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PORT DEVELOPMENT AND INVESTMENT

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Jack Donnelly,
Editor

FOREWORD

Our first journal of 2023 is a fitting start in looking to the future in our industry. Port development and investment – whether that be through infrastructure development, digitalised solutions, sustainability initiatives or workforce upskilling schemes – is the bedrock and catalyst ports and logistics players need to meet today's challenges and obstacles.

Your 128th PTI E-Journal brings you outstanding contributions from minds across the sector and around the globe. We are delighted to hear from port stakeholders from Gothenburg, Halifax, and Venice, on their current work on improving processes; as well as holistic investment approaches to terminal investment from Associated British Ports (ABP), DP World, and many more to what it means to develop the logistics landscape.

As ports and terminals begin to emerge from stalling bottlenecks that have hampered efforts to reduce congestion around the world, budgets can now be set to move on from firefighting to forward-planning to serve bigger ships, harness connected networks, and turbocharge green energy projects to reduce carbon footprints.

We wish you a promising and successful 2023 and look forward to bringing exclusive content to you throughout the year.

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THE EAST-WEST GATE TERMINAL

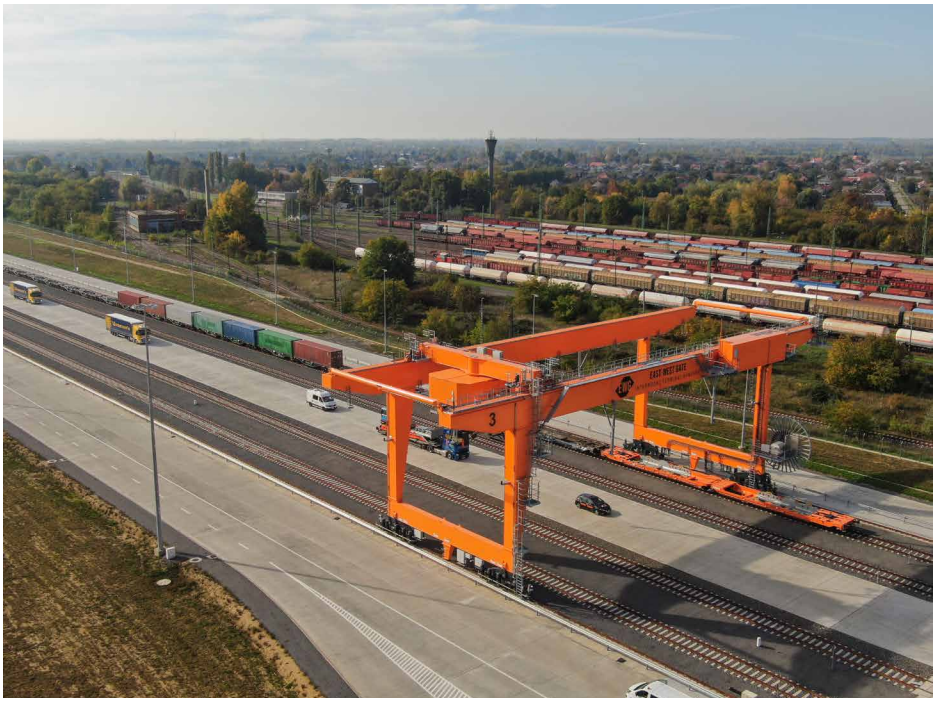
János Tálosi,
CEO, East-West Gate

THE NEWLY OPENED EAST-WEST GATE IS A KEY PLAYER IN UKRAINIAN GRAIN EXPORTS

Europe's largest land-based intermodal terminal, the East-West Gate, was built to handle rail container traffic between Asia and Europe at Fényeslitke on the Hungarian side of the Hungarian-Ukrainian border, at the junction of the narrow and wide gauge railway tracks. However, the Russian-Ukrainian war has given the terminal a whole new meaning, and after a trial run and official approval process, we opened it in October last year, the main objective is primarily to export Ukrainian grain and thus help alleviate the world food crisis.

For months in the first half of last year, the war cut off Ukraine's main export route through the Black Sea, and even in the second half of the year, only limited maritime traffic resumed with the mediation of the UN and Turkey. Ukrainian suppliers have therefore turned to the west to try to maintain grain exports. The Port of Constanta in Romania is now operating at full capacity, rail routes in Slovakia and Romania are saturated, and low and fluctuating water levels on the Tisza and Danube rivers make shipping unpredictable. The difficulties are also reflected in Ukraine's export statistics, with some 30 per cent less grain exported by mid-November 2022 than a year earlier, reaching only 15.1 million tonnes.

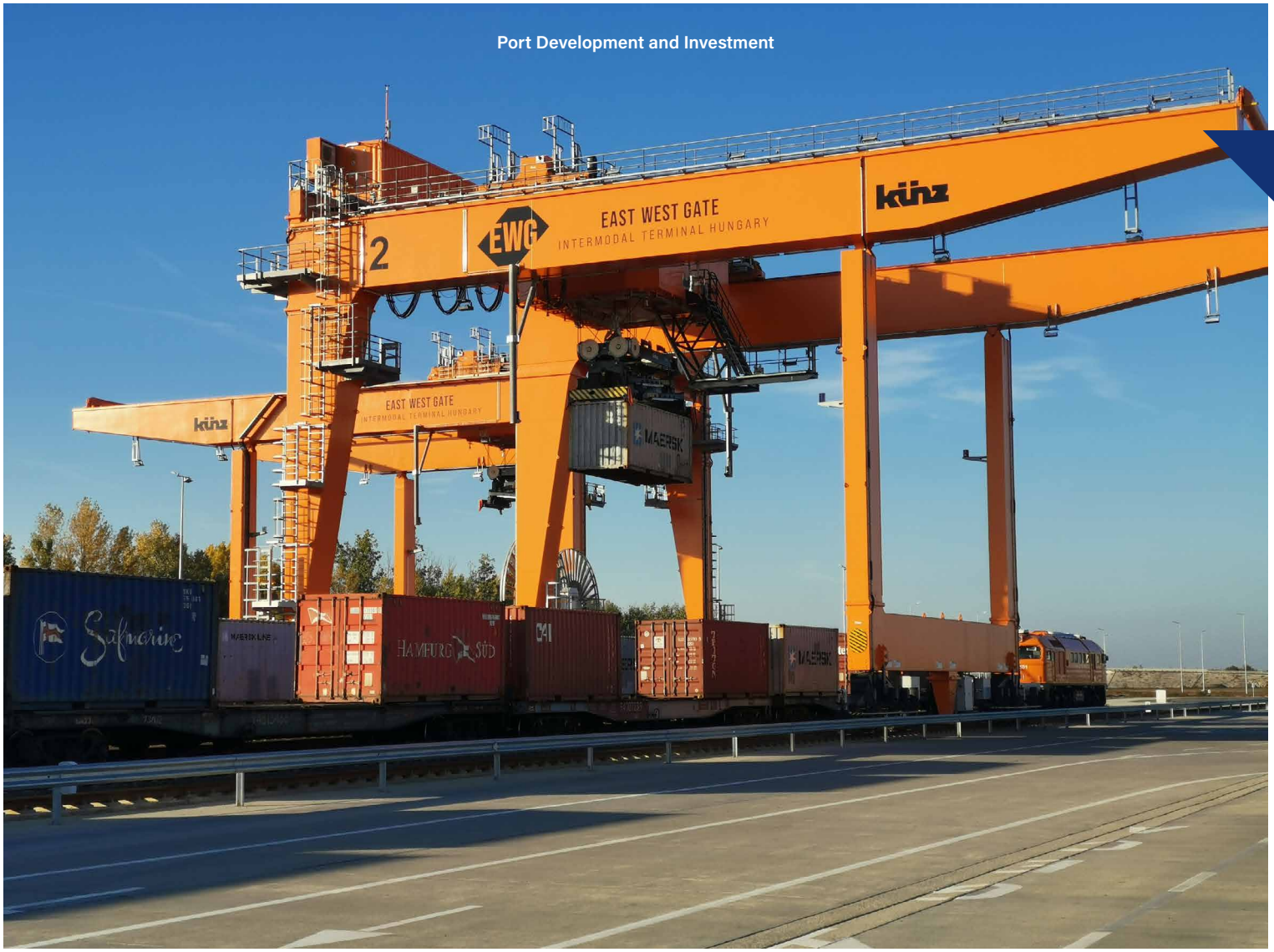
However, there is still spare transport capacity on the route from the Hungarian-Ukrainian border to the northern Adriatic ports of Trieste and Koper, and we can become a key player in serving this route. The first months of operation of the East-West Gate have shown that there is a strong demand from the Ukrainian side for transshipment.



ABOVE
EWG is the first in Europe to control cranes remotely

The volume of containerised grain transport is steadily increasing with our existing partners, and we are in the process of signing contracts with new Ukrainian companies. However, the demand is mainly for bulk transshipment, grain and edible oil transfer, so we are continuously acquiring the necessary equipment, and from the end of January 2023 we will be able to

"THE FIRST MONTHS OF OPERATION OF THE EAST-WEST GATE HAVE SHOWN THAT THERE IS A STRONG DEMAND FROM THE UKRAINIAN SIDE FOR TRANSSHIPMENT."



transfer 1,000 tonnes of grain and 4,000 cubic metres of edible oil per hour from wide-gauge wagons to standard-gauge wagons.

Our terminal is independent, open to any rail and road freight company in the world, and we are open to all freight forwarding operators and carriers.

We expect to play a significant role in the logistics of Ukrainian reconstruction once the war is over, and we also anticipate a resurgence in continental container traffic.

THE VISION: THE GATEWAY TO THE FUTURE BETWEEN EAST AND WEST

The East-West Gate terminal was originally built to serve the ever-expanding East-West rail container traffic, to speed up rail container traffic and reduce the waiting time for the changeover between wide and standard gauge rail, which lead time had increased significantly year on year due to capacity constraints at the transhipment yards until the outbreak of the war.

Our vision was to create the intermodal terminal of the future, a state-of-the-art rail logistics centre equipped with the latest technologies that will play a key role in increasing the volume of rail freight transport in Europe. There is a strong demand for this, as rail and intermodal transport are set to play a key role in the European Union, as they are fast, safe and environmentally friendly. Without the rapid expansion of intermodal transport, the targets set out in the European Green Deal, namely to reduce our environmental footprint by 55 per cent by 2030 and 90 per cent by 2050, will not be met. This would require shifting 50,000 –100,000 trucks from road to rail in Hungary alone every year.

ABOVE
This is the largest european land-based terminal, with a capacity of 1 million TEU

TODAY, STATE-OF-THE-ART TECHNOLOGY IS ESSENTIAL

Our aim is to operate quickly and efficiently, which is a must in today's world and an expectation in logistics. That's why we not only installed the most modern technology available, but also adapted a Hungarian start-up's development to the terminal. In the application of 5G, we looked for completely new ways with Vodafone Hungary and Huawei Technologies Hungary. We were the first in Europe to deploy remotely controlled giant cranes operated through a private 5G network. We operate the four Künz cranes from the central building, which not only improves efficiency, but also provides safer and better working conditions for the staff. Some 20 high-resolution cameras have been installed on each crane, whose images can be seen in real time by

"SOME 20 HIGH-RESOLUTION CAMERAS HAVE BEEN INSTALLED ON EACH CRANE, WHOSE IMAGES CAN BE SEEN IN REAL TIME BY THE OPERATORS IN THE CONTROL ROOM VIA 5G."

RIGHT
We were able to achieve an efficiency improvement of around 20-30 per cent using 5G technology

the operators in the control room via 5G, and they can react without delay, just as if they were sitting on top of the cranes in a cabin.

Also via the 5G network, we continuously track the journey of all trucks, semi-trailers and containers, as well as cargo arriving on rail trains, from entry to exiting the terminal. The system, supplied by Camco Technologies, not only speeds up entry, exit and transshipment of goods, but also serves terminal management and security. In addition, the system not only supports our own work, but as an extra service, our customers can receive real-time information on the progress of their container or truck transfer.

All of our loading machines, including our terminal tractors, are connected to the 5G network, which helps us to efficiently share information, such as giving loading instructions to our operators in real time.

The experience of the first months of operation confirmed our preliminary calculation that we were able to achieve an efficiency improvement of around 20-30 per cent using 5G compared to traditional transloaders. Therefore, we are planning additional 5G applications for our 15,000 square-metre warehouse, such as self-driving delivery vehicles and warehouse automation.

The private 5G network is also supporting a brand new application that is unique in logistics. We have also built the digital twin of East-West Gate, in cooperation with a Hungarian startup. MaxWhere uses 5G to track the processes and operations of the logistics centre in real time, in 3D – the movement of trains, trucks, cranes, delivery vehicles and the route of goods, helping to plan, optimise processes and increase efficiency. The system is an accurate virtual model of the terminal, allowing operators to be trained, with realistic simulation, while the terminal itself is running smoothly.

SUSTAINABLE OPERATION IS NOW A BASIC REQUIREMENT

From the start of the project, we have been working towards a green terminal concept. In addition to our core mission of increasing the role of environmentally friendly freight transport, we also strive for sustainability in our own operations. We use high-efficiency heat pumps to cool and heat our buildings, we also use e-cars and electric terminal tractors, while we source the additional electricity we need from green sources wherever possible. From the outset, we plan to install our own renewable energy sources, solar panels and wind farms. We will see the actual energy use and the capacity required now, after the terminal is handed over and goes live.

ABOUT THE AUTHOR

János Tálosi is a chemical engineer, logistics and property development specialist. For more than a decade, he has been involved in logistics, road transport, real estate development management and the construction of industrial logistics parks. He is the visionary behind East-West Gate and CEO of the joint stock company that built and operates the terminal.

ABOUT THE ORGANISATION

The largest land-based intermodal terminal in Europe, with a theoretical capacity of one million TEU per year, East-West Gate can also load trucks and conventional road semi-trailers onto rail. Its cranes are ATEX and ADR certified, allowing for special cargo transshipment. It also has vacuum grain and crude oil transfer equipment, as well as warehouse space for rent in a duty-free area. Construction started in January 2021, handed over in October 2022, with an investment of €100 million ($107 million).

INDUSTRY Q&A: **ELVIR DZANIC, PORT OF GOTHENBURG**

Elvir Dzanic,
CEO, Port of Gothenburg Authority

Port Technology International covered the landmark Smart Port: Piers of the Future 2022 event hosted by the Port of Barcelona on 15, 16 and 17 November. During the event **Jack Donnelly**, Editor, Port Technology International, spoke to **Elvir Dzanic**, CEO, Port of Gothenburg Authority, to find out his thoughts on the event, and plans for 2023 and beyond.

Cast your mind back to last year's Smart Ports: Piers of the Future 2021. What were the main takeaways from the event for you? What did you learn?

ED: I did not expect innovation to be so high on the agenda. I picked up on conversations last year between different ports on how much innovation is not just as a keyword but in the every day workings of a port.

I was super inspired by the innovation centre here in Barcelona with SEAT and to see how much the port was engaged with it, and how much value they extract from it. The Port of Montreal and Singapore also highlighted that engagement.

Innovation is something tangible and real in the world of ports, which honestly surprised me for the positive side. Most of the time, I have been involved in ports as a shipper, or a carrier, viewing the ports as operational infrastructure. This event has opened up a whole new world for me.

