

# MOVE OVER MUSCLE

## *Seaports Extract Value from Facility Technologies in New Ways*

By Lori Musser

**S**eaport operations are *not* being left out of the technology scramble. Seaports are introducing new high-tech operational technologies at a fast pace, and, hand-in-glove, are upgrading their strategies and skill sets to extract the utmost value from their new investments.

### **On the Docks**

Technology has already permeated the back offices and the docks. There is hardly a newly purchased crane or forklift that doesn't boast an automated this or a remote-controlled that.

Some concerns about job loss as port functions automate persist, but, with seemingly perpetual global trade growth, there has also been a focus on expanding skill sets. Longshore and other workforces have been kept busy doing just that and today's dock workers are increasingly adept with

remote operations, joysticks and hand-held devices.

### **In the Office**

The ongoing transition from traditional port tools, equipment and infrastructure to more high-tech versions has gone well, from an operational perspective. However, high-tech equipment needs a lot more than an operator. It needs someone to spec, choose, finance, purchase, install, connect, monitor, and maintain it.

Those jobs often fall to a port authority or its terminal operators, who also need new skill sets, even if they rely on consultants and contractors to get them started on the high-tech path.

### **Optimizing Port Automation and Tech**

The world's ports and terminals are rolling out AI, 5G, machine learning, robotics,

autonomous vehicles, remote-controls and digital everything, in order to build productivity, resiliency, supply chain efficiency and cost-effectiveness.

To reap all these types of benefits, ports are thinking about their needs from a holistic point of view. Technology offers competitive advantages so it needs to be incorporated into planning related to ESG (environmental, social, and governance), business development, energy needs and energy transition, technology communications systems, resiliency preparedness, and other plans and programs.

### **Your Very Own 5G**

To get the biggest bang for a technology buck, ports need to ensure every tech element that needs to communicate with someone or something can do so.

Adam Schipper is director of business development-ports, for Ericsson North

America. He said that ports are very much interested in ways to safely and securely connect their technologies and digital data flows: “Automation can be optimized using the private network concept. We are focusing on that. It is a private cellular-network-in-a-box — prepackaged and pre-integrated, and easy to install and operate — but it’s a world-class network.”

Schipper said private networks are scalable: “You can start small, with one terminal, manage the network, and expand,” if and when desired. “It has open APIs and easy integration. Enterprise customers like ports don’t want to have to rely on someone else to manage their network,” he said.

There are other advantages. “The beauty of this is we feel security aspects are tighter because it is a dedicated network,” Schipper said. It is arguably far safer than sending data, such as directions to move a crane, over Wi-Fi. And, in the event of a disaster, there is less physical infrastructure (like cabling), to break, and data is moved in real time so there is accuracy in asset tracking, and equipment-condition monitoring, he said.

Schipper said Ericsson’s private networks are 5G NR. NR refers to new radio access technology developed for fifth generation mobile networks, and was designed to be the global standard for the air interface of 5G networks.

A private fully connected network creates a completely integrated, reliable communications system that is important for

performing physical operations such as remotely controlling heavy or automated port vehicles.

The benefits of a private network are easy to assess. “They are eternally reliable, more than a public network and with better coverage and capacity. Automated container-weighing systems, for example, reduce weighing times. Remote-controlled quay cranes lower vessel completion time, increasing productivity by up to 25 percent,” said Schipper.

And while mostly large-volume container ports and terminal operators have been investing in private networks, “We have various sizes — size small, medium, and large — ready to go,” said Schipper.

No matter the size, 5G private networks are foundational in the quest to achieve smart port status. They can be extremely affordable: “They are less expensive than laying down fiber — especially for a new terminal or port. The reality is that ports today have multiple communications platforms that are legacy and sitting there and expensive to keep current. It is a lot more cost effective to optimize a private network,” said Schipper.

For example, a video/camera system connected by cables and fiber can cost in the range of \$8,000 to \$10,000 per camera. On a private network, which is wireless and cellular, the connection savings could reach \$7,000 to \$8,000 per camera, according to Schipper.

## Holistic Port Planning

Most ports rely on consultants, contractors and EPCs to help optimize technologies.

Kosal Krishnan is national maritime market sector leader for WSP, whose maritime specialists are dedicated to the planning, design, and construction of port facilities, marine infrastructure, and coastal facilities.

