Fixing Port Jam Headaches

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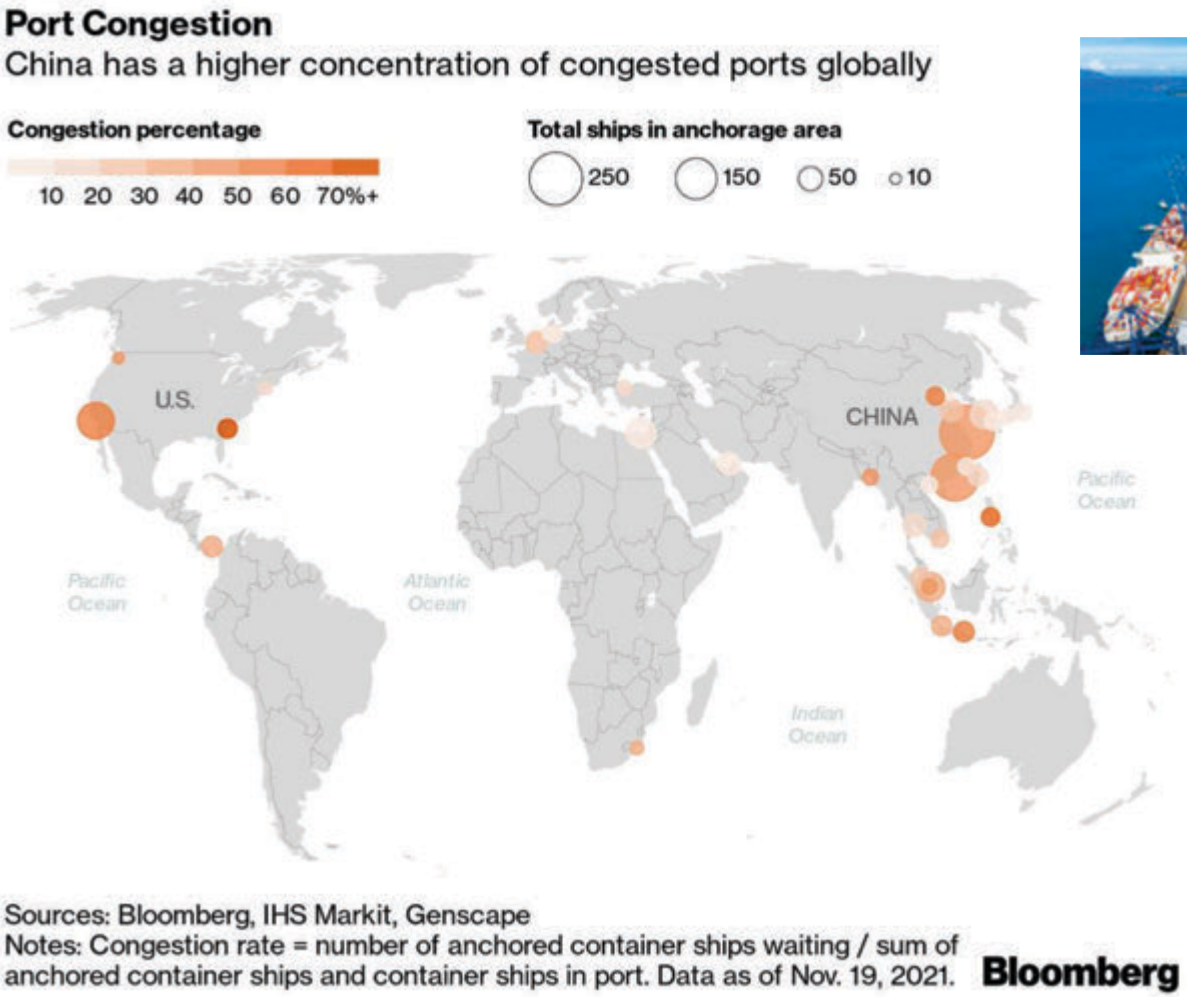
CEO of the COLUMBUS Group

National & international
port freight pinch points are under severe stress
causing port jams, container shortages, ships in
long delaying queues and frustrations with major cost headaches.