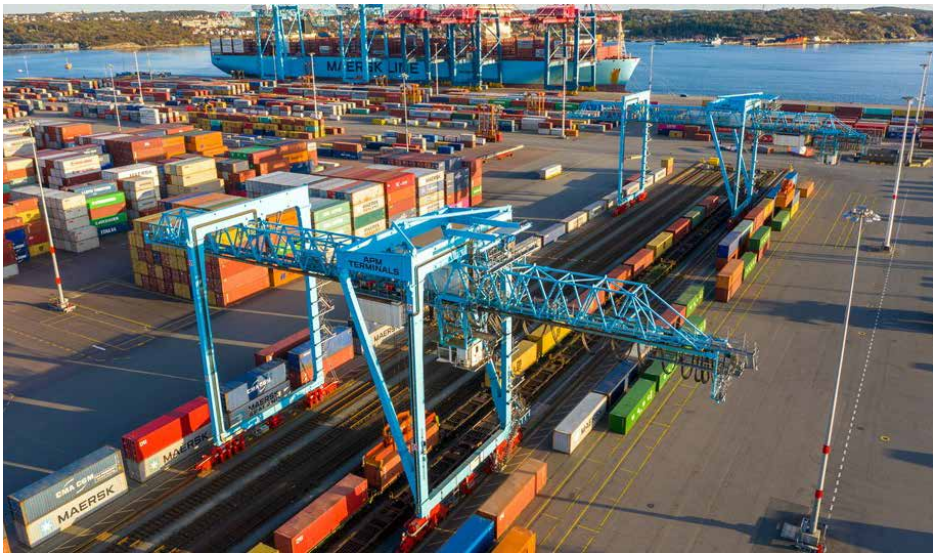
What do you want the logistics sector to remember from this year's event?

ED: For me, this event is an eye-opener that ports are simply no longer just pieces of brick and mortar infrastructure. Ports are playing a much bigger role in the logistics chain.

The competence needed for ports is different today than it was five, six or seven years ago.

We are moving in the value chain. We are moving because we see that we can make a difference. It is not enough for a port to simply take care of their infrastructure. We now need competencies that understand the mechanics of business models, that understand the mechanics of creating value, not just within the limits of the ports area, but also in the entire supply chain.

That is the key takeaway; we need a different set of competencies in the ports now, and I believe that is right because there is no doubt that we can add and create value outside of the actual port area.



BELOW
Rail machinery at the Port of Gothenburg

"THE COMPETENCE NEEDED FOR PORTS IS DIFFERENT TODAY THAN IT WAS FIVE, SIX OR SEVEN YEARS AGO."

What were your personal takeaways from the Smart Ports: Piers of the Future Event for 2022?

ED: Regardless which type of panel discussion, the conversation always tilts into sustainability and decarbonisation and so on. That was the continuous thread in the conversation. I enjoyed the conversation about decarbonising business models, which is something we need to dig deeper into as ports.

Often when we speak about the energy transition, we talk about the technical side of it. How can we adapt our business model to support decarbonisation of our customers? Having just the availability of fuels or the technique in place will not drive new assets to be green in your port.

We need to also synchronise on sustainability. We are competitors in a certain sense, but we need to synchronise that behaviour across various ports – which is where green corridors play a pretty cool role.

We are seeing a growth of 'green' corridors in our industry with the likes of the Ports of Hamburg, Long Beach, and Singapore establishing their own corridors. Could you give some detail as to what a green corridor actually is, and how customers benefit?

ED: From our experience, we have signed two green corridors: one with Rotterdam, one with Ghent.

We signed our agreements on the topic of green fuels and building commitment to e-methanol, with a deadline in place. Those two ports can then commit to establishing availability in e-methanol in each port so ships can use the fuel at both Port A and Port B.

The next step for us is to implement the business model where we incentivise the carrier to use the green fuel and it will be more expensive even with our subsidies, because green methanol is four times more expensive. So, from that, we need to get around the Beneficial Cargo Owners (BCOs) that hold 60, 70, or 80 per cent of that trade lane, take them to the table and offer what concessions we can make.

We might say that the producer of the fuel is making concessions and yet we still cannot cover the delta, and so ask the BCOs if they are paying more for their freight. In all of these cases, the cargo owners have said yes – but there still could be a gap in financing. So then we involve the government, or the European Union (EU), and ask them to do more as the whole value chain is pitching in to make concessions.

It is about driving a change on that corridor; not just a technical change and the availability of the fuels, but a change in behaviour.

This is where ports play a super role because we are so neutral. If the carrier goes to a customer and asks them to pay, it becomes a business transaction, because it is a supplier-customer relationship. If the port comes in, it is not a business transaction, it becomes an easier value conversation.

MAIN
X-Press Mulhacen approaching the Port of Gothenburg

"OFTEN WHEN WE SPEAK ABOUT THE ENERGY TRANSITION, WE TALK ABOUT THE TECHNICAL SIDE OF IT. HOW CAN WE ADAPT OUR BUSINESS MODEL TO SUPPORT DECARBONISATION OF OUR CUSTOMERS?"

“OUR SUSTAINABILITY PRIORITIES MOVING FORWARD: DIGITALISATION TO MAKE SURE THE PORT IS ACCESSIBLE AND EFFICIENT, THE BUSINESS MODEL IMPLEMENTATION... TO ENCOURAGE USE OF THE TOOLS AVAILABLE TO YOU IN THE PORT, AND ELECTRIFICATION ON THE SEASIDE AND LANDSIDE.”

RIGHT
Four heavy electric trucks and an electric bus charging at the Port of Gothenburg's new station

What are the Port of Gothenburg's sustainability priorities moving forward? Have they changed at all?

ED: We laid out our strategy two years ago, and it has not changed. We mapped our ports emissions and the emissions from up and down the logistics chain.

Since February 2021, all operations in which we handle our cargo is through fossil-free power sources. But that is one of the smallest segments emissions output that we have mapped out in our carbon footprint.

The next step for us is electrifying all of our berths. That is a major thing because it's an investment without a return.

Our intention is not to allow the carriers to hook up to shore power whenever they feel like it; we will mandate them to – for example by not allowing them to enter the port unless they plug into the grid, period.

Next year, we will electrify all berths in the energy port. This is a major development; you cannot have your mobile phone in an energy port – that is how dangerous it is. And we have figured out a way to install a 250 Megawatt station there for the ships. We have also electrified our ro-ro terminal for vessels, and in the next two years we will electrify our container terminal. Our entire ports business will then be electrified from the seaside.

We have just invested in digital Just-In-Time solutions with Awake.ai, a Finnish company. Initially, we did not see a business case in this investment, but through simulation we noted that we could reduce the emissions by approximately 3,500 tons of carbon. When you use the European metric and the taxonomy for those tons, suddenly this became a business model.

These are digital investments that will make a port more accessible and predictable for ships. But, again, it is not just about having the digital system because the carriers still might sail and drop anchor. So we could for example impose a rule where you are not allowed to anchor for more than two hours. Just because the system is there, it is an enabler, and behaviour still needs to be changed. We will change that behaviour by imposing these different business models.

In short, those are our

"WE, AS THE COUNTRY OF SWEDEN, ARE GOING INTO LABOUR NEGOTIATIONS NEXT YEAR. WE WANT TO ACHIEVE A SMOOTH LABOUR CONTRACT, PERIOD."

sustainability priorities moving forward: digitalisation to make sure the port is accessible and efficient, the business model implementation primarily for a cost incentive to encourage use of the tools available to you in the port, and electrification on the seaside and landside.

For years the industry has questioned investment in offering shore power to container ships because of its naturally shorter berthing times, making the business case harder for the significant cost of shore power facilities. What are your thoughts on this?

ED: I do not think it goes against the nature of container shipping, because the ships of today are so big that they are not in and out of a port in a few hours. They stay at a berth for eight, nine, or 10 hours, and sometimes even two days.

It has always been our intention to do so when a customer asks for it. When a customer approaches us and says: "I am coming in with a ship, I want to be able to plug and play." We have reversed that conversation to electrify all of our berths, and then we will put pressure on the carrier, requiring them to use it.

We have allocated SEK600 million ($58 million) for our decarbonisation business model. We are not expecting a return on these funds, as they are earmarked for the investment of decarbonising models, including electrification. Roughly SEK200 million ($19 million) is reserved to losing business. We think that people will not appreciate if we say that you have to plug in your ship, or you cannot anchor for more than two hours, or that you must use green trucks. We think that we will see carriers and trucking companies choosing other ports. So we have factored in that loss of revenue as part of that investment.

What do you as a port want to achieve by this time next year?

ED: We, as the country of Sweden, are going into labour negotiations next year. We want to achieve a smooth labour contract, period. We want to avoid disruptions and play fair on all accounts because this is a national issue.

We also will launch the access for e-methanol by 50,000 tons to become a green hub. Access to Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG) is done. Access to Hydrotreated Vegetable Oil (HVO) and biofuel is done, but now we need methanol to become that true green bunker hub that we are talking about.

ABOUT THE AUTHOR:
Elvir Dzanic has a profound passion for business. Dzanic has been working for many years in the logistics sector in different positions. Previous in North America as Vice President of Business Development at CEVA Logistics. But also, at Geodis in Sweden. He has a Bachelor's Degree Shipping and Logistics at Chalmers University.

ABOUT THE ORGANISATION:
The Port of Gothenburg is the largest port in Scandinavia. Around 30 per cent of Swedish domestic and foreign trade passes through the Port of Gothenburg and over 50 per cent of all container traffic. The port is a full-service port, and offers industry guaranteed, highly efficient and climate-smart access to the whole world.

CÔTE D'IVOIRE: A SECOND CONTAINER TERMINAL FOR THE PORT OF ABIDJAN

Olivier de Noray,
Ports and Terminals CEO,
Bolloré Africa Logistics

On 2 December, Côte d'Ivoire Terminal, a subsidiary of Bolloré Africa Logistics and APM Terminals, inaugurated the second container terminal at the Port of Abidjan. This new strategic infrastructure for Côte d'Ivoire aims to strengthen the attractiveness of the Port of Abidjan and double its processing capacity, to reach a total of 2.5 million TEU containers per year.

This is one of the largest public-private partnerships in Côte d'Ivoire, estimated at more than €904 million ($960 million) of which €507 million ($538 million) have been invested by the Ivorian State and €397 million ($421 million) by its two shareholders: Bolloré Africa Logistics and APM Terminals. Construction of the second container terminal began in 2020. It is one of the major port infrastructure development and modernisation projects initiated by the Ivorian government to improve the competitiveness of the Port of Abidjan and make it a key hub on Africa's Atlantic coast.

Built in less than two years, the new container terminal is of sufficient size to receive ships with 16 metres of draught and to handle increasing flows with the capability to absorb more than 1.5 million TEU containers per year. This is more than twice the current capacity of Abidjan Terminal at close to one million containers.

This new terminal also aims to develop the transshipment activities of the Port of Abidjan and offer greater choice to shipowners. For the Autonomous Port of Abidjan, the objective is to increase from 1.2 million to 3.7 million TEU per year and to raise Abidjan to the rank of the largest hub ports on the West African coast.

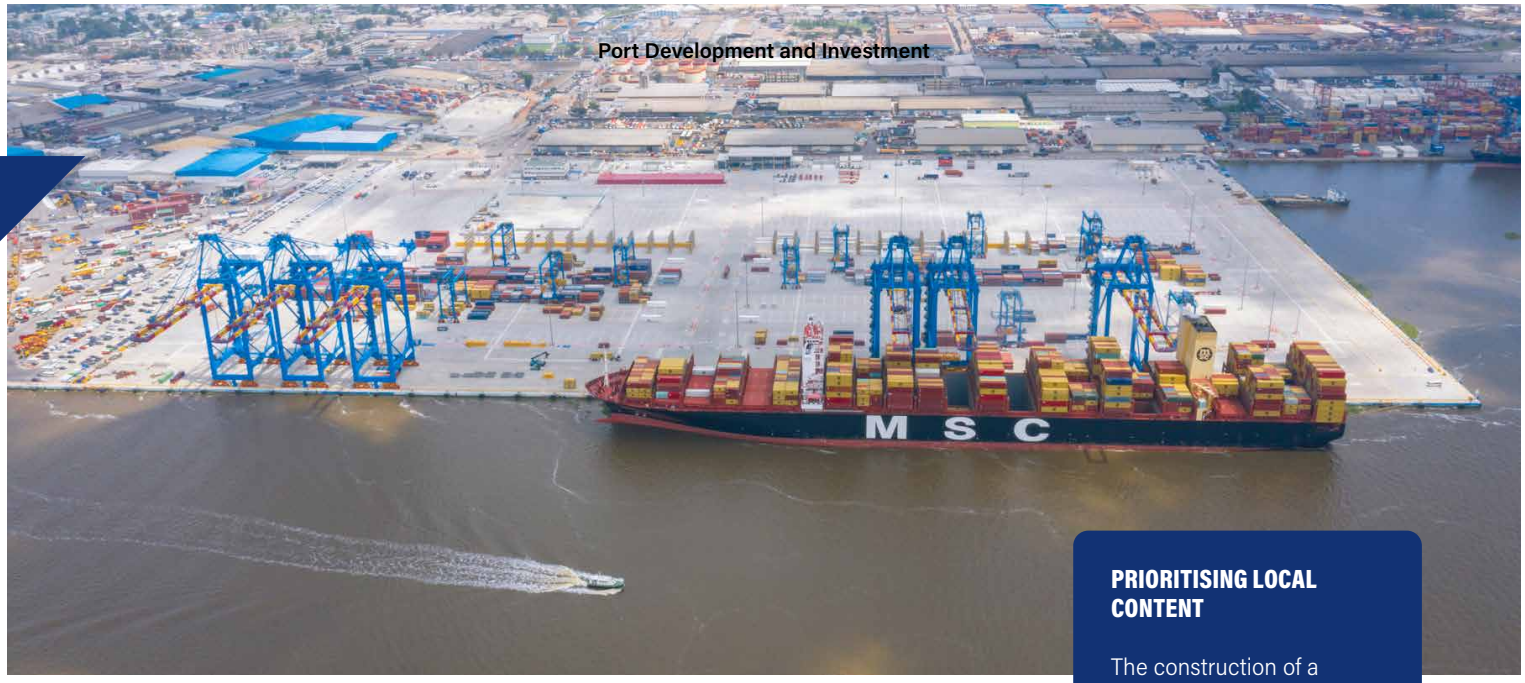
RIGHT
Charging terminals at Côte d'Ivoire Terminal

"WE DESIGNED THIS TERMINAL BY COMBINING OUR EXPERTISE WITH THE LATEST TECHNOLOGICAL ADVANCES, AND BY TAKING INTO ACCOUNT THE ESG ISSUES THAT ARE INSEPARABLE FROM OUR STRATEGY."

To support these ambitious objectives, Côte d'Ivoire Terminal can rely on its shareholder Bolloré Africa Logistics and its network of infrastructures and multimodal solutions to improve the country's import and export flows and increase trade, particularly in agricultural products (cocoa, cashew nuts and mangoes) which make a major contribution to the GDP of the countries in the subregion.

Côte d'Ivoire Terminal is also focusing on innovation in order to offer highly competitive services to shipowners, and has invested in the latest technologies available on the market: the Navis operating system for terminal management, online appointment scheduling systems, an optical recognition access control system, a remote management and temperature control system for refrigerated containers, an online payment system, and more. When combined, these solutions should reduce handling costs while offering a high level of security for operations.

"We designed this terminal by combining our expertise with the



PRIORITISING LOCAL CONTENT

The construction of a second container terminal has contributed to the country's economic development by supporting job creation and skills transfer. The work was carried out, under the supervision of international professionals and experts, by local companies whose staff have been trained in current standards.

