bit faster, and a bit better. In the end, this "bit" can deliver a big difference. ■

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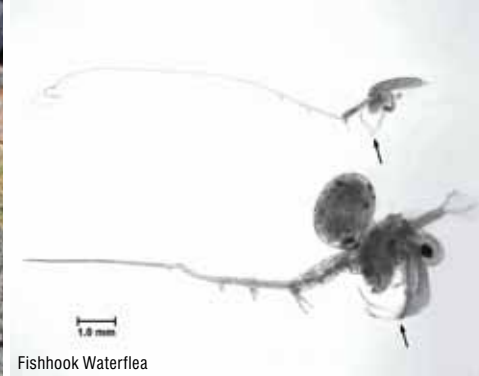


**Big Data Europe** is a project within the EU's Horizon 2020 framework programme (grant agreement No. 644564), which aims at building a knowledge- and innovation-based society, to strengthen the competitiveness of Europe's economy. For more info, please visit [www.big-data-europe.eu](http://www.big-data-europe.eu).





Photos: Wikimedia Commons/Round Goby



Fishhook Waterflea



Pacific Oysters

# The ballast of new regulations

by Maciej Kniter

The second event of the Harbours Review Spotlight series was organised during this year's Transport Week conference. This time we discussed the topic of ballast water, which gains particular attention thanks to new regulations entering into force soon. For a better understanding of this matter, our experts touched upon technical, legal, and biological aspects of ballast water treatment.

According to the International Maritime Organization (IMO) the use of water as ballast began some 120 years ago. The reason was the same as today – a certain amount of it can help balance a ship, providing better manoeuvrability, reducing stress on the hull, and compensating for weight changes. However, as time went by it was observed that picking up water in one place of the world and releasing it somewhere else leads to moving various species, sometimes very expansionist that harm a local environment. This is why the Ballast Water Convention is entering into force on September 8<sup>th</sup> of this year. In short, its goal is to enforce ship-owners to install systems onto their vessels that will ensure that no unwanted bacteria or animal will pose a threat to our seas.

What will be the cost of the retrofitting? Przemysław Myszka in his article entitled “Marine bioinvasion. Ballast water management,” published in the *Baltic Transport Journal* 3/2012 wrote, that: “60,000 vessels will need to be geared up with systems that kill organisms with an average cost from USD 200,000 per one offshore supply craft to USD 4.0 mln for an oil tanker which calls for costly fire

and explosion-proof gear. All in all, companies owning ships will see a USD 100 bln bill – another grief added to their tumbling earnings. Maersk alone evaluates its costs to reach USD 500 mln.” On the other hand, the bioinvaders are responsible for a lot of damage done not only to the environment, but also infrastructure, fisheries, and even human health (epidemics caused by contaminated water).

## What's the regulation about?

The seminar was moderated by Andrzej Smoleński, Business Manager at Alfa Laval, who briefly introduced the subject and talked of the history of ballast water treatment. The first speaker, Sille Grjotheim, Head of Approval Centre Poland at DNV GL Poland, presented the topic in terms of a general overview, market impact, and enforcement. From this presentation we learned that one of the differences in ballast water treatment standards adapted on the one hand by the IMO and the US Coast Guard on the other, is the attitude towards organisms. The Americans want them to be eliminated, while the IMO is satisfied with just their inability to multiply. This results in a different number of accepted



**Yet, not every species carried unintentionally is invasive – it is estimated that the number of invaders is at a level of 10-15% of all species brought to Europe.**





Chinese Mitten Crab

systems. When it comes to deadlines, a very important date will be the already mentioned one of September 8<sup>th</sup>, starting from which the vessels will need to carry a Ballast Water Management certificate, while from 2022 they will need to have a treatment system installed, too.

#### **Tiny invaders**

Professor Monika Normant-Saremba, from the University of Gdańsk's Department of Experimental Ecology of Marine Organisms, Institute of Oceanography, discussed the issue of aliens that are invading our oceans. Obviously, the most vulnerable are the territorial waters of the countries with higher proximity to major trade routes, like Israel, Turkey, Italy, France, Egypt, and Greece. Yet, not every species carried unintentionally is invasive – it is estimated that the number of invaders is at a level of 10-15% of all species brought to Europe. They can be transported in a ballast tank, but also on a ship as well. Shipping in general is responsible for bringing slightly over half of all aliens to our seas, followed by species traversing the Suez Canal (35-40%), but also originating from aquaculture (15-20%) and aquarium trade (less than 5%), as well as going through inland canals and from other sources (both less than 5%). Among the four worst invaders we can find Pacific Oyster, Round Goby, Fishhook Waterflea, and Chinese Mitten Crab.

#### **Solutions offered by the market**

One can notice the weight of the problem when realizing how much ballast

water is transported annually. Krzysztof Kotwzan, Head Office Gdańsk, Machinery and Equipment Department at the Polish Register of Shipping said that there is even up to 5.0 bln tn of it every year.

Fortunately, the market already has solutions put on the table. Karol Kruszyński, Sales Support Engineer at Wärtsilä Polska presented the concept of Aquarius UV and Aquarius EC. The first one is a piece of non-chemical equipment, dedicated to smaller ships. Its major weapon against unwanted species is ultraviolet light, which can remove 98% of particles. Aquarius EC on the contrary, is a chemical tool designed for larger capacity. Here, the concept is based on the use of electro-chlorination.

The two products of Wärtsilä are designed for different ships. This topic was elaborated by Henrik Krull, Regional Sales Manager at Hyde Marine, who stressed that a ship must be treated individually, and choosing a system and project engineering is hard. There are even such factors as where the ship is going to sail. The same holds true for training needs, often neglected, but which may bring a lot of savings and remove potential damages. Finally, when thinking of a ballast water treatment system, one must consider such things as the budget and space.

The perspective of the shipyard was presented by Jacek Maćdrala, Commercial Manager at the Remontowa Shiprepair Yard. Jacek forecasts that ballast water treatment is the future of the shipbuilding industry. And indeed, as the number of projects shows, there were seven projects

**Shipping in general is responsible for bringing slightly over half of all aliens to our seas.**

completed by March 8<sup>th</sup> at Remontowa, and the time of retrofitting was spread from 12 till 23 days.

As far as ports are concerned, according to Maciej Brzozowski, Head of the Port of Hamburg Marketing's Office in Poland, ballast water is not a task for ports, at least not in Germany. In fact, the Port of Hamburg is not engaged in ballast water management, even when it comes to collecting sediments; however the City of Hamburg is. Instead, the institutions responsible for implementing the BWMC in Germany are: the Federal Maritime and Hydrographic Agency – BSH (Bundesamt für Seeschifffahrt und Hydrographie), BG Verkehr (responsible for the environment, working conditions, etc.), and the Water Police.

And finally, voiced by Fotios Katsoulas, Fleet and Newbuilding Analyst/Data Manager at Affinity, there is a lot of uncertainty over the convention and its background. Ship-owners have problems with choosing the right type of BWMC system for them, and they don't know when to do it. Additionally, financial costs of installation are sometimes too high for certain ships, meaning that they will most probably be scrapped as a result of their BWMC-incompatibility.



Photo: www.pexels.com

# How can simulations help ports and terminals?

by Remmelt Thijs, *Senior Project Manager* and Dr. Yvo Saanen, *Managing Director and Principal Consultant at TBA*

The container industry is dynamic by nature. Due to considerable growth, the competitive situation in and between ports, and the changes in shipping line alliances of recent years, the container market has gained a certain dynamic. This is reflected at container terminals accommodating larger vessels, new combinations of shipping lines and often a step-wise growth. This growth could result in higher utilization of existing sites as well as regular expansion projects and new greenfield development for which simulation modelling can be of value.

As one can imagine, planning of new sites and places of expansion as well as operations improvement is not that simple and requires answering several important questions about the layout, the attainable quay crane productivity, the yard operating strategy, the terminal operating system, and the equipment. We'll try to show you that it all can be done in an efficient and reliable way.

## The power of simulations

Although simulation is increasingly used in container terminals, it is not as common as for example in the automotive industry, where no significant investment is made without thorough proof by means of simulation. This is not strange at all when using a benchmark that for every Euro spent on simulation, ten are saved.

But what exactly is "simulation"? The essence of it is to make a model of the (future) reality within the scope of the study objectives. With this model all kinds of experiments can be performed. Usually, simulation is used to assess the effect of different alternatives, for instance, an operation with straddle carriers versus an operation with rubber-tyred gantry cranes (RTGs) and terminal trucks. However, as

we will discuss further on, simulation can be applied for many more uses. In general, a simulation project exists of four steps: First, specification and development of a model, second the validation of a model, then experimentation with a model, and finally analysis of the results. By means of the animation, which visualizes the behaviour of the system, people involved are able to look closer and validate the work of the system.

## Model terminal operations

Some terminals are influenced by shipping alliances and may be under pressure to grow quickly. Therefore, a simulation can be a tool to help assess where bottlenecks could be expected – e.g. at the quay due to larger vessels, the yard due to storage constraints or in the yard or transport equipment to support the targeted service levels. It is very valuable to be able to analyse a what-if-scenario, using suitable tools to answer such questions.

Many terminals, for instance, are reconsidering their yard handling system to increase the stack density and therefore increase the throughput capacity of the terminal. As shipping lines are requesting higher service levels, terminal systems



**But what exactly is "simulation"? The essence of it is to make a model of the (future) reality within the scope of the study objectives.**



need to be designed striving for various – mostly contradictory – objectives. Quay crane productivity has to go up, stack density has to increase, operating costs have to go down, and the landside service has to be improved. In order to create handling systems that comply with those requirements, the use of a simulation approach can be beneficial to separate good from bad solutions and to prioritise improvement measures. Moreover, simulation provides an environment where one can evaluate under varying, but manageable, conditions, e.g. busy and quiet operations, breakdowns, and so forth. In the end, this will result in a more robust plan, solutions that are better thought through, increased software robustness, all leading to a reduction in risk. We aim to assess a solution within the overall system performance and include not only the technical capacity of a component, but also consider the unavoidable inefficiencies when considering a system comprised of several of those components. For instance we consider it much more realistic to consider the dynamics of 20 RMG blocks with twin cranes with its dynamics, than considering the capability of one block with twin cranes and multiply the result by 20. The overall system has inefficiencies that should be considered and therefore a system view is preferred.

The key to supporting these decisions by means of simulation is to model the equipment and operational procedures at a rather detailed level. Many attempts fail to link with reality, because the details that make an operation complicated – for instance the container loading sequence, the grounding rules, and the equipment assignment rules – are left away. We adhere an approach where those aspects are considered, so that the results from

the simulation are similar to the operational data. Close cooperation between a modelling team and terminal operator to arrive at a valid model is essential here.

The output of these kinds of models typically consists of productivity numbers of all the equipment (quay cranes, RTGs, and so on), service times (e.g. of hauliers and trains), occupancy rates of equipment, but also the utilization of the stack, and also the equipment's operating hours.

### Terminal planning of a greenfield site

The development of a new container terminal and the expansion of existing ones create new questions to be answered. Which layout, what kind of equipment and how many pieces of that equipment to purchase in order to have lower costs per move, an acceptable investment level, and competitive performance? These are typical questions awaiting a new container terminal's development team. In the decision making process around these questions, simulation can play a supportive role regarding the dimensions of the terminal (e.g. quay length, stack size), the type of handling system (equipment, operation, and layout), and detailed specifications for equipment, layout and terminal operating system's (TOS) functionality.

The first step is to determine the main requirements for the terminal. Here we apply an outside-in approach, taking the container flows that go through the terminal (vessel arrival pattern, rail pattern, truck pattern, dwell time) as a starting point. Under these external conditions, the main requirements are assessed. This means that we analyse the service level (vessel service time, gross berth productivities, and crane density on vessels) under varying terminal configurations (quay length, number of quay cranes, gross

**Although everyday operations at a container terminal differs from that of the day before, it is worthwhile to explore the possibilities of using models to improve such operations.**

quay crane productivity). Typically, per configuration, one year of operation is simulated, creating a picture of the service over the year. During the year, the variation in the stack (seasonal effects, peaks during the peak and even hourly peaks due to large discharge calls), the variation in berth occupancy (due to vessel delays, and variation in the call size), and the occupation of quay cranes can be observed, giving a rich picture of the service the terminal provides.

For a robust design, several important parameters can be modified to obtain an even richer picture in the terminal planning. A variation in cargo mix, dwell times and vessel mix can be varied to understand the terminal's requirements for varying circumstances. As important input for the next step (determination of the handling system), the model creates an understanding of the peaks in handling (waterside, but also rail- and truck-side). These peaks are important to determine how much equipment is required to supply the quay cranes with enough containers during these peak circumstances. Based on the outcome, decisions can be made concerning the quay length, the number of quay cranes, the gross productivity that quays have to achieve to accommodate a certain terminal throughput, the requirements for storage capacity, and the peak handling conditions.

The second step is more comprehensive, in the sense that there are many variables involved. Planning of the handling system involves the layout, type of equipment for the various operations – think of the number of trucks and RTGs, the number of rail cranes, the number of gate lanes, and so forth, and the logistical concept (incl. yard operating strategies). The latter is gaining importance in the case of automated terminals, since many tasks are taken over by computers. However, also at manually operated terminals is the emphasis put on efficient operations – for instance the implementation of truck

### Example view within a simulation model of operations using an automated rail mounted gantry crane (ARMG) and automated guided vehicles (Lift-AGV)



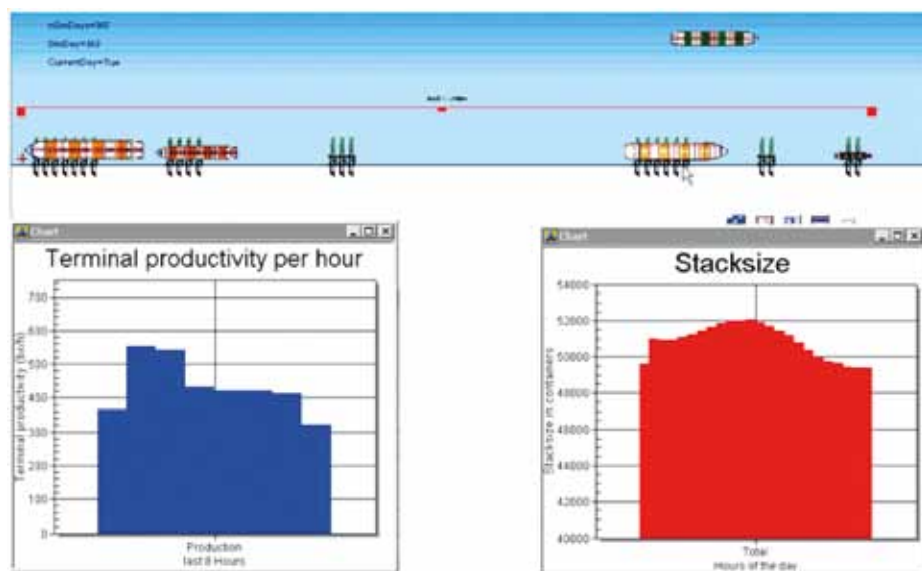
or straddle carrier pooling. In this step, the TOS should be considered in close relation to the equipment as the TOS will make important decisions on grounding and dispatching and a realistic decision systematic is important to be included with a realistic feed of information from the operations, such as the equipment position and estimated time for finishing a job.

An example of this second step is a recent comparison we carried out between manually-driven shuttle carriers (SHC), automated shuttle carriers (ALV) and Lift-AGV's. All in combination with an automated high density yard, operated by ARMGs. In terms of productivity, all three systems achieved the same performance level (40 net bx/h), but with different equipment numbers. In a peak operation the ratio between SHC, ALV, and L-AGV was 2.5-3.5-4 (per QC). The automated equipment is more sensitive to the density of the operation in terms of operating speed. Subsequently, one needs to compare the CAPEX required for each system, as well as the OPEX and understand key risk factors to come to an evaluation of such systems. A simulation detailing such can be taken further to civil design questions on pavement design, electric system requirements but also detailed kinematic characteristics of equipment and TOS functionality specifications.

### Optimise the day-to-day operation

Although everyday operations at a container terminal differs from that of the day before, it is worthwhile to explore the possibilities of using models to improve such operations. The models are getting more comprehensive and are able to capture real operational procedures and handle real operational data. They can also depict processes at the level of individual container moves around the terminal and represent decision-making around grounding containers based on a container's profile. With these models we see a great opportunity to apply them in the analysis and replay of past operations and in the pre-planning of upcoming operations. In this way, we can address questions around equipment usage

**Fig. 1. Screenshot from the simulation model to determine the key terminal parameters**



and manning given a certain operation at a quay, rail and gate, as well as decisions concerning the in-advance preparation of the yard. Similarly operational procedures, namely equipment pooling, sharing part of the equipment, real-time re-allocation of equipment, and sizing the gangs, together with strategies and patterns for yard operations in terms of yard density, travel distance and unproductive moves (shuffles).

The outcome of these analyses can be fed back into the TOS functionality specifications, and into the minds of the managers, planners, dispatchers, and operators, running the terminal. It can overcome the often contradictory perceptions of the bottlenecks in the current operation, and prioritize improvement measures. Thanks to the use of real data and operations, the value of these exercises heavily increases, because it becomes much easier to translate the result back into the consequences for coming operations. Examples of the recent findings comprise the effect of equipment pooling (15% increase of equipment productivity and therefore the potential for reducing operating costs), and the effect of an improved RTG assignment and yard grounding strategy (20% less equipment required on average with the productivity level remaining at the same level).

The essence of arriving at models that can accomplish this added value is a good understanding of the operation, including the rules in the terminal operating system. An alternative to overcome cumbersome modelling of TOS functionality is

to link the simulation environment directly to the system. In this set-up, the simulation represents all the physical processes, the TOS uses the real container data to control the operation. By doing so, it can be configured much faster to accomplish a smooth and performing operation under various conditions.

Operations at container terminals are highly complex, but automation makes them even more complex. Optimisation tools treating the operation as a deterministic process are difficult to apply because in real-time the operation differs highly from the planned situation due to the dynamic processes, weather delays and human intervention. Therefore, tools that explicitly consider the dynamics of a life operation should be favoured over others. Simulation is such a tool, able to represent and visualise container terminal operations – both the physical processes and the rules in the terminal operating system.

Applying simulation makes the decisions concerning the investment in quay and quay cranes, the choice of handling system, and the configuration of a terminal's control system better founded, better to understand, and more transparent to follow. It enables a terminal operator to reduce the risk of developing a new terminal or improving an existing one for similar or changing circumstances. If simulation is applied, one should make sure that the specific characteristics of an operation are validly represented in the model. Otherwise, the risk of nice pictures over sound results lies just around the corner. ■

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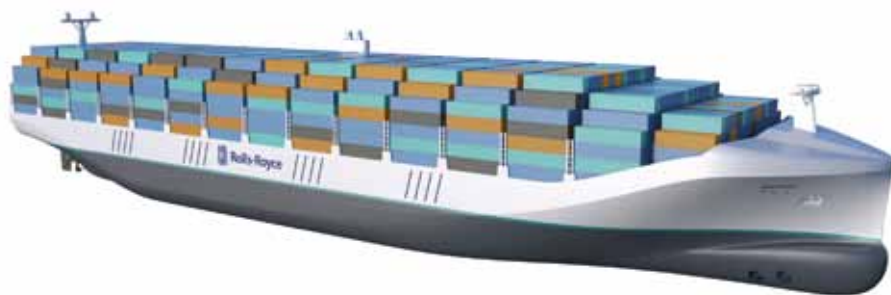
Photos: Rolls-Royce/Flickr



# Shipping's biggest revolution is coming

by Patrik Wheeler

As part of an extensive feasibility study into the unmanned ship concept introduced in 2013, Rolls-Royce, together with project partners Technical Research Centre of Finland (VTT) and Tampere University of Computer Human Interaction (TAUCHI), has visually presented the research results of over one year's hard work into how ships can be safely and efficiently operated from land-based control centres.



centre of remote operations. Handling a range of situations, the centres will have an array of technology to help them such as a "global wall" – a large digital display that provides a real-time overview of worldwide shipping traffic along with status reports of individual vessels. The concept is best viewed in a short video that shows an oX SCC in operation, where the navigating officer is alerted to a potential technical fault involving a vessel's dynamic positioning antenna (video available on [www.rolls-royce.com](http://www.rolls-royce.com)).

After looking at the options, the officer then recommends the appropriate measures to be taken, such as the deployment of surveillance drones on a "standard inspection routine" to provide a 360° view of the antenna and other external areas of the vessel. Depending on if the malfunction is operationally critical or not, the operator can determine the best solution, for example, a replacement can be scheduled at the next port of call.

Other issues such as "repeated eco-efficiency fluctuation" can also be alerted in which the operator crew may call on the expertise of a system specialist and the computer can provide a summary of recent propulsion motor operations, including an audio file for a more sensory

**t**he new concept, part of a set of oX concepts, introduces the shipping industry to a not-too-distant future in which interactive smart screens, voice recognition systems, holograms and surveillance drones are used to operate, monitor and control shipping fleets from ashore.

Rolls-Royce aims to produce a Ship Control Centre (oX SCC) project demonstrator by the end of the decade, although shore-based centres remotely controlling an unmanned fleet may take longer, about 15 to 20 years.

## A centre in detail

These centres will host a master mariner operating a fleet of vessels from a state-of-the-art control room, the nerve

**While the concept itself looks as though it could be a scene from Ridley Scott's latest sci-fi, much of the technology presented is currently available and being used in other industries.**



perception of what is going in with the anomalous motor. The centre is also designed to aid collaborative work allowing engineering teams to convene around a hi-tech collaboration table for an in-depth analysis involving a hologram of the vessel and its component parts.

While the concept itself looks as though it could be a scene from Ridley Scott's latest sci-fi, much of the technology presented is currently available and being used in other industries. However, the underlying theme of the results is the important role situational awareness and sensory perception will continue to play in ship operation even when they are controlled from ashore.

### Almost as a computer game

In the research, which evaluated the lessons learned from other industries where remote operation is commonplace, such as the aviation, automation, military, forestry, and space exploration sectors, Rolls-Royce, VTT and the TAUCHI found a potential inability to use all of the senses to assess ship and machinery performance – the human-machinery interface – as one of the main challenges faced in the development of a shore-based ship control concept.

This was a fundamental aspect of the research, as Iiro Lindborg, General Manager, Remote & Autonomous Operations, Ship Intelligence, explains: "A master mariner or engineer sitting in a control centre thousands of miles away would have no bodily feeling for the vessel, but replicating that 'feel' for the ship through real-time auditory channels and direct video feeds from surveillance drones could create that environment. This is the first public display

of results from research aimed at understanding the human factors involved in operating ships remotely. Situational awareness has been a major area of this project as we needed to understand how crews ashore can continue to use their senses to get a feel for what is going on in the engine room and other parts of the ship."

Other aspects of remote ship operation considered in the research include working in both local and global environments, the tracking of vessels, the optimisation of ship-to-shore communication, machinery self-inspection capability and ship hand-over processes.

The shore-based operation of a vessel would need between 7 to 14 people working in shifts to monitor and control the operation of a fleet of vessels. One supervisor can look after five vessels when just monitoring them. However, roles that currently don't exist on-board a ship would need to be created for the shore-based control centre, such as route optimisation officers and meteorologists to monitor prevailing weather conditions so that appropriate action can be taken. Communications officers will also have a much more important role to play.

What is the most obvious world trend nowadays? We live in an ever-changing world where unmanned and remote controlled transportation systems will become a common feature of human life. What's more, remote control and monitoring technology is already impacting the developments taking place in the aerospace and automotive industries, so it is inevitable that this technology will become widespread. It offers unprecedented flexibility and operational efficiency. "This is the big revolution in shipping," Lindborg says.

**The shore-based operation of a vessel would need between 7 to 14 people working in shifts to monitor and control the operation of a fleet of vessels. One supervisor can look after five vessels when just monitoring them.**

Acknowledging that unmanned ships and their control centres will have to have full system and software redundancy in order to protect critical infrastructure, we at Rolls-Royce have a lot of experience in this area from the pioneering work carried out by the Rolls-Royce Software Centre of Excellence that leads the company's remote engine monitoring activities in the aerospace sector.

The industry is becoming more accepting of a crewless shipping future. "Initially the market didn't see it as viable but now the industry is accepting this future. The mindset has changed. Shipowners and the industry in general are very interested and the oX Ship Control Centre shows that shipping operations can be safer and more efficient if controlled remotely. This is the conclusion to the basic research we have undertaken into unmanned ships; the next step is to build a project demonstrator, which we hope to have completed by the end of the decade. We are looking at the different vessel types and their operational profiles as they will need different types of control centres in different locations," Iiro Lindborg concludes.

The article was originally published in the 3/2016 issue of the *Baltic Transport Journal*, on pgs. 56-57.



