CTAC NORTH AMERICA 2023: TRANSFORMING PORT OPERATIONS AT THE PORT OF VIRGINIA

"ONE OF THE POSITIVE SIDE EFFECTS OF THE NEW TECHNOLOGY IS THAT VIRTUALLY EVERYTHING IS ELECTRIC. REPLACING FOSSIL FUEL VEHICLES WITH ELECTRIC ONES IS A MAJOR CONTRIBUTOR TO A MORE ENVIRONMENTALLY FRIENDLY OPERATION."

Margherita Bruno, Editor, Port Technology International, interviewing
Rich Ceci, Senior Vice President Technology and Projects, Virginia International Terminals

Following the success of Port Technology International's last year's Container Terminal Automation Conference (CTAC) North America 2023, we had the opportunity to engage in a conversation with Rich Ceci, Senior Vice President of Technology and Projects at Virginia International Terminals. In this interview, we explore how the port is actively adopting technology to elevate efficiency, sustainability, and safety.

Can you start by telling me about the specific areas or processes within The Port of Virginia where automation has been implemented recently?

Automation started in The Port of Virginia in 2007 when our Virginia International Gateway (VIG) terminal, located in Portsmouth, came online. Since then, our approach to using technology and understanding its overall value to our operation has not changed very much.

In 2019, we doubled VIG's capacity and implemented the same technology used in 2007 to drive operational efficiency and consistency across the operation; a year later we converted our Norfolk International Terminal's (NIT) straddle carrier operation to the same technology. This conversion ended up increasing the container storage capacity on the same land footprint by 60 per cent. From our standpoint, we are a high-technology port first and foremost, though not all of our technology is associated with automation.

For example, we are using a grant from the US Department of Transportation to evaluate the technology required to service autonomous over-the-road trucks. That project resulted in our latest technology innovation: the installation of a private 5G network at VIG. Though the technology is still being evaluated, it has the potential to make a major impact on push-to-talk human-to-human communications as well as improve our on-terminal manned vehicles' ability to communicate with our terminal control systems. In addition, it may enhance our DGPS location tracking system.

Two years ago, we brought a brand-new intermodal yard concept online that has proven to be amazing. The new approach allows remotely operated intermodal cranes to service an on-dock rail operation much faster and safer than our previous systems. Once again, the win here was speed and safety that was attained by deploying technology assists.

How has technology improved efficiency and productivity in the port's day-to-day operations?

Technology is improving safety and operating speeds. In some cases, by taking humans out of fast-moving equipment and putting them in an office building we have been able to operate the equipment at higher speeds with increased acceleration and deceleration parameters that humans could not tolerate if they were onboard the equipment.

We have taken inspectors out of busy truck gate lanes and moved them into an office setting where they can do their jobs better. They are examining high-resolution pictures rather than walking around and dodging trucks in the rain and snow doing a manual, visual inspection. The result is faster, safer, and more reliable and that directly impacts productivity.

How has technology influenced the overall safety and security measures at The Port of Virginia?

VIG has always had excellent safety ratings. Recently, when we switched our other deep-water container terminal from a conventional to a high-technology operation we saw a significant reduction in lost time incidents – injuries. There is no doubt that

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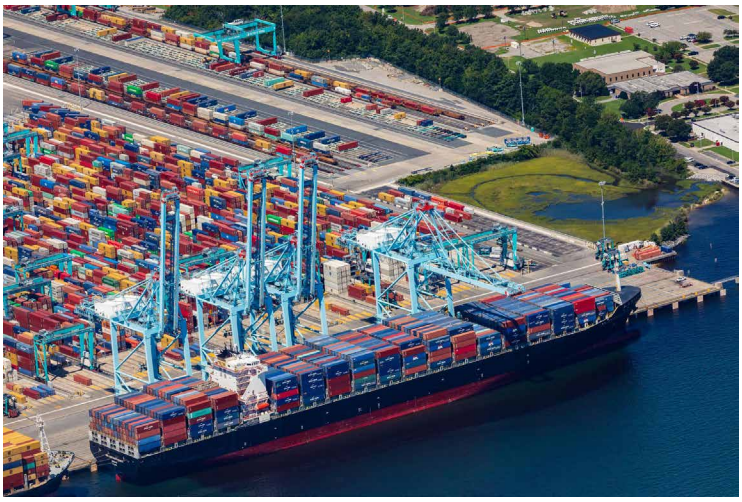

"THE DEMANDS ON THE WORKFORCE RELATED TO TECHNOLOGY ARE GREATER THAN AT A CONVENTIONAL TERMINAL. MORE OF OUR WORKFORCE IS USING COMPUTERS AND TABLETS RATHER THAN PENCILS AND PAPER."

these reductions are directly linked to the safety elements that are intrinsic to the technology.