"BUILT IN LESS THAN TWO YEARS, THE NEW CONTAINER TERMINAL IS OF SUFFICIENT SIZE TO RECEIVE SHIPS WITH 16 METRES OF DRAUGHT AND TO HANDLE INCREASING FLOWS WITH THE CAPABILITY TO ABSORB MORE THAN 1.5 MILLION TEU CONTAINERS PER YEAR."

latest technological advances, and by taking into account the ESG issues that are inseparable from our strategy. Its role will be to support the increase in volumes in Côte d'Ivoire and to act as a transshipment hub to boost import and export flows throughout the region in West Africa" said Olivier de Noray, Ports and Terminals CEO of Bolloré Africa Logistics.

Finally, as far as environmental issues are concerned, the container terminal was built in line with the key principles of the Bolloré Africa Logistics Green Terminal label in order to limit its carbon impact at every level. Created in 2020, the Green Terminal label is a new approach introduced by Bolloré Africa Logistics and validated by Bureau Veritas to reduce greenhouse gas emissions in terminals. In order to best meet its requirements, Côte d'Ivoire Terminal has acquired 100 per cent electric equipment including STS gantries, RTG gantries and a fleet of 36 port tractors. At the same time, other initiatives have been introduced such as a water treatment system that will promote circular economy. According to the managers of Bolloré Africa Logistics, the terminal is expected to obtain the Green Terminal label as soon as Bureau Veritas has finalised its audit. Côte d'Ivoire Terminal is aiming for the maximum score of 3 stars, which would make it one of the first to achieve this score.

KEY FIGURES

- 37.5 hectares of surface area
- 6 STS gantries
- 13 RTG gantries
- 36 electric tractors
- 16 metres of draught
- 37.5 hectares of surface area
- 1,100 metres of quay
- More than 1.5 million TEU containers/year
- 596 billion CFA francs ($960 million) of global investment
- 450 employees

ABOUT THE AUTHOR:
Olivier de Noray is CEO Ports and Terminals of Bolloré Africa Logistics. In 2008, Olivier de Noray joined the Bolloré Group as Director for Ports and Terminals. He conducted Bolloré Group port concession development in Africa under the Bolloré Africa Logistics' brand. Today, Olivier de Noray supervises the whole range of the Bolloré Africa Logistics' port activities recently acquired by the MSC Group. It encompasses 20 different concessions in Africa, Asia and Latin America.

ABOUT THE ORGANISATION:
Bolloré Africa Logistics is a major transport and logistics operator present in 49 countries. A specialist in multimodal transport, the group operates in four business lines: logistics, port, maritime and rail. On December 21, 2022, it joined the MSC Family with the ambition to connect Africa to the rest of the world.

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PORT OF HALIFAX'S GREEN ENERGY CORRIDOR

MAIN
Sunset, with a vessel in the background and tug in the foreground, shows PSA Halifax – Atlantic Hub terminal, a deepwater terminal with 16-metre depth, 800-metre continuous length with on-dock rail.

Lane Farguson,
Communications and Marketing Director, Halifax Port Authority

From his waterfront office at the Port of Halifax, Captain Allan Gray welcomes the morning sunrise earlier than any other CEO of a full-service port in North America. In early January, the skies start to lighten around 7.00 am AST with the first rays of sunlight appearing on the horizon just before 8.00 am. This strategic "first port" location has long been a blessing for Halifax; its "first in, last out" deep-water port status has helped grow the containerised cargo business to record highs in recent years. Now, it is creating a unique opportunity to decarbonise the shipping corridor between North America and Europe, an opportunity that is actively being explored through a Memorandum of Understanding (MoU) with the Hamburg Port Authority.

The two CEOs, Cpt. Gray in Halifax and Jens Meier in Hamburg, have known each other for years and share complementary views on the strategic role ports can play in supply chain decarbonisation, in reducing their carbon footprint and in assisting municipalities and provinces or territories with energy transition. "We have a long relationship of cooperation and share a mutual drive and commitment toward sustainability and digitalisation," said Cpt. Gray. "It seems only natural that we continue to collaborate to decarbonise a significant trade route between our two ports."

There are many reasons why this collaboration is a good fit in terms of supply chain decarbonisation. Halifax, Nova Scotia is home to just under half a million people and is one of the fastest growing cities in Canada. It is the economic centre for Atlantic Canada, with an economy built on the ocean and shaped by the sea. With six universities and a community college, Halifax is fast becoming one of Canada's most exciting technology and innovation hubs. Halifax is home to Centre for Ocean Ventures and Entrepreneurship (COVE), a collaborative facility for applied innovation in the ocean sector, Volta, which is Atlantic Canada's premier innovation hub and a place for the startup and innovation community to work, learn and connect, and The PIER (Port Innovation, Engagement & Research) at the Seaport, Canada's first living lab for the transportation industry. There is a lot of talent in Halifax preparing for the next big opportunity, and increasingly, that opportunity appears to be the development of green hydrogen as a sustainable growth industry.

In August 2022, Canadian Prime Minister Justin Trudeau and German Chancellor Olaf Scholz signed a declaration of joint intent between Canada and Germany, with Canada pledging to help Germany break its reliance on natural gas by producing and shipping green hydrogen to Germany. This has led to multiple major green hydrogen projects announced throughout Atlantic Canada. The Province of Nova Scotia has since announced an offshore wind capacity target of five gigawatts by 2030 with a focus on green hydrogen production. The green shipping corridor announced in October by the Port of Halifax and Port of Hamburg is simply one more element of this emerging picture.

There is much yet to be determined in terms of the green shipping corridor between Halifax and Hamburg, but already, there are some very promising elements. The distance between the two ports is about 5200 kilometres, or 2800 nautical miles. As the green hydrogen industry develops, Halifax could become a natural bunkering location for vessels operating within the Port of Halifax. There would also be the opportunity to develop hydrogen-based yard and container handling equipment; the Port of Halifax, with other Canadian ports, is currently involved in a project proposal to introduce hydrogen-fueled terminal equipment. From there, it's easy to imagine a scenario where the vessels themselves are fueled by green hydrogen or one of its derivatives, fuelling up in Hamburg before making the journey to Halifax where it would refuel before continuing along

"HALIFAX, NOVA SCOTIA IS HOME TO JUST UNDER HALF A MILLION PEOPLE AND IS ONE OF THE FASTEST GROWING CITIES IN CANADA."

its east coast string, and fuelling up again in Halifax ahead of the return trip to Hamburg.

This vision cannot be achieved independently; it will require collaboration between the associated ports and their surrounding communities, municipal, territorial and national governments, energy producers, shipping lines, equipment manufacturers, the technology sector, researchers and universities, and many others.

In Halifax, The PIER at the Seaport is a sector-focused living lab for marine transportation and logistics. The idea for The PIER started to take shape when Cpt. Allan Gray was still in Fremantle, a port city in Western Australia. He had started investigating turning one of the older sheds into an innovation hub for the transportation, logistics and supply chain sector. When he arrived in Halifax in late 2019, he came on a platform of collaboration.

The PIER opened its doors in November 2021, marking a monumental moment for Halifax and the industry, being the first supply chain and logistics living lab of its kind in Canada. In Europe there's a prominent living lab for port innovation in Rotterdam, a major port city in the Dutch province of South Holland, and a more recently opened lab in Hamburg called HomePort.

Halifax was seen as the perfect mid-sized city and port to host The PIER, with its burgeoning innovation ecosystem. It brings together established global organisations like international terminal operator PSA, rail carrier Canadian National (CN), Saab Technologies Ltd., as well as data companies like BlueNode, a Halifax-based tech company focused on data cleansing for the supply chain, and Charbone Hydrogen, a Canadian green hydrogen company working to establish itself as a supplier of an environmentally friendly solutions for industrial and commercial companies. In all, there are over 40 companies working out of The PIER including shipping lines, government agencies, universities, engineering firms, and many others. The PIER provides a landing space for companies with expertise in maritime transportation and logistics who see opportunity to develop solutions alongside global industry leaders.

One of the goals with The PIER is to create a collaborative space where different companies of varying size, expertise and experience can work independently on their own projects but also come together to identify solutions to those persistent challenges that no one company can solve on its own. Decarbonising the supply chain is a good example, and a goal that PIER members and the Ports of Halifax and Hamburg are actively working toward.

ABOVE
CMA CGM Marco Polo, the first vessel with carrying capacity of 16,000+ TEU, overall length 396 metres, to call at a Canadian port.

ABOUT THE AUTHOR:
Lane Farguson is the Director of Communications and Marketing for the Halifax Port Authority. For over 20 years, he has been directly involved in the ever-changing world of communications. He also worked for the Royal Canadian Mounted Police in Nova Scotia, and before that as a television journalist across Canada.

ABOUT THE ORGANISATION:
The world's largest shipping lines call on the Port of Halifax, Canada's Ultra Atlantic Gateway, connecting the port to more than 150 countries. The beautiful Halifax Seaport district is a premier arts and cultural destination. Collaborating and working with strong partners, the Halifax Port community continues to deliver excellence.

MAIN
Work begins on £17.5 million ($21.3 million) container offering enhancement project for deep sea shipping lines at the Port of Southampton

BETTER, GREENER DELIVERY FOR CUSTOMERS – INVESTING IN RAIL CONNECTIVITY AT THE PORT OF SOUTHAMPTON

Paul Reeves,
ABP Head of Commercial, Port of Southampton

Ensuring that goods are moving efficiently on and off ports has been a cornerstone of good customer service pretty much since ports began operation. But more recently another major consideration has emerged, that the movement of these goods should be done in ways that are increasingly sustainable.

Fortunately, there's a way of delivering on both these imperatives – moving more freight by rail.

Rail freight reduces CO2 emissions by up to 76 per cent compared to road haulage. And with the potential for each additional rail freight train to substitute for 70-80 HGVs that is a significant contribution to less road congestion and better air quality for those living close to transport hubs. These environmental credentials, combined with the ability of rail freight over time to offer a more efficient and consistent service, leads to what the Rail Freight Group estimates to be the potential doubling of demand for certain types of rail freight by the mid-2030s if the right infrastructure and conditions are in place .

With 95 per cent of the UK's trade in goods with world moving by sea via the nation's ports, port-centric rail has a particularly important role to play in the UK's commitment to addressing climate change and achieving greater sustainability, represented in the UK Government's target of Net Zero greenhouse gas (GHG) emissions by 2050. As the UK's largest port operator, handling 23 per cent of all port traffic, Associated British Ports (ABP) recognises the vital role ports must play as enablers in the UK net zero transition.

The importance of rail freight both for customers and also for the environment is not a new revelation for ABP. We are the UK's leading rail-connected ports group with a wide network, generating around 100 rail movements a day via 16 of our 21 ports. This of course includes the Port of Southampton, Britain's leading

LEFT
ABP and Solent Stevedore teams celebrate announcement of £17.5 million ($21.3 million) container offering enhancement project

"WE ARE THE UK'S LEADING RAIL-CONNECTED PORTS GROUP WITH A WIDE NETWORK, GENERATING AROUND 100 RAIL MOVEMENTS A DAY VIA 16 OF OUR 21 PORTS."

export gateway to the world, the largest hub for the UK's automotive sector and one of the UK's very largest container terminals.

But we are determined to go further in enhancing our rail capability to deliver more resilient supply chains, better customer service and lower emissions. Investment programmes with key port partners play a key role in this.

That is why in September 2022, ABP announced that it would be making a joint investment with Solent Stevedores worth £17.5 million ($21.3 million) in a new container offering for deep sea shipping lines at the Port of Southampton.

Solent Stevedores is an industry leading cargo handler operating the Solent Rail Terminal with current capacity to handle 180,000 containers per year. This latest phase in the terminal's upgrade project will create an 18-acre facility, which will link the existing intermodal rail transport site with laden and empty container handling, storage, maintenance and repair within a single site boundary – a first for the Port of Southampton. This phase of investment follows an extensive £5 million ($6.1 million) infrastructure and equipment upgrade in 2017 and a further £1 million ($1.2 million) investment in 2019.

Solent Stevedores and ABP have been working in partnership for many years heavily investing in the future of cargo movement by rail into and out of the Port of Southampton. This next phase is due for completion in late 2023. The project broke ground in the Western Docks with contractors, Ryebridge Construction, at the end of the summer last year.

This investment will further strengthen the rail offering for customers at the Port of Southampton giving them greater choice over their container placement and storage. The project involves several site upgrades, including the introduction of 84 reefer plug points, extending the rail loading pad by 150 metres and a new track design to allow trains to arrive and depart at the terminal independently on any of the three lines. By increasing the capacity for cargo to enter and leave the port by rail this latest investment supports long-term plans from both parties for accelerating improvements in local air quality. The work will take place across three stages to enable the rail terminal to continue operating.

And that's not the only new announcement about new rail capability the Port of Southampton has seen. In December DP World UK, operator of the deep sea container terminal on the Port announced a further rail service, linking their Southampton and London Gateway operations. Each train, carrying fresh fruit, beverages and consumer goods, takes up to 120 lorries a week off the roads and cuts carbon emissions by up to 80 per cent. For customers it provides capacity, reliability and growth opportunities.

This investment and service introduction by ABP and our local partners builds on the extra capacity and capability provided by recent Network Rail infrastructure development in track, signals and sidings improvements, including the ability to run 775 metre length freight trains.

Taken together these investments not only enhance the service ABP and others can offer customers, they are also part of the Port of Southampton's multimodal strategy into the future and our commitment to help improve air quality in the local area.

Modal shift to rail is just one element of ABP's broader commitment to contributing meaningfully to the UK's decarbonisation. ABP in Southampton has made the UK's first large scale investment in vessel electric charging or 'shore power' infrastructure. Shore power-enabled ships can now plug in at the port's Horizon Cruise Terminal

and Mayflower Cruise Terminal, for zero emissions at berth.

All of this is exciting news for the Port of Southampton, which already supports 45,600 jobs and contributes £2.5 billion ($3.05 billion) to the nation's economy every year. As the UK's number one export port, Southampton handles exports worth £40 billion ($49 billion) annually, including £36 billion ($44 billion) destined for markets outside the EU. The port is at the heart of supply chains supporting manufacturers and businesses throughout Britain, including in sectors such as automotive where the port supports 11,700 jobs in the West Midlands alone.

The work in Southampton is part of ABP's ambition across the UK to combine enhanced customer offerings and greater sustainability. ABP is already host to the major Siemens Gamesa wind turbine factory at Greenport Hull, has major operations hubs for wind farms in Grimsby and Lowestoft and has significant green energy generation of its own at locations like Barry. Looking forward we have exciting visions for green energy enabled transformations at the likes of Port Talbot (floating offshore wind) and Immingham (hydrogen and carbon capture and storage).

We look forward to working with our partners and customers at Southampton and across the UK as we continue to keep Britain trading, sustainably.

ABOUT THE AUTHOR

Paul Reeves joined ABP as Head of Commercial for the Southampton region in August 2021. He is responsible for supporting customers and driving business growth. With 21 years of experience within Wallenius Wilhelmsen (WW) he brings significant insights into the automotive, bulk project cargo and high and heavy business sectors. He also brings expertise within the wider shipping industry and vehicle logistics to this important role at an exciting time for the UK's number one vehicle handling and export port.

