

# 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 Witteimeier**, Director of Marketing and Sales, INFORM

*At PTI's Container Terminal Automation Conference (CTAC) North America in November 2023, Matthew Witteimeier, 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 Witteimeier:** 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

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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

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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 Witte-meier, 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:**

INFORM specialises in AI and optimisation software to improve operational decision making. Based in Aachen, Germany, the company has been in the optimisation business for more than 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's unique blend of algorithmic-based software expertise, rich industry experience, and big-world thinking delivers huge value for its customers.

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