Photos: Action Modulers

# Swinging into action

by **Rodrigo Fernandes**, *Project Manager & Commercial Manager*  
**Frank Braunschweig**, *CEO & Business Development Manager*  
and **David Brito**, *Technical Director*

**A**ction Modulers – Consulting & Technology Lda is a Portuguese company based in Mafra, focusing on numerical modelling, development of innovative technological solutions, safety planning services, and training activities. The firm also provides licensing, support, and worldwide training on their software systems (e.g. MOHID Studio and ACTION Server), used by hundreds of professionals of the water business in over 40 countries. For more info on the company please visit [www.actionmodulers.com](http://www.actionmodulers.com). For more insights on ACTION Seaport please click here [www.actionseaport.com](http://www.actionseaport.com)

**With roughly 74% of goods coming to Europe seaborne, ports are vital elements of the economic machine. At the same time, they're entities that face a considerable number of both everyday operational and long-term strategic decisions that just have to be made, where a real plethora of factors influences their activities, be it adverse marine weather, search and rescue (SAR) operations, oil spills, various collisions, or new eco-regulations. Luckily, next-gen digital solutions have something in store that might not only ease them in their daily bread-and-butter at present, but boost their performance in the long-term, too.**

**M**ore traffic in general, and ships increasing in size in particular put additional pressure on seaports' productivity. Any drawbacks in this regard can result in congestion and delays, hence burden shippers, transport operators, and ultimately consumers with extra costs. As a consequence, a port's efficiency, competitiveness, and reputation can tumble down. Coupled with a rising emphasis put these days on environmental and safety issues, no wonder that novel technologies – taking advantage of the Internet of Things, big data analytics, high resolution numerical models, and cloud-based methodologies that smartly fuse together various inputs from multiple sources – have emerged to lay a helping knowledge-driven hand to ports.

## ...and action!

In this context, the expertise and know-how gathered by Action Modulers from present and previous research and development projects have enabled us

to design and implement ACTION Seaport, an advanced mobile-friendly platform aimed at decision-supporting first and foremost port authorities (but which can successfully be used by other parties such as coastguards, SAR forces, or maritime offices), covering the bulk of the abovementioned aspects. Using an innovative, holistic, accurate, and cost-effective approach, this technological platform is able to improve port efficiency, competitiveness, and safety, particularly their environmental, navigational, and operational/logistical aspects.

As such, ACTION Seaport can help port authorities and operators by, first, improving maritime situational awareness thanks to data fusion from high resolution metocean models, drift forecasts, Automatic Identification System (AIS) vessel data, webcams, satellite images, weather stations, and buoys. Next, it provides early-warning notifications from adverse metocean conditions as well as daily data analytics reports,

**“ACTION Seaport addresses both general and specific ports' needs, particularly those authorities that want to embrace various future-oriented strategies, like going green or becoming tech-savvy.”**



**ACTION Seaport acts as a source that pools various inputs towards one place, and consequently as a link for this knowledge base to become the foundation of smart data-empowered decisions.**

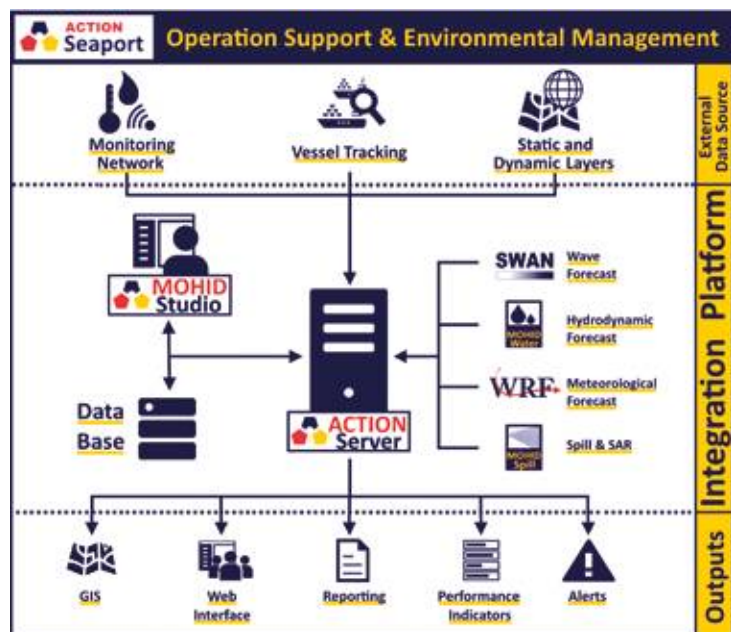


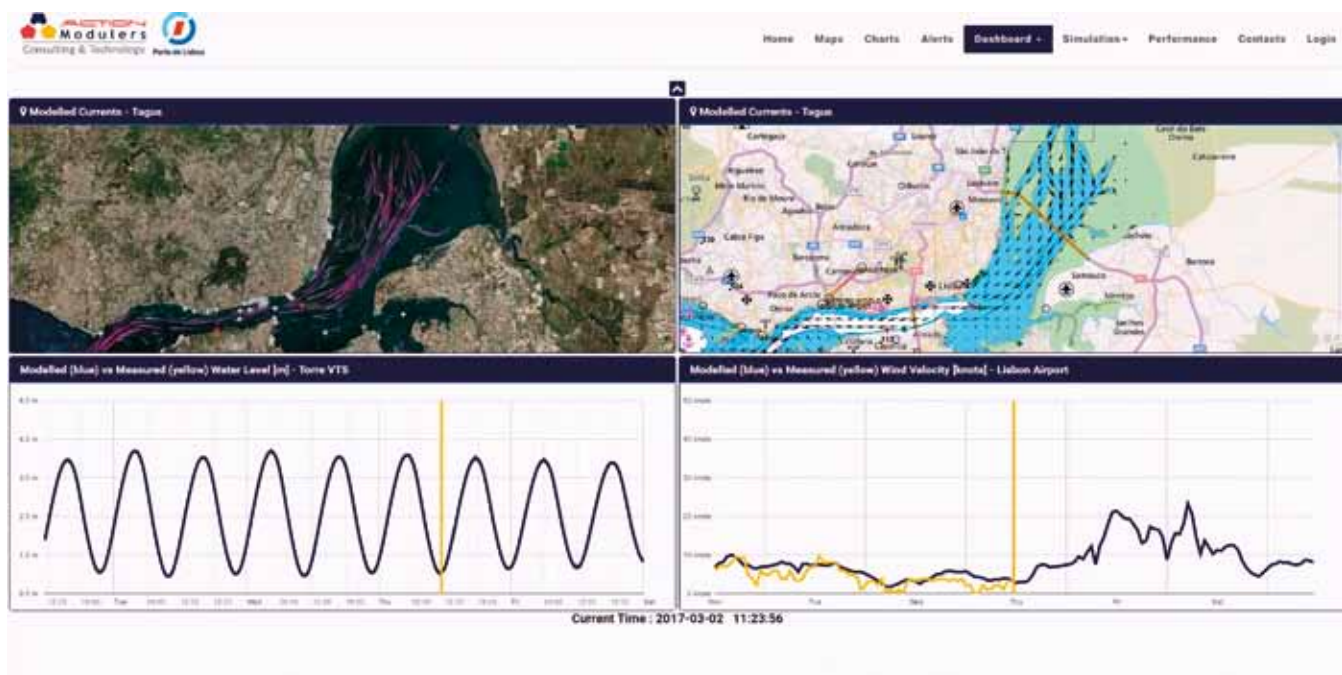
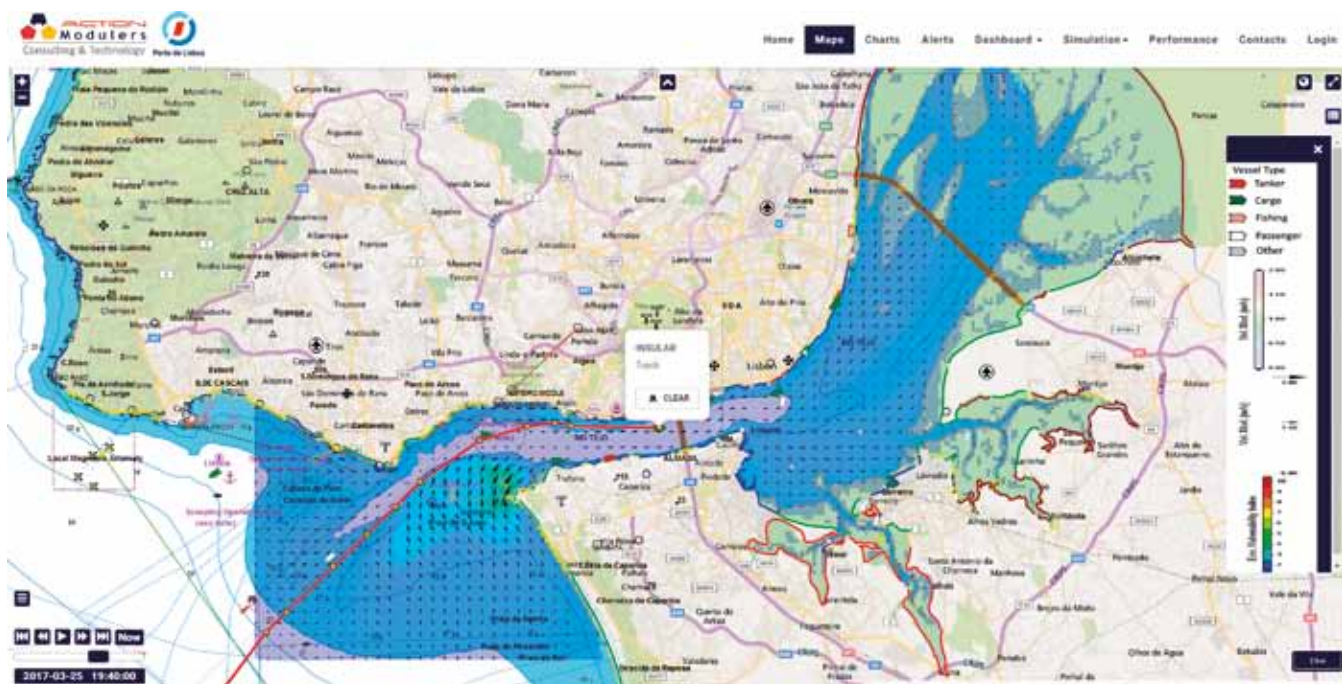
increasing ports' preparedness to face marine weather storms and to manage downtimes more swiftly. Third, ACTION Seaport delivers piloting and navigation support in maps and critical points, along with smart environmental monitoring, integrating vessel data, and estimating water and air parameters. Fourth, it gives tactical support to air and marine pollution as well as to SAR with on-demand drift model for oil, chemical, inert spills, and floating objects. Lastly, it makes it possible to minimize port congestion and optimize berth planning by using continuous and dynamic AIS-based operational port performance indicators (geospatial data analytics) computed in real-time or for user-specified periods. The information provided in the frontend is therefore a result of combining the most recent IT concepts applied to state-of-the-art numerical forecasts and multisource-sensed data.

ACTION Seaport works seamlessly in any Internet-connected device (smartphone, tablets, PC, etc.), efficiently presenting reliable and accurate

information in visually-appealing Web-Geographic Information System maps, charts and tables on specific points, dashboards, tailor-made SMS/e-mail

alerts, reports, and through other web services (Web Map Service + Representational State Transfer API), all duly supported by a cloud





**ACTION Seaport is a market-ready solution that's flexible enough to serve any port worldwide. The first stage of internationalization will start during the European Environmental Ports Conference 2017 (to take place in Antwerp from June 7<sup>th</sup> to 8<sup>th</sup>), where we'll deliver a pre-event training course around our solution's functionalities, as well as present the details on the Lisbon pilot implementation.**

infrastructure to ensure fault-tolerance, scalability, performance, and improved skill and resolution of the numerical modelling forecasts. With a combination of novel and innovative solutions – encompassing dynamic AIS-based port performance indicators, air emissions from vessels, on-demand 3D simulation of oil or other hazardous and noxious substances spills (using the MOHID Water Modelling System), there seems to be no other disruptive, holistic, flexible, and modular solution of this kind

available on the market that's capable of providing ports with such a comprehensive support.

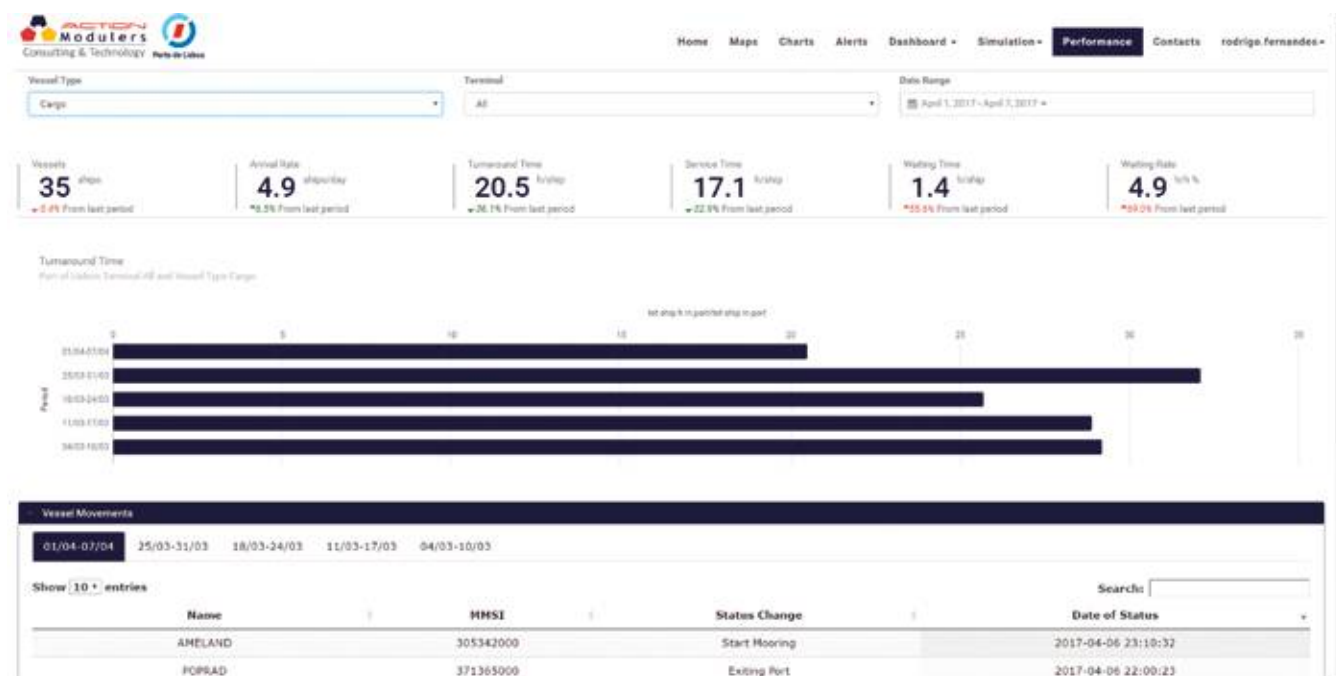
#### Target: market

ACTION Seaport has been tested throughout the Port of Lisbon, one of Portugal's majors when it comes to handlings of solid bulk foodstuffs and containerised goods, as well as one that's heavily involved in passenger traffic, both locally and internationally (named by World Travel Awards Europe's



the details on the Lisbon pilot implementation.

All things considered, ACTION Seaport addresses both general and specific ports' needs, particularly those authorities that want to embrace various future-oriented strategies, like going green (from an environmental and economic point of view), or becoming tech-savvy, a perk that can greatly improve all other port features, overall performance being the name of the game. However, our solution is also tailored towards seaports facing important safety concerns related to port-entrance-and-berthing ship navigation, and here especially in the case of difficult weather conditions and demanding port bathymetry (e.g. shallow waters). In addition, ACTION Seaport can aid other institutions, too, like SAR forces or maritime



Leading Cruise Port 2016). Lisbon is an in-city port, located in the nearest vicinity of urban areas, as well as right in the heart of a big and ecologically-sensitive estuary of the Tagus River, which at the same time is characterized by great time and space variability in terms of currents and water level. As such, the Port of Lisbon must take into consideration various trade, cargo handling, logistics, social, environmental, health, safety, and navigational factors when both executing

its daily routines as well as creating any future plans. And this is also precisely the environment which has guided us in making ACTION Seaport a market-ready solution that's flexible enough to serve any port worldwide. The first stage of internationalization will start during the European Environmental Ports Conference 2017 (to take place in Antwerp from June 7<sup>th</sup> to 8<sup>th</sup>), where we'll deliver a pre-event training course around our solution's functionalities, as well as present

offices. In the end, the benefits are widely distributed on a win-win basis, as faster and safer ports equal better economic conditions, hence improved logistics, lower lead times, cost savings, and so on and so forth. In other words, ACTION Seaport acts as a source that pools various inputs towards one place, and consequently as a link for this knowledge base to become the foundation of smart data-empowered decisions. ■



## Changing tides?

by Dr. Kai-Dieter Classen, LL.M. (Berkeley), Deputy Director  
of the External Affairs Division of the Hamburg Port Authority<sup>1</sup>



**K**ai-Dieter Classen is Deputy Director of the External Affairs Division of the Hamburg Port Authority (HPA) and Associate Lecturer at the University of Hamburg, where he teaches WTO Law and is a Member of the Board of Examiners for EU and International Law. He studied jurisprudence in Kiel, Stockholm, Hamburg and Berkeley. In his career he served i.a. as a National Expert in the EU Commission's Legal Service in the field of International Trade Law before joining HPA in 2012. Here, he advises the management on questions of Competition Law, Ports & Maritime Regulation and foreign affairs. He represents Hamburg in several Committees of the European Sea Ports Organisation.



**The new US administration has taken a controversial U-turn and seems to pursue an anti-free-trade, "America first" policy, backing out of the Trans-Pacific-Partnership (TPP) trade agreement as well as shelving the Transatlantic Trade and Investment Partnership (TTIP) negotiations.**

**Shipping policy is trade policy. While liberalization of global trade was trump for decades, the sector of maritime transport services has remained relatively resistant to such attempts. In this area, the US law on maritime cabotage – the so-called Jones Act – stands out as an instrument of protectionism par excellence. With a looming protectionist era in world trade, this law might be viewed as a blueprint for more regulation of such kind rather than a phase-out model.**

**F**or many years, free trade according to the theories of Smith and Ricardo was the leitmotiv in international politics. The World Trade Organization (WTO) provides the legal global framework for trade in goods and services, while many states exert themselves for additional liberalization based on bi- or multilateral trade agreements. Free trade, however, cannot unfold its full potential, as long as maritime transport services remain shielded from cost- and efficiency-enhancing competition. In 2013, the US and the EU entered into negotiations to integrate their respective markets well beyond WTO standards with the envisioned Transatlantic Trade and Investment Partnership (TTIP). It was in this context that e.g. the European Community Shipowners' Associations (ECSA) demanded that EU operators should have unrestricted access to all US maritime segments, which are currently closed to them due to the US Merchant Marine Act of 1920, also known as the Jones Act.

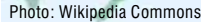
Now, the new US administration has taken a controversial U-turn and seems to pursue an anti-free-trade, "America first" policy, backing out of the Trans-Pacific-Partnership (TPP) trade agreement as well as shelving the TTIP negotiations.

That way, the US government ironically forms an alliance with European anti-globalization activists. Hot on the heels of this new protectionist stance, the Energizing American Maritime Act (H.R. 1240) was introduced to the House of Representatives on February 28<sup>th</sup>. The Bill requires that, starting in 2020, 15% of all US exports of Liquefied Natural Gas (LNG) and crude oil shall be transported on US-flagged vessels. The quota would rise to 30% in 2025. By referring to national security risks, the preservation or rebuilding of technical skills and potential for many high paying maritime jobs, this attempt to establish strategic control over shipping assets and parts of the energy supply chain draws heavily from the Jones Act. Sponsored by a Californian Democrat, the initiative shows in addition that protectionism these days is not only on the Republican Party's agenda.

### Who's Jones?

The Jones Act (46 U.S.C. §50101 et seq. (2006)), named after its initiator Senator Wesley Jones, generally restricts transportation of merchandise between points in the United States to US-built,

<sup>1</sup> This article represents the author's personal view



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Photos: www.pexels.com

as well. For example, the Agreement on Maritime Transport between the European Community and its Member States and the People's Republic of China (OJ 2008 L 46/25), though not yet fully implemented, grants i.a. non-discriminatory treatment "to vessels flying the flag of the other Party or operated by nationals or companies of the other Party, as compared to the treatment accorded to its own vessels, with regard to access to ports, the use of infrastructure and auxiliary maritime services of those ports, as well as related fees and charges, customs formalities and assignment of berths and facilities for loading and unloading."

The Comprehensive Economic and Trade Agreement (CETA) between the EU and its Member States and Canada, signed last year on October 30<sup>th</sup>, and endorsed by the EU Parliament on February 15<sup>th</sup> 2017,

goes significantly further. According to Art. 14.3(2): "A Party shall permit the international maritime transport service suppliers of the other Party to supply feeder services between the ports of that Party." With this obligation, the EU and Canada open their respective maritime cabotage markets to service suppliers of the other party. In Canada, the Coasting Trade Act (S.C. 1992, c. 31) currently excludes foreign ships from coasting trade, i.e. trade from one place in Canada to any other place in Canada. And Art. 14.3(4) prohibits specifically what the Energizing American Maritime Act tries to achieve, by stating that: "A Party shall not adopt or maintain a measure that requires all or part of any international cargo to be transported exclusively by vessels registered in that Party or owned or controlled by nationals of that Party." The contrast between the policies pursued could hardly be starker. To come to full effect, CETA now needs to be ratified by all EU Member States.

### A future uncertain

Despite these developments towards liberalization of maritime services, the EU Parliament's Committee on Employment and Social Affairs (EMPL) in a draft own initiative report on social dumping in the EU (2015/2255(INI)) called on the Commission to introduce Jones Act-like rules. This position, while propelled by the legitimate goal to fight social dumping in the transport industry, ignored that a protectionist environment is harmful to trade, and affects ports, the port industry, and all companies involved in the logistic chain, as well as the final consumer. Moreover, adopting such legislation would be diametrical to EU trade policy and could turn into a slippery slope. In the end, the plenary dropped this controversial demand in its final report, but the incident shows that protectionist positions can become popular also on this side of the Atlantic.

In the US, the legislative initiative for an Energizing American Maritime Act was not met with unanimous applause. Critics pointed to ambiguities in the bill, the lack of sufficient ship-building capacities in the US, increasing costs for transportation, and the contradiction to free trade principles. In effect, the bill would mean an internationalization of the Jones Act. Its potential impact goes well beyond domestic affairs in the US and will be felt on the international energy markets.

Whether the critical voices will find an attentive ear seems doubtful in the current political climate. More protectionist initiatives are on the table and their promoters are already bringing guns to bear on the WTO. For ports, the global transport and logistics industry, but also for the consumer a tide change towards protectionism would be a disaster. ■





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# The threat hidden in the depths

by Lars Jensen, *CyberKeel's CEO*

The rapid increase in satellite bandwidth combined with decreasing costs have resulted in the world's vessel fleet rapidly becoming an integral part of the Internet of Things. Ports and terminals are embracing automation with driverless vehicles, while others experiment with airborne supply deliveries using remote-controlled drones. At the same time, the world of shipping is finally catching up to the technology of the 21<sup>st</sup> century with processes and information exchanges being automated.

CyberKeel is a 2014-founded Copenhagen-based company dealing with maritime cyber security. The company's employees combine unique expertise, deep insights, and experience from working earlier in the maritime industry, with hard-core cyber security skills – and its opposite, the world of hacking. CyberKeel's know-how allows to assist companies not only in enhancing their IT security, but also in raising staff awareness. For more information, please visit [www.cyberkeel.com](http://www.cyberkeel.com).

All of these developments are to be welcomed, as they drive efficiency and value. To put it another way, they are a necessity for any maritime company with the ambition to still be part of the industry ten years from now.

However, there is a hidden threat in this vast ocean of maritime opportunities. Unfortunately, it is a threat which many companies do not address, and of those that do, their approach is often flawed and ineffective. The threat is cyber-attacks, and despite its intangible nature, the damage it does is by all means concrete.

Let us then address this issue in three steps by answering the following questions: Is the threat real? What is the nature of it? And what can – and should – maritime companies do about it?

## Is the threat real?

When CyberKeel was one of the first companies to address maritime cyber security some three years ago, most companies were of the opinion that the cyber-attack threat was mainly hypothetical, but not something that was actually happening. Much like a Hollywood movie script which might seem realistic at first glance, but eventually has no solid footing in reality. Additionally, cyber security companies are at times accused of scare-mongering for the sake of simply generating business for themselves. Hence, the question is a valid one: Is there actually a genuine threat, lurking in the depths?

Regrettably, there is no shortage of actual examples, many documented over the last couple of years. Shipping lines and agents have lost millions of dollars due to e-mail accounts being compromised and misused; maritime information systems have been hacked by criminals and used for smuggling purposes; electronic certificates have been stolen for fraudulent purposes; as well as both ports and merchant vessels experiencing cost-burdening downtimes due to cyber-attacks. Additionally, as the maritime industry is just now joining the Internet of Things in its earnest, it is only now becoming exposed to threats already befalling other industries. Industrial systems have seen cyber-attacks shutting down power plants, physically destroying large-scale equipment, as well as erasing tens of thousands of computers in a single company (not to mention all the nation state hacking clashes). All in all, the threat is real and present.

