

THE OFFICIAL MAGAZINE OF THE PORT OF HAMBURG

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DIGITAL WORLD

PORT OF HAMBURG MAGAZINE



THE PORT OF HAMBURG WILL BE ABLE TO
GAIN VITAL EXPERIENCE, LESSONS AND
CONTACTS THAT CAN SUSTAINABLY CHANGE
THE SECTOR. IN THIS ISSUE OF PORT OF
HAMBURG MAGAZINE, WE AIM TO GIVE YOU
A FIRST INSIGHT INTO TOMORROW'S PORT.



Dear Readers,

A year ago, one would barely have thought it possible to hold a big in-person event. We are all the more delighted that this year Hamburg should be the host for the ITS World Congress. The congress is the world's largest and most popular event for intelligent mobility and traffic digitalization. For the Port of Hamburg too, it is of great importance. Of special interest here are rapid data interchange, intelligent traffic management, drones and robots as a service, and digital security.

We live in a digital world. Our surrounding atmosphere is positively swarming with invisible data. For decades, the transport/logistics sector has been shaped by digitalization. Yet many processes in and around the port are still analog. This is not just time/cost-intensive, but also none too transparent or efficient. Yet in Hamburg progress is highly regarded, and so numerous digital approaches to solutions are captivating the port business. Above all, we have software provider Dakosy to thank. Based in Hamburg, for almost 40 years the company has been digitalizing logistics. Along the entire supply chain, it is the first partner to approach on software solutions. As the initiator of digitalization in the Port of Hamburg, also for our members, Dakosy is of outstanding importance, backing companies with cloud-based solutions for handling international forwarding and Customs formalities. The PCS – Port Community System, seen as one of the world's most highly developed IT systems, is also operated by Dakosy.

Not for nothing, the entire world of mobility & logistics will be looking to Hamburg in October. Its unique situation between its industrial port, HafenCity and the urban city centre is what make this location so special. With the port as the heart of the city, here business, research and public life intermesh. How do sustained supply chains function in this environment? At which point can industrial and personal mobility be combined? Where can digitalization contribute to process optimization? Where does it actually ensure additional security for data, but for individuals too? Numerous projects and innovations address precisely these questions. On the occasion of the ITS Congress, initial results can be displayed, and first successes celebrated.

The Port of Hamburg will be able to gain vital experience, lessons and contacts that can sustainably change the sector. In this issue of Port of Hamburg Magazine, we aim to give you a first insight into tomorrow's port.

We hope that enjoy reading it and discovering so much that is new!

Two handwritten signatures in blue ink. The first signature is 'Ingo Egloff' and the second is 'Axel Mattern'.

Ingo Egloff and Axel Mattern

Joint CEOs Port of Hamburg Marketing

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Ein starker Verbund von 17 Hafen- und Logistikstandorten in Norddeutschland & Skandinavien



Dynamic advances for port traffic

Traffic in the Port of Hamburg is being digitalized. This should lead to smoother transport runs. At the ITS World Congress, the Hamburg Port Authority is showcasing numerous projects for improving road traffic. These could soon be interacting.

Hamburg is seen as the city in Germany with most traffic jams. Traffic in the port is extremely prone to disruptions. Over 30,000 vehicles per day roll along the streets here. Approximately one-third of these are trucks, many serving the various terminals sever-

al times a day. So truck trips alone number up to 40,000, causing high traffic density. The slightest interruption can produce long jams, with truckers unable to take up slots planned and booked in advance. Being responsible among other things for traffic



infrastructure and management, HPA – Hamburg Port Authority is determined to change this. In recent years, numerous projects have therefore been launched to achieve greater transparency and safety and to simplify planning. The crucial key to this: Digitalization and connection of all vehicles with the infrastructure. ‘V2X’ has become established as the relevant acronym. This covers communication between vehicles, and also data interchange with infrastructural elements.

Numerous facts drawn from experience plus precise planning are required before a complete road infrastructure can be digitally managed. Simulation models are extremely helpful here. In the MOZART project, the partners Graz University of Technology, Fujitsu and HPA aim to add an integrated, continuous real-time program selection to rigid and adaptively regulated traffic lights. “We aim there to test real-time traffic control, covering and managing traffic throughout the network. That would enable us to increase capacities,” says Dr. Panthian Zuesongdham, HPA’s Head of Port Process Solutions. The goal is to secure better traffic flow. Vehicles then need to brake and accelerate less, leading to a reduction in emissions. Simplified planning of transport for companies is a further positive aspect.

The time factor plays an important part here. If traffic is to be suitably managed, countless calculations are essential within seconds, if not milli-seconds. In the MOZART project, during the first two stages a ‘digital

annealer unit’ was tested. The result was crystal clear: Based on quantum computing, this technology enables traffic networks to be optimized. At the next stage, the partners will be in process of modelling a real part-network. Thousands of data fragments are entered. For a start, such a model requires a structural model of the road network. That includes traffic lanes, including filter lanes, and the related traffic lights. Also required is data on traffic records, insofar as these are available. In addition, the computer is fed with all conceivable vehicle data so as to precisely describe driver behaviour in microscopic detail. Data on reaction times, turning, braking and acceleration by both trucks and cars is added. With all this data, computers simulate differing traffic loads in the part-network for the port, with traffic light settings also being varied. On the basis of the simulations, forecasts can be deduced and evaluated, then being optimized. With the findings of the third stage as the starting point, the model is no longer to be fed with

“With smartBRIDGE, we have revolutionized infrastructure management. We no longer have to react, but can act and be pro-active. That’s a great difference.”

In the smart-BRIDGE project, sensors monitor the condition of the Köhlbrand Bridge. With this anticipatory control maintenance and repairs can be better planned.



on there. With DIVA – Dynamic Information on Traffic Volume – another system is deployed there. With large LED-lit information panels, this briefs drivers on the traffic situation in the port. Simultaneously, the data is also fed into the Internet. This can cover closures, construction sites and traffic jams, but also free parking spaces. Many tours can therefore be better directed, e.g. with truck drivers needing to take a break rapidly finding a free parking spot, without having to search for long. That can ease the traffic situation. Coordination of traffic lights ensures further easing.

PRACTICAL TESTS ARE HELPFUL

Adjustments to traffic light switching can be useful in several ways. One possibility is for trucks and traffic lights to communicate with one another and create a 'green wave' for several trucks. The partners in the Green4TransPORT project aim to show how this could look in practice. A total of 60 vehicles from various forwarders, including Hoyer and Zippel, have been fitted with an on-board unit. In the test area on Kattwykdamm, there are two intersections with traffic lights. As soon as one of these trucks approaches, the vehicles involved are identified virtually and consequently notified by app of the lights' phases. The vehicle is given priority so that the traffic light's green phase is extended until it has been passed. Should there be no vehicles on a road, V2X technology picks that up, so that in this case the green phase is shortened or cancelled. The upshot is fewer brakings and accelerations by vehicles, saving fuel and reducing environmental pollution.

synthetic data akin to reality, but with real data from HPA's Port Road Management Center.

HPA aims to optimize road traffic in the Port of Hamburg with its traffic management system. This supplies the data for EVE – effective depiction of the traffic situation. HPA has equipped the roads with Bluetooth, video detectors and induction loops that record all movements in the port area down to the last centimetre. These enable the system to supervise the traffic safely. All data collects in the Port Road Management Center. It is analyzed and passed

Forwarder Hoyer's trucks are in two-shift operation in the Greater Hamburg area. Making for their loading point, they often use the re-equipped crossing. "Our truckers have noticed some advantages. The green phase is frequently longer and they can continue without stopping. On fuel consumption, wear or working time, however, the minimal data quantity makes it impossible to discern any advantages, for that the stretch of road is simply too short," says Daniel Pfeifer, Fleet Manager for Hoyer. Should it come to an expansion of the project, the forwarder would certainly participate again.

SMART BRIDGES

Roads, bridges and tunnels also form part of any functioning traffic flow. Until now, reaction has only been feasible in the event of damage. This has led to unexpected interruptions of traffic flow caused by infrastructure repairs, necessitating closures or part-closures. In a digitalized port, that should change. The smartBRIDGE project, part of homePORT – see the 'homePORT' box – already shows what could happen. This centres on the Köhlbrand Bridge. Hamburg's meanwhile venerable trademark has been fitted with a multitude of sensors. Each regularly reports on the state of a specific element of the bridge. This data is all assembled on its digital twin. The virtual depiction of the Köhlbrand Bridge includes all the data essential for determining the current state of the bridge. Should a value depart from the norm, a timely decision can be taken on when the specific point must be repaired. "We have revolutionized infrastructure management with this project. We no longer need to react, but can act and be pro-active. That's a great difference," says Zue-

songdham. The project is being developed jointly by the HPA, Marx Krontal Partner, customQuake and WTM Engineers.

These projects are a first step towards a port free of traffic jams. They show that it is already technically possible in many areas to manage traffic so as to avoid and/or reduce bottlenecks. ■ Ralf Johanning

homePORT

With homePORT, Hamburg Port Authority has set up a campus for innovations and a field test laboratory in the middle of the Port of Hamburg. This is designed to offer space for major companies, start-ups, universities and researchers. To-day, they are already acting as communal innovators, alternative-thinkers and port players. To create the port of the future, they are cooperating on solutions and display interest in knowledge transfer that crosses corporate boundaries. <https://homeport.hamburg>



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GDANSK



As if on tiptoe

One minibus moves around Hamburg's HafenCity almost noiselessly. It's not only electrically powered, but also autonomous.

It gives you a funny feeling at first, the knowledge that this little bus is rolling around the streets of Hamburg's HafenCity completely independently. During the trials, naturally, there's always an escort driver sitting in the bus, yet as a rule they no longer intervene.

So now passengers can get used to that. The autonomous minibus is the central feature of the R&D project HEAT – Hamburg Autonomous Electric Transport – that is meanwhile at its third stage. Dr. Peter Tschentscher, Hamburg's First Mayor, ceremonially inaugurated this at the beginning of August.

"With HEAT, a new self-driving technology has been integrated into traffic on Hamburg's streets. This represents a powerful boost towards developing tomorrow's mobility. In future, short-haul public transport is set to offer comfortable and climate-friendly alternatives to the private car throughout the city," he said.

At a total of five stops around Sandtorkai, Sandtorpark and Kaiserkai by the Elbe Philharmonic Hall, the bus can take aboard up to seven people. Three of them may sit, four have to stand. On account of the current pandemic, however, just now only three people in total are permitted.

Lidar and radar sensors are its eyes and ears. In addition, two extra autarchical sources supply the little bus with essential data along the almost two kilometres of its route. The vehicle also resorts to novel route infrastructure developed by Siemens Mobility and installed by HHVA – Hamburg Traffic Installations. In addition, it

uses the HD map of the current route prepared and made available by the Free and Hanseatic City of Hamburg, precise to within a few centimetres. After combining this with its own data on the nearby environment, the shuttle uses data from this to calculate its own position.

Thanks to this interplay, the autonomous little bus can turn left automatically, avoid obstacles and drive at up to 25 kph. After each stop, the minibus self-sufficiently rejoins the traffic.

In addition, the shuttle bus is already equipped with a passenger briefing system. Three monitors in the vehicle will later display the next stops with scheduled

and actual arrival times as well as data on the route taken and quite possibly, the vehicle's actual position on the route.

Until the ITS World Congress in October, passengers may use this emission-free e-bus, which is five metres' long. ■

Ralf Johanning



HEAT – Project partners

- Free and Hanseatic City of Hamburg: BVM – Department of Traffic and Mobility Planning
- Hamburger HOCHBAHN
- IAV – Automotive Engineering
- Siemens Mobility
- IKEM – Institute for Climate Protection, Energy and New Mobility
- DLR – German Aerospace Centre

In this country around 80 percent of freight volume is still transported by truck. In many cases, a modal shift to rail would be environment-friendly. Yet that involves hurdles for companies.