ABOUT THE ORGANISATION

ABP, the UK's leading ports group is Keeping Britain Trading with 21 ports and other transport related businesses, creating a unique national network capable of handling a vast array of cargo. ABP contributes £7.5 billion to the UK economy every year and supports over 119,000 jobs. ABP is also an essential partner for the Offshore Wind industry, providing Operations and Maintenance (O&M) for over 50 per cent of the sector's activity, as well as investing in infrastructure to realise future renewable energy generation.

"MODAL SHIFT TO RAIL IS JUST ONE ELEMENT OF ABP'S BROADER COMMITMENT TO CONTRIBUTING MEANINGFULLY TO THE UK'S DECARBONISATION."

TRADEPOINT ATLANTIC USHERS IN NEW CHAPTER OF GROWTH WITH PORT EXPANSION

Kerry Doyle,
Managing Director,
Tradepoint Atlantic

A lot has happened over the past eight years at Tradepoint Atlantic (TPA). The 3,300-acre former site of the historic Bethlehem Steel mill has transformed into a major multimodal industrial, manufacturing, and logistics center alongside the fast-growing Port of Baltimore.

Since 2014, we've been proud to be part of many incredible milestones at Tradepoint; from one of the very first major announcements in 2015 announcing our first tenant, FedEx, to our yearly Star Lighting ceremonies honoring the legacy of Bethlehem Steel. We've come a long way—creating more than 12,000 jobs, welcoming new and growing industries such as offshore wind, forging lasting relationships with the community, and keeping our promise to clean up and remediate the site during redevelopment.

But the most exciting and consequential announcement that we have made over the last eight years is our most recent. In November 2022, we announced a joint investment and partnership with Terminal Investment Limited (TIL) to establish an on-site, 165-acre, rail-served container terminal at TPA's Coke Point.

The partnership with Terminal Investment Limited will create and support more than 1,000 jobs at the on-site container terminal. This will dramatically enhance and support the long-term growth of the Port of Baltimore and the State of Maryland. It is a significant milestone that marks a new chapter of growth for TPA and Sparrows Point.

RIGHT
Tradepoint Atlantic and Terminal Investment Ltd. executives with Baltimore County Executive Johnny Olszewski, Jr., Maryland Governor Larry Hogan, and Baltimore City Mayor Brandon Scott

"THE PARTNERSHIP WITH TERMINAL INVESTMENT LIMITED WILL CREATE AND SUPPORT MORE THAN 1,000 JOBS AT THE ON-SITE CONTAINER TERMINAL."

The partnership that we have made with TIL is only possible because of the tremendous investments made at the Port of Baltimore, as well as the expansion of the Howard Street Tunnel, and it shows the lasting and growing opportunities that we have here at TPA.

TIL is a world leader in the creation and development of container terminal sites, and the Port of Baltimore is the jewel of the Mid-Atlantic region. This expansion will not only allow the Port to remain competitive with other major East Coast ports for years to come, it will give Baltimore and Maryland a major competitive advantage up and down the Eastern Seaboard.

Since the very first redevelopment project at Sparrows Point, TPA has remained committed to the highest standards of environmental remediation and sustainability. This terminal will also be one of the greenest in the country, by minimising the carbon footprint of its operations and reducing emissions down the supply chain. And, thanks to

"THIS EXPANSION... WILL GIVE BALTIMORE AND MARYLAND A MAJOR COMPETITIVE ADVANTAGE UP AND DOWN THE EASTERN SEABOARD."

its strategic location less than 50 miles from Washington, D.C., it will allow our customers to reach the third biggest consumer market in the US, while our rail products will offer the closest rail connection from any port to the Midwest.

Ultimately, this new partnership highlights the massive development opportunities that remain at TPA and signals the start of a multi-year public engagement, design, permitting, and construction process with our community stakeholders.

With this announcement, Tradepoint Atlantic has ushered in a new chapter in the revitalisation and redevelopment of Sparrows Point. I urge you to stay tuned — because we are just getting started.

ABOUT THE AUTHOR:
Kerry Doyle is the Managing Director of Tradepoint Atlantic. Kerry co-heads real estate and development, and oversees day-to-day operations for Tradepoint. In 2014, he was part of the Redwood Capital investment team that acquired the 3,300 acre Bethlehem Steel facility. Since joining the Tradepoint executive team in 2015, he has been involved in over 13 million square feet of industrial development. Prior to Tradepoint, Kerry worked in private equity where he led investments in a variety of real estate asset classes and operating businesses.

ABOUT TRADEPOINT ATLANTIC:
The 3,300-acre multimodal logistics and industrial center in Baltimore, Md., offers a gateway to US domestic and global markets, featuring an unmatched combination of access to deep water berths, rails, and highways. At Tradepoint Atlantic, industry is set in motion with the financial backing of Redwood Capital Investments, as well as the robust support of local and state government which enable the redevelopment of the site. To date, Tradepoint Atlantic has helped generate more than 12,000 permanent jobs, with thousands more expected to be created at full buildout. With over $2 billion of private investment currently at work, Tradepoint Atlantic is positioned as one of North America's most strategic commercial gateways. From here, world-class companies unleash their potential, jobs are created, communities prosper and industry is set in motion. For more information visit www.tradepointatlantic.com.

ABOUT TERMINAL INVESTMENT LIMITED:
Terminal Investment Limited Sàrl (TIL) invests in, develops and manages container terminals around the world. It was founded in 2000 to secure container handling capacity in the major ports for Mediterranean Shipping Company (MSC). Since then, TIL has grown and evolved to become one of the largest and most geographically diversified container terminal operators globally, with material equity interests in 40 operating terminals, two terminals under construction and options to purchase interests in two further development terminals. Visit www.tilgroup.com for more information.

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DIGITALISATION OF CUSTOMS PROCEDURES AT PORTS

MAIN
A containership on the fairway to the Port of Venice

Fulvio Lino di Blasio, President, and **Andrea Bucella**, Port Management and Business Development, North Adriatic Sea Port Authority

THE LEGAL FRAMEWORK

Due to a requirement by Italian law, all goods coming in and out of ports must be 'seen' by the Guardia di Finanza, a police force charged with customs policing duties, acting on behalf of the Customs Agency. This does not mean, of course, that every lorry or rail car is checked, but translates in paperwork being submitted at the port gate.

The impact is most visible during import operations: drivers routinely stop their lorries at the port gate and consign a physical copy of the customs documents to Guardia di Finanza officers.

At the Port of Venice alone, more than 600 lorries exit the port every day. Before the digitalisation, it took the drivers 58 seconds, on average, to stop the lorry, bring the documents, get back to the tractor cabin and leave. All this led to the formation of queues during peak hours, disrupting the flow of the traffic, and generated polluting emissions from the lorries waiting behind.

THE INVOLVMENT OF THE PORT OF VENICE

This is why, when Italy's Customs Agency proposed to all ports to digitalise customs procedures at the gates (for containerised goods), the Port of Venice answered the call.

An intermediate phase of partial digitalisation was introduced in November 2021 when drivers, instead of getting off their lorry, could scan a barcode while seated at the steering wheel.

ABOVE
Handed over his paper copy of a document, a driver looks at the colleague scanning a barcode instead, when partial digitalisation was implemented (now everything happens behind the scenes, and there in no need for any scan)

In December 2022 the full digitalisation (that had been tested since the summer) went in place. Drivers now stay put, the Guardia di Finanza do their job digitally, and the time at the gate barely reaches, on average, 14 seconds: a 76 per cent reduction in waiting time.

Venice is the first port in Italy where the digitalisation of customs procedures is implemented, and the Customs Agency aims at making the procedure developed for Venice the standard at all other major ports.

THE TECHNOLOGY

The digitalised customs procedure happens thanks to the integration of three separate systems:

A. the PCS (Port Community System), managed by the Port Authority;
B. "PortTracking", a purpose-built module of "Aida", the Customs Agency backbone software;
C. the TOSs (Terminal Operating Systems) of PSA Vecon and TIV, the Port of Venice's two container terminals.

Behind the curtains, data is exchanged through eight steps (See diagram on final page).

- Step 1 – Whenever a lorry is about to leave one of the container terminals, their TOS sends a message to the PCS, containing the BIC code (for the identification of the box), the lorry plate and, crucially, the MRN (Movement Reference Number, the unique ID of customs declarations in the European Union) of the goods within; further information about the container being loaded or empty is also sent.
- Step 2 – As the lorry gets from the terminal gate to the customs

"THE GREATEST SATISFACTION WAS REALISING THAT, FOR THE FIRST TIME (IN ITALY, AT LEAST), GOODS COULD EXIT THE PORT WITHOUT A SINGLE PAPER DOCUMENT BEING EVER PRODUCED ALONG THE FULL CUSTOMS CYCLE."

area gate (some 600 metres away), its plate is read by a set of cameras belonging to the Port Authority and linked to the PCS.

- Step 3 – Once the lorry is identified, the PCS feeds the MRN to PortTracking.
- Step 4 – The PCS also displays all information concerning the lorry on the terminal of a computer the Guardia di Finanza use for managing the checkpoint at the gate.
- Step 5 – The Customs Agency casts the MRN on the Guardia di Finanza PortTracking terminal.
- Step 6 – At this point, the Guardia di Finanza can access, with a click, all the information related to the goods carried inside the container and decide (if conditions allow for it) to subject them to further checks; in case a risk is detected by the Customs Agency, a red flag alerts the officers. When (as in the overwhelming majority of cases) there is no need for further delay, the Customs Police 'clears' the lorry on PortTracking.
- Step 7 – PortTracking feeds the clearance back to the PCS.
- Step 8 – Having received the notice from PortTracking, the PCS itself (with no further human intervention) lifts the barrier at the gate, allowing the lorry to get out.

The system also copes when multiple MRNs are associated with a single container, as well as when a single MRN is associated with multiple containers leaving the port at different moments.

THE INVOLVEMENT OF STAKEHOLDERS

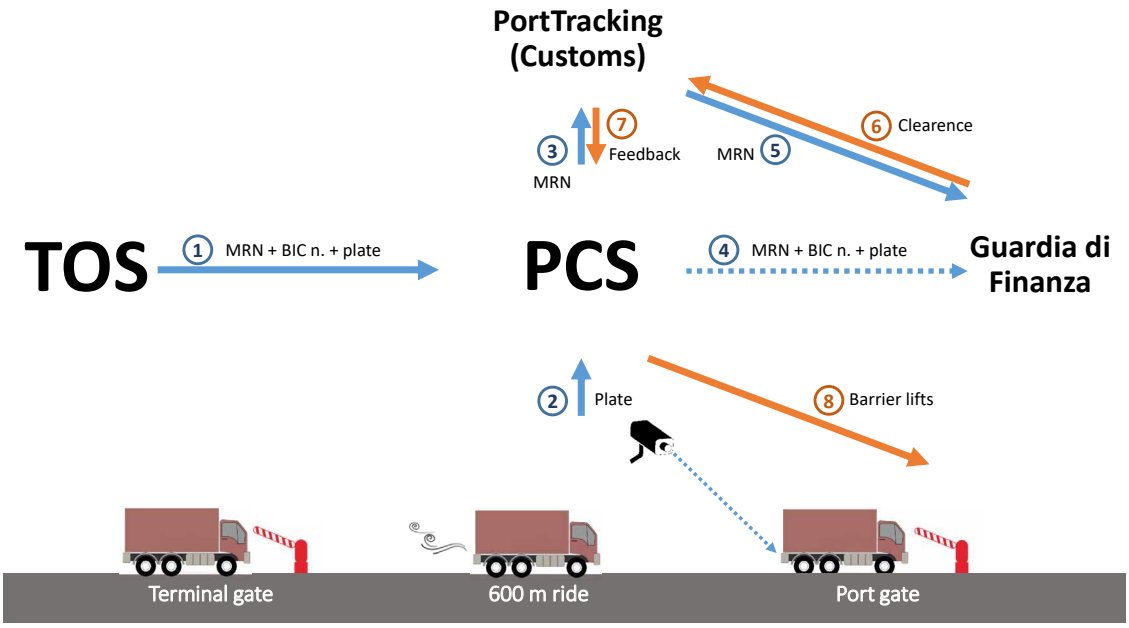
Despite being the first initiative of its kind in Italy, the digitalisation process went smoothly at every stage, from blueprints to implementation. This was possible thanks to the deep collaboration and trust between the staff at both the Port Authority and the Customs Agency, who supported each other in dealing with the inevitable problems that emerge on such projects.

But key to the success was also the involvement, at every stage, of the relevant stakeholders, from container terminals to freight forwarders, road haulage companies and Guardia di Finanza officers.

Advice was asked, and difficulties in the transition to the new model were clearly presented, so that even when more work was temporarily required then was needed under the older model, everyone was willingly doing their part. Also, the usual reticence encountered when private companies are asked to share their data, was overcome.

The greatest satisfaction was realising that, for the first time (in Italy, at least), goods could exit the port without a single paper document being ever produced along the full customs cycle, from the ship's manifest to the declaration to exhibit at the gate.

ABOVE
Berthing at the Port of Venice



LEFT
Information is exchanged through 3 different systems: the port PCS, the terminals TOSs and the Customs Agency's "PortTracking"

A POSITIVE IMPACT ON THE ENVIRONMENT

An idle lorry engine emits 10.41 kilograms of CO2 every hour, and a reduction in waiting time brings, by itself, a reduction in polluting emissions. Before the digitalisation of customs procedures, it has been calculated that lorries queued at the port gate for more than 30,000 hours in a whole year.

After the introduction of the digitalised procedure, however, this reduction in emissions is not on par with the reduction in queuing time, as under the pre-digitalisation system, drivers turned the engines off before taking their customs documents to the Guardia di Finanza.

The reduction in CO2 emissions now obtained amounts – it is estimated – to 'only' about 10 per cent. But a much juicier reduction of almost two-thirds of the CO2 emitted by lorries leaving the port can be achieved with the further innovation in store, in coherence with the Green strategy of the Port Authority.

FROM DIGITALISATION TO AUTOMATION

The digitalisation of customs procedures related to imported containers at the port gate, innovative as it may be in Italy's current setting, is not, however, the end of the journey. Even with the new system in place, human intervention is still needed, if only for a single click of the mouse.

In 2023 full automation is in sight. The plan is installing cameras at the port gate that also identify the container, and to automatically trigger the lifting of the barrier if no alert from the Customs risk assessment arises. Of course, the Guardia di Finanza officers will retain the ability of overruling the automatic clearance in case of necessity.

Digitalisation and automation will also be extended to bulk and general cargo, so that the whole port gate process will be automated, maximising the reduction of CO2 emitted by queuing lorries, and streamlining road traffic flows through the port.

ABOUT THE AUTHORS:
Fulvio Lino di Blasio is President of the North Adriatic Sea Port Authority. A former EY executive, he has a 20-year experience in the field of infrastructures, logistics and ports.