Our fast container handling package with smart intermodal transfers can handle 1000 TEUs / hr ... *renewable energy powered with good profits for all!*

$22Trillion global trade disruption

Global Supply Chain Crisis, now worse April 2022. Bloomberg.



COVID and lock down strategies have not helped!

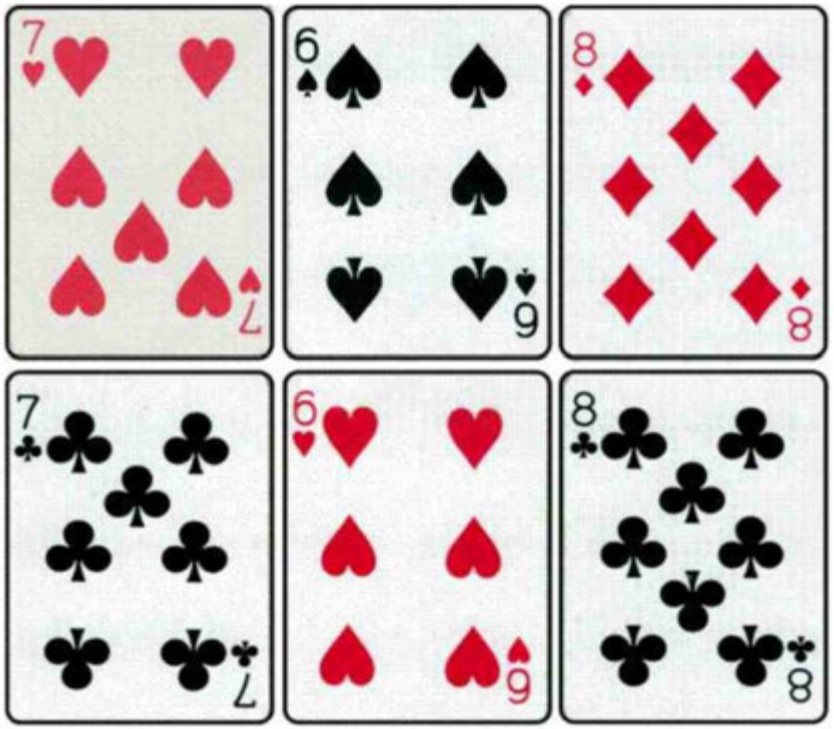
5 elements in our solution:

The target : 1000 TEU containers / hour port crane intermodal system

1. **Memory & data handling -** *where has it gone?*
2. **Matching port infrastructure** *to ultra container ships*
3. **Lifting modules -** *mecanum wheels & renewables*
4. **Movement management -** *3D deck engineering*
5. **Container handling-** *shuffle, stack & train away*

1. Memory & data handling

Start by picking ONE CARD ... and remember it!



Secrets of Australian IT Innovation WINNER 2003

Using our winning software based on multiple levels of smart logic, we can track & trace your containers... like your card selection.

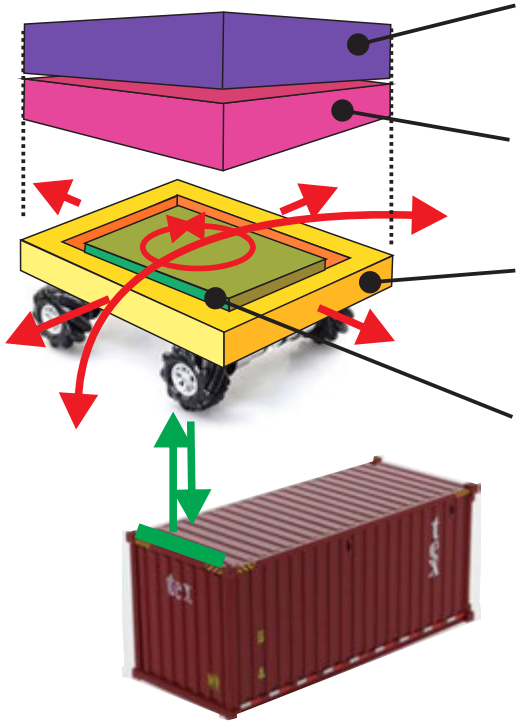
2. Matching port infrastructure to new ultra container ships