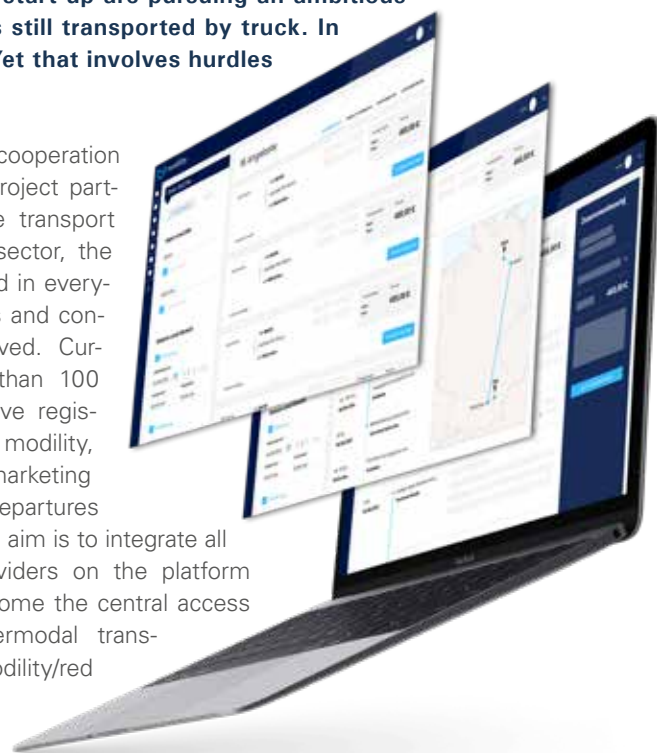
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Web portal for intermodal transport

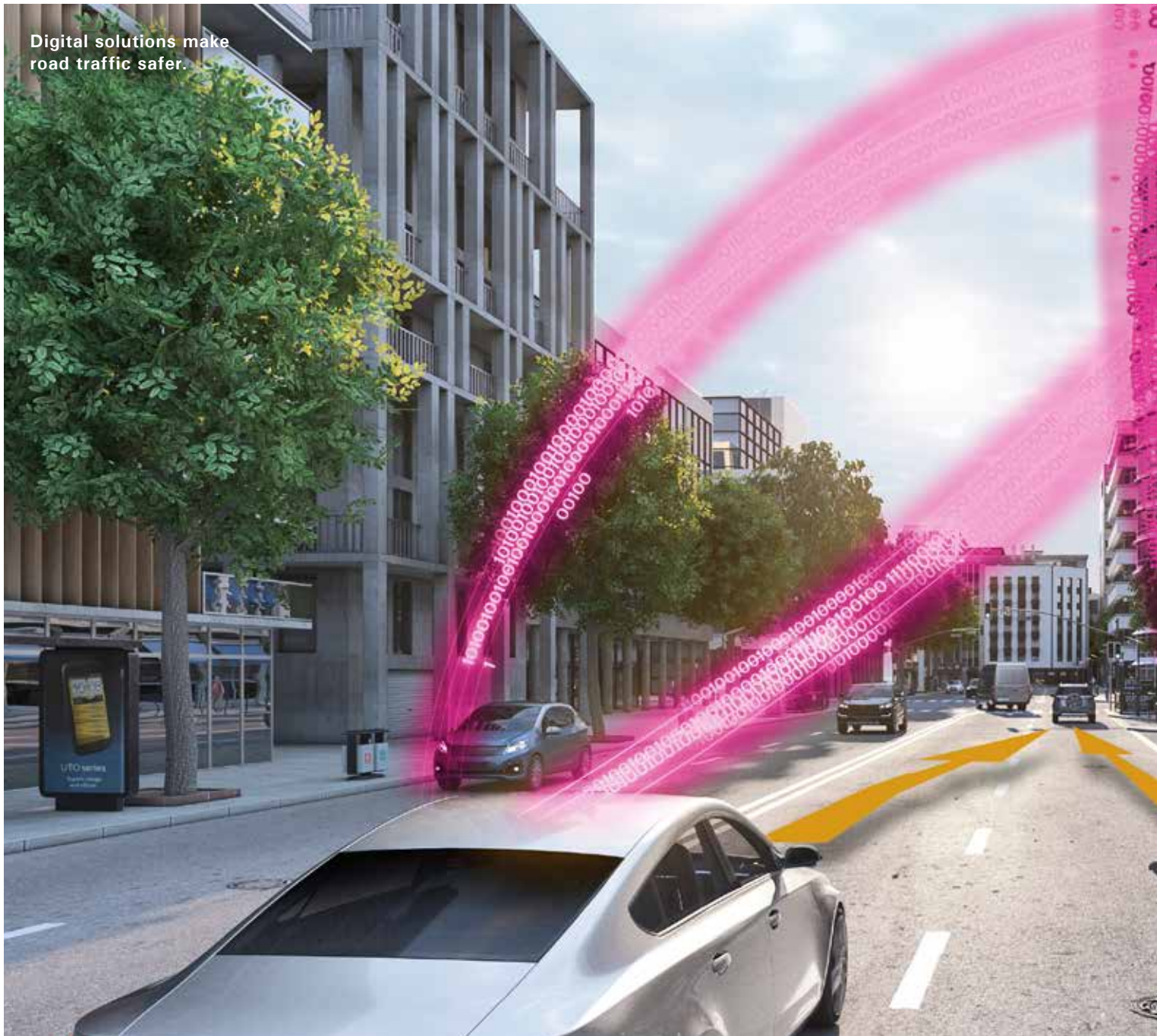
‘We want to offer all companies access to sustainable transport,’ states the modality website. CEO Hendrik-Emmanuel Eichentopf and his team at the Hamburg tech start-up are pursuing an ambitious goal, since in this country around 80 percent of freight volume is still transported by truck. In many cases, a modal shift to rail would be environment-friendly. Yet that involves hurdles for companies.

“In over 200 interviews with players on the market we have discovered that they frequently lack an overview of providers and routes for intermodal transport and organizing shipments is considerably more demanding than for simple trucking,” confirms Eichentopf. Modality aims to overcome these hurdles with the aid of digitalization. The eponymous online portal for the first time brings supply and demand together at a central marketplace, simplifying market access for users unfamiliar with intermodal transport, especially. With an intuitive start-destination search and a few clicks, they receive an overview of intermodal transport alternatives, with an intelligent algorithm in the background seeking relevant rail connections and combining these with suitable pre- and post-carriage runs. The final display is of directly bookable up-to-the-minute offers from various European providers.

Developed in cooperation with twelve project partners from the transport and logistics sector, the portal is tested in everyday conditions and continually improved. Currently, more than 100 companies have registered with modality, which is marketing around 300 departures per week. The aim is to integrate all European providers on the platform and so to become the central access point for intermodal transport. ■ Modality/red



Digital solutions make road traffic safer.



Digital guardian angel for cyclists

Continental and Deutsche Telekom are showing a networked collision warning system at the ITS World Congress

Safety in road traffic can be further enhanced by modern means of communication. The more vulnerable road users, especially, such as cyclists, pedelec and scooter riders, but pedestrians too, can be better protected by a collision warning. Continental and Deutsche Telekom are displaying how such a warning could look at the ITS World Congress in Hamburg.

The two companies have developed a system aiming to provide timely warning of accidents. This calculates the planned routes of the car and the two-wheeler. If these seem likely to cross at the same moment, the system uses mobile radio to warn both parties in real-time. Initial tests in road traffic were successful. "Vulnerable road users are often



Conti mobility study: Automated driving gaining acceptance

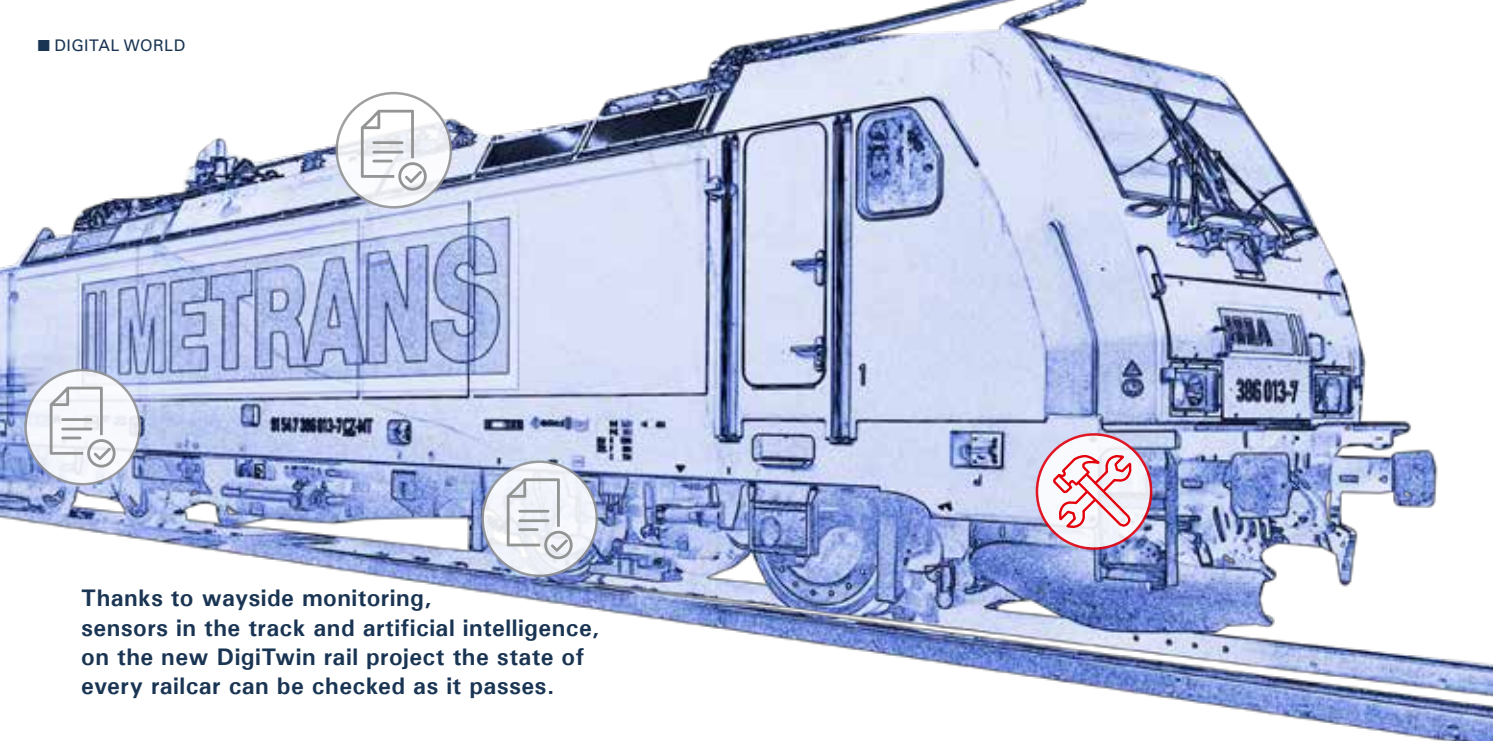
Shortly before the ITS World Congress, Continental is publishing a sixth mobility study. This focuses on automated driving. In sum, the study finds that driver assistance systems and automated driving are increasingly gaining acceptance. Yet a measure of scepticism persists in the USA, France and Germany, especially as regards automated driving. The human pilots still prefer to sit behind the wheel themselves. The situation on driver assistance systems differs. In the five countries covered – China, Germany, France, Japan and the USA – people are very open-minded about any functions that are safety-relevant. In each of these, the social research institute infas conducted representative random samples of about 1000 people on the subject of their mobility habits.

The collision warning is based on GPS satellite positioning, acceleration sensors, mobile communications and cloud computing. The car transmits its position and acceleration value to the cloud via mobile communications. Similarly, the cyclist sends his data via smartphone or networked cycle computer to the cloud. At the ready, the computer calculates the paths for the next five seconds. If a collision looms, it sends a warning to the car and to the cyclist's end user device. So that this information reaches both road users as rapidly as possible, the nearest cloud computer in the mobile network to the location of the possible collision is always used. Technicians refer to this as 'Multi-Access Edge Computing.' "With the collision warning system we are equipping cyclists, pedelec and scooter riders with a digital guardian angel," says Oliver Bahn, responsible for connected mobility at T-Systems. "The key to this is the high degree of connectivity: About 85 percent of the population in Europe use a smartphone. Increasing numbers of cars are also being connected. With our computers in the mobile network, we also ensure extremely short response times."

