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DIGITAL DECADE

PORT OF HAMBURG MAGAZINE

Port of Hamburg

WHICH DIGITAL PROJECTS ARE CURRENTLY BEING PURSUED IN THE PORT OF HAMBURG? HOW ARE TRADITIONAL COMPANIES FARING COMPARED TO START-UPS?


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Dear Readers,

Digitalization and artificial intelligence are among today's mega-trends. Yet digitalization still sounds like something that mankind has still to face. We are already in the middle of digitalization and it has entered many fields of life. To mention just a few examples, we keep our smartphones constantly handy, read and write e-mails, send texts and use WhatsApp, buy a lot online, replace calls on officials by completing online forms, share cars, and use banking apps.

How intensively each of us arranges our life digitally differs from one individual to another. From the smart household to the recent trend towards 'less is more' – or digital downshifting – everything is conceivable. Yet the latter cannot be expected in industry. The aim there must not be simply to join in the transformation, but to make sensible use of it. As this issue of Port of Hamburg Magazine shows, that applies to major companies, along with medium-sized and smaller ones. Whether ocean or inland waterway shipping, rail or trucking – the subject applies to all modes of transport.

Which digital projects are currently being pursued in the Port of Hamburg? How are traditional companies faring compared to start-ups? And how is Hamburg preparing for next year's World Congress for Intelligent Traffic Systems – ITS?

In addition, we asked politicians and scientists about that what's happening just now on digitalization.

We wish you a stimulating read

Sincerely yours, Ingo Egloff and Axel Mattern
Joint CEO's Port of Hamburg Marketing

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SCHRAMM Ports & Logistics GmbH
Elbehafen, 25541 Brunsbüttel

Telefon: +49 (0) 4852 884-0
Fax: +49 (0) 4852 884-26
E-Mail: info-bp@schrammgroup.de

www.schrammgroup.de

Joint effort to digitalize ports

Mecklenburg-Western Pomerania, Lower Saxony, Schleswig-Holstein, Bremen and Hamburg aim to pull together to expedite digitalization of their ports. In this interview, Christian Pegel, State Minister for Energy, Infrastructure and Digitalization in Mecklenburg-Western Pomerania, explains what agreements they have already reached.

Port of Hamburg Magazine: Minister Pegel, the transport ministers of the five North German states met in November last year to discuss the subject of digitalization. What was discussed there?

Pegel: The Parliamentary Under-Secretary actually attended the conference on my behalf.

In the North German states, we want, and need to discover a joint digitalization strategy in our main fields of energy and transport. That must apply to our networks and operations. In our ports, we are all somewhat jealous when we look at the development under way in Hamburg. Yet we are now running projects in our smaller ports as well. Wismar has gained acceptance for a far-reaching digitalization strategy. That's not always very simple, because anxiety about jobs rapidly surfaces. We accepted that and spoke with our workers. Together, we established that jobs would be underpinned, and efficiency boosted at the same time. It's simpler to try out and implement this in smaller ports than to scale it up in larger units.

You mentioned digitalization in the transport field. The opportunity exists of applying digitalization to mutually improve the coordination of ships, trains and trucks as carriers. With its peak traffic situations and vast volumes of freight, this matters in Hamburg. Is it also important for you in Mecklenburg-Western Pomerania?

Certainly, volumes may be lower with us, but that nevertheless plays a big part for forwarders and shipping companies. Last year, Rostock installed a relevant system with a major ferry company in the Sweden trade. In Neustrelitz, we have a DLR research facility that specializes in collecting and evaluating ships' data. Shipowners and forwarders can draw the appropriate conclusions for traffic control from this data.

CHRISTIAN PEGEL, STATE MINISTER OF ENERGY, INFRASTRUCTURE AND DIGITALIZATION OF THE STATE OF MECKLENBURG-VORPOMMERN

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Let's look at rail traffic. That plays an important role as a carrier in all German ports. As part of its climate protection programme, the German government has announced major investments in the rail sector. At the same time, conversion of supra-regional passenger traffic to a half-hour frequency has been announced. That arouses fears of delays for freight traffic. With digital solutions, wouldn't improved utilization of infrastructure be possible?

That's certainly a possibility. German Rail is giving extensive consideration to arranging the system so that considerably more trains can be handled on block sections of mainline routes by using a combination of blockchain and digitalization. I assume that these are processes that will take longer than introducing the half-hour frequency on the Berlin–Hamburg route, which we welcome. If digitalization does not provide relief until a later stage, regional trains as well as freight traffic will initially be restricted. Therefore, we must invest in infrastructure by building track to cater for growing freight traffic.

Do you really mean that digitalization is slower than infrastructure expansion?

In the light of the high standards of safety that we have for rail traffic in Germany, implementing something of this kind will require considerable effort. Given the complexity of the processes, we shall initially try out certain innovations on branch lines. We also need to observe European standards. We need both in parallel: infrastructure expansion and digitalization.

Every company in the logistics sector is of itself relatively far advanced with digitalization. Still missing, however, are platform solutions for bundling data and controlling freight flows. Companies have misgivings about making their data available to a platform. Was anything said about this in the ministerial round?

We discussed the problems involved at a meeting in Bremen last year between port ministers and business representatives. The politicians were more pressing and demanding on the subject than the businessmen. We need platforms of this kind. We must push on with this topic at the next ministerial conference.

With the German economy structured as it is, and with the share of SMEs – small and medium-sized enterprises – at 70 percent, it is essential to recognize this. In the Port of Hamburg, for example, we find that it is sometimes difficult to persuade medium-sized firms to organize shipments by rail, although that is attractive for environmental policy reasons.

A single platform, combining rail, shipping, trucking and inland waterway craft, makes sense and pays off for the SMEs. Apart from the environmental angle that favours rail, driver shortages also play a part. Forwarders are reporting the problem of finding long-distance drivers. One solution would be to use rail for the long haul and trucking only for the 'last mile'.

A rail-based system can more easily be operated autonomously, i.e. without drivers, than road traffic. That too, especially if suitable safety systems have been installed. And freight traffic is predestined for this, in that no passengers would be affected by it. It's different with passenger transport.

Another topic is 5G technology, which offers completely different opportunities for digitally running real-time processes. How do you see this technology?
One comment first of all: Taking the most recent auction of 5G licences and seeing the sums that concerns have paid for these, and also remembering our experience with 4G, then I have my doubts whether we shall have guaranteed supply everywhere that it is needed. The Federal network agency needs to change its way of looking at this, which focuses on the total number of households. With us, that would mean 30 percent of the land area. Looking at 5G usage in traffic, agriculture and tourism, then just considering households is of no use.

To take up the topic of guaranteed supply: We have the problem that there are areas in the Elbe estuary that don't even have 3G. Pilots have state-of-the-art equipment and programs. Yet they cannot use their tablets because there's no reception there. They are 'flying blind' part of the way, or have to make do with VHF voice communication. If security, among other aspects, is affected, would it not be appropriate for the state to oblige companies to ensure a basic supply?
We don't have the problem with pilots, although we are aware of the situation in the Elbe estuary. When the auction was coming up last year, we submitted a motion in the Upper House. This made clear that we regard supply of frequencies as a one-hundred-percent public service, with supply throughout the country needing to be guaranteed. We proposed that companies must provide proof that they possess sufficient funds to ensure blanket coverage, and then they receive frequencies free of charge. Unfortunately we were unable to prevail, but supply must be ensured. We need to work on that.
The example of the pilots, especially, shows that a free market solution is not viable, because that never pays. Yet it is essential for security reasons. We need to finds solutions for this. ■

Digitalization in maritime logistics

Functioning logistics chains form the basis of our global economy, which is dependent on exports and imports and notable for division of labour, plus the resulting prosperity.

The challenges here for logistics are tremendous. Customers for logistics services expect rapid, low-cost and reliable delivery of goods that are ordered at ever briefer notice. Nor are such services supplied by individual players, but by the most seamless possible intermeshing of numerous forwarders, transport, cargo handling and warehousing suppliers across many national borders and continents. Our society also increasingly expects conservation of natural resources and emissions caused by logistics to be minimized, and that along with rising demands on delivery time and quality.

To be able to cater for these requirements, logistics will have to rely more heavily on the intensive use of new technologies – with particular emphasis on digitalization. Digital technologies may have been in use for years in logistics chains, for example to facilitate efficient communication between partners and to handle transactions efficiently. Yet the latest technology options in digitalization now offer far more extensive opportunities. Among these, for example, are digital networking between different logistics partners, 'internet-of-things' applications in logistics chains and systems, as well as the use of artificial intelligence for analyses and optimization of decisions.

To be able to cater for these requirements, logistics will have to rely more heavily on the intensive use of new technologies – with particular emphasis on digitalization.

NETWORKING: FROM PROPRIETARY PLATFORMS TO PUBLIC NETWORKS

For the essential digital networking of players in maritime logistics, commercially operated, proprietary – or supplier-linked – platforms are used as a rule. Access to these is mostly complicated, restricted to the individual platform, and requires participants to feed in data to the platforms. In addition, the providers of such platforms regulate the range of functions and who can use them. To incorporate the players in port-centred logistics chains to the greatest possible extent, work is in progress on developing data networks free of discrimination. The aim here is to create open digital infrastructures that store as little data as possible centrally, with data ownership remaining with the player concerned. Here the functional scope is determined by the players involved, with their innovative power being used to enable them to incorporate new services and applications in a secure process. One example of an innovative network of this kind is currently being developed as part of IHATEC's MISSION project.

INTERNET-OF-THINGS: TRANSPARENCY FOR OPTIMIZED OPERATION

Internet-of-Things technologies incorporate a vast range of identification, communication and sensor technologies enabling real-time localization, status recording and communication between objects in logistics systems such as vehicles, equipment and freight units, and via the internet with all sorts of players. Freight, vehicle and equipment moves, as well as the status of goods, premises and technical systems can be detected, communicated and made available for assessments and decisions. Numerous opportunities for optimizing logistics flows can therefore be exploited.

