Smart Ports & Smart Logistics - Key Trends in Asia

17th ASEAN ports & shipping (Phnom Penh, Sep 11 2019)

Agenda

1. Smart Port Introduction
2. Automatic Development
3. Remote Control Trend
4. Other Technology Trends
5. About Blume Global

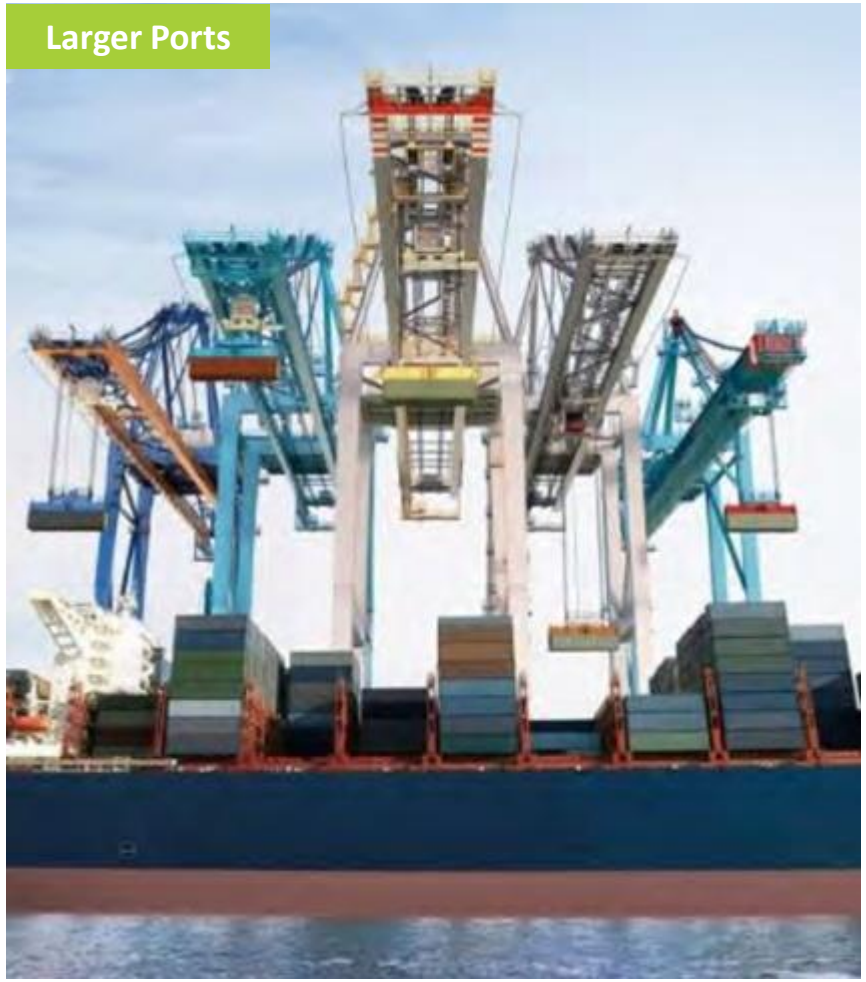
Smartports Introduction

Definition of Smartports

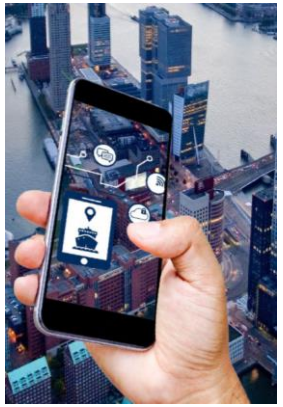
- "***No waste*** of space, time, money and natural resources"
- "More efficient traffic management is made possible by ***interlinking the information and communication systems***. This is how we keep the current traffic situation in the entire port area under control and are able to plan proactively."
- Strategy:-"To develop intelligent solutions for traffic and trade flows in order to optimize the flow of information and ***efficiently manage trade flows*** at the port"
- Smart port policy (for example)- "could be to ***maximize local value***, rather than maximizing cargo flows."
- "A Smart port is an automated port that uses nascent technologies such as big data, Internet of Things, blockchain solutions and other smart technology based methods to improve performance and economic competitiveness. With these technologies, smart ports can also improve environmental sustainability"
  - - Wikipedia

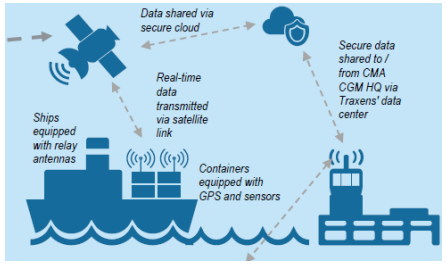
Port Technology & Innovation

Larger Ports



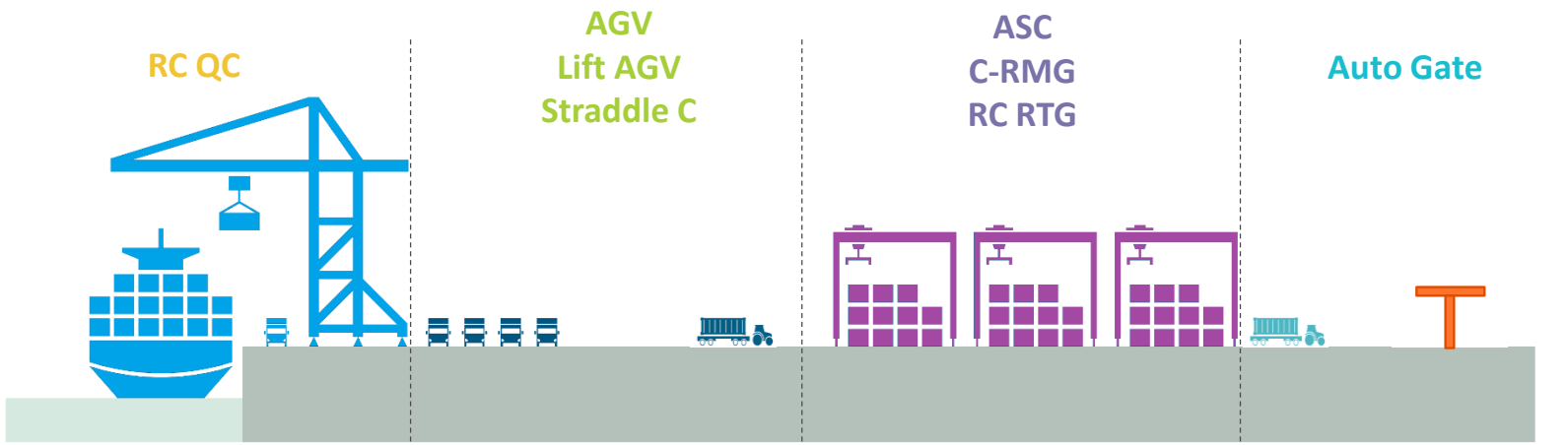
Smarter Ports

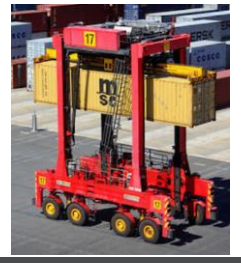




Automation Development

Terminal Automation



Quayside / Berth	Transfer Area	Yard / Stacking	Landside
			
			