In what ways have new technologies contributed to environmental sustainability and reduced the port's ecological footprint?

One of the positive side effects of the new technology is that virtually everything is electric. Replacing fossil fuel vehicles with electric ones is a major contributor to a more environmentally friendly operation. In 2020, we made a commitment to get all of our operational electricity needs from clean energy sources like solar, wind, etc. Our goal for achieving this milestone was 2032, but we completed that migration on 1 January 2024 well ahead of our deadline.

We have also reduced our carbon footprint by replacing our diesel shuttle trucks with hybrid alternatives that use 30 per cent to 40 per cent less fuel. And, we recently started a pilot program to evaluate the use of electric vehicles for on-terminal container movement between the yard and rail operation. The results are very interesting, but the early data shows this will need more time to evolve to become viable.

With the introduction of automation, have there been any changes in the workforce or the skill sets required for your employees?

This is a very good question and in short, yes. The demands on the workforce related to technology are greater than at a conventional terminal. More of our workforce is using computers and tablets rather than pencils and paper.

The demands have been very high and our labour partner, to its credit, is responding well to this challenge and is making strides to master the required skills. And this evolution comes in other areas that have nothing to do with automation.

Take the skills required by a mechanic to service an engine. It is much different from maintaining a hybrid vehicle versus a simple diesel. The advancement of technology impacts more than the obvious computer-assisted jobs that come to mind. Rather these advances affect many aspects of life. This helps because now people are seeing technology all around them – from their phones to their TVs, to their cars. In some ways, our use of these advanced concepts has helped people cope with the other changes happening in other parts of their lives.

In light of last year's labour issues on the US West Coast, how does the port intend to strike a balance between harnessing the benefits of automation and safeguarding the well-being and job security of its employees in port operations?

Our labour union is our partner, and it is a partnership that we value. The VIG terminal was built on a greenfield site to replace a smaller, conventional container terminal. The new terminal became the Western Hemisphere's first high-technology container terminal and when it came online in 2007, not a single job was lost.

From the outset, we decided against the fully automated approach that was used in the Hamburg, and Rotterdam terminals (the only other automated terminals in existence at the time). We did this because we felt that the vessel productivity of the fully automated facilities was not adequate to meet our needs.

Our vision was vessel productivity that was 60 per cent higher than those happening at the

European sites. We felt our labour partner could do a superior job performing the horizontal transport (vessel to/from yard) portion of the operation than those that were automatic and this proved to be the case. We knew from the outset that once we locked in that operating model, there would be no going back.

If we were faced with that same decision today, we would make the exact same one. Our semi-automated approach keeps people in key spots and will outperform any fully automated system. Being part of the Commonwealth of Virginia, our performance is heavily focused on leveraging jobs and commerce.

Has automation had any unexpected challenges or lessons learned during its implementation at The Port of Virginia?

The software demands associated with these systems are significant. The vessel operations on a marine terminal are much less routine than you might imagine. Things are happening all the time, and the uncertainty causes enormous stress on the software.

There are cases where gaps in the software cause people to engage in areas that, while necessary, are impactful for both productivity and accuracy. We strive to plug the gaps and improve the software to reduce the cases where people must work around software problems. The less variability we experience the greater the productivity.

The biggest lessons we learned are that the software makes a huge difference and that the job of that software is much more complicated than anyone would imagine at the start of a project.

What feedback have you received from your clients and stakeholders regarding the impact of new technologies on their experience at the port?

Generally, the feedback is exceptional. Several of the nation's largest retailers called beneficial cargo operators (BCOs), have named us the best logistics hub in their network.

Take, for example, our use of truck reservations. Back in 2019, one BCO was so against the concept it was threatening to pull its business out of the port. We asked it to stick with us so we could prove the value of our concept.

Over the course of an operating year, this company saw the dual move gate turn times of its trucks drop to under 40 minutes; it became an instant convert.

This year another major customer has latched on to our free API-based information subscription platform. That platform is handling 3.1 million messages per month and growing.

Our focus on the environment has also caught the attention of eco-friendly BCOs. The advancements we're making in overall sustainability are helping some of our BCOs hit their Scope 3 reductions goals. Our goal is to be America's Most Modern Gateway and a growing number of our port users understand why.