The cyclist should be able to select the form of alarm call here. If he uses a smartphone or cycle computer as navigation device, it is possible for him to receive an optical signal. If the smartphone is in a pocket, it will vibrate or sound an alarm signal. Simultaneously, an optical or acoustic warning signal reaches the vehicle. ■

Ralf Johanning

overlooked in traffic. On top of that, over 80 percent of accidents between pedestrians/cyclists and motorized vehicles end fatally for the more vulnerable road user, according to the European Road Safety Council. With real-time networking and collision warning, we therefore give cyclists and pedestrians increased visibility. This way, we shall reduce serious accidents, injuries and deaths in traffic," says Karsten Michels, Head of Research & Advanced Development for Continental.



Thanks to wayside monitoring, sensors in the track and artificial intelligence, on the new DigiTwin rail project the state of every railcar can be checked as it passes.

Efficient clearance for freight trains

Along with METRANS Rail (Deutschland), Bonn-based RailWatch aims to develop the digital twin of a railcar to achieve a substantial reduction in the time required for the technical check of a train. The project is backed by the Federal Ministry of Transport and Digital Infrastructure – BMVI's 'Railborne Freight Traffic' funding programme.

With resources increasingly scarce, processes must be faster, simpler and more efficient. Significant growth in railborne freight traffic by 2030 is envisaged. Rail is seen as the most sustainable means of transport, set to significantly boost its market share vis-à-vis trucking. This shift

weather, the vehicle inspectors on duty have had to turn out day and night. That's a mammoth job, but can be done differently.

Thanks to wayside monitoring, sensors in the track and artificial intelligence, on the new DigiTwin rail project the state of every railcar can be checked as it passes. An app transmits the data to the railcar inspector. What could be safer or more convenient? "It is essential that we give our vehicle inspectors the best possible support, by creating digital aids of a kind not yet on the market," is how Holger Westphal, Rail Operations Manager for Metrans, sums up his group's commitment in Germany.

DATA MAKES IT POSSIBLE

The DigiTwin project displays all circumstances that the vehicle inspector needs to cover at present. The basis is the listing of damage derived from the General Conditions for the Use of Railcars. All the fundamentals needing to be checked to guarantee safe train operation are listed there. More than 100 different conditions and faults for automatic recognition by DigiTwin are set out.

The measuring system developed for this is to be used in terminals, ports and industry. The individual digital twin can be fully checked prior to departure. That substantially reduces the time required for technically checking the train. Even before arrival, the vehicle inspector and the maintenance manager are aware of whether or not a railcar displays any faults.

"Digital process optimization can be so simple, saving both costs and time," explains Tobias Frede, CTO of RailWatch and Project Director for DigiTwin. "This data will enable us to push ahead with safe, competitive and future-oriented railborne freight traffic," adds Frede. ■

Railwatch, HHLA/red



among carriers requires not only increases in rail traffic and freight volumes, but also optimization of the related processes.

INDUSTRY 4.0 FOR RAIL

Whether at ports, freight terminals or industrial sites, the railcars, cargo and engine of a freight train have needed to be checked for damage pre-departure. Whatever the

Transforming transportation through technical and digital innovation

As a logistics hub for worldwide freight flows, Hamburg is the largest handling centre for railborne freight traffic. For VTG, this makes it Europe's most significant port. With around 280 kilometres of track and 160 of sidings, it is optimally connected with Europe's rail network. With its focus on intermodal services, it is playing a major part in giving birth to more environment-friendly supply chains.

With around 94,000 railcars, VTG as a top international asset and rail logistics group is making a vital contribution to boosting climate-friendly rail. This involves developing multimodal logistics services, innovative technologies and integrated digital solutions to transfer more freight from road to rail on hinterland services as well.

Successfully transforming transportation will require making the impossible feasible. At present, 95 percent of semi-trailers lack craneability and are rail-incompatible. This makes them one of the main obstacles to any transfer to rail. Against a background of urgent climate goals, VTG along with VEGA International has developed 'roadrailLink – r2L' technology to remedy this deficiency. For shippers, this technology inaugurates an alternative, ecological transport to trucking, already helping now to cut CO2 emissions.

The VTG Connect module facilitates continuous monitoring of the railcar, its load and the transport chain. Movement orders become more precise, making logistics processes faster, and infrastructure load management more efficient. The customer platform 'traigo' extends the group's digitalization trail, creating the central interface for digital fleet management. Already the

recipient of several awards, this digital platform offers customers a comprehensive range of products and services, greatly simplifying use of rail.

Experience VTG technologies and services at close quarters by visiting booth 230 in Hall B4 at the ITS World Congress. ■ VTG/red



The VTG Connect module facilitates continuous monitoring of the railcar, its load and the transport chain.



New types of semitrailers simplify the shifting of goods onto the railways.



The technology opens up new possibilities for combined transport.

SINLOG: Digitally speeding up waterways

Waterway freight logistics quietly offers a range resembling a sleeping beauty, not yet awakened despite substantially higher transport volume in the sector. The shift in transport and striving for CO2 neutrality are making inland waterway shipping increasingly significant. Yet it needs active promotion in the race for customers and orders.

The research project SINLOG – Standardization approach to connect Inland Navigation to intermodal LOGistics – has taken up this challenge. Its vision focusses on building up a communications platform for electronic freight documents. Specifically, anything now accompanying every shipment as paper is in future to be made available digitally to all those involved and to logistics systems. This approach gained backing from the BMVI – Federal Ministry of Transport and Digital Infrastructure, as well as those responsible for its mFUND research initiative.

REINVENTING SPEED

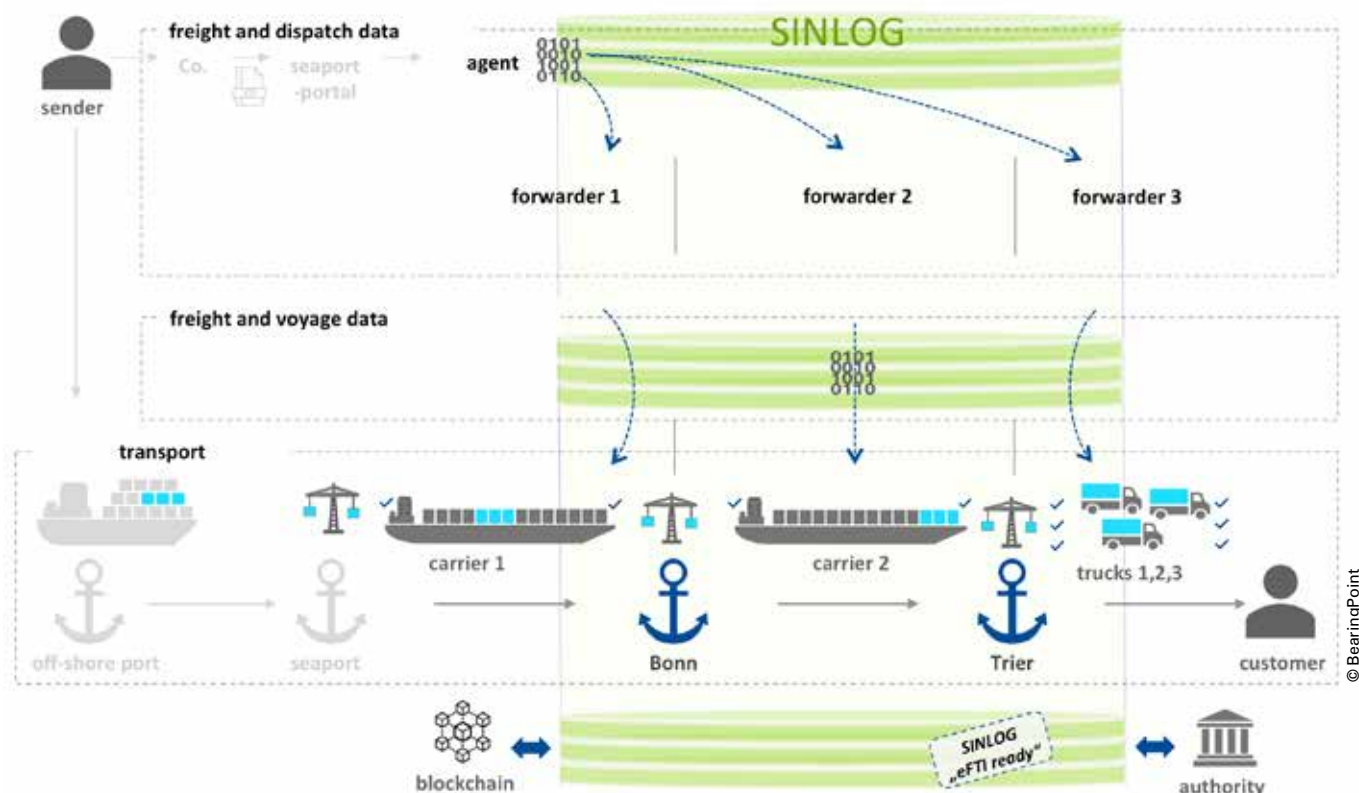
SINLOG has investigated existing solutions for digitalization of freight documents and adapted these for inland waterway shipping. Standards from other transport sectors supplied suggested some good approaches. However, it was especially the EU campaign for eFTI – electronic Freight Transport Information – that presented

challenges for SINLOG. The goal was to record every piece of information as a data field and present this to the logistics chain in relation to both its context and role. The benefit does not stop on the waterway. The data is intermodally also available for pre- and post-carriage runs by road and rail.

SPEEDIER FOR WATERWAYS

SINLOG was implemented within six months. Data on bulk and containerized freight can now be deposited on the communications platform, while interfaces with IT systems, as well as others for all roles in the transport chain, have been fully developed. The major reservation, about data transparency and/or undesired transparency among all parties, is solved by role-specific preparation of information. In addition, to enhance usefulness such further shipment documents as those on calibration and load space inspection are covered by the SINLOG approach.

SINLOG in the logistics chain

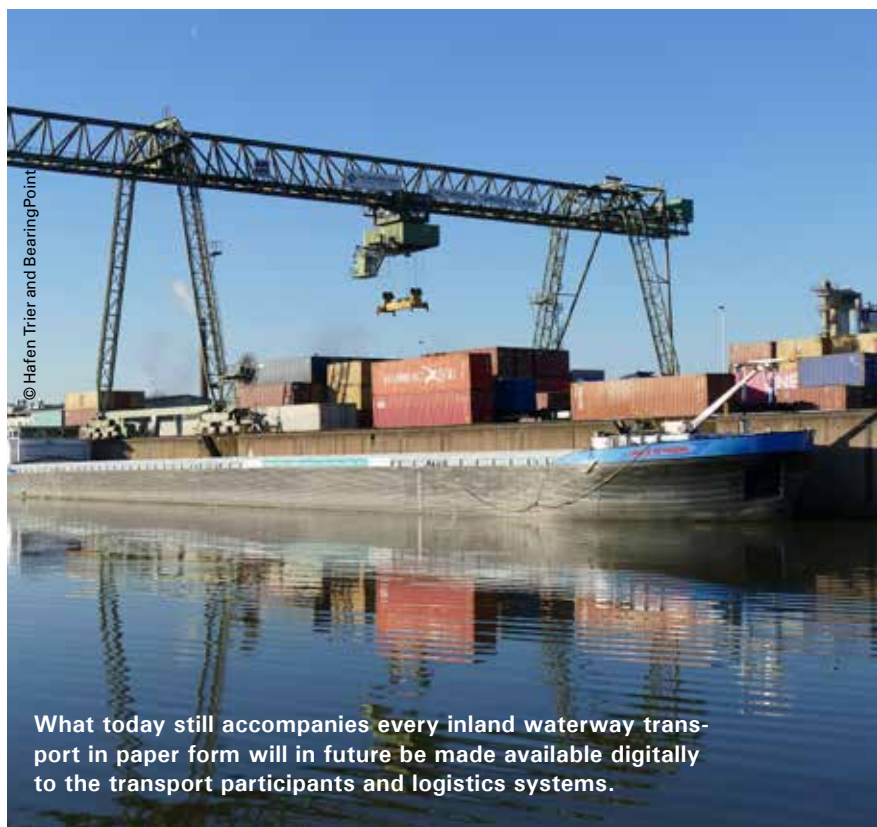


EXCITEMENT AFLOAT

Over 60 participants tested SINLOG and its electronic data interchange in a field trial during voyages on the Rhine, Main, Danube and Moselle. Agents, movements clerks, bargees, calibration experts and freight space inspectors tested all SINLOG processes in actual operation in practice. As additional data, SINLOG also gave port operators statistical data to support official reporting, but also billing models with terminal operators and warehousing companies – eFTI ready.