In addition, these technologies also offer potential for optimizing operational processes. This also applies, and especially so, to boosting environmental compatibility. One example is the dashPORT – Port Energy Management Dashboard – project backed as an element of IHATEC. This involved development of a digital master display for analysis and control of energy flows in ports and terminals. Targeted use of sensors precisely records energy consumption by various users in the port. Then it digitally juxtapos-

DIGITALIZATION IS PRODUCING CONSIDERABLE QUANTITIES OF DATA WHOSE VALUE IS INCREASINGLY BEING RECOGNIZED AND USED

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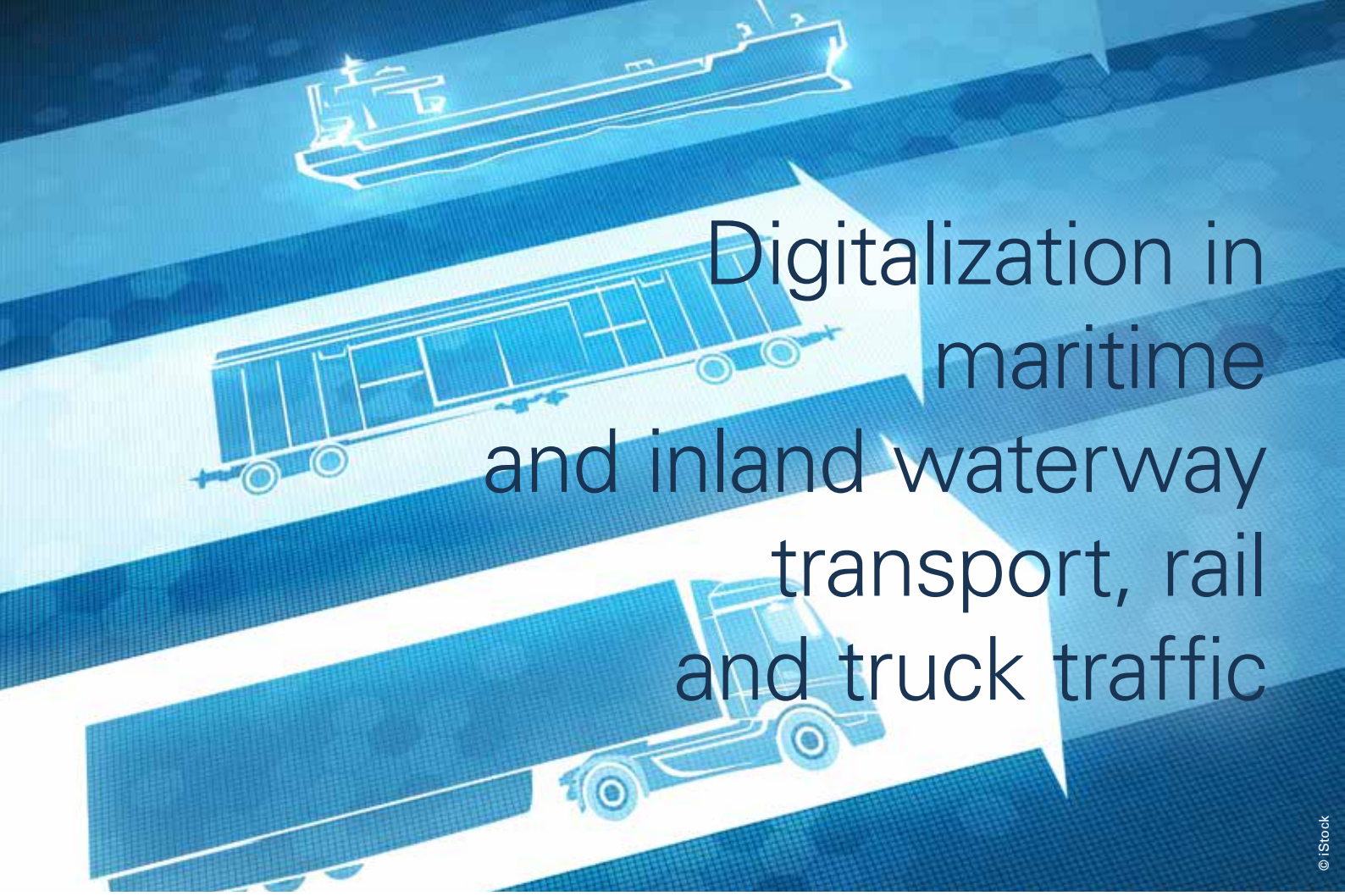
es these with the port processes running in parallel. That enables previously undetected potential for optimizing energy to be identified and implemented with appropriate operational measures. Along with the obvious commercial advantages, this primarily makes an important contribution towards conserving resources.

ARTIFICIAL INTELLIGENCE: ANALYSES AND IMPROVED DECISION-MAKING

The process of digitalization creates considerable quantities of data. The value of these is increasingly being recognized and utilized. Such data enable correlations and patterns in systems and processes to be identified by means of artificial intelligence, and support provided for logistics decision-making.

One example is image evaluation by means of artificial intelligence. One application of this is currently being processed in the IHATEC project COOKIE – see page 14.

A further example of the use of artificial intelligence is forecasting of truck arrival rates and waiting times at logistics nodal points such as empty box depots, packing stations or logistics centres. Based on past and calendar data, as well as knowhow born of experience, AI applications can be trained to be capable of reliably predicting the total number of truck arrivals, and their waiting times at logistics nodal points. ■



Digitalization in maritime and inland waterway transport, rail and truck traffic

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Action to boost inland waterway shipping in multimodal transport chains

Like other sectors, inland waterway shipping will be confronting the challenges of digitalization. Announced by the German Ministry of Transport in May 2019, the 'Masterplan Inland Waterway Shipping' features a special field of action with measures for the short, medium and long term.

As seen today, autonomously operating inland waterway craft may seem a vision for the future, especially on free-flowing waters with their special navigational requirements. So as not to fall behind other carriers, it is only right and proper that research work should be commenced in this direction and testing fields created for trials of additional potential for automation.

SHORT- AND MEDIUM-TERM AIMS

However, digitalization will provide new impulses and opportunities for optimization in inland waterway shipping on the short and medium term, too. The primary foundation for this is the improved data base. In their 'Masterplan', for example, the Federal authorities have agreed to guarantee complete AIS – Automatic Identification System – coverage for waterways in Network Categories A, B and C. In addition, electronic waterway charts for inland waterways are to be continuously improved and extended. Improved data on water depths for crews as well as long-term forecasts on these are equally urgently required.

Extreme low water in 2018 demonstrated the crucial importance of the best possible plannability for shipments during periods of low water to ensure supplies of raw materials for major German industrial centres along rivers. These important steps were therefore also included in the 'Plan of Action on Rhine Low Water' that was a reaction to low water in 2018.

DIGITALIZATION FOR GREATER SAFETY AND IMPROVED UTILIZATION

Digitalization is especially relevant where it improves traffic flow and the safety level for the carrier. The industry has long called for countrywide 24/7 operation of locks. This would substantially reduce waiting times and the formation of queues, as would implementation of slot management at locks. Digital lock bookings would facilitate efficient traffic handling and optimal utilization of lock chambers.

INFRASTRUCTURAL REQUIREMENTS

All the examples of opportunities to improve han-

dling of shipments by inland waterway craft should not obscure the fact that the basic infrastructural requirements will initially be met by rapid and systematic implementation of the waterway projects in the Federal Transport Infrastructure Plan – BVWP 2030. After all, an increased number of control centres will not solve the acute problem of obsolete, incident-prone locks, nor will improved data accessibility and transmission within the logistics chain do so. It is therefore essential to start by repairing the 'hardware', e.g., locks and weirs, optimizing fairways, and providing countrywide access to an effective 5G network along federal waterways. That would lay the foundation enabling digitalization to enhance the attractiveness and efficiency of this mode of transport. ■

Fabian Spieß, Federal Association of the German Inland Navigation e.V.

Click&Ride: Hinterland freight transport path in maximum of three minutes

The 'Click&Ride' web-app now enables rail freight operators to book paths for unscheduled trains with DB Netz in a trice. Within a maximum of three minutes, the app offers capacities available in flexible freight transport – standard segment – at short notice. Among those to profit in future will be customers wishing to book train paths into ports.

Rail takes first place, ahead of trucking and inland shipping, in the Port of Hamburg's hinterland transport. In 2019 alone, container shipments by rail between terminals in the Port of Hamburg and points inland increased by 10.4 percent to 2.7 million TEU. Since December, Click&Ride has made rail even more attractive. Within a maximum of three minutes, this fully digitalized schedule and booking system offers a path for a train inserted at short notice. For comparison, the manual train path design previously necessary took up to 48 hours. For the moment, Click&Ride still plans exclusively through the DB Netz infrastructure, yet intensive preparations are under way to facilitate paths directly into the Port of Hamburg by year-end.

WHAT RAIL CAN DO

At least 45 minutes, and at most 48 hours before departure, rail operators can resort to the tool, feeding in ETD, route desired for national freight transport, and the train parameters. Of all the conceivable paths, Click&Ride compiles those that best match the requirements. After booking the path, the customer can depart on time as planned. Schedule data is displayed on the appliance at the driver's console, or despatched by e-mail. "Click&Ride shows what rail can do," says Dr Michael Beck, DB Netz's Head of Scheduling and Capacity Management. "Never has it been so simple to despatch a freight train."

UNIQUE PATH BOOKING VIA WEB-APP

To calculate the range of a train path, a Cloud-based IT system utilizes and connects vast quantities of data, checks train and route attributes, using this data to select a train path. The basis here is formed by several hundred thousand sequences containing the network's infrastructure and schedule parameters. An algorithm selects the matching sequences and assembles these. The system simultaneously manages to incorporate the train path into the existing schedule structure. Infrastructure is therefore utilized as efficiently as possible.