Yard Automation – Automatic Stacking Crane (ASC)

Yard Automation – Straddle Carrier

Automated Horizontal Transfer

Types of Automated Terminals

ASC

- Decouple process and minimize apron size
- With AGV or Shuttle Carrier
- High stack volume and density
- Optimised throughput

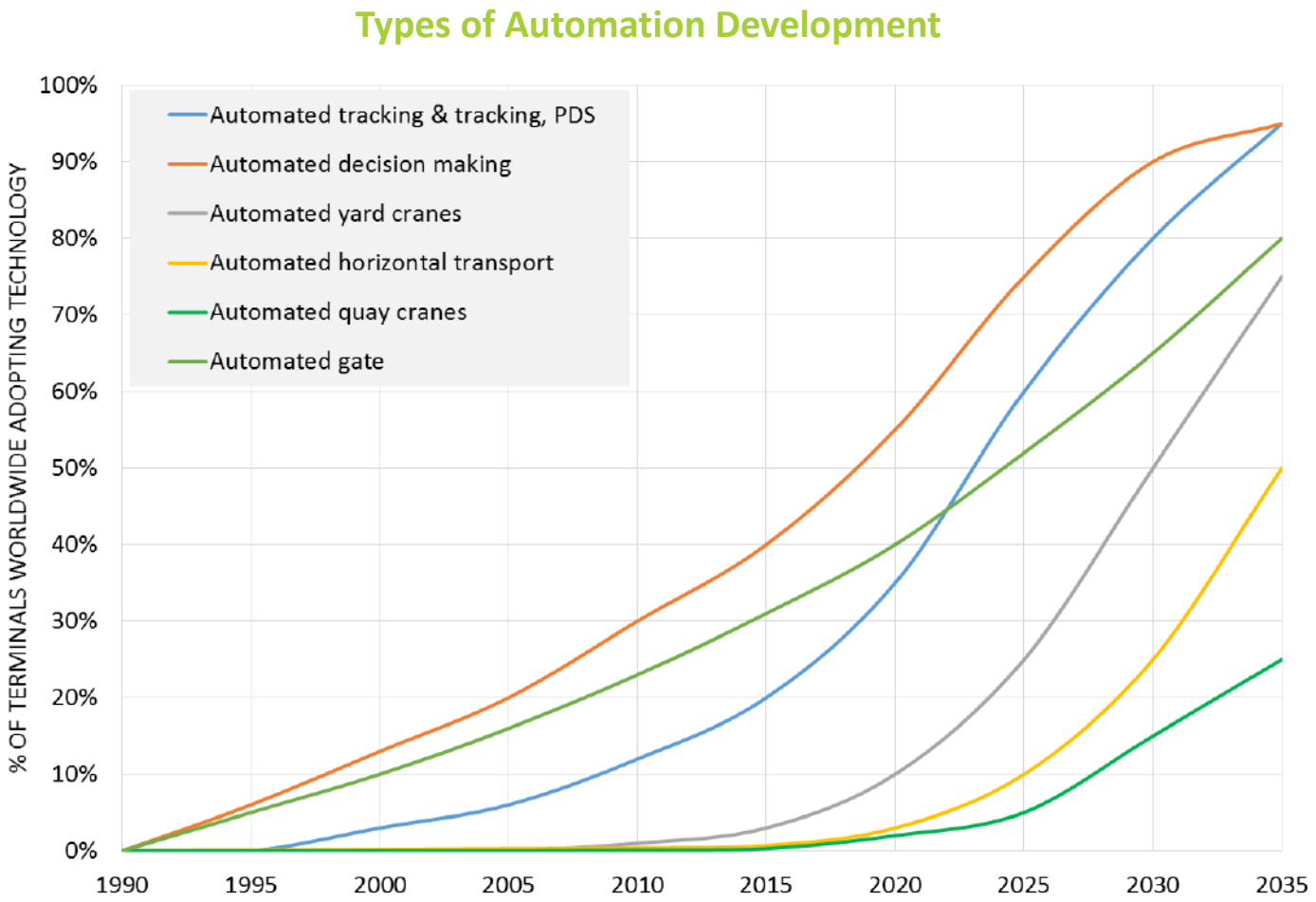
Auto Straddle

- Highly flexible
- Stacking and transportation by same type of equipment
- Relatively low initial investment
- Shorter time to implementation / realization

Remote Control Rubber Tire Gantry (RTG)

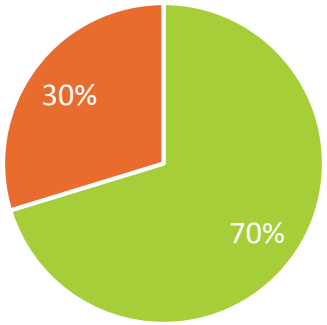
- Various degree of automation
- High stack capacity and manoeuvrability
- With TT or unmanned truck (AI trucks)
- Medium and large terminals

