2024 Maritime Silk Road Port Forum

The United Nations' Study on Autonomous Shipping in the Asia Pacific: Improving the Safety of Navigation & the Sustainability of Shipping through the Introduction of Innovative Autonomous Shipping Technology in Malaysia

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Scope of Presentation

- **Part 1**:
  - The United Nations' Study on Autonomous Shipping in the Asia Pacific
  - Development of Autonomous Shipping in Europe & the Asia Pacific
- **Part 2**:
  - Malaysia's Efforts to Improve Safety of Navigation & Sustainability in Shipping
  - The Analysis & Findings of the UN's Study on Autonomous Shipping in Malaysia
- **Part 3**:
  - Recommendations by the UN's Study for Malaysia
  - The Readiness of Selected Countries to Embrace on Autonomous Shipping

Part 1: The Selected Countries in UN's Study on Autonomous Shipping

Part 1: Expected Outcome of the UN's Study on Autonomous Shipping

Part 1: Development of Autonomous Shipping in Europe

- **Europe** is at the forefront of autonomous shipping development

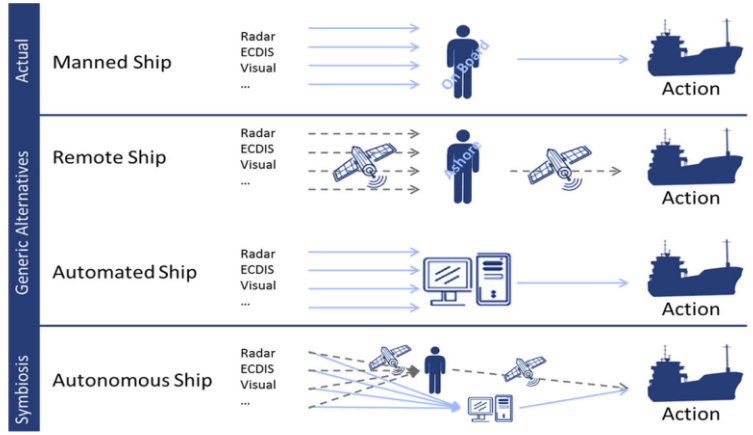
- Examples of projects and initiatives:

  - ✓ Kongsberg-Yara Birkeland

  - ✓ Maritime Unmanned Navigation through Intelligence in Networks (**MUNIN**)

  - ✓ Autonomous Shipping Initiative for European Waters (**Autoship project**)

Kongsberg-Yara Birkeland



MUNIN

Part 1: Some Successful Joint Autonomous Shipping Projects in Asia Pacific

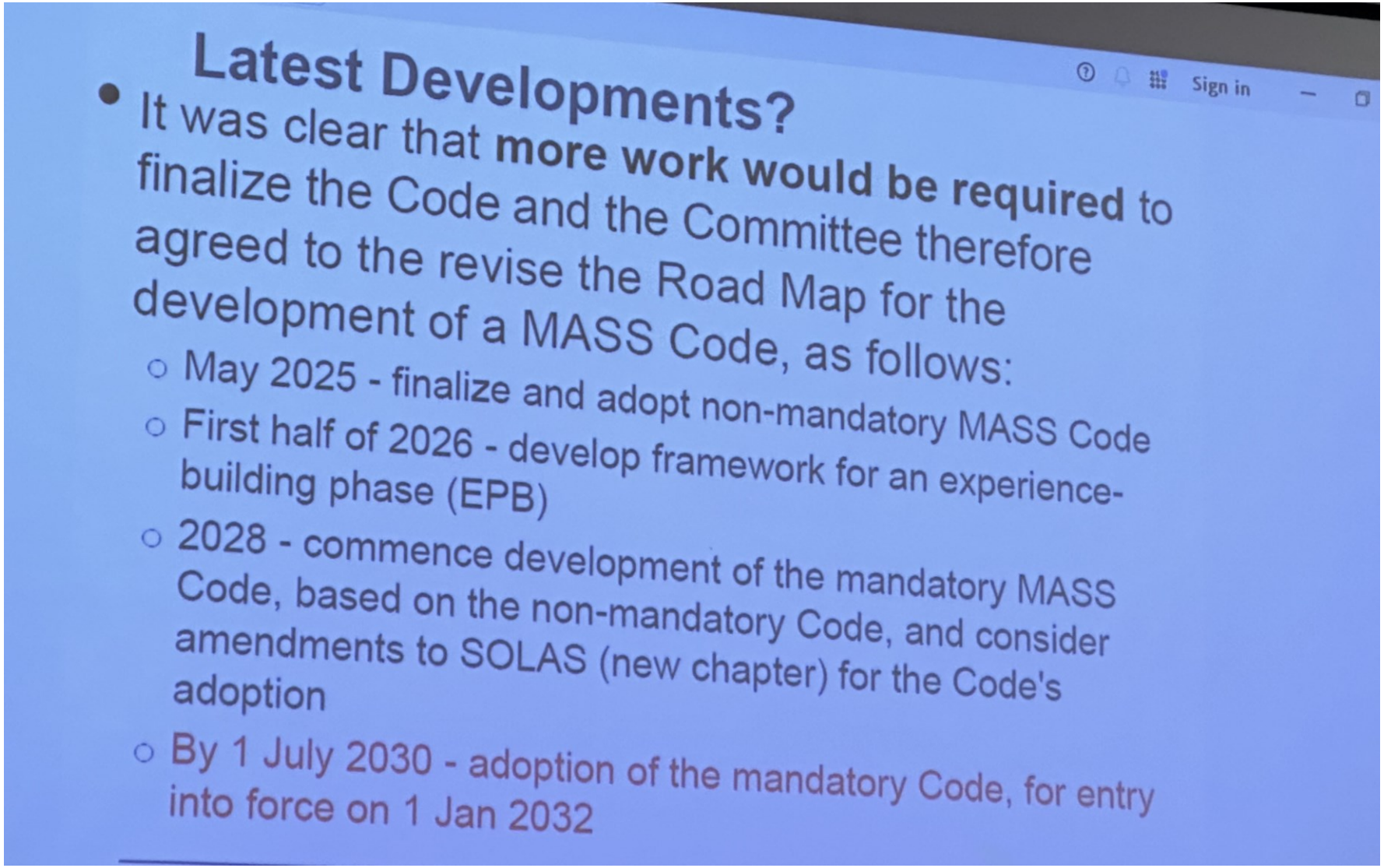
Part 1: The IMO's Regulation on Autonomous Shipping

