

SUCCESSFULLY MANAGING THE NEXT GENERATION PORT & TERMINAL

The Next Generation Terminal Layout

April 2019



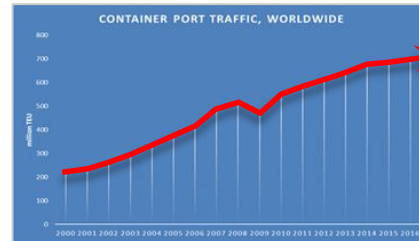
COFASTRANS (Container Vessel Fast Transshipment System)



***2019 – 21,000+ TEU: Now there are over 60 ships bigger than this one**

Container Shipping

- Growth in containerised trade continues.
- Shippers have driven the trend for larger ships.
- Port cargo handling rates slow to improve.
- Enlarging existing methods creates bottlenecks.



2016 - MSC Oscar



2006 - Emma Mærsk



1997 - Sovereign Mærsk



1968 - Encounter Bay



1956 - Ideal-X

COFASTRANS:

To enable faster loading and unloading of the new mega container ships (ULCVs), while reducing traffic congestion at the berth and linking with the latest terminal handling equipment.





Singapore 1972



Malaysia 2016



COFASTRANS 202X

Problems to solve:

1

Conventional cranes cantilever great distances to service bigger ships.

2

Traffic congestion from deluge of containers at short quayside reduces productivity.

3

Faster crane movements needed over wider ships just to maintain productivity.

4

Heavy loads from conventional cranes make quay walls expensive.

Container Terminal Expansion

Right now if a container terminal needs more capacity, it's just a question of adding another kilometre or two of berth and fitting it out with the latest gigantic cantilever cranes, suitable container handling and storage systems.

This is not sustainable in the long term and cannot go on forever. Straight line berths might be flexible and convenient for berthing vessels. But extending into the distance is not environmentally friendly and can be inefficient with long inter-berth journeys and extensive coastal land take.

When will this change?

The COFASTRANS Solution

...brings the ship into the heart of the port...

- Maximise number of hooks over the ship.
- Unload / load to quayside on both sides.
- Intensive work area all around ship.



Mega Container Vessels

Around 20,000 TEU (ie 10,000 40ft containers), stacked up to 10 high above and below deck hatches and 23 rows wide.

EEE vessel:

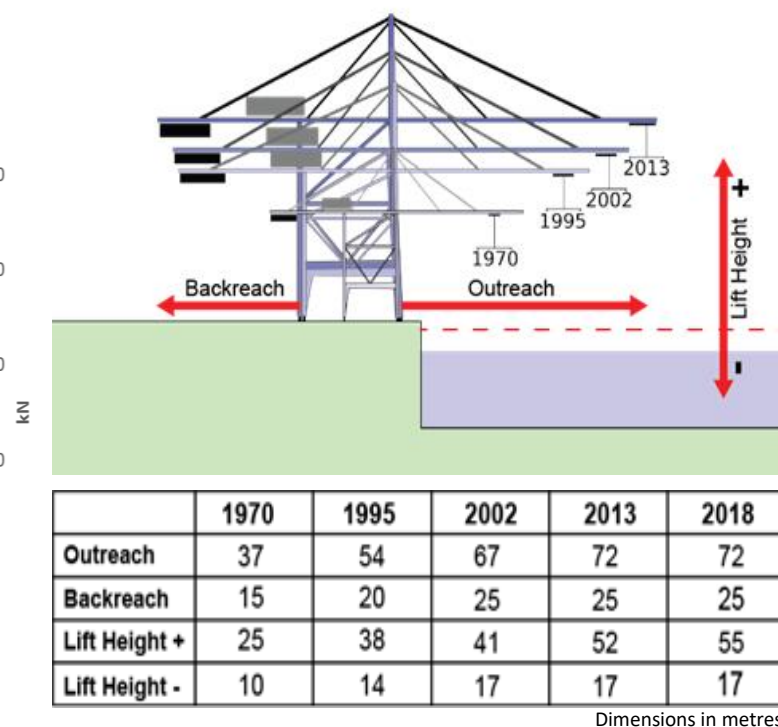
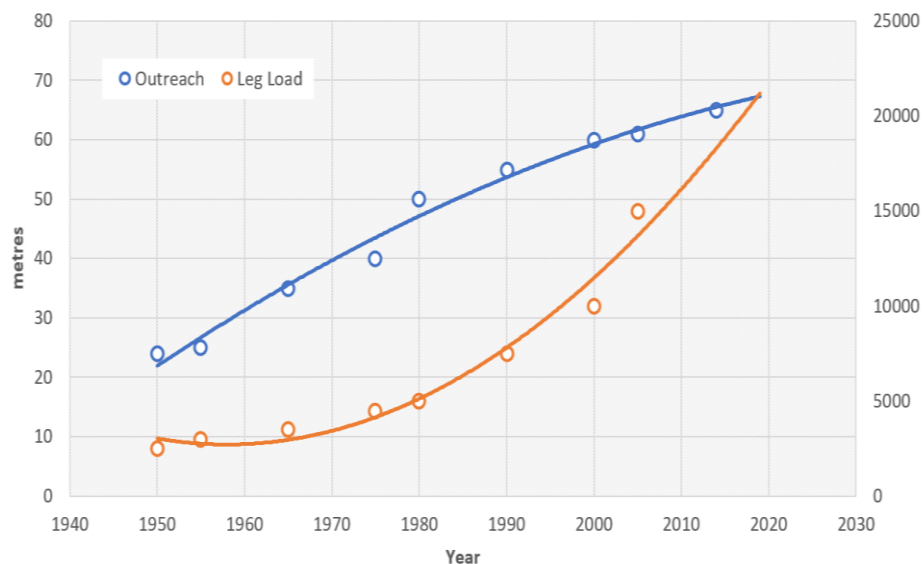
- 400m long x 59m beam.
- Maximum draught: 16.5m.
- 24 Cargo holds.
- Height above keel: 73m.



Could the next vessels be even wider if not constrained by STS cranes dimensions?

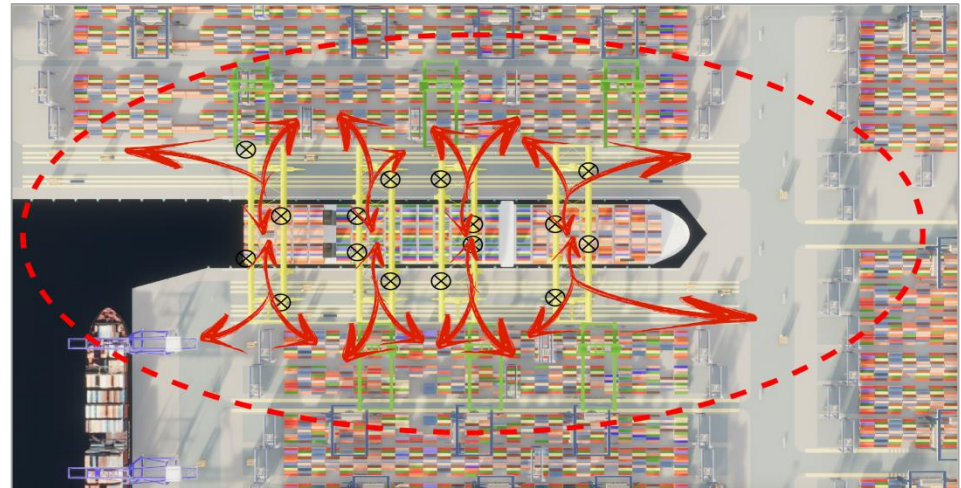
Ship-to-Shore Cranes

Greater outreach and height to match larger ship size.
Close to practical limits for cantilever structure