On an international comparison too, this project promoted by the German Ministry of Transport and Digital Infrastructure (BMVI) – represents a quantum leap. "Click&Ride is unique worldwide and has aroused tremendous interest among innumerable neighbouring rail operators," says Dr Daniel Pöhle, Head of DB Netz's 'neXt Lab' IT innovation laboratory, which developed Click&Ride. Up to 250 IT and rail experts were cooperating on it at one time. Its mathematical optimization will in future be used in other areas such as the network and construction schedules.

All DB Netz's freight transport customers may use Click&Ride. The app is available online and mobile for laptops and smartphones. ■

For further details about the web-app:
www.dbnetze.com/clickundride

DR DANIEL PÖHLE (IN WHITE SHIRT) HEADS DB NETZ'S 'NEXT-LAB' IT INNOVATION LABORATORY

EGIM optimizes traffic flows in the Port of Hamburg

Trucks sometimes stand nose-to-tail along the main routes in the Port of Hamburg. At peak periods, traffic only moves at walking pace. That not only tries the patience of drivers and dispatchers, but is also commercially inefficient.

EGIM – EUROGATE Intermodal set itself the task of defusing the situation with its TRoad application. In 2019, this service provider for international container traffic in intermodal rail/road transport released an upgraded version of the app that had first appeared in 2015. Taking into account current market requirements and slot booking required by terminals, this simplifies route planning for local traffic in and around the Port of Hamburg. The app communicates directly with the driver's smartphone by push message, notifying him/her of tours.

THE ELIMINATION OF WAITING TIMES IS LEADING TO A CONSIDERABLY IMPROVED TRAFFIC FLOW

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The update of TRoad, developed jointly by EGIM and Hamburg University's HITeC – Hamburg Informatics Technology Centre – considerably simplifies control of trucked shipments. Empty runs, and collection of documents from offices, belong to the past. Instead, an automated algorithm calculates the most efficient solution for the current order on the basis of past runs and the existing traffic situation. Taking into account the time, locational and organizational aspects, as well as availability and any need to change chassis, TRoad notifies the most suitable driver from all the subscriber companies. This enables EGIM to make optimal use of the Port of Hamburg's slot booking procedure, also helping to boost the system's efficiency.

EGIM dispatchers are continuously briefed on each container's location. Administration of the stock also runs more smoothly. Most important of all, elimination of waiting times produces substantially improved traffic flows. ■

A COOKIE for containers

Thousands of empty containers are stacked up at HHLA subsidiary HCCR. These need to be closely checked for damage and if necessary, cleaned and/or repaired. The aim of the COOKIE research project is that in future damage should be more systematically classified and rectified with the aid of adaptive algorithms (AI).

It's known as a labour for Sisyphus: one empty container leaves the HCCR – Hamburger Container and Chassis Repair Co – yard with an inspection certificate, and the next steel box is already waiting to fill the slot vacated. As long as operations continue, no end is in sight.

HCCR as a service provider needs to inspect most empty containers stored in the port for damage and contamination, then to expertly clean and/or repair these if required. International Standards – CSC/UCIRC – dictate that only then can they again go aboard a containership.

The inspectors, known in port jargon as 'checkers', scrutinize the interior and exterior of each one of thousands of containers per year. Are sharp nails sticking up from the base plate? Are there any rusty holes or bumps in the box walls? Is the required stability still guaranteed?

Using a modern industrial handheld resembling a mobile phone, HCCR experts photograph every conspicuous spot. Then they feed standardized damage codes into software developed especially for container repair, transmitting this per WLAN to a database that automatically produces a quotation for the repair due. The repair order is then transmitted to a metalworker's handheld. After doing the work, he uses photos to document the proper repair.

This process costs time and therefore money. Furthermore, there's a worldwide shortage of steel boxes. "Despite digitalization, our customers want a considerably higher number of expert inspections of their containers than we can make available," says HCCR sales chief Toni Jakat. "On inspection, a high double-digit percentage of all containers prove to be undamaged. If we were able to identify these intact boxes from the start, and checkers could concentrate on those really needing inspection, then we would be

able to meet our customers' needs far more efficiently."

To separate the wheat from the chaff, or to ensure the most full and precise recognition of damage, is the primary aim of a digitalization project scheduled to last 30 months and known as COOKIE. This is short for 'Container (Services) Optimized through Artificial IntelligencE'. Toni Jakat gave birth to the project and brought various partners to one table. He submitted a research application to the Federal Ministry of Transport and Digital Infrastructure – BMVI – that responded with 900,000 euros from the 'Innovative Port Technologies – IHATEC' support program.

Underlining the importance of HHLA, HCCR's parent company, as technological leader on digitalization, it is running a total of nine IHATEC projects. Its project partner is the Fraunhofer Center for Maritime Logistics in Hamburg-Harburg. This is developing an adaptive algorithm for an image recognition procedure, or an artificial intelligence – AI. This aims to recognize and reliably assess the current status of a container. That first involves evaluation of literally thousands of saved photos. The process is called 'deep learning'.

"AI will compare the live image and stored photos of damage," is how Jakat defines the aim. "Then we will no longer need to bother with boxes fit for despatch, and can look after more repairs." If permanently installed cameras automatically photographed every square centimetre of an empty container passing checkpoints at HHLA terminals on a truck, that would make it possible to identify the share of undamaged boxes.

Another of COOKIE's aims is sustainability, for in very similar fashion AI could one day help HCCR to use its tank container washing unit more efficiently. Vast quantities of water and chemical additives are currently used to clean obstinate contamination in the tanks. COOKIE provides interesting prospects for tank washing, too, says Jakat: "Using automatic algorithms, if the IT system could correctly assess how severe contamination is, then the washing programme could be optimized individually for each tank." That would be a step towards saving resources. ■

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**TONI JAKAT,
HCCR SALES CHIEF**

The port as digital testbed

Using cutting-edge information technologies, HPA – Hamburg Port Authority (HPA) is playing a pioneering role in digitalizing Hamburg. Dr. Sebastian Saxe, both Chief Information Officer and Chief Digital Officer for HPA, knows precisely what is planned and how far developments have progressed.

Port of Hamburg Magazine: Dr Saxe, everybody is discussing digitalization. Which developments in this area will gain acceptance in the Port of Hamburg within the next ten years?

Dr. Sebastian Saxe: The Port of Hamburg acts as a test laboratory for the city. At Hamburg Port Authority, we are developing prototypes for digital applications that are then used throughout the City of Hamburg, or even nationwide. In the coming years, I mainly envisage a significant expansion of sensor and 'digital drive' technology – also known as actuator technology – in all areas of the port; in bridges and locks, warehouses, office complexes and vehicles. This will enable processes in the port to be analyzed and steered real-time. Artificial intelligence and machine learning are increasingly playing a pivotal role in further supporting, and sometimes fully automating processes. That applies not just to production, but also administration and management. Yet ranking above all this is a safety concept that can only be implemented jointly.

DR. SEBASTIAN SAXE, BOTH CHIEF INFORMATION OFFICER AND CHIEF DIGITAL OFFICER FOR HPA

Digitalization creates not just enthusiasm, but often also uncertainty. How essential will the human being be in digitalized ports in future?

Not only digitalization of ports, but the entire future development, will – and must – be centred on man. We as humans and staffers dictate the rules for artificial intelligence, machine learning and autonomous systems – and that will remain true. To facilitate this, we must address digitalization, its opportunities and risks – commercial, societal and economic – openly and actively. Simply looking on is in my view the wrong approach. We need to recognize, utilize and master positive developments and the host of opportunities. To sum up, hanging around and doing nothing is a step back, with individual activities being a thing of the past – the future consists of going forward together. Communication and the opportunity of making digital technology/innovation discernible and tangible, starting with the people of our city, is a central element of moving forward. The planned 'House of Digitalization' in Hamburg will be a meaningful centre for Hamburgians.

Not only digitalization of ports, but the entire future development, will – and must – be centred on man.

HPA is currently testing the deployment of drones as part of the PORTwings project. What precisely is the content of the project?

At HPA our aim is to further optimize the Port of Hamburg's infrastructure by using new digital components. Flying drones, or UAVs, play a major part here. In the PORTwings project, we are currently investigating how these can be intelligently deployed. One important area for their use is disaster relief. With a flood or a fire, for instance, drones give us the opportunity through photos and videos to grasp a situation rapidly and in safety. Yet drones can also be important for maintenance and inspection of port facilities, e.g. by monitoring pipelines in the port. With PORTwings, drones are controlled and supervised from a central HPA console. Also being tested, however, are automation and timing control of flight routines. We use drones already in operation at HPA for checking buildings at points that humans could only reach with substantial effort. Last summer, for example, flying drones were extensively deployed on inspecting the bridge over the Köhlbrand.

Yet PORTwings is only one element in HPA's Digital Testbed project. What are its further elements?

The Port of Hamburg as digital testbed is not simply a project, but a far-reaching support program, making known lessons learned in ports in Germany and elsewhere in the world. As part of that and along with PORTwings, the first version of 'Digital Port Twins' was developed and implemented – a virtual twin of the Port of Hamburg that records all relevant occurrences in the port in real time. For example, this covers the traffic situation on roads, water, and also mobile infrastructure. For the moment, these are covered by four autonomous control consoles. Just as described, another one covers air traffic. The digital twin combines and coordinates these data in an intelligent way, partly through simulations on quantum computers. It accordingly provides the basis for the preliminary step towards a real Port Traffic Center. Using its digital image, we are therefore able to optimize movements in the port and to control these through the Port Traffic Center. Here we invariably think global, since the solutions developed in the project are also transferrable internationally and nationally to other ports. Through the global chainPORT port network, HPA is regularly exchanging information worldwide.