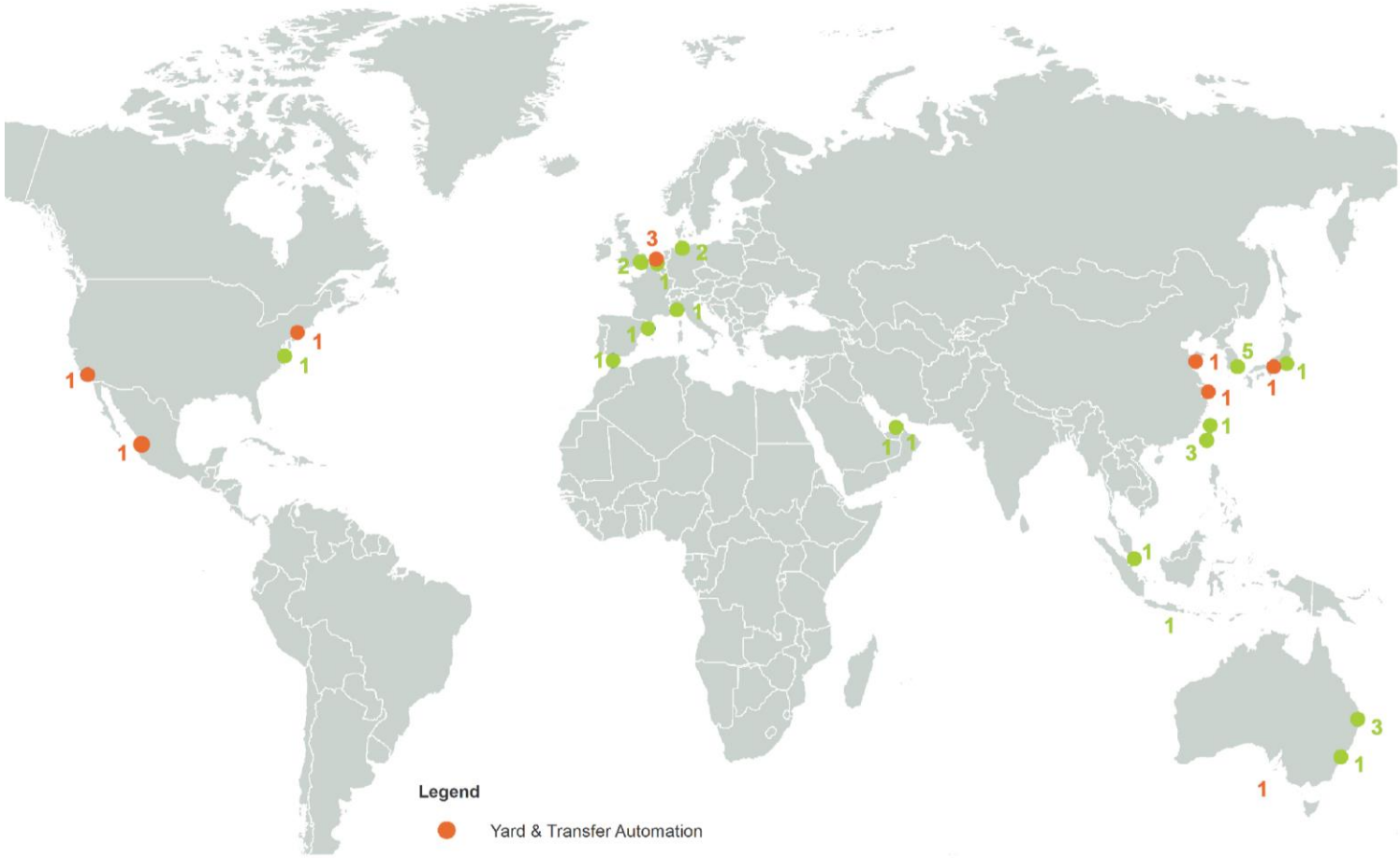
Terminal Automation Trend



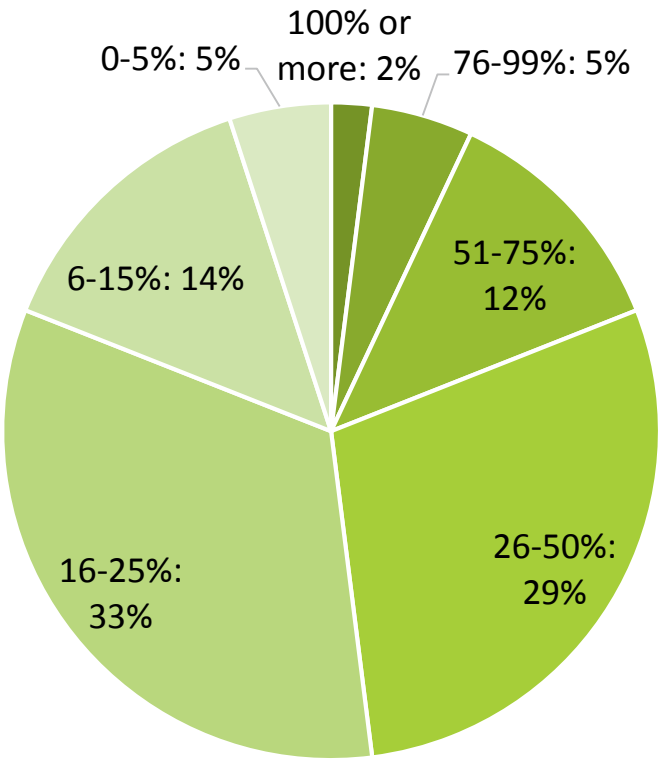
Source: TBA

Global Automated Container Terminals





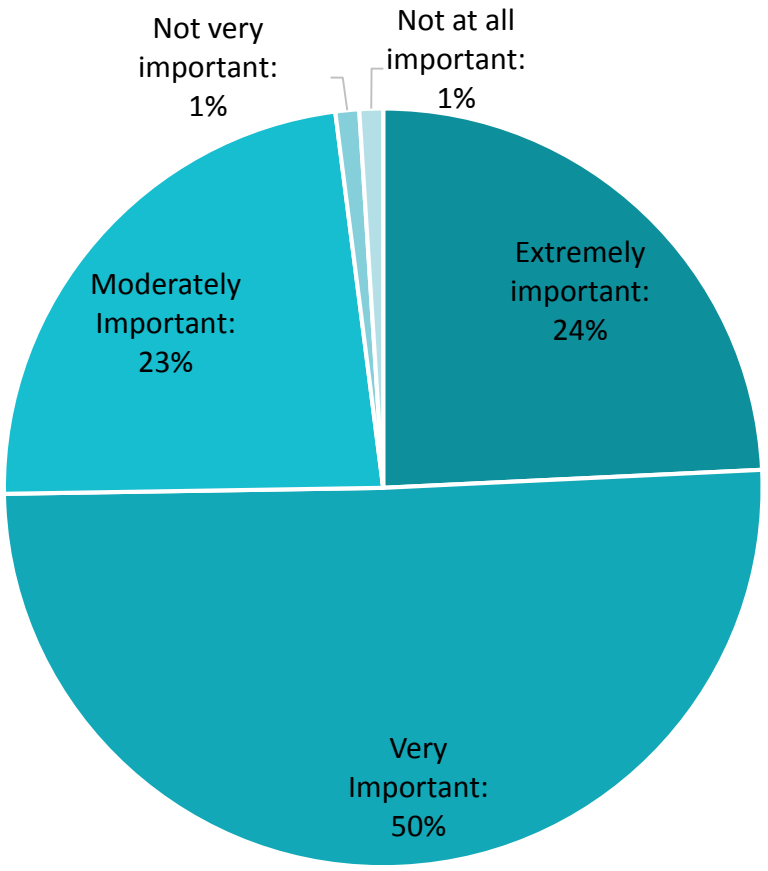
Automation – Reduction in Operating Cost?



