



CONTAINER TERMINAL AUTOMATION CONFERENCE 2024



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FROM THE EDITOR

Margherita Bruno,
Editor



Welcome to this special edition of PTI's journal dedicated to automation! We are delighted to publish this issue in celebration of the eighth Container Terminal Automation Conference (CTAC), set in the beautiful and sunny Valencia.

The maritime industry is currently abuzz with discussions about automation and its future in ports. With the ongoing expansion of global trade, ports and terminals encounter increasing demands to boost efficiency, mitigate environmental impact and bolster competitiveness. In this rapidly changing environment, Artificial Intelligence (AI) emerges as a pivotal catalyst for transformation and a common thread in our journal, offering unparalleled opportunities for innovation and growth.

Kicking off our journal, INFORM takes us back to CTAC North America 2023 in Virginia, emphasizing the importance of software-based optimisation in container terminal operations. Through the utilisation of algorithms and AI, INFORM's flexible approach aims to automate routine decisions, thus freeing up human operators for more complex challenges.

Next, Westwell takes us on a journey through advancements in robotics and AI, particularly focusing on autonomous driving technology within container

terminals. Leveraging extensive experience in autonomous fleet operation, Westwell's fleet management system optimises global route planning and traffic coordination, utilising V2X technology for enhanced performance and efficiency.

RBS further underscores the benefits of digital twins and super intelligent engines in optimising terminal operations. By utilising AI-driven problem prediction and optimal resource allocation, RBS' technologies promise substantial advantages, including cost savings, improved decision making and enhanced team collaboration.

Moving forward, Avlino emphasizes the role of AI-powered strategies in revolutionising yard operations, showcasing significant productivity improvements achievable through intelligent container management.

AllRead leads the charge with its Agile Recognition Software (ARS), demonstrating how AI streamlines cargo handling, reduces delays and minimises errors, thereby optimising operations and cutting CO2 emissions.

Finally, DSP provides insights into its solution, GEMINI, a digital twin platform that leverages AI to simulate and optimise terminal operations. This solution is essential for modern terminals striving to

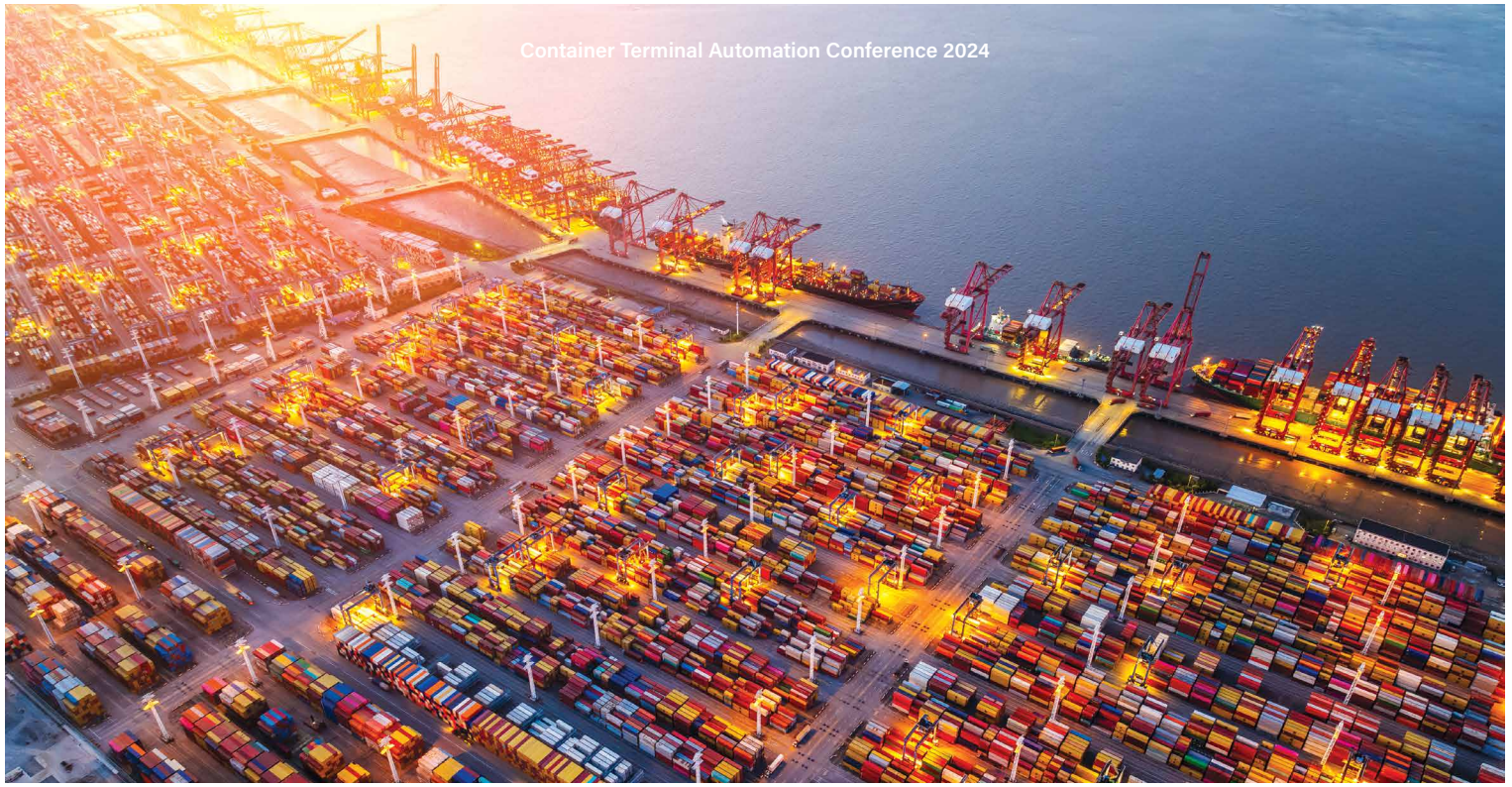
attain competitiveness and operational excellence amid increasing speed and volume demands.

As decarbonisation must go hand in hand with automation efforts, industry frontrunners such as Rocsys and Kalmar emphasize the necessity of customised solutions for electric vehicles in ports. They also stress the pivotal role of hybrid straddle carriers in reducing carbon emissions and promoting sustainability across port and terminal operations.

Lastly, as automation progresses, safeguarding workers' rights and human value in ports and terminals is paramount. With this principle in mind, FERNRIDE advocates for human-assisted autonomy in logistics, ensuring safety and efficiency while addressing challenges such as labour shortages.

DP World wraps up our journal by exploring the challenges of balancing automation with human involvement, emphasizing the importance of upskilling programmes and collaboration between academia and industry to facilitate a smooth transition.

We hope you find this edition enlightening and that it sparks fruitful conversations on the future of our industry. Wishing everyone attending CTAC 2024 a successful and productive event!



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SPEAKERS



Adriaan Landman, COO and Co-Founder, Allread

Adriaan Landman is the COO and Co-Founder of Allread. Responsible for the company's Strategy and Operations, bringing cutting-edge computer vision solutions to major Ports and Terminals in Europe and LATAM, such as Hutchison Ports, Port Authority of Valencia and HGK. Adriaan strongly believes that innovation is about breaking down financial and technical barriers to technology adoption.



Alex van Winckel, Director Strategic Relations and Sales, INFORM

Alex Van Winckel, Director of Strategic Relations and Sales at INFORM's Terminal & Distribution Center Logistics Division, boasts over 15 years in the container terminal sector. He commenced his career deploying a Terminal Operating System (TOS) at HHLA's CTB terminal in Hamburg. For the past decade, Alex has spearheaded optimisation projects in logistics, especially in maritime and intermodal container terminals. At INFORM, he oversees maintaining current business ties and forging new sustainable customer partnerships.



Ashish Panda, Product Manager (Automation), Navis

With approximately 16 years in the maritime/software sector, Ashish Panda possesses extensive experience. He has contributed to numerous automated terminal projects, offering valuable insights from analysis to implementation. Currently, Ashish leads Navis automation product management, steering it towards the next phase of automation in the maritime/terminal domain. He holds a Bachelor's in Marine Engineering from BITS, Pilani, India and a Master's in Maritime Economics and Logistics from Erasmus University, Netherlands.



Bart Noothoven, Dir Projects & Development, Terminal des Flandres (Terminal Link/CMA-CGM)

Bart has over 25 years all rounded hands-on experience in the maritime industry and has sat on all sides of the table; shipping (vessels and agencies), port and terminal management/operations, port/terminal development green and brownfields from the operator side as well as contractor, for the container trade, bulk (dry/wet) and general cargo trades in a variety of different and challenging environments, shareholders and other stakeholders.



Boris Wenzel, Founder and Chairman, TIC 4.0

Boris is a seasoned CEO with 20 years of senior leadership across Asia and Europe, specialising in strategy and change management, as well as being known for turning around companies, building successful teams and creating shareholder value. He is experienced in diverse industries, continents and cultures, adept at representing financial institutions and private equity investors.



Christian Blauert, Global Director Port & Terminal Development, Moffatt & Nichol

Christian Blauert boasts over 25 years of experience in the maritime industry. Prior to joining Moffatt & Nichol, Christian held various C-suite roles, including CEO, for global terminal operators, guiding them through substantial organic and inorganic growth phases. In project management, Christian excels in terminal planning, operational excellence and supply-chain integration, leveraging his extensive international experience with diverse port and terminal operators. Furthermore, he is a specialist in terminal automation, having personally overseen the implementation of numerous automation projects at container terminals.



Daan Nap, Sr. Business Development Manager Ports & Transportation, Rocsys

Daan Nap leads Business Development and Sales for Autonomous Connection Devices (ACDs) at Rocsys, focusing on Ports & Transportation segments. With over 16 years in global eMobility, he pioneered commercial DC fast chargers for cars in Europe at Epyon, later acquired by ABB. Before Epyon, he held roles at Siemens, Royal Philips and IBM, holding a BSc in engineering from the University of Applied Sciences in The Hague.



Daniel Serrano, Automation, Development and Processes Coordinator, TTI Algeciras

Daniel Serrano serves as the Automation, Development & Processes Coordinator at Total Terminal International Algeciras S.A. (TTI ALGECIRAS), situated in the Strait of Gibraltar and recognised as the first Automated Terminal in the Mediterranean Sea. With a diverse background, Daniel has held various positions, ranging from the Operations Department, where he managed real-time cargo operations, to the IT Department, where he led automation initiatives. Currently, Daniel is part of the team developing the Big Data and TIC4.0 project at TTI ALGECIRAS.



Dr. Jan Gummersbach, Project Director Port Logistics, BOXBAY

Jan, a mechanical engineering PhD, transitioned from a research role at the University of Siegen to a managerial career specializing in logistic handling systems for heavy loads. With over 20 years' experience, he excels in technical solutions for high-bay storage systems. He joined SIEMAG GmbH in 2004 as project manager sales, rising to Head of Sales Grinding Machines in 2008. In 2021, he joined BOXBAY's sales team, aiming to revolutionize port container handling.



Fernando Marti-Delda Rosello, Ports & Terminals Project Manager, NextPort.AI

Fernando Marti-Belda Rosello, a telecommunications engineer with a focus on data analytics, is currently the Project Manager for Ports & Terminals at NextPort.AI. Leveraging his expertise in operations within container terminals and continuous improvement practices, he drives efficiency and enhances performance by employing the latest technology and data science. Fernando plays a vital role in extracting value from industry data and shaping the roadmap for enhanced data capabilities.



Francisco Blanquer, Senior Manager Terminals R&D, CMA CGM

Mr. Francisco Blanquer, an Innovation and Development Senior Manager, brings extensive industrial experience as a Spanish civil engineer. Over thirteen years, he spearheaded innovation and development initiatives in the port sector, managing greenfield projects worldwide for the Noatum group. Francisco introduced advanced technologies like LNG port equipment and fostered an industrial culture in terminals. His recent endeavors involve implementing IoT and Big Data technology in container terminals, notably in Valencia and Malta, while currently expanding his innovation expertise at Terminal Link (CMA-CGM).



Felix Paul Czerny, Founder and CEO, CONROO

As founder and CEO of CONROO, Felix is dedicated to shaping the company's strategy and operations, focusing on developing innovative AI-powered solutions. At CONROO, Felix and his team bridge the gap between their customers like terminal, depot and warehouse operators and truckers as well as trucking companies. His goal is to enable efficient logistics with the latest technology available and to drive innovation and productivity in the industry.



Gangadhar Gude, Founder & CEO, atai

Gangadhar Gude is the CEO of ATAI Labs Pvt Ltd (2018) and Co-Founder of INVECAS Inc (2014). He led INVECAS to accolades like the Red Herring Global 100 award (2016) and Most Innovative Product Winner at IESA Technovation Awards (2018). ATAI, his latest venture, specializes in AI solutions for supply chain (maritime & warehousing), earning NASSCOM MIC 3.0 recognition. Gangadhar aims to democratize cutting-edge technologies for supply chain problem-solving, fostering innovation accessibility.



Gerhard Fischer, Head of BD Harbour Cranes, Siemens

Gerhard began his career at Siemens AG in Erlangen, Germany in 1990, focusing on high-frequency and large-power converters. Since 2008, Gerhard has served as Head of Sales for harbour cranes at Siemens AG in Erlangen, Germany. He holds memberships in the IEEE Industry Applications Society, VDI working group B1 for cranes, and VDE DKE working group for hoisting systems and serves as vice-chairman of the PEMA committee for equipment design and infrastructure.

SPEAKERS Continued



Giorgio Corbellini, Lead - Commercial Vehicle Automation (CVA) Business Unit, Embotech

Giorgio Corbellini leads the Commercial Vehicle Automation (CVA) Business Unit at Embotech in Zurich, Switzerland. His work focuses on deploying and scaling autonomous vehicle fleets for gated areas like port terminals and logistics yards. With previous experience at Daimler AG and Disney Research, Giorgio combines his PhD in Computer Science and Master's in Telecommunication Engineering with fluency in Italian, English, French and German to advance the field of commercial vehicle automation.



Graham Wilde, Head of 5G Business Development, Three Group Solutions

Graham Wilde serves as the Head of 5G Business Development at Three Group Solutions, a global telecoms division of CK Hutchison. In this role, he oversees the coordination of Private Network development across the Hutchison Group's mobile operators and collaborates closely with Hutchison Ports on digitisation and automation endeavours across their ports spanning 27 countries. Previously, Graham held the position of Managing Director at UK Broadband, a pioneering company that deployed private 4G networks at the Port of Felixstowe and Heathrow Airport in 2014, marking significant milestones in connectivity innovation.



Hannah Ohorn, Head of Automation Project, Eurogate

Hannah has been in the maritime industry for over 13 years and held different leading positions at big shipping companies such as Hamburg Süd and Maersk Line. After heading the Technical Development department for the Hamburg-based shipping company CPO, Hannah switched in 2023 to the container terminal industry. In her leading role as Head of Automation Project, she is responsible for driving the automation roadmap for the EUROGATE Group.



Harry Nguyen, CEO and Founder, Realtime Business Solutions

Since 1991, Harry has led Realtime Business Solutions (RBS), a premier TOS provider, as Director. With over 30 years in the field, he excels in software R&D, notably spearheading the development of the industry-leading TOPS software. This state-of-the-art TOS optimises terminal operations, enhancing performance globally. Implemented in numerous terminals worldwide, TOPS remains at the forefront of the industry, showcasing Harry's ongoing commitment to innovation and excellence.



Héctor Iturria Sánchez, Senior Software Engineer and Project Manager, Prodevelop

With a degree in Computer Engineering from the Polytechnic University of Valencia, Hector has been linked to the creation of technological solutions for more than 15 years and more than 12 years in the port sector. He has participated in the development of management applications for multiple port authorities and since 2018 he has been working together with different international container terminals in the data acquisition field and creation of digital data platforms.



Hein Chetcuti, Operations Development Manager, Malta Freeport Terminals

Hein Chetcuti boasts over 20 years of expertise as an Information Systems and TOS specialist in the Container Terminal Industry. Renowned for his proficiency in digitalisation, he played a pivotal role in designing, developing and deploying crucial Business Intelligence tools and other mission-critical systems. With extensive experience collaborating with industry stakeholders, Hein holds a BSc from the London School of Economics and an MSc from Royal Holloway. He is currently pursuing a doctorate with a focus on innovation in container terminals.



Henrik Hanke, Digitalisation and Automation, DGT Duisburg GmbH

Henrik is a seasoned expert in digitalising and automating intermodal container logistics in the hinterland, boasting two decades of experience. He has led numerous projects for industry leaders in contract logistics, combined traffic and intermodal container logistics. With a strong technical foundation, Henrik prioritises the business perspective. Specialising in digital and process excellence, Henrik emphasises human involvement and resilient terminal design for both brownfield and greenfield projects.



Iván Deosdad i Lopez, Senior Vice President Operations, SAAM Terminals

Iván has more than 20 years of professional experience in the international port industry. Prior to taking up the position he worked for COSCO Shipping Ports, DP World and Hutchison Ports in various senior management positions. He joined the company in October 2021. He has a degree in Nautical and Maritime Transport from the Universitat Politècnica de Catalunya (UPC), with a Diploma in Container Terminal Management (MTO) from the DP World Institute.



Jan Bossens, CEO, Camco Technologies

Jan Bossens is the founder and CEO of Camco Technologies. He developed Camco technologies from a smart gate solution provider to a global provider of container terminal gate, rail, quay and yard automation solutions using proprietary image recognition and real-time location-based technology. Camco Technologies is still taking the industry lead with its digital twin solutions powered by data captured from Camco's own technology and TOS information. Today Camco counts over 200 full-time equivalents servicing 300+ clients across the globe.



Ji Zhang, Regional Director, Westwell

Joined Westwell in 2023 as Regional Director, Ji Zhang counts on double degrees in Telecommunication Engineering and Artificial Intelligence. With more than 15 years of experience in the sector, he has worked in different roles such as R&D, Sales or Management in European and Asian multinational companies.