Is digitalization the key to securing the port's future or does the growing exchange of data and virtual services render the traditional exchange of goods increasingly superfluous?

Innovations, sustainability and digitalization will alter and in particular, improve many routines in the port. It is absolutely certain that container and bulk freight shipments will continue in the port. Yet these will involve new features: Sustainability, efficiency and humanity are for me the laws of the new decade that has just commenced. And the accepted and simplifying view of the idea that freight is to be shifted from point A to point B on the globe by means of a container will create new, undreamt of opportunities in the Port of Hamburg. Let's look towards these opportunities with fresh optimism! ■

Track capacity management for port railways – future proof with digitalization

Rising freight volumes and the many participants involved in processes require a high degree of coordination in the port. In 2019 alone, around 200 trains a day and 150 different RUs – rail undertakings – were using the Port of Hamburg.

© ZEDAS

Smooth communication between the port authorities, rail operators and terminals is vital for effective and non-discriminatory use of track capacity.

CUSTOMER PORTAL AS DIGITAL GATEWAY TO THE PORT

Sectoral zedas®cargo software digitalizes all stages from train notification to invoicing. The customer portal marks the start of the continuous communication chain. The customers themselves record enquiries and bookings about infrastructure use on the platform. Complete booking data is available electronically and guarantees high quality data as a planning basis.

PLANNING AND MOVEMENT CONTROL – SIMPLER WITH APPS

Thanks to easy-to-view Gantt diagrams, the port planner can deal with all incoming enquiries very simply. These display the time elements of all stages of a project. The dispatcher has access to all essential data for releasing the required resources and smoothly controlling traffic flow. In everyday operation, realtime data is an aid on track occupancy, location, status and freight loaded.

Apps especially designed to meet the needs of RUs and marshalling providers are an important element in integrating train drivers and wagon inspectors. Inde-

pendently of the traffic control centre, railcar data, for example, are retrieved, shunting moves displayed, damage recorded, or continuous corrections made, all digitally. The dispatcher in the port has a continual view of moves by RUs or shunting providers.

INVOICING MADE SIMPLE

A wagon's circulation from arrival to departure is recorded completely and in detail, forming the basis for precise invoicing. Remuneration is automated and transparently notified. In addition, improved adjustments of tariff systems to actual conditions of use is possible. Via the client portal, all data for invoicing their services can be made available in real-time on request to RUs and marshalling suppliers.

ZEDAS's track capacity management supplies each partner with an individual display of orders – from the enquiry to planning and movement control right up until invoicing for fees. The combination of desktop application, for the control centre, and work instructions per mobile equipment, for workers at the track, creates a continuous communication flow. This enables rail processes in the port to be better controlled, and utilization of track infrastructure optimized. ■

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Contact: Chris Richter, Head of Rail Logistics Sales, crichter@zedas.com

ULRICH WRAGE AND DIETER SPARK, CEO DAKOSY AG, HAMBURG

Digitalization achieves maximum transparency – from shipper to port of destination

Interview with Dieter Spark and Ulrich Wrage, Joint CEOs of DAKOSY Datenkommunikationssystem AG, Hamburg

HHM: On digitalization in the Port of Hamburg, DAKOSY is regarded as the mother ship and model for success. How are you standing your ground against start-ups?

Dieter Spark: We see start-ups as equal partners and sources of ideas. We must definitely engage with them. Start-ups have the advantage that as a rule they start off with a creative idea on a level playing field and can develop as they please. They therefore usually progress more rapidly than such established outfits as DAKOSY, who are frequently obliged to observe many constraints on new ideas. Yet we at DAKOSY can throw a mass of experience and innovative power, plus a great environment, into the ring. Our crucial advantage is that we have built up a great community. Before programming, we bring all parties to the table and work together on what is really required.

Ulrich Wrage: Our work is also a very largely a matter of trust. Our customers rely on us to handle their data in confidence, and see that nobody is advantaged or disadvantaged. That naturally doesn't prevent the same applying to start-ups. However, we have built up this trust over decades. We proceed neutrally and represent everybody's interests. Our corporate structure also plays a part here. This consists of Hamburg's seaport industry and as a rule has a stake in all port-related projects.

So you have managed to integrate all those involved in the port industry here?

Wrage: Yes – that's correct, and even covers many official bodies. We are a founder member of the Digital Hub Initiative Hamburg that involves companies, start-

ups, research and education in one place and is building up an international network. We monitor the start-up market. Should we consider that a recently launched company would be a good recruit, then we go for a partnership. We are ready to learn, network ourselves, and seek cooperation.

You are currently working intensively on the Export Management Platform 4.0, an internet-based Cloud solution. Can you explain what this means?

Spark: The idea is that export-related data from all the players is made available in a cloud. In the sense of Logistics 4.0, we aim to achieve holistic planning, direction, coordination, implementation and control of the entire export chain, from shipper to destination port.

Wrage: The sooner the port knows what is going to arrive, the better it can prepare, and act as planned. We therefore aim to join in earlier and earlier, making the essential data available in the supply chain. Ideally, the terminal is already aware that a container is to be loaded via Hamburg even before it is despatched. In the other direction, we aim to notify any changes in the port, for example whether a vessel will be punctual or delays will occur.

And are those involved willing to make their data available?

Spark: Yes, since they are also interested in having everything run smoothly. For their part, also, their customers wish for maximum transparency. Unlike online trading, where as a rule just one service provider shifts a consignment from A to B, possessing all the relevant data, many more players are involved in export processes, for instance shipping lines, forwarders, terminals, intermodal operators and official bodies. So, the supply chain becomes fragmented. EMP 4.0 should make this as transparent as courier services.

You are currently working on an innovative research project on the subject of blockchain. Please explain what RObоB means.

Spark: RObоB stands for 'Release Order based on Blockchain'. Blockchain technology ensures that transactions are stored in various servers with the participants, and not centrally with us in a database. If somebody wishes to expand or change data, then a dispersed computer network dictates whether this is permissible. Nobody can forge data.

You have selected the process step of container release as the test feature in the blockchain. Why that one, exactly?

Spark: The release code entitles a transport company to collect a container from the terminal. The enormous value of goods transported in a container makes heavy demands of the access entitlement and security of the IT process. This aspect is ideally suited to displays using blockchain technology. Use of Blockchain technology enables data on release to be stored more securely than before and distributed to those entitled.

How far are you with this?

Spark: Coordination of the process involved great effort, so the project was extended to the beginning of May. With the central software for the blockchain code now ready, we have started practical testing. From June, this will enter live operation. Should blockchain technology gain acceptance, we shall trigger further process steps.

In the meantime, you are developing software not only for the port, but with Fair@Link have also done so for airports. How does this differ?

Wrage: In principle, the requirement is comparable with a seaport's. Many players are involved in the supply chain. Here too, the aim is increase transparency, make planning simpler, and cut handing and waiting times for airfreight. Five years ago, we made a successful start with Fair@Link at Frankfurt/Main Cargo Airport, and since last year Hamburg Airport has also been using it. More than 70 forwarders, 380 truckers and numerous handling agents are connected. Now, nobody can imagine operating without FAIR@Link any more.

> However, we have built up this trust over decades. We proceed neutrally and represent everybody's interests.

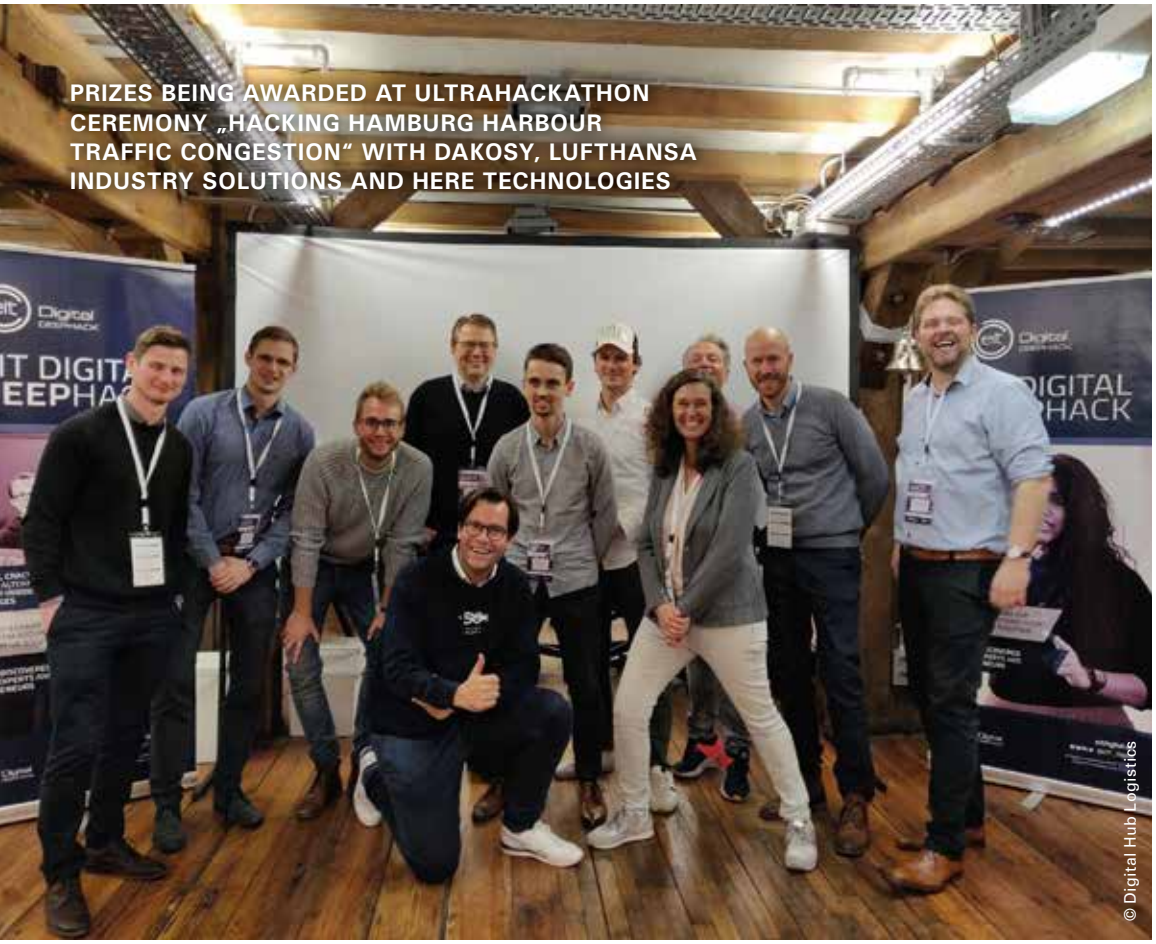
Where do you still see a need for IT action?