- Labour cost is key cost component, which accounts for **40-60%** of the total costs per TEU (US)
- Manned operations requires **double of labour** cost than full automation
- Power & fuel perspective, eRTG (e-mode) of 2-3 kwh/TLC vs ASC of 1-3 kwh/TLC

Source: TechValidate 2018 survey of 78 current users of Navis

Automation – Secure Competitiveness?



- An ASC costs about US$1 million more than an electrified RTG
- RMG requires rail construction, thus involves additional costs
- IT investment is in a range of US$1-1.3 million, depending on the choice of TOS

Source: TechValidate 2018 survey of 78 current users of Navis

Automation – Benefits?

Source: TechValidate 2018 survey of 78 current users of Navis

Remote Control Trend

Remote Control Centre – Hong Kong (HIT-T9)

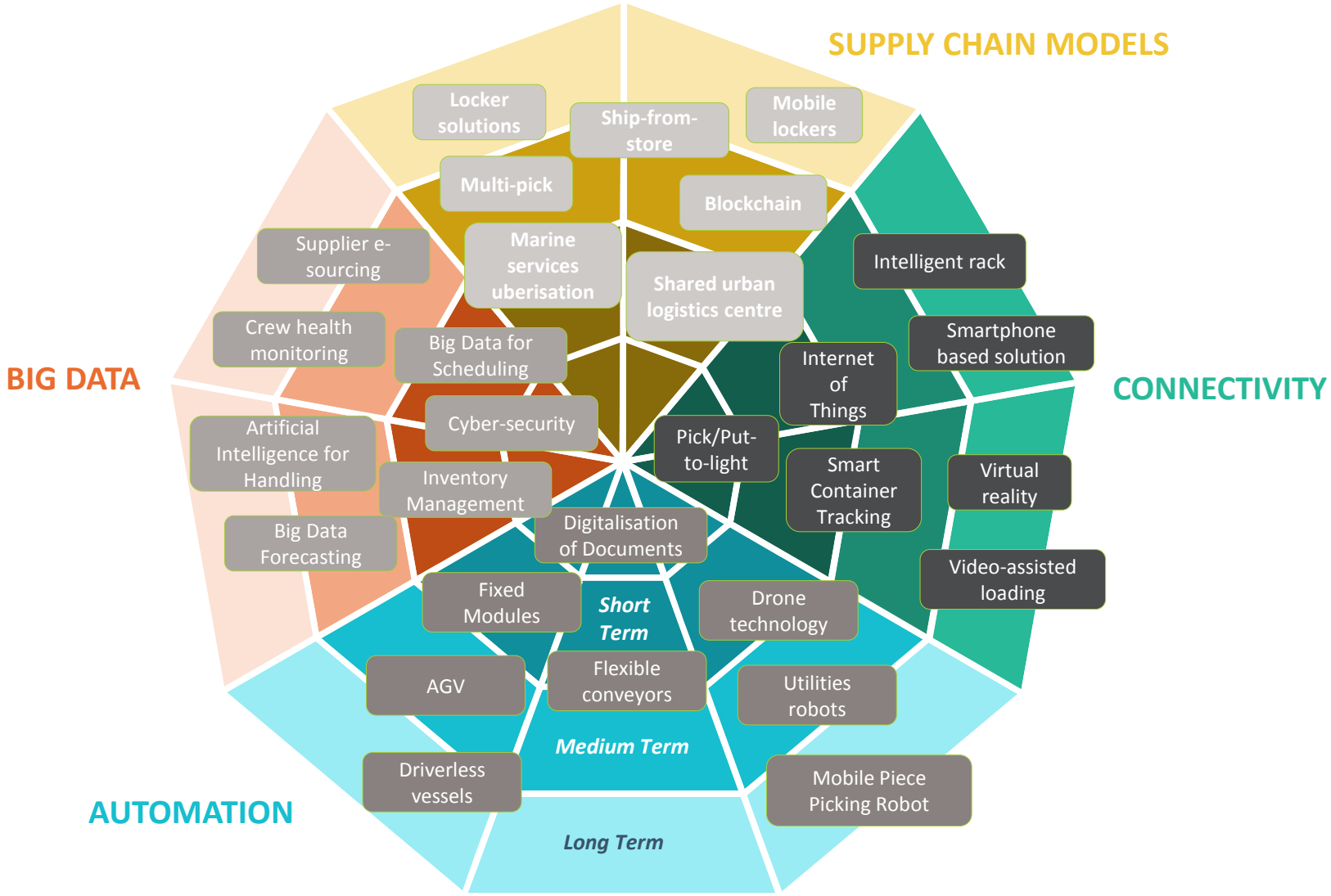
Remote Control Centre – Thailand (LCB Terminal D)

