

# Singapore Port 2030

Smarter, greener and automated, these will be the key features in the next generation port (NGP) by 2030, as Singapore embraces automation, digitisation and artificial intelligence in its maritime vision. *The Business Times* takes a look at how the future port may look like

**T**HE Port of Singapore faces unique challenges that other ports may not have, such as land and sea space constraints, and a limited pool of manpower. To remain competitive and stay relevant as a maritime nation, Singapore needs to ride the inevitable trend towards smart shipping, in which ship owners are turning to automation and the application of big data and predictive analytics to lower operating costs and improve efficiencies.

By relocating container terminals from Pasir Panjang to Tuas where the multi-purpose Jurong Port and most maritime logistics providers are based, Singapore is able to design and build a maritime port for the future from scratch, incorporating new ideas and technologies. Consolidating port operations at one location will also improve connectivity and

economies of scale, thus reducing costs by eliminating inter-terminal haulage.

Another challenge for Singapore is building a maritime-future ready workforce. By 2030, it is envisaged the labour mix at the Port of Singapore will encompass more highly skilled technicians and engineers with specialised training.

The next generation port will feature digital technology that will boost efficiency and productivity, improve safety and security. The Maritime and Port Authority of Singapore signed a two-year agreement with IBM in August 2015 to create a unified platform to integrate real-time data and provide a consistent view across data points to help port operators make more informed decisions. The blue print of NGP will also look at intensifying land-use, raising the level of sustainability and connecting with the community.

## Tuas Port

The port will occupy 1,337 hectares of land (about the size of two Ang Mo Kio towns). To maximise land use in land-scarce Singapore, the new port can handle up to 65 million standard-sized containers annually, making it the largest container terminal in the world.

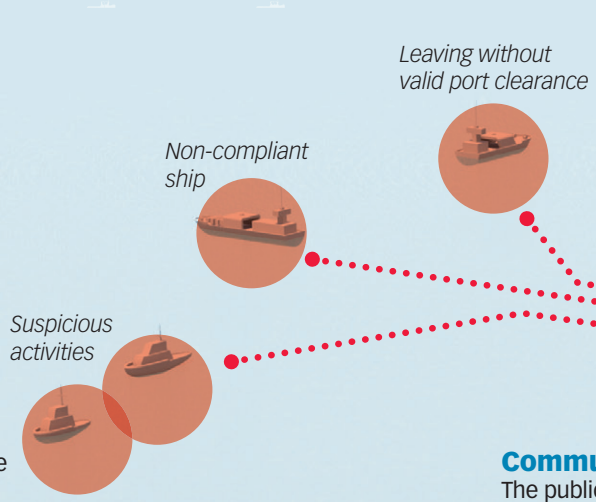


## Big data and predictive analytics

An unprecedented amount of data – from world meteorological and oceanographic data, traffic data, material and machinery performance data, data on cargo flows across the world, maritime accident data and even passenger and seafarers' personal data – will be shared among the next-gen shipowners, port operators and other players in the maritime eco-system.

### Intelligent port system

Built-in algorithm detects "anomalies" when two vessels are coming together at the wrong place or the wrong time, alerting port operators to possibilities of illicit activities such as illegal bunkering. A separate algorithm can detect vessels suddenly slowing down or changing directions and alert port operators of possible hijacking or piracy.



### Multi-tiered concept

Building a platform above part of the container port on which port-related and industrial developments, such as container freight stations, logistic hubs and other facilities, can be developed.

### Community spaces

The public will have access to the new port's fringes to better understand its operations.

### Berths

66 berths will be in operation by 2030.

### Automated Guided Vehicles (AGV)

Unmanned, emission-free transportation platforms used for shuttling containers between the quayside and container yard.

### Automatic yard storage system

Instead of the conventional system where containers are stacked one on top of the other, the NGP will have 'shelves' to slot the containers into, thus optimising efficiency, as operators no longer have to remove the topmost containers to reach the bottom-most ones.

### Autonomous truck platooning

Under the technology, a human-driven truck can be followed by one or more driverless trucks.

### A safe and secure port

A next-generation Vessel Traffic Management System (VTMS) will be developed to handle increased shipping traffic and larger ships in the future. The system will leverage data analytics to predict traffic hotspots and decision support tools to assist vessels in planning and optimising their sea passages.

### An efficient port

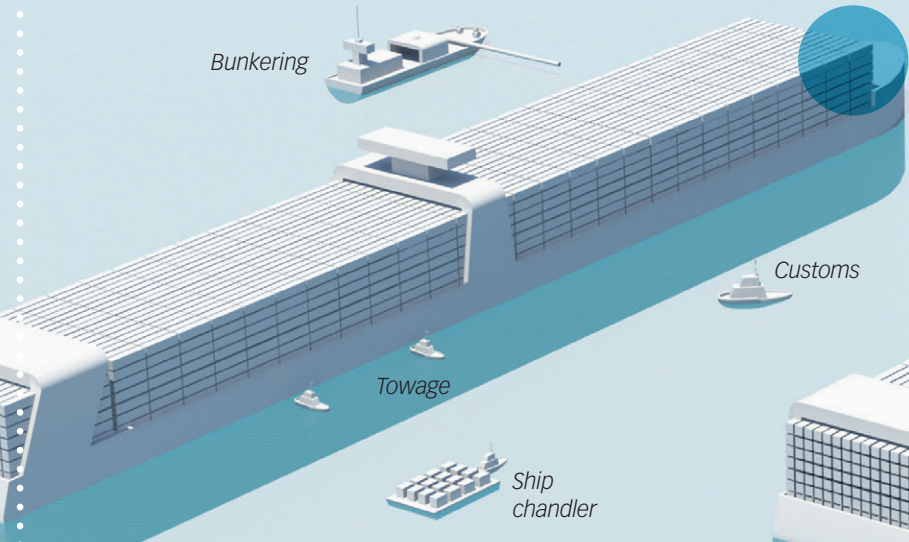
Terminal operations and machinery will be automated, and technologies such as automated guided vehicles and truck platooning are being explored and developed to increase the efficiency of port operations. Automation will reduce manpower needs and boost productivity of port operations.

### Intelligent port

Real-time information from multiple smart sensors and sources will be used to provide data for analysis. The data will then be fed through advanced maritime sense-making systems that can process, mine and extract useful information for decision and policy making, along with contingency planning.

### A green and community oriented port

The use of clean energy will be heavily promoted – especially liquefied natural gas (LNG) as a ship fuel – for day-to-day port operations. More community spaces will be built around the port fringes for public access to allow the maritime sector to stay connected with the masses.



### Next-gen Vessel Traffic Management System

Smart ships communicate vital information to the port operators via onboard sensors. Smart buoys, satellites and radars detect ships due to arrive. If arrival times are predicted to be later or earlier than scheduled, predictive analytics will advise ships to slow down or accelerate. This helps the port to better manage its anchorage space and plan ahead for loading or unloading.

Seawater treatment plant

Storage of fresh water

*"By harnessing technology, by our willingness to experiment, and by learning from others, we will push the boundaries of what defines a port."*

– ANDREW TAN, CHIEF EXECUTIVE, MARITIME AND PORT AUTHORITY OF SINGAPORE