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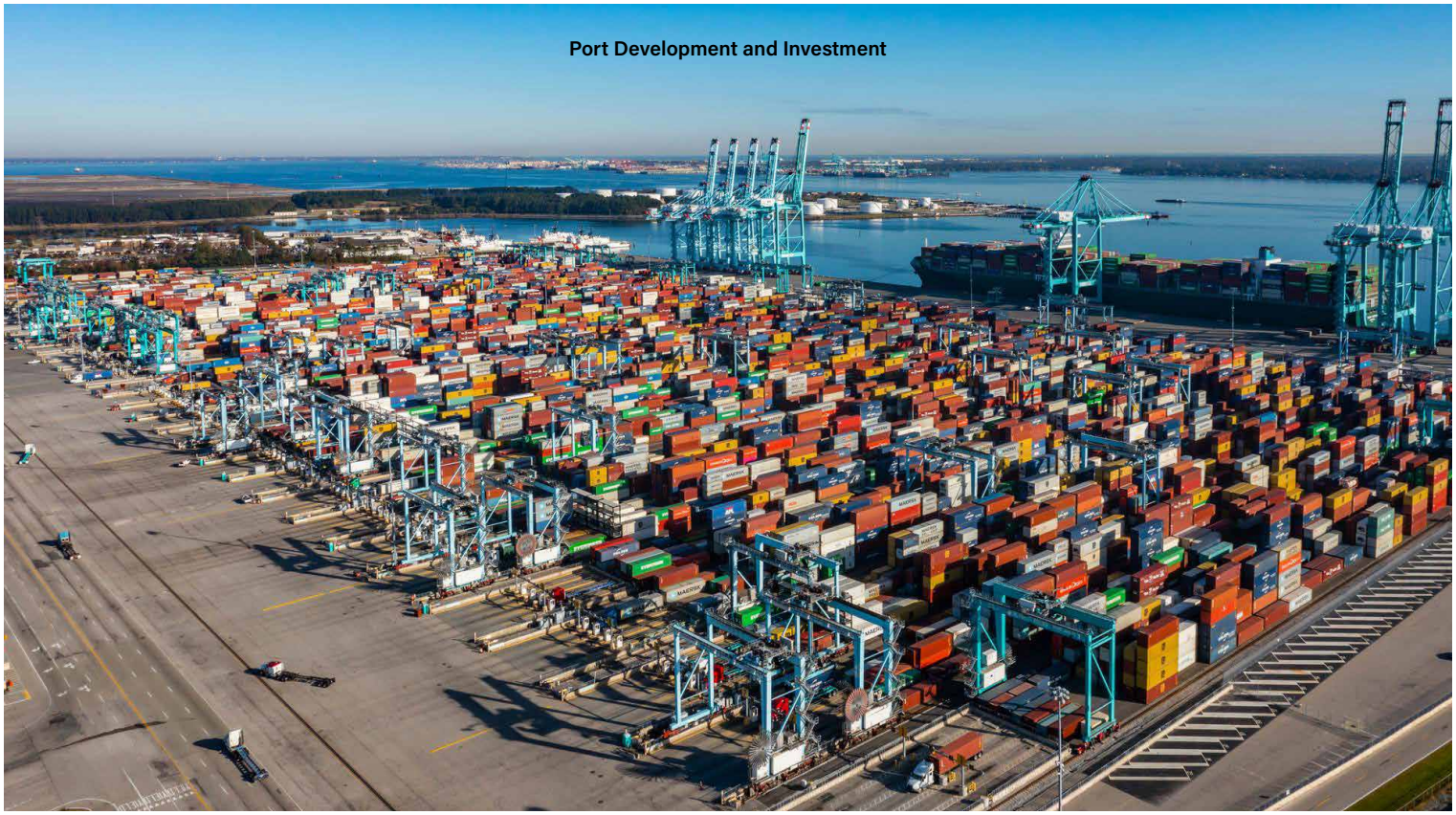

"OUR EARLY-ADOPTER APPROACH TO TECHNOLOGY BACK IN 2007 HAS ALLOWED SOME MAJOR EQUIPMENT PROVIDERS TO EVOLVE INTO TECHNOLOGY COMPANIES. THE RESULT IS THAT WE HAVE A VERY LOYAL SET OF SUPPLIERS WHO ARE HIGHLY COMPETENT TECHNOLOGY COMPANIES."

Can you elaborate on any partnerships or collaborations with technology companies or research institutions that have facilitated the integration of automation at The Port of Virginia?

Our early-adopter approach to technology back in 2007 has allowed some major equipment providers to evolve into technology companies. The result is that we have a very loyal set of suppliers who are highly competent technology companies.