ONLY THE RESULT COUNTS

Comprising BearingPoint, MSG, the Port of Trier, BÖB, Fraunhofer FIT and PMMG, the SINLOG team will now evaluate all field trial findings by October. Initial pointers are very promising, but that does not mean that SINLOG should be taken for granted. If the sector is to stop following in the wake of other modes of transport, it is and will remain its job to actively and jointly be open to the chances presented by the new digital opportunities. ■ Hanno Schellenberg/red



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Start-ups: Experience the future now at the ITS World Congress

This year's ITS World Congress in Hamburg offers a special exhibition area and a packed programme backed by the Ertico Start-up Initiative. With 'Connect, Innovate, Grow' as its motto, this offers mentoring tours and matching opportunities for start-ups from all over the world desiring to network with Ertico partners, German industry and companies in the mobility sector. The start-up area will not only offer space for an exhibition stand, but will also serve as an innovation hub within the Congress, offering young entrepreneurs a platform for introducing their business ideas, participating in pitching sessions and attending platform discussion.

„With their creativity and adaptability, start-ups have the potential and the knowhow to help us to find fresh solutions for tomorrow's journey. They are indispensable for the future of the European economy. With its new products, services and ideas, we are very eager to see what this vibrant start-up community will contribute to the ITS in Hamburg,“ said Jacob Bangsgaard, CEO of Ertico.

In Hamburg, it is primarily Digital Hub Logistics that will be a central rendezvous for such logistics start-ups as Boxxport, NaviSense and instaFreight. ■

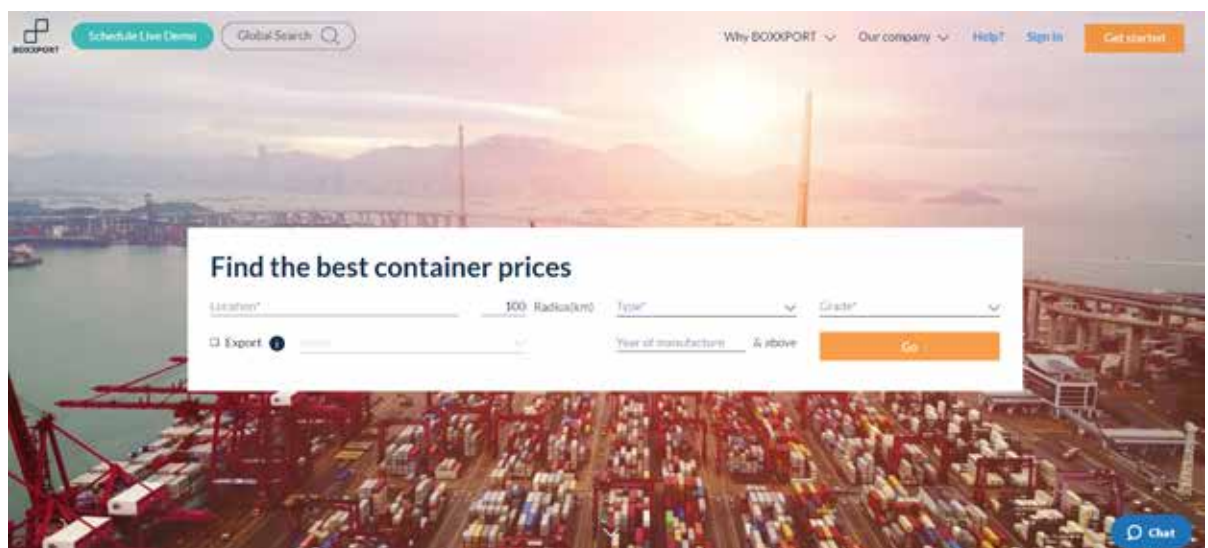
ITS Future 2021 Hamburg offers:

-  500 square metres of exhibition space for 60 ITS start-ups
-  The opportunity to showcase business ideas to an international audience consisting of leading representatives of the worlds of business, politics and science
-  A daily programme that includes pitching contests, platform discussions, workshops, networking opportunities and matchmaking events with corporates and investors, and much else besides

Boxxport

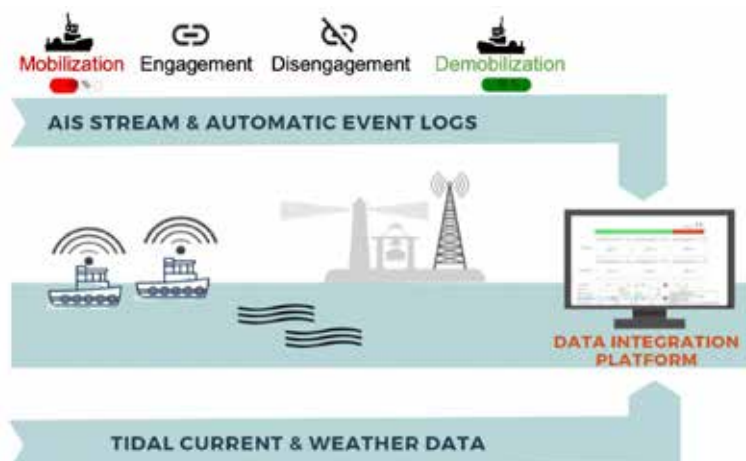
A tense situation prevails on the worldwide container market. The traditional buying and selling of containers is increasingly hitting the buffers, being both time and cost intensive, largely non-digitalized, neither transparent nor efficient. The Boxxport start-up rethinks global supply chains and now counters container scarcity with a digital market place for boxes. The online platform pools container dealing processes, making available re-

al-time data on availability and price. Containers can be bought and sold worldwide here. In future, there should also be opportunities for leasing and auctioning boxes. The main emphasis will be on transparency, something often lacking in conventional trading. This digital product from Boxxport represents a great leap forward. Schemes like this one could sustainably revolutionize the logistics sector. ■



Navisense – workboat.ai

To make their operations more climate-friendly in future, ports and port operators need to turn their thoughts to protecting the climate. Intense pressure on costs and competition make this a major challenge. Smart und innovative solutions are in demand. The Navisense team has therefore developed software enabling effective speed and fuel management for port tugboat compa-



nies. The workboat.ai application is available to both shipping companies and crew members, even on their smartphones. Algorithms reveal fuel consumption and also supply functions for optimizing fleet structure. The aim was a simple, economical solution that would function without elaborate extra technical equipment for vessels. The AIS-based IoT Software is already in service in more than 30 ports. To reduce fuel consumption and emissions, use in other workboats is planned. ■



Was Deutschland braucht, bewegt die HHLA.

Als eines der führenden europäischen Logistikunternehmen bringen wir Waren und Güter in Bewegung – und die Transportströme in Fluss. Mit Verantwortung. Mit Verlässlichkeit. Und mit Nähe zu unseren Kunden. Als logistischer Knotenpunkt und Teil der Versorgungsinfrastruktur sorgen wir auch in schwierigen Zeiten für Stabilität in Deutschland. Wir sind Bindeglied zwischen lokalen und globalen Märkten sowie der Logistik von heute und morgen. Denn: **Die HHLA ist das Tor zur Zukunft.**

From port to door: smarter and more sustainable logistics

Given the importance of freight, shipping and logistics to global supply chains and world economies, it's hardly surprising that five prominent port cities are playing host to consecutive ITS World Congress: Singapore, Hamburg, Los Angeles, Suzhou and Dubai.

Commerce between nations and cargo handling at ports have always been major economic contributors, directly through turnover and gross value added to GDP and through more indirect benefits like job creation and infrastructure investments. ITS and smart mobility are now playing a central role in developing next-generation logistics, helping ports be more efficient, sustainable and profitable.

'Goods Journey from Ports to Customers: Smart and Sustainable Ports of the Future' was the focus at an ERTICO-ITS Europe webinar in the run-up to October's ITS World Congress in Hamburg. "Maritime trade is the bloodstream of the global economy, transporting around 11 billion tonnes of goods every year," says Zeljko Jeftic, Deputy Director of Innovation & Deployment, ERTICO-ITS Europe.

'THE INTELLIGENT PORT OF THE FUTURE.'

Hamburg's smartPORT initiative promotes sustainable economic growth and optimal efficiency while minimising environmental impacts. "Located in the heart of the city, there are obvious challenges in balancing economics with the social impacts created by port activities," says Dr Phanthian Zuesongdham, Head of Division Port Process Solution and Lead Coordinator smartPORT, Hamburg Port Authority. "We need to organise our infrastructure and traffic capacity, so cargo flows are quick and efficient. This is where ITS technologies and collaborating with partners come into play."

Given the proximity of so many ports to urban and residential areas, the intersection between ports and local/regional road networks is particularly interesting to Richard B. Easley, President of E-Squared Engineering. "We should remember that freight and traffic are inseparable: this may seem obvious, but it's not always appreciated." He says we need to think about integrated solutions that bring highway, road-way and port operations together. "Separate solutions can mean new problems. We need to be smarter, and make sure well-meaning solutions don't have unintended consequences. Linked to that, we need to deal with an 'It's not my job' attitude among different stakeholders when it comes to freight issues."

TOWARDS MORE SUSTAINABLE PORTS

Indeed, ports and cargo handlers are increasingly developing and trialling future mobility solutions. However, "The commercial demand for sustainable transportation is rising faster than the efficiency gains provided," says Joerg Luetzner, Continental's Head of Innovation Management Commercial Vehicles & Services. "The industry needs to step up its efforts to provide those efficiency increases and further reduce CO2 emissions." Continental's focus includes reducing fuel consumption and increasing efficiency through, for example, innovative tyres and tyre pressure monitoring, and 360° Fleet Solutions. Several Continental-related activities will be featured at the World Congress. For ports, this includes ra-

dar-based localisation for the EU-funded AWARD project looking at confined area manoeuvring. "We're also involved in the ENSEMBLE project for platooning," Luetzner says. "And in terms of customer delivery, we are working with partners in Singapore to trial last-mile delivery robots in a real-life city environment."

MARITIME DECARBONISATION

Staying in Singapore, this central shipping hub has now embarked on an ambitious decarbonisation programme. "There is no 'silver bullet solution, and the preferred fuel depends on many factors," says Yi Han Ng, Director of Innovation, Technology & Talent Development Division in the Maritime and Port Authority of Singapore. "Singapore's maritime decarbonisation efforts focused on two key targets. Beyond ensuring emissions from domestic maritime and port activities meet internal targets in the 2030s and 2050, Singapore supports the International Maritime Organization's initial strategy on the reduction in GHG emissions from ships." To support the global efforts, Singapore established an international advisory panel for maritime decarbonisation which recommended four strategies: harmonising standards, implementing new solutions, financing projects, and collaborating with partners.

Yi Han Ng says, "Our Maritime Singapore Decarbonisation Blueprint 2050 will be ready by the end of 2021 and we have set up an SGD 120 million fund to support a Maritime Decarbonisation Centre in Singapore." Singapore can leverage its status as a major bunkering port to support future marine fuel research and trials leveraging on the local research expertise and under a regulatory sandbox environment to conduct joint industry projects to develop industry standards and facilitate knowledge sharing: "The Port of Singapore can be a Living Lab for maritime decarbonisation," he adds. "We hope others will join us on our journey towards a low-carbon shipping sector."