Remote Control Trend

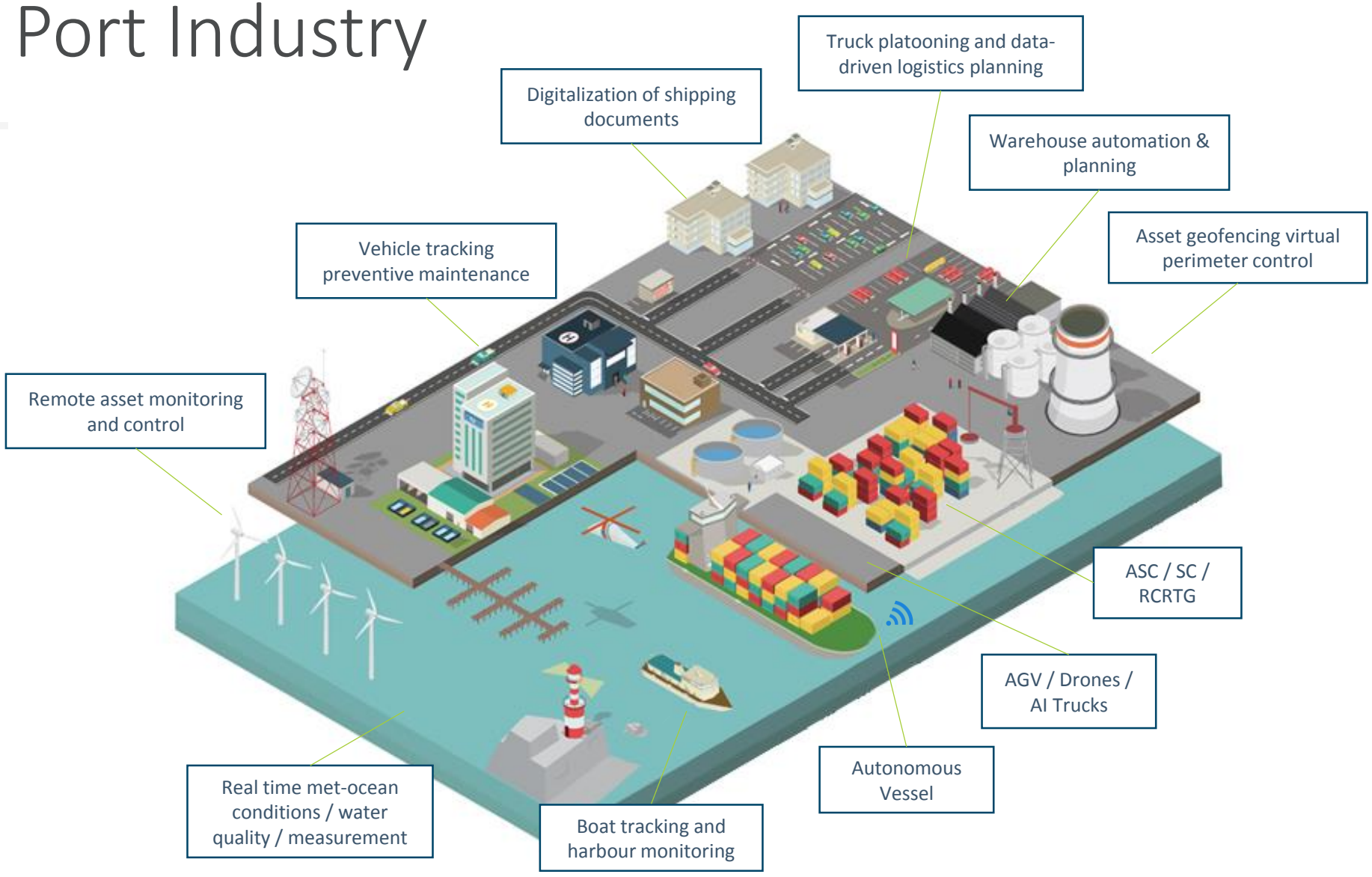
- Remote control QC and RTG have been made available to the market
- QC and RTG with remote control function cost higher than traditional QC and RTG, but much less than ASC
  - Traditional RTG – USD ~1.7 mil
  - **RC RTG – USD ~2 mil** (+17% vs traditional RTG)
  - ASC – USD ~3 mil (+76% vs traditional RTG)
- Labour – one driver for traditional RTG vs one staff for **4-8** RC-RTGs
- Productivity – expect higher MPH (allegedly 20% by HIT) but at ***limited level*** given standardised process
- Safety and better working environment
- Remote control top priority for greenfield terminals and also preferred option for brownfield where conversion is possible

Other Technology & Trends

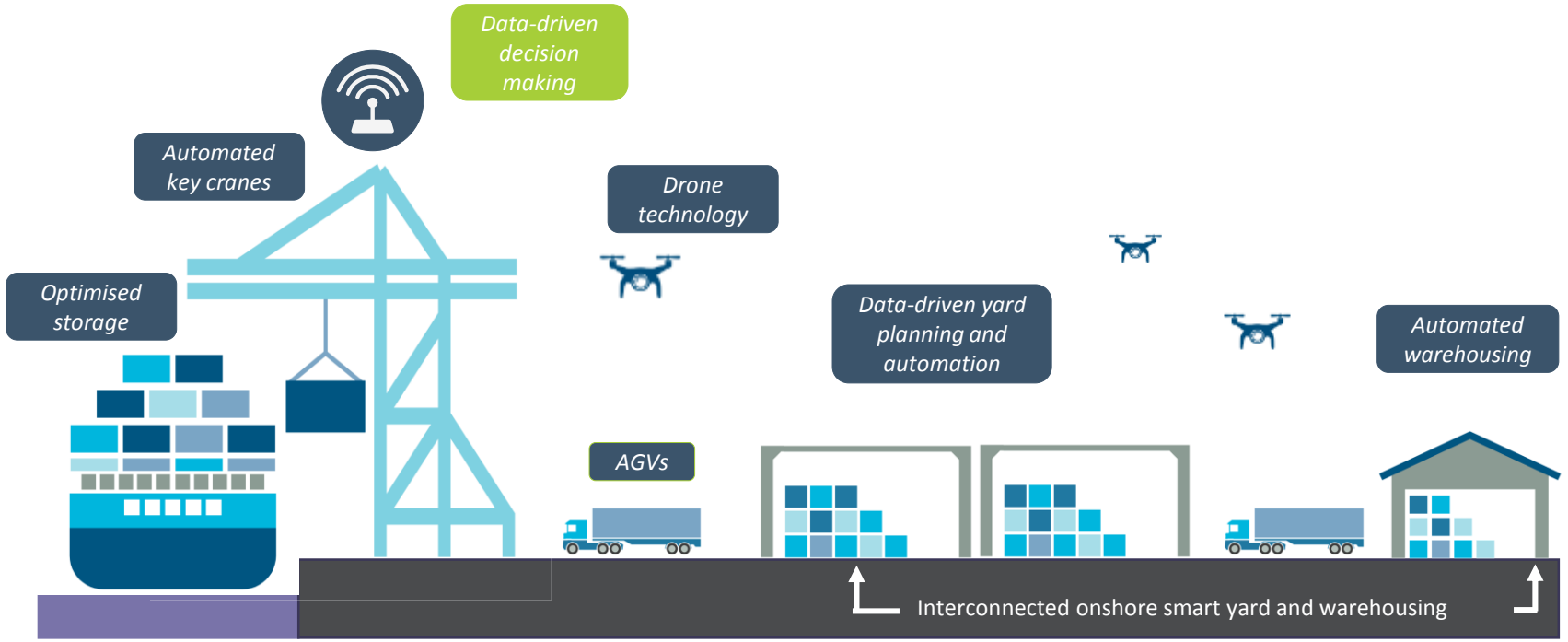
Innovation Trends on Logistics and Transport