Spark: We can envisage forecasts for improved planning deduced from the existing and growing data pools – with the buzzword being Artificial Intelligence. At a later stage, weather, building site and traffic data could be added. ■

The Old Warehouse District is the cradle for future logistics

Digital Hub Logistics sees itself as a marketplace of ideas for the logistics industry – and not just in Hamburg.

Since its launch in August 2017, the company, which is part of the Germany-wide De:Hub-initiative, is to become a point of contact for companies thrilled by innovations, as well as trailblazers and founders from and for the logistics industry.



PRIZES BEING AWARDED AT ULTRAHACKATHON CEREMONY „HACKING HAMBURG HARBOUR TRAFFIC CONGESTION" WITH DAKOSY, LUFTHANSA INDUSTRY SOLUTIONS AND HERE TECHNOLOGIES

© Digital Hub Logistics

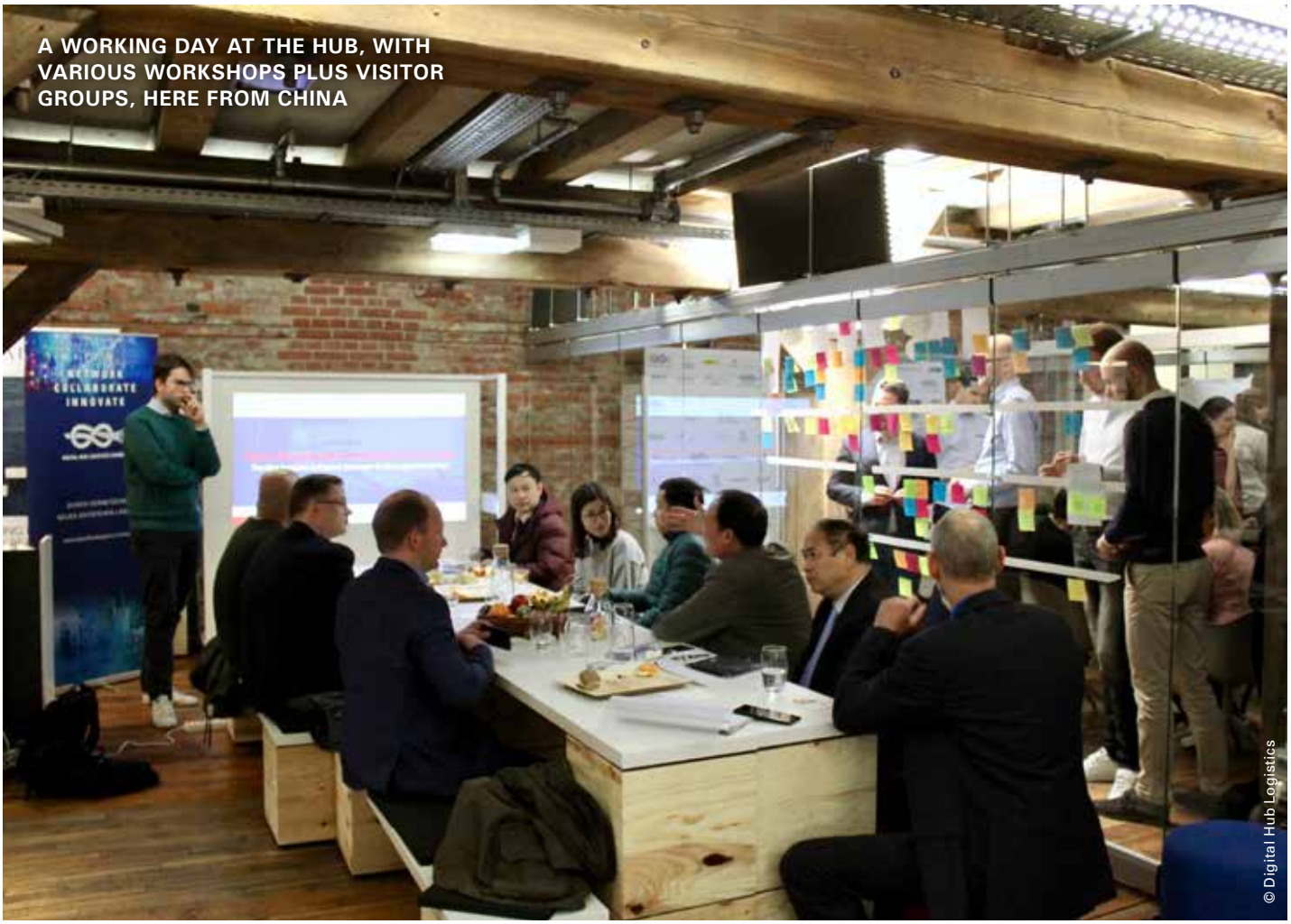
ENTERPRISES, POLITICS, START-UPS AND SCIENCE

Innovations in process, product and business models are being driven ahead by students and political stakeholders in the heart of Hamburg's Warehouse District, Speicherstadt. The different segments of logistics meet up on 1,200 square metres of co-working space. Large, established corporations, SMEs, education and research, capital providers and start-ups are meeting and networking on one site to boost the pace of digital transformation in the logistics sector. For instance, start-ups in maritime logistics are working alongside new companies in the area of city logistics, or intralogistics. Interplay here of 'corporates' such as HHLA, DHL, Ingenics, Dakosy, Volkswagen Group Logistics, Gebrüder Heinemann and Auerbach Shipping facilitated implementation of 40 projects in 2019. These ranged from commissions, to orders for joint prototypes, to investments in start-ups.

However much the stakeholders may vary in size and logistics specialization, Digital Hub Logistics as an eco-system is based on the fact that all partners, start-ups and their stakeholders, including Logistics Initiative Hamburg as well as BWVI – the German Ministry of Economics, Transport and Innovation, are inspired by real challenges and the idea of creating new, innovative and competitive products and services.

FRESH IDEAS IN OLD PREMISES

Its cornerstone is a physical space – the co-working areas on St. Annenufer in Speicherstadt. Around 80 events per year are held on these premises. These serve to hatch new initiatives and specific ideas for projects, or simply to foster encounters over drinks and snacks. A host of different events take place at the Hub, some logistics-driven, some less so. Commissioned by BWVI, during the 2019 Hamburg Port Birthday the Graphmasters start-up achieved a worldwide logistics masterstroke in combining navigation and bottleneck avoidance. Last summer, guest digitalization expert Christoph Keese used experience of other sectors to explain to the



A WORKING DAY AT THE HUB, WITH VARIOUS WORKSHOPS PLUS VISITOR GROUPS, HERE FROM CHINA

logistics community why 'disruption' is only a by-word until it actually occurs. In November 2019 'hackers' from all over the world assembled at Digital Hub Logistics to spend a weekend working on innovative solutions for optimizing processes in and around the Port of Hamburg. Apart from public event formats, Digital Hub offers its corporate partners tailormade and topic-specific workshop formats. These centre on a company's challenges, ideas and needs. In interplay with start-ups and additional companies, the aim is to develop these into cooperative success stories.

A NETWORK FOR TOMORROW'S LOGISTICS

Subsidized by the German Ministry of Economics and Digital Infrastructure (BMWI), the Digital Hub belongs to a federal network of a total of 12 physical and 16 topic-based hubs, the De:Hub Network. Through this, partner companies and start-ups profit not just from contacts in logistics, but can also network on such topics as mobility (in Munich), smart cities (in Leipzig) or artificial intelligence (in Karlsruhe). Over 60 start-ups in an international environment make for a powerful network of founders and innovations.

HAMBURG SCORES AS LOGISTICS CENTRE NO. 1

Hamburg is Germany's premier logistics location and one of Europe's top logistics hubs. While many B2C – Business-to-Consumer – start-ups still tend to play start-up in Berlin or Munich, in recent years Hamburg has increasingly come to the fore as the centre for B2B – Business-to-Business – start-ups, especially in logistics. This is not necessarily a matter of launching the next unicorn, or start-up valued at over one billion euros, but of bringing a pioneering spirit of innovation to making competitive and commercially profitable business ideas a reality.

FINANCING AS A CHALLENGE

The topic of money and financing plays an important part in the world of start-ups and innovations. The greater the available risk capital, the more crowded - usually – the start-up throng. Yet since risk capital and the Hanseatic merchant scene tend to be adversaries, at first glance Hamburg is at a disadvantage compared to cities elsewhere in Germany, Europe and the world. It remains simpler to obtain a cash injection for a good idea in Berlin, London or Silicon Valley than on the Alster or the Elbe. Yet even here, things are moving in Hamburg. Major companies have recognized that in the era of digitalization, going it alone often fails. Instead, dependence on start-ups' agility and wealth of ideas is being accompanied by a host of public support and private accelerator programs, the latter being intensive ones offering help with both knowledge and resources. This shows that Hamburg has embarked on remaining at the very heart of logistics. ■

How a Hamburg forwarder makes logistics more sustainable with artificial intelligence

More and more freight is being transported worldwide – whether by sea, rail or road. Especially in times of ever more urgent action on the climate, for all those involved that poses this question: How can the rising volume of shipments be successfully handled and the environment be spared at the same time? One Hamburg start-up has discovered a way of making logistics greener and more efficient – and is gaining ample recognition.