## What is the nature of the threat?

Let us start with dispelling another common myth. The main threat from cyber-attacks is not someone who hacks into an LNG carrier, and blows it up like some super-charged bomb while in port. Whilst this scenario might be conceivable in theory (for ideology-possessed terrorists), it is highly unlikely (for someone involved in money-focused organized crime). The actual threat is much more “boring.”

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**There is a hidden threat in this vast ocean of maritime opportunities. A threat which many companies do not address, and of those that do, their approach is often flawed and ineffective. The threat is cyber-attacks, and despite its intangible nature, the damage it does is by all means concrete.**



It would be too lengthy in this article to go into depth about all the actors and vectors of threat involved, but in essence it boils down to three key aims, namely the theft of money; stealing information; and/or the denial of asset usage. Some attacks might target accomplishing several of these aims simultaneously.

The theft of money is already a large business, and also in the maritime industry. Either directly from maritime companies, or by manipulating their data to steal money from a third party. The theft of information – or the manipulation thereof – is also big business, as successful cyber-attacks towards maritime information databases can help to facilitate illicit shipments. For instance, a container shipment from origin to destination requires 20 to 50 handover points of critical information. All it requires is the successful penetration of one or two of these entities, and it is now possible to perform a “ghost shipment” where the container is moved across borders without anyone actually knowing this takes place.

More disconcerting is the denial of asset. It is a variation of the classical denial-of-service (DoS) attack, but instead of blocking access to computers, the intention is to render the use of an asset (such as a ship, terminal, or a port) impossible. Such attacks do not have to be sophisticated to work; all one needs is to overload critical systems with malware or deploy cheap GPS jammers in critical locations. None of these attacks would permanently render the assets useless – but that is not the purpose.

A denial-of-asset attack primarily has one of two aims. One is simply blackmail (not unlike ransomware attacks). The maritime company will eventually regain control over its vessel or automated terminal equipment – but how long will that take,

and at what cost? When it strikes, it will likely appear more attractive to simply pay the ransom to get the asset up and running once again.

The other aim would stem from nation states. Any country engaged in armed conflict (or similar) with another state will, as an integral part of its warfare strategy, aim at disrupting the opponent's critical infrastructure, with the maritime sector certainly to be considered as such for states with any length of coastline. Consequently, each and every maritime company, irrespective of its ownership, could find itself targeted by nations desiring the operational shut-down of maritime activities in a certain area.

#### **What should maritime companies do?**

Whilst all the cyber threats can indeed sound daunting, heightening the cyber security levels can be done by employing relatively simple and inexpensive measures.

First – and most importantly – maritime companies need to understand that a cyber security strategy should be developed at the C-level. This means the CEOs along with their direct reports should all be part of this. Even though the IT manager will certainly have some tasks and responsibilities, the anchoring of the cyber security strategy cannot be with the IT manager alone, as simply he or she does not have the authority to deal with it singlehandedly (nor their departments as a whole). This is because cyber-attacks aim to exploit weaknesses in business processes as well as with ordinary staff, and unless these issues are not addressed extensively, any action taken by IT managers will be easy to undermine and compromise.

For land-based organizations, simple staff awareness sessions increase land-side cyber security materially. Additionally,

**Whilst all the cyber threats can indeed sound daunting, heightening the cyber security levels can be done by employing relatively simple and inexpensive measures.**

training for IT managers in simple tricks to heighten security using configuration tools they already have will further increase security. These steps are relative inexpensive, and do not require large investments in new software or in other tools. Secondly, a critical and practical review of back-up processes must be undertaken regularly. Any maritime company must be able to cope with the complete loss of all data.

For seaborne assets, BIMCO released a set of voluntary guidelines for cyber security in early 2016, and CyberKeel was one of the contributors. These recommendations provide a very pragmatic approach to cyber security on-board vessels, where the reality of poor bandwidth, equipment malfunctions, and very low cyber awareness skills are prevalent.

Hence in short – maritime companies should neither panic nor should they ignore the threat. For starters, they need one or maybe a few days of workshops on understanding the threat within the context of their own business. Then by adjusting their procedures accordingly, and doing a bit of simple training, they will already have increased their cyber security levels significantly. Only when all these measures have been taken, implemented, and kept alive, should the next step of more sophisticated measures be considered. ■





Photos: Karl-Ludwig Poggemann/Flickr



# Explosion & fire risk

by Peregrine Storrs-Fox, *TT Club's Risk Management Director*

**I, personally, as the Risk Management Director of specialist freight transport insurer TT Club, am concerned that a lack of emphasis on the safe handling of dangerous goods, epitomised by the dramatic explosion in the Chinese Port of Tianjin in August 2015, is leading to increased risk in global trade.**

inevitably, there have been a number of differing assessments on the impact of the explosions in Tianjin in August 2015, but a sound and thorough analysis was recently provided within a Swiss Re 1/2016 “Sigma” report. That report states that Tianjin was the biggest insured loss of the year, with property loss estimated at between USD 2.5-3.5 bln, and approaching 200 fatalities. The official Chinese report speaks of the destruction of over 12,000 vehicles and 7,500 freight containers, together with significant further damage up to 5 km away. However, TT Club would argue that these blasts should primarily be seen as a spectacular example of why those operating throughout global supply chains should examine their work practices and risk procedures more thoroughly.

## Causes and aftermath

However the damage is estimated, the incident should become a focal point, drawing attention to underlying vulnerabilities within global supply chain processes. It underlines how cargo in transit, potentially mis-declared, packed or handled incorrectly, can cause widespread damage and loss of life.

TT Club’s analysis of its claims history reveals that incident causation is perhaps surprisingly consistent through the supply chain industry insured by the Club. Two of the key causes are immediately relevant here – fire and poor cargo packing. Indeed, while there is substantial consistency in the relative significance of each major causation year-on-year, it is notable that the costs

related to fire are almost invariably disproportionate to the number of incidents.

In this regard, TT Club highlights that the total economic costs incurred by the industry, as well as individual entities, should also take into account those elements that fall outside the ambit of insurance, and particularly headings that are frequently hidden losses, such as management time and distraction, and reputational damage. The Swiss Re “Sigma” (mentioned above) identifies the disparity between “insured” and “total economic” losses; earlier studies have concluded that any entity may expect to suffer multiples of the insured losses in overall economic impact following an incident. And this is particularly relevant in relation to fire, which by nature is a most destructive and intrusive type of incident, more directly threatening the survival of an entity.

While Tianjin was undoubtedly a substantial and tragic incident, a key issue that needs to be addressed in the context of both maritime and land-based transport is that cargo-related fires and explosions are too common in the containerised supply chain. In addition to port-based incidents over the last year in Vancouver, Canada, and Santos, Brazil, there has been a lengthening list of container ship explosions and fires in recent years. Indeed, there is a generally perceived worsening trend with regard to cargo-related shipboard fires, primarily when the crew was not trained as firefighters, being presented with unknown hazards in the ship’s stow and hardly adequate firefighting techniques.

“While Tianjin was undoubtedly a substantial and tragic incident, a key issue that needs to be addressed in the context of both maritime and land-based transport is that cargo-related fires and explosions are too common in the containerised supply chain.”

However, the nature of most of these cargo-related fires in port areas amply demonstrates what TT Club describes as “adjacency.” This is the risk arising from one package within one transport unit amongst some kind of storage area. Where such a package is or becomes dangerous, whether or not accurately packaged, declared, packed and secured in the transport unit, the proximity to other cargo and units may lead to a catastrophic consequence.

It is clear that cocktails of chemicals can be extremely potent, individually and in combination; it is equally true that many inert cargoes are capable of burning fiercely. Thus, while the ignition, intensity and longevity of a fire may be directly influenced by the type of cargo concerned, the totality of the devastation and consequent economic loss, in risk assessment terms, needs to take the inherent uncertainties in the unit load industry into account. A huge benefit derived through the concept of utilising standard-sized units to enclose diverse cargoes is undermined by the unknowns of content and condition in any given box.

### Just following the rules

TT Club has repeatedly publicised the generic risks arising from poor and incorrect packing practices, consistently finding that about two-thirds of insured cargo damage claims can be attributed to such issues. This general statement is corroborated by the container shipping lines' Cargo Incident Notification System Organisation (CINS) data, which shows an overwhelming 75% of the incidents reported as being due to packing issues. The general importance of the CTU Code (IMO/ILO/UNECE Code of Practice for Packing of

Cargo Transport Units – for more information visit: [www.imo.org](http://www.imo.org)), published at the end of 2014, cannot be stressed too highly.

However, matters relating to cargoes that are inherently defined as dangerous inevitably lead to greater concern. There are well established international standards relating to the transport of dangerous goods by any mode, derived from the recommendations of the UN Committee of Experts, contained in the UN Recommendations on the Transport of Dangerous Goods (known as the “orange book”). This forms the basis for a series of codes covering the classification, packaging and labelling of dangerous goods for transport by road, rail, inland waterway, sea and air.

Relevant guidance for activity within the port area, dovetailed into this intermodal regime at international level, is the International Maritime Organization's (IMO) document “Recommendations on the Safe Transport of Dangerous Cargoes & Related Activities in Port Areas” (MSC.1/Circ.1216 (2007)). As an aspiration, the contents of these recommendations should be implemented, modified or otherwise covered in national guidance or regulations.

A concern has to be that the level of compliance with mandatory international law is insufficient to preclude incidents. Greater focus should be addressed to training and competence, together with engendering behavioural change. Seeking to address this, the IMO recently issued MSC.1/Circ.1531 in relation to the CTU Code, encouraging national governments to promote due diligence checks between supply chain stakeholders, and providing guidance as to the characteristics of service providers. More importantly, a broad set of stakeholders is identified, setting out their roles and how they can affect culture

**“Nevertheless, implementation and enforcement of international law is practically reliant on processes and controls at individual, corporate and national levels. For every known incident, there will most likely be a plethora of “near miss” events.**

change. The recognition that all stakeholders have ownership in the supply chain venture rings very true with maritime tradition; crucially, it is consistent with the reality that most stakeholders have no actual knowledge of what is in the box or how it is packed and secured.

Nevertheless, implementation and enforcement of international law is practically reliant on processes and controls at individual, corporate and national levels. For every known incident, there will most likely be a plethora of “near miss” events. By way of example, Hapag-Lloyd noted a sharp rise in its “Watchdog” findings following Tianjin, commenting that “many ports drastically tightened their dangerous goods guidelines in the wake of the incident or even prohibited dangerous goods from being processed at all.” This demonstrates both the risks and a capability, through intelligent software, to implement mitigation.

At their heart, trade facilitation and efficient global supply chains rely on the operation of good faith, requiring the competence of each stakeholder. Let the explosions at Tianjin be a rallying call to improve cargo handling practices, reducing risks to people, and maintaining the integrity of cargo and transport infrastructure. ■



# Getting ready for the switch

by Bartosz Dąbrowski

**The year 2020 will bring about a key shift for ship-owners all around the globe. The 0.5% sulphur cap will be introduced globally, a regulation affecting some 70,000 vessels, and subsequently markets served by them. Is it high time to start worrying, or has the 0.1% Sulphur Emission Control Areas (SECA) paved the way so that the rest of the world can easily sleep at the switch?**

**T**he Baltic and North Seas, the English Channel, as well as North America together with the US Caribbean and Hawaii have been subject to a strict 0.1% sulphur limit in ships' fuel since January 1<sup>st</sup>, 2015. The SECA topic has been one of the hottest over the past few years, leading to many controversies, including openly voiced doubts about politicians' sanity, missed forecasts on bunker prices, additional surcharges levied by shipping operators before 2014's end, and abatement investments in either scrubbers or Liquefied Natural Gas (LNG).

Two fairly stress-free years of living with SECA were made possible thanks to the sharp dump in oil prices that miraculously took place at the turn of 2014 and 2015, while others have introduced their own rules, too, such as e.g. Hong Kong where ships at berth are already limited to 0.5% fuel, with China eyeing the potential of introducing the 0.1% level in 2020. However, we are now talking about the whole of Earth's seas and oceans. How can a task, which by all means was challenging for one of the most developed economies in the world, be successfully played out involving the remaining parts of the globe?

## The way(s) out

Availability of compliant fuels is the first thing called into question. Back two years ago, the bulk of ship-owners decided to pursue the simplest solution, namely they switched to Marine Gas Oil (MGO), increasing its deliveries by as much as 50%. However, MGO together with other low sulphur fuels is predicted to generate high costs in 2020 and beyond (USD 464/tonne), as well as cause problems with supply. The Organisation for Economic Co-operation and Development estimates the additional cost for the container shipping business alone to range between USD 5.0 bln and USD 30 bln per year. According to EnSys' Supplemental Marine Fuel Availability Study, some 205 mln tn of Heavy Fuel Oil (HFO) will have to be "switched" into 195 mln tn of compliant distillates, as 2020's total fuel consumption is predicted to reach around 342 mln tn. Some technology and refining companies are preparing in advance to supply this demand, as outlined by Bruce Abbott, Genoil's President and COO, in his article *The 0.5% global sulphur cap. Technology key to meeting new marine fuel market challenges* in *Baltic Transport Journal* 5/16.

The 0.5% cap is to cut HFO demand by approx. 44%. Nevertheless, just as in



**Most probably, several companies will use different options at the same time, as was the case in the Baltic, e.g. some of Fjord Line's or Viking Line ferries running on LNG, while others on MGO.**



## The global 0.5% sulphur cap

SECA, HFO will still be on the market for those who decide to retrofit their fleets with exhaust gas cleaning, i.e. scrubbers. By 2020, approx. 48 mln tn of High Sulphur Intermediate Fuel Oil (HS IFO) is forecasted to be burned by scrubber-equipped vessels, according to EnSys' paper. Other prognoses, in turn, point to a limited number of scrubber installations by 2019's end. Before SECA entered into force, only DFDS Seaways and Finnlines decided to go full steam with scrubbers, each investing around EUR 100 mln in them, and hoping for a significant price spread between high and low sulphur bunkers. This scenario, however, hasn't materialized so far, so other companies aren't exactly hasty with making such risky capital-intensive and return-on-investment decisions. As per forecasts placing a price tag of USD 70 per barrel, the difference between compliant and non-compliant bunkers can reach USD 400/tn in 2020+, but we saw a number of such calculations going down the tubes once the clock hit January 1<sup>st</sup>, 2015. Here, there's also the need to decide whether to go for an open, closed, or a hybrid loop scrubber, costing in the range of USD 3.0 and USD 10 mln for newbuild

bulk carriers and container ships, respectively. Choosing the latter two may be a necessity when operating in fresh water environments or in areas where water-to-sea discharge is restricted. Yet, in these cases a ship-owner must also include the costs of chemical consumables as well as sludge handling, and not all sea-ports are ready to take care of it. As any addition, scrubbers will increase maintenance expenditure. DNV GL has calculated that using HFO with a scrubber will cost 4-16% more by 2030 than running solely on HFO. Though, on the other hand, the global nature of the sulphur cap will make it easier to sell or charter scrubber-equipped ships.

And finally, Liquefied Natural Gas (LNG), the third more or less readily available solution (at least in contrast to other less fashionable alternatives, e.g. methanol or companies developing their own fuel like Finnish Meriaura). Various predictions for 2020 put LNG's worldwide shipping share at 2-10%, however, leaning more to the lower level (as, it seems, everybody recalls DNV's past going-through-the-roof optimism on gas uptake as marine fuel, a far cry from what has actually taken place to date). Putting aside the well-recognized

eco-advantages of LNG, such as cutting sulphur and nitrogen emissions with a chunky surplus, the price still means the most. The 2014-2015 collapse resulted in narrowing the LNG-oil spread. This can, however, change in the future, should the lack of MGO availability, coupled with increasing maritime-use of LNG make the latter's price more attractive. Be that as it may, LNG retrofitting is still rare (an estimated USD 28 mln for a container carrier with a payback time going beyond 10 years), while new-builds are confined not only to liner shipping (and here rather ferry than container), but also to regions with a mature bunkering market (here, also, preferring economies of scale of ship/terminal-to-ship fuelling than from tank trucks, the latter being slower and more expensive).

Most probably, several companies will use different options at the same time, as was the case in the Baltic, e.g. some of Fjord Line's or Viking Line ferries running on LNG, while others on MGO. As such, CMA CGM has signed a memorandum of understanding with Total, where the



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French oil and gas supermajor will provide both compliant bunker as well as fuels to be used together with scrubber systems.

#### Inevitable costs

According to DNV GL's Global Sulphur Cap 2020 report, the 0.5% cap will make shipping 20% to even 85% more expensive, depending on region, vessel, and fuel type. Furthermore, ship-owners may face indirect costs of the switch, as the new law will impact global oil markets' supply and demand chains (this kind of fear, common in pre-SECA times, did however not materialize in the end). Some also doubt the environmental benefits resulting from the new limits, echoing the well-known worry of a significant sea-to-roads modal backshift. Again, in SECA scale, this did not happen, while sulphur emissions were considerably lowered (on this matter check *Baltic Transport Journal* 6/16's article *A cleaner sea breeze. Emissions from Baltic Sea shipping in 2015*). Moreover, the NGO Transport & Environment has said that choosing 2020 over 2025 as the date of implementing the stricter rules will save some 200 thou. lives as an effect of lower exposure to compounds causing lung cancer and serious cardiovascular health issues. Yet, a completely different scenario can take place in this matter, as per research made by the University of Rostock on the difference between biological reaction to diesel and HFO (read more in *Baltic Transport Journal* 3/15's piece *A toxic turn? Health effects of shipping emissions*).

The global 0.5% sulphur cap gives a strong sense of a déjà vu with a number of "ifs" popping-up all over the place – if there's sufficient/inadequate refining capacity, then...; if oil process go up/down, then...; if more vessels will be equipped with scrubbers or will run on LNG, then..., and so on and so forth. In other words, it's a comeback of the (in)famous wait-and-see attitude. ■

**Tab. 1. Sulphur 0.5% cap compliance scenarios for tankers**

|                              | <b>Tanker 1</b>  | <b>Tanker 2</b>  | <b>Tanker 3</b>  |
|------------------------------|--|--|--|
| Age                          | 3  | 13   | To-be-built  |
| Operating profile            | High speed (15 knots)                                      | Low speed (11 knots)                                       | High speed (15 knots)  |
| ECA exposure                 | Medium   | Low  | High   |
| TC/spot (who pays for fuel?) | TC (long-term)   | Spot   | TC (long-term)   |
| North America trade?         | No   | No   | Yes  |
| Solution 1                   | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA<br>+ EGR/SCR (Tier III)             |
| Solution 2                   | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA<br>+ EGR/SCR (Tier III) |
| Solution 3                   | LNG + EGR/SCR (Tier III) <sup>1</sup>                      |  |  |

Source for all tables: DNV GL's Global Sulphur Cap 2020. Know the different choices and challenges for on-time compliance

<sup>1</sup> Using LNG as marine fuel removes 85-90% of NO<sub>x</sub> in the case of low-pressure engines (2- and 4-stroke), while for a high-pressure engine without further emission abatement systems, NO<sub>x</sub> removal is typically 40% to 50% when operating on LNG, hence requiring exhaust gas recirculation (EGR) or selective catalytic reduction (SCR)

**Tab. 2. Sulphur 0.5% cap compliance scenarios for container ships**

|                      | <b>Container 1</b>   | <b>Container 2</b>   | <b>Container 3</b>   |
|----------------------|--|--|--|
| Age                  | 3  | 13   | To-be-built  |
| Operating profile    | Operating at design condition                              | Operation at lower speeds than designed for                | Operating at design condition  |
| ECA exposure         | Medium   | Low  | High   |
| North America trade? | No   | No   | Yes  |
| Solution 1           | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA<br>+ EGR/SCR (Tier III) |
| Solution 2           | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | LNG + EGR/SCR (Tier III) <sup>1</sup>  |
| Solution 3           | LNG?   |  |  |

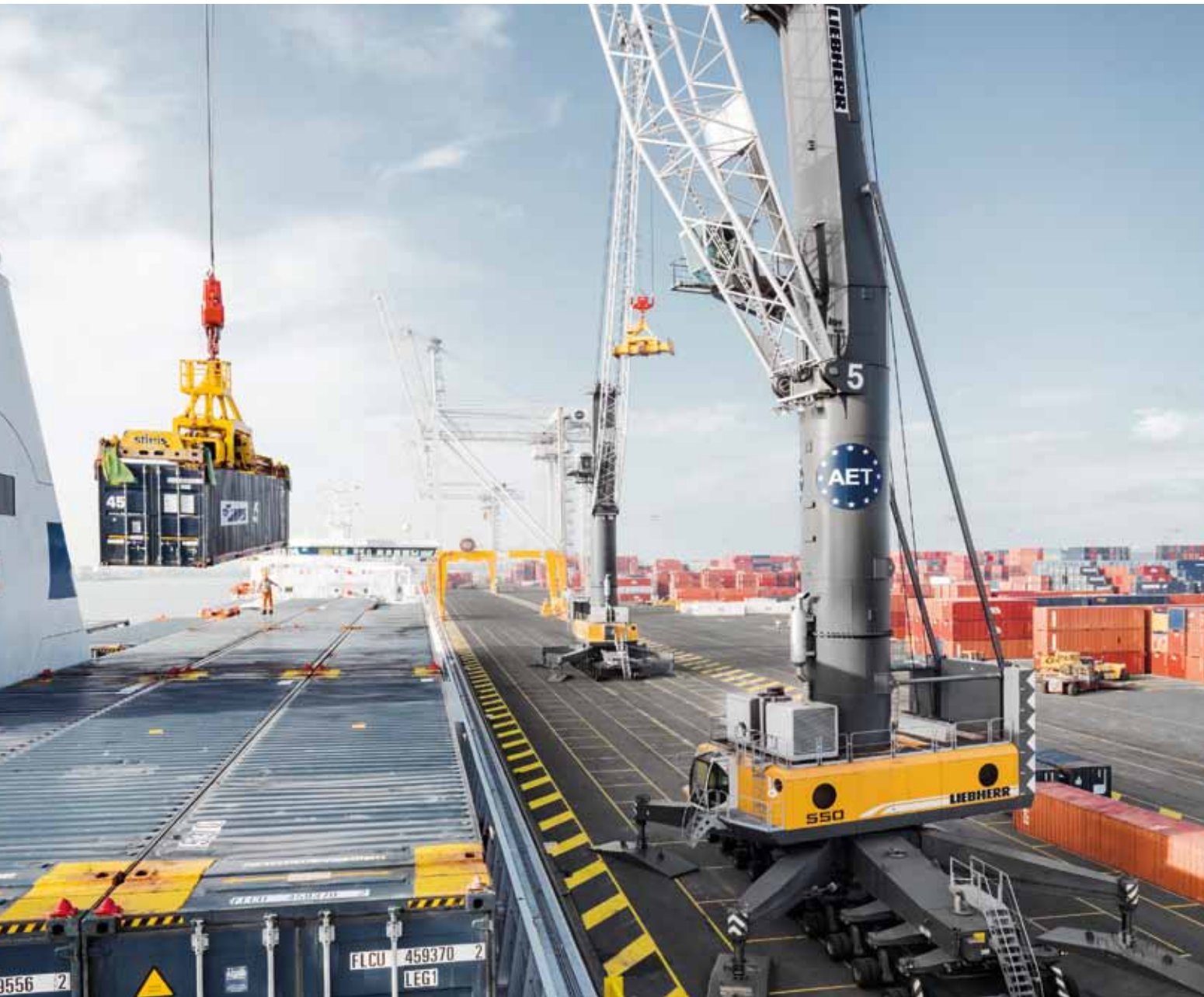
<sup>1</sup> See footnote in Tab. 1

**Tab. 3. Sulphur 0.5% cap compliance scenarios for bulk carriers**

|                      | <b>Bulker 1</b>  | <b>Bulker 2</b>  | <b>Bulker 3</b>  |
|----------------------|--|--|--|
| Age                  | 3  | 13   | To-be-built  |
| Operating profile    | Normal speed profile                                       | Normal speed profile                                       | Medium/high speed  |
| ECA exposure         | Medium   | Low  | High   |
| North America trade? | No   | No   | Yes  |
| Solution 1           | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA             | Hybrid fuel<br>0.5% outside ECA<br>0.1% in ECA<br>+ EGR/SCR (Tier III)             |
| Solution 2           | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA | HFO + Scrubber<br>0.5% outside ECA<br>Scrubber 0.1% in ECA<br>+ EGR/SCR (Tier III) |
| Solution 3           | LNG + EGR/SCR (Tier III) <sup>1</sup>                      |  |  |

<sup>1</sup> See footnote in Tab. 1

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Photo: Wikimedia Commons

## Connecting the unconnected

by Bartosz Dąbrowski

**It wasn't until the 1990s that the Internet was finally adopted outside the premises of military and academic buildings. Since then, the World Wide Web has conquered the globe, now being available almost everywhere and for anyone. However, it can push its limits far beyond today's boundaries, as a mere 1% of items on Earth are currently Internet-connected.**

Connecting PCs, laptops, tablets or even smartphones is just not enough anymore. The real potential is hidden in creating a network of physical objects up-to-date standing nowhere near the Internet.

