

Asia-Pacific Regional Forum on Connecting to Global Supply Chains through Inter – Regional Land Corridors & Maritime Routes

The Prospects of Automated Terminals & Autonomous Shipping in Southeast Asia



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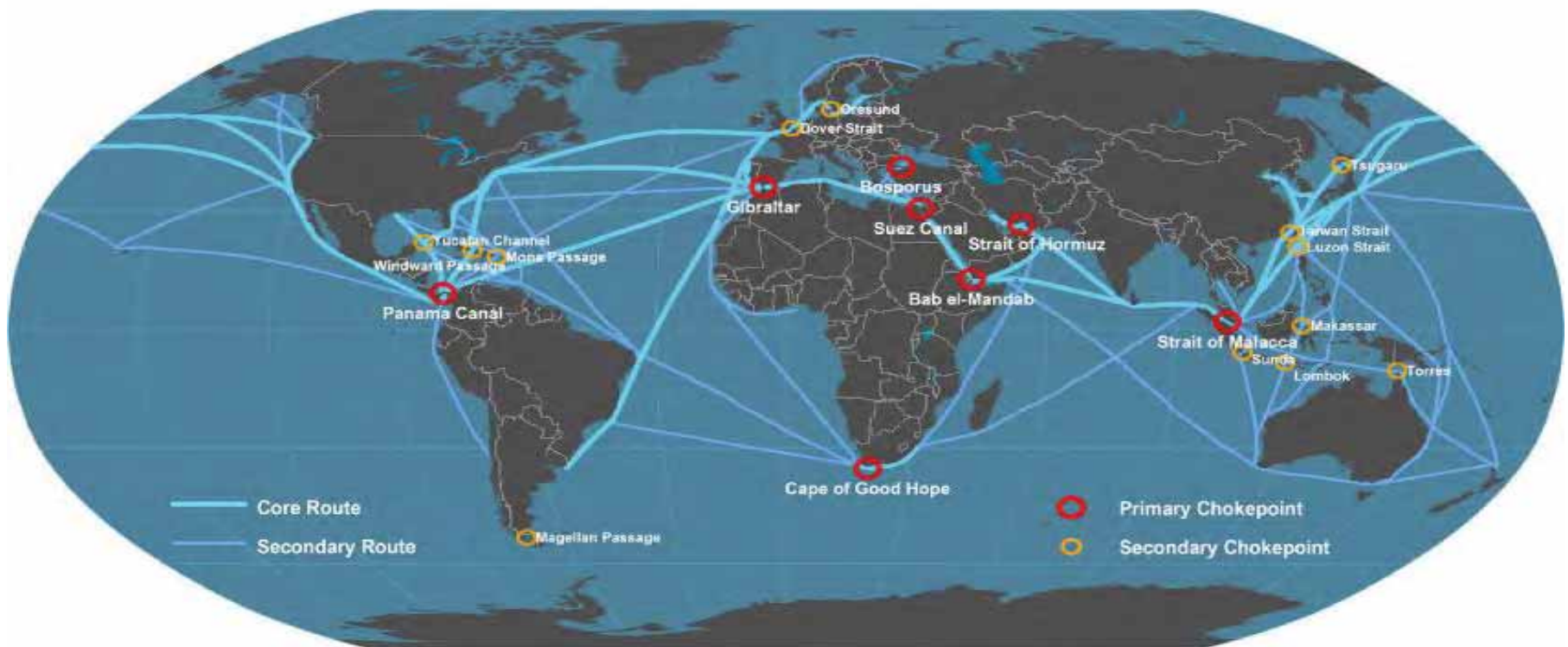
UNITED NATIONS ESCAP, Bangkok, Thailand

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Presentation Outline

- Maritime Industry in Malaysia & SEA
- Development of IR 4.0 in Maritime Industry
 - Autonomous Shipping (AS)
 - Automatic Container Terminal (ACT)
 - Smart Logistics 4.0
- Way Forward for Maritime Industry in Malaysia & SEA
 - Autonomous Shipping (AS)?
 - Automated Container Terminal (ACT) for 3rd Port?
 - Smart Logistics 4.0?