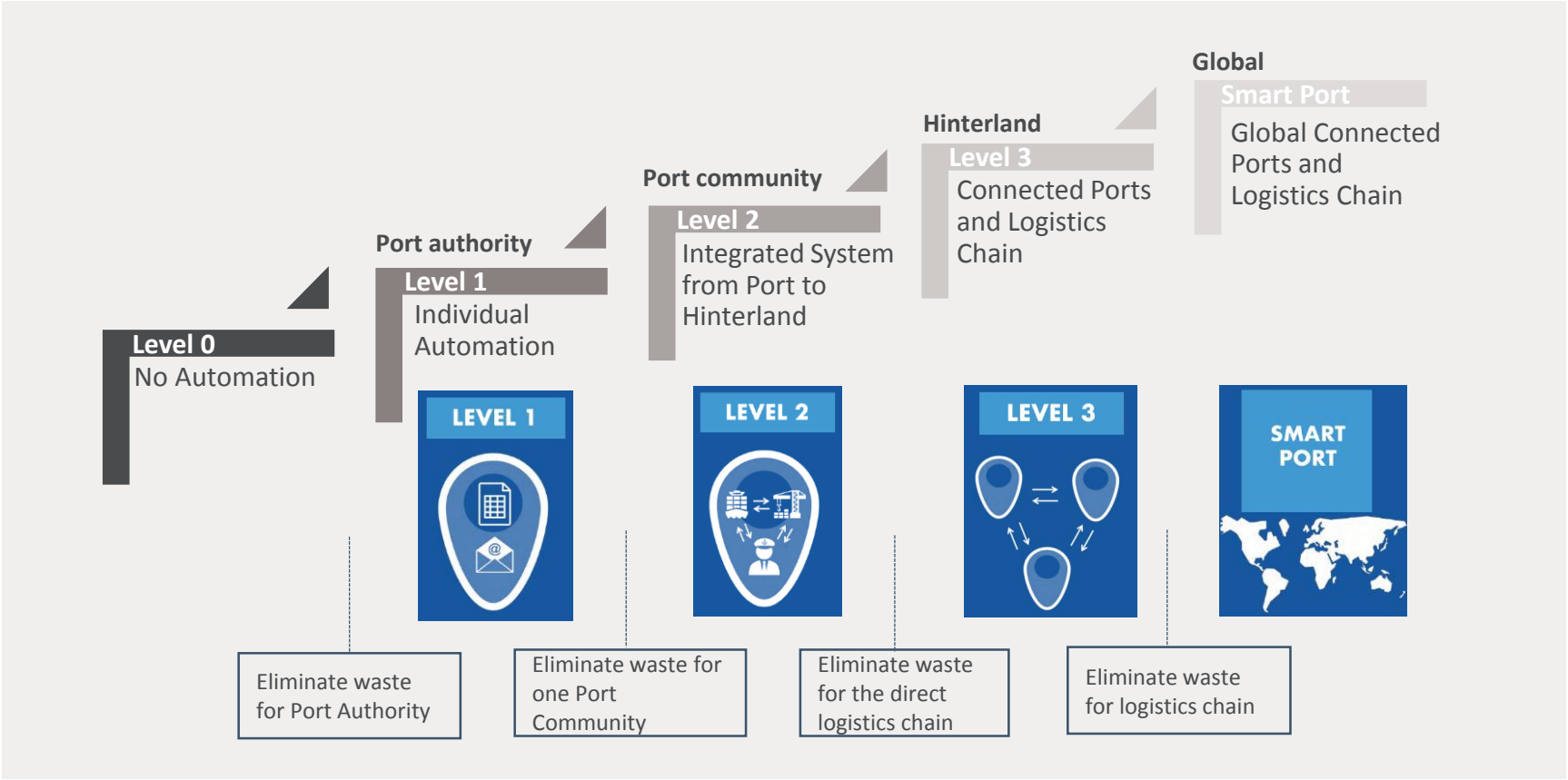
Future Port Industry



Smart Ports – Individual Level



Smart Ports – Global / Supply Chain Level



Source: Port of Rotterdam

Case Study – Ocean Terminal

Blume empowers ocean terminal to increase container throughput and terminal efficiency

The Challenge

One of the largest terminals in U.S. needs to reduce port congestion and improve terminal efficiency with the below goals:

1. Increase the movement of container going in and out of ports
2. Minimize dwell time
3. Increase container throughput
4. Reduce labor costs