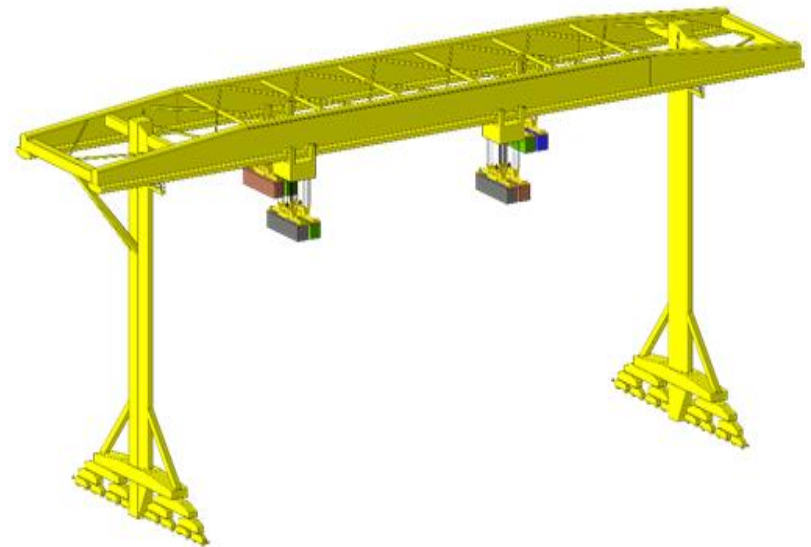
Indented Berth

- Cargo handling over both sides of ship.
- Access to maximum quayside space.
- Intensive activity zone around the ship.
- Controlled, protected environment.
- Well suited to automation.

