As travel restrictions, closed borders and other Covid-19-related disruptions continue to play havoc with global supply chains, the need for more accurate and frequent data on the location and status of cargoes has arguably never been greater.

The unprecedented situation is driving interest in smart container technologies that add a layer of intelligence, using data from sensors and internet connectivity, to track box movements and events across ships, port terminals, trains and trucks.

These hi-tech monitoring solutions can help various stakeholders respond to shipper/cargo owners’ demands for improved service and visibility. The data can identify the time and location of shocks, or packing issues that can inform the development of better packing procedures to prevent damage. The data can help other members of the supply chain identify bottlenecks and opportunities to streamline operations and cut costs.

Uptake of the technology was on the increase even before the pandemic, the global market for trailer and cargo container tracking solutions was worth an estimated EUR1.1 billion in 2019, up from EUR857 million the year before, according to the latest figures from IoT market research firm Berg Insight. It is forecast to double to an eye-watering EUR2.2 billion by 2024.

Major carriers have pumped millions of dollars into new smart refrigerated containers. In 2019, CMA CGM and MSC each added 50,000 smart reefer containers, using technology from Traxens, to their fleets. Hapag-Lloyd has committed to...
embed its real-time monitoring solution, called ‘Live’ by Globe Tracker, into 100,000 reefer units by 2021.

The market for dry containers is as advanced, mainly due to the specific requirements for the cargo and the relative high cost of monitoring tech, but many believe this will change soon. Kathryn Delecluse, smart container commercial project leader with MSC has said the company is aiming to equip 30% of its dry containers with sensor technology by around 2025.

Thomas Bagge, CEO of the Digital Container Shipping Association (DCSA), which is working with industry stakeholders to drive adoption of smart container standards, tells Marine Trader: “It’s just a matter of time before smart containers are universally adopted because they enable so many benefits, you can track temperature, humidity, co2 levels, shocks etc. and get much more accurate estimates for time of arrival, which is of use to so many players, including logistics companies or port terminals.”

Several creative business models have sprung up to make container monitoring more cost-effective. The expense of a permanently installed monitoring installation can be reduced by deploying reusable tracking devices fixed to the container wall or door and then removed at the end of a voyage.

Some companies sell the sensor hardware and an analytics platform, needed to interrogate the data, as a bundled service, others sell them separately, or utilise sensors made by third parties.

US-based Savi offers a real-time analytics solution to shippers and third party logistics providers, which can feed ETAs and analytics into Transportation Management Systems to help optimise cost and performance. Exception alerts can be used to track shipments at risk...
Digital containerisation raises exciting possibilities, but challenges also remain. Efforts to upgrade or replace the some 25 million containers in circulation will require commitment and investment of delays, damage or other disruption.

The biggest player in the fixed installation smart container market is Traxens, which works primarily with carriers and shippers, but is also exploring how to convey data to other parts of the supply chain.

One ambition is to integrate with port terminal operating systems (TOS) to enable them to handle new types of event, such as anticipated time of arrival of a container passing through the port.

Sylvain Prévot, Head of Strategy at Traxens comments: “Imagine a world where all containers are connected, as soon as the container is loaded and leaves the warehouse, a notification is sent to any party interested by the information, if the terminal has an estimated time of arrival for the container it could be key to improving operational efficiency.”

Early warning of container arrivals could help ensure enough space is available in the yard, cranes or forklifts could be mobilised in advance of the arrival of a barge or truck.

Switzerland-based Arviem works on behalf of global shippers / cargo owners covering four main industries: food, electronics, chemical and industrial to monitor and optimise their supply chains. It’s devices are attached by magnets to containers then removed when the destination is reached and sent on to the next shipment.

This results in much greater utilisation than a smart container with a fixed installation, claims CEO Stefan Reidy: “We can recharge the battery in a hub and send it to the next destination within two days …our business model of putting a flexible device into the box requires less investment to offer a global service.”

“Data coming from the edge of the network is used to create risk profiles,” he adds. “So we can tell the client where they should take actions to prevent risks, where to optimise the supply chain, where to change the route etc. to reduce the cost of logistics.”

If one port is shown to generate more shock messages than another, for example if containers are dropped, the client might be advised to adjust route planning to call at an alternative facility to help preserve the quality of the cargo. The service can also help shippers bring down their insurance premiums.

Data sharing is particularly important in the logistics supply chain due to the volume and diversity of players, which underlines the need for clear, unambiguous message exchange standards to maximise the potential of smart containers.

The Digital Container Shipping Association (DCSA), which represents nine carriers including MSC, Maersk, Hapag-Lloyd and CMA CGM, has released three smart container standards designed to ensure interoperability between smart container solutions and overcome the barriers associated with proprietary solutions.

All DCSA standards are open source, vendor neutral and technology agnostic and the DCSA is keen to collaborate with all parties in the maritime supply chain to drive adoption of standards-compliant solutions. “All companies are able to pick up our work and produce products that comply with the standards,” says Bagge. “This will guarantee that their devices are able to communicate with vessels from the major carriers, it is a rapidly developing space and there’s a lot of innovation happening.”

Digital containerisation raises exciting possibilities, but challenges also remain. Efforts to upgrade or replace the some 25 million containers in circulation will require commitment and investment by the likes of container leasing companies and shipping lines etc, and the specific business model and who should ultimately foot the bill remains unclear.

Real-time tracking of shipments raises security concerns, such as increased exposure to cyber attacks, and arrangements will need to be in place to ensure that data shared between different entities does not reveal protected or commercially sensitive information.

This is no fait accompli, but if maritime is to go the way of other industries, like telecoms or finance, in its pursuit of digitally interoperable solutions, then smart containers have the potential to become a key piece of the puzzle.