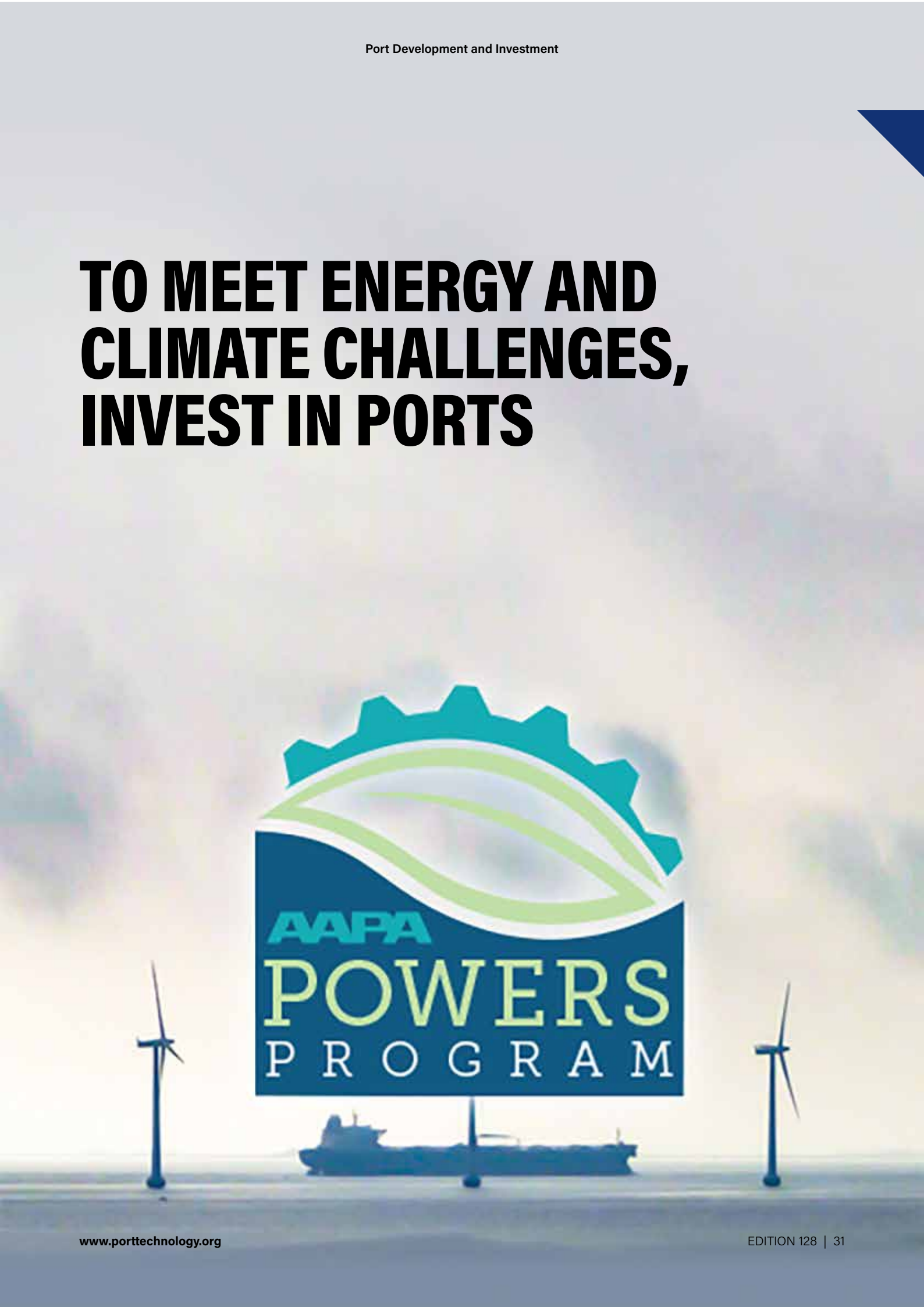
Andrea Bucella, at the Port Management Department, bridges the gap between port operators and public agencies, sometimes through digital transformation.

ABOUT THE ORGANISATION:
The North Adriatic Sea Port Authority oversees Venice and Chioggia, multipurpose ports located at the upper end of the Adriatic Sea, in the central Mediterranean.

In 2022 they handled freight weighing about 26,000,000 tonnes (of which some were carried in about 600,000 TEU) and served 360,000 passengers.

"DIGITALISATION AND AUTOMATION WILL ALSO BE EXTENDED TO BULK AND GENERAL CARGO, SO THAT THE WHOLE PORT GATE PROCESS WILL BE AUTOMATED."

TO MEET ENERGY AND CLIMATE CHALLENGES, INVEST IN PORTS



Ian Gansler,
Manager of Energy, Resilience, and Sustainability Policy, American Association of Ports Authorities (AAPA)

Climate change and growing demand for energy pose unprecedented and daunting challenges. Sea levels are rising, storms are growing stronger, droughts are more frequent, and heat waves are hotter. At the same time, Russia's war in Ukraine is forcing nations to re-examine their energy supply lines. The developing world demands more energy than ever as economies industrialise and families enter the middle class. To solve these twin challenges, policymakers must look for innovative solutions that both make existing energy use more efficient and incentivise the adoption of new technologies and markets to add new options to the energy mix. The American Association of Port Authorities (AAPA) is making the case for investment in ports as a principal solution to these challenges.

Why ports? Ports are one industry among several in the transportation sector, which is one of several sectors using a significant portion of the world's energy. Why should ports merit a specific focus from industry and government leaders looking to solve energy and climate crises?

Throughout the COVID-19 pandemic, America and the world have been forced to recognise the critical importance of ports to not just the transportation industry, but every aspect of the global economy. Through the worst lockdowns of the pandemic, as consumers stayed socially distant, they spent less on travel and entertainment and more on goods. As this wave of furniture, exercise equipment, and gaming consoles filled container ships, some ports got backed up. As China locked down whole cities to mitigate coronavirus infections, some of the busiest ports in the world faced the messiest backups. All these backups, in developing and developed nations, cascaded outwards. Congestion and shortages were exacerbated at rail yards, truck depots, retailers, and manufacturers. Few industries were spared.

Much of this congestion has since been unwound, but it taught us a lesson: as a key node in the supply chain, what happens at ports will affect every aspect of the world economy. There is no reason this cascading effect must always be a negative force. In the fights against climate change and energy insecurity, it can be a powerful force for progress. That is why AAPA has launched the Port Opportunities with Energy, Resilience, and Sustainability (POWERS) Program.

AAPA's membership has agreed on five policy pillars to position ports to be leaders in the years to come:

- Bolstering the capacity to export made-in-America energy, especially with Russia's war in Ukraine threatening to leave Europe in the cold
- Creating a new American industry in the production of alternative fuels to power the vessels and land-side equipment of the future, including hydrogen, Liquefied Natural Gas (LNG), ammonia, biofuels, methanol, and more
- Electrifying America's ports, through the installation of electric cargo-handling equipment, shore power, charging stations, and microgrids
- Hardening our infrastructure against energy shortages, rising seas, heat waves, and stronger storms
- Preparing physical and human infrastructure to build American offshore wind

Each of these pillars represents an opportunity to forge entirely new industries, create new jobs, secure energy supply lines, mitigate greenhouse gas emissions, and mitigate harmful criteria pollutants.

In the United States, the Federal Government has started to recognise this opportunity with unprecedented investments in ports. In Fiscal Year 2014, the Federal Government spent only $1.3 billion on port infrastructure. By Fiscal Year 2022, that figure rose to $6.8 billion, a 423 per cent increase.

"AS A KEY NODE IN THE SUPPLY CHAIN, WHAT HAPPENS AT PORTS WILL AFFECT EVERY ASPECT OF THE WORLD ECONOMY."

"A SINGLE PRODUCER OF HYDROGEN, BASED AT A PORT, MAY FIND THAT THEIR CUSTOMERS HAIL FROM MULTIPLE MODES OF TRANSPORTATION AND MANUFACTURING SECTORS."

This extraordinary trend is thanks principally to three pieces of legislation. First, the Harbor Maintenance Trust Fund, the federal account that funds dredging of harbours and navigation channels, was reformed to spend 100 per cent of its revenue on port projects. Previously, a large share of its funds were simply deposited in the U.S. Treasury.

Second, Congress passed the Bipartisan Infrastructure Law. This trillion-dollar package will revitalise American infrastructure over the next several years, including through $2.25 billion for the Port Infrastructure Development Program (PIDP). This four-year-old competitive grant programme has been amended to fund emissions mitigation projects, energy and coastal resilience, offshore wind infrastructure, and more.

Finally, Congress passed the Inflation Reduction Act. The largest ever American legislative package to fight climate change includes $3 billion for an entirely new Grants to Reduce Air Pollution at Ports programme. This infusion of funds will make possible projects to install shore power systems, electrify cargo-handling equipment, produce hydrogen fuel for ocean-going vessels, and more.

There is no shortage of projects ports can fund with these historic investments, creating outsized and cascading benefits for the maritime industry and economy writ large. For example, increased investment in LNG export terminals will bring sorely needed energy supplies to American allies abroad, replacing Russian supply lines. American LNG terminals are operating at or near capacity, and expanding them is in the world's interest. Natural gas can also be used to produce hydrogen fuel, which has a big role to play in the maritime industry's future.

The production of alternative fuels like hydrogen at a port will create jobs for an entirely new industry, but this kind of investment will also secure energy supplies and reduce emissions at the same time. The world's biggest maritime shipping companies are studying and implementing new technologies that will allow the vessels of the future, and increasingly today, to run on low or zero-emission fuels. Hydrogen produced at a port could be used to power these vessels on domestic or international voyages. Hydrogen can also be used as a feedstock to produce ammonia or methanol.

But ocean-going vessels are not the only use for hydrogen. Hydrogen can be used in a fuel cell to power vessels while at berth, to power land-side cargo-handling equipment on a port complex, to power drayage trucks shuttling goods from a port to inland locations, or locomotives doing the same. A single producer of hydrogen, based at a port, may find that their customers hail from multiple modes of transportation and manufacturing sectors. This is ports' greatest asset: their multimodality. An investment at a port, where water meets land, where international markets meet domestic, will benefit all of us, consumers and business leaders alike.

Hardening our coastal and energy infrastructure are also critical tasks that must have a particular focus at ports. The COVID-19 pandemic showed us what happens when ports are congested and not operating at peak efficiency. As climate change causes extreme weather events to strike with more severity, the potential for supply chains to be hampered by natural disasters must be addressed. Berths must be hardened against rising sea levels, land-side infrastructure hardened against stronger storms, and energy supplies hardened against heat waves. The choice here is simple. If ports do not receive adequate investment to head off natural disasters, weather could disrupt the global flow of freight.

These challenges are not going away. In the fight against climate change and the necessity for reliable energy sources, every day is more critical than the last. Without the benefit of time on our side, policymakers and business leaders should look to maximise their investments by building out infrastructure in the places where it will have the biggest impact. In that calculus, there is no better place to invest in modern infrastructure than at ports. Improvements there will benefit all modes of transportation, every industry in the economy, and indeed, every person in our societies.

ABOUT THE AUTHOR:
Ian Gansler is the Manager of Energy, Resilience, and Sustainability Policy for AAPA. In the last Congressional session, he advocated for and secured over $5 billion in funding for port grant programmes. In the evenings, he is pursuing a Master of Public Policy from Georgetown University.

ABOUT THE ORGANISATION:
America's seaports, represented by the American Association of Port Authorities (AAPA), are the center of America's transportation system. AAPA represents 83 seaports and advocates for them in Washington, DC. Seaports handle $6 billion worth of goods daily and generate 31 million jobs. Learn more at aapapowers.com or @PortsUnited on Twitter.

TURNING THE TIDE

"THE [PORT COMMUNITY SYSTEM] BENEFITS ALL PORT USERS BY OFFERING A SINGLE SOURCE OF REAL-TIME, DYNAMIC INFORMATION TO ENHANCE OPERATIONAL EFFICIENCY."

Geoff Lippitt,
Chief Commercial Officer,
PD Ports

During 2022, businesses, including our own, have continued to be affected by economic headwinds in the UK and its trading partners, as well as the ongoing impact of the war in Ukraine, COVID-19 crisis, and global supply chain disruption.

Despite this, thanks to continued investment, major business wins and a strong and consistent pipeline of opportunity, PD Ports remains in a strong position and on track to reach our ambition to become the UK's premier seaport and logistics operator.

PD Ports is the proud owner and operator of Teesport, a nationally significant piece of infrastructure that continues to act as a critical gateway for international trade. To support growing demand and ensure that we continue to attract investment and opportunities to the region in support of the 'levelling up' agenda, we are taking proactive steps to also become the UK's leading 'smart port'.

We are also the Statutory Harbour Authority for the River Tees, responsible for not only the maintenance of the river and safe navigation of vessels, but also for ensuring that the river continues to play its full part in supporting the future growth of our region and the UK as a whole.

The recent global pandemic highlighted just how important it is that businesses, especially within critical industries like the ports sector, embrace technology and accelerate digitalisation to ensure that supply chains are more resilient to potentially disruptive events.

PD Ports is therefore embracing new technologies to not only drive our own ambitious and growth, but also to support fellow stakeholders and users of the River Tees and enhance resilience across the region.

ABOVE
Aerial image of Tees Dock, owned and operated by PD Ports

"PD PORTS IS... EMBRACING NEW TECHNOLOGIES TO NOT ONLY DRIVE OUR OWN AMBITIOUS AND GROWTH, BUT ALSO TO SUPPORT FELLOW STAKEHOLDERS."

Two years ago now, we launched 'Future Teesport' and set our ambitious vision to be the UK's most successful port region by 2050. Future Teesport outlines our plans to identify new opportunities capable of adding an extra £3.2 billion ($3.9 billion) to the economy whilst helping to create up to 38,000 new jobs and maximising future prosperity.

Our vision, and ambition, has been backed by the UK Government with the then Maritime Minister, Robert Courts, expressing his support. He said: "Teesport is one of the country's leading gateways for international trade and a major contributor to the local economy both now and in the future.

"I welcome this ambitious plan which will boost local jobs, building on the region's capabilities as a manufacturing and exporting

powerhouse, and I look forward to working with PD Ports as we level-up our economy and embrace our exciting future as a global trading nation."

At the heart of our vision sits innovation, which has already formed the basis of some major initiatives at PD Ports.

In 2021, as part of our wider strategy to positively promote the river and the Tees Valley region, we launched a new innovative website aimed at showcasing the strengths of the world leading infrastructure, connectivity and skills base that sit on our doorstep.

Boasting a fully interactive map that allows users to experience the course of the river and absorb the size and scale of various facilities, as well as a comprehensive business directory and jobs board, the website is a one-stop-shop for investors, stakeholders and job seekers, replacing the need for traditional port handbooks.

Julie Underwood, Executive Director of International Trade at the North East England Chamber of Commerce, backed the project from the outset and was delighted to see the platform launch successfully.

"PD Ports has delivered an invaluable tool in the new Teesport website and it certainly reflects the enormous asset the Port is the to the Tees Valley," said Underwood. "It presents the scale of the port, and all the businesses utilising this facility in a very engaging way, demonstrating the value of the River Tees to the continued prosperity of our region and the people who work and live here."

ABOVE
PD Ports CEO, Frans Calje, Harbour Master, Paul Brooks, Deputy Harbour Master, Chris Stocks and Bill Scott, CEO Wilton Engineering, launch the Future Teesport Vision

In the 12 months since launch, we have continued to develop the platform, introducing new updates and features such as a 'business spotlight' to ensure the website continues to serve its primary purpose of enhancing the international competitiveness of the river.

We have also delivered, ahead of schedule, the first phase of a Port Community System. Inspired by our commitment to customers and developed in partnership with the Port of Rotterdam, the new IT system benefits all port users by offering a single source of real-time, dynamic information to enhance operational efficiency and the service we provide as the Statutory Harbour Authority.

Within the first weeks of implementation, we found over 75

"WE HAVE CONTINUED TO DEVELOP THE PLATFORM, INTRODUCING NEW UPDATES AND FEATURES SUCH AS A 'BUSINESS SPOTLIGHT' TO ENSURE THE WEBSITE CONTINUES TO SERVE ITS PRIMARY PURPOSE OF ENHANCING THE INTERNATIONAL COMPETITIVENESS OF THE RIVER."