**The problem explained: new generation 24,000 TEU container ships are typically 400m long, 61.5m width and 33.2m deep,
with estimates of 90km of intermodal single container height trains to move such a load off the wharf or stack 24m / 9 containers high. (Offloading & loading can double the intermodal & stacking numbers stressing the need for greater efficiency)**

3. Lifting module & movements

The start point is 200 or more hoisting modules (working in sets of 2), each mounted on 4 MECANUM wheels with many movement options to quickly lift and move containers, with integrated smart navigation.

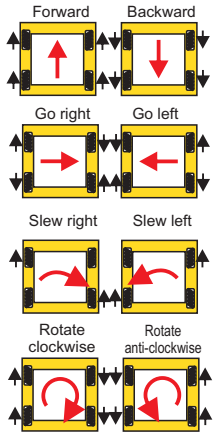
Powered by a mix of quick change / recharge renewables, including green hydrogen, green ammonia and LDES batteries, supported by power harvested from lowering other containers helps lift the next container, in a smart energy management, integrated system.



Quick change green hydrogen, green ammonia or LDES (long duration electrical storage) graphene aluminium ion batteries

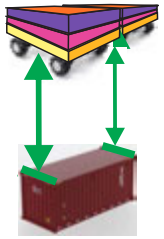
Navigation, hoist controls and container import analysis package and power level monitoring.

The 4 Mecanum wheels can rotate in separate different directions which makes it possible for the one hoist assembly to freely move as shown



The hoist system usually works in sets of two per container with the lifter spreader parked high at a 45 degree angle so it is clear when not moving a container.

The lift capacity of two hoists working together is usually up to 20 tonnes for one container.



4. Smart 3D deck engineering for effective & fast hoist travel

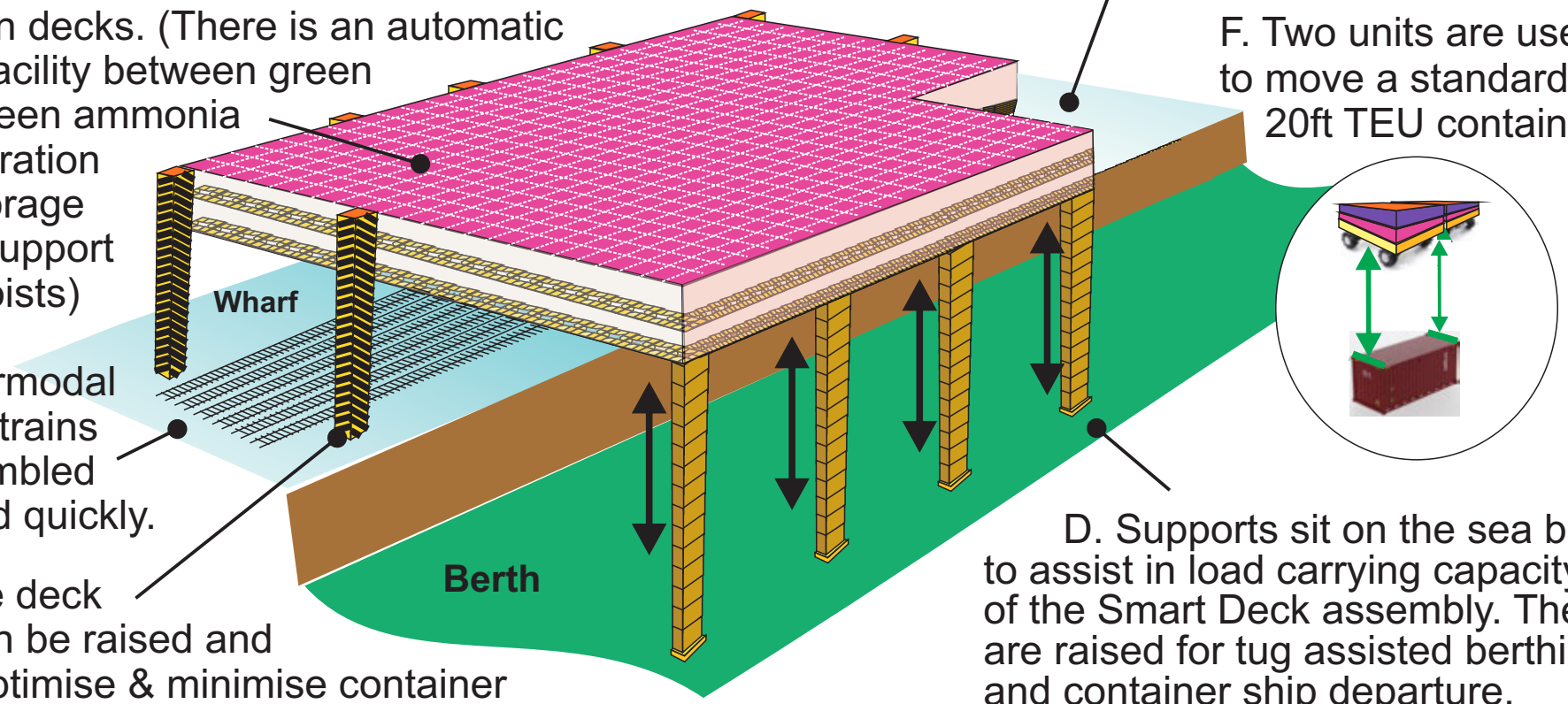
A. Double layer Mecanum Hoist Smart Deck full left/right and left/right movement also has the ability for the hoist assemblies to be lifted between decks. (There is an automatic quick swap facility between green hydrogen, green ammonia and Long Duration Electrical Storage batteries to support the Smart Hoists)