Malaysia as a Maritime nation



Maritime Industries in Malaysia

**Offshore Oil &
Gas & Renewable
Energy**



Maritime Transport



**Marine, Coastal
Tourism & Yachting**

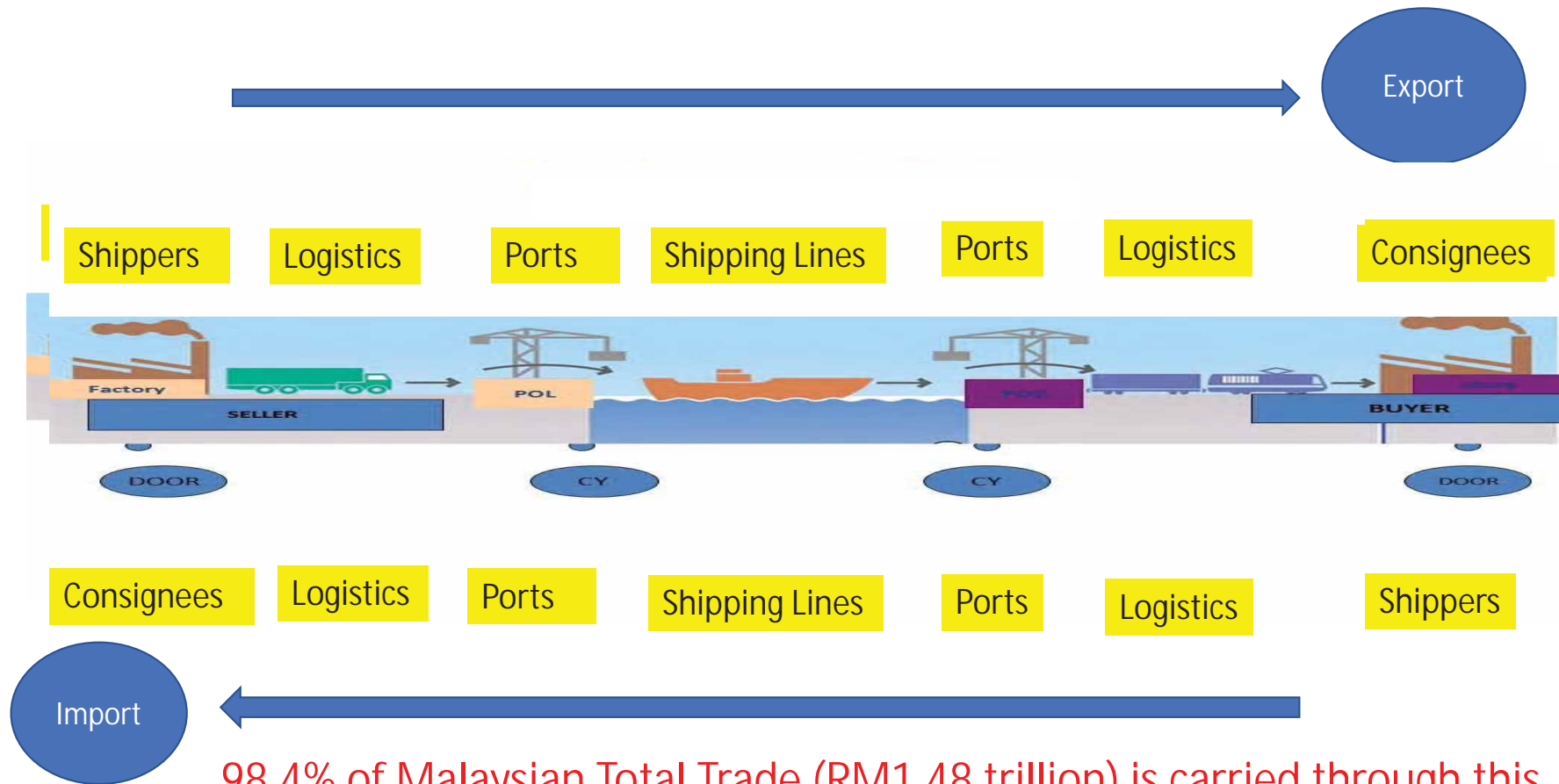


**Fisheries &
Aquaculture**



Four Major Sectors in Maritime Industry contributed 22% of Malaysia's GDP

Supply Chain of Shipping & Logistics



98.4% of Malaysian Total Trade (RM1.48 trillion) is carried through this supply chain (2016)