The so-called Internet of Things (IoT) – part of a larger structure hyped the Internet of Everything (Fig. 1), where not only objects, but also people, processes, and data are interconnected – is believed to have what it takes to further improve our everyday lives and the efficiency of large-scale businesses by getting rid of the unnecessary time restrictions, the incompatibility of objects, waste of materials, and the lack of truly intelligent self-learning and self-tuning solutions.

The value created through capturing data from connected items and the resulting insights are set to revolutionize the business of many companies, in particular their logistics operations.

### How IoT makes sense

Verizon's 2015 Internet of Things report suggests that in order to be

considered as part of the IoT, a solution needs to demonstrate the three "As", namely being aware, autonomous, and actionable. As such, a connected asset must be able to sense something from its surroundings, then transfer or process the data itself, all in order to make the best decision.

To make it possible, the IoT utilizes numerous well-known connection technologies, among them wireless local (e.g. Bluetooth, Wi-Fi), mesh networks, wide area (e.g. 3G, LTE), as well as good-ol' wires. Consumer-related devices, embedded technologies and apps are also crucial, as the use of controllers and actuators. Remote controls are no longer only assigned to multimedia devices and gadgets.

The whole logistics supply chain is set to benefit from the IoT. Connecting the "dark assets" is of great benefit to warehousing operations, freight transportation, and last-mile delivery. By chain-wide monitoring, measuring, controlling, automating, and optimizing in real-time the status of assets, parcels, and people, one can simultaneously boost operational efficiency, safety & security, customer experience, not to mention gaining first mover's new business model bonuses.

Thanks to the IoT, a company can run real-time measurements of how its assets are performing and modify what they are doing at any given moment, as well as plan their next steps in advance. Business processes can be automated to eliminate manual corrections, improve quality, and

reduce expenses. The IoT also enables to develop and coordinate the work usually divided among people, systems, and assets. Moreover, the IoT offers applied analytics which gives the chance of improving or withdrawing a product at any given stage to drive new solutions.

In other words, as DHL and Cisco put it in their Internet of Things in Logistics paper, the IoT has two main features when it comes to supply chain management – sense and sense making.

### Warehouses level-up

Most of the conveniences that IoT brings to companies start at the logistics level. As early as in a warehouse, the IoT can organize labour in a more efficient way.

Already at the beginning, when products are entering the warehouse, pallet scanning and tagging are set to facilitate inventory management and control. Wireless readers can be used not only for gathering information and counting products, but also for damage detection by scanning pallets for any hidden defects. The tags provide real-time visibility to prevent e.g. misplacing items or an inability to find a particular product. Unnecessary operations are thus minimized and corrections no longer need to be double-checked.

Next, monitoring-connected machinery and vehicles enables optimal asset utilization. Assets can be deployed to other tasks if they are identified to be idle, or saved from over-utilization by sensing

**The value created through capturing data from connected items and the resulting insights are set to revolutionize the business of many companies, in particular their logistics operations.**

the wear and tear maintenance time. Sensors may also be helpful in identifying any inefficiencies for managers (or Artificial Intelligence) to measure and adjust the productivity of forklift drivers.

The predictive nature of IoT will benefit warehouse operations, too. Package damage and pile-ups are likely to be prevented with throughput measurement. Detecting physical stress and temperature may help predict damages, thereby lowering the costs of asset repair. By signalling any potential hazard the IoT can help to maintain high health and safety standards as well. Analysing weight and pressure can help to avoid loading pallets incorrectly, with

through the air, or traversing the Eurasian steppes on a flatcar.

However, the role of the IoT in transport & logistics goes beyond only track-and-trace functions. For instance, it may aid in preventing theft or major business disruptions thanks to predicting where and when a hotspot/event-to-avoid will emerge.

Predictive functions also have a lot to offer in the field of health and safety. For example, cameras in vehicles will be able to monitor driver fatigue, based on pupil size and blink frequency. If they detect a threat, audio alarms and seat vibrations will be able to wake up the driver, as well as autonomously call for emergency.

allow any customer to check if e.g. proper temperature was maintained for a product during delivery or whether the seal was broken.

From the perspective of a delivery company, it is crucial to monetize and optimize the return trip of a delivery person. In such cases, applications allow for all the details of the delivery and the recipient's whereabouts to be known to the delivery person. Real-time route optimization will save time and money, as more deliveries will be made in less time thanks to avoiding unnecessary halts resulting from traffic jams, accidents, construction works, etc. This will also lower the overall fuel bill and cut transport-caused emissions.

**Fig. 1. The Internet of Everything and the Internet of Things-enabled capabilities**



Source: DHL's and Cisco's Internet of Things in Logistics (2015)

the likelihood of a pallet falling also possible to be measured. Another way to prevent accidents, hence money spent on fixing damages, is to scan the environment for hidden objects, making it possible e.g. to slow down automatically when another machine or a pedestrian is detected.

Costs can also be reduced by smart warehouse energy management. Light, heating and ventilation can all be used in an intelligent, i.e. workload-customizable way.

### Forwarding connectives

Similar solutions prove to be instrumental in streamlining freight transportation. With health and safety enhanced, logistics operators can concentrate more on tracking and monitoring a cargo unit or even a single product anywhere it is – sailing the seven seas, ploughing

Finally, the last part of the delivery journey will be more efficient and flexible with IoT's ability to track a customer's absence at home, or to detect any obstacles in the place of destination. Flexible delivery can be facilitated with such innovations as sensors in mail boxes and proper tools for setting and updating possible delivery times and alternative collection points. Products with proximity sensors can detect if a recipient is at home and communicate all the necessary data to the delivery person.

What's more, sensors could be placed in storages, allowing retailers to automatically place an order at the nearest distribution centre if they are low in stock. Apart from fewer instances of stock shortages, what will surely please the customers is the possibility of item-level tagging. It will

### Meshing with the IoT

Logistics, being among the first adopters of IoT technologies, needs to implement the numerous missing links to fully connect its operations. Although for security and privacy reasons, it might never be possible to connect all connectable assets, it is clear that the development of the IoT will be a huge step forward for many businesses and a large convenience for individual users.

Logistics, as an industry with numerous links and networks constantly looking for improvement, will be one of the biggest winners if one day it manages to interconnect all of its "dark assets" in the IoT cloud. ■



# The future now

by Katarzyna Chmielewska

**Supply chain managers and executives are all too familiar with cost-cutting practices and efficiency improvements. In a cost-to-profit transformation effort, they rely on many available options to boost the productivity and profitability of their facilities, such as warehouses. However, it now seems that emergent technologies – particularly robotics – can further reshape and improve the field of logistics. Its proponents claim that robots working in parcel sorting hubs, distribution centres, and delivery vans are not a matter of “if” but “when.”**

**R**obotics is being extended “beyond manufacturing and into the logistics side of the supply chain,” writes a new trend report *Robotics in Logistics* by Deutsche Post DHL Group. Companies are testing, developing, and implementing robotics in warehouse and distribution centres in order to make them safe to work around people and augment the warehouse operations. So far, they have seen mixed results. Nevertheless, they remain confident that despite some setbacks resulting from lingering technological limitations, the path for robotics in logistics is set.

## A helping hand made of metal

Driven by progress and innovation, the push toward robotics is also motivated by a potential labour gap issue. While the e-commerce revolution and increasing parcel shipments will continue to call for more logistics employees, we will see a decline in the size of the available workforce because of shrinking population levels in the Western world. Industry analysts believe that over the next 30 years in the US alone there will be a shortage of 35 million workers.

At the moment, however, it is estimated that 80% of warehouses are manually operated, 15% are mechanized, and only 5% are

automated. Across the board, facilities have been implementing a variety of strategies to keep up with demands for increased productivity and throughput. “Logistics workers will benefit from collaborating with robots, while customers will see faster service and higher quality,” states DHL’s report. Automated warehouses will still employ people in key functions, but a fully mechanized environment will make it possible to boost productivity, reliability, and profitability – the trifecta of logistics success.

Trailer and container unloading robots, stationary piece-picking units, or mobile piece-picking robots will be delegated to perform tedious, labour-intensive, and hazardous tasks. Stationary and mobile piece-picking robot variants will further transform the workflow. The former will collect an entire shelf of goods and deliver it to the picker, effectively turning humans into stationary assembly line workers. This will reduce the walking time and save some 50% of warehouse picking operations. Stationary piece-picking robots will also minimize the repetitive task of taking objects from one container and placing them into another.

A mobile picking robot will drive around traditional warehouse shelves and collect items just like its human counterpart.

“**At the moment, however, it is estimated that 80% of warehouses are manually operated, 15% are mechanized, and only 5% are automated.**”





## More reliability, less downtime

Robotic warehouses will be more flexible and faster to relocate. Robots will increase productivity and performance quality. They can be used to perform a plethora of jobs, from unloading trucks and co-packing, to picking orders, checking inventory, or shipping goods. “Most robots will be mobile and self-contained but coordinated through advanced warehouse management systems and equipped with planning software to track inventory movements and progress with orders with a high degree of accuracy,” explains the *Robotics in Logistics* report.

Additionally, the resulting system will be more reliable as there will be fewer “single points of failure.” All units will be independent of each other and easier to fix without disrupting the entire system. Since they will be connected to the cloud, the replacement will automatically download the information needed and proceed without a hitch.

Warehouse workers of the future will be given more responsibility and higher-level tasks such as managing operations, coordinating flows, fixing robots, and handling exceptions or difficult orders. People will train the robots through simple interfaces and take on more challenging tasks themselves. They will supervise tasks in robot-control centres, addressing emergent issues, managing workflows, and making key operational decisions. Manual labourers will be aided by exoskeletons to lift heavy goods.

Productivity will grow thanks to increased operational capacity and

Source for all infographics: Robotics in Logistics. A DPDHL perspective on implications and use cases for the logistics industry (2016)

Though relatively costly and technically challenging, mobile collecting units have distinct advantages over stationary goods-to-picker systems, namely that they are more scalable and portable. They will prove a great solution for small distribution centres which could add, rent, or lease them according to their operational needs. Additionally, since they will not be bolted to the floor, they can easily be moved if the warehouse needs to change locations.

Many breakthroughs in robotics are made with customer satisfaction in mind. Prototypes of ground delivery robots, companions to drones, are currently being tested. Even before a parcel leaves the

warehouse, it might need to be modified according to a client’s specifications. More and more retailers make requests to customize products for key customers (i.e. bundle items, add stickers, repackage), which, while not difficult, is space- and labour-intensive. To deal with the growing demand for last-minute modifications, warehouse operators will rely on co-packing and customization robots. At the moment, no ultimate technology solutions exist since the process requires a fair deal of flexibility to deal with a variety of products and modifications. Still, research in this area is “evolving fast and shows great promise,” assures the trend report from DHL.

flexibility. Warehouses will function at peak efficiency because the workers will be able to add and remove robots as needed. Companies will also be able to reduce capital investment and increase operational flexibility thanks to robot leasing, rental, and access to a pre-owned robot market.

Full automation will have equally positive effects on sorting centres, too. Effective on the first and last shift, robotic sorting centres will run 24/7 to better align with their distribution counterparts. The new supply chain will work in waves to carry out multiple shipments to end customers each day aided by loading and unloading robots, robotic arms, and self-driving trucks.

The futuristic last-mile delivery includes drones for airborne delivery to hard-to-reach addresses, mobile parcel robots to perform local deliveries, exoskeleton-donning human employees to deliver large parcels, and robots at local parcel service centres.

### Perfect future?

Only time will tell whether these futuristic visions of automated warehouses and sorting facilities come true. "The history of robotics includes many stories of hype and disappointment, but if you take a step back and look, you see a steady progress," claim the report's authors.

We can already see the positive initial trials of robotics in logistics. Self-contained mobile picking robots and forklifts are entering distribution centres. Advanced sensors such as cameras, laser scanners, and proximity-sensing skin are tested to ensure employee safety. Moreover, robots will become more human-friendly by providing high-quality customer service, such as speaking our language, reacting to emotions, and accessing appropriate account information for successful interaction.

**We can already see the positive initial trials of robotics in logistics. Self-contained mobile picking robots and forklifts are entering distribution centres. Advanced sensors such as cameras, laser scanners, and proximity-sensing skin are tested to ensure employee safety.**

### SORTING CENTERS



### LAST-MILE DELIVERY



Threats need to be duly taken into account as well. Anything with a chip inside can be hacked, especially when it is connected to the Internet. And while we should not worry too much about Hollywood-style fairy tales, with Artificial Intelligence wiping out humankind, cyber security is already a fierce battlefield, with theft and sabotage disrupting businesses on a daily basis. Breaking a competitor's supply chain with just a few clicks could be an irresistible temptation for some; looking after one's own firewall will therefore be all the more important.

Some claim that "ignoring robotics in logistics and manufacturing is no longer an option for any entity." However, many systems are still rather costly (between several thousands to more than a few million US dollars), and they might be unavailable for mid-size to small operations for a while. The futuristic vision of the fully-mechanized warehouse promises many gains. Nevertheless, today's realities present warehouse managers with the challenge of weighing the short- and long-term benefits of robotics in logistics.





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Photos: UNIT45/VUCAFrame



# Re-framed

by Rutger Noorlander, *UNIT45's Commercial Manager*

**Since its emergence, the simple yet ingenious invention of a 20-foot box has seen many modifications – high-cube, hard/open-top, ventilated, reefer, tanker, even bulk, to name just a few. However, vehicle transports used to be reserved for specialized sea & land car carriers. This may change sooner rather than later thanks to yet another container variation.**

A couple of years ago Van Uden, one of our well-respected customers, asked if we could develop a frame to be used for car transportation on-board barges. After a few meetings they agreed that the frame had to meet a few requirements, namely it must be based on standard ISO shipping container dimensions; it had to be easy to use; provide fast loading/unloading of transported vehicles; as well as be approved for rail/road/sea transportation. The inquiry made by Van Uden gave birth to the VUCAFrame, a multimodal FEU/45-foot-based car frame, which we believe will bring significant cost savings and logistic benefits not only to those who deal with finished vehicles transport, but also to the entire terminal-car dealer supply chain, not least the environment.

## In the frame

The VUCAFrame comes in different sizes – FEU or 45-footers as well as 1.5 m or 1.7 m high. This makes it possible to load it onto over three-quarters of all cars currently produced worldwide. Moreover, the frame can come with or without a gooseneck tunnel; there are models with flat flooring, hence other than cars cargo (e.g. standardized pallets) can be loaded as well (10 tn of maximum payload). Last but not least, special-sized frames can be built upon request.

All of these features promise cost cuttings due to simplifying the supply chain. For starters, less people are needed to handle the cars – the car manufacturer drives his vehicles straight into the VUCAFrame and lashes them (the frame has hundreds of lashing points, while the ramp is only a few centimetres high, so every car or forklift can easily drive into the frame). Next, a track & trace device is placed on the frame and on each car. This RFID tracks the frame and its exact location which is important when dealing with high density compound storages; in combination it also tracks every single car if it's on the frame or unloaded, helping to prevent car theft. The frequency how many times a signal is sent can be adjusted as well, a handy solution for high value car transports. Alike other boxes, the VUCAFrame is stowed on-board a vessel, train (stacked two-four high if possible, e.g. in the US), or a truck (in this case even up to eight pieces) with the use of standard container handling equipment. By fewer vehicle handlings and lashings, damages can be reduced. Lastly in this regard, VUCAFrames can increase terminals and compounds' storage space by a factor of three, as the frames can simply be put one onto another, something which cannot be done with "bare" cars.



**The VUCAFrame comes in different sizes – FEU or 45-footers as well as 1.5 m or 1.7 m high. This makes it possible to load it onto over three-quarters of all cars currently produced worldwide.**



What's important, too, the VUCAFrame has the Convention for Safe Containers (CSC) certification, and can also have proper rail approvals for almost every country (all certification is thoroughly done by DEKRA). In contrast, with car trailers it happens that vehicles need to be unloaded due to different state legislations. These "cross-border issues" cost a lot of time, and are a source of drivers' annoyance. With VUCAFrame, one can easily drive from one country to another without having to change anything.

### **Farewell, empty mileage. Welcome eco-gains!**

Because the VUCAFrame is a container – a specialized one for finished vehicle logistics, but still a container – it can be used in both directions. The FVL industry has inherently been struggling with the empty mileage issue, because car carrying trucks can hardly be used for backhaul transports of other commodities. The VUCAFrame, in turn, can also take on-board palletized freight, hence offering more versatility to logistics companies.

But it's not only about transports, the environment counts as well. Alike governments and other business sectors, the FVL industry is looking for ways to reduce its carbon footprint. In an ideal frame-based distribution chain, a car only needs to start its engine twice – at

the factory and at the local dealer. This is more or less up to ten times less than how things are run today, meaning a reduction in polluting emissions by over 70%. Indirectly, many more reductions can be achieved; for instance, fewer damages lead to less repairs and handlings, hence providing additional CO<sub>2</sub> reduction gains. The cars are also delivered clean to the local car dealer due to the tarpaulin that is covering the frame, thus saving water and cleaning agents.

Nonetheless, the biggest emission savings come from eliminating or limiting the empty mileage issue in the FVL industry. No empty trains and/or trucks are needed anymore to reposition all the empty car distribution equipment. While precise calculations are still pending in this regard, it is believed that the VUCAFrame can reduce a FVL company's carbon footprint in the range of 35%-50%.

All things said, we put faith in the VUCAFrame not only because it's a product that we've put on the market, but because it can change finished vehicle logistics in such a way that the industry will become leaner, safer, more efficient, and environmentally-friendlier. By the way, the frame's use can go even beyond its core business, as the VUCAFrame recently starred in the eighth instalment of the *Fast and Furious* series (*Fast 8* hit the screens in April, 2017).

**The FVL industry has inherently been struggling with the empty mileage issue, because car carrying trucks can hardly be used for backhaul transports of other commodities. The VUCAFrame, in turn, can also take on-board palletized freight, hence offering more versatility to logistics companies.**

VUCAFrame is a 2014-established joint venture between Van Uden and UNIT45 aimed at simplifying car transportation. The frame is available worldwide, has been designed and developed in Rotterdam, and is produced in China in accordance to customers' needs (colours, logotypes). For more information, check out the website [www.vucaframe.com](http://www.vucaframe.com), or contact us directly via [info@vucaframe.com](mailto:info@vucaframe.com).





# Railways of the New Silk Road

by Professor Yuan Li, Institute of East Asian Studies, University of Duisburg-Essen



**Y**uan Li is Acting Professor and Representative Chair for East Asian Business and Economic Studies at IN-EAST and Mercator School of Management at the University of Duisburg-Essen. He is also President of the Chinese Economic Association (Europe/UK), as well as holds the honourable academic title of "Zijin" scholar, awarded by the Nanjing University of Science and Technology.

**Connections between the major European and Asian civilizations started more than 2,000 years ago, thanks to the diligent and courageous camel caravans that explored and opened up what's today known as the ancient Silk Road. Nowadays, Europe and Asia are once more trying to enhance connectivity, this time with the use of modern transportation, in order to boost trade, investments, and economic development, as well as to improve diplomatic relations, scientific progress, and cultural exchange for all countries and regions across the Eurasia continent.**

**T**hese new connections and corridors – covering Central Asia, the Caucasus, the Black and Caspian Seas, Mediterranean-bordering countries, the whole of the European Union in general, and the Central-Eastern-Baltic part in particular – are related to the so-called "Belt and Road Initiative" (BRI) launched by China in recent years as an attempt to revive the historical Eurasian Silk Road(s).

Since its introduction, the BRI initiative has been the centre of a plethora of in-depth analyses, and policy debates. This grandiose project aims at fostering China's integration into the world economy, and marks a significant milestone in the country's engagement in the international milieu. It is China's new opening-up strategy developed in response to changing domestic and international circumstances. Accordingly, the five major targets of the BRI include promoting policy coordination, facilitating connectivity, accelerating trade, tightening financial integration, not least promoting people-to-people bonds. If all these goals turn into reality, it will affect China and countries along the Belt and Road significantly,

becoming a propeller for thousands-of-kilometre-long hinterland development. So far, there are more than 100 countries and international organizations taking part at different levels in the BRI Initiative. The widespread willingness to participate in this project shows that the involved countries believe in the positive effects that can be achieved through partnering with the Chinese.

## Back on the rails

I work at the Institute of East Asian Studies of the University of Duisburg-Essen, one of the largest research centres on East Asian studies in Germany. Duisburg is situated in the Ruhr Area and, rather than for close ties with Far East Asia, it used to be better known for its blast furnaces, coal mines, and the inland port. This state of affairs started to change in 2010, when the Yuxinou Railway was completed, connecting Chongqing and Duisburg via a 11,179 km-long railroad. It sets out from Chongqing (one of the country's five national central cities) in Southwest China, and passes through Kazakhstan, Russia, Belarus, Poland,



and finally reaches Germany in Duisburg. If transported by sea from Chongqing to Europe, container-packed goods would first need to be shipped from Chongqing to Shanghai or Shenzhen, and then carried overseas. As such, the Yuxinou Railway has reduced the total transportation time to only two weeks against one and a half months in the past. In March 2014, Chinese President Xi Jinping visited Duisburg to promote the construction of the “New Silk Road Economic Belt.” The Chinese President witnessed the arrival of a cargo train at the railway station in Duisburg from Chongqing, and expressed his hope that this German hub

will play a bigger role in the China-Germany-Europe cooperation.

Although using railroads to move goods from one place to another is one of the oldest forms of modern trade, the idea and the scope of the New Silk Road railways are totally new, making the potential behind them second to none. In the era of the Internet and globalization, linking continents by railways might give birth to a real transportation revolution. This is because, compared to ocean shipping on the one hand, intercontinental rail lines have significantly reduced the time needed to get from point A to point B, while comparing them to air cargo services on

**The five major targets of the Belt and Road Initiative include promoting policy coordination, facilitating connectivity, accelerating trade, tightening financial integration, not least promoting people-to-people bonds.**

the other, rails have notably reduced the transportation cost (by approx. 40%). Moreover, the investment in improving transport infrastructure can function as a driver for better productivity and economic growth, as well as add to prosperity, hence help in reducing poverty in countries and regions along the Belt and Road.



Photo: Wikimedia Commons

Note that earlier studies have found that trade infrastructure is related to development since it improves the external trade balance, reduces income inequality and poverty, and enhances economic growth.

#### From a line to a network

Since its introduction in 2013, the Belt and Road Initiative has progressed very fast. I remember when President Xi Jinping visited Duisburg in March 2014, the watchword “One Belt, One Road”

Germany, and France. On its westbound leg, Hanxinou’s trains carry electric products, cars, and building materials, whereas on their way back they transport among others European automobiles, luxury goods, and wine.

Suzhou (Jiangsu Province’s second-largest city) is in turn the beginning point of the Sumanou Railway, which passes through Russia, Belarus, and finally arrives in the capital of Poland. Following its first operation in November 2012,



(OBOR) was a new phrase heard before by very few people. Nowadays, in turn, this phrase has become a buzzword in the global media, attracting the highest attention whenever it pops up. Moreover, if you look at the map of today’s economic corridors, you will find that the BRI has expanded from including just “One” Belt and “One” Road into many “belts” and many “roads.” As a result, there is a growing number of rail lines similar to the abovementioned Yuxinou Railway, and currently connecting more than 20 Chinese cities with Central Asia and Europe. These railways, and the logistic companies operating them, are the modern equivalent of camel caravans, traversing the Silk Road many centuries ago. Here I just want to list some of the pioneers among them.

First, the Hanxinou Railway, which originates in Wuhan (capital of the Hubei Province, and the most populous city in Central China), reaches Czechia,

it was listed in the Guinness World Records as the longest distance for rail container transportation. Before Sumanou, there was no direct railway connection between Europe and Southeast China. Goods carried on this stretch mainly consist of electronic products, machinery, clothing, and household items.

The Rongou Railway also reaches Poland, but originates in Chengdu (one of the three most populous cities in Western China). Since April 2013, the speed of Rongou has continued to increase, cutting its timetable from an initial 14 days down to only ten and a half. Rongou operates according to a fixed schedule, so that the trains do not need to be filled up before setting off for their final destination. Export companies have welcomed such a solution, as it enhances the convenience for them to arrange their production activities.

The Zhengzhou Railway starts in Zhengzhou (Henan’s provincial capital

“ Compared to ocean shipping on the one hand, intercontinental rail lines have significantly reduced the time needed to get from point A to point B, while comparing them to air cargo services on the other, rails have notably reduced the transportation cost (by approx. 40%).



located in east-central China), and heads to Hamburg. Thanks to this trade lane, Chinese products from this region no longer need to be transported to the Port of Qingdao for overseas shipments.