B. Many intermodal double layer trains can be assembled and unloaded quickly.

C. The whole deck assembly can be raised and lowered to optimise & minimise container lift operations, including container stacking to 9 TEU's.

E. The Double Layer Mecanum Hoist Smart Deck can be contracted where necessary to avoid the container ship's infrastructure etc..

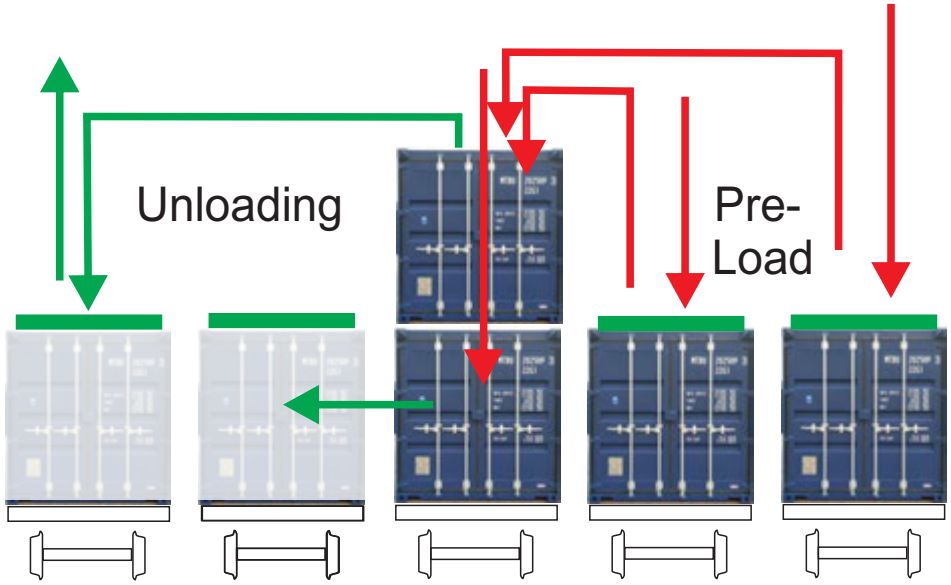
F. Two units are used to move a standard 20ft TEU container.