IR 4.0 in Autonomous Shipping (IS)

- Status of AS in Europe, China, Japan & The US
- The IMO engages actively in China, Finland & Sweden (with government support)
- IMO Maritime Safety Committee's definition of AS - MASS (Maritime Autonomous Surface Ship)
- 3 categorises of AS by IMO
- Characteristics of AS

DIMECC One Sea

Timeline for autonomous ships



Current Development of AS

- Rolls-Royce unveiled design of the world's 1st remote-controlled unmanned cargo ship in 2014
- Yara & Kongsberg plans to deploy the 1st autonomous & fully electric cargo ship in 2018, remote operation in 2019 & fully AS by 2020
- China's test field for AS in Zhulai, Guangdong
- Japanese consortium - Ministry of Transportation's joint project with Mitsui OSK Lines & Mitsui Engineering & Ship building Co – 2025
- US's 1st unmanned surface vehicle Sea Hunter

Characteristics of Manned Ship & Autonomous Ship

Manned Container Ship



Autonomous Ship



No captain & crew member – reduced crew costs

Reduced human error & risk

Reduced risk of piracy but vulnerable to hackers – hijacked or changed in route, deliberately cause collision

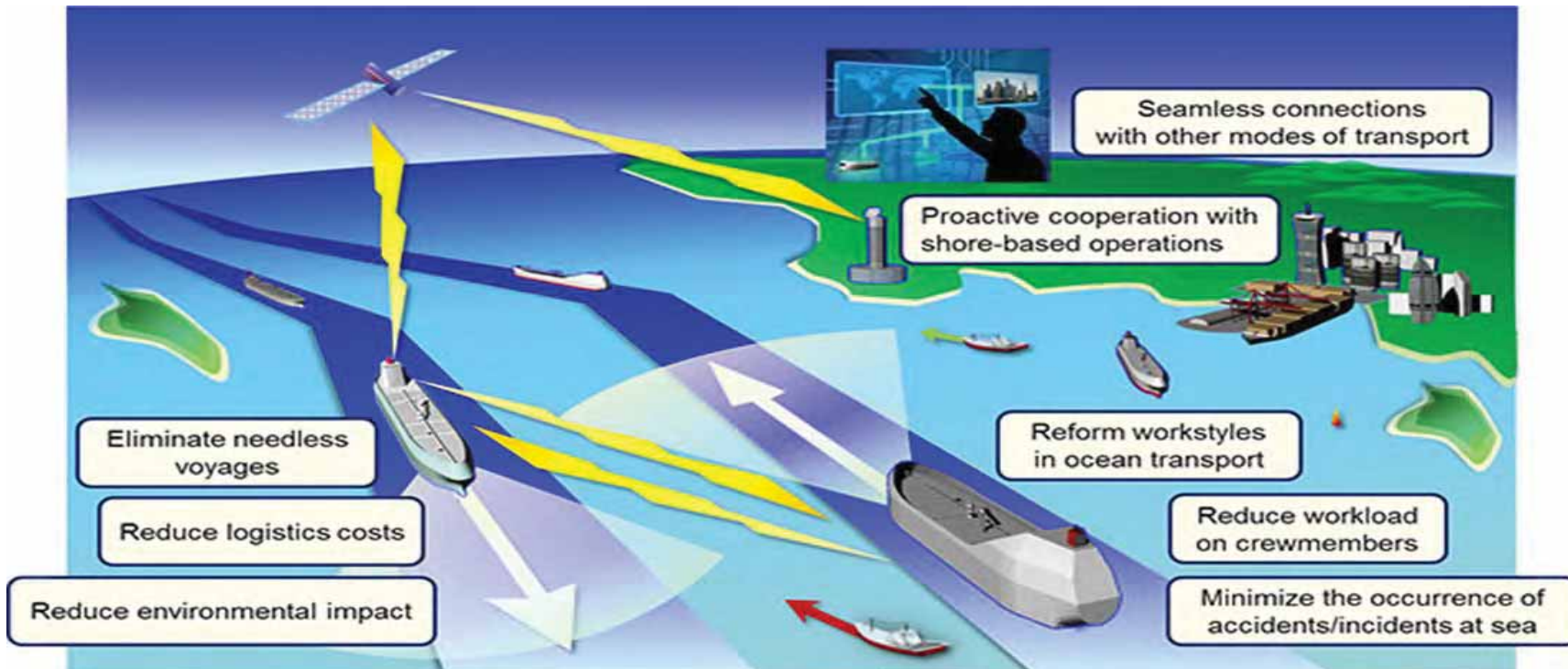
Need for ship security & regulation

Current Development of Autonomous Shipping in China

- 1st of its kind in Asia
- The world's largest offshore test field
 - 771 sq kilometres
- The country's main base for research into AS technology
- Partnership



An illustration of the benefits of Autonomous Shipping



IR4.0 in Automatic Container Terminal (ACT)

- The Fully ACT is based on AI & referred to as a robotic port
- ACT market is growing at CAGR of 25% during 2017-2021
- ACTs are cleaner, safer, quieter & surely faster than conventional terminal
- ACTs have efficient STS cranes, integrated ship to gate & remote operations from a control room