Joan Carbó, Asset Digitization Project Engineer, APM Terminals Valencia

Joan works in APM Terminals as Asset Digitalization Project Engineer in the Maintenance Department. He is an Electronic engineer who graduated from the Polytechnic University of Valencia. Also graduated at the Artificial Intelligence Samsung Innovation Campus UPV. With a background in the Automotive Industry, Joan applies innovative and open-minded solutions to the Container Terminals, thinking outside the box and collaborating with the vendors in finding the best solutions for APM Terminals.



John Alvarez, IT Director of Terminal Development, Fenix Marine Terminal

With 22 years in the maritime sector, John Alvarez is a tech-driven professional dedicated to optimizing operations. He's played pivotal roles in developing Real-Time Locating Systems, data management platforms, and automated terminals, fostering efficiency and productivity. Having worked at esteemed firms like TraPac and P5 Solutions, John currently serves as IT Director of Terminal Development at Fenix Marine Terminal. Here, he spearheads IT solutions, driving innovation and growth in terminal operations.



Jon Arnup, Founder and CEO, Trent Port Services & TrentGO

With over 30 years of international experience in the port industry, Jon Arnup has held senior line management and corporate director roles with leading global port operators. As the leader of Trent Port Services for eight years and TrentGo for three years, he spearheads port-focused services, strategic projects a global eMarketplace solution. Trent received recognition as a Top-10 Startup Company in the APAC region by APAC Business Headlines magazine under Jon's leadership.



Juan Manuel Díez, Innovation Director, Port Authority of Valencia

Juan Manuel Díez, PhD in Industrial Engineering and MSc in Port Management, is the Innovation Director at the Port Authority of Valencia. With over 25 years' experience in ports and maritime transport, he focuses on innovation, efficiency, new technologies, and environmental protection. Juan is an author, instructor for the UNCTAD Port Certificate Program, and member of industry committees including ESPO, ALICE, and MEDPORTS, contributing significantly to port management advancements.

SPEAKERS Continued



José Andrés Giménez, Director of Port Logistics, Fundación Valenciaport

José Andrés Giménez, an Industrial Engineer from the Polytechnic University of Valencia (2005), boasts 17 years of expertise in logistics-port operations. He specialises in driving efficiency through Industry 4.0 technologies like IoT, Big Data, Artificial Intelligence and Process Automation. Previously, he served as Director of Energy and Security and currently holds the position of Director of Port Logistics at the Valenciaport Foundation (Port of Valencia). In this role, he manages innovation projects, leading multidisciplinary teams in collaboration with innovative international companies.



Jost Daemmgen, Industry Segment Leader - Port Solutions, TMEIC

After earning a degree in Mechanical Engineering from Ostfalia University of Applied Sciences, Jost embarked on his career as a Research and Development Engineer at Maschinenfabrik Kurt Neubauer GmbH & Co. He later transitioned to client-oriented roles at Erich Rottmann Technik GmbH, Konecranes, TMEIC and Kalmar, specialising in crafting optimal solutions for container ports and terminals. Jost's primary focus at TMEIC is aiding clients in selecting crane control and automation solutions to maintain competitiveness in the market for years to come.



Luis Canto, Chief Technical Officer, Yilport Holdings

Luis Canto has dedicated 25 years to the Ports Industry. As CTO of Yildirim Holdings, overseeing 25 ports across Asia, Europe, Africa, South and Central America, he drives innovation and sustainability. Beginning as a Design Engineer at IMPSA in Argentina, he later managed after-sales services in Southeast Asia. Joining Kalmar/Cargotec APAC Crane Upgrades division, Luis led projects across multiple terminals in Asia-Pacific.



Luisa Kempf, Senior Manager Sustainability & Energy Transition, Eurogate

Luisa Kempf is Senior Manager Sustainability & Energy Transition of EUROGATE Technical Services GmbH. EUROGATE a shipping line-independent container terminal group with container terminals in 12 locations across Europe. Luisa supported the TIC4.0 initiative from the start and EUROGATE is one of the founding members of TIC4.0.



Marco Fehmer, Chief Executive Officer, DSP Data and System Planning SA

Marco Fehmer, a Civil Chartered Engineer specialising in transportation and logistics, has been CEO of DSP Data and System Planning SA since 2017. DSP is a globally recognised Terminal Operations Systems (TOS) implementation and process optimisation consulting partner. Marco also serves as President of the Board of DSP LAB Pvt in Chennai, India and as a Member of the Board of Directors of DSP TALUMIS BV. Additionally, since 2022, he has been CEO of DSP AMERICA Inc.



Martin Tremblay, Executive Director of Information Technology, Montreal Gateway Terminals

Currently serving as the Executive Director of IT at MGTP, Martin's strategic insights into IT governance and best practices have greatly contributed to MGTP's success. From his early focus on warehouse management systems to his key role in Montreal's recent greenfield terminal project, Martin has consistently led technological innovation. Currently, he spearheads Project Mercury, MGTP's largest technology investment in a decade, aimed at significantly improving operational efficiency and data analytics capabilities through cutting-edge AI technologies.



Mathias Dobner, Chairman, BOXBAY

After completing his mechanical engineering doctorate, Mathias shifted from RWTH University Aachen to excel in executive management, specialising in container handling systems. Post-DEMAG's acquisition by Konecranes in 2018, he became VP of Container Handling Systems at SMS Group. He also serves as CEO of BOXBAY, a joint venture with DP World. With expertise in terminal operations, environmental factors and material flow, Mathias underscores the importance of holistic solutions for efficient handling systems.



Miguel Ruiz, Head of Employee Relations, APM Terminals Valencia

Miguel boasts over 25 years of diverse experience in container terminals, both locally and internationally. He began in various roles, including finance and commercial positions, before advancing to Managing Director roles at terminals such as La Havana (Cuba), Buenaventura (Colombia) and Gijon (Spain). Currently, he oversees employee relations in dockers pools companies, with a strong focus on trade union relationships. Miguel actively serves on the Board of Directors and participates in several associations, also handling public affairs for APM Terminals Spain GTW.



Nasser Ben Othman, Digitalization Manager, Terminals R&D Assets, CMA CGM

Nasser, a dynamic and proactive professional, has propelled innovation in the port industry for a decade. With a methodical approach, he navigates challenges, achieving significant milestones. Nasser's strategic vision drives business units forward, ensuring sustained success. With experience and passion, he continuously pushes boundaries, embracing opportunities in the evolving port landscape.



Norbert Klettner, Vice President, TIC 4.0

Norbert has been working for more than 15 years in the port and terminal industry implementing and integrating Terminal Operating Systems (TOS), initially for the terminal operator EUROGATE, and since several years as the Managing Director of the RBS EMEA Office implementing the TOPS Expert system. Norbert has been a founding member of TIC 4.0 since 2018 and is the Vice-President of TIC 4.0 and a member of the Executive and Operation Councils of TIC 4.0.



Oscar Pernia, Founder and Technical Lead, NextPort.AI

Dr. Oscar Pernia, Founder & Technical Lead of Next Port, is a prominent figure in innovation and R&D, particularly in advancing Artificial Intelligence within the Port Industry. With a background in Telecommunications Engineering and a PhD in Industrial Engineering focusing on Algorithms Design and Simulation for Marine Operations Optimization, he boasts over 20 years of global experience in Container Shipping. He is an active contributor to industry associations like DCSA, TIC 4.0, ITPCO, ISO, PEMA and Maritime Informatics.



Oskari Tähtinen, Product Manager Automation Software, Kalmar

Oskari Tähtinen, a proficient Product Manager specialising in Automation Software at Kalmar, brings six years of dedicated expertise to the table. Armed with a Master of Science degree from the Tampere University of Technology, Oskari boasts a solid background in technology and automation principles. His pivotal role at Kalmar includes advancing automation software offerings, staying abreast of industry trends and meeting customer requirements. Moreover, Oskari has contributed to numerous automation projects across Europe, Australia the US, delivering cutting-edge solutions for marine and intermodal terminals.



Pat O'Leary, Head of Technology, PEMA (Port Equipment Manufacturers Association)

With over 40 years of experience in the global ports and terminals sector, Pat O'Leary retired from Liebherr at the end of 2019. He began his career at Liebherr Container Cranes in 1978, where he served as Chief Electrical Engineer for over two decades, overseeing the development of various crane types. Pat now plays a crucial role within the association by supporting and coordinating the work of PEMA's technical committees, focusing on Safety & Environment, Automation & Control Technologies and Equipment Design & Infrastructure.



Peter Szelei, Senior Director Business Development, FERNRIDE

Peter Szelei is a seasoned business development leader in smart mobility, autonomous driving technology and the automotive industry. In the past 12 years, he has spearheaded initiatives at the intersection of technology and transportation, leveraging his expertise to forge strategic partnerships and drive expansion in the evolving landscape of mobility solutions. He specialises in helping start-ups and more mature technology companies enter new markets or commercialising cutting-edge technologies.

SPEAKERS Continued



Que Tran, Vice President - Technology and Transformation, Europe, DP World

Que has extensive senior technology and transformation leadership experience within international organisations. He is currently leading Technology and Digital across Europe at DP World, a leading enabler of global trade and an integral part of the supply chain. He has been named among the top 30 leading business and technology executives in the CIO 100 by CIO UK for three consecutive years and has been conferred the title of 'Fellow of the British Computer Society' and recognised for outstanding achievements and contributions to technology.



Rafael Velasquez, Director Optimisation and Integration, INFORM

Rafael Velasquez brings 17 years of experience in optimisation projects within the Research and IT sector. He joined INFORM in 2008, spearheading numerous international projects with industry leaders like GCT, DP World and TraPac, advancing optimisation solutions in the container terminal industry. Rafael holds a PhD in Mathematical Optimisation from the Technical University of Kaiserslautern and he is a renowned speaker at industrial and academic conferences, advocating for the practical applications of Operations Research and AI.



Ramana Jampala, President and CEO, Avlino

Ramana Jampala is the Co-Founder and CEO of Avlino, bringing a unique perspective on technology trends and market impact to the company's strategy. With 25 years of experience, Ramana is known as an entrepreneur and versatile Technology Executive, excelling in Investments, Business Strategy, Advisory Services and Design Engineering. His career spans successful digital initiatives for Fortune 500 corporations and technology startups. As General Partner of SAS Investors, he leads early-stage investments and serves on the Board of Directors of several thriving enterprises.



Robin Audenaerdt, Program Manager, Audenaerdt Project Management

Robin began his career journey as a project engineer at Europe Combined Terminals in Rotterdam in 1995, the continent's largest container port. Over the years, he has served as a project and implementation manager for various terminals and ports, handling container, car, multipurpose and airfreight operations. Currently, he serves as a Program Manager at Hutchison Ports ECT Euromax terminal in Rotterdam while also sharing his expertise as a part-time lecturer in logistics at Breda University of Applied Sciences in The Netherlands.



Rodrigo Garro, Sales and Marketing Manager, TMEIC

With over 20 years in Automation, Rodrigo started in the Automotive industry, shifting a decade ago to Ports & Terminals at Orbita, now TMEIC Port Technologies. Utilizing his cross-industry expertise, he facilitated the company's global expansion. Rodrigo, passionate about data and solution design, served as Key Account Manager in 15+ countries before becoming Sales and Marketing Manager, assisting clients in terminal automation solutions at TMEIC.



Stefan Hillenbrand, Head of Program Management, Strategic Modernisation, APM Terminals

Stefan Hillenbrand has been instrumental in driving APM Terminals' global modernisation programme for the past six years. Leading programme strategy, transformation and integrated terminal modernisation roadmaps, he focuses on data science, performance analytics and functional PMO. Collaborating with stakeholders across 60+ global locations, Stefan elevates safety, efficiency customer service standards through digital transformation. Stefan holds an MSc in Supply Chain Management from Copenhagen Business School and has completed executive education programmes at the Massachusetts Institute of Technology.



Stephan Piworus, Vice President Europe, atai

Stephan Piworus assumed the role of Global Vice President at Identec Solutions in 2016, overseeing the Marine & Ports business unit and global sales activities. With extensive experience spanning various roles in both industry and the public sector, he has played a pivotal role in establishing the thriving Maritime Cluster in Hamburg. Throughout his career, Stephan has been a champion of innovation and change management, consistently driving progress and transformation in the organisations he serves.



Sven Valentin, General Director, MSC Terminal Valencia

Sven Valentin has been working as Grl Mgr for MSC Container Terminal Valencia SAU (MSCTV), since 2008. Sven Valentin has acquired extensive operations experience in the Port sector, working in different operations functions in several container terminals in different ports, since 1994. Before working in the Ports, Sven sailed as deck officer on merchant ships 3 5 years ago.



Sven Zoelle, Managing Director, DGT Duisburg GmbH

Sven brings a wealth of experience to his role as Managing Director at Duisburg Gateway Terminal GmbH, the largest upcoming container terminal in the European hinterland. With extensive experience as a product owner in digitalisation projects in intermodal container logistics, Sven aligns processes and technology people for operational excellence. Having managed multiple container terminals and spearheaded sustainability initiatives, Sven is focused on developing Duisburg Gateway Terminal into the largest and only climate-neutral container terminal in the European hinterland, positioning it for future success.



Yvo Saanen, Managing Director, Portwise

Dr. Yvo A. Saanen is the Managing Director and Founder of Portwise. Dr. Saanen has been involved in a range of projects, including long-term development, process improvement, terminal extensions and redesign of handling systems, as well as the design of greenfield terminals. Notable projects include DP World's facility in Antwerp, HPH's Euromax facility in Rotterdam OOCL's facility in Long Beach, along with recent automated terminals in Rotterdam by APM Terminals and DP World.



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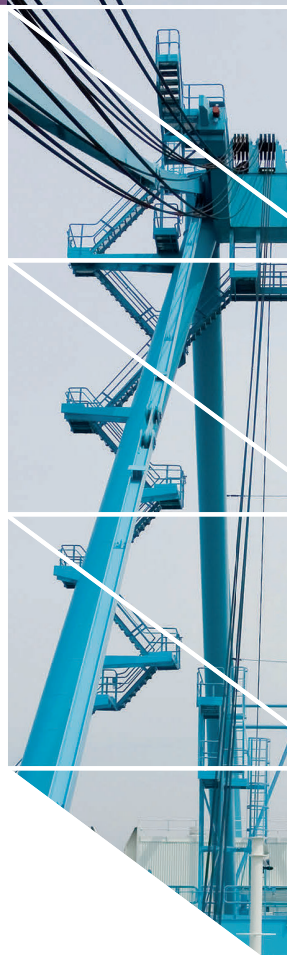
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INFORM specialises in AI and optimisation software to improve operational decision making. The company, based in Aachen, Germany, has been in the optimisation business for 50 years and serves a wide span of logistics industries including ports, maritime, and intermodal terminals. With a broad range of standalone and add-on software modules, INFORM delivers huge value for its customers through its unique blend of algorithmic based software expertise, rich industry experience, and big world thinking. INFORM's industry proven optimisation algorithms have been delivering real-world results at the world's most complex ports and terminals for over 25 years, improving everything from yard stacks, vehicle utilisation, crane productivity, through to rail processes. When it comes to optimisation, experience and results, customers should count on the experts at INFORM.

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RBS

RBS specialises in the development of software applications for the Container Handling Industry and has accumulated extensive experience in software development. The company has exclusively focused on the Container Handling Industry for nearly three decades. Throughout this period, RBS has offered consulting services to the Shipping and Rail Container Handling Industry and has developed cutting-edge software tailored specifically for this sector. The company has successfully implemented its 'TOPS' software in numerous Container Handling operations across various countries, including Australia, Brazil, Egypt, France, Germany, Indonesia, Italy, Japan, Lithuania, New Zealand, Panama, Romania, Taiwan, Togo, and Vietnam.



Westwell

Westwell is a global provider of autonomous driving solutions. They are dedicated to unlocking the potential of various industries through AI and new energy, striving to be an industry pioneer in global intelligent services.

With a mission to "make a well change" in container logistics for their customers and partners, Westwell has developed multi-scenario intelligent solutions for the bulk logistics fields, including seaports (via their dedicated seaport solution – WellOcean®), railway hubs, dry ports, airports, and factories, etc. By introducing Qomolo® (their autonomous new energy commercial vehicle brand), Westwell connects operation and circulation between various production factors and transport capacity. Through the launch of Loopo® (their digital interconnection platform for production factors), Westwell is capable of delivering enhanced efficiency and sustainable productivity value for end-users in every sector, including production nodes and trading flow.

To date, Westwell has deployed hundreds of autonomous driving vehicles and sets of autonomous driving systems commercially across the globe. Their products and services cater to a wide range of freight logistics scenarios such as seaports, dry ports, and manufacturing plants, serving over 160 clients in 18 countries and regions worldwide.

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Avlino

Avlino is a US-based Artificial Intelligence company specialising in delivering solutions to enhance the efficiency of Container Terminal Operations. The company aims to transform the supply chain by providing terminal operators with solutions to overcome common pain points and challenges that undercut their business objectives. With this mission, the company developed AICON, a Solution Suite designed to dynamically solve the challenges of demand fluctuations. Combining AI/ML and Operations Research, AICON delivers actionable insights, real-time work instructions, and autonomous workflows in a cutting-edge approach that significantly reduces manual processes, increases throughput, optimises resource allocation, and improves customer service.



BOXBAY

BOXBAY is a joint-venture formed by DP World and SMS group, and it offers a disruptive technology that significantly improves operations at container terminals. The BOXBAY High Bay Storage systems achieve a three-fold increase in the transshipment capacity of container terminals and use only one third of the footprint of conventional storage systems for an equivalent number of containers. Instead of stacking containers directly on top of each other, BOXBAY places each container in an individual rack, making each one directly accessible. In October 2022, the high-bay storage system for containers by BOXBAY was named as the winning concept for the German Award for Supply Chain Management 2022.