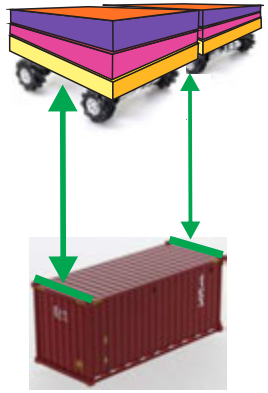


D. Supports sit on the sea bed to assist in load carrying capacity of the Smart Deck assembly. They are raised for tug assisted berthing and container ship departure.

5. Container handling
shuffle, stack and train away

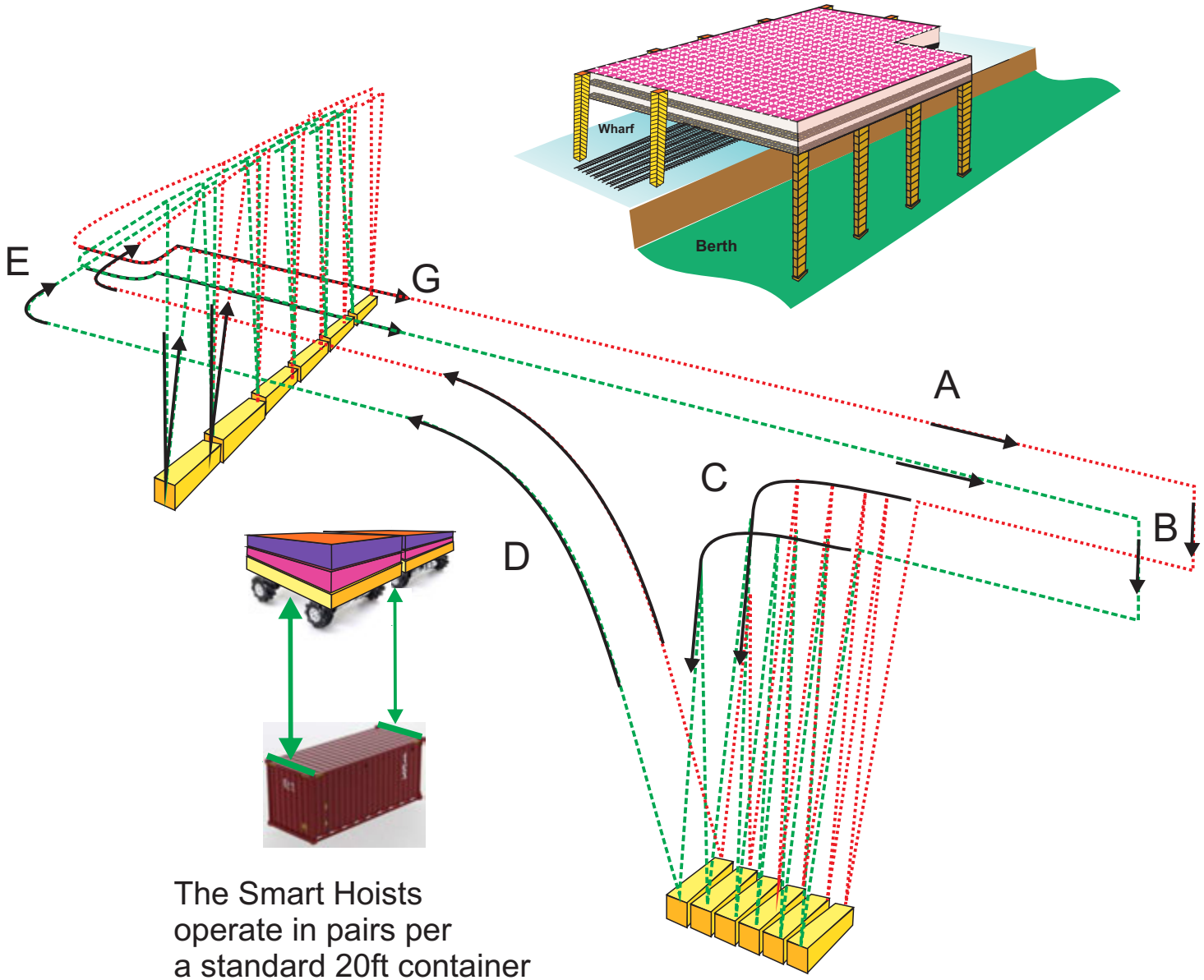
There are multiple INTERMODAL practices for loading containers onto trains. In the UK at Southhampton & the London Gateway, changes now mean that 775m long trains are often configured to move almost 100 TEU containers per train, and while more efficient with reduced greenhouse gas emissions, depending on the number of reach stackers in use it can still take around 3 hours to unload & load each train.