Hamburg is one of Germany's top logistics centres. The Metropolitan Region primarily has the Port of Hamburg to thank for its position as a powerful motor of economic development and an international foreign trade hub.

Yet the Hanseatic City is also seen as a pioneer on digitalization and future-oriented logistics solutions. The city has often produced successful start-ups in this area. Take Carrypicker. This online forwarder is pursuing a unique and highly promising approach with the potential to cause sustained change in the sector. The company has developed an artificial intelligence that plans shipments not just more efficiently, but also in a more environment-friendly way.

ANDREAS KARANAS (CENTRE) AND HIS TEAM AIM TO IMPROVE TRUCK LOAD FACTORS WITH THE AID OF AI

GREEN LOGISTICS MADE IN HAMBURG

At least 72 percent of freight shipments within Germany are handled by truck. According to the Federal Environment Office, they produce over 40 million tons of greenhouse gas emissions per year. One other certainty: In the coming years, the volume transported will rise further.

"Mathematically, almost one in three trucks is operating empty," explains Andreas Karanas, Carrypicker's founder and CEO. "The average load factor is no more than 70 percent." The IT expert does a calculation: "If the load factor were raised by just ten percent, then annually the entire CO2 emission of a big city like Frankfurt-am-Main would be saved. And that's just what we are planning at Carrypicker."

The nub of his business idea is that contrary to other approaches for reducing damaging emissions within logistics – varying from electric trucks to more sustainable freight warehouses – the Hamburgian has found a way of immediately improving the transport industry's ecological balance. How? Simply with improved planning of truck transport.

ARTIFICIAL INTELLIGENCE AND POWERFUL COMPUTERS

The entrepreneur is aided here by artificial intelligence that he himself programmed. Unlike traditional forwarders, where the whole planning process is still usually done manually, Carrypicker relies on powerful computers. "We tinkered with our AI engine for eighteen months. On the basis of over 300 million freight data, this invariably discovers the most efficient combinations of part-truck loads," reveals Karanas. "Thanks to it, we are now in a position to utilize trucks distinctly better – this benefits shippers and truckers, but above all, our environment."

Last year, Carrypicker came to the attention of German transport minister Andreas Scheuer and his BMVI – German Ministry of Transport and Digital Infrastructure. Under the Modernity Fund subsidy guideline, they backed Carrypicker with more than 2.4 million euros. There are great hopes that in the long term, Carrypicker can improve truck transport's CO2 balance and achieve a new level of climate efficiency. ■

DIGITALIZATION INDEX FOR SMES 2019/2020: Logistics sector score exceeds average digitalization

At an average of 61 index points, the degree of digitalization of traffic, transport and logistics companies is distinctly higher than the average for all sectors. This is one of the findings of Deutsche Telekom's benchmark survey 'Mittelstand Digitalization Index 2019/2020'. Digitalization is of great importance for the future development of business in the logistics sector. More than half – 53 percent – of all companies have already firmly anchored the topic in their business strategies. A further 26 percent are in process of implementing their first digital projects.

Traffic, transport and logistics companies achieve an outstanding result on the indicator 'Customer relationships' at 60 index points. 59 percent of those surveyed already use social media networks to gain potential customers, while 44 percent use search machine marketing. Generally seen as conservative, the logistics sector is far ahead in the rankings.

Such measures also pay off. Almost nine out ten - 86 percent – companies stated that through this they can better win customers, while for 78 percent, or over three out of four, the strategy had benefited revenue.

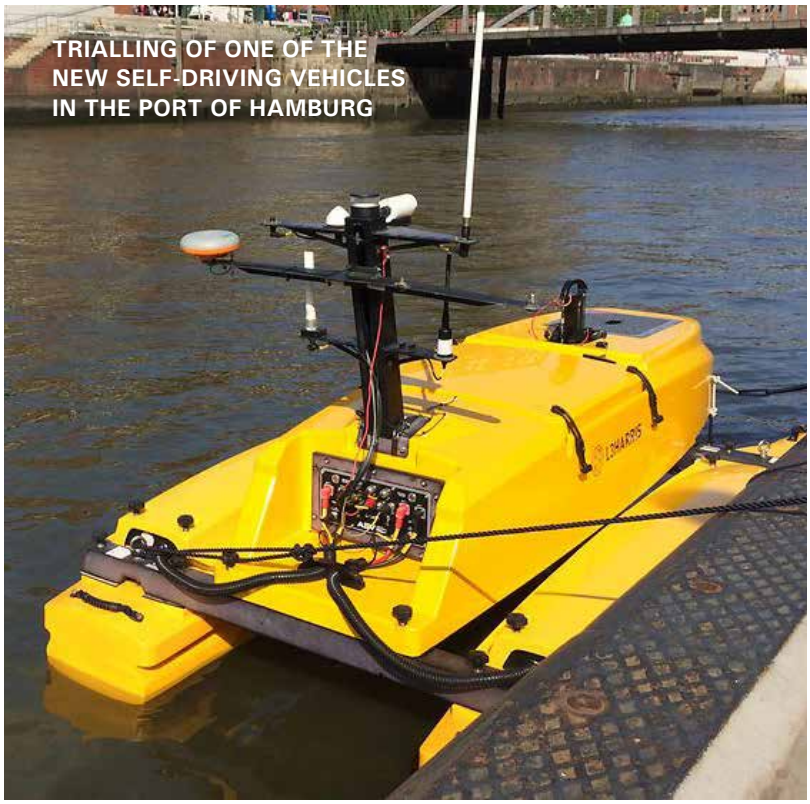
The sector also scores on an analysis of realtime data: 40 percent der companies monitor their freight transport in realtime, with a further 25 percent wishing to do so soon. At least one third (34 percent) use an app to cover all tours in a digital logbook. Just as many use an app for tour planning. Yet the survey indicates that just 16 percent of logistics and transport companies use digital bills of lading.

The top digitalizers, scoring 86 points in the digitalization index, are especially gratified with their turnover trend, attraction of new customers and speed of reaction to client enquiries.

ITS World Congress 2021: Opportunity for the port industry

Up to 15,000 visitors from all over the world will be coming to Hamburg for the World Congress for Intelligent Traffic Systems (ITS) between 11 and 15 October 2021. Six years after the World Port Conference in 2015, the Port of Hamburg will once again be presenting itself as a hotbed of innovation.

Even if the ITS World Congress, held not only in America and Asia, but also every three years in Europe, has so far been reputed to be unduly car-biased, some change should occur in Hamburg in around a year and a half. Hamburg will act as the German host for this event organized by the European trade and industry association ERTICO. Even in its bid for this major event, the city successfully set out to introduce ports & logistics as the keynote themes. Of the 40 completed and over 70 ongoing projects included in the city's ITS strategy, a large number originated in the port & logistics sector. Many exciting projects have been initiated since the World Port Conference in Hamburg. These are meanwhile being coordinated by an ITS project management team at a local public transport company, Hamburger Hochbahn. This was formed especially for this congress and is equipped with agile tools to achieve digital transformation. The port is a laboratory for the city, enabling new digital solutions to be tested in ideal conditions, lessons to be learned from these, and solutions to be created in the port, but also in other places.



TRIALLING OF ONE OF THE NEW SELF-DRIVING VEHICLES IN THE PORT OF HAMBURG

© BWVI

"In this new decade when sustainability and digitalization will play a crucial role in all the world's ports, we are very active in supporting processes with modern digital methods in the ports & logistic field. Our main stimulus just now is the World Congress. We naturally want to present the best digitalization projects there," says Dr Sebastian Saxe, Chief Digital Officer – CDO for Hamburg Port Authority (HPA) and the Ministry of Economics, Transport and Innovation. "Last year, for instance, we successfully piloted drones for pipeline inspection and disaster relief in the Port of Hamburg and discovered highly promising strategies for transferring what we learned into the city – to the fire brigade, for example." Dr Phanthian Zuesongdham, HPA's Head of Digital and Business Transformation, adds: "To manage traffic flows in the port more efficiently and safely is the aim of our 'Green4Transport' that intelligently networks traffic lights and driver information systems in cooperation with partners in industry. In addition, by the time of the World Congress we want to create a space for experimenting with product innovations near the Elbe Tunnel in St Pauli. This would offer ideal conditions for testing additional opportunities to deploy drones."

HHLA – Hamburger Hafen und Logistik also plans to present several projects at the World Congress. In cooperation with MAN Truck & Bus, automatic truck driving as a reality will be tested at HHLA Container Terminal Altenwerder (CTA). The Hyperport Cargo Solutions joint venture aims to develop a hyperloop system for seaborne cargo handling and hinterland traffic, as well as a transfer point for test purposes at CTA. HHLA Sky will present the drone technology it has developed. This provides all conceivable services with the aid of automated drone flights.

Given the heavy use of Hamburg's road traffic network, the city is currently running several projects aimed at using the immense potential of its numerous waterways for urban logistics. "ITS solutions could make an important contribution here towards running waterborne traffic more economically, safely and sustainably," says Niels Wiecker, Head of the Port & Logistics Department in the Ministry of Economics, Traffic and Innovation. With Hamburg Logistics Initiative representing the city in the project consortium, the INTERREG project AVATAR commencing this

HEAT (HAMBURG ELECTRIC AUTONOMOUS TRANSPORTATION) STANDS FOR SMALL AUTOMATED-DRIVE ELECTRIC BUSES THAT FORM PART OF THE CITY'S STRATEGY FOR INTELLIGENT TRAFFIC SYSTEMS – ITS

© HOCHBAHN

year is developing small autonomous and emission-free vessels that are even suitable for comparatively narrow waterways and facilitate large-scale deployment in waterborne logistics.