CONROO

CONROO enables terminal and depot operators to efficiently handle trucks and utilise off-peak capacity. This is realised by a fully digital gate handling and a state-of-the-art slot management platform. CONROO closes the communication gap and frees up valuable logistics resources. CONROO believes that efficient logistics is essential for the global economy. Global freight volumes continue to increase, yet a significant amount of capacity remains unused. Therefore, it is crucial that the logistics chain runs smoothly and efficiently uses all available resources. CONROO aims to accomplish this by enabling efficient logistics and recognising the value of all resources. To achieve a maximally efficient logistics chain, CONROO works with stakeholders at all stages of the supply chain. They welcome all contacts and exchanges from terminal or depot enthusiasts, truckers, freight forwarders, logisticians, applicants, decision-makers, and members of the press.



Rocsys

Rocsys is recognised as a frontrunner in the field of autonomous charging solutions for electric transportation. Employing a pioneering methodology that integrates soft robotics, AI-driven computer vision, and data-centric services, Rocsys is dedicated to delivering a dependable, smooth, productive, and economical charging encounter for both fleets and consumers. By actively participating in industry consortiums and establishing strategic alliances with multinational corporations and OEMs, Rocsys establishes itself as the benchmark for the forthcoming era of autonomous charging.



Siemens

Over 5500 electrical port cranes worldwide are currently controlled and driven by Siemens, the number one brand of choice in port cranes since 1891 where Siemens commissioned the world's first electrical port crane. Siemens' extensive experience in development, engineering and commissioning ensures technical and operational know-how. This domain know-how is key in digitalization and automation of terminals and enables successful brownfield modernization & automation projects to ensure reliable, safe, productive operation against lowest cost of ownership.



TMEiC

TMEiC propels industries globally with its extensive range of distinctive system solutions, encompassing variable frequency drives, motors, photovoltaic inverters, and advanced automation systems tailored to diverse industrial applications. The birth of Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEiC) in 2003 marked the amalgamation of Toshiba and Mitsubishi Electric Corporation's industrial systems divisions.

BRONZE SPONSORS



AllRead

AllRead is a software company specialising in Optical Character Recognition (OCR) solutions for the port ecosystem. Since 2019, it has been helping Intermodal platforms control containers gate-in/gate-out by road, rail, or cranes. Following a patented technology based on Deep Learning (Artificial Intelligence), AllRead offers a lightweight and cost-effective system to Ports and Terminal Operators, removing financial and technical barriers to adoption. AllRead's customers include some of the largest port operators in Europe and Latin America: The Port Authorities of Valencia, Algeciras, Barcelona, Hutchison BEST Terminal, HGK CTS Terminal, D&C Group, Port of San Antonio (EPSA), among others.



ATAI

The applied AI company known as ATAI is at the forefront of Digital Transformation in the Maritime, Logistics, and Supply Chain industries. Their pioneering efforts focus on optimising productivity and recognising opportunities for sustainability and cost efficiency through innovative business models. ATAI achieves this by streamlining current processes with comprehensive problem-solving applied AI solutions. Their capabilities are enhanced by AI algorithms, sensors such as cameras, location sensors, wireless mesh networks like LoRa and 5G, as well as lidar and radar technology. As a result, ATAI has successfully tackled numerous operational hurdles across various market sectors.



Camco Technologies

Camco Technologies is recognised as a pioneer and market leader in container terminal automation. Their image recognition and location tracking solutions are capable of registering all movements that occur during the container hand-over processes at various locations such as the gate, yard, cranes, and rail operations. The data captured by their solutions allows for optimisation of terminal processes, while their software empowers terminals to achieve their digitalisation goals. The solutions provided by Camco Technologies play a significant role in enhancing operational efficiency, customer satisfaction, and profitability.

All the necessary hardware and software for their solutions are developed at Camco Technologies' headquarters in Belgium. Their solutions have already been successfully implemented in over 300 terminals worldwide. With a widespread network of subsidiaries and partnerships, Camco Technologies ensures that their clients are always within easy reach.

SPONSORS Continued



DSP Data and System Planning

DSP Data and System Planning – DSP – has been operating as a technological company in the Ports & Terminals industry since 1986. They provide a wide range of professional services and products aimed at aiding ports and terminals in their optimisation and digitalisation endeavours. The company offers global consulting and support services and products related to Terminal Operating Systems (TOS) and automation. They possess the necessary expertise to carry out comprehensive N4 implementations, which encompass project management, business process mapping, configuration, integrations, training, testing, go-live support, and post go-live assistance.



FERNRIDE

FERNRIDE offers scalable automation solutions for yard trucking that increase productivity, promote sustainability, and improve worker safety. The company employs a human-assisted autonomy approach, which allows for remote takeovers of trucks when necessary. This ensures seamless integration and reliable operations for logistics operators. With over a decade of research and high-profile customers, including Volkswagen, HHLA, and DB Schenker, FERNRIDE uses cutting-edge technology to address major industry challenges, such as driver shortages and the negative environmental impact of logistics operations. The company was founded by Hendrik Kramer, Maximilian Fisser, and Jean-Michael Georg, and currently has over 130 employees.



IGO Solutions

IGO Solutions is a specialist in container terminal automation and over the past 20 years have played a significant role in automating over 12 global container terminals. They are also leading provider of AI-driven optimisation technology solutions for container terminals, offering new generation products and consulting services, that are making a real tangible difference to container operations.

Over the past years IGO has invested in innovative solutions aimed at further improving container operations at significantly lower costs than their competition. These solutions include:-

- Remote STS Crane Automation using latest LIDAR cameras through our sister company AMLAB
- Latest RFID Technology, for location detection services through our sister concern IGOVicininity



TrentGO

TrentGO is a Global eMarketplace company, headquartered in Singapore, with a simple aim "To become a truly global eMarketplace where all 'Buyers, Sellers & Logistic Partners' can interact and trade in a transparent, live and competitive manner".

With multiple port customers, on five continents today, their mission, focus, and drive is to:

- Change the way ports and port operators look at buying all their spare part needs forever.
- Become the world's leading online Spare Parts, Products & Services E-Marketplace for Ports, and bring an unparalleled level of service to ports worldwide.
- Become the most transparent, easiest, and cost-effective way to buy products and spare parts for a terminal.
- Support digitalisation of ports and provide a new business process flows to support increasing levels of equipment and process automation within the port industry.



Kalmar

Kalmar is recognised as the global leader in sustainable cargo and material handling for ports, terminals, distribution centres, and heavy industry. The company boasts an extensive electric portfolio and a worldwide service network, which enables them to assist their customers in transitioning towards safer, more eco-efficient, and productive operations. Collaboratively, Kalmar and its customers work towards developing innovative solutions that have the potential to shape the future of the industry, ultimately enhancing the efficiency of their customers' operations.



Moffatt & Nichol

Moffatt & Nichol is a multidisciplinary, full-service professional services firm that possesses expertise in structural, marine, and waterfront facilities; civil, coastal, mechanical, and electrical design; marine construction cost engineering; and inspection and rehabilitation. The company offers creative and practical solutions in the field of port engineering. With over 75 years of experience, Moffatt & Nichol is recognised as a leader in the planning, design, and operations of ports and maritime infrastructure, and has played a crucial role in the development of terminal and waterfront facilities worldwide.

Throughout the evolution of containerisation and the current complexities of goods movement trends, environmental regulations, and advanced technologies, Moffatt & Nichol has established an international reputation for delivering innovative solutions to support a wide range of port, maritime, and freight transportation projects.



Navis

Navis is recognised as the foremost brand of TOS within the Kaleris supply chain execution software platform. The Navis TOS solution has been instrumental in enhancing performance and efficiency for esteemed organisations operating in the cargo supply chain.

The company takes great pride in its ability to amalgamate industry best practises with cutting-edge technology and exceptional services, thereby empowering its customers to achieve maximum performance and mitigate risk, regardless of the nature of their cargo. By adopting a comprehensive approach to operational optimisation, Navis users are able to reap the benefits of enhanced visibility, swifter processes, and quantifiable business outcomes.

Whether it involves monitoring cargo movements within a terminal, enhancing vessel safety and cargo capacity, optimising rail network planning and asset utilisation, automating equipment operations, or managing multiple terminals through an integrated and centralised solution, Navis plays a pivotal role in streamlining operations.

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TMEiC

TMEiC propels industries globally with its extensive range of distinctive system solutions, encompassing variable frequency drives, motors, photovoltaic inverters, and advanced automation systems tailored to diverse industrial applications. The birth of Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEiC) in 2003 marked the amalgamation of Toshiba and Mitsubishi Electric Corporation's industrial systems divisions.

EVENING DINNER SPONSOR



Prodevelop

Prodevelop is a software company specialised in ports and terminals digitalisation that has a technological alliance with 200+ ports and terminals worldwide. With 30 years of collaboration on innovative projects, they offer their clients cutting-edge technology to transform their business through digitalisation, solving complex problems and differentiating them from their competition.

LUNCH SPONSOR



Three Group Solutions

Three Group Solutions delivers wholesale, enterprise, and IoT solutions that leverage CK Hutchison's global mobile networks, partner networks, and CK Hutchison's expertise in ports and related services, retail, and infrastructure. CK Hutchison Group Telecom operates the three networks in Italy, the UK, Sweden, Denmark, Austria, and Ireland. It also holds a majority interest in Hutchison Telecommunications Hong Kong Holdings Limited (HTHKH), providing cutting-edge mobile services in Hong Kong and Macau. Hutchison Asia Telecom (HAT) comprises CK Hutchison's mobile operations in three rapidly growing Asian markets – Indonesia, Vietnam, and Sri Lanka. Hutchison Ports, the world's leading port investor, developer, and operator, is also a member of CK Hutchison Holdings. This unique position enables Three Group Solutions to offer customers the best solution designers, engineers, and go-to-market specialists across CK Hutchison, in addition to market expertise.

BREAKFAST SPONSOR



PORTCHAIN

Portchain

Portchain is known as the leading provider of berth alignment solutions for container terminals and carriers. They collaborate with prominent container carriers and terminal operators to develop mutually beneficial solutions that enhance operational efficiency in container shipping. Established in 2017 and headquartered in Copenhagen, Portchain operates on a worldwide level, catering to container terminals and carriers across Europe, Asia, North America, South America, and Africa.

NETWORKING BREAK SPONSOR



GullsEye 
KEY TO PRODUCTIVITY

GullsEye

GullsEye is a terminal operating system that accelerates container, RoRo, general cargo, and liquid cargo services in the terminals. The system guarantees customer satisfaction and provides comprehensive auditability through its advanced monitoring and reporting modules.

The optimisation and workflow modules of GullsEye contribute to increased productivity and reduced operating expenses. The system offers rich dashboards designed for mobile devices and web, allowing users to access all statistics and key performance indicators instantly. This feature enables users to make timely decisions with accurate and real-time information. Additionally, customers can manage and monitor operations from anywhere using the web and mobile applications provided by GullsEye. Overall, GullsEye offers terminal customers a complete self-service solution for executing and monitoring their operations.

DELEGATE BAG SPONSOR




VISY

Visy

Visy provides process automation ecosystems to manage the flow of traffic, cargo and personnel in ports, terminals, and logistics centres. Every asset that goes in or out of a facility, whether by road, rail, or quay, can be managed by Visy technology. Visy's mission is to help its customers save time and money on each transaction therefore improving operational KPIs.

With a history spanning three decades, Visy is a pioneer in optical character recognition (OCR), applied AI, and deep learning for camera-based solutions in process automation. Visy ecosystems manage more than 6,000,000 automation tasks per day in over 30 countries to improve the quality of the supply chain.

Visit www.visy.fi to learn more.

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EXHIBITORS



AUCOS-Systems GmbH

AUCOS-Systems GmbH was founded by Rüdiger Metternich in Buchholz i.d.N. in 2018. It serves as the sole sales company for all the different technical systems developed by RMM, Metternich Mechatronik GmbH, which are designed to optimise technical equipment connected with the horizontal transport of containers.

The main product offered by AUCOS-Systems is AUCOS-Coup, an automatic coupling between truck and trailer. This product has been in use and patented since 2010, and it is currently being utilised at various terminals worldwide. Another innovative development by AUCOS-Systems is AUCOS-Lock, an automatic locking system for containers on the chassis. Additionally, the company is working on the development of other components such as AUCOS-Leg.



TCK.W

The leading company in the field of wire rope and conveyor belt inspection devices and automatic online real-time monitoring systems is Luoyang Wire Rope Inspection Technology Co., Ltd, also known as TCK.W. They specialise in the design, manufacturing, sales, and after-sales services of these products. By integrating the MRT system and VI system, they are able to easily, accurately, and efficiently detect both internal and external defects. TCK.W products have obtained CE, TUV, IC, and FCC certificates, making them suitable for various industries such as port and marine, onshore and offshore, steel and metallurgy, mining, elevator, cable car, and construction.



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RECAPPING CTAC NORTH AMERICA: INSIGHTS FROM INFORM

"INFORM HAS PROVEN REPEATEDLY THAT OPTIMISATION IS THE ROUTE TO ENHANCING CONTAINER THROUGHPUT THROUGH IMPROVED ASSET UTILISATION IN CONTAINER TERMINALS."



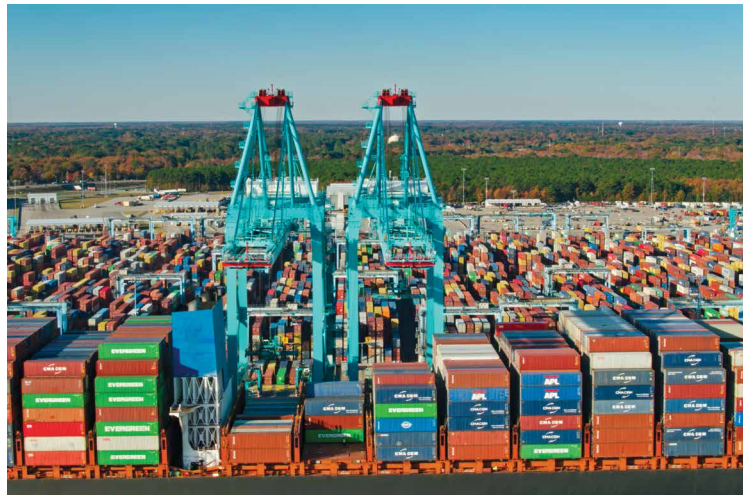
Dom Magli, Staff Reporter, Port Technology International, interviewing **Matthew Wittemeier**, Director of Marketing and Sales, INFORM

At PTI's Container Terminal Automation Conference (CTAC) North America in November 2023, Matthew Wittemeier, representing INFORM, discussed his perspective on container terminal optimisation. With over 25 years of experience, INFORM emphasizes proven technological solutions tailored to diverse end-user requirements. Their insights shed light on the role of AI and optimisation in shaping the future of automation in port operations.

What technological solution does INFORM believe is best for optimisation?

Matthew Wittemeier: We've been in the business of container terminal optimisation for over 25 years, and we've learned a lot along the way. From our perspective, the best technological solution to achieve "optimisation" is both one that is proven in the real world and one that is flexible to the end-users' precise requirements. Let's break that down.

There are a lot of startups coming out and saying they can use AI, machine learning, or other techniques to improve container terminal operations. However, we see an equal number of projects fail as these startups lack industry experience, knowledge, or long-term capital to see them succeed in what is a very entrenched industry. Here, proven track records are crucial to success. At INFORM, we've been refining our proven optimisation algorithms for decades across a broad customer base, including some of Europe's largest maritime terminals down to small intermodal



facilities in North America and everything in between.

That brings us to the second half of the solution design – a flexible solution. The solution that Container Terminal Burchardkai (CTB) needs in Hamburg, Germany, is widely different compared to what Norfolk Southern's Rossville intermodal terminal needs in Memphis, US. While the core algorithm – say our Yard Optimizer with housekeeping – is the same, how it is configured and implemented varies greatly to ensure each end-user achieves their specific optimisation goals.

We can also look at this question from a technology perspective. There's a saying: "There is more than one way to bake a cake." (Well, that might not be the actual saying, but that is the PG, professional version, at least.) Many technologies like operations research (OR), artificial intelligence (AI), or subsets thereof

like machine learning (ML), natural language processing (NLP), generative AI, etc., exist today to apply "smart," algorithmic-based decision making that can be integrated into computer software. Each of these "tools" has a potential series of roles to play.

As an example, ML can be used to analyse past data and derive meaningful insights. At INFORM, we use these insights to enrich the data and data parameters we use in our algorithms. However, ML has its limits. Data insights from 2019 were not indicative of what would happen in 2020 due to the COVID-19 disruptions, and further, data from the Covid era is proving to have limited applications in predicting/ informing today's terminal operations. To overcome these effects on the ML tool, one must consider other technologies.

Again, at INFORM, we leverage highly refined and thoroughly

tested OR-based algorithms at the core of many of our optimisation modules. These algorithms leverage currently available data to efficiently model and derive an optimal solution for a particular optimisation challenge in real time. There are no delays to the terminal's operations. OR-based decision making is extremely powerful at optimising the now.

What role does INFORM believe AI will play in the progression of automation?

MW: As an industry, when we think of automation, the first

thoughts are typically large, expensive automated hardware like an automated stacking crane (ASC) or automated guided vehicles (AGVs) buzzing around a terminal, moving containers from one place to the next. While these are the highly visible aspects of container terminal automation, these robots rely on equipment control systems (ECS), or software, to drive them. Under the ECS layer exists the terminal operating system (TOS), or central operational data system, where more software collects and disseminates operational messages.

Algorithmic-based AI tools like the add-on optimisation modules INFORM delivers into the market sit firmly within the software environment to improve the efficiency of operations while also improving the utilisation of assets. In a 2 million TEU facility, we would expect to see a 15-35 per cent increase in productivity numbers depending on the assets you're looking to optimise (ASCs, AGVs, etc.). What's more, the efficiency of these algorithms is increasing at rates unmatched on the hardware side.

A typical planning problem INFORM solves today in real-time

"AI AND OPTIMISATION ARE THE TOOLS THAT TERMINAL OPERATORS SHOULD BE LOOKING AT TO IMPROVE HOW THEIR MANUAL, SEMI-AUTOMATED, OR FULLY AUTOMATED TERMINALS PERFORM."





would have taken us 110 years to solve in the early 1990's.