In the proposed 1000 TEU/Hour system, the restrictions of reach stackers are overcome. Typically a 100 TEU Train could be unloaded and reloaded in less than 20 minutes.

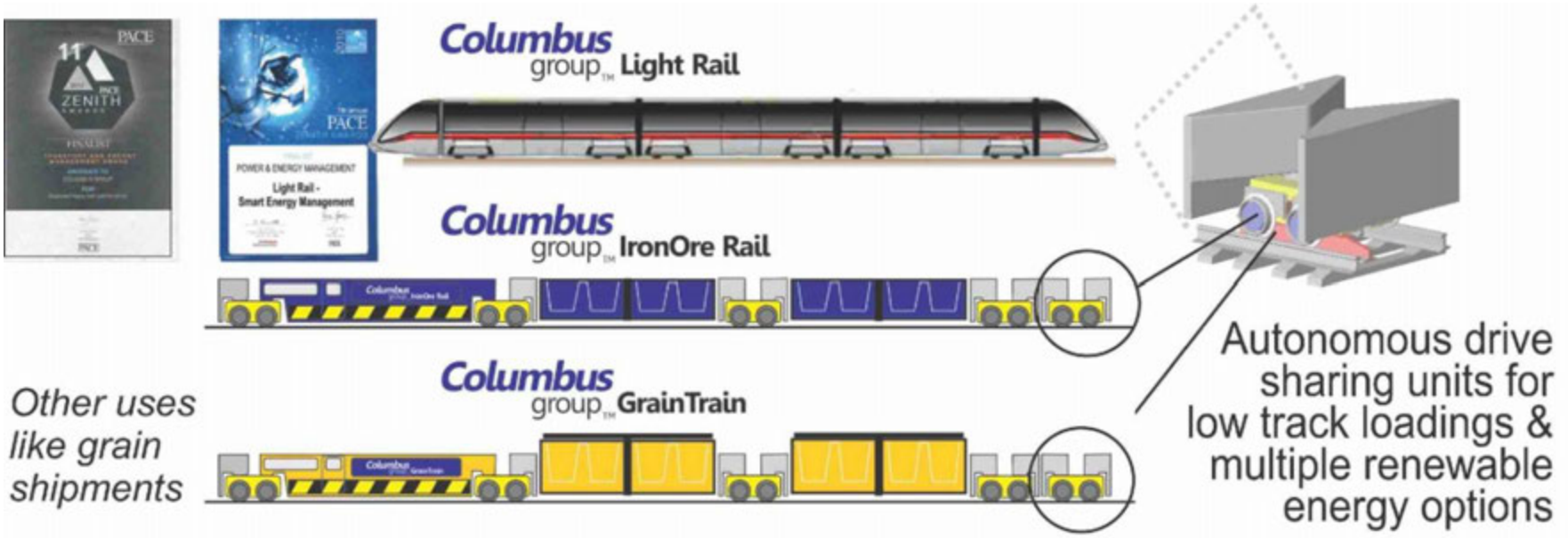
6. How it's done - typical moves



The Smart Hoists
operate in pairs per
a standard 20ft container

In this example, 12 Smart Hoists (A) move out above the container ship, (B) transition to the lower Smart Deck and the move back to the wharf and (C) above a container selected to be captured lower the two hoists and then after capturing the container, travel back to the wharf (D) hoisting to achieve height, faster. (E) If the containers are for rail removal, then the containers turn using the Mecanum features, then travel to the intermodal area (F), and there the containers are lowered and released, before return (G) on the upper Smart Deck.