Krishnan described a recent project wherein WSP provided engineering design services to nearly double cargo capacity at Port Everglades, an important container port. Technology, in the form of special low-profile super post-Panamax cranes (there’s a busy airport next door), will enable the port to handle larger container ships and open a gateway for Asian carriers to serve the vast consumption markets of Broward County and South Florida.

It is a best practice for consultants and contractors to leverage technology to benefit seaports. WSP weaves the latest technologies into its solutions, through the lens of its financial and operational expertise, to deliver comprehensive and future-ready solutions for ports.

Krishnan said there is substantial port interest nowadays in automated marine terminals, in the provision of shore power to vessels, and in similar tech-based initiatives.

That begs the question of electrical supply and sourcing, both essential to a more modern, efficient and sustainable maritime industry, according to Krishnan. Ports are

collaborating to look under the hood to ensure that their electricity is sourced in a way that aligns with their carbon-reduction goals, and to ensure that the potentially massive electrical draw of a port full of vessels (not to mention terminals full of electrified equipment) doesn't black out a city. Such transitions require careful, collaborative strategic planning by vessel and terminal operators, ports, their advisors, utilities, government, and others.

It's not just putting outlets on a pier.

## Here Comes Autonomous Charging

As ports further electrify, workers are needed to connect and plug things in. Or are they?

President and COO of the Taylor Group of Companies, Robert Taylor, recently announced an autonomous charging initiative for second generation ZLC Electric Container Handlers: "Autonomous charging is the next step in our commitment to battery electric vehicle technology," he said.

Taylor Group is working with Oregon-based Rocsys on the initiative, which Rocsys describes as autonomous charging that enables dependable and fast charging, while at the same time reducing wear and tear on charging cables and connectors.

## Green Tech Catalyzes Growth

In Canada, the Port of Belledune, New Brunswick, is looking for value from green tech. Jeff David is chief engineering and operations officer at Belledune Port Authority. "The port aims to be Canada's green energy hub. We want to attract renewable and clean energy to the port that will, in turn, attract industry to the area for the production of green products," he said.

In that effort, the port has created a specialized development district to welcome green energy projects — solar, biomass and wind energy, or small modular reactors — as well as advanced energy storage systems and low-carbon industries including green manufacturing.

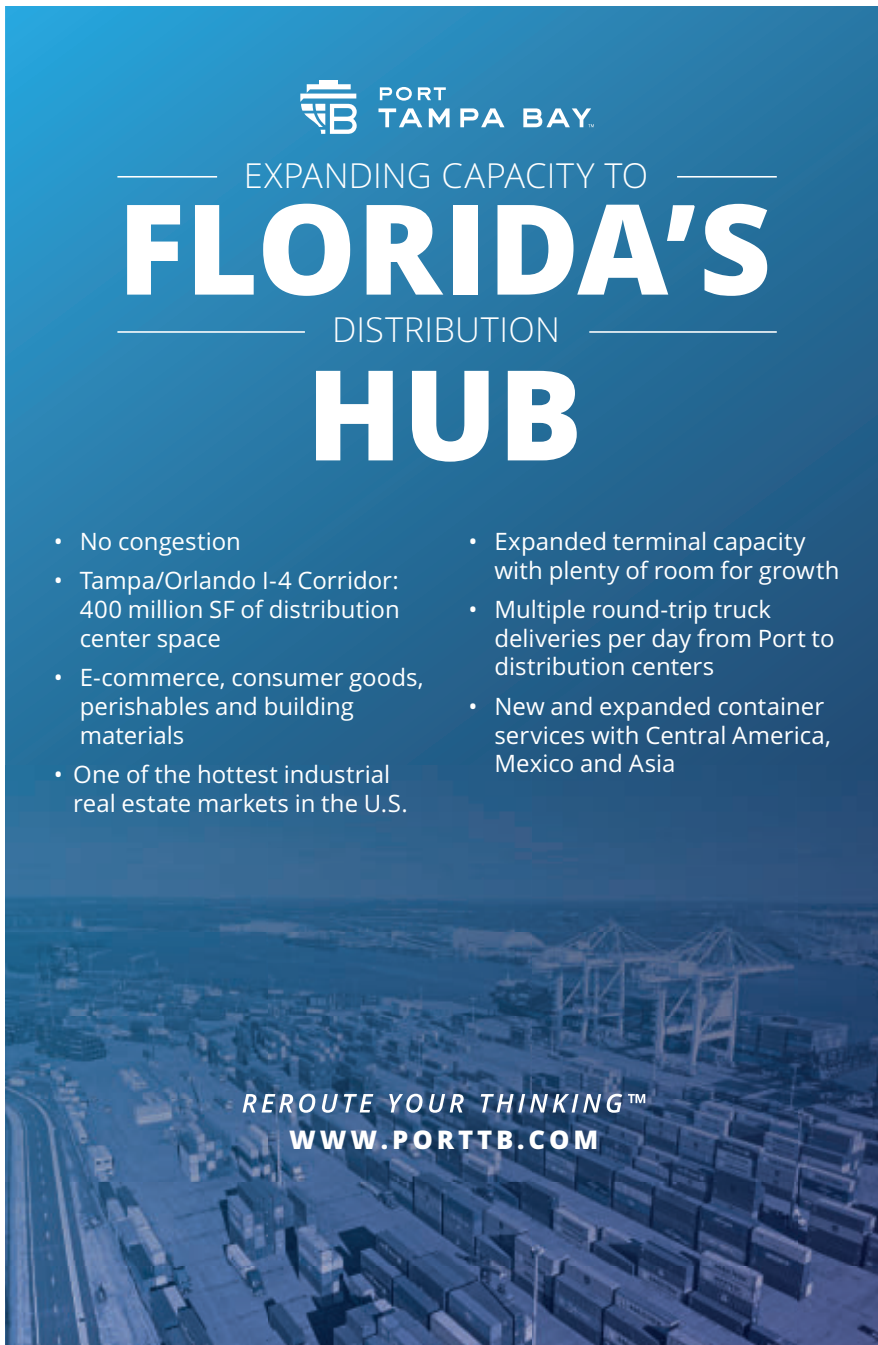
It isn't doing this alone. It has partnered with its First Nations communities and provincial electric utility NB Power to align, develop, and market opportunities for private sector green development.