This is because of a 2,000 times increase in physical computing power. This seems impressive until one compares it to the advances in optimisation algorithms over the same period. Linear Programming algorithms, considered the most important class of optimisation techniques by many experts, have improved by a factor of 1.74 million times. In short, over the past 30 years, there has been an 870-times improvement in software's performance compared to hardware's. Significant improvements in automation will undoubtedly come from AI and software as opposed to hardware moving forward.

What effect will automation have on ports and terminals' container throughput?

MW: I think the past 25 years have shown conclusively that automation, on its own, does not significantly improve a terminal's container throughput. It has been

argued for the better part of the past decade that with the increase in hardware complexity and quantity of hardware sensors, there have been decreases in equipment productivity. No, overall, automation is not the tool that was promised to dramatically improve terminal efficiency and increase container throughput.

Conversely, INFORM has proven repeatedly that optimisation is the route to enhancing container throughput through improved asset utilisation in container terminals. We started our journey some 28 years ago, about the same time as the first automated terminal in Rotterdam was kicking off. We have shown that algorithmic-based, real-time yard optimisation can dramatically decrease container rehandlers. When paired with our housekeeping (or grooming) algorithm, we can significantly improve the peak period efficiency in terminals. Our crane and vehicle optimisers drive up equipment productivity while also allowing the same quantity of work to be completed with fewer active assets.

This results in driving down OPEX and future CAPEX costs. Our ML module has proven to be extremely capable of improving data accuracy and parameterised data inputs in these decision making processes.

In short, AI and optimisation are the tools that terminal operators should be looking at to improve how their manual, semi-automated, or fully automated terminals perform. They say, "The proof is in the pudding", and our experience and track record prove our point. No other vendor in the industry can match the experience, knowledge, and track record of INFORM in delivering optimisation solutions that work.

What is INFORM's long-term goal for automation?

MW: We firmly believe that software-based decision automation, or "decision making," as we commonly refer to it, should be implemented broadly to free humans from mundane, routine decisions, allowing them to focus

“WE FIRMLY BELIEVE THAT SOFTWARE-BASED DECISION AUTOMATION, OR “DECISION MAKING,” AS WE COMMONLY REFER TO IT, SHOULD BE IMPLEMENTED BROADLY TO FREE HUMANS FROM MUNDANE, ROUTINE DECISIONS, ALLOWING THEM TO FOCUS ON MORE COMPLEX, NON-ROUTINE CHALLENGES.”

on more complex, non-routine challenges. As already noted here, we can automate 90-98 per cent of daily operational decisions. Think of what your operations team could be doing with their experience and knowledge if they weren't focused on yard planning or work order assignments. The value-added potential is huge!

What are INFORM's plans for 2024?

MW: Without giving too much away, we have quite a few exciting things in the pipeline. Of course, our principal objectives are to deliver solutions to our current customers. With active deployments at PSA, DP World, and Norfolk Southern, to name a few, we have several new customer solutions in the works, and we're looking forward to bringing these solutions live. This comes on the heels of significant upgrades with TraPac and GCT Deltaport in 2023.

Furthermore, and as we have become known for, we've got some interesting developments

in the works. We have just kicked off a project with a major American terminal operator to help them better understand how to improve their maritime terminal's yard throughput using our yard optimisation and machine learning modules – something we've been doing with CTB in Hamburg for nearly two decades. We're also working on the challenges that vehicle electrification will bring to terminal operators when deploying at scale, and we've been looking at the continued development of ML applications. We've built an ML algorithm that can accurately predict week-to-week dwell time in North American intermodal facilities. Cool stuff!

ABOUT THE AUTHOR:

Matthew Wittemeier, CPM is Director of Marketing and Sales at INFORM's Terminal & Distribution Center Logistics Division where he also sits on the board tasked with driving the company's customer-facing business strategy. In his time with INFORM, he has become a thought-provoking contributor to many industry publications and

conferences. He's co-author of the multi-award-winning 2038: A Smart Port Story – a novella about the future of technology in terminal operations and the social challenges it may bring. In addition, he is a member and judge at The Academy of Interactive and Visual Arts (AIVA), is a Certified Practicing Marketer, and sits on several boards. He holds a Bachelor of Management and Professional Studies.

ABOUT THE COMPANY:

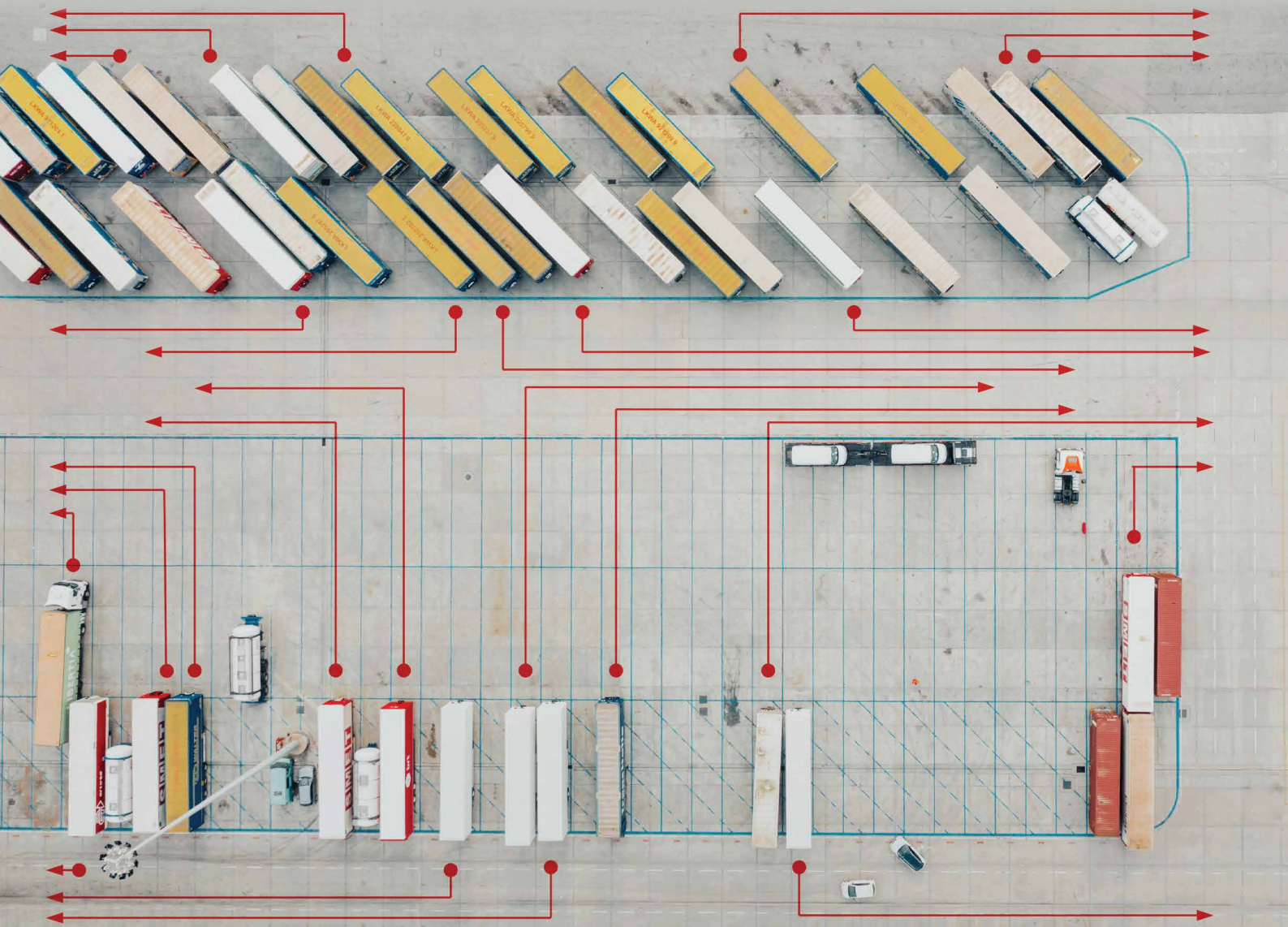
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More Info: <https://infrm.co/terminal>

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AUTONOMOUS TRANSPORTATION IN TERMINALS WITH GLOBAL PATH PLANNING AND V2X





Dr. rer. nat. Chao Chen, Head of Research and Innovation Group, Westwell

INTRODUCTION

The latest research progress in robotics and Artificial Intelligence (AI) helps autonomous driving technology become more and more applicable in daily life and industry scenarios. The robotaxi and the autonomous trucking systems are built mainly based on vehicle on-board sensors and computing units. As the operation domain on public roads involves large-scale scenarios regarding locations and objects, an intelligent vehicle must be able to make its decision with its own perception and localisation inputs. Although many V2V and V2I solutions are employed to help deal with complicated situations, the system coverage is limited. The management system of a fleet of robotaxi or autonomous trucks is usually rather a platform managing ride-sharing or logistic orders than a system coordinating the traffic flow, because the majority of road occupants are still manually driven vehicles.

On the other hand, if an autonomous vehicle is working in a closed environment, for example container terminals or logistic hubs, the operation domain is well-defined and bounded in the region. Without a doubt, the problem complexity is reduced by orders of magnitude, especially the corner



cases. In addition, a centralised traffic management system can greatly improve the productivity of the autonomous fleet by optimising the routes to reduce travel time or waiting time. The reasonable size of operation space enables full coverage of smart infrastructures to boost the perception range of a single vehicle. The information gathered either by smart vehicles or roadside units can be uploaded and help the central system to make global decisions.

During the years of pioneering autonomous fleet operation in several container terminals, Westwell gained a significant amount of experience in managing and optimising operations.

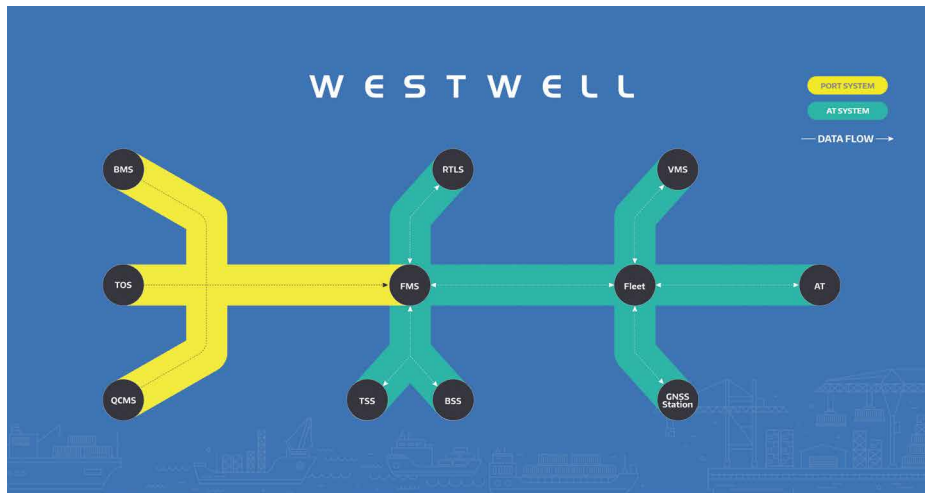
The team has developed a fleet management system that addresses global route planning and coordinates the traffic with V2X data. The following sections will make a brief introduction to the fleet path planning approach and the V2X applications with remote vehicle localisation solutions.

FLEET PATH PLANNING

Evolutions of Fleet Path Planning

A fleet management system (FMS) in container terminals started with the deployment of automated guided vehicles (AGV). At that time, the AGV operated in areas isolated from manual trucks, FMS had complete knowledge and control

“DURING THE YEARS OF PIONEERING AUTONOMOUS FLEET OPERATION IN SEVERAL CONTAINER TERMINALS, WESTWELL GAINED A SIGNIFICANT AMOUNT OF EXPERIENCE IN MANAGING AND OPTIMISING OPERATIONS.”



“THE LATEST DEVELOPMENT OF THE PATH PLANNING STRATEGY IS TO COMBINE THE GLOBAL PATH PLANNING IN FMS AND THE LOCAL PATH PLANNING FROM AT.”

of the traffic on the field. Routes and paths could be designed and optimised offline. The fleet could operate as a machine with well-synchronised clocks. Only limited exception handling was required. In this system, a single AGV only needs to have basic collision avoidance functionality. Its major task is to follow the exact trajectory commanded by the FMS. An AGV doesn't need to negotiate with the traffic, as the FMS already sorts out all the sequences and resolves all the conflicts.

The situation becomes more challenging with mixed traffic scenarios, as an autonomous truck (AT) operates together with manual trucks without time or space separation. The most straightforward solution is to let the AT determine its route and path, and FMS only provides the destination and some middle waypoints. This approach is the same as the robotaxi on public roads, which is easy to scale and supports many ATs. However, since an AT only has a limited range of sensing, it can only come up with local optimal decisions. The

situation becomes even more tricky in conflicts, for example, uncontrolled intersections or merges. Rules need to be carefully designed to avoid deadlock of multiple ATs. To solve complicated deadlocks and optimise the traffic flow, FMS started to act as a coordinator in many cases.

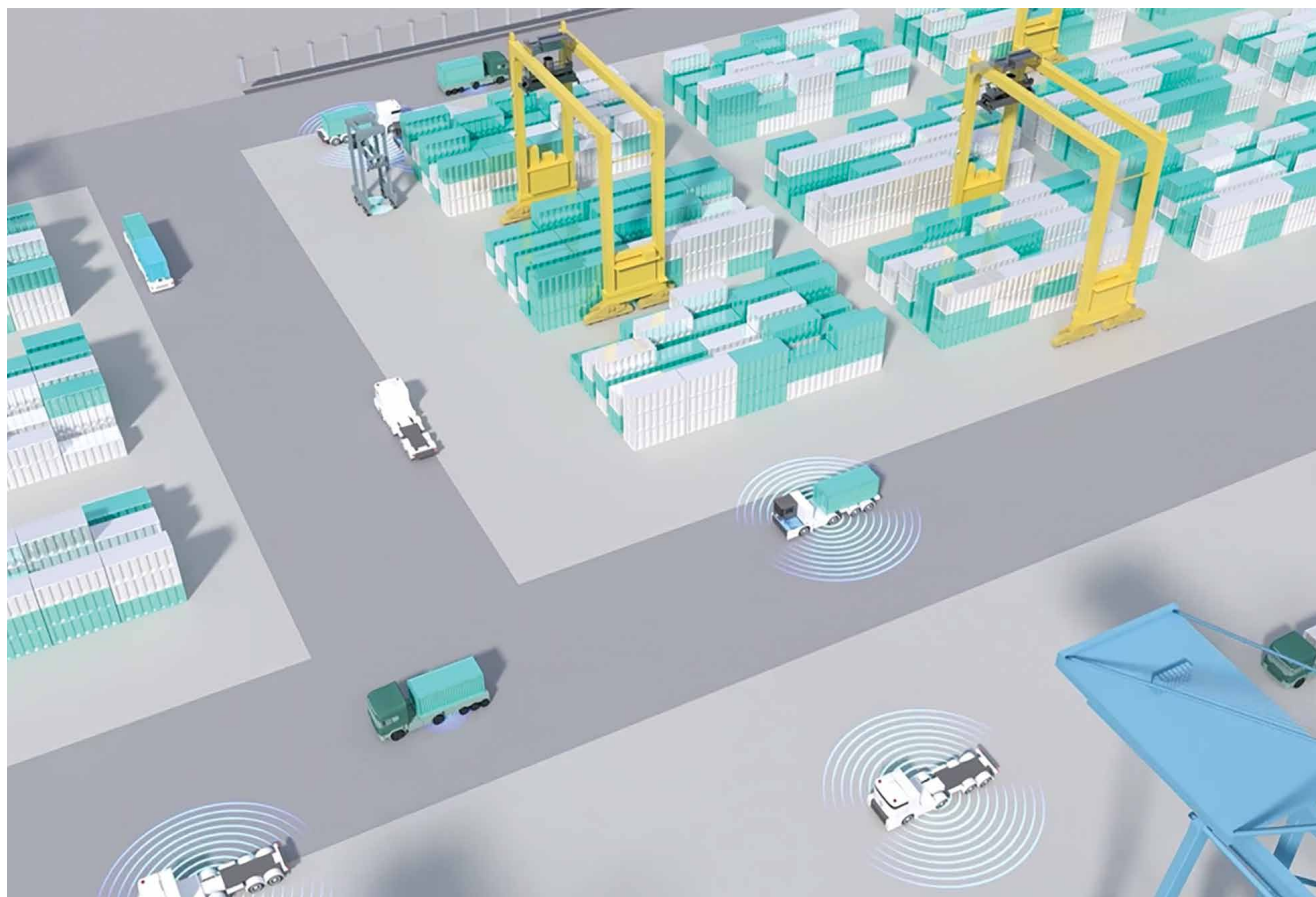
Thus, Westwell's global path planning is born again, but quite different from the initial one. The latest development of the path planning strategy is to combine the global path planning in FMS and the local path planning from AT. FMS can optimise the traffic flow from the global perspective, while AT has the flexibility to manoeuvre in its close environment.

Cooperation between Global and Local Path Planning

The figure above illustrates an example of Westwell's system blocks in the container terminal. The yellow parts are the existing port systems and the green ones are the AT systems. According to this architecture, FMS is the centre node communicating with the terminal operation system (TOS),

block management system (BMS), quay crane management system (QCMS) and the AT fleet. Besides its basic functionalities for task management, exception handling and workflow management, it also plans and manages AT paths on the global level for the following purposes:

1. Multi-vehicle spatiotemporal coordination, which continuously observes and grants AT access to a certain road or lane segment. The global path is defined as a sequence of paths or lane segments. An AT receives an operation task with a global path, but it can only traverse the lane segment which is granted by FMS. This method gives FMS higher priority to control the usage of certain space and time.
2. Combination of global path and local path, which gives an AT flexibility of local decisions. Even though the global path is controlled by FMS, an AT can request additional space to travel. For example, if the current lane is blocked by a vehicle waiting for service, AT can initiate an overtake with a local path changing to the bypass lane. If FMS checks the condition is satisfied, it grants the access to bypass lane for overtaking and updates the global path accordingly.
3. Traffic flow and intersection management, which balances the utilisation of road resources. The fleet provides information about the traffic situation. In this case, FMS can optimise the global path selection to avoid congested lanes and intersections. Decisions can also be made with the crane, especially in the yard.
4. Deadlock resolution and collision avoidance, which guarantees deadlock-free and safe operation of the fleet. After accepting the operation task and global path from FMS, an



AT reports its state and local path in a constant frequency. FMS continuously checks the paths with conflict or deadlock. By setting the speed or reserving the lane segment, FMS can resolve any deadlock in advance and reduce any potential risks.