The Solution

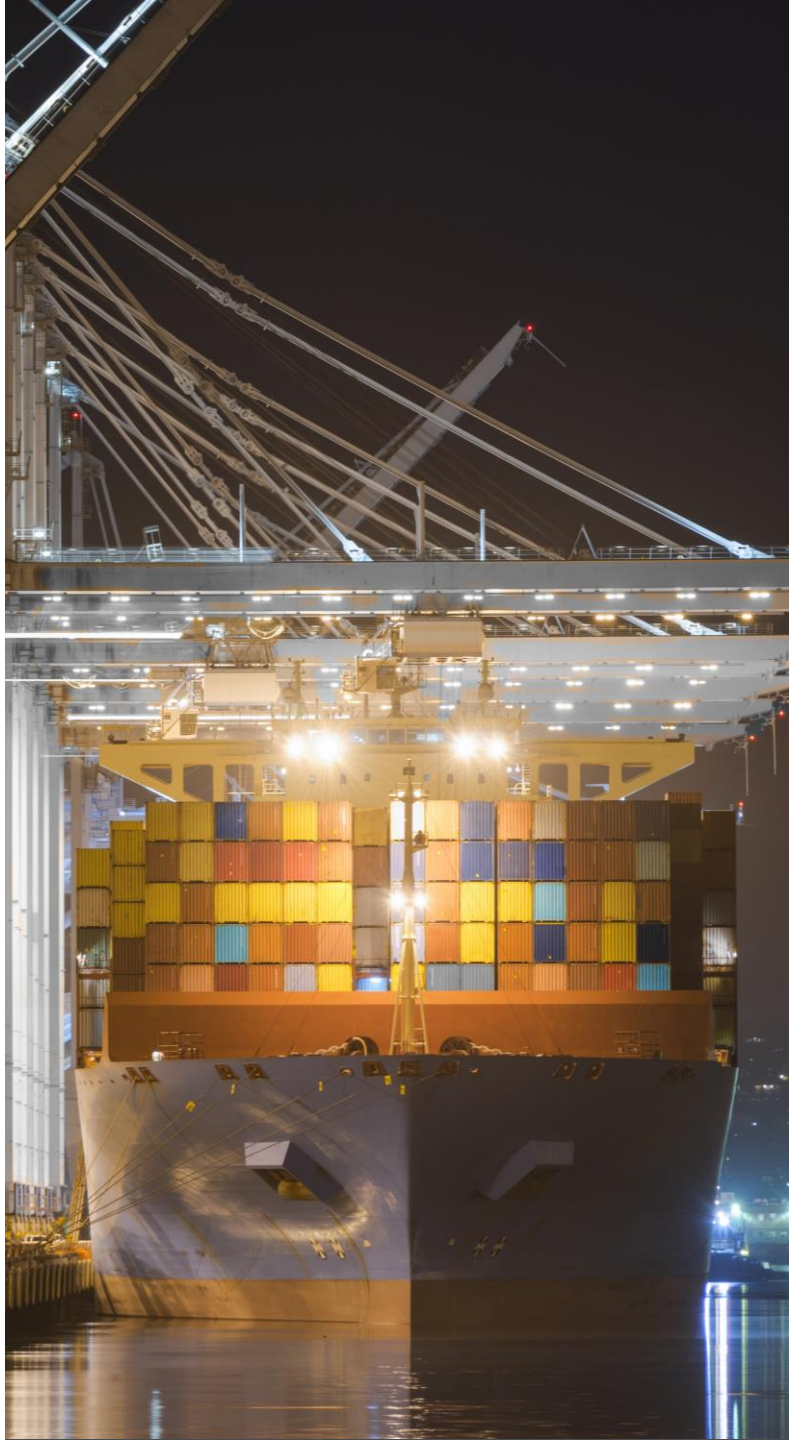
By sharing terminal data and using the Blume Optimization Engine, the terminal uses AI & ML on real-time asset tracking and event data to provide more efficient container moves to satisfy shippers, ocean carriers and motor carriers at one of the nation's busiest seaports. The solution includes:

- VIP Service for Customer Pick-ups
- Push Appointment Scheduling for Motor Carriers
- Expedited Container Retrieval Solutions

Success

The ocean terminal increases efficiency for all supply chain participants and improves own operational metrics to increase terminal competitiveness

- Increase container velocity and increase container throughput
- Reduce container dwell times by 48 hours or more
- Increase driver efficiency to enable more turns
- Provide differentiated customer service



Smart Ports – Example in Action

Tuas Megaport Terminal, Singapore

Geofencing
Geofencing will allow workers wearing an RIFD tag and automated vehicles to stay out of each other's way

Automated Cranes
Automated cranes have already been in use in various ports for some time, but Tuas will be completely serviced by unmanned cranes both on land and quayside The cranes will come fitted with cameras and sensors for precise loading and unloading

Smart Glasses
Smart glasses will allow workers to physically see the location of defects on vehicles and cranes that have been previously tagged by the maintenance drone. It will also ensure they keep within the boundaries of the geofenced area

Unmanned Vehicles
PSA currently has 30 AGVs for testing. In future, 1000 will be built for the new Port and come equipped with sensors that prevent collisions and indicate the need to refuel, and can be remotely controlled

Going Green
Tuas aims to adopt green energy in order to reduce its carbon emissions to zero. Green buildings powered by solar energy and harvesting rainwater will also be built and only recycled materiel will be used to reclaim land in the initial 2 phases

Drone Technology
Unmanned drones will scan all equipment and relay video back to detect defects and equipment maintenance, pre-empting breakdowns and identifying those in need of repair