It also has MOUs in place to strengthen bilateral relationships and support the energy hub. On May 10, 2023, the Belledune Port Authority signed an MOU with the Port of Rotterdam focused on the production, storage, and shipment of cleaner fuels such as green ammonia, hydrogen, biomass and renewable natural gas. It enables the ports to explore the possibility of infrastructure developments, innovations, and technology advancements as the industry transitions to cleaner fuels.

David said Belledune has a similar MOU with Niedersachsen Ports in Wilhelmshaven, Germany, signed in August 2022, to work together on shipping commodities and manufactured products, also with a focus on clean fuels and green products.

The mainly bulk cargo port has already lined up an anchor project for its green hub, a green hydrogen production plant to be developed by Cross River, to begin production by 2027. The plant will produce ammonia fuel for export.

In another major project, the Canadian government's National Trade Corridors




  
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pre-arrival and post-departure assessments of our assets for damage,” he said. While the Apps are dependent on physical inspections by the harbor master’s department, once inspections are uploaded, they are easily accessed in the GIS system by appropriate parties, facilitating any necessary action.

### Integrating Technologies for Prosperity

Leveraging any technology can help a port succeed. Technology is changing the world’s seaports. Port operations are being carried out in “smarter” not “harder” ways.

Now that technologies are pervasive in port operations, they must also be integrated into all planning. Ports can leverage operational tech to enhance port safety and security, build productivity and resiliency, and better support supply chains in general.

Port skill sets are going high-tech too, and, ports are even finding ways to help drive green tech. Innovative and comprehensive ways to extract value from facility and operational technologies are driving continued seaport prosperity. ●

Fund, which helps infrastructure owners and users invest in critical transportation assets that support economic activity, has funded up to \$12.5 million for a \$25 million dry conveyor loop project at the Port of Belledune. The provincial government funded another \$4 million for the project.

The conveyor system will alleviate congestion issues at Terminal 3 by using Terminal 2 to unload material in new lay-down areas. This will increase the port’s capacity and efficiency and allow larger vessels to dock at Terminal 2, reducing the cost of shipping for the port’s clients.

“In addition to greatly enhancing the performance of our operations, the new conveyor system will electrify the movement of cargo and make an important contribution to reduce our operations’ greenhouse gas emissions,” said Denis Caron, president and CEO of the Belledune Port Authority. “This project is a game changer for our efficiency improvements and allows our partner, QSL, a competitive advantage for cargo handling.”

David said Belledune is a small port doing big things. That even applies to its GIS system. “We developed Apps to do



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