Westwell's global path planning depends on the precise knowledge of the entire traffic situation. FMS has access to the autonomous fleet state and crane status by design. However, if the manual traffic data is missing, it can only get the big picture with a significant size of autonomous fleet. In this case, the V2X infrastructure is developed to fill the gap.

PATH PLANNING WITH V2X

Vehicle Localisation with Connected Device and Surveillance System

To gain a full vision of all the traffic in the terminal, there are several ways to detect and track non-autonomous vehicles. The most direct method is to install a connected device with global localisation in a vehicle. It is applicable for all terminal-owned vehicles with a certain amount of cost. But it is almost impossible to equip every external vehicle. With the help of AI technology, detecting and tracking a vehicle with a camera image becomes state-of-the-art technology. As many terminals have high surveillance camera coverage,

the CCTV video image can be used to detect and track vehicles and pedestrians. Following this idea, a terminal surveillance system (TSS) called WellSecurity is developed to detect and map objects to terminal road networks. It can then identify rule violations and hazardous situations.

As illustrated in the system block diagram, TSS is connected to FMS. It sends the real-time vehicle and pedestrian location to FMS. Combining all the information, Westwell's FMS can build a birds-eye view of the terminal with all the moving objects for global planning.

V2X Application Scenarios

One good use case is at the intersection entering a block. Since an AT has a limited sensing

“WESTWELL'S FMS CAN BUILD A BIRDS-EYE VIEW OF THE TERMINAL WITH ALL THE MOVING OBJECTS FOR GLOBAL PLANNING.”



range or may be blocked by other obstacles, it is not always aware of the situation at the first several bays of the block. In case of a manual vehicle stopping at the first bay, AT may end up queuing behind and blocking the intersection. With V2X detecting the obstacle in advance, AT can choose the bypass lane or wait outside the intersection.

Another effective scenario is helping AT to navigate through congested traffic under quay cranes. It is common that due to the busy loading or discharging operation, multiple lanes under quay cranes are blocked. Rather than waiting in line, FMS can let an AT change lanes and move to an unoccupied crane or cut-out to use a free lane to bypass any vehicle that is waiting for service.

The V2X can provide information beyond the sensing range of an AT. Therefore, a Westwell's AT becomes smarter than an experienced human driver.

CHALLENGES AND OUTLOOK

After implementing and deploying the FMS and TSS with global path planning and V2X functionalities, we see a significant boost in fleet performance even in complicated mixed traffic operations. There are still several challenges and room for improvement in this system. Firstly, the handshake between global and local path planning requires reliable and low-latency network communication. Second, the flexibility of the AT local planning asks FMS to process the change requests in time and deal with swarming intelligence problems. Rather than commanding the ATs one by one, it is desired to help them to cooperate. With the V2X information about manual vehicles, AT can learn from experienced human drivers to handle difficult situations. The ultimate goal is to achieve close or beyond human fleet performance with less infrastructure burden and excellent scalability.

ABOUT THE AUTHOR:

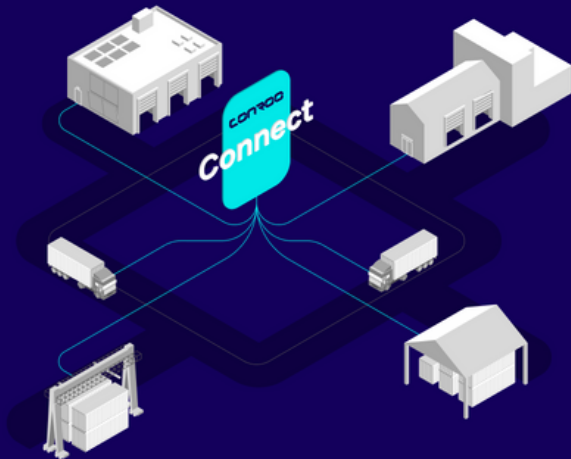
Dr. rer. nat. Chao Chen is the Head of Westwell's Research and Innovation Group. He received his PhD degree in robotics and embedded systems from the Technical University of Munich and has more than 15 years of industrial experience in autonomous driving and intelligent vehicles.

ABOUT THE COMPANY:

Westwell is a global provider of autonomous driving solutions. The company unlocks potential through AI and new energy, striving to pioneer intelligent services globally. To date, they have deployed hundreds of commercial autonomous vehicles and systems worldwide. Westwell's products/services serve freight logistics scenarios like seaports, dry ports and plants. The company serves more than 200 clients in 18 countries.

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FIVE REASONS YOU NEED A SUPER INTELLIGENT DIGITAL TWIN FOR YOUR TERMINAL



Harrison Nguyen, Account Executive,
Realtime Business Solutions

Digital twins are one of the fastest growing concepts in the container handling industry, especially with the growth of complementary technologies such as IoT and cloud. The virtual 3D replica of a terminal gives you complete visibility of the terminal environment, its equipment, container inventory and much more. However, a digital twin alone may not be enough to provide a wide variety of benefits, it also needs to be paired with a super intelligent engine that can work hand in hand to improve a terminal overall operation. When digital twin technology is combined with the latest machine learning and AI tools, terminals are exposed to a wide range of benefits. This includes the ability to view and even resolve incoming problems. The following highlights the key reasons why you need a super intelligent digital twin for your terminal:

1. REDUCES RISKS AND DRASTICALLY IMPROVES PERFORMANCE

With continuous forecasting of terminal performance, a 3D digital twin can reduce the risks of accidents and respond to safety-critical events more effectively. Having an overall 3D view of the terminal, its equipment and the container inventory in the yard will allow the terminal to reduce the risk of any potential accidents that can happen in the yard. Furthermore, the forecasting of potential bottlenecks and issues allows your terminal to improve overall efficiency and performance. For equipment control, a super intelligent digital twin can link to the



terminal operating system (TOS) to minimise the unladen movement of container handling equipment (CHE). Moreover, it can distribute traffic and avoid congestion in terminals, to prevent bottlenecks and other issues from occurring. This benefit is further enhanced when linked to automated CHEs, as it can provide maximum operational efficiency. In terms of vessel operation, a digital twin can more accurately predict ETA/ETD of vessels for increased efficiency in terminals. All these

features of a digital twin linked to a super intelligent engine can reduce risks within a terminal and improve a terminal's overall operational efficiency.

2. REDUCES OVERALL OPERATIONAL COSTS

Having a digital twin can be useful in determining optimal resource allocation. It does this by helping to calculate the most efficient berthing times, forecasting the

“WHEN DIGITAL TWIN TECHNOLOGY IS COMBINED WITH THE LATEST MACHINE LEARNING AND AI TOOLS, TERMINALS ARE EXPOSED TO A WIDE RANGE OF BENEFITS.”



“A DIGITAL TWIN PAIRED WITH AI CAPABILITIES WILL ALLOW IT TO ALSO PREDICT AND RESOLVE INCOMING PROBLEMS, WHICH WILL RESULT IN EVEN MORE COST-SAVING BENEFITS.”

cost of resources, and reducing the downtime of equipment. A digital twin should also have real coordinate data of any CHE and container in the yard to calculate the distance for every move and equipment utilisation. This calculation and forecasting allow for the best possible use of resources which can save fuel and time, resulting in lower overall operational costs. Combined with automation, it will increase control and further reduce the overall costs of operations for the terminal. A digital twin paired with AI capabilities will allow it to also predict and resolve incoming problems, which will result in even more cost-saving benefits.

3. ALLOWS FOR COMPLETE VISUALISATION OF THE TERMINAL

Having a real-time 3D view of the terminal, its equipment and the containers in the yard allows you to oversee all the operations, resources and plans to make more informed decisions. Usually, it can be difficult to oversee an entire terminal with just a TOS, so a digital twin really helps in real-time visualisation and monitoring. A digital twin with a super intelligent engine will not only allow the user to visualise terminal operations but also predict and prevent incoming problems before they even occur. A super intelligent digital twin will allow the user to visualise the

current yard and to look into the future to optimise planning. An intuitive digital twin should also be easily accessible anywhere in the yard to allow the users to better monitor and control the terminal.

4. HELPS GUIDE DECISION MAKING

The complete visualisation of all activities in the terminal allows you to make more informed decisions which can lead to better operations. It allows for predictive maintenance, which helps avoid risks and the wear and tear of resources. Not only does it help with operational decision making but also improves financial decision making as real-time data

“THE COMPLETE VISUALISATION OF ALL ACTIVITIES IN THE TERMINAL ALLOWS YOU TO MAKE MORE INFORMED DECISIONS WHICH CAN LEAD TO BETTER OPERATIONS.”

and advanced analytics allow decision makers to make better and faster decisions, leading to a potential boost in business performance. The digital twin, paired with an intelligent engine, can also have predictive and preventative capabilities, which further enhance the decision-making process. Additionally, data can be outputted to several charts that will outline the performance of your terminal and what areas can be improved. With this technology, terminals can make more informed operational and financial decisions.

5. FOR BETTER TEAM COLLABORATION

When a digital twin is properly utilised by users and operators, it can improve your productivity and operational efficiency. The 3D view allows for more transparency and an increasing level of integration between systems. This will in turn optimise the workflow and productivity of the team. Also, it will undoubtedly impress visiting customers when they view your

workflow. In its recommended setup, the team will have at least one large screen to display the digital twin, where the whole team can view the real-time operations and movements within the terminal. This way everyone in the team can have a complete 3D visualisation of the terminal, which allows the team to collaborate better and make more informed decisions.

The multitude of benefits that digital twin technology brings to your terminal is hard to dismiss. With the growing emergence of this technology within the industry, combined with other technologies such as AI and automation, your terminal can experience a massive competitive edge. The wide variety of benefits includes reducing risks and improving performance; reducing overall operational costs; gaining complete visualisation of the terminal; better decision making; and improved team collaboration. A digital twin is definitely worth the investment and when paired with a super intelligent engine, the advantages are almost endless.

ABOUT THE AUTHOR:

Harrison Nguyen is an Account Executive at Realtime Business Solutions (RBS) and is passionate about how software can revolutionise industries. He graduated from the University of New South Wales with a Bachelor of commerce and computer science with distinctions. With his fresh ideas and burning ambition, Harrison is dedicated to helping terminals find the best solutions to optimise their operations.

ABOUT THE COMPANY:

Realtime Business Solutions (RBS) specialises in developing state-of-the-art TOS solutions and has worked exclusively in the Container Handling Industry for over 30 years. Over this period, RBS has carried out the installation of the RBS TOPS software to many Container Handling operations around the globe. RBS' most recent products include TOPS Expert and TOPX Intelligent 3D, which is a super intelligent digital twin. For more information, please visit: www.rbs-tops.com.

CHARGING AHEAD: HOW AUTONOMOUS CHARGING ELEVATES PORT EQUIPMENT OEMs


ROCSYS

Daan Nap, Senior Business Development Manager
Ports & Transportation, Rocsys

HOW CHARGING OPTIONS GIVE PORT EQUIPMENT OEMs A COMPETITIVE ADVANTAGE

Ports are dynamic operations, where a wide range of different tasks must happen, often across multiple shifts and under tight schedules. This means ports and terminals rely on a wide range of different types of vehicles and equipment to meet intense demands. At the same time, many ports are introducing automated and electric vehicles into their fleets to help meet emissions goals and streamline operating costs.

This change presents new opportunities for original equipment manufacturers (OEMs). But, as a vehicle OEM, are you ready with the solutions and options your customers need?

The move towards electrification and automation in ports has already begun. As more ports look to supplement or even replace their existing fleets with electric and automated vehicles, vehicle OEMs are developing innovative new electric and automated versions that can meet the rigorous demands of port logistics without sacrificing efficiency.

ARE OEMs READY WITH THE CHARGING OPTIONS PORTS ARE ASKING FOR?

While more OEMs develop new electric and automated vehicles and equipment, they may not have considered if they are prepared for the range of charging options that the market, and customers, will need now and in the future.



"CHARGING INFRASTRUCTURE AND PROCESSES IS A KEY CONSIDERATION FOR PORTS IN THEIR JOURNEY TO ELECTRIFICATION AND AUTOMATION."

Charging infrastructure and processes is a key consideration for ports in their journey to electrification and automation. First, they must have sufficient grid capacity to charge a large number of vehicles, alongside the required space and facilities to do so. Ports also need the correct chargers for different equipment types. Most will seek standard CCS1 or CCS2 connectors on equipment to enable the same chargers to be used across the whole fleet.

Second, workforce shortage drives vehicle automation, potentially boosting safety,

efficiency and cost savings, especially with electric vehicles. Autonomous charging provides an optimal solution for the entire autonomous process. What many OEMs may not realise is that vehicle operators may need more than a simple training course to learn how to charge vehicles. Operators need to remember to charge vehicles the right way every time or potentially risk a dead battery, which can have a serious impact on port operations.

So, if operators can't just 'plug in' their vehicles as needed, what is the alternative that will enable a smooth transition to electric vehicle fleets?



OEMs ARE ADDING AUTONOMOUS CHARGING AS AN OPTION

Here's where autonomous charging provides a solution. For example, Rocsys autonomous charging can enable vehicle operators to simply park their vehicle alongside a charger, which then automatically begins the charging process. When the charging cycle is complete or the vehicle needs to go back into operation, the charger will disconnect from the vehicle, so it is ready to use again – all without the effort from the operator.

The Rocsys API can also automatically alert Rocsys of any charging issues, so that remote interventions can be made, preventing further disruption. And since Rocsys autonomous chargers are design-agnostic, they integrate with all current charging like CCS and NACS.

Manufacturers such as Hyster, Terberg and Taylor are among the vehicle OEMs that are already working with Rocsys to deliver port equipment with 'Rocsys ready' charging options. To remain competitive in this space and extend your customer base, now is the time to explore adding

hands-free charging as a further option for your electric and automated vehicle portfolio.

Rocsys is an industry leader in autonomous charging and has worked alongside both vehicle OEMs and their customers to develop autonomous charging solutions for a variety of markets and applications.

ABOUT THE AUTHOR:

Daan Nap is responsible for Business Development and Sales of Autonomous Connection Devices (ACDs) at Rocsys, for the segments Ports & Transportation. He is dedicated to implementing and scaling innovative technology solutions that contribute to a sustainable future.

Daan brings more than 16 years of experience in the global eMobility market. At Epyon he helped realise the very first commercial DC fast chargers for passenger cars in Europe as of 2010. In 2011, Epyon was acquired by ABB, a global leader in robotics, machine automation and digital services. At ABB Daan served as the Global Head of bus charging, delivering the first pantograph systems and depot charging solutions for bus charging, covering more than 50 countries. He worked



on the early solutions for Energy Management and delivered the world's very first MegaWatt Charging Systems (MCS) to commercial customers already in 2022.

Before Epyon, Daan had various roles at companies including Siemens, Royal Philips and IBM. He holds a BSc in engineering from the University of Applied Sciences in The Hague.

ABOUT THE COMPANY:

Rocsys is the global leader in automated charging solutions for electric vehicles. Our cutting-edge technology, including next-generation soft robotics, AI-driven computer vision and data-driven services, unlocks greater efficiency, safety, seamlessness, sustainability and scalability for the world's leading port operators, logistics companies and automotive brands. With operations in Europe and the United States, Rocsys plays a leading role in shaping standards that will unify a powerful EV ecosystem through industry consortiums and strategic partnerships with multinational corporations and OEMs.

For more information, visit www.rocsys.com.

“ROCSYS AUTONOMOUS CHARGING CAN ENABLE VEHICLE OPERATORS TO SIMPLY PARK THEIR VEHICLE ALONGSIDE A CHARGER, WHICH THEN AUTOMATICALLY BEGINS THE CHARGING PROCESS.”