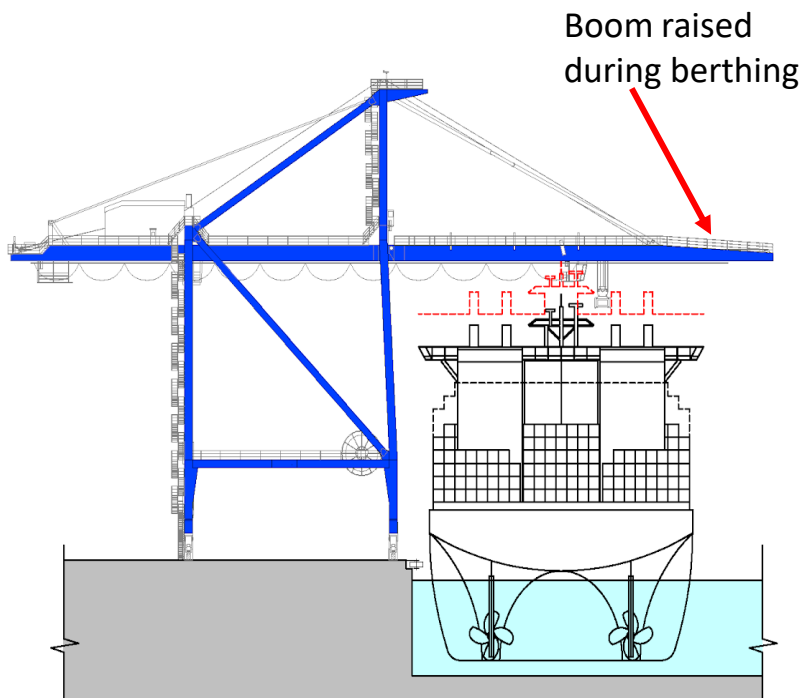


Innovative Portal Crane

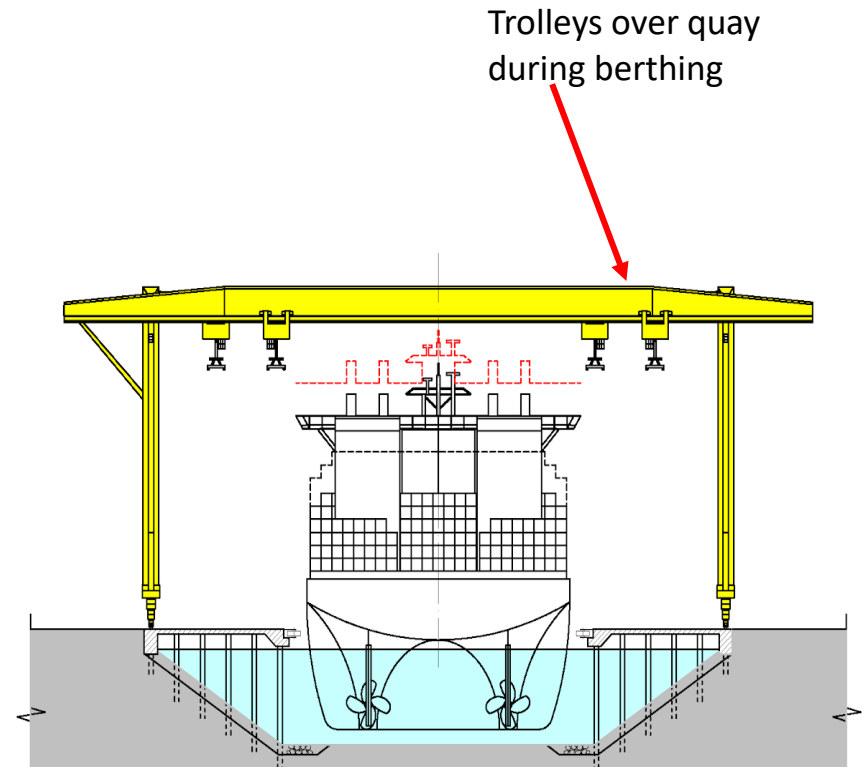
- 2 trolleys on each beam.
- 2 beams work over non-adjacent holds in ship.
- Transfer containers over both sides of ship.
- One leg on each quayside, set back from edge.
- Efficient, robust and durable structure.
- Heavy lift capacity.