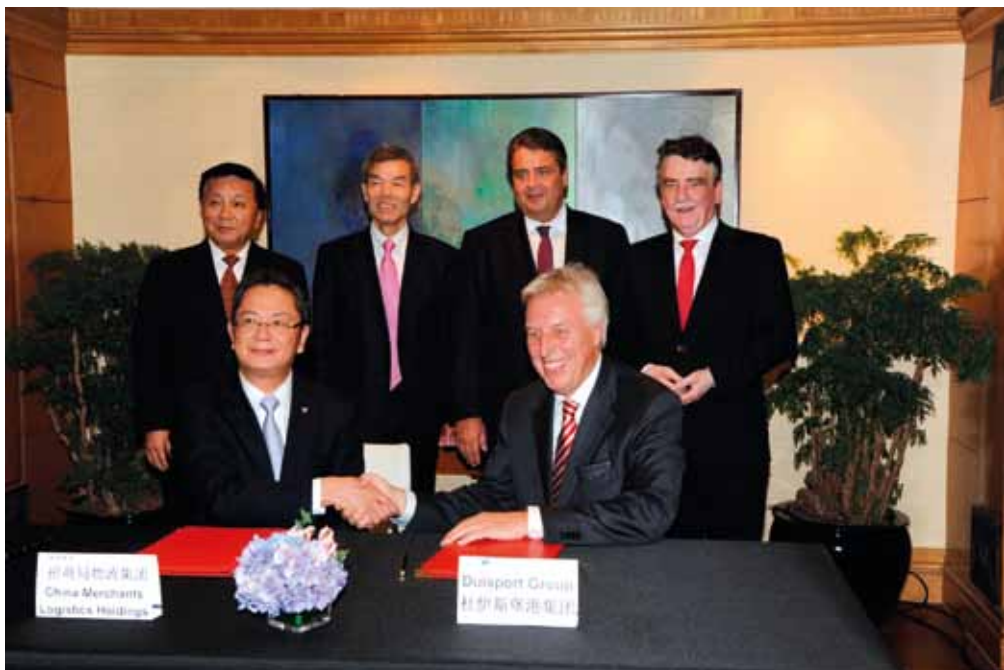
The Hexinou Railway began its operations in June 2014, and starts in Hefei (the capital and largest city of the Anhui Province in Eastern China). However, at that time it only transported products to Kazakhstan. Later, Hexinou was extended to Russia, and in June 2015 it reached

all railways between Europe and China (and most probably worldwide, too). As Yiwu is a city famous for its small commodities, the train usually carries miscellaneous goods to Spain. On its backhaul to China, it transports Spanish products, including wine, olive oil, and cured ham.

And lastly, the Haou Railway kicked off in June 2015. It runs from Harbin (the capital and largest city of the Heilongjiang Province in north-east China), and

years was less than 1.5%, while eurozone countries have been hovering around 0%. It is true that emerging markets, such as the BRICS, have had higher growth momentum, but a few of them have also run into various problems, some of them of structural nature.

Finding new long-term growth drivers is therefore utmost urgent for a sustainable recovery of the world economy. Nevertheless, it will take



Hamburg. From Hefei to Hamburg it takes about 15 days, and the distance is approx. 11,000 km. The service chiefly takes care of electronic and household appliances, and textiles.

Shipments over the Xiangou Railway took off in October 2014. Currently, Xiangou transports goods (i.e. tea, porcelain, and automotive parts) across three routes. One starts in Changsha (capital of the Hunan Province, south-central China), and continues through Kazakhstan, Russia, Belarus, and Poland before arriving in Duisburg. The other two routes end in Moscow, and Uzbekistan's Tashkent.

In November 2014, the Yixinou Railway started to operate. It runs from Yiwu (a city of about 1.2 mln people in the west coast Province of Zhejiang), then passes through Russia, Belarus, Ukraine, Poland, Germany, France, and finally stops in Spain. It has by far the longest transportation distance among

passes through Mongolia, Russia, Belarus, and Poland before reaching its final destination in Hamburg. Here trains also depart to and from Harbin and Hamburg every 15 days. The first shipments comprised clothing, electronic components, and automobile parts. Currently, the products included in the shipments from Harbin also come from Japan, South Korea, and other parts of northern China. International companies such as Audi, Mercedes-Benz, and Foxconn have all voiced their intentions to ship their products via the Haou Railway.

#### Firing the engine anew

I personally think the Belt and Road Initiative has the potential to become a new global growth engine. The recovery of the world economy after the 2008 financial crisis continues to be fairly weak, with several potential skeletons still resting in the cupboard. The average growth rate of developed economies in recent

dedication and hard work to breed a new white swan. For instance, Asian developing countries have a vast market potential, but their economic take-off is restricted by poor infrastructure, with lacking funds for catching up. For developed economies, such as Europe, although the growth of bilateral trade, investment, and other economic exchanges with China have been very impressive in recent decades, the economic potential of trade and investment relations with China is far from being fully triggered on. This is mainly due to restrictions, bans, and other institutional barriers.

Although the impact of the new railway lines on the volume of commercial exchange between China and Europe is (so far) quite limited, this is not to deny some significant effects on the bilateral trade, namely a new round of institutional



changes that facilitates commerce. Interestingly, a lot of railway projects were formed bottom-up, driven in the first place by market demand. Then companies collaborated with different governmental tiers to solve problems arising, among others, from multiple regional and national regulations. Since these projects have involved many countries along the Eurasian Land Bridge, sometimes even national cabinets have had to step in to negotiate with each other to reduce institutional barriers that hinder transnational transportation and trade. For example, in the past the customs inspection procedures were very complicated such that trains from China to Europe needed to stop in each and every country along the New Silk Road. At that time, it would take about 40 days for a train to reach Europe from China, which absolutely didn't make sense from a shipper's point of view. But the customs inspection procedures have been greatly simplified – and are still being improved – so today there's no requirement for trains to have unnecessary stops on their now-less-than-two-weeks travel between China and Europe. In this sense, rail operation across the New Silk Road

has generated positive external effects on reducing institutional barriers, hence helped in bringing down transaction costs and loosening other restrictions on economic activities, in the end unlocking new growth potential for countries along the route.

#### The Red & Blue train

I would also like to take Duisburg as an illustrative example of what opportunities the BRI could bring to non-Chinese cities and regions. In recent years Duisburg has become an important logistic hub for many New Silk Road railways connecting China and Europe. As mentioned earlier, the first China-Europe express railway was from Chongqing to Duisburg. Now the number of China-Europe rail lines that go to Duisburg has increased to more than five. These direct connections make it possible to connect China and Europe in a quick and inexpensive way. Thus, these rail services have generated direct imports and exports benefits for Duisburg, as well as for its surrounding areas. Besides instant trade gains, there are also many other knock-on profits, such as local employment. Around 300 logistics-oriented companies are based in the Port



Although the impact of the new railway lines on the volume of commercial exchange between China and Europe is (so far) quite limited, this is not to deny some significant effects on the bilateral trade, namely a new round of institutional changes that facilitates commerce.



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Photo: Wikimedia Commons

of Duisburg, accounting for 20,000 jobs upholding on port activities. Besides, let us do not forget about international partnerships, or simply public relations. After establishing the new railway service, and especially after the official visit of President Xi Jinping to Duisburg, a lot of Chinese local governments these days want to establish some sort of cooperation ties with Duisburg, and quite a number of Chinese companies has increased their investments in this region. For instance, in 2014 Nanjing High Accurate Drive Equipment Manufacturing launched its European headquarters in Duisburg due to the railway. Now the number of Chinese companies in Duisburg has increased to more than 50. It can be expected that Duisburg in particular, and the Ruhr Area in general will attract more and more companies from China, not to mention Chinese tourists in the future.

Moreover, this initiative also offers an opportunity for international productivity cooperation between German and Chinese firms, chiefly in the field of investment, and best practices. Countries along the New Silk Road are at different levels

of development. Some developing states are at the beginning stage of their industrialization, and lack the required capital, technology, and know-how, while some developed nations, like Germany, are at the top of the global production and productivity chain. At the same time others, including China, are somewhere in the middle. On the one hand, China as a market for high-end German products and investments will become larger, following the increase in size and ranks of the Chinese middle-class.

On the other hand, China will also transfer some of its capital, technology, and manufacture industries to developing countries with a comparatively lower wage level. Chinese and German companies can work together on jointly investing in these developing countries in between. Such investments will help these countries in creating more (and better) jobs, as well as in increasing exports, and upgrading their industrial capabilities.

Finally, exchanges will not just take place in the field of economics and trade. Another important associated benefit

**Finally, exchanges will not just take place in the field of economics and trade. Another important associated benefit is the facilitation of cross-cultural communication, and the exchange of ideas.**

is the facilitation of cross-cultural communication, and the exchange of ideas. In the past, Chinese tea and tea culture were introduced to Europe through international trade, which inspired Europe to develop its own tea practices and industry. Similarly, the way Germans brew beer has also influenced China, and given birth to China's beer culture and business. The Chinese are curious about Europe, and the Europeans are interested in China. Through cultural exchanges they can better understand each other's tastes and living styles in order to better communicate, interact, and collaborate, be it in Duisburg, Chongqing, or any other city at both ends of the New Silk Road. And this seems to be beneficial to everyone.



Photos: Wikimedia Commons

# All roads lead to Beijing

by Przemysław Myszk

**On paper the chief goal of the so-called One Belt, One Road (OBOR) initiative is making China and Europe the twin engines of future-proof global growth thanks to improving connectivity, increasing trade and investment, tightening financial integration, as well as strengthening international relations. On the other hand, some suspect that what's believed to be the signature legacy of China's President Xi Jinping's tenure has its unstated or even denied objectives. This way or another, the Baltic, and particularly the south-eastern part, has its stake in playing Beijing's game.**

**T**he New Silk Road Economic Belt, commonly referred to today as OBOR, was mentioned for the first time by President Xi Jinping back in September 2013 during his speech at the Nazarbayev University in Kazakhstan's Astana. The initiative, both its land and sea legs, covers over 60 states and 4.4 bln people. The New Silk Road is to connect these countries through hard infrastructure (railways, roads, pipelines, sea-, inland-, and airports), as well as owning to commercial and cultural ties brought closer. Taking stock of the ongoing digital revolution, the OBOR is also to be supplemented by a Digital Silk Road (DSR), proposed in 2015 by the China Cyberspace Administration. The DSR will focus on developing a 5G platform, as well as on utilizing cloud computing, the Internet of Things, big data, digital investments, along with internationalizing e-commerce, all for the purpose of pushing ahead the OBOR agenda and other spin-offs, such as the Internet of Energy and smart cities. For instance, in November 2015 Inmarsat cut a deal to provide satellite communications for OBOR.

On the organizational side, OBOR is led by first-ranked Vice Premier Zhang

Gaoli, member of the China Central Politburo of the Communist Party of China. Plans related to the New Silk Road are developed and issued by the National Development and Reform Commission, the Ministries of Foreign Affairs, Commerce, and Transport, but most importantly by the State Council, China's chief administrative authority. On their part, the General Customs Administration, the Administration of Quality Supervision, Inspection and Quarantine, not to mention cities, provinces, rail companies, and logistics centres, are responsible for lubricating OBOR's engine to run smoothly on the ground level.

Ranking so high – and also taking into account the Chinese tradition of doing everything in order to save face – failing with OBOR is not an option. Looking from a different angle, the New Silk Road exceeds the narrow project-to-money perspective, hinting at issues that do not easily fit into the return-on-investment narrative.

## Leaky bucket?

Yet, money is clearly at stake. Here four Chinese-led financial institutions stand out. The two most prominent are the newly-founded Asian Infrastructure Investment Bank (AIIB; proposed in October 2014,



**The China Development Bank enrolled USD 126 bln across 400 projects in OBOR regions by 2014's end, whereas plans are to fund some 900 undertakings with USD 800 bln. However, according to PwC, OBOR countries need USD 5.0 trn in 2016-2020, while the Asian Development Bank and McKinsey balloon this figure to USD 8.0 trn in 2010-2020.**



kicked-off two years later in January with USD 100 bln of initial capitalization), and the China Development Bank. The former is seen as one of China's most up-to-date evident successes in bringing the international community around the OBOR idea, as it attracted more participants than initially assumed (54 currently); apart from the Baltics, all other countries from the Baltic Sea region are represented (Tab. 1). The AIIB is inclusive, with voting rights distributed proportionally to capital contributions.

**Tab. 1. BSR members of the Asian Infrastructure Investment Bank (AIIB), and China**

| Country            | Total subscriptions [USD mln] | Voting power [%] |
|--------------------|-------------------------------|------------------|
| Russia             | 6,536.2                       | 6.5588%          |
| Germany            | 4,484.2                       | 4.5962%          |
| Poland             | 831.8                         | 1.1030%          |
| Sweden             | 630.0                         | 0.9099%          |
| Denmark            | 369.5                         | 0.6608%          |
| Finland            | 310.3                         | 0.6042%          |
| China              | 29,780.4                      | 28.7903%         |
| <b>Grand total</b> | <b>89,128.1</b>               | <b>100%</b>      |

Source: Asian Infrastructure Investment Bank. Subscriptions and Voting Power of Member Countries as of September 22<sup>nd</sup>, 2016

The former, in turn, is believed to be the world's largest bank lender, putting on the table twice as much cash as the World Bank, and triple that of the (its rival) Asian Development Bank (where Japan and the US have the largest share proportion; neither of them has joined the AIIB). The China Development Bank enrolled USD 126 bln across 400 projects in OBOR regions by 2014's end, whereas plans are to fund some 900 undertakings with USD 800 bln. There is also the July 2014-founded Shanghai-headquartered New Development Bank, formerly known as the "BRICS" Development Bank, with authorized lending of USD 34 bln (started in 2016), but with a contingent reserve arrangement of USD 100 bln (USD 41 bln from China alone). Lastly, the Silk Road Fund, set up in November 2014 by the China Investment Corporation, the Export-Import Bank of China, and the already mentioned in detail China Development Bank. The Fund's initial capitalization amounts to USD 40 bln, focused on medium- to long-term investments in railways, roads, pipelines, and resource and industrial development. For the Baltic, the China-CEE Investment Cooperation Fund (USD 435 mln and 1.0 bln in Phase I and II, respectively) is

# What's next for China?



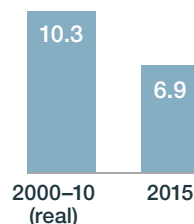
### The pessimist

The warning signs show China is headed for a financial crisis.

Corporate debt as % of GDP doubled

from **107%** in 2007 to **155%** in 2015

GDP growth decreased, %



Foreign reserves fell in 2015 by around **\$500 billion ...**  
... and by midyear, the stock market had dropped by **43%**

### The optimist

A productivity-led growth model will allow China to continue to perform. That model will:

lift labor productivity by **1-8% a year** by 2030 depending on the sector

sustain GDP increases at **5.6% a year** over the next 15 years

boost household incomes by **>\$5 trillion** by 2030, compared with investment-led path

Source: World Bank; McKinsey Global Institute analysis

also worth mentioning because of several Polish projects in its portfolio. These are indeed mind-boggling sums of money; however, still short of what's really needed to leap over decades of infrastructure underfunding, particularly in Central Asia. According to PwC, OBOR countries need USD 5.0 trn in 2016-2020, while the Asian Development Bank and McKinsey balloon this figure to USD 8.0 trn in 2010-2020 (the latter in the 2011-starting decade). In other

words, private capital will be required to join the New Silk Road scheme.

And here comes one of the main challenges, as pointed out by Alexander Cooley, Director of the Harriman Institute at Columbia University, in his piece *The Emerging Political Economy of OBOR. The Challenges of Promoting Connectivity in Central Asia and Beyond*. Crowley speaks of "deadweight



losses” estimated to account for approx. 80% while investing in Pakistan, 50% in Myanmar, and 30% in Central Asia. These leaked funds can in turn aggravate graft, informal barriers, and rent-seeking issues these regions are struggling with, petrifying or even strengthening corrupt networks (e.g. in Legatum’s Prosperity Index Pakistan overall ranks 139<sup>th</sup> out of 149 analysed nations). Why then does China agree to write off millions by e.g. investing USD bln 46 in sea- and airports, pipelines, and railroads within the April 2015-signed China-Pakistan Economic Corridor (going through the troubled Balochistan and Kashmir provinces)? The answer is the Port of Gwadar thanks to which the transit time of shipping oil can be cut by approx. 85% in comparison to the not-so-safe-either lane passing the Strait of Malacca. All of this because China is apart from coal

and rare earths a country short of natural resources, importing e.g. 60% of its oil needs (20-25% from African states, and approx. 50% from the Middle East). Seen from this perspective it’s certainly connectivity being at stake, but treated as a means for improving China’s energy security, vital to the country’s economy. And this also goes hand-in-hand with China’s customary non-interference policy in domestic affairs, meaning that everything is “all right” granted the oil keeps pumping (and even if it entails Chinese mining and construction firms getting in crossfire between separatists in Balochistan, where Gwadar is located, and the Pakistani government).

#### The critical investor

In years 2001-2013, China spent about USD 70 bln on oil and gas assets worldwide in order to secure the flow of



**Beijing’s message to Central Asia seems clear: Money and infra development for transit and/or resources, without Kremlin’s “state capture” practices.**





resources, apparently reluctant in the end to trust the market in supplying its needs at a reasonable price and speed. In Africa, China has over the years become the continent's largest trading partner and external investor (estimates state that China will provide USD 1.0 trn in financing to African countries by 2025); however, focusing mainly on resource rich states, with half of all investments being oil-related. The deals run along a standard path, tied to Chinese subcontractors, workers, and equipment suppliers, re-paid in long-term supplies of resources, but often raising concerns about labour, legal, and environmental issues. In such a way China is also tackling the overcapacity problem its dominantly state-owned manufacturers are troubled by.

Next, back in 2013 China surpassed the European Union in being the Middle

East's largest trading partner. In Iraq, China is the largest investor, whilst Qatar invests in China's natural gas facilities. Speaking of hydrocarbons and geopolitics, the Chinese invested in and completed the Aktau-Alashankou oil pipeline which runs from Western Turkmenistan via Uzbekistan and Kazakhstan (read: omits Russia), as well as the USD 7.3 bln-priced 3,666 km long China-Central Asia natural gas pipeline (hence undercutting Turkmenistan's dependency on Russian imports, as a result weakening Gazprom's position in the region). Beijing's message to Central Asia therefore seems clear: Money and infra development for transit and/or resources, without Kremlin's "state capture" practices. Obviously, following the sanctions lift on Iran, China is eyeing business-transport-energy deals with Tehran as well. As such, the first cargo train from China arrived in Iran's capital in February 2016.

It may appear that Russia and China would clash over the OBOR initiative, especially considering Moscow's own Eurasian Economic Union, where the Trans-Siberian Railway is seen as the main backbone of transporting goods across the Eurasian Land Bridge, whereas China is also developing alternative southern routes, some of them, like the Trans-Caspian Route, omitting Russia in its entirety. Yet, the issue is more nuanced. Russia officially supports the

New Silk Road, because it clearly cannot go without the Transsib, so it simply means business for Russian freight train operators, but the Kremlin, named as a "Gamer" in Cooley's article, advocates in favour of OBOR seeing it as a tool for eradicating Western influences in Central Asia in particular, and worldwide in general. Russia announced some time ago its "pivot to the East" in response to Western sanctions, but oil and gas deals with China may be shaky, following the slowdown of the Chinese economy, the fall in hydrocarbon prices, and Beijing's eco-endorsement of the Paris Agreement. Interestingly, the US also embraces the New Silk Road idea, but from a "Trader" standpoint, believing that better connectivity will spur overall economic development, which in turn will become a foundation for political stability (which, however, does not automatically equal democratization). Nevertheless, this may now well undergo a 180-degree twist should newly-elected US President Donald Trump stay committed to the collision course with China from his campaign. On the other hand, Trump abandoned the Trans-Pacific Partnership (which does not comprise China) a move the Chinese can only applaud.





**Tab. 2. China's GDP in 1960-2015**

| Year              | GDP<br>[current USD] | Five-year<br>change [%] |
|-------------------|----------------------|-------------------------|
| 1960              | 59.184 bln           |                         |
| 1965              | 69.709 bln           | +17.8%                  |
| 1970              | 91.506 bln           |                         |
| 1975              | 161.162 bln          | +76.1%                  |
| 1980 <sup>1</sup> | 189.65 bln           |                         |
| 1985              | 307.48 bln           | +62.1%                  |
| 1990              | 358.973 bln          |                         |
| 1995              | 732.032 bln          | +104%                   |
| 2000              | 1.205 trn            |                         |
| 2005              | 2.269 trn            | +88.3%                  |
| 2010              | 6.04 trn             |                         |
| 2015              | 10.866 trn           | +79.9%                  |

Source: World Bank

<sup>1</sup> Deng Xiaoping's reform and opening-up starts in December 1978

### Hopes and fears

The reasons for putting faith in the New Silk Road from a European perspective are fairly clear, starting with economic (and safety) development of areas of importance for the EU, particularly Africa, the Middle East, Eastern Europe, and Central Asia. China's aim of gearing USD 2.5 trn of additional trade over the next decade sounds enticing, too. A shift in transport patterns, primarily from sea onto

rails, would also be a positive thing from a flexibility point of view, especially taking into account all the problems of global ocean shipping. Non-Chinese firms can potentially benefit from a wide range of opportunities as well, taking stock of their unique know-how and technology, including infrastructure development, operation, and maintenance (at least domestically); financial and professional services (e.g. insurance, consulting, public-private partnerships, advising and meeting specific Islamic finance requirements); transport and logistics (taking care first and foremost of transporting goods with new services, but also fleet renewal, comprehensive door-to-door management, staff training); information and communication services (developing the Digital Silk Road along with many traffic systems for real-time monitoring, optimizing intermodal flows, and delivering ICT hard- and software, like cables, satellites, and programmes).

But beneath the surface fears also loom. For many years China has been maintaining a low profile globally, being rather an agenda follower, not its setter. With the use of OBOR the country wants to take what it believes to be its rightful

“Non-Chinese firms can potentially benefit from a wide range of opportunities, taking stock of their unique know-how and technology, including infrastructure development, operation, and maintenance; financial and professional services; transport and logistics; as well as information and communication services.



place on the international stage in line with its economic in-house and abroad power. That's why some call OBOR the new Marshall Plan that, "will define China's role as a world leader," as one headline of the *South China Morning Post* reads. The *Financial Times* also wrote, "If the sum total of China's commitments are taken at face value, the new Silk Road is set to become the largest programme for economic diplomacy since the US-led Marshall Plan for postwar reconstruction in Europe [...]." As such, a "Go Global" framework is set. According to the Rhodium Group, in 2015, for the first time in history Chinese Foreign Direct Investment (FDI) in the US were higher than US money invested in China (though still the 1990-2015 cumulative relation stands at USD 228 bln vs. USD 63.8 bln in favour of the Americans). Nevertheless, China is starting to exercise its soft power more openly, e.g. sinking down the P3 Network of Maersk Line, MSC and CMA CGM, not letting Vale's iron ore bulkers berth at its seaports, taking over the majority stake in the Piraeus Port Authority, or utilizing market restrictions, its legal system, and control of the press to hinder the entrance of foreign companies onto the Chinese market. Also, OBOR projects funded by a purely Chinese financial mechanism will be recycled by going to its state-owned companies (maybe with the exception of projects requiring special-purpose knowledge and tools, but as the Pirelli and Volvo cases show, technology can be bought together with an entire company).

Several countries have started to push back China's influence (and the OBOR agenda on the side) due to anti-Sino sentiments. For instance, in April 2016 mass protests broke out in Kazakhstan against long-term leasing of the country's lands to Chinese farmers. In Myanmar, where 42% of FDI in years 1988-2013 came from Beijing, the USD 3.6 bln Myitsone Dam project was suspended, the Burmese people expressing their feeling that China is exploiting them, not to mention supporting the junta. Interestingly, local politicians in Central Asia tend to drag Chinese projects into partisan hurdles, campaigning on anti-China tones, and questioning the legitimacy of Chinese investments, but "surprisingly" tilting back to Beijing after being elected. Nevertheless, Sinophobia is growing in Central Asia, stemming from a deeply-rooted Soviet legacy of mistrust in the region, as well as a lack of contacts hence people-to-people understanding,



**Paweł Paszkiewicz**

*Managing Director at TRIXX International*

"My company delivers lighting solutions as well as stones from our own production site in China to hotels throughout Europe; so far I have been quite used to transporting our products by sea. However, the New Silk Road as an alternative to ocean or air freight is more than promising. I came across it for the first time in 2016, when we were equipping the Ritz-Carlton Hotel in Budapest, and time was very precious to us. Therefore, we commissioned VGL Group to transport two 40-foot containers by rail, and one twenty-footer by sea. And so the two boxes rail-departed Chongqing on January 30<sup>th</sup>, and reached Małaszewicze on February 12<sup>th</sup>, while our third container left the Port of Yantian on February 3<sup>rd</sup>, and arrived in Gdańsk port on March 3<sup>rd</sup>. It's evident that the delivery time was almost three times in favour of rail, while the price went in the opposite direction, being three times more expensive (around USD 8.3 thou. vs. USD 2.4 thou.). But in this case the cost was not as important as the time. In general, I find the New Silk Road initiative very competitive, and I'm looking forward to taking advantage of it also in the future.

and unfavourable press coverage. Luckily, the situation in the EU looks different thanks to Europe's far better bargaining position.