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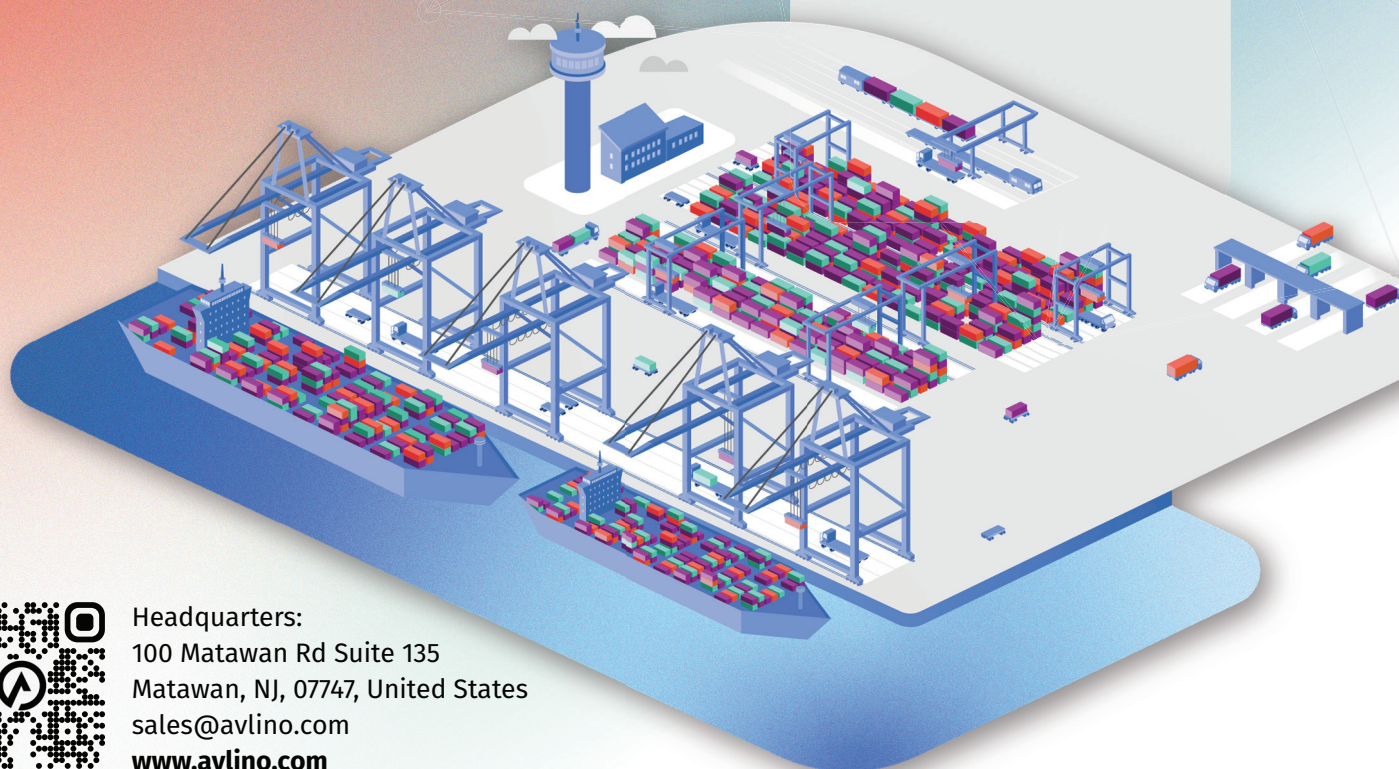
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Matawan, NJ, 07747, United States
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USING AI IN CONTAINER TERMINAL AUTOMATION



Adriaan Landman, COO and Co-Founder, AllRead

As ports and terminals face increasing pressures to improve efficiency, reduce environmental impact and enhance competitiveness, Artificial Intelligence (AI) emerges as a critical enabler of transformation, offering unprecedented opportunities for innovation and growth.

Most of the advances in AI that we are experiencing today come from the use of Neural Networks and Deep Learning. Those algorithms use statistical models capable of learning to find patterns in input data, and, in recent years, they have even surpassed basic human abilities such as seeing or listening and even beginning to have reasoning abilities.

AI can drive significant advances in operational efficiency by addressing key challenges such as congestion, tracking accuracy and environmental sustainability in the port ecosystem.

TERMINAL OPERATIONAL EXCELLENCE THROUGH AI

Operational excellence in cargo transport logistics is paramount for meeting the ever-increasing demands of global trade. AI, particularly through solutions like AllRead's Agile Recognition



Software (ARS), plays a critical role in enhancing efficiency, accuracy and sustainability.

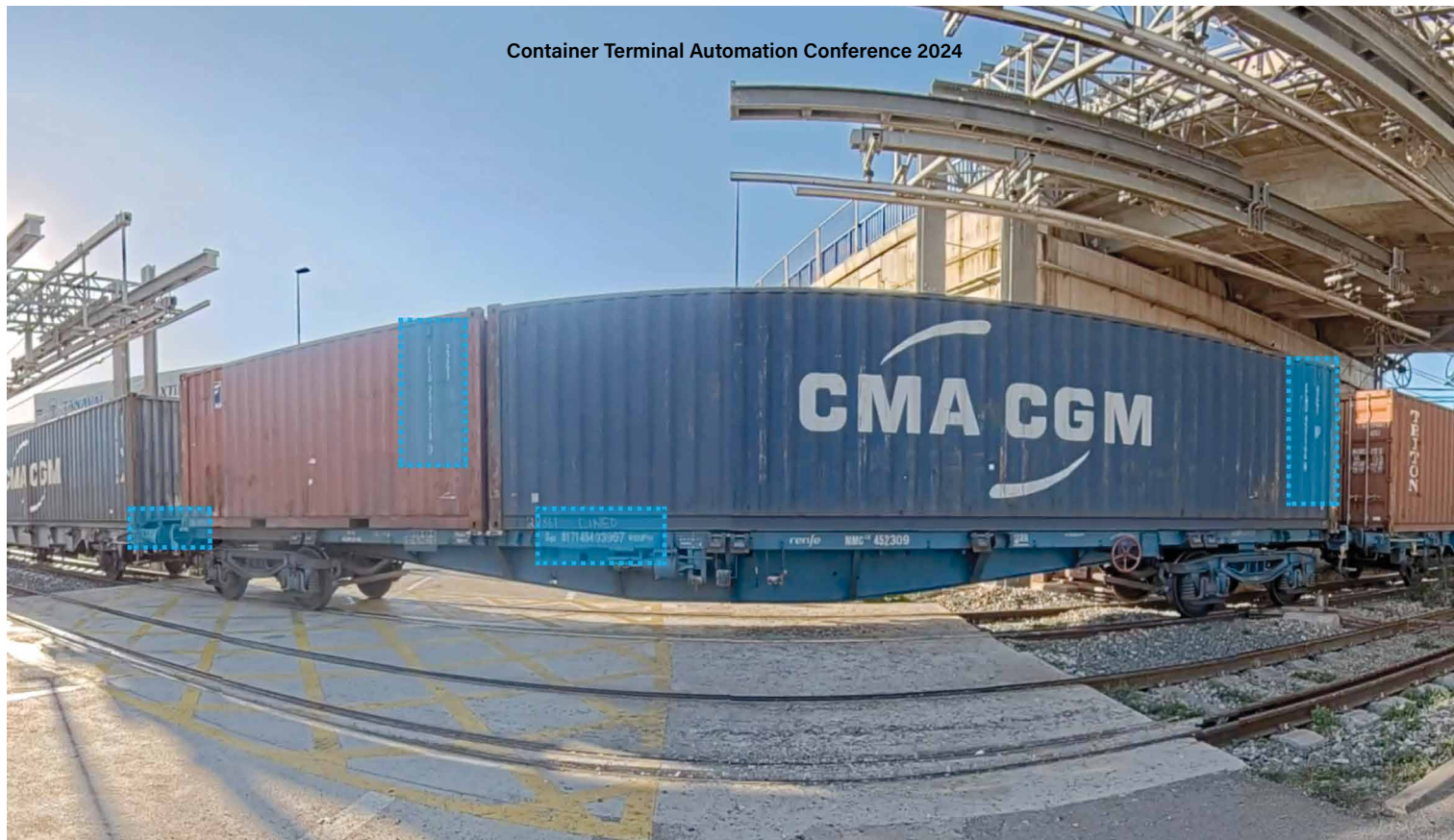
By automating cargo asset identification, monitoring, examination and tracking, ports and terminals minimise both delays and errors caused by manual tasks. The application of AI technologies significantly streamlines port operations, reducing turnaround times and increasing throughput.

For example, the integration of the ARS solution at the Le Havre Container Terminal (LHTE) in France to monitor and control their rail accesses resulted in a system able to provide a complete list of

containers and wagons within minutes after each train entry. This not only speeds up operations but also provides better data quality than the one provided by the error-prone manual verification.

Thanks to the latest advances in neural networks, AI-based solutions are nowadays better suited to work with excellent performances in harsh, unconstrained and ever-changing scenarios. Whereas Computer Vision systems from some years ago required a careful design of the image acquisition system, with specific cameras, sensors or lighting conditions to perform adequately, today the

“AI CAN DRIVE SIGNIFICANT ADVANCES IN OPERATIONAL EFFICIENCY BY ADDRESSING KEY CHALLENGES SUCH AS CONGESTION, TRACKING ACCURACY AND ENVIRONMENTAL SUSTAINABILITY IN THE PORT ECOSYSTEM.”



“INNOVATION THROUGH AI OFFERS A PATHWAY TO HANDLE MORE CARGO WITH GREATER PRECISION AND LESS ENVIRONMENTAL IMPACT.”

generalisation power of neural networks allows for minimised infrastructure requirements. The installation of the ARS system in Hutchison Port BEST terminal in Barcelona was done with a minimal investment in infrastructure. With the installation of two off-the-shelf IP cameras and LED lighting at the train terminal entrance, AllRead ARS began to extract vital data for the operation. This meant an 80 per cent improvement in operation efficiency while reducing acquisition and maintenance costs by 60 to 80 per cent, demonstrating a clear economic benefit along with operational improvements.

SUSTAINABLE IMPACT OF AI AUTOMATION

Sustainability is increasingly becoming a critical concern in cargo transport. Innovation through AI offers a pathway to handle more cargo with greater precision and less environmental impact.

AllRead's solutions contribute to environmental sustainability by enabling a modal shift from road to rail transport and optimising logistics operations to reduce idle times and unnecessary movements.

Traditionally, trucks waiting at access controls for an average of 20 minutes emit significant amounts of CO₂, with an idling truck consuming 3.5 litres of fuel per hour, resulting in 9.34 kilogrammes of CO₂ emissions. By optimising logistics operations through digitalisation and automation, we can significantly cut CO₂ emissions. In one case study, the application of AllRead's recognition technology facilitated a 25 per cent reduction of latency of trucks, translating to an annual savings of 1,321 tonnes of CO₂, while also improving logistics operations efficiency by up to 60 per cent. This demonstrates the potential for significant environmental benefits alongside operational improvements.

OVERCOMING DIGITAL TRANSFORMATION CHALLENGES

The journey towards fully integrated, AI-powered port operations is fraught with challenges, including adopting new technologies, integrating existing systems and needing cultural change. According to the report of the Observatory of Transport and Logistics in Spain (OTLE), in the field of digital technologies, although progress has been made, there are still challenges regarding the digitisation of freight transport and logistics.

AllRead's approach, focusing on easy-to-implement, cost-effective solutions, addresses these challenges head-on. By providing scalable, flexible AI recognition technology that is easily integrated into existing infrastructure, AllRead facilitates a smoother transition to digital operations, empowering ports to overcome traditional barriers to innovation.

"THE JOURNEY TOWARDS FULLY INTEGRATED, AI-POWERED PORT OPERATIONS IS FRAUGHT WITH CHALLENGES, INCLUDING ADOPTING NEW TECHNOLOGIES, INTEGRATING EXISTING SYSTEMS AND NEEDING CULTURAL CHANGE."

FUTURE VISION AND AI'S ROLE IN PORTS AND TERMINALS

We live in an incredible moment in human history where today's technologies are developing at breakneck speed. Not only does computational power continue to double its capabilities every year, following Moore's law, but the use of AI applications, particularly Deep Learning algorithms, has also reached an exponential phase of growth. There is a myriad of AI-based applications as an integral part of our daily life.

But there are still some challenges ahead to overcome. There is still a huge gap between the latest explorations in AI and deploying Deep Learning models into production in an ever-changing real world. Changes in the environment

provoke data drifts that might significantly affect the accuracy of AI models over time. It is essential to monitor the model's performance and data drifts and perform necessary actions, such as continuous learning, to ensure the model's accuracy and avoid potential consequences such as incorrect decision-making or other liabilities.

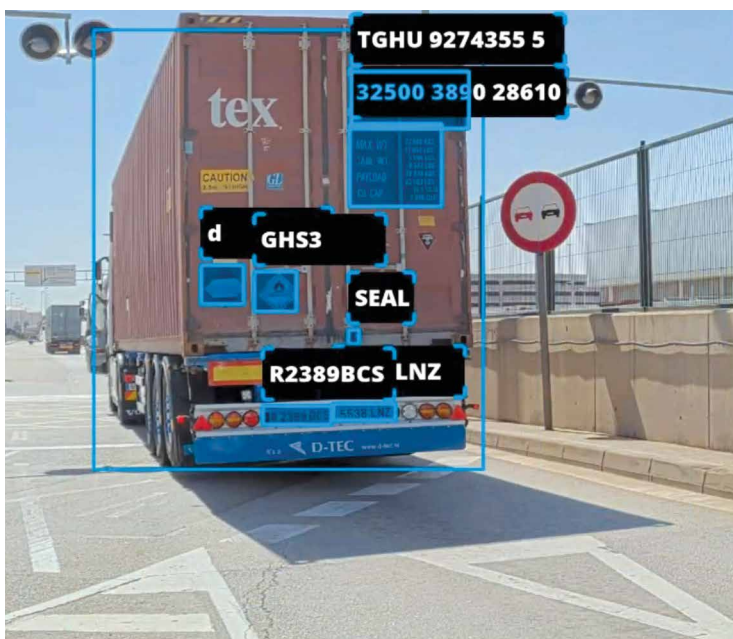
The growing need to reduce operational costs, gather real-time information and make data-driven decisions at port facilities is collectively driving the adoption of AI. This vision of intermodality, supported by AI technologies, promises a logistics ecosystem that is more efficient, sustainable and resilient. Looking ahead, AllRead's role in enhancing intermodal transportation is set to grow.

ABOUT THE AUTHOR

Adriaan Landman is the COO and Co-Founder of AllRead. Responsible for the company's Strategy and Operations, bringing cutting-edge computer vision solutions to major Ports and Terminals in Europe and LATAM, such as Hutchison Ports, Port Authority of Valencia and HGK, Adriaan strongly believes that innovation is about breaking down financial and technical barriers to technology adoption.

ABOUT THE COMPANY

AllRead is a software company specialising in Optical Character Recognition (OCR) solutions for the port ecosystem. Since 2019, it has been helping intermodal platforms control incoming and outgoing containers by road, rail or container cranes. Following a patented technology based on Deep Learning (Artificial Intelligence), AllRead offers a lightweight and cost-effective system for ports of any size, removing financial and technical barriers to adoption.



PREDICT AND OPTIMISE OPERATIONS USING TERMINAL DATA: GEMINI AIR IS THE SOLUTION





DSP TALUMIS



Gabriella Meduri, Senior Project Manager and Automation Expert, DSP

Container terminal operators face an escalation of speed and volume every day, pushing them to find an even more manageable and adept regulatory systems approach.

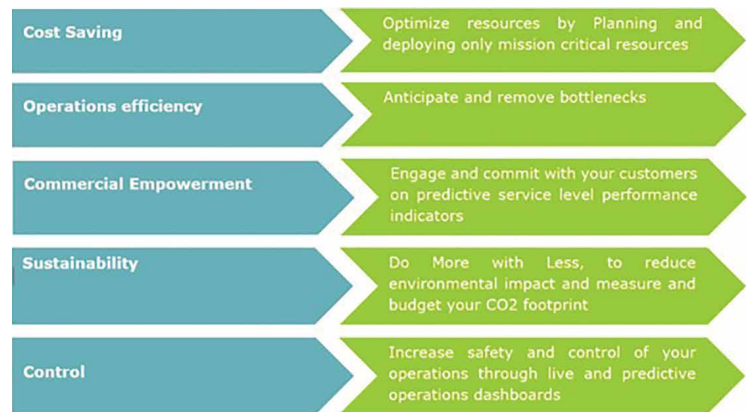
Today, the situation is that terminals strive for the optimal utilisation of equipment, yard and berth space, labour force and other resources to minimise costs while maximising performance. Factors such as vessel arrivals, congestion, maintenance events and operational challenges are further compounded by the complexity of this process.

For every single container that arrives at a terminal, a plethora of documents, emails, EDI data, inspections, allocations and transactions must be completed and deciphered by the terminal operating system (TOS) in the first instance and later the process has to be tracked and followed by expert users. And only then any container movement can be initiated.

To facilitate efficient control over different operations, numerous processing tasks need expert knowledge and/or technological utilisation to make informed decisions. Throughout the process of data reception, planning, scheduling and execution of tasks (with appropriate equipment at the optimal times) the expertise of terminal operators stands as the foremost determinant of terminal operational efficiency.

Considering the imperative of resource conservation, the encompassing energy, human resources, cost management and the competitiveness among terminals and routes, the utilisation of information becomes paramount.

What we realised over the



years is that terminals should take ownership and consciousness of their data as an asset. Information collected in a shift, day or year can be used to learn, optimise and refine the processes to improve the efficiency and reliability of any resource. Often this info is not utilised enough by terminals, especially in small realities.

The quantity of data collected cannot be handled without the support of a digital model capable of finding unexpected and measurable correlations. The expertise gained by key operators is precious and fundamental; however, it can be supported and enhanced with the help of such technologies.

In this context, DSP Talumis sees the need to support terminals to face their challenges and improve their business model and operational efficiency with the virtual reality of GEMINI. DSP Talumis is a joint venture of the two companies DSP and Talumis, which have joined forces and expertise to develop cutting-edge AI applications in the container logistics sector.

Incorporating digital workflows and processing integrated systems that assist in better coordination and analytical operations, GEMINI aims to simplify and enhance the efficiency and performance of the organisation.

The term "digital twin" might sound like a simple concept, but nowadays it can take various meanings, depending on the industry and scope you are referring to. Its denotation depends on the problem you want to solve with a digital solution.

Depending on the final objective, we can name the digital twin as simulation, emulation, augmented reality and more. There are in fact multiple levels of fidelity in the simulation model allowing for different optimisation and analysis.

Through a combination of simulation models and data (gathered from live sources, historical records and others), engineers can use software to build a virtual twin of a physical object, process or system. A digital



**CREATE YOUR VALUE
OUT OF YOUR DATA**

“WHAT WE REALISED OVER THE YEARS IS THAT TERMINALS SHOULD TAKE OWNERSHIP AND CONSCIOUSNESS OF THEIR DATA AS AN ASSET.”

replica is updated using data from its physical counterpart along with other sources. Often machine learning and simulation are incorporated to improve planning and decision making.

In our vision, digital twin technology represents the process of using data streams to create a virtual representation of a real-world asset to improve decision making, information access and collaboration.