Ship / Crane Interface

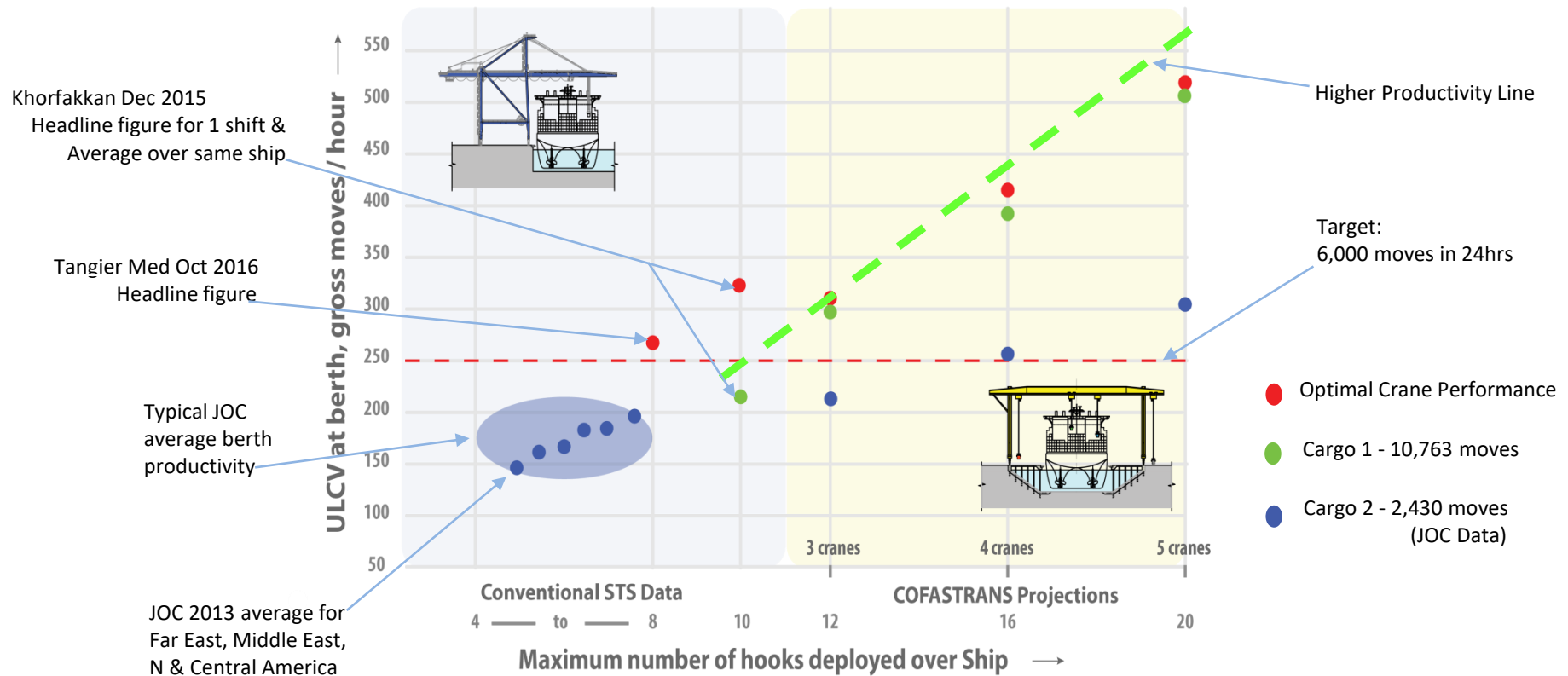


ULCV size Ship-Shore Gantry Crane



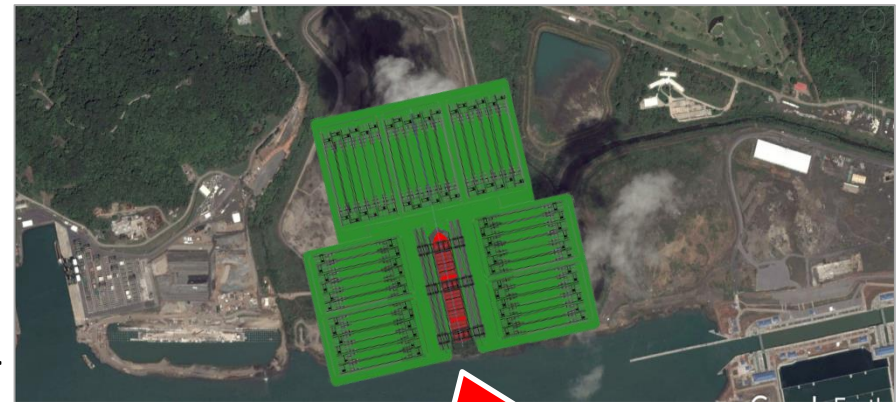
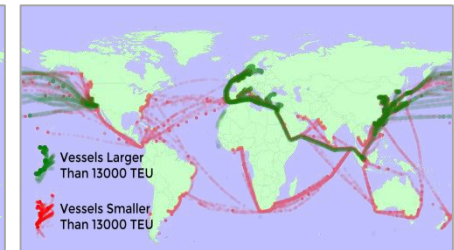
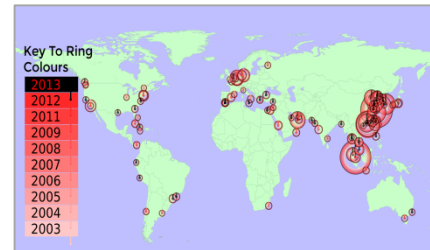
Innovative Portal Crane

Berth Productivity



Suitable Locations

- Largest ships trade on Asia - Europe routes
- Also Asia - West coast US.
- Adjacent to existing terminal needing to expand.
- Terminals constrained by limited sea frontage.
- New transshipment destinations.
- All locations different – bespoke designs needed.



Possible location for COFASTRANS, adjacent to conventional terminal

Map data Google, DigitalGlobe

COFASTRANS:

Disruptive technology....breaks the mould and unlocks opportunities to increase berth productivity.