A BROADER SOCIAL AND ECONOMIC ROLE

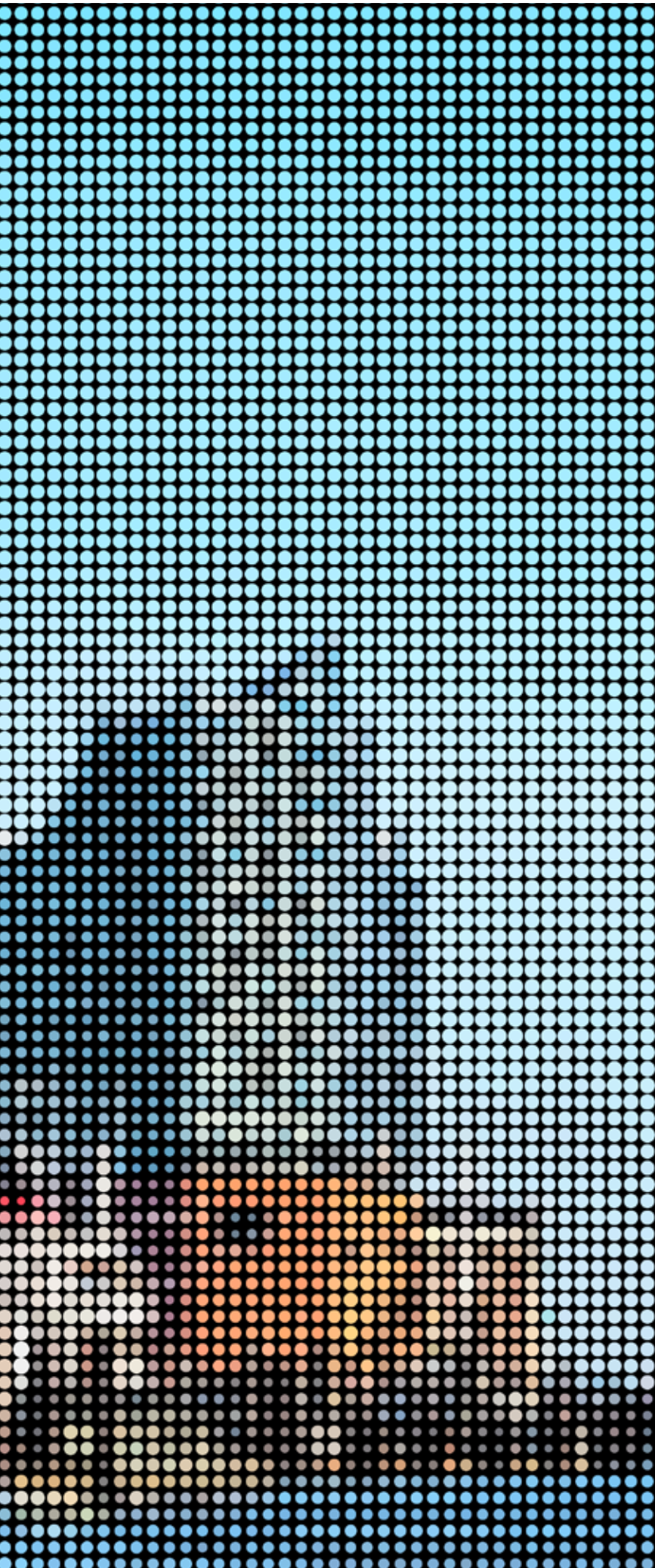
Ports of course play an important role outside their gates. One of the world's busiest inland ports, Suzhou in China is an excellent example of the contribution of ports to their hinterlands and nations. "Our port economy is very important to the local economy," says Zhiwen Wu, Head of Investment Management, Jiangsu Suzhou Port Group. "We contribute to economic development in various ways, for example, through port city integration and coordinated development. Every million tonnes of cargo throughput can create more than 100 million yuan of GDP plus employment opportunities for 2,000 people" – and Suzhou is a growing port. Throughput increased from 330 million tonnes in 2010 to 550 million in 2020. Zhiwen Wu adds, "We are a contributor to strong regional growth in the Yangtze delta region. Experience shows the port is a powerful engine to drive the hinterland economy: indirect output value, employment opportunities, local taxes, and developing local infrastructure."

PORT TO CUSTOMER: LAST-MILE DELIVERY

So what if the last stages of a goods' journey from port to door? "Recent times have shown the increasing importance of Light Commercial Vehicles to individuals and society in terms of delivering goods and services," says Christian Kassyda, Director Transport Policies – Public Affairs, Volkswagen. "We are in the midst of a transformation to local zero-emission mobility and logistics, and the pace of change continues to accelerate in the key areas of electrification, digitisation and automation. This is about making traffic safer, more environmentally friendly, and more efficient."

Jacob Bangsgaard, CEO of ERTICO-ITS Europe, adds, "Smart sustainable mobility is what we do, and Logistics is a priority area for us. We are keen to continue strengthening dialogue in this area, so Logistics has naturally become a bigger and more important element of our Congress. Please join us in Hamburg to learn more." ■ Ertico/red





ITS networker Hans Stapelfeldt

Hans Stapelfeldt is building contacts and coordinating communities

This year, the ITS World Congress will take place in Hamburg for the first time. That's a gigantic opportunity for the city, business and the port, one to be grasped. Hans Stapelfeldt is performing a key role there for Hamburg. As networking manager, he is uniting business, science and research to transform innovative ideas into solid projects. We discussed the Congress and his duties with him.

HHM: Hans Stapelfeldt, you are the official ITS NMO – Network Manager. What does that mean precisely? What are your duties and why are these so vital for Hamburg and the Congress?

"For a start, the City of Hamburg has a clear ITS strategy till 2030, aimed at realizing solutions for tomorrow's urban mobility and logistics right now, becoming a state-of-the-art city. We can only succeed in close cooperation with business. My job as ITS NMO is to assemble around one table the already first-class, extensive network of LIHH – Logistik-Initiative Hamburg, with over 500 corporate and individual members from extremely different sectors – and then to arouse their enthusiasm for mobility and logistics projects paving the way for our joint future. The ITS World Congress offers a marvellous platform there for presenting Hamburg as the Gateway to New Mobility."

This year, the Congress sets special store on new companies and innovative ideas. What do you anticipate from that, and how are you supporting start-ups?

The international speed of innovations in all sectors of passenger/freight transport is impressive. Changes made to processes are no longer evolutionary, but revolutionary and disruptive. Every week, start-ups come up with super new ideas, searching for a use or business case. Here we bring together fully operational businesses with highly creative start-ups. Close cooperation with Digital Hub Logistics is a great bonus here, especially in relation to holding the ITS World Congress. Such alliances make a very positive impact on Hamburg as a maritime logistics hub.

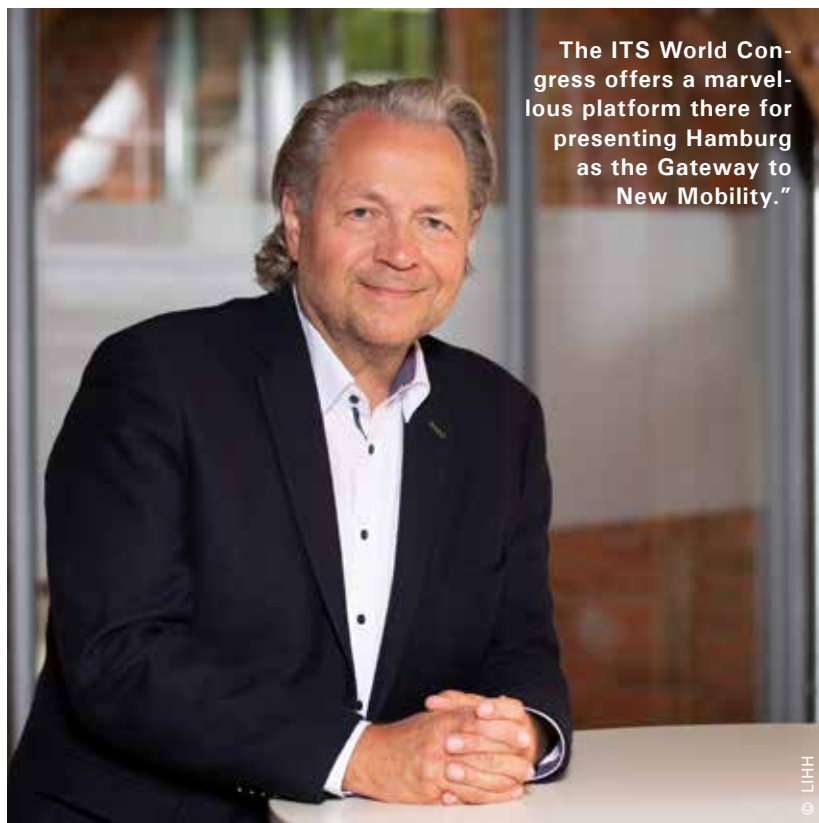
What does hosting the ITS Congress this year mean for the City of Hamburg? How do you see Hamburg as gaining from its experience of the Congress?

One of the reasons why Hamburg was selected to hold the ITS World Congress in 2021 was its very spe-

cial location: Port-based industry, HafenCity and the traditional city centre are adjacent. What does that do for people and products? It's fascinating! International interchange at the Congress will further inspire Hamburg to show how successfully and sustainably mobility & the port & freight & logistics can be shaped for our future.

Is there a point that you especially wanted to make that wasn't covered by our questions? Fire away:

Hamburg sees the ITS World Congress as giving a positive boost to good projects to transform mobility. There's more to that than daily outings to work and leisure. In Hamburg as a maritime logistics hub, we look forward to a host of impulses and suggestions from numerous international visitors to drive a sustained transformation of mobility in all intermodal areas of freight transport – from 25,000-TEU container ships, via planning for micro hubs, to the final lap with e-cargo bikes. ■



The ITS World Congress offers a marvelous platform there for presenting Hamburg as the Gateway to New Mobility."

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MOVING THE WORLD, TOGETHER.

Tomorrow's mobility in Hamburg already

The ITS World Congress in Hamburg's Messehallen and Congress Center commences on 11 October. Experts will be demonstrating and discussing how tomorrow's mobility will look.

ITS stands for Intelligent Transport Systems, known in German as IVS – intelligenten Verkehrssystemen. This year's world congress will focus on mobility for both people and goods. Exhibitors will demonstrate how sustained, ecologically compatible transport systems could look. In addition, visitors will be able to enjoy numerous fascinating lectures and panel discussions. Ertico as the organizers have joined their partners in preparing many practical excursions, so that the host of applications here will not remain fixated at a theoretical level. Participants will enjoy the opportunity to experience tomorrow's mobility.

The keynote topics of the World Congress are arranged in six interlinked areas. One of these is automated and networked driving. In this area, exhibitors demonstrate how far the technology has already progressed. One fine example is the HEAT – Hamburg Electric Autonomous Transportation – project. This consists of a minibus, autonomously doing its rounds in Hafen-City – see page 10. Logistics-versed visitors will find the sections 'Freight's journey from the port to consumers', 'Intelligent infrastructure' and 'New services – New technologies' still more intriguing. Here you can experience how an automated container terminal functions and how freight travels across the terminal with automated moving trucks. Immediately after that, several projects demonstrate how traffic can be better regulated with intelligent control. Anybody not wishing to stay on the road can witness the latest solutions for drone transport. Many of these solutions can be seen at Gateway Hamburg on the ground floor of Hall B4, stand 230. It's from there too that one accesses the Logistics Experience Tour, enabling visitors to experience many of the projects live.

Nor is personal mobility neglected at the Congress. Under the headings 'Mobility on Demand' and 'Mobility as a Service', solutions are introduced that show how optimally to reach a destination using a carrier mix. Here the sixth keynote topic then features with ideas for cities and their inhabitants. Sustained and energy-efficient mobility solutions are presented here that have already been implemented in Hamburg.

What the Congress costs

Should they wish to participate in individual events, the exhibition, and demonstrations, then until 30 September delegates and speakers pay 1,380 euros for the whole duration. Afterwards, the total charge will be 1,580 euros. Students pay only 200 euros. Anybody wishing to attend for only one day pays 830 euros until 30 September, thereafter 930 euros. Here one tariff applies for everything. The Visitor's Pass for 100 and 125 euros, respectively, enables holders to attend the Opening or Closing Ceremony. In addition, they may visit the exhibition from Tuesday to Friday and attend demonstrations.

TOGETHER FOR THE WORLD OF LOGISTICS IN THE NORTH: GATEWAY HAMBURG

Apart from its broad range of partners, the joint stand GATEWAY HAMBURG is also convincing for its open stand design and an exciting journey covering the world of ITS. Logistics Initiative Hamburg, HHLA – Hamburger Hafen und Logistik, Hamburg Port Authority and Port of Hamburg Marketing have lined up to present Hamburg's exciting ITS milieu. Use this unique access to the global ITS community to build up relations and form new contacts.