Blume Global

Global Supply Chain Platform for Logistics

The Blume Global Network

All U.S. Class 1 Railroads

119 Countries

22 Languages

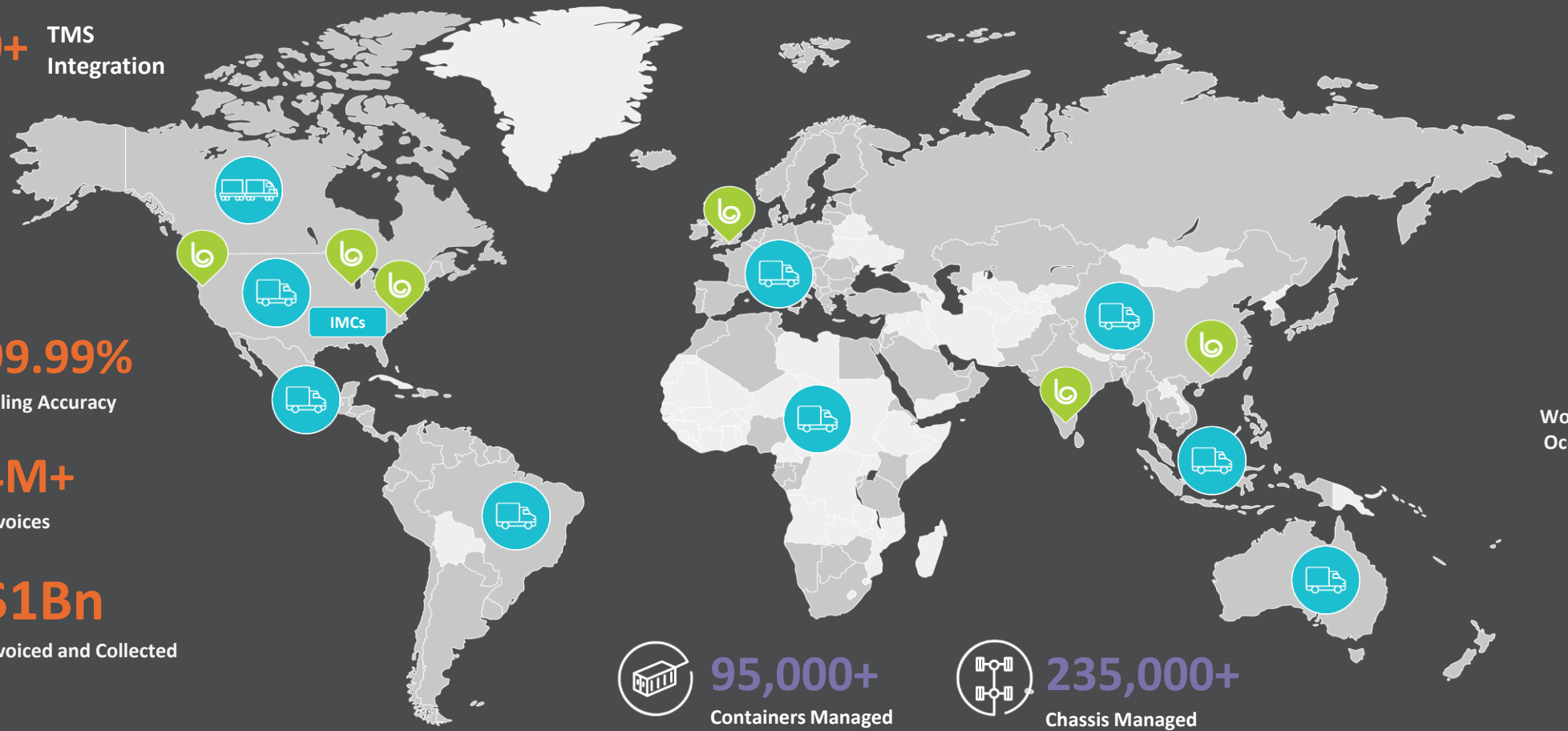
6 Offices Globally

6M+ Shipments

181M+ Annual Events

1100+ Terminals Depots Rail Ramps

70+ TMS Integration



200+
Air Cargo Carriers

99.99%
Billing Accuracy

14
World's Largest Ocean Carriers

All
Global Vessels Tracked

4M+
Invoices

$1Bn
Invoiced and Collected

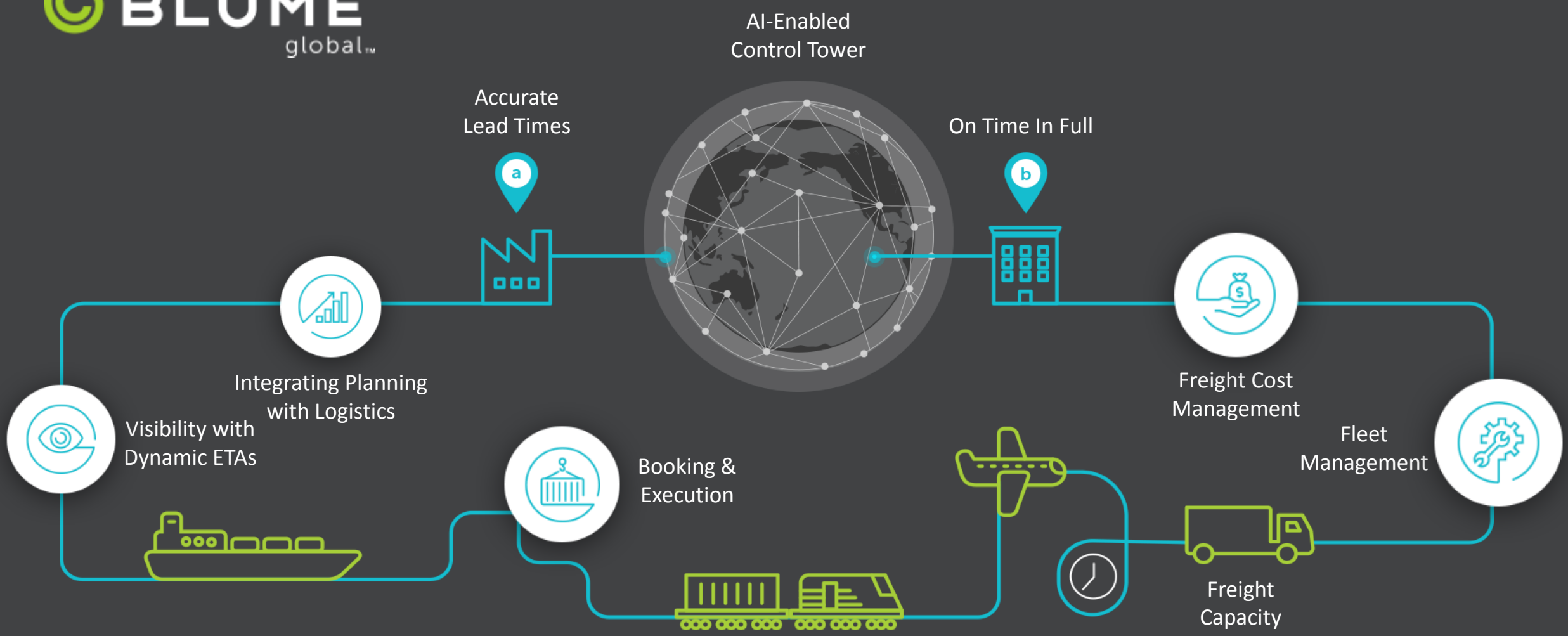
7000+
Motor Carriers

95,000+
Containers Managed

235,000+
Chassis Managed

Modes and Nodes on Blume Network | Physical Assets | Network Strength | Blume | Connected Countries

BLUME global



AI ML-Enabled Solutions for Every Move. Every Mode. Every Mile.

Preview of Blume's 7,000+ Customers and Partners

3PL

- APL Logistics
- BNSF Logistics
- Expeditors
- Kuehne+Nagel
- [redacted]

IMC

300+ IMCs in our network including…

- CELTIC INTERMODAL
- C.H. ROBINSON
- Thoroughbred Direct Intermodal Services
- SUNTECKtts
- WERNER

Ocean Carrier

- ACL
- CMA CGM
- CONTAINERSHIPS
- ONE Ocean Network Express
- ZIM

Motor Carrier

7,000+

Rail Road

All U.S. Class 1 railroads

- CP
- CSX
- Florida East Coast Railway
- Kansas City Southern Lines
- Norfolk Southern
- Union Pacific

Shippers

Top US Retailers

Top Agricultural Equipment Manufacturer

Port Logistics

- E-DRAY Collaborative Port Logistics
- HRCP

Partners

- DCLI Direct Chassislink Inc.
- Infosys

Software Partners

- SAP
- ORACLE
- Google Cloud

Thank You! Arkun!

1. To learn more, please visit our website
   - www.blumeglobal.com
2. Or contact Dr. Mark Yong
   - Mark.yong@blumeglobal.com