"DRONES, DUBBED THE 'FUTURE OF WAREHOUSING', WILL ALSO REMOVE THE NEED FOR WORKING AT HEIGHT, SAFEGUARDING OUR PEOPLE WHILST PROVIDING AN EFFECTIVE AND EFFICIENT SOLUTION FOR OUR CUSTOMERS."

per cent of users – which include shipping agents, port terminals, towage providers and boatmen – utilising the system on a daily basis and are now progressing plans to implement additional modules to further develop the platform.

Phase two, which includes the new features, will be rolled out during 2023.

Combining our focus on digitalisation with our ambitious sustainability targets, in October we launched a new research project Vertically Integrated Cloud-Based Ports, following a successful bid for support from the Clean Maritime Demonstration Competition, funded by the Department for Transport and Innovate UK.

Alongside project partners Teesside University, GE Renewables and Connected Places Catapult, we are investigating the use of a cloud-based, integrated digital solution for energy management and will demonstrate how an intelligent energy network can help lower emissions, and costs, across our industry.

We are also continuing to progress a partnership with heliguy™, a world leader in the commercial drone industry, to further boost efficiencies and resilience across Teesport.

The initial investment included the procurement of five state-of-the-art drones designed to optimise operations and reduce risks, as well as tailored, remote-pilot training for 17 employees across the group.

The equipment is now being utilised across a variety of departments including our dedicated Harbour Police force and Engineering teams to deliver multiple benefits including emergency response, surveillance and asset and infrastructure management.

Building on this success, PD Ports is also in the process of rolling out drone technology across our warehousing facilities at Felixstowe in a first of its kind initiative to support stocktaking.

The drones, dubbed the 'future of warehousing', will also remove the need for working at height, safeguarding our people whilst providing an effective and efficient solution for our customers.

Our enduring commitment to innovation and digitalisation has been recognised within the region with PD Ports winning both the Teesside heat and the grand final at the North East Business Awards during 2022, demonstrating our leading approach.

We are confident that our ongoing investment in advanced, digital connectivity will continue and will, in turn, cement Teesport's role as the north UK's premier gateway for global trade whilst also building on our world-leading port assets.

ABOUT THE AUTHOR:
Geoff Lippitt joined PD Ports in 2011 and, as Chief Commercial Officer, oversees the commercial developments of the Company's UK-wide port and logistics operations. Lippitt has led the transformational development of PD Ports' green rail agenda and was recently elected Vice Chair of the Rail Freight Group.

ABOUT THE ORGANISATION:
PD Ports is one of the largest and most progressive port operators in the UK. Owner and operator of Teesport and the Statutory Harbour Authority for the River Tees, PD Ports plays a critical role facilitating the nation's trade, providing thousands of businesses with essential access to global markets.

LEFT
The PD Ports team celebrate winning the Innovation & Technology Award at the 2022 North East Business Awards

REIMAGINING TOMORROW'S PORTS FOR TODAY'S CARGO OWNERS

John Woollacott,
Head of Ports & Terminals (P&T)
for DP World Europe

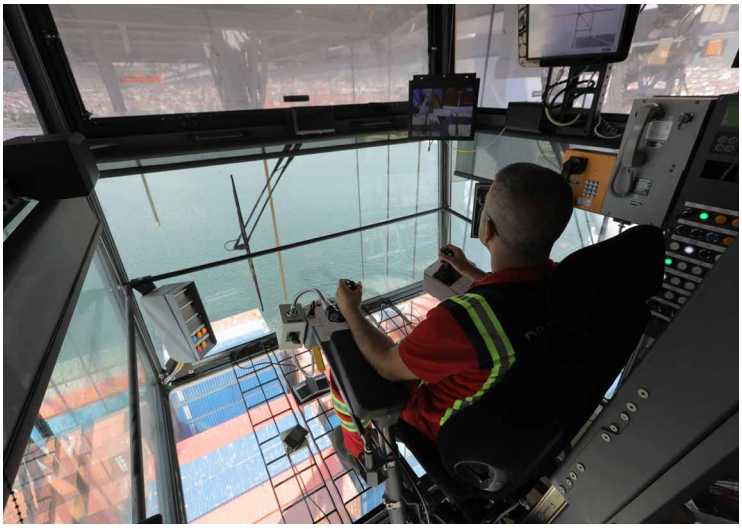
Over the course of 2022, the mainstream media foreshadowed that the ongoing issues in the trade and logistics sector may spill into 2023. The new president of supply-chain solutions at United Parcel Service (UPS), Bill Seward, recently confirmed that supply chain pain points are likely to continue into this new year .

From my position overseeing growth and development for DP World's Ports and Terminals in Europe, I have a more optimistic view of the role that our ports can play in easing the pressure on supply chains.

A key challenge has been high utilisation at terminals caused by supply chain issues, which have led to capacity pinch points. But boosting capacity at key locations increases trade opportunities, leading to higher throughput and, when done right, can make operations more sustainable.

At this point, I would like to emphasise that our ports in Europe performed very well in keeping up productivity despite the increased stack utilisation caused by challenges in supply chains. One key area of note is the Northern European ports where utilisation has been high. To alleviate these issues, DP World and other players in the industry are in the process of expanding physical capacity with major expansions in key ports including London Gateway, Antwerp and Rotterdam.

Increasing physical capacity at these major links in our global supply chains is an important and major investment as everyone seeks to meet growing demands.



RIGHT
Image of crane operator at Yarimca terminal

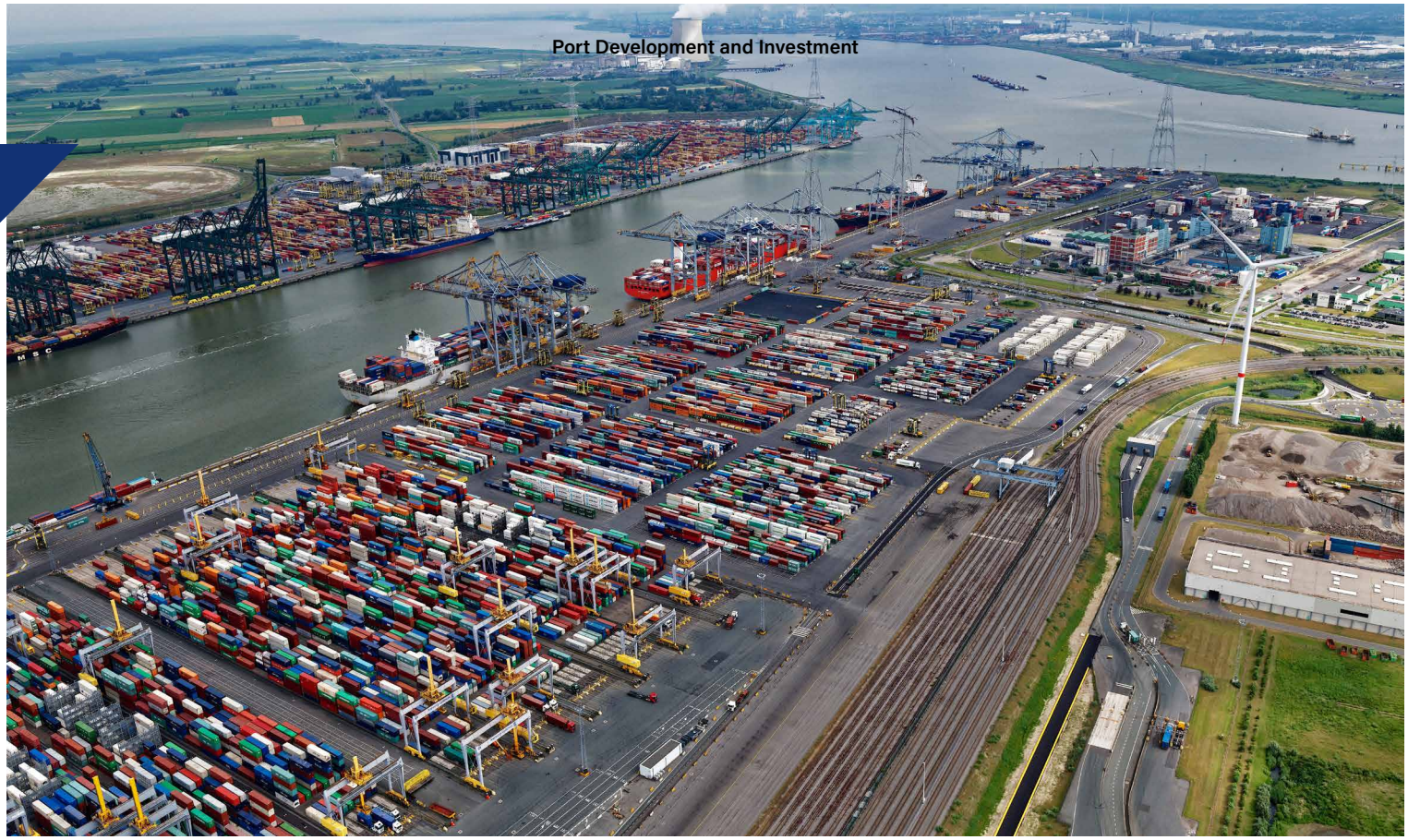
"BESIDES EMPLOYEE ENGAGEMENT TO EDUCATE TEAMS ON WHAT IS POSSIBLE FOR THEM AND OUR CUSTOMERS, INTEGRATING MODERN SYSTEMS THAT CAN SUPPORT THESE GREATER THROUGHPUTS IS ESSENTIAL."

In addition to increasing physical capacity at the ports, it is critical that ports and terminals consider broadening their service offering to facilitate stronger end to end solutions, more choice for cargo owners and better results for end customers.

On the flipside of these investments, however, is an operational change. Working towards greater capacity involves new mindsets and practices which will ensure improved supply chains can be delivered – and these things are already making a difference today.

INNOVATING SMARTLY

Before the benefits of physical expansion can be enjoyed, all port components – from the staff to operational systems – must adapt to future-ready practices so they



ABOVE
Aerial view of entire Antwerp Gateway yard

"AUTOMATED EQUIPMENT POWERED BY ELECTRICITY REPLACES FUELLED EQUIPMENT, THUS CUTTING OUR CO2 EMISSIONS DRASTICALLY – BY 51 PER CENT SINCE 2013."

can sustain the changes being made. Otherwise, companies risk letting customers down as we acclimatise to new ways of working.

The advantage of adapting now is that, as logistics providers, we can improve supply chains for customers before our port developments are complete hence addressing the supply chain concerns.

Yet preparation is key here. Besides employee engagement to educate teams on what is possible for them and our customers, integrating modern systems that can support these greater throughputs is essential. In the meantime, technology can maintain services during times of change - hence the need for ports to digitalise their operations.

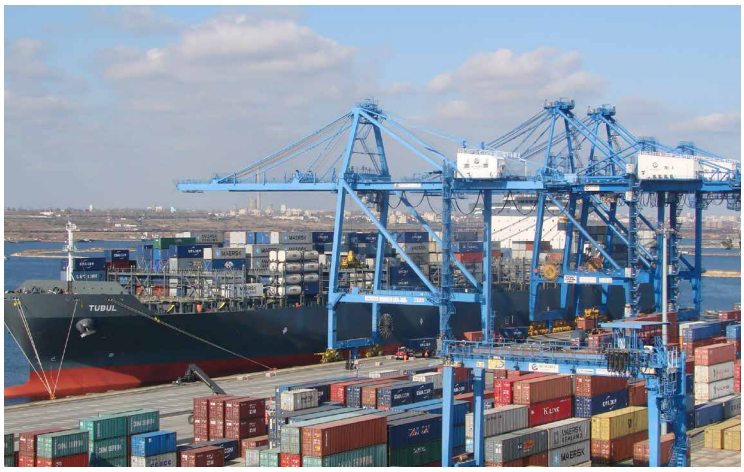
Standardising such technology across ports and freight forwarders, along with age-old security concerns, are a hindrance to this. But as our Vice President of Inland and Logistics, Rob Harrison, echoed at the most recent International Port Symposium, digitalisation can – at a minimum - be used to simplify basic processes and reduce errors at ports worldwide. While adapting our physical infrastructure, maintaining such order during these times of instability is invaluable.

Our €200 million ($217 million) investment in DP World Antwerp Gateway is evidence of this theory – and the work here is not set to be completed until 2026. We have been integrating terminal operating software and gradually introducing more automated equipment and processes. By doing this, we have enhanced our container stacking abilities and will increase our throughput capacity to 3.5 million TEU annually.

An aspiration that DP World is actively pursuing is synchronising our improving operations through a centralised digital platform, which will allow us to gain visibility and predictability, so we can process cargo with minimal delays and redeploy port staff for more specialist work to increase efficiency in all areas.

The automated equipment and ensuing smarter way of working will allow us to handle greater throughput within the same footprint. Furthermore, automated equipment powered by electricity replaces fuelled equipment, thus cutting our CO2 emissions drastically – by 51 per cent since 2013 to be precise.

Before physical expansion is even complete, our deep-sea ports are increasing the seamless flow of goods across countries and creating value for our customers in greener ways than ever before.



RIGHT
Aerial view of container yard and customer vessel at Constanta port

USING CHANGE TO INSPIRE

Elsewhere in our region, our port development is inspiring our team's approach to client solutions with new vigour, as we recently witnessed in our Constanta terminal in Romania.

Here, we are undergoing an expansion that will diversify ports activities to include handling Project cargo, Ro-Ro operations and warehousing and logistics capability. Once finished, this multimodal facility will act as an important trade corridor between Europe and Asia, working in synchronicity with its geography and the needs of its customers.

Yet ahead of completion, some of the benefits of this expansion are already being realised.

We partnered with an agribusiness based on a small island in the Danube that was facing logistical challenges exacerbated by rising costs and global supply chain disruptions. Our solution for them stemmed from our port's evolution. Traditionally, we would have taken a port-centric view here, treating the logistics outside the terminal's borders as a separate issue – and therefore missing the bigger picture in the supply chain. However, because our expansion work is incorporating greater multimodality in the form of truck, rail and barge solutions, we are more connected as a business – and our solutions took this into consideration.

In this instance, thanks to how we are reimagining our ports' functions within the broader supply chain, we could provide an end-to-end solution via Constanta connecting this client to their Middle Eastern market without them relying on multiple vendors (which can be costly and inefficient). Further, through rail and barge, we have increased the volumes of trade being moved in a more sustainable way.

MAKING THE FUTURE A REALITY TODAY

Across our network, this reimagining of how ports and terminals serve the broader supply chain is what we are using to guide our innovations. To keep up with growing demand for more goods over shorter timescales, our ports need to be more than just cargo handlers – they need to be well-oiled cogs that empower the broader supply chain and work in tandem with them. When action happens at a port, it should streamline the end-to-end process, not add another costly step to it.

In Europe we are also realising this with our investments across our inland terminals. Our 12 sites, which sit across Germany, Switzerland, Belgium, and the Alsace region of France, are connected by road, rail and barge solutions. While we concentrate our efforts on increasing the footprint of these sites to boost throughput further, we are equipped in the meantime to better serve customers with a diversified transport network across this valuable corner of the world.

In fact, we now offer rail or barge services at virtually all our European terminals, providing more resilience and sustainability in our efforts to do away with supply chain flaws.

Reflecting customer needs, our Europe ports are also evolving to include warehousing facilities, enabling business to manage inventory goods closer to key markets, futureproofing their businesses against future supply chain shocks.