OPENING TIMES:

Sunday, 10.10.2021:

Registration from 14:00

Monday 11.10. to Thursday 14.10.:

Trade fair – Messehallen: 08:30 – 19:00

Lectures and presentations:

07:30 – 08:30: Breakfast session

07:30 – 19:00: Registration and cloakroom

08:00 – 19:00: Speakers' and press rooms open

09:00 – 18:30: Lectures and presentations

Friday, 15.10. 2021

Closing ceremony: 12 noon

End of ITS World Congress: 13:00

What to expect

Experience the future of smart mobility
in motion for five days in October 2021



15,000
visitors



3,500
international
delegates



250
projects and
showcases



400
exhibitors



30,000
sqm exhibition
floor



200+
programme
sessions



100+
journalists
from trade
business and
news media



100+
countries



50+
startups

Standards for an optimized supply chain

Where digitalization is concerned, for a long time now container shipping has been no laggard. No way! Nils Kahn, CEO of MSC Germany, explains the commitment in the field and which tools his shipping line has available for its customers.

PoHM: We are living in the age of digitalization, but apparently in shipping, there's a lack of progress. What's behind that?

Nils Kahn: This is becoming less and less the case. Certainly we are a latecomer compared to other industries, and I'm speaking for shipping in its entirety. However, the Digital Container Shipping Association – DCSA was founded in 2017, with the aim of concentrating on promoting standardization, digitalization and inter-operability in container shipping.

What does that actually mean?

Put simply, it's about terminology being defined differently in various ports. We aim to standardize it. Let's take 'Arrival', say, as an example. This can just as easily mean arrival at the pilot station, as at the berth. The DCSA has defined five ship arrival phases with 50 precise timestamps. This means that when transmitting data, you can avoid someone assuming that a ship is already at the terminal, when in reality it has just taken the pilot. Several hours may well intervene.

Which targets is the DCSA still working on?

We want to establish what we know as the Just-in-Time Port Call programme for everyone involved. Today, it may well be – but it's not the case for Hamburg – that a vessel is approaching a port, but on arrival realizes that its berth is still occupied: Delays in clearance are pre-programmed. If this information is recognized in good time, the captain can automatically receive a message on the bridge via JIT Port Call to steam slower. We are working intensively to get all those on board, who need to be involved. Decisive is that almost all leading container shipping lines are supporting this project.

MSC shipping has installed the 'myMSC' eBusiness Platform. What's that all about?

'myMSC.com' is for all of our customers, meaning everyone involved in the supply chain that we work with, including truckers and forwarders. All those who are registered can enter their cargo shipment parameters. Within seconds 'myMSC' calculates not only the price, but also provides a real-time overview of order history and offers. Moreover, via this platform, all draft Bills of Lading can be checked and directly edited by the user. The tool is available both online and via the myMSC app.

What other benefits do the customers have?

They can check ship sailing schedules, place and process orders, or track their shipment. This is real progress compared to the past, when everything was done by phone or e-mail, costing our staff a lot of time. The eBill of Lading has replaced the traditional original Bill of Lading. Nothing is lost any longer: Everything is clearly arranged and stored in one place.

That almost sounds as if digitalization is making the whole business more impersonal. Is that right?

We have absolutely no intention of withdrawing from our local proximity to customers. Just the opposite. For us it is really important to maintain our inter-personal relationships. And that is working too, since through our digital front end we now have much more time to be with our customers personally on-the-spot, discussing absolutely different things.

You also offer your customers real-time container tracking. Why is it important to constantly know where the cargo is located?

When required we, as a shipping line, equip our containers with smart devices, so that customers can track where their shipment is in real-time. These devices transmit a geo-signal, as soon as a smart container leaves its prescribed radius. With this the customer knows that a delay is occurring on voyage. The smart devices also register when doors are opened. If this occurs in an area where the doors should be closed, this points either to possible damage or even theft.

Do smart containers have advantages during the corona pandemic too?

Absolutely, for example,



When required we equip our containers with smart devices, so that customers can track where their shipment is in real-time.



we have a customer, who needs assembly fitters for his cargo in the country of destination. They have to assemble elements from the various containers into a complete plant on-the-spot. Allowing for time in quarantine, the assembly team need to arrive at the consignee's location together with the cargo. So, the customer needs to know where his shipment is, avoiding cost for containers being positioned too soon.

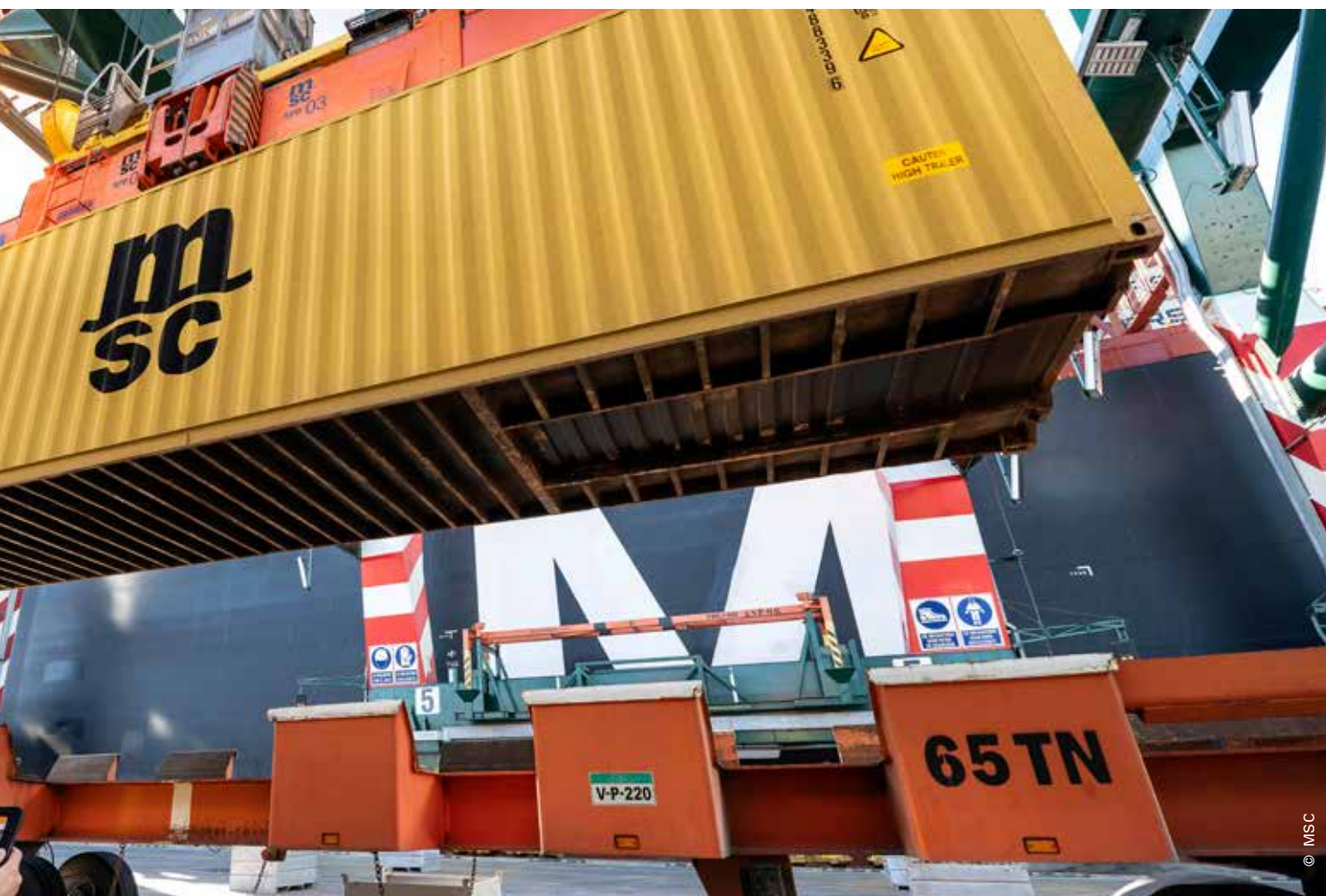
What has digitalization to do with sustainable mobility?

For the whole industry, it is DCSA's goals that will lead to shipments being optimally handled and cleared. The JIT Port Call mentioned above, actually has a double impact: With reduced speed, the vessel saves fuel and, at the same time, considerably reduces emissions. ■

Nicole de Jong

Facts and figures

Since 2010, Nils Kahn has served MSC Germany Group. From 2019, in addition to Germany, he has also been responsible for the business in Austria, the Czech Republic and Slovakia. In these four countries alone, MSC Mediterranean Shipping Company, with its headquarters in Geneva, has 12 offices. The company is active throughout the world in the shipping and logistics sector, operating 570 vessels and carrying 21.5 million TEU. It is represented by more than 100,000 staff in 155 countries.



Protection against digital intruders

Growing digitalization produces advantages but makes appropriate protection against cyber-attacks essential. Siemens Mobility deploys its expertise on products, solutions and services to effectively protect complex traffic systems and their data.

For Siemens Mobility, digitalization is unthinkable without cyber security. For a long time, therefore, there has been a focus on holistic cyber-security schemes for rail traffic. With growing digitalization of signalling, control centres and trains, namely, the threat of hacker attacks increases.

In the wake of digitalization, control and communications systems in the transport sector are shifting to open standards such as Ethernet, IP and wide-

spread radio technologies. In the process, more use is being made of normal market components. This trend demands secure design and thorough measures for increased cyber security. In its current study, ENISA – the European Union Agency for Cybersecurity – is throwing light on European rail systems and making recommendations for measures and the next steps.

Growing digitalization is enabling processes to be optimized, efficiency boosted, energy consumption reduced and safety heightened. Yet it also necessitates appropriate protection against cyber-attacks. In other words: “Hackers have also targeted critical structures. We must stop systems being hacked, polluted with malware, or being manipulated,” says Christian Paulsen, Product and Solution Security Officer for Siemens Mobility.

In passenger traffic, the foremost aim must be to protect human life, in freight traffic that also applies to the engine driver. Yet the goal must also be to protect infrastructure and equipment, avoid environmental damage, preserve the supply chain and keep to a minimum economic damage to freight companies. Delays can also lead to shippers being unable to meet their delivery obligations. A reputation can be harmed, with the company threatened by penalties.

At the latest, since the growing frequency of cases of blackmailer software, the topic of cybersecurity

has concerned corporations and legislators world-wide. Signalling, control centres and the trains themselves need to be equipped against attacks. Yet what does good security consist of? “Our job is to protect these systems with appropriate security technologies such as encoding firewalls or systems for recognizing unauthorized intruders,” explains Paulsen. The cybersecurity experts at Siemens Mobility act on the basis of a risk-based approach with the aim of achieving adequate security at acceptable cost. “To discover how far protection goals can be put at risk, we examine the individual sub-systems such as equipment parts, components, hardware and software from external suppliers or open-source applications,” he adds.

Siemens Mobility acts on the basis of such international standards as IEC62443, which was framed for industrial automation systems. The rail industry has further developed it to secure rail systems. “Just released, the new technical specification is named TS50701,” says Paulsen. This covers additional requirements for rail systems that arise from threats and the related gaps in security. The aim of this technical specification is to ensure that what are known as cybersecurity properties are met.

This means that rail as a system is considered holistically, but its sub-systems are analysed for cybersecurity needs – a signalling system’s requirements differ from those of a radio system or the power supply. “In each case we deduce the risks and transform these into technical requirements,” he explains. Siemens Mobility has built up mechanisms that, if the worst comes to the worst, will rapidly intervene to maintain operations. That has also involved rapidly reacting to the problem and discovering the cause and further repercussions of an attack.

The topic of cloud security, however, also belongs in any holistic approach. “In the course of the convergence of IT systems with the OT – operation technology world, mainframe infrastructures are increasingly being replaced by cloud suppliers. Many companies do not want to build up in-house computing centres, or else operate or commission the service externally,” he adds. Here again, the computer must be appropriately protected against attacks. With adjustments, the approaches selected can be applied to these structures. ■

Nicole de Jong

“Hackers have also targeted critical structures. We must stop systems being hacked, polluted with malware, or being manipulated,”

Christian Paulsen

Siemens Mobility acts on the basis of such international standards as IEC62443, which was framed for industrial automation systems.