What we do in DSP Tulumis is combine our expertise from

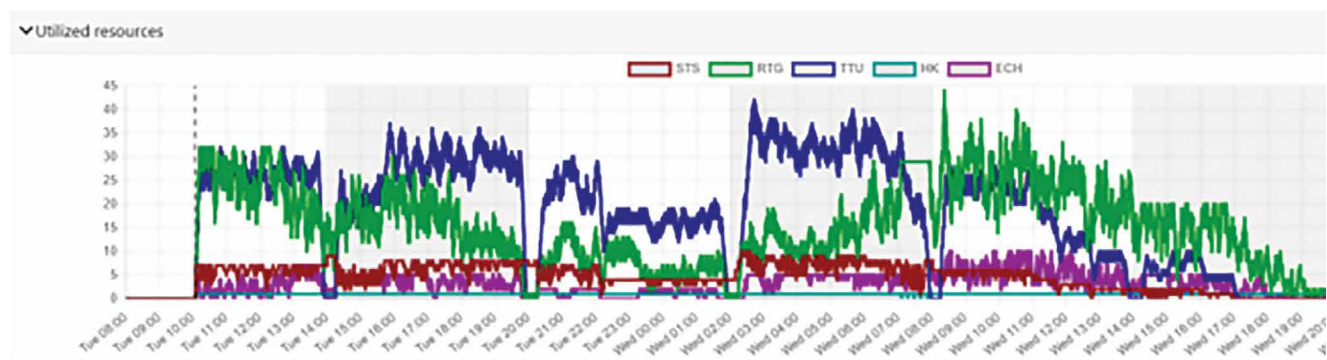
operations, simulation, modelling, data analysis and Artificial intelligence (AI) to reproduce the terminal processes, the trends and the behaviour of its various components.

GEMINI AIR, which is the acronym of Artificial Intelligence Resourcing and one of the GEMINI modules, is a digital representation of the terminal capable of mirroring operational decisions and strategies of TOS, to model all operational flows and standard operating procedures

or workers' practice during real operations, predict and measure resource capacity versus resource demand, allowing the terminal to avoid shortages or incur the cost of excess.

There are still some unexpected events that cannot be predicted in advance in real operations. Therefore, we always need to consider that any digital representation would have some small variance from reality. Still, the level of accuracy we reach in our predictions is very high.

FIG 1.
Utilised resources
aggregated data



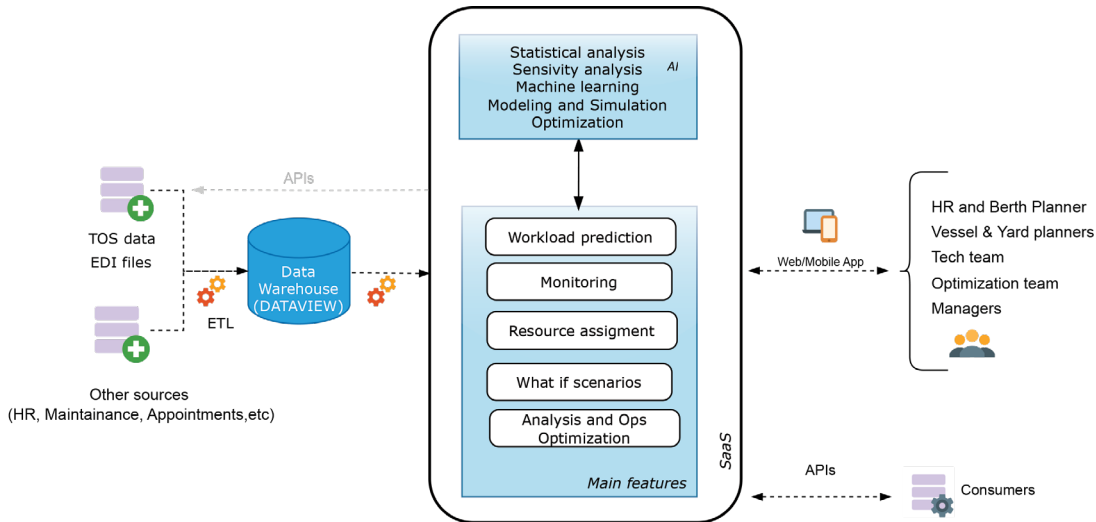


FIG 2.
GEMINI AIR
architecture

The amount of data GEMINI AIR can manage in a very short time is significantly more than the most expert planner could ever fathom.

GEMINI AIR utilises three different levels of data and then merges the output to deliver the results in the form of short, mid and long-term forecasts. Data is presented to the user at different levels and multiple views, from

aggregated graphs to specific and user-friendly tabs.

The users can instruct GEMINI AIR to create different scenarios based on variable equipment resources. The impact will be seen in the results for each scenario and will provide insight into the decisions to make and the appropriate actions to be taken.

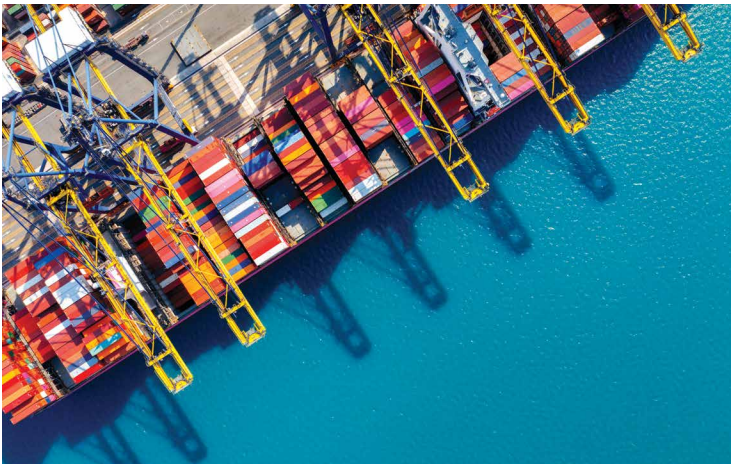
GEMINI AIR has a key aspect

which is the ability to simulate in advance what will be in the terminal "if" something happens. For example, "what if" a specific delay occurs, or "what if" the resource assignment changes. This can be combined in one or multiple branch scenarios that can be created simultaneously and compared with the actual situation between them.

GEMINI AIR enables you to look ahead at what will happen in the next predicted future by congregating info received from the TOS, appointment system, HRS, Maintenance software, user interaction and more.

Management and operations personnel can now have the information they've always wanted at their fingertips, which will lead to safer and more efficient decision making and increase the overall performance of the terminal. GEMINI uses AI technology together with terminal mapped processes to provide 'predictive optimisation.'

GEMINI AIR predicts the terminal workload by shift,



"GEMINI AIR ENABLES YOU TO LOOK AHEAD AT WHAT WILL HAPPEN IN THE NEXT PREDICTED FUTURE BY CONGREGATING INFO RECEIVED FROM THE TOS, APPOINTMENT SYSTEM, HRS, MAINTENANCE SOFTWARE, USER INTERACTION AND MORE."

“DIGITAL SOLUTION GEMINI AIR CAN COVER THE GAP OF HAVING ENOUGH EXPERT RESOURCES AVAILABLE AT THE TERMINAL AND STILL SUPPORT THEM IN MORE DETAILED ANALYSIS, OPTIMISATION AND SUGGESTION WHEN ASSIGNING THE RESOURCES TO THE SHIFTS.”

by service, by carrier and by container movement. The resource allocations are calculated considering all the interactions between internal equipment, external trucks, container arrivals, congestion and restrictions that might occur during a shift. It looks at the whole terminal at once, considering all the variables coming from the other systems and the user input.

This prediction of workload can allow the terminal to identify inefficiencies, bottlenecks or areas in need of improvement, and then to take actions in the short or long term.

The user's interactions with the system will give a new input to the model and with each user variation created, the workload and assignment are instantly updated.

It is possible to interact and visualise the results of the prediction and suggestions from multiple tabs like the Berth or Rail schedule, the Resources planning and the Bay Planning, which allows the model to predict the split and assignment of the vessel work even

before it is done into the TOS and many others.

GEMINI AIR uses AI both to suggest the user what to do and what needs to be improved to support their decision making. This solution not only allows users to monitor what happens in the terminal in real time via its dashboards but also what will happen in the progressively updated future, according to the scenarios users create.

GEMINI AIR can lead to cost savings and improved efficiency also looking at the sustainability side of operations.

Our solution measures the energy consumption for each scenario and allows the terminal to measure the CO2 emissions generated by a working shift. This is one of the parameters a user can adopt to evaluate one scenario against another one. At the same time, the travelled distance and needed maintenance for the equipment can be foreseen in advance supporting the user in decision making.

CONCLUSIONS

Efficiency, profitability and reliability are key elements of container terminals' competitiveness. Furthermore, sustainability is an added value that for multiple reasons has become extremely important in recent years.

The most important resources terminals can use to achieve all the above goals and often do not use enough, next-to-good operations and practices are their own data.

Digital solution GEMINI AIR by DSP Talumis can cover the gap of having enough expert resources available at the terminal and still support them in more detailed analysis, optimisation and suggestion when assigning the resources to the shifts. It can give an immediate overview of the overall situation for current and next shifts to managers and the details needed to more operative people. It also allows users to look into the past and learn from it.

The usage of detailed operational flows, big data analytics, advanced

Berth schedule

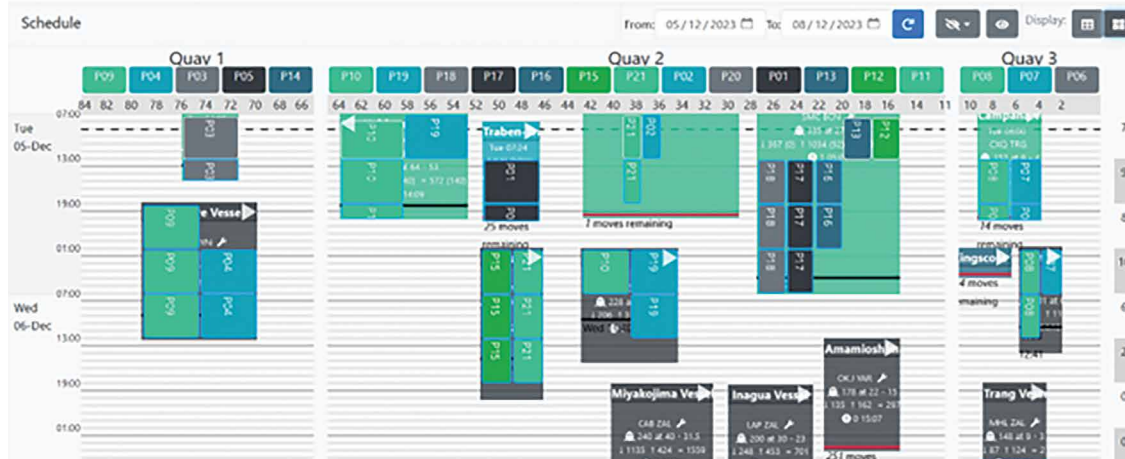


FIG 3.
Prediction seen on
the Berth Schedule



mathematical models and machine learning, together with user input, makes GEMINI a powerful tool for operations to improve performance and save costs.

ABOUT THE AUTHOR:

Gabriella Meduri is a Senior Project Manager and Automation expert at DSP and she is the Project Leader of GEMINI.

She drives the GEMINI team in the functionality, development and roadmap definition of the digital twin solution. Gabriella has been awarded a Master's Degree in Transportation Engineering and a Second Master's in Logistics Innovation Management. After some years of work as a transport engineer, Gabriella has gained 16 years of experience in the maritime industry from operations to becoming a Senior TOS consultant

with deep experience in automated environments, now working on the definition of new advanced solutions applied to container terminals.

ABOUT THE COMPANY:

DSP headquarters are based in Switzerland and were founded in 1986. Now operating through four business units worldwide, DSP provides business consultancy and IT solutions taking advantage of its specialised and proven know-how in operations, informatics technologies applied to the shipping industry, port and terminal management and intermodal transportation.

DSP focuses efforts on TOS Consulting, Business Intelligence, Digital Twin and System Integrator offering solutions and products that are perfectly suited to any marine and inland terminal. With

the final aim of Enhancing Logistics Efficiency, Sustainability and Performance, DSP has built up Business Intelligence Systems and a Digital Twin Platform enriched by AI technologies. Moreover, strong in its expertise, DSP has a solid network of partners and supports individual terminal cases in evaluating the best IT solutions to empower their business operations. DSP has been a NAVIS partner since 2007 covering all implementation, support, testing optimisation, customisation and training services.

DSP Talamis is born from the synergy between DSP and Talamis to develop digital simulation and forecasting for the Ports and Terminals industry. Talamis, based in The Netherlands, has been active since 2003 and provides modelling, simulation and optimisation in different industries.



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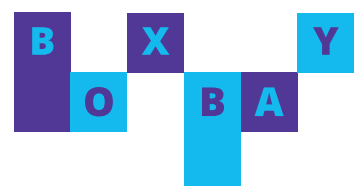
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HUMAN-ASSISTED AUTONOMY IS THE ONLY PATH TO SCALABLE AND RELIABLE AUTOMATION TODAY. HERE IS WHY

**"HUMAN-ASSISTED AUTONOMY
IS THE ONLY PATH TO SCALABLE
AND RELIABLE LOGISTICS
AUTOMATION TODAY."**

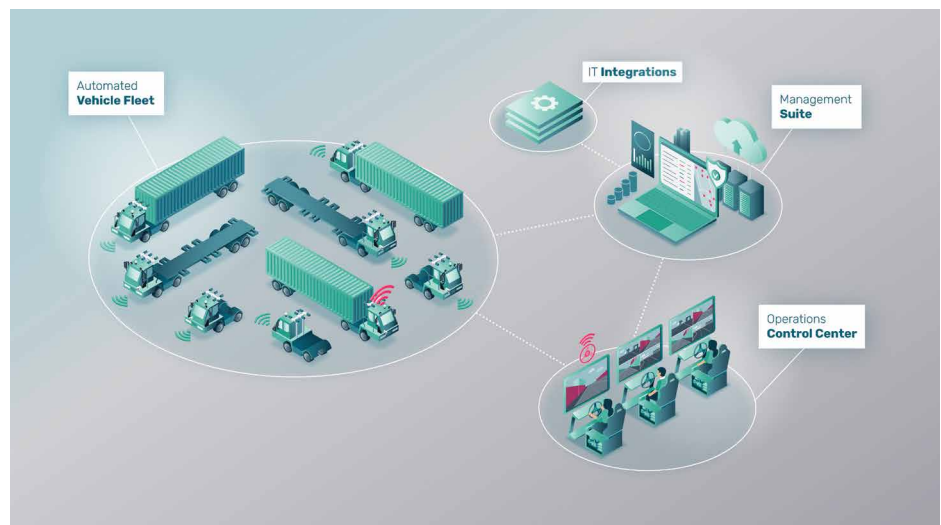

FERNRIDE

Hendrik Kramer, Co-Founder and CEO, FERNRIDE

I am not here to steer controversy, but let me get straight to the point: human-assisted autonomy is the only path to scalable and reliable logistics automation today. In ports and container terminals, we deal with mixed traffic conditions in horizontal transportation. Case in point: in brownfield terminals, there are often streams of traffic containing various vehicle types. This means there could be exceptions or edge cases, which vehicles that are "only" autonomous could not handle. In the autonomous driving space, we are used to the moonshot approach: it's all in or nothing; either full autonomy or none at all. And it is, definitely, robots vs. humans. This is a great way to think about it when writing sci-fi, but it is not about the opposites; it's about combining the two, to harvest the benefits and start the transformation today.

ARE WE IN NEED OF TRANSFORMATION AND MORE AUTOMATION?

Container terminal operators face increasing volumes and ever-growing vessel sizes to serve, rising costs, skilled labour shortages and slim profit margins, exacerbated by geopolitical tensions and global issues such as the pandemic. This is driving them to embrace new, digital solutions to increase productivity, improve worker safety, enhance sustainability and achieve the operational resilience required to meet contemporary challenges. When we look at logistics in general, we see the same trends: thin profit margins, a lack of truck drivers and the urgent need to reduce CO2 emissions are the



most apparent problems. Europe's truck driver shortage is predicted to escalate from 400,000 to 2 million by 2026. The combination of increasing labour costs and a declining workforce is set to squeeze profits further. The push for industry transformation and increased automation is therefore not just desired but necessary, and the solutions need to be effective, cost-efficient and smoothly integrated with existing operations.

FERNRIDE provides scalable automation solutions that can be deployed at scale, specifically for automating horizontal transport in container terminals, and we concentrate on solving problems that can be addressed immediately. We believe in the power of human-machine collaboration for economic viability, rather than only relying on autonomous technology. We term this approach "human-assisted autonomy".

HUMAN-ASSISTED AUTONOMY: THE SOLUTION THAT WORKS TODAY

The concept of autonomous driving is not new in the logistics industry. There are commercially successful use cases of automated guided vehicles (AGVs), mainly in ports, and with clear separation from humans and other traffic, as well as autonomous mobile robots (AMRs) in specific settings, such as inside warehouses. However, the implementation of autonomous technology in **more complex environments and mixed traffic is far from being fully operational.** The reasons: the infinite number of edge cases, sensing and compute performance requirements, the absence or cost of a general supply chain for all hardware components and regulatory requirements.

For our customers, uptime, reliability, scalability and cost are crucial. With many unknown

FERNRIDE

Automation Solution for Horizontal Container Transport

FERNRIDE-enabled Autonomous Terminal Tractors

The terminal tractors are equipped with FERNRIDE's **Vehicle Kit** and a drive-by-wire interface to enable automated driving as well as remote control capabilities.

Operations Control Station

Purpose-built workstations for remote controlling FERNRIDE-enabled Autonomous Terminal Tractors. Trained operators monitor the autonomous vehicle fleet and assist the vehicle if required.

Management Suite

A holistic software suite for managing and orchestrating the autonomous vehicle fleet. It is fully integrated with the required legacy IT systems (e.g., Terminal Operating System) and process landscape of the container terminal site and enables all relevant service processes.

Vehicle Assistance
On-demand remote vehicle control by operator through low-latency video streaming and additionally visualized data.

Fleet Monitoring
Real-time tracking (e.g., locating) and management (e.g., transport task) of the autonomous vehicle fleet in operation.