On the face of it, reimagining the ports of tomorrow does not seem like a quick-fix solution. But with the right preparation, results can be enjoyed today. With a new year full of new opportunities upon us, logistic sector leaders should embrace the chance to keep trade flowing for today's customers and rethink how their ports are serving their needs

ABOUT THE AUTHOR:
Woollacott has been with DP World for over two decades, starting out at P&O Ports in Australia. John has extensive experience in developing new port projects, including greenfield developments, as well as acquisitions and expansion projects. He has also performed a variety of roles focusing on finance and business development across the company in Sydney, Manila, London, Antwerp and Dubai. Woollacott is currently DP World's Head of Ports & Terminals for Europe, where he is responsible for aligning on the strategy, and bringing all of DP World's European ports and terminals together to ensure they are leveraging the company's regional offering in the best possible way.

ABOUT THE ORGANISATION:
DP World is the leading provider of worldwide smart end-to-end supply chain logistics, enabling the flow of trade across the globe. DP World's comprehensive range of products and services covers every link of the integrated supply chain – from maritime and inland terminals to marine services and technology-driven customer solutions.

INDUSTRIAL IOT AND THE JOURNEY TO STRATEGIC VISIBILITY

Todd Simms,
VP, Industry Strategy and Supply Chain Thought Leader, FourKites

Like many technologies that preceded it, the potential impact and value of the Internet of Things (IoT) has been long heralded – and in manufacturing and "Industrial IoT," in fact, a great deal has been accomplished in terms of leveraging IoT to monitor and improve the operation of manufacturing facilities, processes and to track goods-in-transit.

But manufacturers can extract even more value from IoT. Device costs are coming down, the technologies and capabilities are improving and 5G networks are practically ubiquitous. Millions more devices will be deployed and connected every year for many years ahead.

Here are just a few ways IoT will help manufacturers achieve truly strategic visibility, enabling newfound powers to optimise their complex operations and supply chains.

FILLING THE GAPS IN ASSET VISIBILITY

How do we maintain end-to-end (E2E) visibility of strategic assets on a continuous basis? The reality today is that we still have many blind spots throughout our supply chains. As I've voiced before, many organisations have implemented some form of what they are defining as 'visibility.' But most organisations think of it in the most limited way, i.e., as the 'track-and-trace' and/or 'where are my shipments' portion of visibility.

True E2E visibility is a journey that goes far beyond being able to see and respond to the status of shipments in transit. And IoT has the potential to take manufacturers much further.

By leveraging IoT devices to track every single asset – or, perhaps, just particularly high-value assets – at every step and every stop, from manufacturing to destination, manufacturers will have actionable data to help them improve various aspects of operations and deliver a better experience to customers.

Consider an example in the automotive world, where trucks and automobiles manufactured overseas are loaded onto huge ro-ro ships that take them around the globe. Today, the customer has visibility into that ro-ro's location, and they have visibility when it arrives at a shipyard. But the second those cars and trucks are unloaded, the picture goes dark. Are they still in the shipyard? When can I expect them? How can I best manage my workforce?

Going forward, IoT devices will track every individual vehicle, providing the customer with 24/7, continuous visibility and telematics data to help them optimise their operations – ultimately delivering a better customer experience.

BETTER PLANNING

That 24/7, continuous visibility into every strategic asset can significantly improve manufacturers' planning processes. Think about the example of the fabled "golden screw," i.e., that difficult-to-procure part that is essential to a manufacturer's ability to finish a high-value product. With end-to-end, granular telematics on the location and condition of those kinds of assets, a manufacturer can optimise many different aspects of planning. And they can do so proactively rather than reacting to an unpleasant surprise.

As the level of accuracy gets better, planning gets better. The ability to deliver materials more quickly gets better. Managing manufacturing site capacity gets more efficient and optimised. And that positively impacts working capital. The benefits ripple throughout supply chain operations.

REAL, MEASURABLE PROGRESS ON ESG INITIATIVES

Companies are under increasing pressure from stakeholders of all stripes to make meaningful progress on environmental, sustainability and governance (ESG) initiatives. IoT has the potential to be a powerful tool in helping them do so.

"TRUE E2E VISIBILITY IS A JOURNEY THAT GOES FAR BEYOND BEING ABLE TO SEE AND RESPOND TO THE STATUS OF SHIPMENTS IN TRANSIT."

"GOING FORWARD, IOT DEVICES WILL TRACK EVERY INDIVIDUAL VEHICLE, PROVIDING THE CUSTOMER WITH 24/7, CONTINUOUS VISIBILITY AND TELEMATICS DATA TO HELP THEM OPTIMISE THEIR OPERATIONS."

First, effective IoT deployments typically drive increases in manufacturing automation, and that creates various efficiencies throughout the "plan/source/make/service/deliver" continuum, from saving fuel or power to optimising the use of various resources in ways that help manufacturers drive towards their sustainability goals.

Perhaps just as important, rich IoT telematics data can finally be the linchpin to tangibly measuring ESG KPIs. Companies cannot make meaningful progress without meaningful measurement. And that telematics data also means a greater ability to report on progress externally to the many regulatory agencies and governments that are expected to mandate more reporting in the years ahead.

BETTER SUPPLIER SCORE CARDING

I would roughly estimate that a typical manufacturer has visibility into approximately 65 per cent of tier one suppliers. With each successive tier, visibility drops lower and lower. Billions of smart devices and sensors deployed throughout a supplier network can change all of this, serving as the fuel for more accurate and detailed vendor score carding. And that is ultimately an opportunity to gain greater insight into vendors' ESG practices and progress, optimise sourcing strategies, and improve the overall health of vendor relationships.

. . . . . .

If expert predictions prove true, 2023 will be a year fraught with economic challenges. But the companies who are going to "win in the turns" are the ones who deploy IoT very intentionally, with very clear objectives for how they want to action this rich data. Perhaps a given manufacturer only needs 24/7 visibility and monitoring on a subset of highly strategic assets to achieve specific goals around optimising manufacturing capacity and improving delivery times. This is just one of myriad examples of how IoT can provide manufacturers with truly strategic visibility.

The key is to be intentional. And I cannot state that any better than did FourKites customer Jon Mosher, export operations lead at Bayer, whose crop science division uses FourKites to track shipments over the road, ocean and air. Mosher says leveraging visibility data into actionable insights is critical: "It's good to have that information, but after that shipment has arrived, how do we use that data?"

If you've yet to ask yourself how you can use IoT data in the years ahead, now is the time.

ABOUT THE AUTHOR

Prior to joining FourKites, Todd spent 7+ years at Gartner in the Global Enterprise Supply Chain organsation helping support global fortune 50/100/500 companies solve complex supply chain issues. While at Georgia-Pacific/BlueLinx in distribution, he was responsible for all aspects of sales and operations for the Greater Los Angeles area, including sales, customer service, logistics management, inventory and personnel for a distribution center that generated $75 million revenue.

ABOUT THE ORGANISATION:

Leading supply chain visibility platform FourKites® extends visibility beyond transportation into yards, warehouses, stores and beyond. Tracking more than 3 million shipments daily across road, rail, ocean, air, parcel and last mile, and reaching over 200 countries and territories, FourKites combines real-time data and powerful machine learning to help companies digitise their end-to-end supply chains. More than 1,200 of the world's most recognised brands — including 9 of the top-10 CPG and 18 of the top-20 food and beverage companies — trust FourKites to transform their business and create more agile, efficient and sustainable supply chains. To learn more, visit https://www.fourkites.com/.

NEW ERA OF POSITIONING TECHNOLOGY FOR TERMINALS

"FOR KALMAR, SEPTENTRIO'S SOLUTIONS HAVE PROVEN TO BE UP TO THE COMPLEX CHALLENGES AND DIFFICULT OPERATING ENVIRONMENT OF CONTAINER PORTS."

Jack Donnelly, Editor, Port Technology International, featuring interviews with **Stef van der Loo**, Market Access Manager, Septentrio, and **Pekka Leikas**, Product Manager, Kalmar

The logistics landscape is complex and challenging with constant change. Cargo volumes are changing, infrastructure, operations, vehicles, and processes are evolving over time.

When evaluating positioning technology, this is not an exception. Satellite receivers and inertial systems have become more accurate, reliable, flexible and configurable than ever before. The age-old belief that positioning requires an expensive infrastructural overhaul is now outdated and invalid. Yet hardware and technology used in, for example, container terminals to track vehicles and accurately provide a position at all times, is often outdated, complex or expensive.

THE LEGACY SYSTEMS

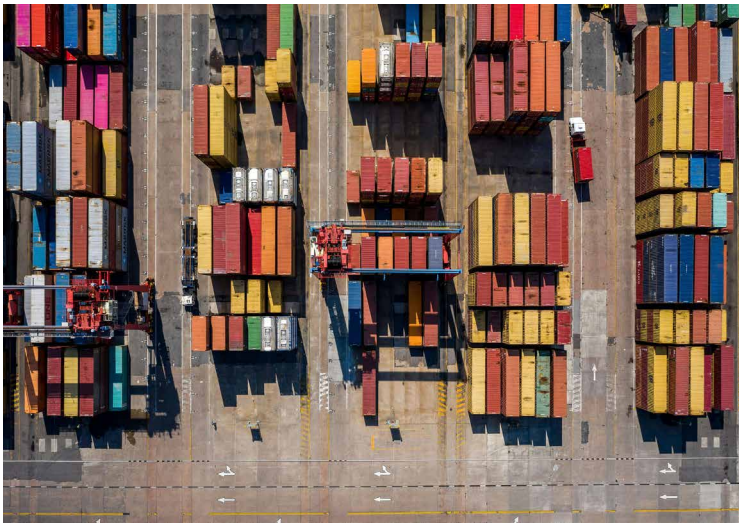
Older PTS, DGPS or non-GNSS systems* out there rely on other technologies and methodologies to function; for example, the use of transponders in the asphalt or concrete. They have proven to be accurate enough to run an autonomous operation, however a considerable investment is needed for such an infrastructure.

Not only this, but transponders require a fixed layout, are time consuming to install and in need of intensive maintenance. Radar or fixed Real-Time Locating Systems (RTLS) are fairly expensive, and intensive maintenance and installations are needed.

GNSS SUITABLE FOR COMPLEX PORT ENVIRONMENTS

Often a terminal has its own heritage of processes and common use, and is therefore

RIGHT
GNSS/INS is suitable for all terminal vehicles from terminal trucks to reach stackers to straddle carriers and RTGs. It provides positioning and orientation for real-time vehicle or container tracking, record keeping, machine automation and autonomous navigation.



GNSS/INS EXPLAINED

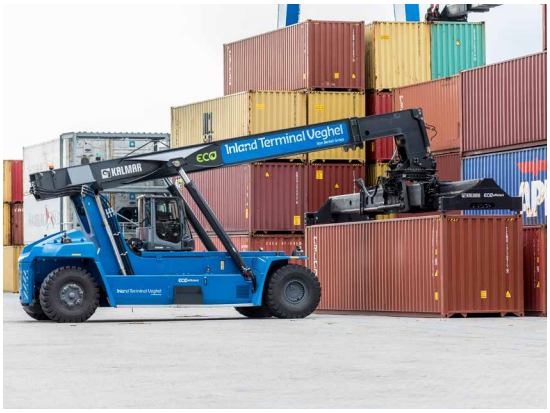
Global Navigation Satellite Systems (GNSS) are made up of satellites which broadcast signals from space with positioning and timing information. These signals are picked up by receivers which then use this information to determine their geographic location in terms of longitude, latitude and height. So what is the difference between a GPS and a GNSS receiver? A simple GPS receiver only makes use of one global navigation satellite system, while multi-constellation GNSS receivers get information from many such systems at the same time, including GPS, Galileo, BeiDou and GLONASS. This allows them to 'see' many more satellites at any given time. Septentrio multi-frequency GNSS receivers connect to all signals from any GNSS satellite for maximum positioning availability and accuracy down to sub-decimetre level, referred to as RTK accuracy.

While GPS/GNSS provide absolute global positioning, the Inertial Navigation System (INS) uses an IMU sensor to determine a relative position and orientation angles: heading, pitch and roll. It accomplishes this by using gyroscopes and accelerometers to accurately measure its rotation and acceleration. INS relative positioning is used to 'bridge' areas where the line of sight to GNSS satellites is temporarily lost, such as under cranes or between container stacks.

INTERFERENCE RESILIENCE EXPLAINED

By the time they reach earth, GNSS satellite signals are weak in power. This means that they can be 'jammed' or overpowered by other electromagnetic radiation such as radio signals on nearby frequencies or even radiation from nearby electronics. Illegal devices called 'jammers' are sometimes used by truck drivers who try to avoid road tolling, and can knock out GPS signals in of radiuses of hundreds of metres. Technologies such as AIM+ Advanced Interference Mitigation at the receiver core use notch filtering and integrity algorithms to stop jamming from affecting the positioning solution.

Spoofing is a smart form of interference when an attacker transmits wrong signals into a GNSS receiver to hijack its positioning output. GNSS spoofing has been in the news during the last few years often around ports or marine vessels. To avoid the trap of spoofing Septentrio receivers are equipped with ASP+ technology on both software and hardware levels, including the latest OSNMA signal authentication mechanism.



ABOVE
GNSS/INS installations on equipment and vehicles are scalable and repeatable reducing infrastructure investments and improving time-to-market. These can be retrofitted or designed-in from the start.

decentralised in its IT partners and other systems in the facility.

Terminals have many challenges to overcome. Including many various infrastructure installations and layouts, mixed fleets of equipment and vehicles used, different types of configurations, and multiple needs per terminal or customer. For the successful installation of high-accuracy GPS/GNSS positioning in the port environment, there are also additional challenges related to satellite signals. Users of satellite positioning solutions frequently deal with phenomena such as multipath (reflection of signals), security concerns (replicated unsecured signals), jamming (disruption of signals), but also obstacles, safety of life, accurate output, integrity of a product, and trustworthiness of the data.

POSITIONING SYSTEMS FOR LOGISTICS AND TERMINALS

A standalone GNSS/Inertial Navigation System (INS) receiver – positioning solution – can cover almost all areas of a terminal nowadays. Septentrio is a worldwide leader in providing highly accurate positioning systems for safety critical applications that operate in challenging environments.

Its portfolio allows multiple options for various operations: whether it is used for real-time tracking of vehicles or containers, record keeping or for any other automation/autonomous solution.

For over a decade, Septentrio has been providing positioning solutions for some of the largest ports in the world such as Port of Antwerp and Port of Houston, as well as other major players in the supply chain, providing robust, easy-to-integrate positioning solutions. The ports and terminals sector in addition to many others (rail, defense logistics automation, mining logistics automation, collision avoidance, personnel safety tracking and more) benefits from reliable high-accuracy GNSS.

ADDRESSING TODAY'S PORTS' CHALLENGES WITH SEPTENTRIO'S LATEST POSITIONING TECHNOLOGY

Septentrio has proven to solve the detailed industry challenges with a comprehensive product range and a special fit for logistics operations. Every system is standalone and can be easily mounted on any type of vehicle. Whether you want to integrate a board in your own sensor stack, or simply mount a IP68/69 rugged box on a vehicle, both options are possible. No intensive installations nor any changes to the infrastructures are needed.

The company's products include OEM boards, GNSS/INS systems, dual antenna heading solutions and compact modules. Septentrio systems are connected and used with various other systems, allowing their positioning systems to seamlessly integrate.

One of the benefits, therefore, are that major investments are no longer needed and you can maintain a level of flexibility to change your port layout.