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The project team tests the robot in the dry dock, before it is deployed underwater.

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At your service: Robots for inspection of ship's hulls

Ships, especially their hulls, are vulnerable to damage. Harsh conditions, environmental impacts and wear can cause costly defects. Metal corrosion is one of the main causes. This emerges as fragile rust, corroding more and more metal. Unfortunately, that is frequently only recognized when the damage is already extremely serious. Visual checks and measurements are regularly conducted in drydock or by divers.

Funded by the EU, the BugWright2 project seeks to close the gap between the currently feasible and actually desired capabilities of ship inspection and service robots. A visual and acoustic multi-robot aerial and underwater inspection should suffice to detect patches of corrosion at an early stage and to clean the surface if required. On merchant ships, this can substantially reduce fuel consumption, also diminishing the need for anti-fouling coating of ship's hulls. A combination of the measurement capabilities of autonomous MAVs – micro air vehicles and small AUVs – autonomous underwater vehicles with teams of magnetic-wheel crawlers operating directly on the surface should permit implementation requiring minimal intervention by the user. Virtual reality technologies produce real-time displays of the detailed findings. BugWright's IGHT2 technology can easily be adapted to other structures comprising of metal plates. Apart from being used mainly for ship's hulls, it can also be used for storage tanks, for instance.

After the start of the project in January 2020 and with a planned working duration of 51 months, the project is currently still at Stage One, namely work on prototypes. The RoboPlanet crawler and Blueye's Pioneer are being devel-

oped on the basis of genuine robots in commercial use. Adaptations of the mechatronics, localization of the robot and the 2D map structure and of the autonomous navigation are being undertaken on the basis of special requirements. Drones from the University of the Balearics and IN-SA Lyon have so far undergone laboratory tests.

Project partner

Centre National de la Recherche Scientifique – Dream Lab, Centre Technique des industries mécanique, Universidade do Porto, Underwater Systems and Technology Laboratory, Universitat de les Illes Balears – Higher Polytechnic School, Institut National des Sciences Appliquées Lyon, Rheinisch-Westfälische Technische Hochschule Aachen, Universität Klagenfurt, Norges teknisk-naturvitenskapelige universitet, Universität Trier, World Maritime University, Lakeside Lab, RoboPlanet, Blueye Robotics, RINA, Glafcos Marine, Administracao dos portos do Douro e Leixoes, Arsenal do Alfeite, In Extensio Innovation Croissance, Trondheim Havn, Danaos Shipping Company, Star bulk shipmanagement

The BUGWRIGHT2 technology can be easily adapted to other structures composed of metal plates.

© RoboPlanet

demical, and the impossibility of organizing any new ones yet, delays have occurred. Nevertheless, the project is by no means at a standstill. Other partners are working on Stage Three, data visualization and user interface.

"We hope that the project will improve ship inspection and maintenance, but also reduce maritime repercussions on the environment," says Laura Monnier, project manager. Autonomous robotic inspection and maintenance aspires to produce a vital economic and ecological breakthrough in this sector.

This project is funded by the European Union's Horizon 2020 research & innovation program under Grant Agreement No. 871260. <https://ec.europa.eu/programmes/horizon2020/en>. ■

"We hope that the project will improve ship inspection and maintenance, but also reduce maritime repercussions on the environment."

Laura Monnier, project manager

Patricia Späth

Initial practical on-the-spot trials were due to be conducted in spring in Greece and Portugal, as well as Norway, and to continue this year. Yet with all planned journeys cancelled due to the pan-

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The battery-powered research vessel developed by Fraunhofer CML, with an automated underwater unit is 1.5 metres long and 1.20 metres wide. The prototype was tested on a lake as well as by simulation.

Automated underwater inspection of ships' hulls

Together with partners from industry and science, Fraunhofer CML has developed 'Robotic Vessels as a Service' in a research project. Deploying cameras, sensors and sonar, the automated vehicles are set to survey areas around ships and gather environmental data such as water depth.

'Robotic Vessels as a Service or RoboVaaS' is the name of a project, headed by CML – the Fraunhofer Center for Maritime Logistics and Services. This aims to develop small, automated units that can, for example, carry out underwater inspections as a service. Using cameras, sensors and sonar, the automated vehicles are designed to survey ships' hulls, discover damage to the hull or propeller, and/or ascertain how much fouling is present. "Until now this has necessitated laying up in a dry dock, or time and cost intensive use of divers," states Nico Cantopop, academic assistant in the Sea Traffic and Nautical Solutions team at CML.

RoboVaaS could also be used for inspecting bulkheads, to determine whether there is damage or cracking. "With our solution, it is also feasible to record environmental data, check if the water is deep enough, or whether there is an underwater obstacle that has to be removed," he explains. The Anti-Grounding Case ser-

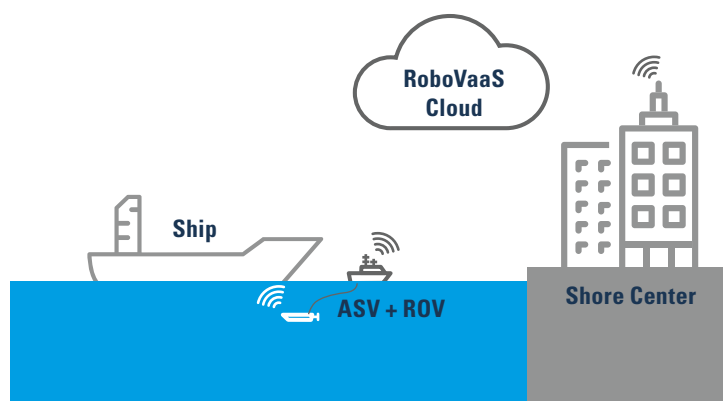
vice, developed in CML's simulation studio, provides automated inspection of areas around the vessel. The relevant data is then sent to the bridge in real-time, so that the captain finds out in which corridor he can sail without danger. "We have invited some nautical officers to our studio, who have successfully tested the service and were delighted with the new technology," recounts the scientist.

There is also a clear focus on data capture in this project. "Together with our partners, we have developed a solution to facilitate communication underwater," declares a smiling Zantopp. During the project those involved have developed a user interface to assist companies booking these services. Those who want to use RoboVaaS later, can register via the platform and input their service requirements. If they book the underwater inspection service, for example, then Fraunhofer CML will deploy the boat they have developed, along with the autonomous underwater unit, to carry out the

service required. The operating software for both the Unmanned Aerial Vehicle – UAV and Remotely Operated Underwater Vehicle – ROV, as well as web-based control software, were programmed at CML. “In the project we have built a battery-powered research vessel, 1.5 metres long and 1.2 metres wide, integrated the underwater vehicle in the system, and thoroughly tested the services developed – on a nearby lake and by simulation,” adds Zantopp.

The project partners have completed most of the work on RoboVaas. Due to the Corona pandemic, however, the project has been extended to the end of November 2021. The final demonstration will take place in Hamburg during the ITS World Congress from 11 to 15 October 2021. Among other things, there will be an investigation into how the research results can be applied. The project partners can well imagine implementing an offer during the next few years for the maritime stakeholders. Currently, the existing prototype of the research vessel is undergoing further development. “It’s a kind of platform that can be used in modular form to play out various scenarios,” explains Zantopp. At a slightly later stage, the automated vehicle will be used as an interface for flying drones, extending research on automated sailing on water. ■

Nicole de Jong



The project partners

Fraunhofer Center for Maritime Logistics and Services – CML Germany (Project Manager), Hamburg Port Authority, TUHH smartPORT, Kraken Robotik, University of Padua, SIGNET (Italy), SonarSim, University of Limerick, CRIS (Ireland). RoboVaaS is being supported with a total of 1.5 million euros in the ‘MarTERA – Maritime and Marine Technologies for a new ERA’ programme under the Horizon 2020 umbrella, an EU-sponsored programme for research and innovation.



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The clean port that precedes cleaner seas

An autonomous robotic system is set to collect waste from the seafloor in future. The Port of Hamburg is also serving the EU project SeaClear as a test bed.

It has for long been no secret that our oceans are heavily polluted. Between 26 and 66 million tons of litter lie on the seabed. So far, no solutions have existed for taking steps against the problem. In tourist are-

robot, which is equipped with a grab. This robot finds its way to the relevant spot, where it collects the rubbish.

For testing the robot system, just recently a digital

twin of Hamburg's petroleum port was created, to serve as a testbed for these underwater robots. Despite the travel restrictions caused by the pandemic, initial field trials have already been conducted. Apart from technical trials, the tests in Hamburg primarily assess the boundaries of legal parameters affecting autonomous systems. These will prove crucial for the subsequent utilization of SeaClear. Jens Meier, CEO of HPA, is another believer in the project: "For us, this here consists of a win-win situation: On the one hand, with it we contribute to cleansing the oceans of waste; on the other, here in Hamburg we gain essential experience of deploying autonomous systems."



© SeaClear Project

The autonomous vessel operates a reconnaissance plus a grab robot that intelligently recognize and collect underwater rubbish. A drone provides back-up for this combination.

as, divers are often deployed to remove litter. This is not just very costly, but also dangerous.

Along with seven more partners, Hamburg Port Authority – HPA is consequently working on an automated approach. The 'SeaClear' autonomous robot should in future enable the seafloor to be cleared of litter piece by piece. SeaClear consists of an autonomous vessel plus two underwater robots. The exploration robot scans the seafloor with a camera and a sonar appliance and produces a map for localizing litter finds. Advanced algorithms enable the robot to distinguish not only waste from living marine organisms, but fish from seaweed. As soon as this robot has detected pollution, it sends the data to the second underwater

The project is being funded under the European Union's Horizon 2020 program and should be completed by 2023. So some time will elapse before SeaClear leaves the port and really cleanses the sea. ■
Lea Mentzel

To the Youtube Video:



SeaClear can ...

- Distinguish rubbish in the sea from marine life by means of underwater sensors
- Map its surroundings
- Collect larger and smaller pieces of litter under water
- Cooperatively direct the team of robots



HHLA Sky's industrial drones are robust, lightweight and equipped with every available safety technology.

High over the port

Drone technology supplier HHLA Sky, a subsidiary of Hamburger Hafen und Logistik AG -HHLA, was awarded the German Innovation Prize in the Start-Up category this summer. Its experts have developed a unique, industrially applicable system capable of simultaneously monitoring and guiding over 100 drones. HHLA has had drones in operation ever since 2017.

HHLA Sky's drone and control point technology enables users to control more than 100 autonomous drones in parallel operation over the world from one control centre, e.g. for inspection, monitoring for factory protection, or intra-logistics in the form of transporting documents and small parts. For its parent, HHLA Sky drones operate at the terminals in the Port of Hamburg, collecting data on the state of the terminal surface, or for inspecting cranes, container gantry cranes and plant. HHLA Sky forms part of the digitalization strategy of the logistics group, which sees digitalization in the port as indispensable.

HHLA Sky offers its clients end-to-end solutions. Among these are specially developed, high-performance industrial drones, consultancy packages on deploying drones, authorization procedures and training courses. HHLA also offers a complete drone supervision & control system, unique worldwide, which can control and monitor drones beyond any visual line of sight.

HHLA Sky's drones for industry are extremely robust, very light and equipped with all available safety technology. In principle, for instance, they can provide everything from catastrophe and operational protection for airports and industrial plants, via environmental monitoring, to surveys. Yet they are also conceivable for optimizing internal transport chains, being able to transport small parts weighing up to the three kilograms.

HHLA Sky aims to make drone flights safe and efficient.

Automation of worldwide industrial operation of large drones will facilitate this. HHLA Sky's CEO Lothar Müller comments: "You can do a great deal with drones, far more, perhaps, than we can imagine today. Drones will also gain acceptance wherever a genuine benefit is apparent."

The company is also bringing its expertise to bear on re-

search projects. One example is 'UDVeo' – Efficiently Organized Urban Drone Traffic.