- Benefits of ACT – save labor cost, decrease operation breakdown & lessen industrial disaster
- ACT improves productivity by 20% to 30% & green environment



Current Development of ACT

- The ECT terminal at the Port of Rotterdam & HHLA terminal at the Port of Hamburg are pioneers in ACT
- Netherland – Gantry crane productivity by more than 50%
- China's Yangshan Ports able to handle 4 million TEUs & expand to 6.3 million TEUs.
- Singapore to build 65 berths in Tuas from 2020 to 2040 with ACT, green, drone, ship tracking & on-time technology

ACT at Port of Rotterdam



Watch: Remote Operated STS Cranes at Maasvlakte 2 Container Terminal, Rotterdam

See the first remote operated STS cranes without driver's cabin in operation at APM Terminals Maasvlakte 2 container terminal located in Rotterdam,...

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Next generation ACT at TUAS in Singapore



자료 : http://www.enevproperty.com/?page_id=685, 2017.05.28.

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Comparison of Terminal Operation System

Manned terminal operation



Transmits and receives various data using wireless terminal and handy radios

angch&mima.gov.my

Automatic terminal operation



- High-tech intelligent planning / operating system
Automation equipment work instructions and terminals through
Operational control room (5 ~ 6 people)

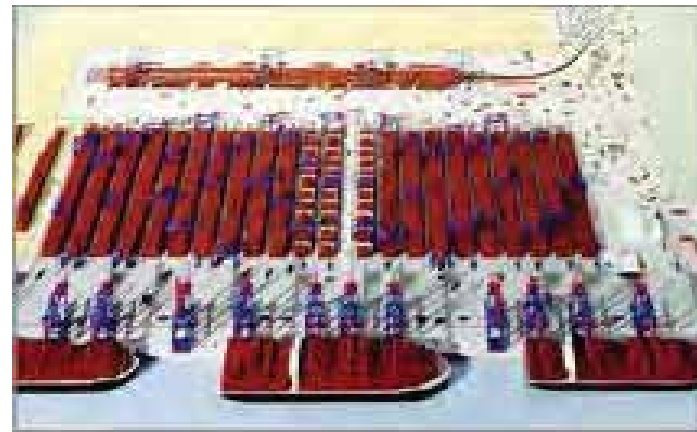
Comparison of container terminal layout

Horizontal layout in the CT



To Improve RTGC utilization

Vertical layout in the ACT



To simplify operations and reduce the number of AGVs

Comparison of Berth Area

Manned Gantry Crane

Single trolley with twin or tandem lifts



Handling efficiency: 30-35 lifts per hour

Automatic Gantry Crane

Double trolley with twin lifts or tandem lifts



Handling efficiency:

- (1) Sea side trolley handled b men by 30-40 lifts per hour
- (2) Sea side trolley handled by automatic operation by 25-30 lifts per hour

Comparison of Container Yard Area

RTGC (Rubber Tired Gantry Crane)



One RTGC
4high x 6row

RMGC (Rail Mounted Gantry Crane)



Two RMGCs installed / operated per
block to increase storage rate and
capacity, and breakdown preparation.

5 high x 10 row

Comparison of transportation vehicle

Yard tractor / truck



Auto Guided Vehicle



Comparison of gate area

Manned container terminal



Bare code system

Automatic container terminal



Reduction of container delivery time and terminal productivity by applying advanced technology such as image recognition and DSRC (Dedicated Short Range Communication)

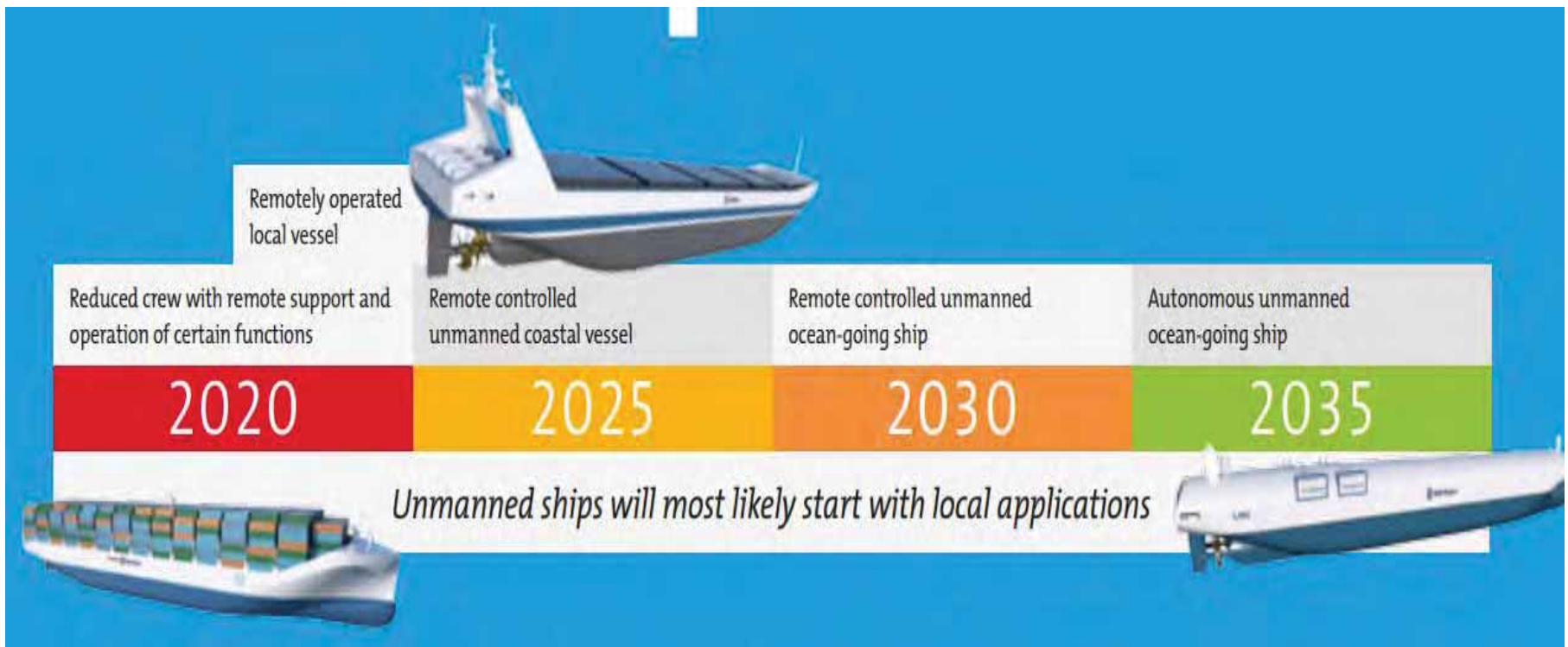
Smart Maritime Logistics 4.0

- Construction of logistics strategies is composed of
 - Autonomous Shipping
 - Automated Container Terminal
 - AI,
 - IoT,
 - Robot
 - big data