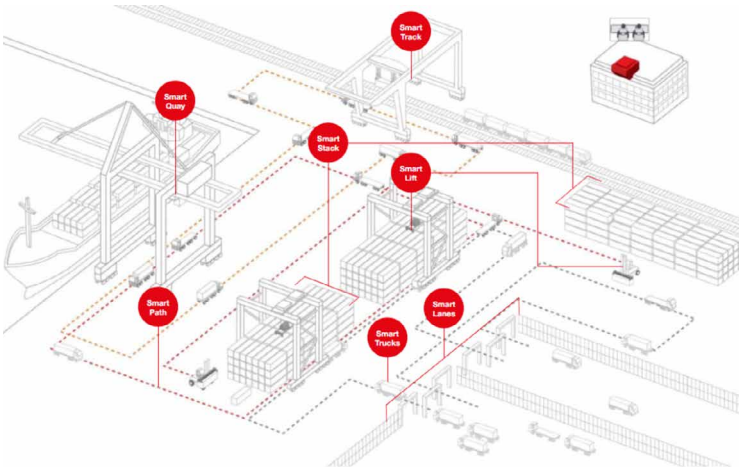
Sub-decimetre accuracies can be reached, which is well suited for full automation, and the integration of inertial sensors allows for bridging GNSS "dark spots" under the crane for instance, providing a continuous positioning output with the company's proprietary algorithm technology FUSE+.

Septentrio receivers have been extensively used for autonomous

operation in other industries as well, including autonomous driving of mining trucks and agriculture robots. The reason for the success of this automation is the high level of integrity provided by the receiver, including honest uncertainty limits for positions in challenging environments.

Reliability of positioning is crucial in ports because of crowded areas, tight spaces, expensive and large assets, personnel safety and demand for efficient continuous operations. GNSS positioning can be trusted because in challenging situations higher errors will be flagged by the integrity algorithm.

Stef van der Loo, Market Access Manager, Septentrio, explained: "GNSS technology has been improving over the last several decades, and especially over the last few years we have made several development breakthroughs in receiver reliability, availability and ease of integration."



RIGHT
Kalmar SmartPort solutions use GNSS/INS receivers and take container terminal and logistics operations to the next level by gathering more and better-quality data about containers, terminal equipment and vehicles.

Instead of metre accuracies, van der Loo added, Septentrio products now achieve sub-decimetre accuracies, an incredible feat considering the signals are coming from a satellite. "Logically, now, more companies such as Kalmar are leveraging the latest GNSS/INS technology for reliable high-accuracy positioning," he said.

The Septentrio solutions are perfect for integration with many types of vehicles, while maintaining the scalability and repeatability needed. Moreover, the time to market and thus fast deployment is very favourable, whether it is a retrofit installation or factory install.

Pekka Leikas, Product Manager at Kalmar, added: "We've had several generations of different types of position detection systems in use. A few years ago we were looking for the best possible technology and

"GNSS TECHNOLOGY HAS BEEN IMPROVING OVER THE LAST SEVERAL DECADES, AND ESPECIALLY OVER THE LAST FEW YEARS WE HAVE MADE SEVERAL DEVELOPMENT BREAKTHROUGHS IN RECEIVER RELIABILITY, AVAILABILITY AND EASE OF INTEGRATION."

provider for our next generation SmartPort products. We needed to improve the position accuracy for better quality of data, for example wrong coordinates caused failures in container stack inventory. For Kalmar, Septentrio's solutions have proven to be up to the complex challenges and difficult operating environment of container ports and improved the reliability of our SmartPort solutions and decreased the need for manual corrections."

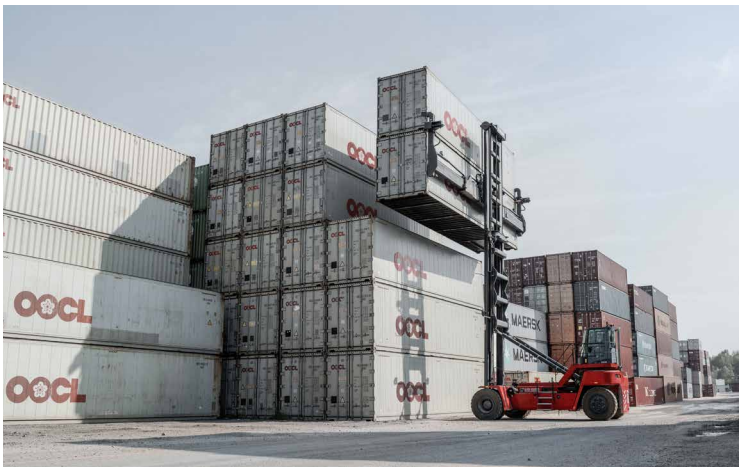
SEPTENTRIO GNSS/INS USED IN KALMAR SMARTPORT

Kalmar SmartPort solutions take container terminal and logistics operations to the next level by gathering more and better-quality data about containers, terminal equipment and vehicles. This helps improve the flow of containers around terminals or yards, remove bottlenecks and congestion, reduce errors, increase speed, productivity and safety.

As part of the SmartPort systems vehicles are equipped with an AsteRx SBi3 Pro+ GNSS/INS receiver, which delivers sub-decimetre positioning together with accurate orientation information. The installation and integration of the stand-alone GNSS or INS receiver is easy, with the help of the intuitive user interface. The GNSS receiver is part of a hardware and software kit on the vehicle that is connected to the Terminal Operating System (TOS). This receiver enables job optimisation and automated data collection for receiving an exact position of the stored container into a stack.

The AsteRx SBi3 Pro+ is robust inside and out. Its rugged box is IP69 compliant withstanding vibrations and shocks according to MIL-STD. The positioning output is trustworthy which is crucial for reliable operation and liability. Septentrio's proprietary RAIM+ integrity algorithm, based on two decades of field data, ensures reliable positioning by giving honest error estimates at all times.

There are many signals and other electromagnetic noises in a terminal



yard, which makes it a challenging environment for reception of GNSS satellite signals. AIM+ Advanced Interference Mitigation technology uses sophisticated signal filtering to protect the receiver from GNSS interference referred to as jamming. In fact, interference resilience is what Septentrio receivers are recognised for, and the company's equipment is often used for highly secured or defensive operations.

When assistance is needed, Septentrio can provide worldwide support. "We have been happy with the support Septentrio has provided to us," said Leikas.

"They have developed their products based on our needs and wishes. We have been working together with Septentrio to make sure the GNSS receivers are a perfect fit for the harsh conditions we face in terminals. Septentrio continuously improves their products with market or use-case specific feedback to overcome all the specific challenges."

Septentrio positioning solutions are not only easy to install, but very scalable, which makes them also attractive for smaller fleets and integrators. These GNSS receivers are perfectly suited for port asset tracking, as well as stand-alone solutions for yard vehicle tracking and automation. In the case of vehicle tracking the positioning information is used for choosing the nearest vehicle, for safety tracking, collision avoidance or geo-fencing. Full vehicle automation is achieved with high-integrity positioning for reliable vehicle navigation and control.

In the last few years GNSS positioning technology has taken several strides forward, which now allows it to be the positioning technology of choice for major logistics solution providers such as Kalmar. There are many receivers on the market offering varying degrees of quality when it comes to positioning. Choosing for receivers with a high degree of integrity ensures reliable and effective asset tracking or logistic machine automation.

ABOUT THE AUTHORS:
Stef van der Loo holds the role of Market Access Manager at Septentrio. With his extensive background in electronics and over 10 years of experience in the logistics, autonomous vehicles markets, robotics and agriculture markets for which he developed many successful go-to-market strategies for software and INS/MEMS orientation solutions.

ABOUT THE ORGANISATION:
Septentrio designs, manufactures and sells highly accurate GPS/GNSS receivers, for demanding applications requiring accuracies in the decimetre or centimetre range, even under difficult conditions. For over two decades Septentrio has been working with some of the largest ports in the world and major players in the supply chain, providing robust, easy-to-integrate positioning solutions for reliable high-accuracy GNSS.
www.septentrio.com

THE INNOVATION PLAYBOOK

Jack Donnelly, Editor, Port Technology International, featuring an interview with **Gadi Benmoshe**, Managing Director of Marinnovators and Vice Chair of the Data Collaboration Committee at IAPH.

The term 'innovation' has an enormous breadth and depth in what it can mean for the ports sector. Across the industry, a plethora of innovative digital solutions have come to the fore in the past decade. There are now almost too many to list: Internet of Things, Artificial Intelligence and Machine Learning, Digital Twin technologies, 5G and soon 6G, autonomous operations, as well as the growth of quantum computing to name but a few.

With this, for a port seeking to innovate it can be difficult – and costly – to invest in innovative solutions for a better customer service. In a bid to crystalise what can be a muddy investment landscape, in October last year the International Association of Ports and Harbors (IAPH) published a guidance fact sheet on the mindset towards innovation in ports.

"We felt the need to give ports the right tools to become more efficient and more competitive – and so we assembled experts from nations such as Spain, Germany, Israel, Morocco and France in the interest of sharing common knowledge and where we could help on closing the gaps," commented Gadi Benmoshe, Chair – Innovation Group, Data Collaboration Committee for the IAPH and co-author of the fact sheet.

Benmoshe is a former Chief Information Officer for the Israel Ports Company with years of experience in the terminal and logistics sector.

The fact sheet was launched on the back of the evolving role of the port: even before the COVID-19 pandemic, Benmoshe said, port authorities, as government-owned entities, began to reconsider their role and look beyond just the port; and instead at the entire supply chain. Dry ports, hinterland connectivity, cargo moved by trains, waterways, or HGV transport led ports authorities to place an emphasis on door-to-door transport – thinking about the importer and exporter.

OPPOSITE
Port of Barcelona

"WHEN YOU ARE TALKING ABOUT INNOVATION, YOU HAVE TO LOOK AT NOT ONLY TECHNOLOGY BUT ALSO PROCEDURES, BUSINESS MODELS AND OTHER OPPORTUNITIES."

The fact sheet thus provides readers with snappy points on what they can do to innovate.

A key tenet of the report notes that, whilst the mind casts to the prodigious potential of emerging technology when hearing the term innovation, this is not just about technology. The fact sheet makes this clear using the case study of the Port of Barcelona partnering with the Port of Busan to create a new logistics centre in Barcelona.

"[We have] the understanding that you have to innovate not only with technology," Benmoshe said. "I am a tech-first person – but when you are talking about innovation, you have to look at not only technology but also procedures, business models and other opportunities.

"The Ports of Barcelona and Busan smartly used the data they have available to find out their main lines of transport and counterparts. Clearly, Busan and Barcelona have been exchanging information on how each port can benefit and wanted to officially solve each other's challenges through innovation."

Organisationally, the fact sheet calls for a Chief Innovation Officer (CINO) to have a direct line of access to "top management with cross functional access to all other departments."

"Other industries ahead of ports have learned this lesson," the report wrote. Innovation function should collaborate throughout all levels of the organisation; including top management and the board to assure that innovation is aligned with corporate strategy and obtains the right funding.

Benmoshe explained more: "A vast majority of ports do not have a Chief Innovation Officer – or it's inside the department of the Chief Information Officer in an additional role to the Chief Information Officer. In this white paper, we emphasize that innovation is not something you can do in addition to your day-

“PORT MANAGEMENT NEEDS TO SHIFT TO RECOGNISE INNOVATION IN THE SAME WAY AS YOU WOULD WITH A RISK MANAGER, OR A CYBERSECURITY MANAGER.”

to-day role. There needs to be an element of organisational structure behind that.

“Being a Chief Innovation Officer involves coordinating and cooperating with different parts of the Port Authority, startups on the other end, universities, and BCOs.

“Port management needs to shift to recognise innovation in the same way as you would with a risk manager, or a cybersecurity manager. Risk management is not just in finance – there is risk in all departments; innovation needs to be the same, permeating through all divisions.”

A particularly intriguing concept on embracing innovation was the fact sheet’s thoughts on investment in startups. Those aforementioned technologies in AI and quantum computing are being pioneered by bright minds with new businesses ready to shake up operations in logistics.

The paper takes a brilliant example of Ashdod Port’s work on investment in startups. The Israeli port has a business incubator department that has helped more than 70 firms in a variety of industries since its founding in 2021. In early January 2023 Ashdod Port announced an investment of NIS3.6 million ($1.026 million) in five startups in fields including cybersecurity and crane monitoring systems.

ABOVE
Ashdod Port

Benmoshe outlined that a port like Ashdod did not begin simply with random investments, and instead had a clear plan about what challenges it had and how innovative startups could help meet them.

“[Ashdod] started with a plan to meet a challenge, which is a must in an innovation journey with startups. From that plan, you can find out which tools are suitable to you, allowing you to implement and reduce wasted resources and wasted time for the startups.

“Not only should the ports themselves talk in the same language, but the port and startup have to learn the language of each

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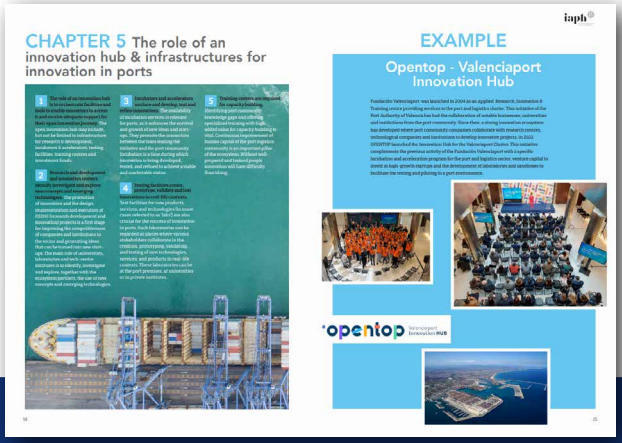

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"NOW IS THE TIME FOR INNOVATION, BUT IN EMBRACING INNOVATION IT IS ALL ABOUT HAVING TO PLAN CAREFULLY TO SUCCEED WITH THAT. START INNOVATING, AND DO IT IN A PLANNED MATTER."

other. A startup has its own wants and needs, and you need to consider not just your needs. Most ports cannot invest millions in startups, so the port will have to find those early-stage startups and create a smaller investment which, in the future, hopes to be a revenue stream."

The IAPH white paper is an outstanding one-stop-shop for ports wanting to find out how others have been innovative previously, what innovation can mean to them, and how to manage expectations in making decisions in the future with an innovative mindset.

"Now is the time for innovation, but in embracing innovation it is all about having to plan carefully to succeed with that. Start innovating, and do it in a planned matter," Benmoshe said.

"Be ready, there will be some failures, and it's part of the journey. A former President of Israel, Shimon Peres, reaching his 90s he had a quote saying that one of his biggest regrets is that he did not dream more. So dream big."

ABOUT THE AUTHOR:

Gadi Benmoshe is the Managing Director of Marinnovators, offering digital transformation, innovation and cybersecurity consulting services to Port Authorities, Port Operators and Maritime-Tech Start-Ups.

He is Vice Chair of the IAPH Data Collaboration Committee and a former Chief Information Officer of Israel Ports Company. He also participated in a number of activities of: IMO, IPCSA, UN/CEFACT, WEF, ISO.

ABOUT THE ORGANISATION:

IAPH is a non-governmental organisation (NGO) headquartered in Tokyo, Japan. Over the past six decades, IAPH has developed into a global alliance of ports, representing today some 160 ports and 120 port-related businesses in 87 countries. The member ports together handle well over 60 per cent of the world's sea-borne trade and over 60 per cent of the world container traffic.

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