Innovations involving logistics will also be devised before the World Congress in Digital Hub Logistics. More than forty start-ups along the logistics added value chain are working with companies and scientific and research partners on digital and sustained innovations in services and products. As part of the national De:Hub initiative, by 2021 the hub should expand to cover 4,500 square metres and serve as a beacon for tomorrow's German and European logistics.

Harry Evers, Managing Director of ITS Hamburg 2021, sees the ITS world's first visit to Germany as a great opportunity for the entire German mobility and logistics sector: "Not simply for the Free and Hanseatic City of Hamburg, but for Germany as a whole, staging this offers a great opportunity for displaying new developments and applications involving mobility for people and goods." ■

HAMBURG ITS World Congress

Digital Congress on Mobility of People and Goods

In cooperation with the German Ministry of Transport and Digital Infrastructure, ERTICO's ITS World Congress will be held at the Congress Center Hamburg and in the Messehallen Convention Centre between 11 and 15 October 2021. This will be a showcase for innovations from the whole of Germany, with six keynote topics: automated and connected driving, mobility services, digital port and logistics solutions, intelligent infrastructure, urban air traffic and sustained mobility. High-ranking digitalization and mobility experts from industry and science along with representatives from the public sector from more than 100 countries are expected. The exhibition will promote and highlight start-ups in a special manner. Technical demonstrations will also form an important part of the congress. Registrations for these are possible until this August.

www.itsworldcongress.com

Digital trust: Our joint task for grasping digitalization opportunities

Cyber threats have grown in recent years. Major German companies and renowned international groups in the maritime sector have repeatedly been the victims of cyber-attacks.

This has consequences. The Bitkom trade association puts annual damage caused by cyber criminals for German companies alone at around 50 billion euros. If we wish to fully exploit the great opportunities offered by digitalization, we must eliminate the threats involved, and build up trust, with today's maxim being 'Digital Trust'.

With its infrastructure, thousands of companies and high standing as an economic factor, the Port of Hamburg has for years been a potential target for criminals in the virtual world – whether these are hacktivists, cyber-terrorists or state-backed services from other countries. Years ago, Hamburg Port Authority (HPA) faced up to these threats, and has since systematically developed its strategy. It is also the case that digital trust at a high level can only be achieved as a task shared between all those involved in the maritime supply chain – and that means globally, far beyond the Port of Hamburg.

To master these challenges, HPA is pursuing a proven approach on several levels. Traditional IT security technologies such as multi-stage firewall systems or virus scanners and web filters serve as preventative security measures. In the era of global digitalization, total isolation from the network is not an option. Supplementary detection measures are applied for timely identification of any gaps in security. Along with regular security audits and penetration tests, these consist of hacker simulations by external professionals, as well as identification of anomalies based on artificial intelligence. Only if you know your own security gaps – however tiny these may be – can you close them.

Despite extensive security measures, a successful cyber-attack can never be totally ruled out. For critical situations, hard-and-fast crisis plans, which are easy to carry out if incidents occur, are of pre-eminent importance. In addition, HPA is engaged in a global exchange on attempted hacker intrusions and countermeasures with other major ports. One channel here is the chainPORT network.

JENS MEIER, CEO HAMBURG PORT AUTHORITY

Irrespective of how good preparation may be technically, however, digital trust must always be seen holistically. People and processes need to be paramount. To ensure that a company's staff do not become the weak link in a strong security chain, coordinated awareness campaigns make sense. The aim is to make colleagues sensitive to current threats. For instance, the most elaborate digital security system rapidly loses it protective function if someone leaves the door to the cellar wedged open out of convenience, not thinking it is relevant to security, but this allows access to the IT cables.

If everybody pulls together, a live cultivation of digital trust can be the basis for efficient and secure digitalization of numerous processes in the Port of Hamburg – from which everybody will ultimately gain. ■

HHLA SEES NUMEROUS OPPORTUNITIES FOR DEPLOYING DRONES IN THE PORT OF HAMBURG

The flying ace

Sven Howar has been the operations manager and a drone pilot at HHLA Sky right from the start. Hamburger Hafen und Logistik AG's start-up intends to establish itself in the new market for drone services.

The Gartner company, which considers itself a leading global research firm, publishes an annual "hype cycle for new technologies". In it, "autonomous flying modes of transportation" were described as being in the "innovation trigger" phase – meaning they are at the beginning of their technological development.

This will change rather quickly, predicts Sven Howar, project manager, drone pilot and service manager at HHLA Sky. If it were up to him, the in-house start-up of Hamburg-based logistics company HHLA would immediately start to use drones for automated flight operations. Though Germany still has no experience with automated flight to speak of, this can be seen as an opportunity.

"We have no technological problems since we are dealing with mature products," explains Howar. "The legal and organisational framework has yet to develop, though things have happened on a legislative level." The 28-year-old knows what he's talking about: he wrote his academic thesis at Leuphana University Lüneburg on the "possibilities and limits of drone usage for delivery processes in Germany".

It's currently possible to become an absolute pioneer in a very promising market, and HHLA Sky wants to take advantage of this. No details can be revealed yet, but one thing is certain: HHLA Sky's in-house drones are unique. Extremely robust and equipped with all available safety technology, they can in principle carry out every conceivable assignment.

The frequently cited express deliveries and other shipments are just a small part of the market. Drones are much more often used to quickly identify impending threats to industrial areas from the air, as well as for civil protection and environmental monitoring. In the construction industry and in agriculture, drones are used to survey ground and build-

© HHLA / Thies Rätzke

ings. HHLA also uses them for maintenance checks of container gantry cranes and fuel depots, and to monitor AGV surfaces at Container Terminal Altenwerder that are off-limits to staff.

"We can attach all kinds of sensors or other tools to our drones," explains Howar. "For the most part, we collect data on behalf of customers, but we can also build a complete drone control centre for them." HHLA Sky analyses the problems faced by customers and collaborates with them to find the ideal individualised – and often very specific – solution.

A towering figure, Sven Howar leaves no doubt of his expertise with drones. As a small boy he built remote-control models, which kept getting bigger. The rotor of his current helicopter, which he sends zooming across model airplane fields, has a diameter of 1.20 metres. "A model like this is much more complicated to operate than a modern drone, which stabilises itself automatically," explains Howar.

He easily passed his drone licence test. Since then, he has been authorised to remotely operate HHLA's drones with the assistance of a control centre developed for HHLA. "Pilots would only ever need this if the automated control were to fail. This has not happened yet in practice, though it has been sufficiently tested in safety checks," reports Sven Howar.

Sven Howar and the HHLA Sky team simulated this and all other imaginable scenarios last year. All drones and control software were extensively tested in hundreds of flights; emergency landing points were defined, and various practical applications tested. The drone service is finally ready for take-off! ■

DRONE PILOT SVEN HOWAR AT HIS WORKPLACE

© HHLA / Rolf Otzipka

When smart and green go hand in hand

Electronic data transfers, improved ship tracking and automated crane systems have already transformed the Port of Hamburg into a highly efficient operation. In the next step, digitalization and intelligent technologies are intended to make the port 'smart'.

"In global terms, Hamburg is definitely one of the front-runners," says Michele Acciaro, an Associate Professor of Maritime Logistics and Director of the Hapag-Lloyd Center for Shipping and Global Logistics (CSGL) at Kühne Logistics University (KLU) in the HafenCity Hamburg. But that being said: "We need far more technologies in the port that employ artificial intelligence (AI), Cloud Computing, Smart Contracts, Big Data and the Internet of Things (IoT)." This could facilitate the automation of terminal processes and maneuvers in the port. One example: bunkering fuel or water. Here, automation could help avoid human error, save time and boost efficiency.

But efficiency isn't every-thing when it comes to global competition. In the future, a given port's ecological footprint will also be a key aspect, as Acciaro predicts. And this is where decentralized Distributed Ledger technologies like blockchain could come into play, making it theoretically possible to track an individual product, the CO2 consumption involved in each stage of its production, and its transport route. Such transparent supply chains would allow consumers to select more sustainable products, and would give sustainably operating ports a competitive edge in the process. But for today, this is still wishful thinking.

"An expansion of renewable energy use in port operations could also benefit from digitalization," says Acciaro. One conceivable option in this regard: equipping the port with a virtual power plant to interlink decentralized power-generation sites. In turn, this would require an intelligent power grid or 'smart grid', which combines energy production, storage and consumption, using technologies like sensors, Big Data and AI to do so, and which can intelligently compensate for output fluctuations stemming from renewable energies.

But efficiency isn't everything when it comes to global competition. In the future, a given port's ecological footprint will also be a key aspect, as Acciaro predicts.

Consequently, the challenge for the Port of Hamburg is to not only be 'smart' but also 'green.' With the European Union's 'Green Deal', the general course set for the future is already clear: Europe is meant to be climate-neutral by 2050. Hamburg has the potential to lead the way. "The city has a manageable size, and is one of the richest cities in one of the world's richest countries," Acciaro explains. But making this a reality will require more thinking outside the box, more systematic analysis, and more interdisciplinary collaboration. If this makes the port CO2-neutral, the environment is cleaner, and Hamburg's residents feel more content about where they live, then smart and green go hand in hand.