7. Complementary freight options



Using light rail strategies with low axle loadings that can utilise poor track if that is all that is available, then moving iron ore in half height containers and grains become possible where the 1000 containers / hour port crane systems are very useful for fast unloading, stacking, blending and even shipping in containers for rapid unloading at the destination port.

8. Adding up the benefits of 1000 containers / hr port cranes

1. **Better utilisation** of port crane facilities
2. **More revenue-generating trip cycles** from ship assets in a year
3. **Change routes to avoid bad climate change weather** outcomes
4. Ship travel time options to **adjust hull speeds to improve fuel economies**
5. **Improved container stack management** and container selection options
6. Stockpile elimination and **flexible ore blending** / grain mixing prospects
7. **Faster selective container access** response to freezer failures
8. More intermodal **transport swapping options**
9. Average container **movements are less that 4 seconds each**.

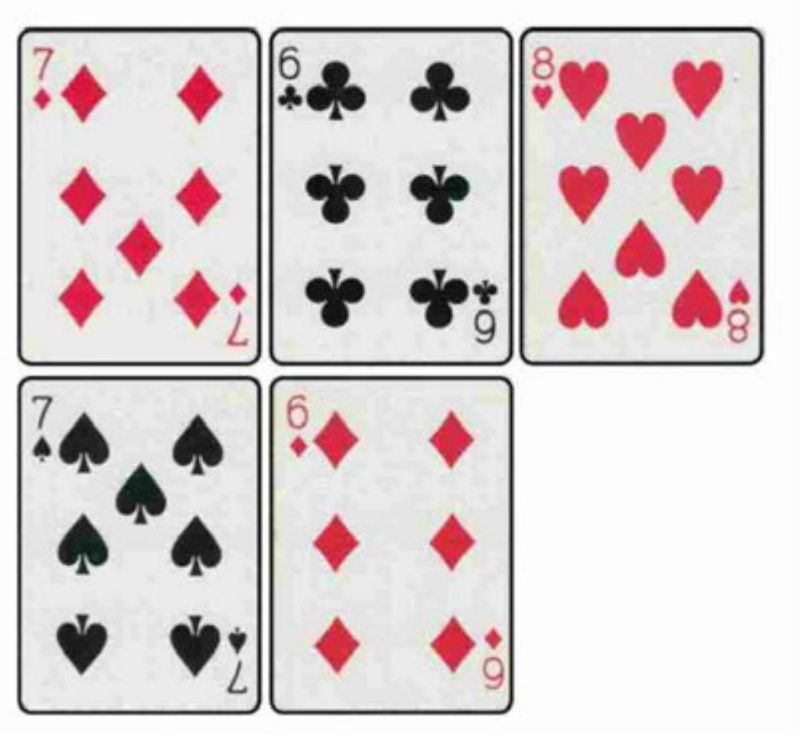
June 2017, the *Madrid Maersk moved 6500 containers at the Port of Antwerp and set a record for an ultrallarge container vessel in 59 hours, averaging 110 containers per hour. If the Shanghai to Antwerp 11,000 nautical mile trip at 11 knots, both ways, was added to the single cycle time,*

Why needed: **Imagine the commercial benefits of almost another half trip cycle every year!**

9. Knowing where it all is

And if our computer tracking system is working well ....
then the card you selected at the start ....
IS MISSING from the remaining cards below!!!

Our 1000 containers / hour port crane intermodal system depends on reliable and effective container control ***including the management of some 200 Smart Hoist units.***



Thankyou! Any questions?

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R&D of the **COLUMBUS Group** has been recognised in many ways

from Blue Carbon Credit seagrass, to innovative comms, defence projects, multiple mining awards & smart software

Research organisation of the Year

2014 WINNER
Innovative Mining Solutions

2015 WINNER
Minerals Processing of Year

2017 WINNER
Environmental excellence

2017 WINNER
Mining & Minerals Processing

2003 WINNER
Business & Commercial software

2021 FINALIST
Starbin Comms

2010 WINNER
PV Applications