- Setting up of advanced controlled centre, navigation support, stevedoring, storage & inland traffic access
- Dealing with emergency of Autonomous Shipping

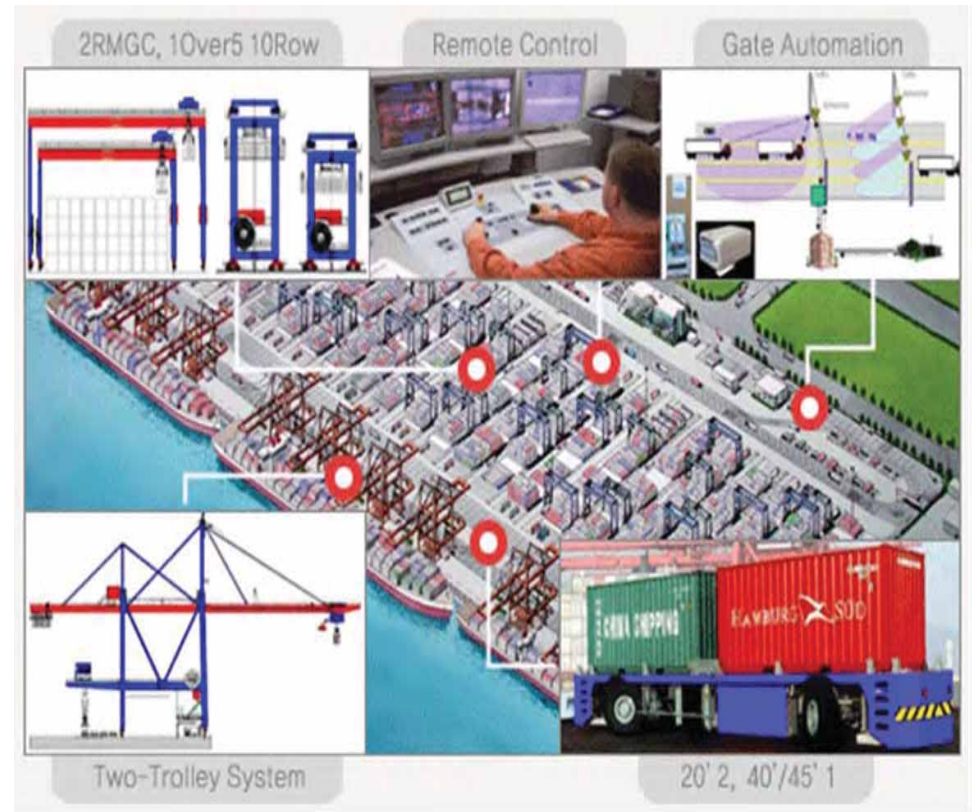
Way Forward – Malaysia’s Maritime Industries

- IR 4.0 is expected to transform maritime, port, logistics & SBSR industry
- Big data application will be widely used in ship operation
- Malaysia’s maritime industry to prepare for:
 - Shipping – AS
 - Ports – ACT
 - Logistics - Smart Logistics 4.0

Southeast Asia – Autonomous Shipping?



Southeast Asia – Automated Container Terminal?



Summary

- Maritime Industry in Malaysia & SEA
- Development of IR 4.0 in Maritime Industry
 - Autonomous Shipping (AS)
 - Automatic Container Terminal (ACT)
 - Smart Logistics 4.0
- Way Forward for Maritime Industry in Malaysia & SEA
 - Autonomous Shipping (AS for shipping)
 - Automated Container Terminal (ACT for Ports)
 - Smart Maritime Cluster

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Thank You

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