With positive gains for end users, environment and safety:

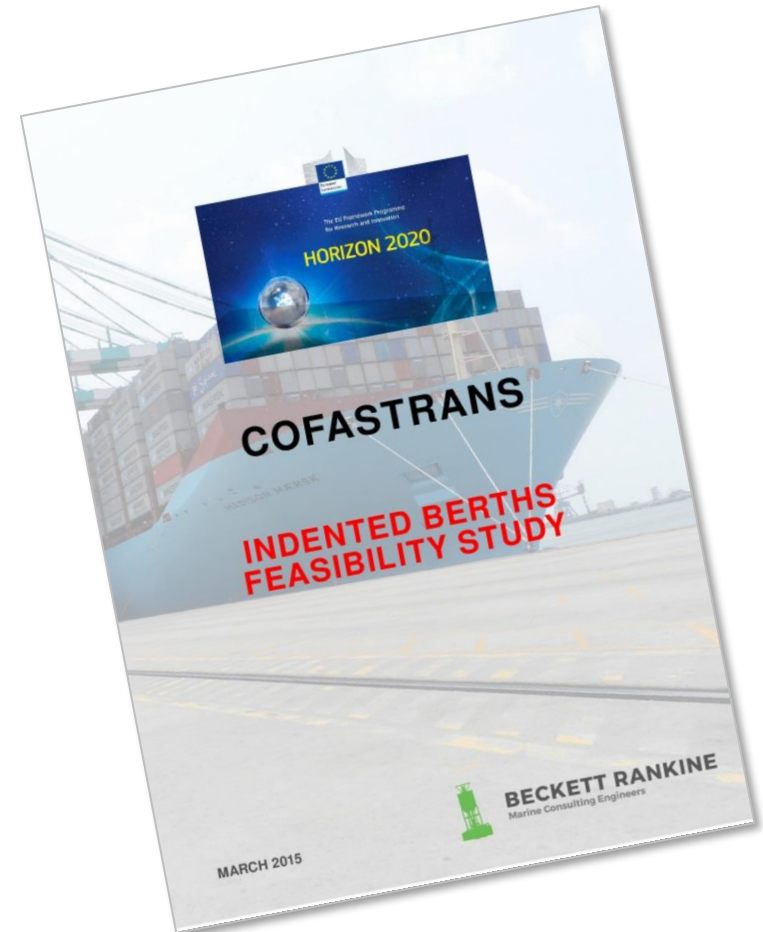
- *Faster handling of the biggest ships*
- *Fuel saving & lower costs*
- *Reduced industrialisation of land / sea interface*
- *Improved safety at ship / shore interface*
- *Ideally suited to automation*
- *Transformation to Port of the Future*



PIANC World Congress Panama – May 2019

- Stakeholder engagement
- Peer assessment
- Navigation details
- Layout concepts

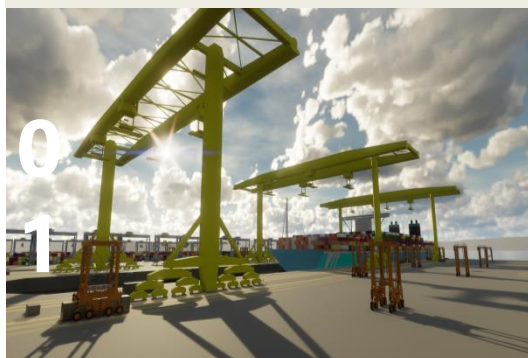
Research & Consultation



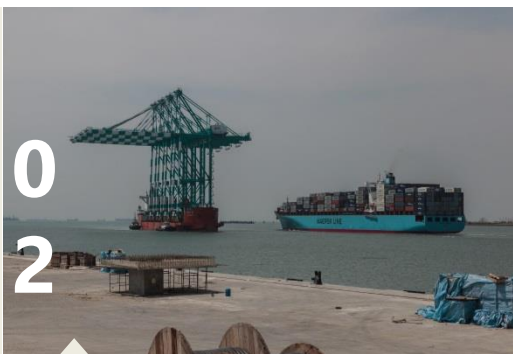
Looking forward....

Benefits

- Faster ship turnaround.
- Reduced terminal congestion.
- Improved safety.
- Well suited to Automation.



02



Opportunities

- Coordination with ship design.
- New hub destinations.
- Brownfield site optimisation.
- Enables use of wider ships.