This scheme is backed by Helmut Schmidt University in Hamburg and the BMVI – Federal Ministry of Transport and Digital Infrastructure. Taking the Hamburg Metropolitan Region as one example,

the aim is to develop an IT-based control system for unmanned flying that embraces the elements of reliability, flight planning, supervision and control. The end product is a legally/technically integrated model scheme for software-run drone traffic management that also covers integration of drone traffic with other forms of traffic, especially traditional aviation. Even in urban areas, that should enable drones to be operated safely. ■



Using the Hamburg metropolitan region as an example, an IT-based guidance system for unmanned aviation is to be developed.

Catharina Pape

Write to me at: facebook.com/hafenhamburg

PETER PICKHUBEN'S PINBOARD



By the way

... you can also find my favourite port on social media. Take a look:

-  HAFENHAMBURG
-  PORTOFHAMBURG
-  PORTOFHAMBURG
-  PORT OF HAMBURG

FernSAMS

The 'FernSAMS – Remote controlled tugs in arrival & departure manoeuvres of large vessels' group project – should make deploying tugs more efficient and safer. Increased efficiency and lower building and operating costs, as well as reduced manpower costs, through standardized automated ship's assistance, increase competitiveness. When tugs are no longer built for a human crew, their weight is lower, making them more agile and reducing energy consumption. In addition, there is a minimized risk of accidents for crew members, since with remote-controlled tugs critical manoeuvres and operations, e.g. towing lines, no longer have to be manually handed over. A reliable data link from another tug is required so that the tugs can operate as a team. No automation is planned for this technology.

ANITA DUSS Project, Ulm

After the successful 'Hamburg Truck Pilot' Project, the next level of complexity for the digital future is being pursued in Ulm with the 'ANITA – Automated Innovation in Terminal Processes' project. At the DB Intermodal Services container depot and the DUSS Terminal, fully automated trucks are set to operate autonomously in transporting shipments. This should make it possible to structure intermodal transport more efficiently and flexibly. The project that started around a year ago and involves MAN Truck & Bus, Deutsche Bahn – German Rail, Götting and Fresenius University of Applied Sciences is sponsored by the Federal Ministry for Economics and Energy. For the implementation, initially the infrastructure has to be captured and digitally mapped, to enable communication between trucks and the terminal. The observations and analyses needed for the algorithm have been completed and the first goal achieved. At the next stage the map created will be transferred into software for the mission planning.

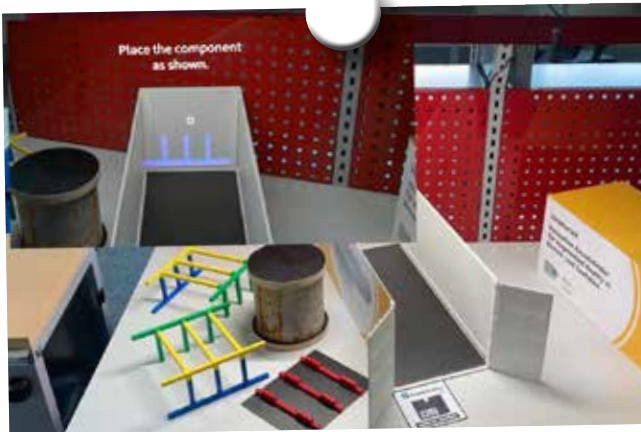


© MAN Truck & Bus SE

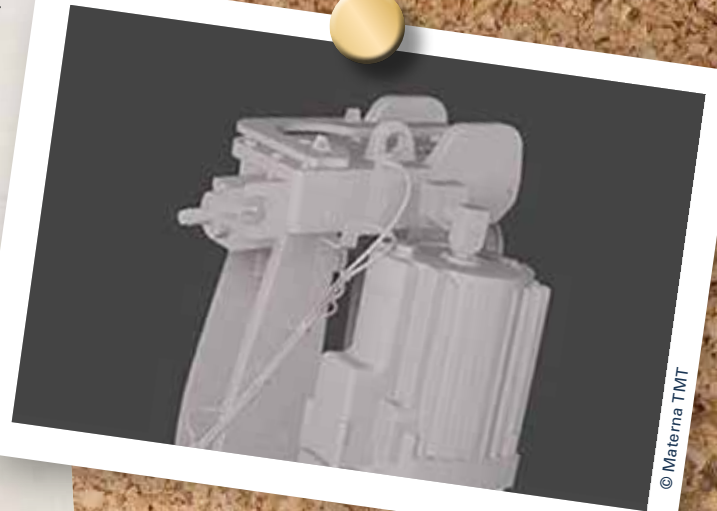


InnoPortAR

The 'InnoPortAR – Innovative Applications for Augmented Reality (AR) in Inland Ports and Seaports' project is set to extend working processes in ports with a computer-supported 'perception of reality' component. With this support, work should be simplified and optimized. By wearing data glasses, the operative should, for example, have more information available when handling a container. The research focus here is on how the worker can be supported by applying AR to work processes. The many, varied applications should demonstrate their true range. The aim of the technology is to improve the commercial viability and competitiveness of multimodal terminals in inland ports and seaports.



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IRiS

In ports worldwide, unpacking containers is still often carried out manually. 'IRiS – Interactive Robotics System for Unpacking Sea Containers' is a project aiming to reduce strenuous manual labour when stripping containers. The semi-automated unpacking system, based on a digital twin, facilitates intervention in the work process at any time, carrying out and supporting adjustments in various situations. The robot takes over the work steps, capturing the packages by using a camera and then developing a final unpacking strategy. The system positions itself, aligning the grab on the underside of a row, grabs a row of packages with the vacuum gripper, pulls it out, puts it down and moves it onto the integrated conveyancing technology. When the vacuum gripper has nothing more to transport, the process can be started again. The theoretical unpacking capacity is dependent on the size of packages.



Volocopter

Now that air taxis are already flying emission-free, Volocopter has developed an automated electric-powered drone. VoloDrone is intended to be used in various fields. It can carry up to 200 kgs and has a range of up to 40 kilometres, making it suitable for a range of applications. Weighing 600 kgs, the drone is also capable of vertical take-off and landing. Where different modes of transport fail, when trying to reach poorly or only slowly reachable destinations, this would be a practical logistics application for a heavy-lift drone. Apart from logistics applications, it can also be used without difficulty in agriculture and forestry, construction and maintenance, as well as emergency relief and humanitarian assistance in difficult terrain. Together with its investor DB Schenker, an operating plan is being developed for the VoloDrone.



2020 Annual Report

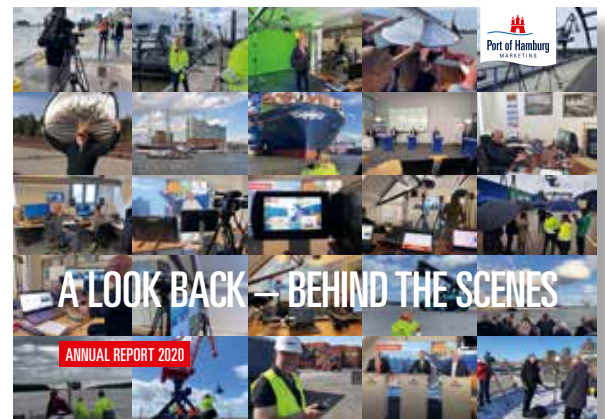
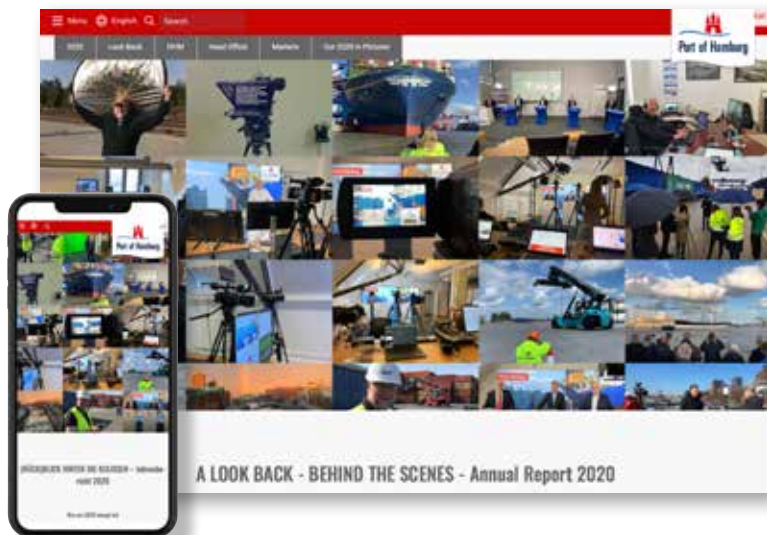
“A look back – behind the scenes”

In 2020 everything was different. We aimed to demonstrate that with our recent HHM Annual Report. With our look back – behind the scenes, we show Port of Hamburg Marketing's team from a personal angle.

Who is really behind the services for our members? How did we at Port of Hamburg Marketing find last year? How did the pandemic affect HHM activities worldwide? We simply let our colleagues report, whether on cancelled Asia trips, home-office working, or creating HHM's own film studio. Whereas transferring activities into digital space proved a challenge for many, HHM grasped the opportunity, developing novel formats for exchanging and distributing information. Enabling HHM to maintain contact with the market and network worldwide from home offices, social media were to the fore

there. With its new 'PORTtalk' and 'PORTmovie' formats, HHM gave its members a voice just when they were unable to meet customers and partners at events as usual. In addition, the 'PORTtalk live' series of online events offers monthly digital discussions on port and logistics topics. Nor did 2020 prove at all boring for HHM's project team. Despite more difficult conditions, they were able to support and complete national and international projects, and land new ones. Our market researchers also had their hands full – forecasts being all but impossible. Along with its members, HHM mastered last year's challenges, so filling the 2020 Annual Report was actually really simple.

Besides the print version the 2020 Annual Report is also available on the Port of Hamburg website. Personal accounts, additional data and pages, as well as a photo/video gallery, can be found there. ■



Imprint

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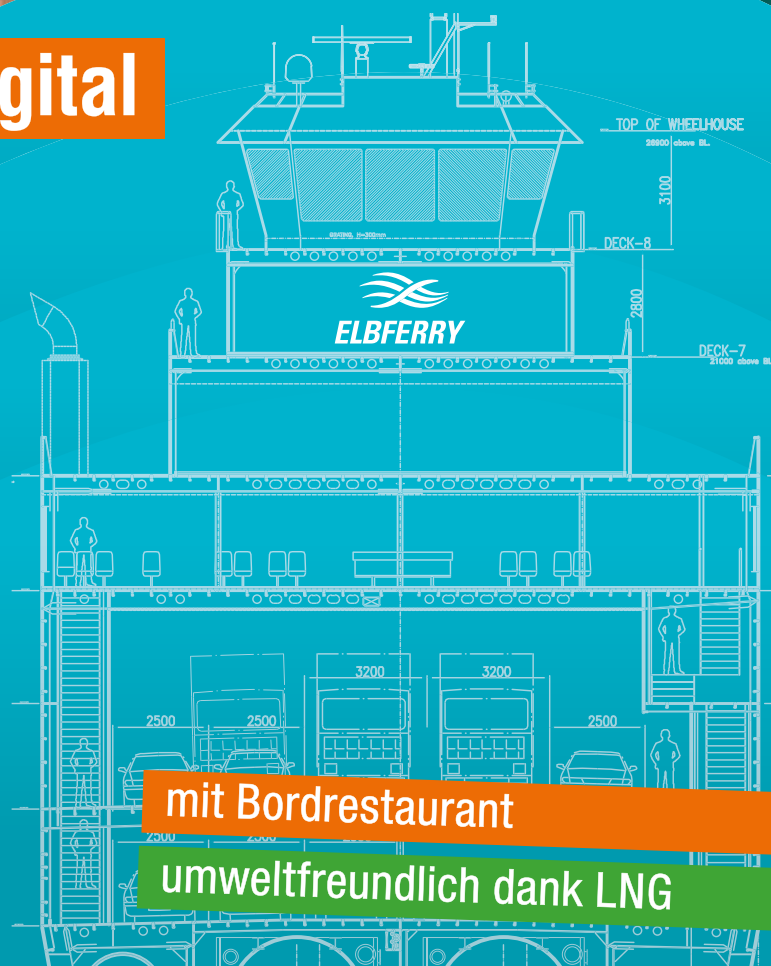
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