#### **The New Silk Road's Baltic part**

Back in *Baltic Transport Journal's* first piece on OBOR (4/2015), we listed China-Baltic-crossing rail services at that time, including Chongqing-Duisburg, Suzhou-Manzhouli-Warsaw, Chengdu-Lódź, Zhengzhou-Hamburg, Beijing-Hamburg, Kunming-Rotterdam, Harbin-Hamburg, and Yiwu-Madrid. Since then, a couple of new initiatives have been agreed upon or put in place. Starting not chronologically, but with fanfare, on June 20<sup>th</sup>, 2016, the presidents of Poland and China welcoming a freight train from Chengdu in Warsaw under a new brand, labelling now all sets across the Eurasian Land Bridge, namely China Railway Express. On its westbound leg, the twenty 80-foot platform train brought electronics and car parts, while on its way back it took processed food.

Going back in time, to April, Gdynia-based Loconi Intermodal signed an agreement with the Hunan Province on developing Poland-China rail services, the

former exporting food products. Also in April, a new service kicked-off on the Wuhan-Małaszewicze-Duisburg-Lyon route, as well as between Chengdu and Kutno, the latter organised by PCC Intermodal. The first 11-day departure from PCC's terminal in Central Poland took place on April 30<sup>th</sup> with 41 FEU stacked on-board a train. In addition, the Chengdu International Railway Service Corporation officially opened its representative office in Poland during the ribbon cutting ceremony.

In June, DHL Forwarding organised the first multimodal shipment (with electronics) from Taiwan to Europe. The service starts in the Taiwanese Port of Taichung, berths on mainland China in Xiamen, and goes to Germany via Chengdu and Łódź. In September, DB Cargo and

**With the use of OBOR China wants to take what it believes to be its rightful place on the international stage in line with its economic in-house and abroad power. That's why some call OBOR the new Marshall Plan.**





BMW renewed their contract covering rail shipments from the latter's plants in Leipzig and Regensburg to Shenyang via Poland, Belarus, and Russia. The 11.0 thou. km route previously took 23 days, axed now to 17 (20 door-to-door). DB Cargo nowadays sets up two trains per week for BMW, estimated to carry up to 2,500 boxes/year. Another logistics service provider, GEODIS, announced a deal with Marseille-based designer jeans manufacturer KAPORAL on an 18-day 11.3 thou. km Wuhan-Lyon rail service. "We successfully coped with a number of operational and technical challenges. Twenty drivers were needed to operate the train on its way through seven countries. Locomotives had to be changed eight times and we had to manage three special transhipments at certain borders due to the different track gauge," Kim Pedersen, Executive Vice President of GEODIS' Freight Forwarding Line of Business, highlighted the daily routine of managing China-Europe links. The companies aim at boosting their service up to three weekly calls.

Hoval, a supplier of heating and ventilation systems, is another European company which decided to switch from sea onto rails. It has now established a multimodal solution for Marchtrenk-Munich (road) and then on-rails from Bavaria's capital to Chongqing via Poland, Belarus, Russia, and Kazakhstan. Similarly, but this time westbound, Korean Samsung has signed a Silk Road memorandum of understanding (MoU) with Russian Railways. The sea-to-rail shift (time difference 35 days vs. 18) includes sea shipments from Korea/China to the Port of Vladivostok, and then by rail across the Transsib to Western Russia (Kaluga), and Europe (Poland, Slovakia, and Hungary). Next, Chinese rail operator CDiRS, in cooperation with Dutch Railport Brabant, linked Chengdu with Rotterdam with one run/week, but with plans to have five in place from late 2017. The Chengdu-Łódź route will further rise in prominence after TCL Corporation's decision to increase the output of its TV set production plant in this Chinese city up by 0.8 mln from its current 2.0 mln/year. Assembly parts will be rail-transported on the route in question to the Corporation's subsidiary TCL Multimedia in Polish Żyrardów.

In the meantime, Latvians have joined the New Silk Road agenda. First, the heads of the Latvian Railways and China Railway signed a letter of intent foreseeing the set-up of a regular train service between Latvia and China. Second, LDZ Logistics, a subsidiary of Latvian Railways, and Duisport have signed a MoU on jointly attracting China-Scandinavia freight via Riga. The agreement foresees the setup of a working group tasked with evaluating development opportunities provided by the existing container trains operated by the Latvian Railways, namely ZUBR (end point Odessa) and Baltic Transit (Almaty), as well as developing Riga as a hub for the Baltics and Scandinavia. Third, a meeting between China and 16 Central and Eastern Europe countries was held in Riga on November 4<sup>th</sup>-6<sup>th</sup> within the CEE 16+1 format (China together with Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, and Slovenia). A number of MoUs was signed both between politicians and enterprises on transport and logistics cooperation and developing industrial parks, whereas





Latvia was chosen as the logistics coordinator of the CEE 16+1 platform.

Lastly, in November 2016, PKP CARGO and the Xinjian Province signed a MoU on developing the dry port in Urumqi in rail-based China-Europe trade. Having mentioned PKP, the company operates its own dry port on the Polish-Belarusian train-gauge-change border in Malaszewicze (back in 2015, PKP Cargo and Zhengzhou International Hub from the Henan Province signed a letter of intent for setting-up a 50/50 joint rail venture aimed at developing PKP's facility), and during the above-mentioned presidential meeting in June, the company informed that it now handles around 20 China-Europe trains per week in Malaszewicze, up from three to five just three years earlier. However, the southern alternative may add some competitiveness in the future, as PKP LHS, responsible for the wide gauge railway in Poland which connects with Ukraine's network as well as for operating the Euroterminal Sławków in south-central Poland, has joined the Trans-Caspian Route. In this regard, Georgian Railway – Georgia being Trans-Caspian's focal rail-sea transit point – foresees the volumes to build up from 300 thou. TEU in the short-range across the corridor in question, double the figure in the mid-term, up to 1.5 mln TEU in the long-run.

#### A bite of the cherry

What does the New Silk Road business case look like then? First, from a rails-perspective. During the previous Harbours 360 Conference, Thomas Kargl, CEO of the Far East Land Bridge (FELB), and a real veteran when it comes to managing rail services over the New Silk Road, shared some statistics on volumes his company handled over the past two years. Back in 2014, FELB transported 30 thou. laden TEUs, whereas one year later this number went up to 47 thou. TEU,

an increase by 56.7% year-on-year (DB Schenker 40 thou. TEU in 2012-2014). Then Thomas analysed the rationale behind choosing rail over sea shipments on the China-Europe trade lane. It is true that the rail service is more or less tagged with double the price than ocean freight rates, Thomas agreed, but on the other hand, there are also clear benefits to a shorter transit time (16 days on average vs. 40), like short-term capital commitment, and small losses of commercial interests. Moreover, Thomas added, the reliability and simplicity of rail services further add to the attractiveness of overland transportation, all the more valuable in times of high uncertainty that pertains to the global sea shipping business, where one's container can get stuck on-board a vessel whose owner suddenly declares

irrevocable bankruptcy. Asked in this regard about the beginnings of FELB (regular traffic commenced in 2009), or more general rail shipments on the New Silk Road, Thomas admitted honestly that the concept ran into all imaginable obstacles from day one (incl. accusations of nuclear contamination...), but in the end everything smoothed out, delivering an invaluable experience which has come in handy many times. All in all, Thomas continued, the market has accepted the service, and now it's up to parties like FELB to push the business case along infrastructural developments. As such, the goal set for 2017/2018 is to further cut the transit time, hopefully to only 10 days on the Shanghai-Central Europe



**Thomas Kowitzki**

*Head of Multimodal at Deutsche Post DHL Group*

**T**he start of China's One Belt One Road initiative opened a genuine alternative by connecting Europe and China via rail. It certainly is a refreshing project with growing opportunities for shippers. Complementing the air and ocean freight options, the rail link between Europe and China has developed tremendously with a clear profile: Faster than sea shipments, yet cheaper than air transportation. Using different train routings via the northern and western corridors, DHL connects the strong ground networks in Europe and China with seamless access from rail to road, enabling to deliver all kinds of different shipment sizes for shippers with smaller up to large volume requirements. As such, the services DHL Railconnect for Less than Container Load (LCL), and DHL Railline for Full Container Load (FCL) shipments have been developed, and see a growing volume development across all industries. Shippers benefit from one contact point for the entire process chain, too, with close end-to-end monitoring, and status updates. Thanks to the close presence of DHL's own facilities to rail terminals along the New Silk Road, our company has fast access and short distances to transshipment points, and can offer customs, consolidation, and distribution services. Apart from connections to and from Europe, China also has a robust network with other Asian economies, like Vietnam, Taiwan, South Korea, and Japan, as well as strong ties with Africa, giving the New Silk Road all the chances of becoming a heavily used network of road-rail-air-ocean multimodal end-to-end services. But the steady year-after-year growth is also adding new complexities, thus requiring further development. DHL is exploring more capacities, more capabilities, and continuously searches for optimization throughout the entire transport chain to fulfil increasing customer demands in the future.





route from today's 16, as well as to balance flows in both directions. The timetable target, together with new route developments, will in turn help to achieve the 1.0 mln TEU/year level in the foreseeable future.

What's then the general long-term approach Baltic countries and companies ought to incorporate? In the paper *One Belt One Road: Insights for Finland*, prepared by Enright, Scott & Associates for Tekes (a publicly funded expert organisation for financing research, development, and innovation in Finland), one can read, "There are a number of things that Finland and Finnish companies can do to address the opportunities and challenges associated with the OBOR initiative. These include being outwardly supportive but inwardly analytical and opportunistic, developing or finding projects that can be

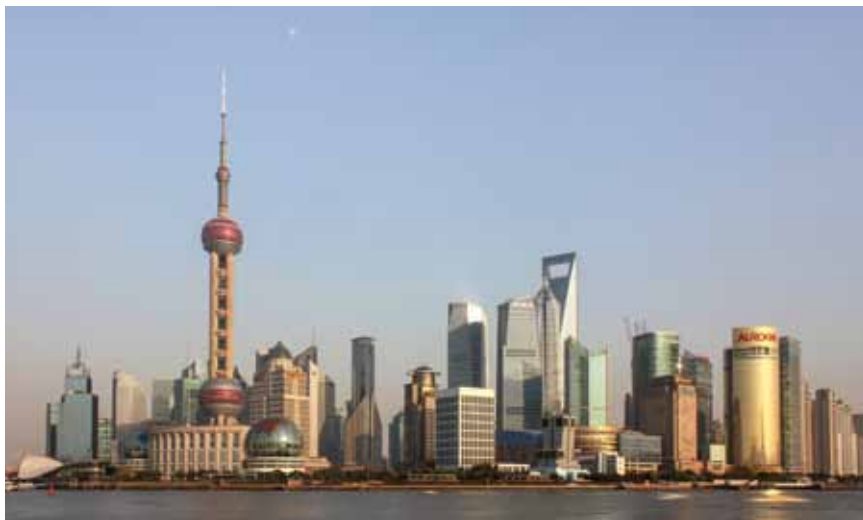
put under the OBOR rubric, finding areas in which Finnish companies have distinctive capabilities to contribute to OBOR projects, seeking opportunities in which Finland and Finnish companies might be favoured, looking beyond the initial stages of the OBOR initiative, redirecting or re-branding existing efforts to fit the OBOR rubric, exploring where consortia involving Finnish companies may contribute, seeking out the right Chinese partners, exploring the indirect implications of OBOR (including market developments, shifting economic geography, changing competitive positions, development of new supply chains), seeking guidance where appropriate, and avoiding being passive in addressing OBOR opportunities."

#### **The Chinese Dream (中国梦)**

The sheer size and scale of OBOR kindle the imagination. It is a multifaceted project the world hasn't arguably experienced

in decades, both when it comes to potential outcomes, as well as challenges mounted across the to-do-list literally from day one, including the already mentioned lack of support structures and soft infrastructures necessary to absorb the investments in less developed countries of Central and South Asia; attracting the private sector in co-financing the venture; organising and managing large-scale construction sites that either span over hundreds of kilometres or go through mountains and rain forests; coping with politics and safety; adjusting for potential black swans (e.g. Trump's agenda, coming into conflict over the South China Sea or the Senkaku/Diaoyu Islands); approaching a common understanding between different cultures; improving China's PR, and so on and so forth.

Paradoxically, China's domestic slowdown (its GDP "only" rose by 6.9% in 2015) fuels its opening-up abroad, to recall Deng Xiaoping's reform push from the late 1970s. Domestic overcapacity, rising workers' wages that depress China's competitiveness, soaring corporate debt, falling foreign reserves (minus USD 500 bln in 2015), stock market -43% typhoon in mid-2015, as well as expansion of the country's better products and services-demanding middle class (estimated USD +5.0 trn in household income by 2030), internalization of e-commerce, embracement of both the Paris Agreement as well as the Third Industrial Revolution, not least fondness for reviving the Middle Kingdom idea (where all roads lead to) – all of this persuade China to take a more pronounced global stance. Like it or not, but the global agenda is being rewritten in Mandarin. ■





## Mamuka Bakhtadze

*Georgian Railway's CEO*

**T**he One Belt One Road (OBOR) initiative was offered for the first time to the public in 2013 by Chinese President Xi Jinping. The project has no specific boundaries as such, and covers a partnership between states ranging from infrastructural investments to culture. As of today, there are over 60 countries participating in the project, and – considering the historical involvement in Eurasian economic relations – it's no wonder that Georgia is one of them. Having said this, how can all of them get closer to one another? In short, the past three years have shown that the involved countries answered this challenge by improving their infrastructure, as well as by expanding logistics networks. I think that these are the absolute prerequisites for further economic development of OBOR's stakeholders, or in other words – a good starting point in what seems to be the world's biggest connectivity scheme of our time.

Georgia's both public and private sectors fully support the New Silk Road, and our country sees itself as one of the crucial players in the Asia-Europe multimodal transportation corridor. That is why Georgian Railway, the sole railway operator in the country, has been proactive these years in adhering to OBOR's mission by, among others, developing reliable partnerships with countries along the Trans-Caspian International Transport Route, particularly with Azerbaijan and Kazakhstan. Our partners have agreed to let trains pass through their borders seamlessly with minimal bureaucratic involvement, which in turn translates into one customer-friendly price policy. The Trans-Caspian Route originates in China, passes through Kazakhstan and Azerbaijan, and via the Georgian ports of Poti and Batumi goes further into Europe. Here it's also worth mentioning that Georgia has already passed not only China-originating cargo, but also from South Korea. This fact sends out strong signals that freight transportation through Georgia is not limited to its region, but stretches to Far East economies like the mentioned South Korea, or even further overseas to Japan, hence being proof of the route's market viability. In order to capitalize on this, as well as to serve the route's clients' needs in an even more convenient way, our company together with the Georgian Government has pushed forward several infrastructural projects in the country. For instance, we're modernizing a 40 km long rail stretch, whose capacity will be boosted from today's 27 mln tn to over 100 mln tn/year.

Another international project directly increasing the effectiveness of the Trans-Caspian International Transport Route is already in progress, as the construction of the new Kuryk ferry port in Kazakhstan has already been launched. In its first phase it will increase the capacity of Kazakhstan's Caspian throughput by approx. 6.0 mln tn/year. Upgrading Kazakhstan and Azerbaijan's ports will increase the turnover of goods in the region, and decrease the clearance time for shippers.

Yet another important project involves three countries in the region: Georgia, Turkey, and Azerbaijan, and is known as the Baku-Tbilisi-Kars Railway (BTK), to be completed in the upcoming year. In the long-term it is expected to have an annual transit capacity of 17 mln tn. As Georgia and Turkey have different rail gauges (broad and standard, respectively), the Georgian Akhalkalaki region has been designed as a bogie exchange point, ensuring smooth transportation. As a result, the BTK will increase the overall transport capacity of Georgia for goods from East Asia to Europe through Turkey, and vice versa.

As Georgia's goal is to serve as a transit connection hub for East Asia, Central Asia, and Europe, it is obvious that it needs a seaport that can handle big vessels. Hence, another crucial project for Georgia as well as for the OBOR initiative is the Anaklia Deep Sea Port, located some 25 km north of the Poti harbour, and sponsored by prominent investors in Georgia and the USA, TBC Holding and Conti International. Anaklia is intended to serve Panamax-sized vessels that currently cannot be handled at Poti. Along with Anaklia seaport, there will be a 600 ha big Free Industrial Zone. Close proximity to a capable harbour, tax benefits and other support mechanisms from the government, a free trade agreement with China, the Deep and Comprehensive Free Trade Agreement with the EU, not to mention close regional economic ties will all ensure that Anaklia will be another successful project in the recent history of Georgian steady economic development.

As it was mentioned above, Georgia and China agreed on free trade terms. Both countries have worked on a feasibility study together for eight months, finalizing the negotiations in 2016. A free trade agreement with an Asian powerhouse such as China opens huge opportunities for Georgian industries, and one of the first to embrace it has been the wine industry. The ranks of the Chinese middle class are increasing dramatically, particularly in urban areas; hence, it is high time for Georgian companies to pay more attention to China's demand for high quality products. Georgian Railway will serve as a reliable backbone for transportation of goods here, too, as well as facilitate the development of international e-commerce.

The New Silk Road is like long block trains – it requires significant investment of energy and time at the beginning, but over time such an endeavour will yield good benefits to the involved countries. We expect that the Georgia-served corridor will have a tremendous positive impact on our land-locked Central Asian partners, thus making them more economically open to the global marketplace by bringing to light their true capabilities. Lastly, one of the most important things that should be mentioned when speaking of the importance of railways, is their eco-friendly character when compared to road and air transports. As such, the One Belt One Road initiative should also be one of the most prominent examples of developing a sustainable transport network across multiple countries.





Photo: ISEMAR

# The Mediterranean blue economy

by Paul Turret, *Director of the Higher Institute of Maritime Economics (ISEMAR)*



**T**he Higher Institute of Maritime Economics (ISEMAR) was founded in 1997 by the local communities, the Chamber of Commerce and Industry, and the port community in Nantes Saint-Nazaire. Its goal is to develop expertise serving as a touchstone for maritime transport, ports, and naval industry. The Institute is, therefore, a honed observatory on changes in maritime economics. ISEMAR puts its knowledge in research and understanding of maritime transport and commerce at the disposal of a wide audience since these are crucial issues in this global economic era. For more info please visit: [www.isemar.fr](http://www.isemar.fr)

**“Mare Nostrum,” meaning “our sea,” was the Latin term for the Mediterranean Sea, an area in which trade has a long-standing history. All big cities on its shores Marseilles, Genoa, Barcelona, Venice, Athens and Istanbul, to name the most famous, have a rich maritime past. It seems that they have a promising future as well.**

**Y**et, the global colonial expansion of Europe led to a relative marginalisation of the region, which resulted in a period of decline for maritime cities. During the 19<sup>th</sup> century, the European supremacy gradually evolved here, the key event in shipping being the opening of the Suez Canal. From 1869 the Mediterranean Sea became a key corridor, a section of the Euro-Asian maritime route. During the tense period in oil trading and the Cold War, the Mediterranean axis became a geopolitical issue. Today, the so-called “Med. Corridor” has regained its significance after the advent of globalisation. Its basin is again a part of the global market; the cities on its shores are home to the largest shipping companies and shipbuilders in the world, and the area therefore bears considerable weight in the global maritime industry.

## Maritime industries and stakeholders

The corridor between Suez and Gibraltar is on the oil and gas route that connects the Persian Gulf and the container routes to Asia. In 2015, 62.0 mln tn of crude oil, and 22.0 mln tn of Liquefied Natural Gas (LNG) travelled westbound. Similarly for 22 mln full TEU, the Mediterranean Sea is just a long strait linking Western and Northern Europe. As far as money is concerned – the Egyptian government has spent USD 8.0 bln on the

Eastern gateway of the Suez Canal to increase traffic. However, their hope to develop crossings through the Canal is largely dependent on demand, and not on good transit times. The investment is highly profitable for Egypt – the Canal yields USD 5.0 bln per year, which is the second national source of income after tourism.

European prospects are based on changing trade flows, with less crude oil after the closure of refineries and more products from Russia, the Middle East, and Asia. In the Med., a small group of large refineries will remain in southern Spain and Sicily. Tank storages in this case are strategically placed at the extremity of the Mediterranean Sea. The major tanking actors have invested in Spain, Cyprus, and Morocco.

Another market plays a considerable role – tourism. In fact, the Mediterranean is the largest tourist area in the world, with its sunny local climate that makes spending time (and money) here very attractive. For the maritime industry, tourism feeds the ferry and cruise industries, the latter developing dynamically. In 2015, the European cruise market represented 6.6 mln passengers (twice as many as in 2005), while customers from Italy, Spain, and France accounted for 29% of the total, while 64% of all European boardings occurred in Mediterranean ports. The cruise business is a good

**“In 2015, 62.0 mln tn of crude oil, and 22.0 mln tn of Liquefied Natural Gas (LNG) travelled westbound. Similarly for 22 mln full TEU, the Mediterranean Sea is just a long strait linking Western and Northern Europe.**

source of income for harbours mostly for already attractive cities, but also for smaller towns. The industry owes much to the beautiful landscapes and fascinating history of these areas. However, the excesses of mass tourism have caused local protests (e.g. in Venice).

The ferry business is another pillar of the Mediterranean maritime economy. The vessels connect different coasts and many islands. Major ro-ro lines run between Europe and North Africa, Italy

and Spain and, for 20 years now, link Turkey with the West Mediterranean. The car-carrier sector plays a major role for Spanish, Italian, Romanian and Turkish factories since the advent of the new low-cost car market.

Traditionally, Mediterranean cities are home to big ship-owning families, and even the term “motorways of the sea” comes from our region and was coined by Grimaldi. This eponymous dynamic company from Naples

**Traditionally, Mediterranean cities are home to big ship-owning families, and even the term “motorways of the sea” comes from our region and was coined by Grimaldi.**

became one of the largest ro-ro operators after purchasing Minoan Lines and Finnliness. Naples is also the birthplace of Mediterranean Shipping Company (MSC), created by the Aponte family, which



Photo: Fincantieri



is said to be world's No. 2 in container and No. 3 in cruise ships. The other key Mediterranean maritime cities are Marseilles, Genoa, and Piraeus, but that's not all. CMA CGM is France's major flagship company, while Piraeus is a hive of attractiveness on that side of the globe, which is underlined by the biggest fleet in the world accounting for 42,000 jobs in the Athens area. It is also because of this that Greece is a heavy-weight in the European shipping industry, and first and foremost thanks to the use of its national flag (this also holds true for Cyprus and Malta). All in all, in 2015, 70% of EU flags were Mediterranean, and in terms of economic control of fleets by shipping companies, Greece, France, and Italy have a combined 60% share in Europe.

#### **The European container battle**

The Mediterranean container sector amounts to approx. 2.2 mln TEU for the internal market, and 18.0 mln TEU for external trade. In terms of cargo flows, it offers access to very diverse economies, such as the southern part of the EU, Israel, emerging Turkey, developing Northern Africa, Egypt and the Balkans, but the line of hubs from Port Said to Algeciras/Tanger-Med has no real impact on the countries in terms of national economies. However, there are some

ports that have access to their national markets. For a long time, the hinterlands of European West Mediterranean ports were limited, but the port authorities of e.g. Barcelona, Marseilles, as well as Genoa, Adriatic's Venice, Trieste, and Koper, or the Black Sea's Constanta, are striving to extend their sphere of influence.

Today, the Northern range controls around 75% of the European market but only 50% is in its "natural hinterland." So for our ports, the European battle is focused on gaining a larger share of the continental market in a belt connecting Bordeaux with southern Poland via the Northern Alps and Central Europe (the potential is approximately 4.0 mln of full TEU per year, according to our calculations). To achieve this, excellent port performance, reliability, and good intermodal solutions will be required. Winning over of Bavarian, Swiss, and Austrian shippers will not be easy. However, there is a real growth potential for Mediterranean ports in this respect.

#### **A tradition of mechanical engineering**

European shipyards now focus on the sectors of passenger ships, ferries, and cruise boats. In 2015, 50% of European production was built by Mediterranean shipyards. In the case of France and Spain, the survivors of the 1980s



**We are now seeing a new wave in maritime mechanical engineering in Europe with the advent of marine renewable energies. Unfortunately, Mediterranean countries are lagging in this sector. Europe's first windfarms were located in the North Sea, and a major part of this new industry is now in Danish and German hands.**



collapse are on the Atlantic coast, while in Italy, Rome has preserved public control over a big player, Fincantieri. Italy is also the third European country in shipbuilding, and Fincantieri is striving to become European No. 1, competing with French and Norwegian yards. Being focused on the Romanian companies, they are part of larger groups (Croatia is hoping to retain this key industry). After expanding in the 2000s with new yards, orders in Turkey have now entered a contraction phase, because European owners have stopped massively purchasing small tankers and chemical carriers.