Challenges

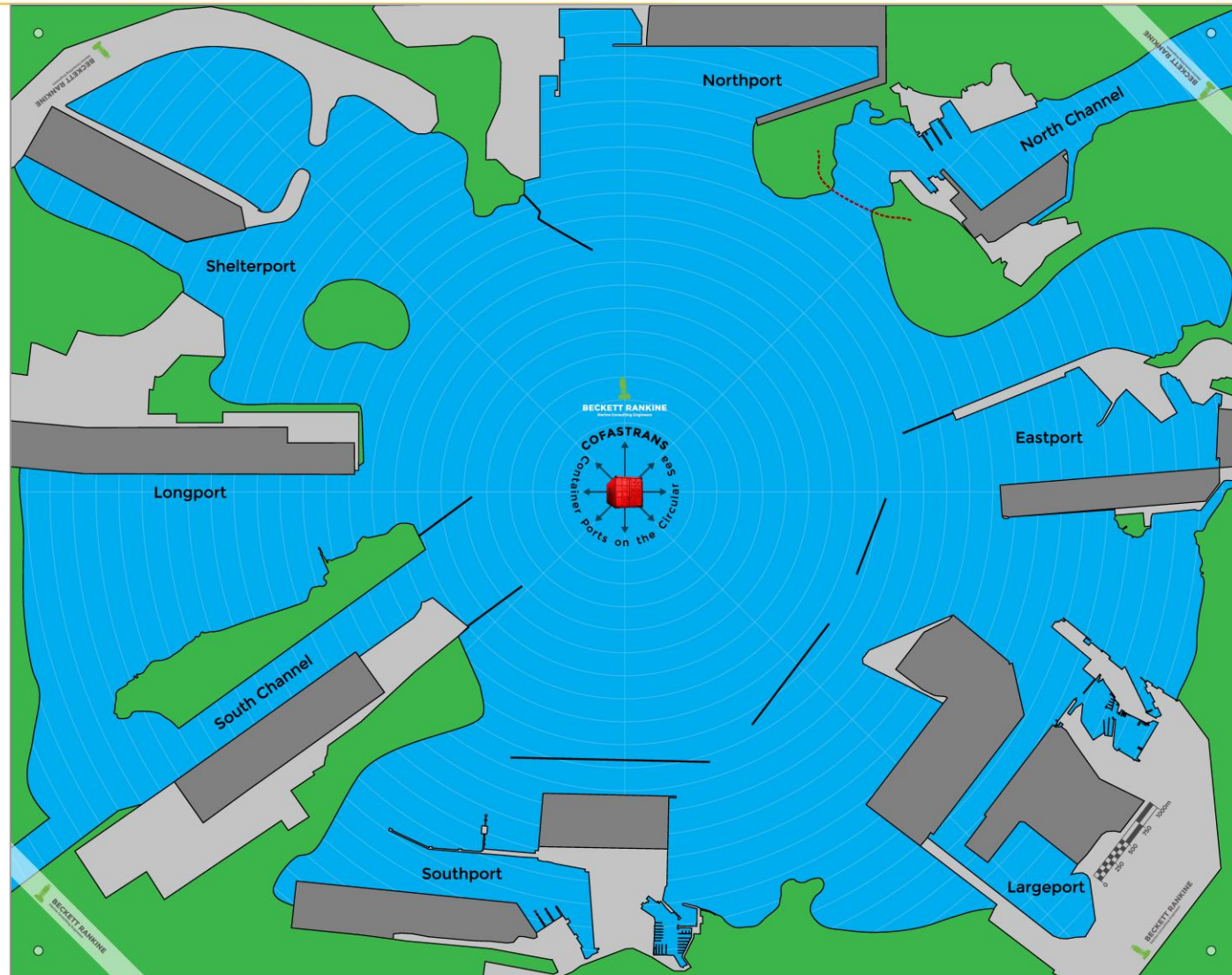
- Big change for conservative industry.
- Ports to invest, shippers to benefit?
- Recent heavy investment.

What next?

Which Port will
be first?

All ports are different

Many are well suited to
indented berth development.



Questions...



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