“FERNRIDE PROVIDES SCALABLE AUTOMATION SOLUTIONS THAT CAN BE DEPLOYED AT SCALE, SPECIFICALLY FOR AUTOMATING HORIZONTAL TRANSPORT IN CONTAINER TERMINALS.”

situations across different container terminals, full autonomy today cannot guarantee sufficient availability and performance of the solution across different ports. Hypothetically, it is possible to over-optimize your autonomous stack for a single location at a time, but this approach is not scalable, and the cost involved would not make it feasible for customers. Thus, the commercialisation of such a “full autonomy solution” is impossible.

Additionally, a step-by-step approach is required, as the change

to automation is not going to happen overnight. The new autonomous vehicles will have to operate in mixed-traffic environments and encounter new complex situations for years to come.

With the human-assisted autonomy approach, we are combining the strengths of humans and machines to not only solve these challenges but also tap into the potential to improve efficiency, safety and overall performance in complex and dynamic environments.

So, how does it work? Humans and machines work together in a symbiotic relationship where humans provide oversight, guidance and intervention when necessary, while autonomous systems handle 80-90 per cent of tasks.

In the case of FERNRIDE, a human operator supports several automated terminal tractors from a remote control station. This approach ensures rapid scalability, increased productivity and worker safety on the customers' sites. In

“WITH THE HUMAN-ASSISTED AUTONOMY APPROACH, WE ARE COMBINING THE STRENGTHS OF HUMANS AND MACHINES TO NOT ONLY SOLVE THESE CHALLENGES BUT ALSO TAP INTO THE POTENTIAL TO IMPROVE EFFICIENCY, SAFETY AND OVERALL PERFORMANCE IN COMPLEX AND DYNAMIC ENVIRONMENTS. ”

the future, we aim to further boost the efficiency of operations and make the newly created jobs even more comfortable by increasing the autonomous capabilities. Scaling across different container terminals is going to become straightforward, as we have seen in our customer engagements that 80 per cent of the tasks that an autonomous vehicle needs to handle in terminals across the world are the same. The edge cases are handled by the human remote operator.

By now, terminals are already familiar with remote-controlled, electrified container handling equipment such as gantry cranes. Ports adopting such equipment may be ready to automate their terminals with automated horizontal transport solutions, ensuring the safety of their personnel.

HUMAN-MACHINE COLLABORATION CREATES THE JOBS OF THE FUTURE

Let's face it: **human-assisted autonomy is more socially acceptable and easier to integrate into the customers'**

reality compared to full autonomy. As I mentioned earlier, the path to automation doesn't create the human vs. machine situation. On the contrary, the goal is to leverage the strengths of both to achieve better outcomes than either could achieve alone.

In this scenario, we can not only close the gap of labour shortage but also train and upskill the existing workforce. Based on the feedback we got from workers across many geographies across the globe, moving employees to a safe, more comfortable working environment is way more attractive. Times of sweating in the cabin during the summer or freezing during winter are a thing of the past.

Creating those high-value jobs is part of the ongoing transformation of the workplace of the future which is now also extending to "mobile" equipment like trucks, as this concept has already been the state-of-the-art for crane operators for years. This is another reason why we love working with this industry - once an innovative technology works reliably, customer adoption happens swiftly.

ABOUT THE AUTHOR:

Hendrik Kramer is the Co-Founder and CEO of FERNRIDE, which offers a scalable solution for autonomous, electric trucking. He co-founded FERNRIDE in 2019 with Dr. Maximilian Fisser and Jean-Michael Georg in Munich. Before launching FERNRIDE, he specialised in Entrepreneurship and Autonomous Driving in his Master's programme at TU Munich and Stanford University. He started his first company already at the age of 16 and scaled it to a successful international business.

ABOUT THE COMPANY:

FERNRIDE offers scalable automation solutions for yard trucking that increase productivity, promote sustainability and improve worker safety. The company employs a human-assisted autonomy approach, that ensures seamless integration and reliable operations for logistics operators. FERNRIDE uses cutting-edge technology to address major industry challenges, such as driver shortages and the negative environmental impact of logistics operations.

KALMAR HYBRID STRADDLE CARRIERS DOMINATING THE MARKET





Aki Heikkinen, Sales Director Horizontal Transportation, Kalmar

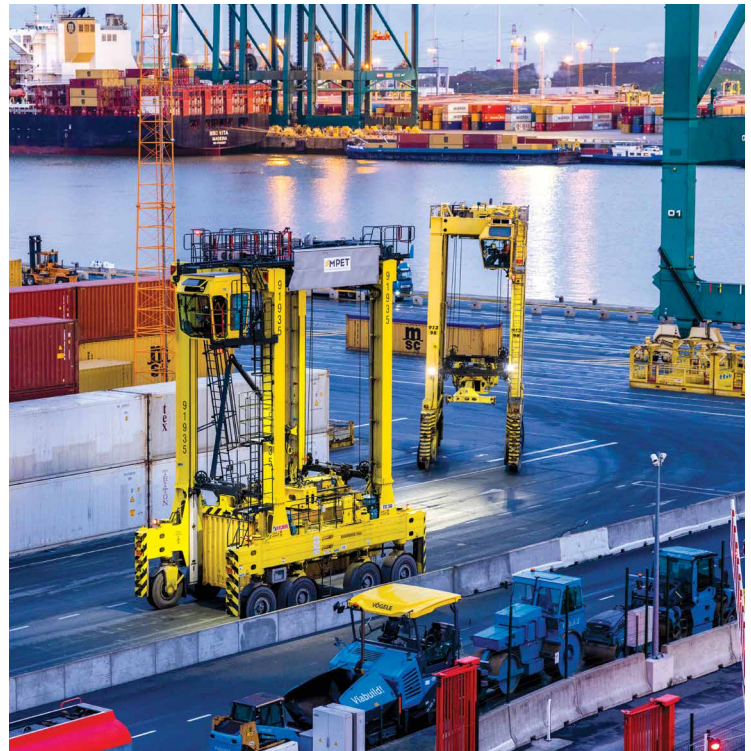
In the rush to decarbonise port and terminal operations, the quickest gains are made by switching from diesel to hybrid or fully electrified vehicles. In recent years, Kalmar Hybrid Straddle Carriers have proven wildly popular, accounting for more than 50 per cent of straddle sales. Read on to discover how the company's hybrid straddles are being used in today's future-oriented ports and terminals.

For many decades, burning diesel has been a simple and effective way to power industrial equipment. However, reducing emissions has become a significant concern for port and terminal operators. Corporate imperatives, the cost of fuel and stricter environmental legislation are forcing change in many jurisdictions.

Going electric is a great way to reduce both local emissions and noise levels drastically, but not all operators can transition to fully electric equipment. This is where the Kalmar Hybrid Straddle Carrier is playing an important role, as it provides an excellent alternative for operators who are not able to transition to fully electric equipment.

HYBRID STRADDLE CARRIERS ACCOUNT FOR OVER 50 PER CENT OF SALES

"Since 2014 we have sold over 600 hybrid straddle carriers," explains Aki



Heikkinen, Sales Development Lead, AMEA at Kalmar. "Not only big global terminal operators are going in this direction; smaller local operators are also attracted by the competitive advantages of more eco-efficient operations, especially as customers focus on cleaning up the carbon intensity of their supply chains."

On average, cargo handling equipment accounts for roughly one-quarter of the total emissions at a container terminal. There are a host of ways to cut terminal emissions, from automation, energy regeneration and introducing hybrid or electric drivelines, to fleet-level solutions like route optimisation.

"SINCE LAUNCHING ITS FIRST STRADDLE CARRIER MORE THAN 50 YEARS AGO, KALMAR HAS BECOME A LEADING SUPPLIER OF ECO-EFFICIENT HYBRID AND FULLY ELECTRIC TRANSPORT SOLUTIONS."



“FOR OPERATORS LOOKING TO REDUCE THEIR CARBON FOOTPRINT EVEN FURTHER, SWITCHING TO HYDROTREATED VEGETABLE OIL (HVO) FUEL IS A WAY TO MAKE A BIG IMPACT.”

“But you have to go beyond the equipment itself and consider systems efficiency,” highlights Heikkinen. “How efficiently is your fleet utilised? How smart is your terminal operating system at minimising unproductive moves? Overall resource efficiency is a big piece of the puzzle.”

KALMAR HYBRID STRADDLE CARRIERS: EFFICIENCY IN MOTION

Since launching its first straddle carrier more than 50 years ago, Kalmar has become a leading supplier of eco-efficient hybrid and fully electric transport solutions. Its vision for a hybrid straddle took shape back in 2008, resulting in a highly eco-efficient machine today.

The hybrid straddles rolling off the production line now use up to 40 per cent less fuel and cut CO₂ emissions by as much as 50 tonnes per year compared to diesel-only equipment.

“Real fuel savings depend on a number of factors including driving distances, ambient temperature, terminal operating mode and so on, but our theoretical calculations have been backed up by real-world data from hundreds of machines in operation today,” says Heikkinen.

For operators looking to reduce their carbon footprint even further, switching to hydrotreated vegetable oil (HVO) fuel is a way to make a big impact. Kalmar Hybrid Straddle Carriers are HVO-

compatible, enabling up to 90 per cent lower fuel emissions.

A case in point: long-time Kalmar customer DP World Southampton, aiming for net-zero emissions by 2040, has introduced both Hybrid Straddle Carriers and HVO fuel as a vital step towards reaching its target.

EASIER MAINTENANCE AND LOWER NOISE LEVELS

“We know from experience that in a typical terminal, straddle carriers can idle up to 50 per cent of the time,” explains Heikkinen. “The Kalmar Hybrid Straddle Carrier cuts diesel engine idling out completely since the diesel engine only comes on when batteries require topping up.”

Li-ion batteries are coupled with a smaller, compact diesel unit that starts and stops as required to recharge the batteries. As the straddle goes about its work, it converts energy from deceleration and spreader lowering into additional electrical power.

Straddle carrier batteries are housed in a modular power unit on the hybrid machine's top frame, along with a battery cooling system and a hydraulic system that powers braking, steering and spreader movement. Battery modules maintained with Kalmar Hybrid Service have a lifetime of around 10 years. Over 2.5 million operating hours is evidence of the proven technology.

"The hybrid machines are not only much more efficient but also quieter," notes Heikkinen. "Outside

sound is 6 decibels lower than diesel-only machines, while cabin noise is 50 per cent reduced. That makes for a much more pleasant work environment for operators."

Learn more about Kalmar Hybrid Straddle Carriers and Kalmar Electric Straddle Carriers.

ABOUT THE AUTHOR:

Aki Heikkinen works as a Sales Development Leader at Kalmar and has more than 18 years of experience with Straddle Carrier sales. Aki has in-depth knowledge of the global straddle carrier market and the latest technologies. Throughout his time at Kalmar, Aki has worked closely with product development representing the customer's perspective in R&D projects.

ABOUT THE COMPANY:

Kalmar is the global leader in sustainable cargo handling for ports, terminals, distribution centres and heavy industry. With its extensive electric portfolio and global service network, they help customers move towards safer, more eco-efficient and productive operations. Kalmar develops innovative solutions that shape the future of the industry, improving customers' every move. www.kalmarglobal.com.

Kalmar is part of Cargotec. Cargotec's (Nasdaq Helsinki: CGCBV) sales in 2023 totalled approximately €4.6 billion (\$5 billion). The company employs around 11,400 people. www.cargotec.com.



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ADAPTING TO THE AUTOMATED LANDSCAPE: TALENT AND TECHNOLOGY IN CONTRACT LOGISTICS



Michael Schuettrumpf, COO, Contract Logistics,
DP World Europe

The advent of Industry 4.0 marks a significant paradigm shift across various industries, from shipbuilding to logistics, as technology continues to reshape traditional manufacturing processes. Thanks to Artificial Intelligence (AI), Internet of Things (IoT), robotics and advanced analytics, operations and productivity are being optimised.

However, the constant introduction of technology ensures the perfect balance between automation and human involvement continues to evolve. This challenge is amplified by a deficit in skilled talent and a lack of appetite to work in the sector, due to a misunderstanding of what the sector has become and the rewarding career path it can now offer.

TECHNOLOGY SHAPING CONTRACT LOGISTICS

Automation, in particular, has the potential to transform the logistics industry. It will have profound implications for contract logistics, where we are becoming increasingly reliant on advanced digital solutions to optimise operations and meet evolving customer demands. With the rise of e-commerce and the globalisation of supply chains, logistics providers are under pressure to deliver goods faster, cheaper and with greater transparency than ever before. As a result, technologies such as warehouse automation, autonomous vehicles, and data analytics are becoming indispensable tools for streamlining processes, enhancing efficiency and improving decision-making in contract logistics.



“AUTOMATION FACILITATES SCALABILITY, PROMOTES WORKPLACE SAFETY AND ENHANCES OVERALL PERFORMANCE, THEREBY IMPROVING THE CUSTOMER EXPERIENCE .”

As customers' expectations continue to evolve, driven by the convenience and speed of online shopping as well as complex supply chains and shorter lead times, technology will play an even more significant role in enabling seamless order fulfilment, real-time tracking and personalised services. Embracing technological advancements is not just an option but a necessity for contract logistics providers looking to remain competitive and agile in an increasingly digitalised and interconnected world.

AUTOMATIONS TRANSFORMATIVE POTENTIAL

Warehouse automation, including Automated Storage and Retrieval Systems (AS/RS) and Autonomous Mobile Robots (AMRs), is a necessity to optimise storage and retrieval processes, minimising space requirements and reducing labour costs. Similarly, automated order picking and packaging systems are enhancing order accuracy and fulfilment speed while minimising errors and waste. Equally important is the gained



“BALANCING AUTOMATION WITH HUMAN EMPLOYMENT IN CONTRACT LOGISTICS DEMANDS A NUANCED APPROACH, WHICH CONSIDERS OPERATIONAL EFFICIENCY, COST-EFFECTIVENESS, WORKFORCE SKILLS AND EVOLVING LOGISTICS TASKS.”

flexibility to handle big volume swings robustly.

Transportation is witnessing the emergence of autonomous vehicles and route optimisation software, promising efficient last-mile delivery and reduced fuel consumption.

Information management is also benefitting from automation through Warehouse Management Systems (WMS), Enterprise Resource Planning (ERP) solutions and Bots, offering real-time visibility into inventory and supply chain processes in a lean environment.

The argument for automation in contract logistics is certainly a compelling one. Firstly, automation significantly enhances efficiency and speed by reducing manual handling time and expediting various processes, crucial in meeting tight deadlines which are commonplace in contract logistics. Secondly, automated systems minimise errors, ensuring accuracy in delivering products to designated locations, vital for fulfilling contractual obligations. Thirdly, while initial investment in automation may be required, long-term cost savings are substantial, driven by reduced labour expenses, optimised space utilisation and streamlined processes.

Moreover, automation facilitates scalability, promotes workplace safety and enhances overall performance, thereby improving the customer experience - a critical aspect of success in contract logistics, where meeting contractual commitments and providing a seamless logistics experience are paramount.

ATTRACTING TALENT TO CONTRACT LOGISTICS

The contract logistics sector is contending with diverse challenges in talent attraction, varying across regions and industry segments. This can be attributed to a perceived lack of innovation, limited visibility among job seekers, difficulties attracting younger professionals to counter an ageing



workforce and misperceptions regarding the nature of logistics roles. Global talent shortages, educational pipeline deficiencies and post-pandemic industry perceptions are further compounding these challenges. If we are to address these obstacles, we need a concerted collaborative effort to communicate the industry's modernisation, promote technological advancements and enhance diversity and inclusion.

We need to align educational pipelines with industry needs to ensure a dynamic and skilled workforce capable of navigating the evolving landscape of contract logistics. This will require upskilling and reskilling programmes to equip workers with the necessary expertise. Collaboration between educational institutions, industry stakeholders and government bodies is vital if we are to develop comprehensive training programmes. Employee retention will become essential as skilled professionals are increasingly sought after, emphasising the need for competitive compensation and continuous learning opportunities.

BALANCING THE BENEFITS

Balancing automation with human employment in contract logistics demands a nuanced approach, which considers operational

efficiency, cost-effectiveness, workforce skills and evolving logistics tasks. While automation offers significant benefits, challenges related to workforce dynamics and talent availability persist in the industry. Task complexity plays a crucial role, as automation excels in repetitive tasks while humans are better suited for decision making and adaptability. Combining automation and the human touch will be essential in building the resilience all sectors of the logistics industry require. Tactically, while automation facilitates scalability during peak periods, human workers provide flexibility in handling variable workloads and unforeseen challenges, maintaining operational resilience. Human employees remain essential for customer-facing tasks and personalised services, highlighting their irreplaceable role in customer interaction. Finding the right balance between automation and human employment is crucial.

PRECIPICE OF TRANSFORMATION

As the contract logistics sector navigates the intersection of talent and technology in an automated era, it faces both challenges and opportunities. The evolution towards automation promises increased efficiency, cost-effectiveness and competitiveness. However, the success of these technological

advancements hinges on the availability of skilled talent capable of leveraging and managing these technologies effectively. The symbiotic relationship between automation and human expertise holds the key to a future where logistics is not only more efficient but also more humane. As we stand at the precipice of a transformative era, finding the balance between man and machine will ensure a logistics sector that is not only technologically advanced but also resilient and socially responsible.

ABOUT THE AUTHOR:

As COO for Contract Logistics at DP World Europe, Michael Schuettrumpf is responsible for delivering and growing the contract logistics strategy. Responsibilities include the execution, customer delivery and financial performance of more than 100 warehouse operations for customers in 12 European countries in the Automotive, high-tech, eCommerce, Industrial, Chemical and FMCG sectors. His vast experience and 'customer-first' mindset ensure contract logistics is executed with excellence.

ABOUT THE COMPANY:

Trade is the lifeblood of the global economy, creating opportunities and improving the quality of life for millions of people around the world. DP World aims to make trade flow better, changing what's possible for the customers and communities they serve globally. With more than 106,500 employees across 73 countries, the company is pushing trade further and faster towards a seamless supply chain that's fit for the future. By integrating its physical infrastructure with cutting-edge technology, DP World creates efficient end-to-end solutions, pushing the sector towards better ways to trade and minimising disruptions from the factory floor to the customer's door.

Find out more about DP World's decarbonisation strategy [here](#).



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