We are now seeing a new wave in maritime mechanical engineering in Europe with the advent of marine renewable energies. Unfortunately, Mediterranean countries are lagging in this sector. Europe's first windfarms were located in the North Sea, and a major part of this new industry is now in Danish and German hands. France has developed its own sector, but the south has been left out. The first French windfarm based on floating wind turbines on the Mediterranean

coast has yet to be commissioned, but Italy has already launched ambitious projects (although the scope of the first project, near Taranto, is limited). Finally, Spain has stuck to its specialty in onshore windfarms. One thing is clear: Southern Europe is not part of this new maritime economic sector.

**Tab. 1. Top 10 Mediterranean container ports in 2016**

| No. | Port        | TEU [mln] |
|-----|-------------|-----------|
| 1   | Valencia    | 4.77      |
| 2   | Algeciras   | 4.76      |
| 3   | Gioia Tauro | 2.80      |
| 4   | Genoa       | 2.30      |
| 5   | Barcelona   | 2.22      |
| 6   | La Spezia   | 1.27      |
| 7   | Marseille   | 1.25      |
| 8   | Koper       | 0.84      |
| 9   | Livorno     | 0.80      |
| 10  | Cagliari    | 0.69      |

Source: Port authorities

#### Remaining in good shape

The adventure of the blue economy for the Mediterranean Sea began

3,000 years ago. Today, shipping and port activities remain strong. The dynamic maritime families and port communities have managed to preserve Southern Europe's status. For the shipping world, adapting to globalisation has been a challenge a challenge, overcome by stakeholders such as CMA CGM, MSC, and many Greek companies. Regarding shipbuilding, Mediterranean shipyards remain a largely preserved industry in Europe.

When comparing the Mediterranean and the Northern European maritime sectors, the South remains a strong contender. However, the picture is quite different for its ports. For 40 years now, the Northern Range has concentrated a large part of the European market. Gaining new shares is a common goal for southern ports. At the end of the day, the idea of the Mediterranean blue economy is deeply rooted in its history and the Med. retains its "emporium" on trade with the inland. ■



**Kvarken  
Ports**

THE PORTS OF UMEÅ AND VAASA

# TWO PORTS STRONGER TOGETHER

A LOGISTIC HUB FOR THE BOTHNIA REGION



# Home for blue growth

by Wim Stubbe, the Port of Oostende's Business Development Manager



**W**im, a Master of Laws from the University of Leuven, has been working as Business Development Manager at the Belgian Port of Oostende since 2008. He's a sworn advocate of smaller and less-fashioned seaports, eagerly and what's most important also successfully finding for them new business opportunities in a world where everybody seems to be buzzing only about TEU records.

Looking at the port business through news headlines (particularly the media centres of big harbours), one could get the impression that seaports are solely about more and more TEUs moved by giant cranes from football stadium-big carriers, thousands of tonnes of coal unloaded at once, and oil pumped in the amount of Switzerland's lakes (at least). Who then needs small- and medium-sized seaports not able to handle the largest ships and their hinterland-rich freight? Luckily, a great deal of industry players find them utmost important as partners in developing various offshore ventures.

**T**ake for starters Oostende, one of four Flemish seaports in the south of the North Sea. It is also by all means an in-city port, with its inner part stretching 7 km alongside the Bruges-Oostende canal, linking the harbour with the European inland waterways network. The port is also well rail & road-connected. However, considering the pressure from the side of real estate developers and "visionary" urbanists, it is no longer possible to expand Oostende's outer port. As such, the nautical access is restricted to vessels 200 m long with no more than 8.0 m of draught.

But there is more than just cargo traffic in the North Sea. The title of the European Commission's strategy paper to the European Parliament in 2012 outlined this fairly clearly: *Blue Growth, opportunities for marine and maritime sustainable growth*. In other words, the economic potential is situated in the sea.

For instance, the Belgian North Sea's wind farms make an important contribution to achieving the country's renewable energy targets. Today, a total of 232 wind turbines are up & running, producing energy for approx. 750 thou. households. The aim is to install 450 wind turbines with an overall capacity of 2,245 MW and

an annual electricity output of 770 TWh, equivalent to 9.5% of the 8,085 TWh electricity consumption in Belgium. And, if you want to install a turbine out in the sea, you need a port.

## Blue energy and offshore wind – early days and today

The Port of Oostende took its first steps in the blue growth sector in 2007-2008 with the construction of the first phase of the C-Power offshore wind park (six 5.0 MW turbines). This new economic activity needed a dedicated infrastructure as well as space within the outer port in order to be able to realize the construction works at sea.

Considering that the Belgian government has issued licences for the set-up of eight offshore wind parks, it was clear that the Port of Oostende had to re-think its basic infrastructure to handle all the related installation and maintenance. As such, in 2009, Oostende revised its core strategy, taking on the ambition of becoming the Flemish service port for the blue growth economy.

This has in turn resulted in the set-up of a new public-private partnership called NV REBO (Renewable Energy Base



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Oostende), involving the ARTES Group, DEME Blue Energy, Offshore & Wind Assistance, Participatiemaatschappij Vlaanderen (owned by the Flemish government), and naturally the Port of Oostende. The primary goal of NV REBO is to become an efficient and cost-effective offshore terminal for handling, lifting, storing, assembling, and transporting all kinds of offshore components. In this regard, in 2011, Oostende port and NV REBO invested over EUR 5 mln in setting up a heavy load quay and associated storage space, together with an office, for different offshore industry service providers. However, Oostende does not just want to be a ship-in-out assembly plant – it aims at being a cluster of knowledge, best practices, and technology research & development to the offshore industry. The Port of Oostende is therefore making the necessary investments to facilitate the installation, management, and maintenance of offshore wind farms.

### Installation & management

Over the years one has learnt that each and every project is different and has its own unique challenges. The quality & design evolution of offshore components is enormous, and experience shows that every sea has its own characteristics: What holds true for Belgian waters, does not work when dealing with the seabed off Danish coasts in the Baltic. For that reason, preparing offshore wind farm elements in a specialized port is of utmost importance before their departure for the installation site. As such, the idea that a wind park can be built using a computer in an office somewhere in Barcelona, linked with a

spreadsheet of an accountancy department in Eastern Europe, is a sheer illusion.

Efficient and cost-effective handling of offshore components is a key task of Oostende port and NV REBO's management. Together with the client we can investigate different options to organize the upcoming port operations. The at-port construction and sea transportation of six gravity-based foundations, with an average weight of 2,700 tn each, is still a landmark within the history of Oostende. Installation vessels like Fred Olsen's *Bold Tern* or DEME's *Innovation* and *Neptune* are regular guests at the Port of Oostende, including very special ceremonies like the one that took place on April 28<sup>th</sup>, 2016, when Queen Mathilde of Belgium re-baptized Jan De Nul's *Vidar* jack-up heavy-lift vessel as *Vole au vent* in the port. Fancy as it sounds, Oostende nonetheless does not forget about the things which make it all possible, i.e. improving its port's nautical access, extending the turning circle, straightening the quay walls in line with the leading lights, etc.

Managing the whole venture implies, among others, that electricity production at sea needs to be monitored in accordance to the grid supply capacity and at an efficient price-setting, all influencing the profitability of an investment. From a technical point of view, this means that wind farm managers have daily interactions with different subcontractors, service providers, and turbine manufacturers. Wind park managers like C-Power, Otary (having the Rentel, Seastar, and Mermaid concessions), and Parkwind (Rentel, Seastar, and Northwester 2) have chosen to establish their headquarters at the Port

**The idea that a wind park can be built using a computer in an office somewhere in Barcelona, linked with a spreadsheet of an accountancy department in Eastern Europe, is a sheer illusion. For that reason, preparing offshore wind farm elements in a specialized port is of utmost importance before their departure for the installation site.**

of Oostende, organizing permanent monitoring of their parks at sea here.

### Operations & maintenance

Harnessing the power of wind isn't only about hammering a big steel pole into a seabed and then letting nature do all the work. As in the case of any other business, we're essentially talking about achieving and maintaining optimal efficiency. In effect, several service companies have installed their offices at the Port of Oostende in order to secure the maintenance, while others have asked to open a representation in the Oostende offshore village.

Considering the stable growth of the cluster, the port management has developed a master plan to install these different enterprises on the spot; a plan that takes into account not only safety and security aspects, but also places sustainability high on the agenda (e.g. the port authority is investigating the economic opportunity of installing a prototype of the mid-size 100 kW Xant wind turbine to provide the site with electricity). Implementation of this process is the daily and ongoing business for the port.

Furthermore, the turbine manufacturers Senvion, Siemens, MHI Vestas, and GE have installed their offices, warehouses, and workshops in the Oostende offshore village to quickly respond to emergency maintenance. To make this possible, the port has refurbished several buildings next to the NV REBO terminal, as well as built new premises. As to the offshore industry subcontractors, a wide range of services ranging from IT to training have found their way to the Port of Oostende, including e-Bo, CMI, Multitech, G4S, Buijsse, and Falck Safety.



Photos: Port of Oostende



Additionally, no operations & maintenance activities could do without crew transfer vessels. A number of shipping companies are operating such ships to/from Oostende and Belgian wind farms, just to mention Windcat, Nordfjord, Sima Charters, Sea Contractors, MPI, MCS, Stemat, Turbine Transfers, Geosea, and Offshore & Wind Assistance (the last two being Belgian operators). Moreover, the company GEOxyz, specialized in highly advanced technological underwater surveys and crew transfer, has based its fleet of 17 ships at the port. Next to GEOxyz, Survitec has opened a new premise in order to secure the safety and security on-board the vessels.

In order to broadly support these activities, the Port of Oostende will invest in better mooring infrastructure along with performant IT systems to ensure efficient communication between port users and nautical authorities. Lastly, more land will be prepared for an innovative shipbuilding company that is open to developing more efficient vessels that meet the various needs of wind park operators.

### On a challenge wave

Offshore wind parks' construction and maintenance represent the most important part of the blue growth development at the Port of Oostende; however, it's not the only one related to renewable sources of energy. For instance, together with Marintek, Sintef, Highlands & Islands Enterprise, the universities of Aalborg and Brindisi, we have analysed within the framework of the BEPPo – Blue Energy Production in Ports project the role small and medium-sized seaports can play in the development of wave and tidal energy. The Port of Oostende actively supports several other practical initiatives stemming from experimental development to full-scale testing, e.g. the wave projects Flansea and Laminaria have tested their solutions in and around Oostende port's breakwaters.

**We as a port authority must adapt to the new normal of mega vessels and all the perils this trend brings about for small and medium-sized ports. Alike in sports (and warfare), the best defence is attack.**



There are other blue growth opportunities that can be considered for realization. Due to climate change and rising temperatures, the water level in the North Sea is increasing. To cope with this challenge it is important to develop new techniques and technologies for monitoring the sea level, as well as on- and offshore hydraulic and underwater constructions. The Flanders Bays project (Vlaamse Baaien) has given a positive impulse, opening the door to developing new technologies in this field.

Next, the port is investigating the possibility to establish temporary and permanent test facilities in close cooperation with the marine and maritime industry. Moreover, the existence of wind parks creates an opportunity for the offshore aquaculture to establish new projects in cooperation with wind park managers within the framework of the marine spatial planning, where there is room for the exploitation and management of the seabed, promotion of marine biotechnology, cultivation of algae, all in full respect to the North Sea's eco-system.

In order to realize these ambitions and targets, the Port of Oostende is working in close cooperation with different organizations and institutions that have established themselves in the harbour. An important partner in these developments is the West Flanders Development Agency, which launched the Factory of the Future Blue Energy in 2012 to support clustering and branding of the marine and offshore industry in coastal areas.

As to research, a joint venture has been set up with Ghent University which has resulted in building the GreenBridge incubator centre in Oostende's inner port, hosting start-ups and companies finding their way into the world of renewable energy and blue growth. Other knowledge centres that have established their headquarters here are the Flemish Institute for Agricultural and Fisheries Research (ILVO), and the Flanders Marine Institute (VLIZ). The former investigates new technologies for fishing and management of fish stocks in the North Sea, whereas the latter functions as a coordination and information platform for all the scientific marine and maritime research in Flanders. VLIZ has its own research vessel (named *Simon Stevin* after the Flemish mathematician, physicist, and military engineer), and has built an internationally renowned data-centre. The United Nations Educational, Scientific and Cultural Organization (UNESCO)

has established its project office for the International Oceanographic Data & Information Change (IODE) at the Port of Oostende, too. In 2010, the port brought its relations with the industry even closer thanks to setting up as one of the founding fathers the Flanders Maritime Cluster, an interest group for all the industries that are active in and around the sea, with offices in Oostende's port house.

And most recently, the Belgian Offshore Cluster (BOC) was established, gathering different industrial players from the offshore wind sector, organizing the third edition of the Belgian Offshore Days at the Port of Oostende in March 2017. Finally, the port of Oostende invests a lot in international cooperation with other SME-ports in the North Sea, the Baltic Sea and the Atlantic Ocean. One key example is the DUAL PORTS Project, that has been approved within the North Sea Program (for more details please visit (<http://www.northsearegion.eu/dual-ports>)). This project aims at developing sustainable utilities and abilities in SME ports in order to diminish the carbon footprint of these ports and increase their energy efficiency. Therefore, new technologies are tested and implemented, as well as new systems of smart port management, implementing knowledge added value, in collaboration with research centers and public authorities.

### The new blue-coloured normal

As has been the case for decades, Oostende will continue to function as a traditional harbour, taking care of various break-bulk, ro-ro, and dry bulk freight, serving at the same time cruise ships, also being a safe haven for fishermen and their boats. But we as a port authority must adapt to the new normal of mega vessels and all the perils this trend brings about for small and medium-sized ports. Alike in sports (and warfare), the best defence is attack.

The realization of the blue growth strategy – along with other projects from the field of a circular economy, fine chemicals or inland navigation – has given the Port of Oostende a new pillar to rest on in order to guarantee its long-term viability amidst neighbouring seaports where containers stack high & mighty. Anybody wanting to diversify its port business portfolio is more than welcome to visit us and talk about finding one's way through the new normal, painted in blue. ■







# Chop and change

by Dirk Visser, *Dynamar's Senior Shipping Consultant and Managing Editor*



**A**lkmaar-based Dynamar B.V. was established in 1981 in response to a growing demand for professional maritime industry credit and market reports. Nowadays the company also delivers comprehensive transport & shipping information and consultancy services for the energy and financial sectors, being at the same time one of world's leading container sector credit risk analysts and a major provider of analytical container shipping news, commentary, and consultancy. For more info please visit [www.dynamar.com](http://www.dynamar.com). Prior to joining Dynamar in 1999, Dirk Visser worked for more than 30 years in an Amsterdam-Rotterdam agency and the forwarding industry in several senior posts, representing nearly 70 (liner) shipping companies of all kinds. As a Senior Shipping Consultant and Managing Editor, Dirk is responsible for Dynamar's consultancy and publications departments.

**Since the start of this millennium, Dynamar has been closely following the annual progress of the world's 25 largest container liner operators. One of the more remarkable developments has been the enormously increasing distance, in terms of fleet size, between carriers No. 1 and 25. Meanwhile, the alliance (re/de)formation hit another climax last year, as a consequence of there being too many and too big ships, a trend that also swept away a few companies...**

**I**n January 2000, the fleet of Maersk Sealand (as it was named the year after its merger with the American carrier SeaLand Service), amounted to 282 ships with a nominal capacity of 620,300 TEU. This was twelve times more than that of South Korean No. 25 Cho Yang, then deploying 24 vessels (51,900 TEU). In this context, last year's bankruptcy of Korean Hanjin was reminiscent of Cho Yang's disappearance in August 2001. By the first month of this year, in turn, Maersk Line's (as it was renamed following its 2006 acquisition of P&O Nedlloyd) fleet grew to 631 vessels of nominal 3,274,000 TEU. This time it was fifty eight times that of then No. 25 Transworld Group and its 34 units (56,200 TEU).

Below, we're updating the standings of the present 25 biggest liner box carriers, which entered 2017 following an utterly hectic 2016, a year when we said farewell to no less than eight names, some of them tracing their origins back more than 100 years ago, including APL (American President Lines; 1848), China Shipping Container Lines (1984), Hamburg Süd (1871), Hanjin Shipping (1945), "K" Line (Kawasaki Kisen Kaisha; 1919), MOL (Mitsui OSK Lines; 1884), NYK (Nippon Yusen Kaisha; 1885), and UASC (United Arab Shipping Company; 1976).

## Financial catastrophe in the making

Effective January 2017, the Top 25's overall share of global capacity reached 85%. However, company size does not necessarily come with good financial results. For the first time, as a group, the Top 25 collectively posted a net loss in 2015, this running into hundreds of millions of dollars. Even more monetary horror may be underway; for the first nine months of 2016, the combined net result of twelve of these lines reporting their financials fell by more than USD 13 bln! For 10 of them, the loss came down to USD 163 per TEU on average. Little wonder! Over the same three quarter-long period, spot rates quoted for the 10,500 nautical miles Shanghai-Rotterdam leg were USD 618 all-in per TEU on average. This equals less than six dollar cents per nautical mile. Quotations ranged between a nadir of USD 205 despair in March, and a "zenith" of USD 699 in July. What carrier could survive on that?

These indeed turbulent times have led to a wholesale change in the East-West alliance system. Back in January 2015, four such collaborations kicked off, namely 2M of Maersk Line and MSC; the CKYHE Alliance (Coscon, Evergreen, Hanjin, "K" Line, and Yang Ming), the G6 Alliance (APL, Hapag-Lloyd, Hyundai, MOL, NYK, and OOCL), as lastly the Ocean Three (China



**Tab. 1. ULCS operated and on order as of early January 2017<sup>1</sup>**

| Operators                         | Existing   | Ordered    | Total      | Avg. TEU capacity | Total TEU capacity |
|-----------------------------------|------------|------------|------------|-------------------|--------------------|
| CMA CGM/APL                       | 59         | 15         | 74         | 12,700            | 941,000            |
| Coscon                            | 48         | 30         | 78         | 14,600            | 1,140,000          |
| Evergreen                         | 15         | 16         | 31         | 16,300            | 505,000            |
| Hapag/UASC                        | 34         | 5          | 39         | 14,300            | 556,000            |
| Hyundai                           | 16         | 0          | 16         | 12,000            | 192,000            |
| IRISL                             | 0          | 4          | 4          | 14,500            | 58,000             |
| Japan 3 <sup>2</sup>              | 23         | 22         | 45         | 13,900            | 625,000            |
| Maersk/Hamburg Süd                | 74         | 20         | 94         | 14,700            | 1,383,000          |
| MSC                               | 76         | 19         | 95         | 14,500            | 1,380,000          |
| OOCL                              | 10         | 6          | 16         | 16,200            | 259,000            |
| PIL                               | 0          | 12         | 12         | 11,800            | 142,000            |
| Yang Ming                         | 14         | 7          | 21         | 13,900            | 292,000            |
| ZIM                               | 4          | 0          | 4          | 10,100            | 40,000             |
| Non-operating owners <sup>3</sup> | 14         | 15         | 29         | 11,000            | 319,000            |
| <b>Total</b>                      | <b>387</b> | <b>171</b> | <b>558</b> | <b>14,000</b>     | <b>7,832,000</b>   |

As of early January 2017, the total operated ULCS fleet stood at 387 units. Another 171 were on order for delivery in 2017 (91 vessels), 2018 (66), and 2019 (14). Considering the present market and its direct perspectives, it may be assumed that operators/owners will try to (further) postpone delivery, as happened in 2016 when more than 25 ULCS slipped into this year. This also explains the unprecedented number of 91 deliveries formally planned for 2017. The largest ULCS currently operating are the six LNG-ready 19,870 TEU units of UASC. The biggest ULCS to come are five 21,100 TEU monsters being built for OOCL, of which the first one is to hit the water in May this year. She will be preceded by the first ever delivery of a 20,000+ mastodon when MOL is to take in the 20,150 TEU also LNG-ready *MOL Triumph* in April 2017.

<sup>1</sup> By individual carrier, incl. newly (to be) acquired subsidiaries, merged or sister companies in 2016/17, 10,000+ TEU vessel numbers

<sup>2</sup> "K" Line, MOL, and NYK

<sup>3</sup> Ships sub-chartered, if any, are included in the fleets of the current operators

**Tab. 2. ULCS operated and on order as of early January 2017**

| Future alliances     | Existing   | Ordered    | Total      | Avg. TEU capacity | Total TEU capacity |
|----------------------|------------|------------|------------|-------------------|--------------------|
| 2M+                  | 166        | 39         | 205        | 14,400            | 2,954,000          |
| Ocean Alliance       | 132        | 67         | 199        | 14,300            | 2,844,000          |
| THE Alliance         | 71         | 34         | 105        | 14,000            | 1,474,000          |
| Other <sup>1</sup>   | 4          | 16         | 20         | 12,000            | 240,000            |
| Non-operating owners | 14         | 15         | 29         | 11,000            | 319,000            |
| <b>Total</b>         | <b>387</b> | <b>171</b> | <b>558</b> | <b>14,000</b>     | <b>7,832,000</b>   |

Sorted by the three new alliances taking effect in March/April, the 10,000+ TEU dominance of 2M+ (incl. South America-specialist Hamburg Süd and Hyundai with its current 16 ships) comes to the fore once more (however, the future operator of these, i.e. the South Koreans themselves or the other two partners, is yet unknown). One should also take note that not all ships in the three listed alliances will operate solely across the East-West routes.

<sup>1</sup> ULCS carriers not currently a member of any alliance, such as IRISL, PIL, and ZIM

For the first three quarters of 2016, spot rates quoted for the 10,500 nautical miles Shanghai-Rotterdam leg were USD 618 all-in per TEU on average. This equals less than six dollar cents per nautical mile. Quotations ranged between a nadir of USD 205 despair in March, and a "zenith" of USD 699 in July. Which carrier could survive on that?

Shipping, CMA CGM, and UASC). However, less than one-and-a-half years later, in April/May 2016, the relevant carriers announced drastic rearrangements of their groupings into 2M+ (Maersk Line and MSC, plus Hyundai sharing space) the Ocean Alliance (CMA CGM/APL, Coscon, Evergreen, and OOCL), and THE Alliance (Hapag-Lloyd/UASC, Hanjin, "K" Line, MOL, NYK, and Yang Ming). All being well and with the permission of the US Federal Maritime Commission already in their pockets, these three new alliances will start operations effective April 1<sup>st</sup>, 2017.

But deeper consolidation forces stand behind these reshufflings. Here we mention all materialised or initiated mergers and acquisitions within the space of a single year (2016), involving no less than 12 lines. As such, China Shipping merged into Coscon (effective from February 2016); CMA CMG took over APL (completed in June 2016); Hanjin sadly went under (filing for bankruptcy protection on August 31<sup>st</sup> last year); the merger-to-be of UASC into Hapag-Lloyd (most likely in 2017's first quarter); the proposed JV between "K" Line, MOL,

**Tab. 3. ULCS operated and on order by Panamax-New Post Panamax categories**

| Type          | Existing   | Ordered    | Total      | Avg. TEU capacity | Total TEU capacity |
|---------------|------------|------------|------------|-------------------|--------------------|
| Up to Panamax | 214        | 65         | 279        | 11,700            | 3,262,000          |
| Post Panamax  | 126        | 48         | 174        | 14,500            | 2,517,000          |
| 18,000+       | 47         | 58         | 105        | 19,500            | 2,052,000          |
| <b>Total</b>  | <b>387</b> | <b>171</b> | <b>558</b> | <b>14,000</b>     | <b>7,832,000</b>   |

The final table is sorted by ships capable of transiting the new set of Panama locks, i.e. which have a maximum breadth of 49 m, as well as those that cannot. In the latter category, the so much to the imagination speaking 23-boxes wide 18,000+ TEU leviathans are listed separately. It is clear that the possibility to pass through the Panama Canal contributes to the trade/schedule flexibility of a carrier. The ULCS fleets operated or on order by Evergreen, IRISL, and Yang Ming are lacking this versatility; for the future Japan 3 group, only MOL deploys smaller than the (new) Panamax tonnage. By definition, each deep-sea newbuilding is too large for the trade at the time of its delivery, and all are built to stay around for at least 25 years. Moreover, these modern ships, especially those ordered after 2009, have been constructed according to superior specifications, with their engines providing the lowest possible fuel consumption, amongst others. More than 30 of the larger units are LNG-ready.

and NYK (planned for July 2017); as well as Maersk Line's intended acquisition of Hamburg Süd (probably late 2017).

In the course of the abovementioned sweeping and powerful changes, smaller liner companies have come under great pressure to consider consolidation as well, promising 2017 to be another exciting year. And, indeed, the New Year had barely begun before speculation erupted that Hong Kong's OOCL would be put up for sale by the Tung family, with mainland China's Coscon as the most likely buyer. Firm denials followed from both sides, often best read as signs of starting to reach the ultimate deal...