As Acciaro stresses: "Many pioneering technologies are still in the experimental phase. Nevertheless, we need to start experimenting with them, using the port as our laboratory." Other ports have shown how it's done: since 2011 the Port of Los Angeles has been working toward the ambitious goal of operating certain sections virtually emission-free. And in 2019 Singapore developed an autonomous tug system (IntelliTug project) as part of a long-term partnership with the tech provider Wärtsilä. Also worthy of mention: Antwerp's 'Capital of Things' initiative. Based on the 'Internet of Things', the first smart port projects were launched in 2018, and brought together the port authorities, the city, university, and a prominent research center. According to Acciaro, Antwerp's approach represents a recipe for success. "All the major ports have formed strong partnerships. Hamburg surely stands to profit even more from its business and research excellence." ■

Hapag-Lloyd Center for Shipping and Global Logistics (CSGL):

The Hapag-Lloyd Center for Shipping and Global Logistics (CSGL) fosters exchange between the international research community and companies in the shipping sector. The center's goal is to promote the development of Hamburg as an international maritime knowledge hub. Focusing on maritime logistics, it is part of Kühne Logistics University, Hamburg.

www.the-klu.org/csgl

Prof. Michele Acciaro PhD, Associate Professor of Maritime Logistics and Academic Director, Hapag-Lloyd Center for Shipping and Global Logistics (CSGL)

New data center in Hamburg: Digitalized and inter-connected into the future

No other German city has understood the significance of digitalization as well as Hamburg, where digital projects and innovations are increasingly making their mark on the cityscape. To facilitate the interchange of information and data, however, high performance digital infrastructure is needed – data processing centers such as Equinix make it a reality.

The digital transformation has arrived in German towns: Full connectivity in the cities of the future or 'SmartCities' offers approaches to solutions for current challenges, such as environmental protection and growing traffic volumes.

DIGITAL INFRASTRUCTURES MAKING IT A REALITY

However, digital transformation is presenting companies with technical challenges. In many cases they, or local authorities do not possess sufficient IT capacity of their own to transmit and evaluate heavy quantities of data. At the same time, close collaboration with partners, IT services and being linked to clouds are decisive factors. One approach to the solution is an effective IT infrastructure. These create the most fundamental precondition for a successful digital economy, inter-connecting companies, cities, citizens and possible external partners. The whole thing takes place on neutral platforms, known as digital ecosystems.

JENS-PETER FEIDNER
MANAGING DIRECTOR
EQUINIX (GERMANY)

© Equinix

THE PERFECT COMBINATION

Data-processing center operators such as Equinix support the City of Hamburg in establishing such digital infrastructure. Equinix has recently opened the HH1 data processing center, a new German site in the Hanseatic City, facilitating connectivity for companies worldwide via the global Equinix platform.

Data processing centers not only offer additional IT capacity, but also ensure private, direct, physical connections to sector-specific digital ecosystems – and in addition within the data processing center, by-passing the public Internet. Using this inter-connection, they make a neutral platform available, enabling companies to share immense quantities of data – within short latency with their partners, and shielded from external access. Using this, a city or company's complex digital projects can be implemented faster and more securely. Via such a digital platform, data interchange is possible, not only between a city's utilities or transport operators and external companies such as mobility suppliers, but also among ships, trucks, railway networks and waterways.

In this sense, data processing centers make an important contribution to digitalizing a city. ■

Info Equinix

Founded in 1998, Equinix protects, connects and promotes today's digital economy by inter-connecting global market leaders in 55 markets, 26 countries located on five continents with their customers, staff and partners. As global connectivity leaders, the data processing centers are strategically positioned as homogeneous global connectivity platforms. They bring market leaders and innovators together to open up the way into the digital future.

Write to me at: facebook.com/ppickhuben

PETER PICKHUBEN'S PINBOARD

By the way

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

- HAFENHAMBURG
- PPICKHUBEN
- PORTOFHAMBURG
- PORTOFHAMBURG
- PORT OF HAMBURG
- HAFEN HAMBURG MARKETING E.V.

Or download the Port of Hamburg app in your app store.

Rail federations sign charter on DAC - Digital Automatic Coupling

Digital Automatic Coupling is essential for successful rail freight traffic. The six leading trade associations in the rail freight sector are convinced of that. Today they presented the DAC Charter at the Tenth VPI Symposium in Hamburg. They called on politicians and the sector to join forces and to set in motion the key technology for an efficient Rail 4.0 throughout Europe. Among the first signatories for the charter initiated by the VPI were Pro-Rail Alliance - Allianz pro Schiene, NEE, VDB, VDV and UIP. Companies and institutions wishing to back the moves are invited to subscribe to the charter.

The DAC charter describes three steps that these associations regard as needing to be implemented now for the successful launch of DAC. A boost for DAC research; a Europe-an timetable for fleet conversions; ensuring finance for the change process. Experts put the cost of equipping locomotives and freight cars throughout Europe with the new coupling technology at between six and ten billion euros.

© VPI

from left: Gilles Peterhans (International Union of Wagonkeepers), Neele Wesseln (NEE) Dirk Flege (Allianz pro Schiene), Malte Lawrenz (VPI), Michael Sikorski (VDV)

Digital strategy for Hamburg

The Senate has agreed on comprehensive guidelines on digital strategy for the coming years. With a strategy that takes into account all areas of life in the community, Hamburg is systematically pursuing the path embarked on with the 'A Digital City Strategy' back in 2015. In recent years, Hamburg has made considerable advances as a digital city. That has involved such topics as mobility, culture, town planning, the port, logistics and local government, as well as creating structures facilitating progress on digitalization throughout the city.

The 'Digital Strategy for Hamburg' defines areas for action on digitalization and lists specific projects. For instance, this strategy indicated how digital in-frastructures and platforms are being further developed and how responsible treatment of data must look. In addition, a large number of plans and projects are presented, for which government agencies and publicly owned compa-nies take responsibility.

A digital strategy for Hamburg online:
https://static.hamburg.de/fhh/epaper/digitalstrategie/

© Senatskanzlei

ELEKTRA! Keel of world's first emission-free pusher laid

The first keel element of the ELEKTRA was formally laid down at the Hermann Barthel shipyard in Derben, Saxony-Anhalt on 4 November 2019 at a ceremony not always performed for inland waterway craft. The energy system on the ELEKTRA as a first emission-free vessel will set a precedent for inland waterway shipping.

For the first time, this pusher boat will be using energy from hydrogen gas, LT-PEM fuel cells and batteries. The keel-laying marked the start of the ELEKTRA's construction, and completion by the yard should follow in the fourth quarter of this year. Extensive trials of the vessel and her energy system will then be conducted in the Berlin area, and between there and Hamburg. The ELEKTRA is to be deployed primarily on freight transport between Berlin and Hamburg, as well as on the capital's local services.

Video on the topic of the world's first emission-free push-tug, 'ELEKTRA': https://youtu.be/gdBwdcOnRTo

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Commercial space in Hamburg Metropolitan Region

To further boost the Hamburg Metropolitan Region as an area of economic activity, counties, rural districts and towns there have joined forces to market their commercial sites jointly. This is unique in Germany at the metropolitan regional level. The GEFIS commercial space tool now facilitates regional planning and development of sites there to meet requirements.

In existence since 2009, the GEFIS commercial space data system has been completely revamped and conceived for international marketing. All maps and sites are now fully digitalized, facilitating a map-based search. The system has been revamped to be more convenient and operable on mobile devices. It has also been expanded with new functions and more detailed data. Partners in the area have so far given details of over 400 commercial sites available immediately or at short notice. These cover a total of around 1,000 hectares.

GEFIS online: https://gefis.metropolregion.hamburg.de

Shell investing in InstaFreight

Forwarder InstaFreight intends to cooperate with Shell Ventures as an investor. The aim is to further speed up digitalization of freight transport by road and to further transform the freight market in Europe. Both companies will cooperate closely in further developing services for their customers.

InstaFreight aims to simplify the forwarding business by optimizing processes and making data more transparent, with the focus on the practical benefits for both shippers and carriers. In place of analogue processes and communication channels, InstaFreight offers its trade customers a digital alternative that facilitates rapid and convenient booking of shipments.

Via a fuel card accepted worldwide, Shell with its retail fuel network, the world's largest, offers freight carriers immediate and sustained access, not just to fuels, but also to other products and services. With the aid of telemetric and mobility services, the group offers solutions to security, maintenance and fuel consumption issues.

© InstaFreight

‘BiSchi Online’ – The new data source on inland shipping

Developed by Port of Hamburg Marketing, the new ‘BiSchi Online’ service provides callers with instant briefing on the inland waterway network in Germany. Whether on water levels, berth searches or the obligatory glance at the traffic situation – the new digital map service supplies all relevant data simply and free of charge.

This data portal supplies inland shipping players and other interested parties with a glimpse of real-time data about inland shipping and traffic flow on inland waterways. Information on available load/discharge ports and the situation there, especially, illuminates the existing transport network and its potential. Display of ship positions facilitates viewing on the actual state of traffic. The embedded search function allows rapid navigation to the required data, such as the water level at Wittenberge, for example.

‘BiSchi Online’ can be viewed at www.hafen-hamburg.de/de/wasserstrassen and integrates the following official data and notifications with geographical references facilitating use of a web application:

- RIS-Index: Standardized structure of geographically referenced descriptions of all objects relevant to inland shipping, e.g. the location of inland ports, lock chambers and bridges
- PEGELONLINE: Water levels at all inland and coastal gauges on federal waterways
- Notice to Skippers – NtS: Latest official notification of occurrences on inland waterways that affect safety or traffic flow, e.g. temporary closures, maintenance work, etc.
- Tracking & Tracing: Position display for vessels on the basis of AIS signals transmitted

Implementation of the project is subsidized by the Federal program by the ‘Transnational cooperation’ project of the Federal Ministry of the Interior, Construction and Homeland. ■

VIEW OF THE ELBE LATERAL CANAL FROM THE LÜNEBURG SHIP LIFTS IN SCHARNEBECK

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Imprint

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Port of Hamburg Marketing, Tel: +49 40 37709 0, E-Mail: info@hafen-hamburg.de

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SPEDITIONS-ASSEKURANZ • Versicherungsmakler GmbH
Gewerbestraße 11 · 21279 Hollenstedt
Telefon: +49 (0) 41 65 / 222 21-0 · Telefax: +49 (0) 41 65 / 8 10 41
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