Domestically-based companies like Nascent (a gate system supplier based in North Carolina) Now-Trac (a California-based DGPS provider), Versiant/General Informatics (network consulting supplier in North Carolina), and Navis/Kaleris (TOS provider based in Oakland) have been with us from the start. So have a number of European companies like CAMCO (OCR provider based in Antwerp), and TBA (simulation/simulation emulation provider based in the Netherlands). These companies grew their technology in concert with the development of our first terminal, and have gone on to enhance and grow them further over the past 16 years.

We have recently expanded some of our partnerships to a group of Virginia universities that are contributing to our autonomous vehicle project and also providing great help in our evolving cybersecurity strategy.

You can't have the success we have had by working alone. We have been fortunate to have as many great companies helping out along the way. One other area that made a major contribution is the equipment suppliers and control system companies. The list in that area includes some very large, well-known names like Konecranes for Automated Stacking Cranes, and Kalmar for shuttle trucks, TMEIC for advanced equipment control systems, and ZPMC for ship-to-shore cranes.

What advice do you have for other ports or businesses looking to incorporate new technologies into their operations based on your experiences at The Port of Virginia?

First, you must manage the expectations of all your project stakeholders: all of them. If you get

any one of them out of sync you will likely have problems.

Be 100 per cent transparent. Do not trivialise any problems and, by all means, do not make problems sound hopeless. Accurate, factual transparent updates are mandatory.

Second, this is a lot harder than anyone imagines at the outset. The project team will work harder on one of these projects than on any other in their career: take whatever you think is a lot of work and then double it. And before you think this can be solved by adding people – just be careful. As the team gets larger the communications demands increase non-linearly.

Our project teams have been fairly small, usually less than 10 people. Those teams have typically done the entire job and by that I mean, business case development, engineering design, construction, procurement, equipment selection, and commissioning as well as all IT-related stuff.

Every seam between two suppliers adds an element of risk. So be careful how much you allow to be farmed out.

As automation becomes more prevalent in the shipping and logistics industry, what strategies does the port have in place to remain at the forefront of these technological advancements?

This is an interesting question. We deploy technology when it makes sense and has a benefit to safety, efficiency, or capacity. We also look for cases to improve the experience of the port stakeholders (i.e. API interfaces etc). So, we do not benchmark ourselves to ensure we are in the "forefront". That question might be better if we consider how a new project team can digest the various emerging and existing technologies to create a project that is at the forefront of advancement.

People today have a major advantage versus what we were looking at back when our APM project started in 2004. There are 20-plus successful cases today that can serve as a benchmark for the design of new projects. Technology has advanced over that period.

Undoubtedly new project teams are going to want to pick and choose elements from successful terminals. They will think they know better or have different needs (even if they don't).

A recommendation would be to look at a successful terminal as though it is a cake. The procedure for achieving a great cake involves following a recipe. The recipe used to produce a successful terminal can be adapted to different tastes or needs.

Be careful and make sure you know what you are doing. You might for instance decide to add almonds instead of chocolate to the batter and still get a great result. On the other hand, eliminating eggs, or replacing wheat flour with rice flour might end up making a mess and the follow-on result will be very costly. So, innovate, but be mindful of the risks.

Could you discuss any ongoing or upcoming automation projects or initiatives that are part of The Port of Virginia's future plans?

We currently have $1.4 billion of projects underway and several very large projects in the engineering phase. The running projects are well-known:

- Renovating, modernising and adding capacity to the North Berth at Norfolk International Terminals (NIT)
- Deepening our harbour to 55 feet and widening it to allow for two-way traffic by the largest ships in the world
- Expanding capacity at NIT's Central Rail Yard and
- Creating the Mid-Atlantic's staging hub for the development of offshore wind infrastructure

All of these projects will be completed by the end of 2027.

ABOUT THE AUTHOR:

Rich Ceci joined VIT in May 2016 as Senior Vice President of Technology and Projects. He is responsible for the major expansion projects in The Port of Virginia. Rich and his team have completed expansions to two of the port's largest terminals that have increased capacity by 40 per cent.

Previously, Rich was VP of Information Technology for GCT USA in Bayonne NJ where he managed the Global Expansion Project, winner of several industry awards. In addition, he was the IT lead on the APM Terminals Virginia project.

ABOUT THE PORT:

The Port of Virginia is proudly recognised as CPPI's top-performing port (with more than 1,000 vessel calls) and is located in Site Selection's 2022 Top State for Business Climate. The port exclusively owns and operates its terminals and the nation's leading chassis pool. At The Port of Virginia, customers and partners experience the efficiency and service excellence only offered through the most modern and technologically advanced container terminal operations on the US East Coast.