#### Too much, too big, too slow

Cost reduction, in the form of larger, less gas guzzling, and more efficient ships has been the top container liner operators' answer to low rates. It started with Maersk Line's 2006-launched 15,600 TEU E-class, developed and built for Europe-Far East trade. High volumes, excellent at-sea vs. in-port time relationship, capable container terminals – this lane seemed to be the ideal route for Ultra Large Container Ships (ULCS) in order to reap the maximum from their economies of scale.

Worried by the Danish company's lower slot costs eroding their market shares, other carriers followed suit in big numbers. By the end of 2016, altogether 16 of the Top 25 lines controlled 100% of all ULCS operating, along with 89% in the order book, representing 387 ships/5.2 mln TEU/13,500 TEU on average, and 171 vessels/2.6 mln TEU/15,300 TEU run-of-the-mill, respectively. Capacities range between 10,000 TEU and 21,200 TEU. By 2016's end, a total of 177 ULCS with an average capacity of 15,300 TEU has been operating between North Europe and Asia.

On the land side, in turn, the consensus among big ship carriers is that container terminals should handle 6,000 moves/day on a ULCS. The universal consent among stevedores, on the other hand, is that production of 3,500 moves is a more realistic maximum.

The current largest ULCS in operation is UASC's 2015-launched 19,900 TEU *Barzan*. She is 400 m long and has 24 x 40-foot box bays (transverse rows of FEU containers). Because of the "two islands" deck configuration, *Barzan* can be handled with nine Ship-to-Shore gantries (at the max). This is not much more than the seven STSes which could empty or fill an 8,000 TEU, 350 m long ship built some 10 years ago. The difference in capacity between the two vessels is not so much in length, as it is in their breadth (six deck rows more), and in height (extra tiers under and on deck). If it comes to quay cranes, the differences are extensive as well; on the *Barzan*, the crane's spreaders have to travel longer, i.e. wider and deeper. Tandem-spreaders will be used whenever possible, while the cranes need to be much taller, minimum 50 m under the spreader. Thus, they are heavier by approx. 2,000 tn, therefore requiring stronger berths.

Several of the Top 25 carriers, and the four largest in particular, have extensive container terminal interests across the world. Along the North Europe-Far East routes alone, where the world's largest ULCS monsters sail, Maersk Line (APM Terminals/23), MSC (TIL Group/9), CMA CGM (APT, Terminal Link, CMA Terminals/16) and Coscon (Cosco Shipping Ports/19) combined are involved in no less than 67 terminals. Interestingly, but none of these facilities has so far been able to achieve a ULCS production of 6,000 moves per 24 hours...



**A Dynamar-developed Carrying/Capacity Ratio shows that, since 2005, the indexed Top 25 capacity has outgrown indexed carryings of the same operators by no less than 38%. This is what leads to the roots of the current liner shipping hassles**

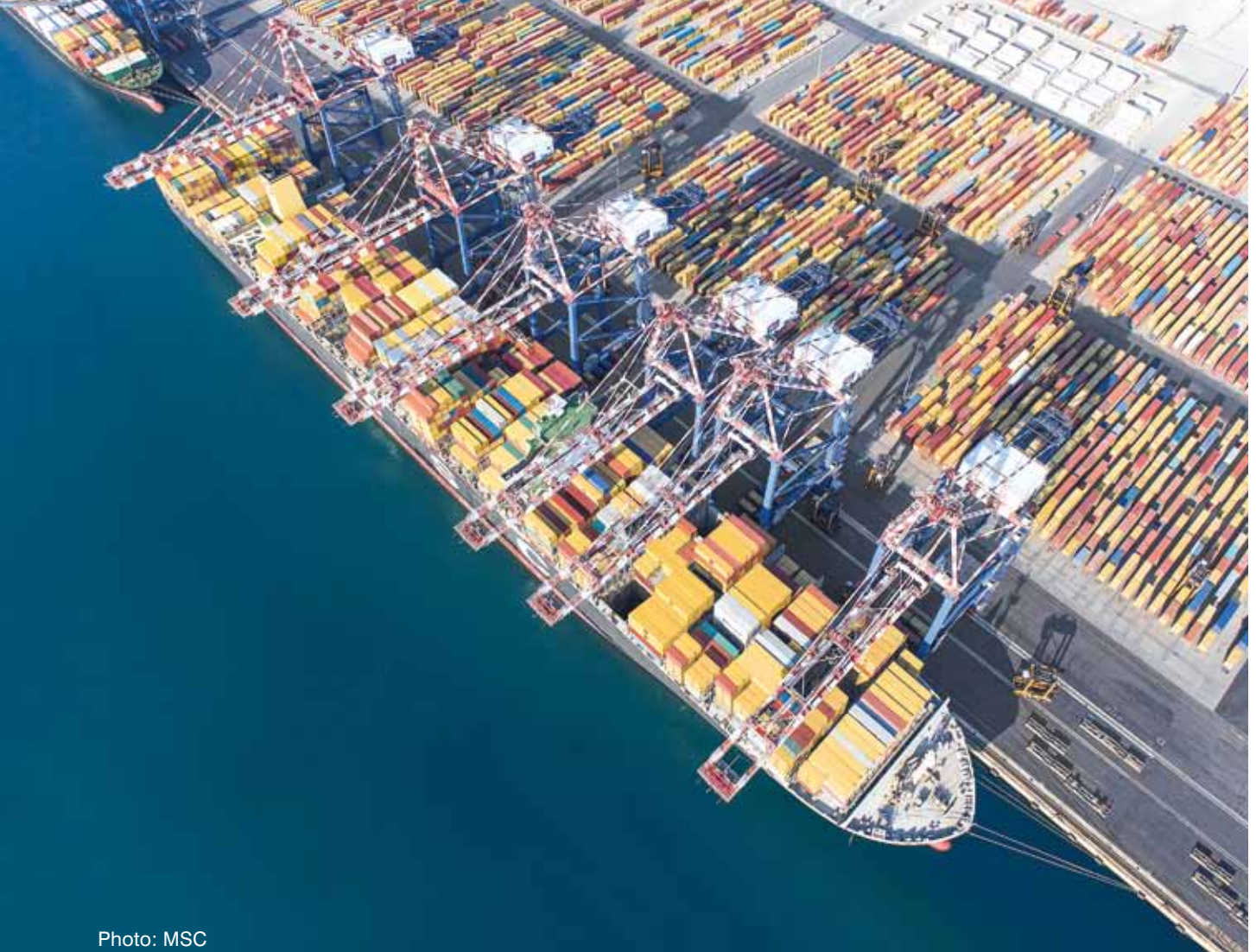


Photo: MSC

A Dynamar-developed Carrying/Capacity Ratio shows that, since 2005, the indexed Top 25 capacity has outgrown indexed carryings of the same operators by no less than 38%. This is what leads to the roots of the current liner shipping hassles, namely a deluge of large newbuildings combined with a faltering market have resulted in severe overcapacity inducing a bitter rate war ensuing dramatic losses. In other words, it is the price of too many and too big ships, handled in addition by too slow STSes.

Aware of the overcapacity damage done with their financials turning a deep dark red, almost no carrier ordered ULCS in 2016. Almost, because in December, the Islamic Republic of Iran Shipping Lines (IRISL) fulfilled an earlier “promise” to go for ULCS as well, ordering an initial four 14,500 TEU units.

#### Not only liner box shipping

Cold comfort, but it is not container liner shipping alone immersed in uncertainty. Break-bulk, heavy lift, dry bulk, tankers, non-operating owners, you

name it, all the main shipping segments are concurrently groaning under a severe downturn seldom seen before. It can barely get any worse... In addition to maturation, container shipping also faces the yet largely unknown effects of 3D printing, automation, and robotics on cargo streams, all of which facilitate nearshoring. At the same time, protectionism is starting to show its ugly face again.

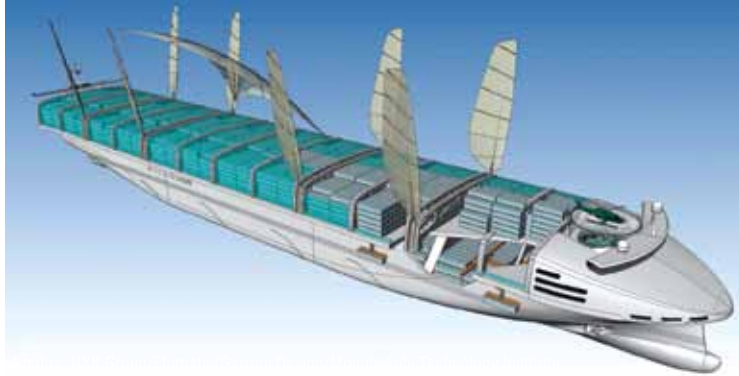
Paradoxically, despite all doom and gloom, at the very end of 2016 it was reported that the shipping industry's confidence had hit its highest level in 15 months. That's the spirit, that's what typifies shipping! It may have helped that in the fourth quarter of 2016, spot rates on all long haul trades from Shanghai saw a recovery, positively influencing the level of contract rates for the New Year. The container ship order book has shrunk to an equally historic low of less than 16%. Scrapping has never been as high as last year's 700,000 TEU, expected to continue at the same level in 2017. Troubles haven't disappeared, but who knows, maybe the worst is over?

**Paradoxically, despite all doom and gloom, at the very end of 2016 it was reported that the shipping industry's confidence had hit its highest level in 15 months. That's the spirit, that's what typifies shipping! It may have helped that in the fourth quarter of 2016, spot rates on all long haul trades from Shanghai saw a recovery.**

#### The Top 25 future

Ongoing container liner consolidation, as so convincingly initiated in 2016, should help address all challenges if the resulting larger companies and alliances seriously work on eradicating the current excess tonnage while keeping future capacity expansion in check. And finally, as said, 2016 ended with (ultimately) eight companies less than it started with. No worries, though, as long as there is worldwide water and trade, there will be the 25 largest container liner companies, worthy of knowing everything about them!





# In the wake of a new era of shipping

by Przemysław Myszkowski and Maciej Kniter



**For some the term “sustainability” is just a magic spell repeated over and over again across Brussels’s corridors, while for others it is their default mindset, a vision they have for what the world should look like today and in the future. We talk with Ian Petty, SSI’s new General Manager, about the shipping industry’s sustainability rights and wrongs, surrounding regulations, global trends, and a roadmap on how to combine the environmental and social with the commercial.**

**B**efore being appointed Sustainable Shipping Initiative’s General Manager, Ian worked for nearly 40 years in the maritime sector, being i.a. a First Class Master Mariner, gaining vast seagoing experience. He was also Director Group Operations and a Member of the Executive Management Team at P&O Maritime in Australia and Dubai, and Project Director at James Fisher Fendercare and James Fisher Marine Services.

**T**he Sustainable Shipping Initiative (SSI) is an independent charity, comprised of ambitious leaders spanning the whole shipping value chain from charterers and ship-owners, to ship yards, class societies and technology companies whose common objective is to make sustainability mainstream. The SSI works with its members and other shipping stakeholders to create a more environmentally responsible, socially conscious, safer, accountable, and more economically profitable industry. For more info on SSI please visit: [www.ssi2040.org](http://www.ssi2040.org)

## ■ What is wrong nowadays with the shipping industry’s sustainability? How high would it score against other industries?

Nothing has pretty much changed with the shipping business’ environmental impact, as this industry is still the most eco-efficient transport mode out there. However, that said, we cannot sweep under the carpet the fact that more or less 90% of world trade is carried across seas, hence the total CO<sub>2</sub> output of the sea shipping industry adds up considerably. It may on the one hand seem not so big after all, like 2.5% of global emissions, but on the other hand it’s an equivalent of a country the size of Germany. Another thing we need to bear in mind, are the results of the International Maritime Organization’s (IMO) latest greenhouse gas study, according to which the environmental impact of shipping will increase in the future, ranging anywhere between +50% to +250% by 2050, depending naturally on the pace of economic growth. At the same time, in contrast, the land-based industries are cutting their emissions. As such,

we can imagine the seaborne transports’ emission share going from this 2.5% up to maybe even 17%. This is one of the reasons why the shipping industry must take action now, despite it currently enjoying the label of the most eco-effective per one mile of transported goods. Then again, sustainability isn’t only about the environment, running in turn through a whole range of areas. The shipping industry has to therefore also take care of such issues like crewing, ship recycling, ocean governance, and transparency. These are the real and tangible to-dos for the industry if it wants to earn its sustainability badge.

As a matter of fact, this all led to setting up the Sustainable Shipping Initiative (SSI) back in 2010. We rounded up the needs that required addressing, and coined our Vision2040. This time horizon is neither too short nor too long to take into account the trends and developments taking place in the shipping business, not to mention that it encompasses such industry-internal features like a ship’s lifespan. In other words, what will leave a shipyard this

or next year, will most probably still be sailing in a quarter of a century, thus having its pennyworth in the sustainability discussion. Our Vision targets six areas where the shipping industry must advance, including proper governance of the oceans (as such, also spatial planning); cooperation with other stakeholders, e.g. ports, that are also concerned with various ship-related emissions be it CO<sub>2</sub>, SO<sub>x</sub>, NO<sub>x</sub>, particulate matter, etc.; safe and healthy working environments for ships' crews, so that people will want to continue working at sea; financial solutions that reward sustainable performance; and last but not least, fuel transition to alternative power sources.

■ **What can the shipping industry be proud of?**

While there are clearly things to work on, as listed above, the shipping industry has also come a long way forward in recent years.

I was at sea for 13 years, and saw a huge change in the culture of the sea. The industry was very wasteful in the past, sometimes quite literally with waste thrown out over the side. This collusion has in turn been replaced by a "leave nothing behind but your wake" principle.

Basically speaking, the industry is waking up, and we're seeking a change within how things are done, also thanks to SSI's efforts. For instance, stakeholders' demands have changed up and down the supply chain, from the side of customers, charterers, investors, and so forth. People have just realized that sustainability creates benefits – environmental, social, and commercial. We see also it in the news, stories about responsible ship-owners taking action, even in the absence of any legislation, to improve their footprint. Take for example one of SSI's members, Maersk Line, and its Triple-E container carriers, standing for energy efficient, eco-friendly, and

economical. It is a good example of how one can combine savings on bunker bills with axing CO<sub>2</sub>-per container emissions (-50% on the Asia-Europe trade lane). Another of our members, AkzoNobel, has introduced voluntary credit carbon schemes, whereas Bunge has optimized the speed of its vessels. The whole point of such undertakings is their dual nature – they make commercial sense, but at the same time they also reward sustainable performance. We have also introduced new neutral clauses into chartering agreements around the Virtual Arrival project. These allow a ship to steam at the most economic speed instead of going full ahead only to end up in a queue in a port, wasting time and money anchored. Some of our other members are very much into technical innovation aimed at better efficiency for lower fuel consumption and reduced emissions. These may not be the big one-in-a-kind revolutionary solutions, but a set of minor ones which, when added up, bring significant gains. Next, other parties are working closely with ship recycling yards in Southeast Asia, improving the safety performance of these facilities; there is a tough task ahead of them, but they've already managed to help in changing some unacceptable practices there. So, there are a good deal of advances to be proud of, as well as plenty of issues that still need addressing.

■ **To what extent is the industry pursuing sustainability on its own, and to what degree is it imposed on by other parties, such as international regulatory bodies, governments, but also society? Is it a partnership relation or rather a sort of "forced marriage"?**

Surely, we are dealing here with a variety of parties and relations between them. There are organizations ready to stand up for what's right in their view, and be proactive in achieving their

goals. From where we're standing, we saw our members joining the Paris COP 21 debate around CO<sub>2</sub> emissions control implementation, calling for a proper regulation of this issue. The key for the shipping industry in this regards, is that the Paris Agreement is a global deal, because ship-owners really get frustrated with regional implementations. Some regions act unilaterally, like the European Union (or at least its northern part), the US, and some other, which makes it difficult for a shipping company to compete on such a "level" playing field. That's why we can witness further resistance to locally-binding regulations, as it simply weakens the competitiveness, and increases the risk of investments driving out of certain regions.

On the other hand, there are companies that recognise the value of regulations being a catalyst for change, just as people introduce supply chain cost-efficiencies that are in line with environmental concerns. There are certainly driving forces going on with legislations, and these are potentially leading to the point where the majority of ship-owners will embrace the clean-tech sustainability idea, both for the sake of corporate social responsibility reasons and for commercial reasons. Frankly speaking, sustainability is more and more becoming an issue which cannot be opted in/out by a ship-owner; for many it has become an essential part of their strategies. In contrast, we must also speak openly about the shipping business' financial problems, i.e. for some it is just impossible to gather the capital for clean-tech investments, because many of them are fighting to stay afloat virtually on a daily

basis. That is the reason why we at the SSI have devoted much of our time to working on financial models that will allow ship-owners to get their return on investment. Often today it is the charterer who reaps the benefits of an improvement, not the ship-owner that makes it in the first place, the so-called split incentive. The model Save as You Sail (SAYS), developed by our member, ABN AMRO bank, tries to re-balance this in a more equitable way. Trust is vital as well. Some ship-owners may be reluctant to invest their money into not-so-mature technologies, or in solutions that in real life operations do not exactly provide the benefits marketed initially. Here, transparency in trialling new technology is key, so that the final results can be credible.

■ **Sustainability is high on the Baltic Sea region's agenda. What do things look like in other parts of the world?**

The Baltic Sea region has always been at the forefront, particularly in regards to environmental awareness. However, other parts of the world are setting the pace as well, just to mention the North American Nitrogen Emission Control Area. What's common for these places, it's not only their sensitive environment that makes them stand out, but a sort of high social understanding that by protecting seas and coastal areas we and the future generations will benefit from such actions. Just look at the immense bottom-up campaign in Australia set up for protecting the Great Barrier Reef. Nevertheless, the global picture is much more fragmented, with certain regions' sustainability developing at a much slower speed. The shift-to-sustainability is chiefly led by the more developed countries. For instance, during the 69<sup>th</sup> session of the IMO's Marine Environment Protection Committee (MEPC), it was the European Union together with some of the bigger flag registries pushing for greater CO<sub>2</sub> controls, with resistance coming from

the likes of India, Brazil, and Russia; these countries are more concerned with such legislation negatively impacting their trade or competitive performance. In other words, one could feel the tension between national and global interests. Ultimately, however, shipping is a global industry, which will have to meet the sustainability challenge globally.

■ **By its nature, the shipping business does not act in isolation from global trends – be it economic and societal drifts, technological advancements, climate change, political turmoil, etc. From your perspective, what are both the black and white swans that can suddenly disrupt the way goods are being moved from one place to another?**

A number of events can disrupt the shipping business, most recently the oil markdown, Brexit, and the coup d'état in Turkey, not to mention the sanction war between the West and Russia which has significantly affected trade volumes in the Baltic. However, the industry's attitude is that things will smoothen out one way or another, the pace of change is slow, the IMO is taking its time with regulations (ballast water is a good example here), and so on, and so forth.

Back in 2010, we published *The Case for Action* paper in which we identified seven global megatrends that may significantly impact the world as we know it today. Those include climate change; advances in technology; increasing regulation; changing energy supplies; increasing demand for transparency; ocean governance and spatial planning; as well as shifts in the global economy as a result of the emergence of new global economic giants (whoever they may be). Out of these we picked three that have the biggest potential for disrupting the shipping business, namely energy supply and climate change, increased scrutiny, and a change in economic context.

If I were to pick the black swan out of this mix, it would be climate change. There is much talk about lowering carbon emissions in line with the +2.0 centigrade target, but for many this goal is a very distant one, many years from today. However, this +2°C limit is above the baseline set in the latter part of the 19<sup>th</sup> century. In reality, for

2016's first half, global temperatures have been tracking at or very close to this threshold. As such, we are not in need of a global temperature slowdown, rather of global cooling. What's alarming, is that nobody knows what or where this will exactly happen. Indeed, the Northern Sea Route may open up for year-round shipments, but other places may suffer from extreme weather phenomena with devastating chain-reaction effects. It is not that scientists are speculating about global warming and its potential consequences, people are already being affected by it. That's why sustainability in general, and that of the transport sector in particular, is so crucial for our wellbeing.

■ **If it would be only up to SSI to shape the future, what would the shipping industry look like in a quarter of a century?**

This is a question about SSI's very raison d'être! Effectively, our ambition is to have an industry where there is a formal system of global ocean governance in place which recognizes different rights and responsibilities of various ocean users, i.e. proper ocean management through adequate spatial planning. Alongside that, we would like to see a clean and healthy port community, taking care of the environment, with corruption being a thing of the past. We would like to see the shipping industry as an enabler of trade and development. Making the sector a sought-after career choice is critical, too. It would also be great to have creditable sustainability rating schemes to inform shipping-related commercial decisions, so that proactive and responsible companies could thrive. We foresee financial instruments being developed that give preferential access to capital and insurance for high levels of sustainable performance. Diversified energy sources – biofuels, hydrogen, wind – is another key target. Wider cooperation and resource sharing through a fully integrated supply chain would be worth a shot as well. All combined, we would like to see the shipping industry's CO<sub>2</sub> emissions reduced by at least 90% against the 1990 level. This is our roadmap which we are working on together with our members and partners.



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# partnership events

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**transport logistic**  
9-12 May 2017  
DE/Munich

*This trade fair has established itself as a 100% transport & logistics showcase, presenting in one place the entire value chain as well as major international market players. Transport logistic combines innovative products, technologies, and systems with pooled expertise and a strong sales focus.*



**Global Liner Shipping**  
16-17 May 2017  
DE/Hamburg

*The key points of the event's agenda include containers, global outlook of terminal operating sector, Panama Canal expansion and trade routes, as well as supply chain digitization and optimisation. Special offer for the Harbours Review Readers save 10% with code – GLSHR.*



**LNG Conference**  
17-18 May 2017  
EE/Tallinn

*The LNG as a part of the energy security package and its potential for the Baltic Sea region will be at the heart of discussions. The key topics include small scale LNG infrastructure, logistics and bunkering fleet future design, Blue Corridors, comparison to other fuels, as well as ship-owners' perspective on the market.*



**The Posidonia Sea Tourism Forum**  
23-24 May 2017  
GR/Athens

*The 4<sup>th</sup> edition of the Forum includes cruise sessions focused on industry development and growth strategies in the East Mediterranean, yachting sessions evaluating on i.a. the sector in Greece, as well as an exhibition space for, among many, ports, hotels, and yacht brokers.*



**LNGgc Americas**  
31 May-2 June 2017  
US/Houston, Texas

*The event is devoted to the entire supply chain from gas liquefaction to supply, and distribution. The participants will learn more on the latest economic, strategic and technical developments for US small scale infrastructure and fuel economics. Book now to secure your place and enjoy a 20% exclusive discount with the this VIP Code – FKA2636HARBRW.*



**Inter-TRANSPORT**  
31 May-2 June 2017  
UA/Odessa

*The exhibition Inter-TRANSPORT and Agro-LOGISTICS will be connected with the conference devoted to the future business and education in the maritime industry, new possibilities of the multimodal transportation between Europe-Asia-Europe, environmental protection and life safety.*



**ESPO 2017 Annual Conference**  
1-2 June 2017  
ES/Barcelona

*The conference is a chance to hear a broad overview on the last year most discussed topics: Global policy on ports and shipping decarbonisation, climate change consequences for ports, limiting the increase of global temperature, and the role of port authority in changing the port's business model.*



**UniMerchants Grain Academy**  
1-2 June 2017  
PL/Gdynia

*The two-day event covers a wide range of sector topics, including crop perspectives and main supply/demand trends in EU for the upcoming harvest, the use of paper markets in global commodities, risk minimizing in the soft commodities trade, and such mechanisms of price building.*



**TOC Europe**  
27-29 June 2017  
NL/Amsterdam

*The event comprises four parts: Container Supply Chain Conference, focused on opportunities for the future container trade, Bulk Logistics & Technology, showcasing logistics innovations and green bulk transportation, TECH TOC Conference, presenting the maintenance and repairing of port equipment, as well as clean technologies and decarbonisation processes, and finally Port Technology Exhibition showing the latest innovations.*

We invite you to cooperate with us! If you wish to comment on any key port issue, share your feedback or have information for us, do not hesitate to contact us at: [editorial@baltic-press.com](mailto:editorial@baltic-press.com), +48 58 627 2320/ 2321.

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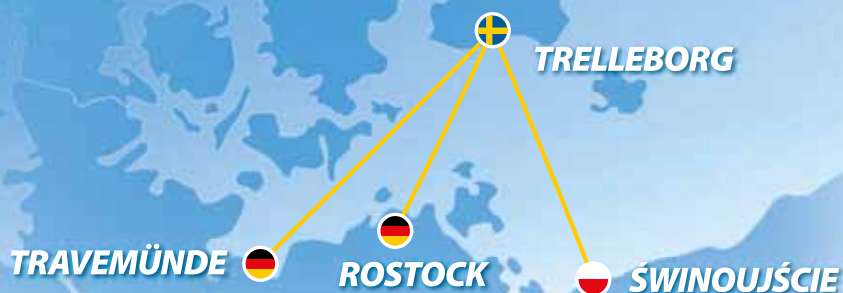
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