The International Maritime Organisation (IMO)

(Source: The IMO)

- ✓ IMO instruments such as the SOLAS, COLREG, MARPOL & ISPS Code are inadequate to regulate the advancement in autonomous shipping
- ✓ IMO is addressing this challenge by developing a goal-based **Maritime Autonomous Surface Ships (MASS) Code**
- ✓ The MASS Code will serve as a guideline to regulate **remote control** and **autonomous operation of ships**

Part 1: Latest Development of the IMO's Regulation on Autonomous Shipping



Part 1: Potential Impacts of Autonomous Shipping

- **Navigation Safety:**
  - ✓ Eliminate needless voyages
  - ✓ Minimise the occurrence of incidents at sea

- **Sustainability of Shipping:**
  - ✓ Reduce environment impact
  - ✓ Seamless connections with other modes of transport

- **Economic, technological, social** and **human**:
  - ✓ Reform workstyles in ocean transport
  - ✓ Reduce workload on crew members
  - ✓ Reduce logistics costs

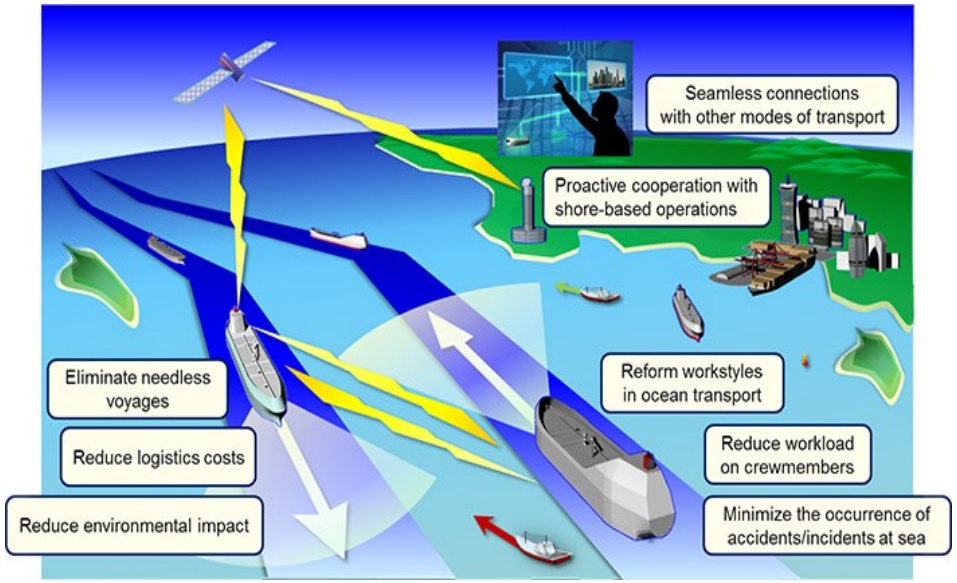


Illustration of Potential Impact of Autonomous Shipping

(Source: https://www.mol.co.jp)

Malaysia as a Maritime Nation

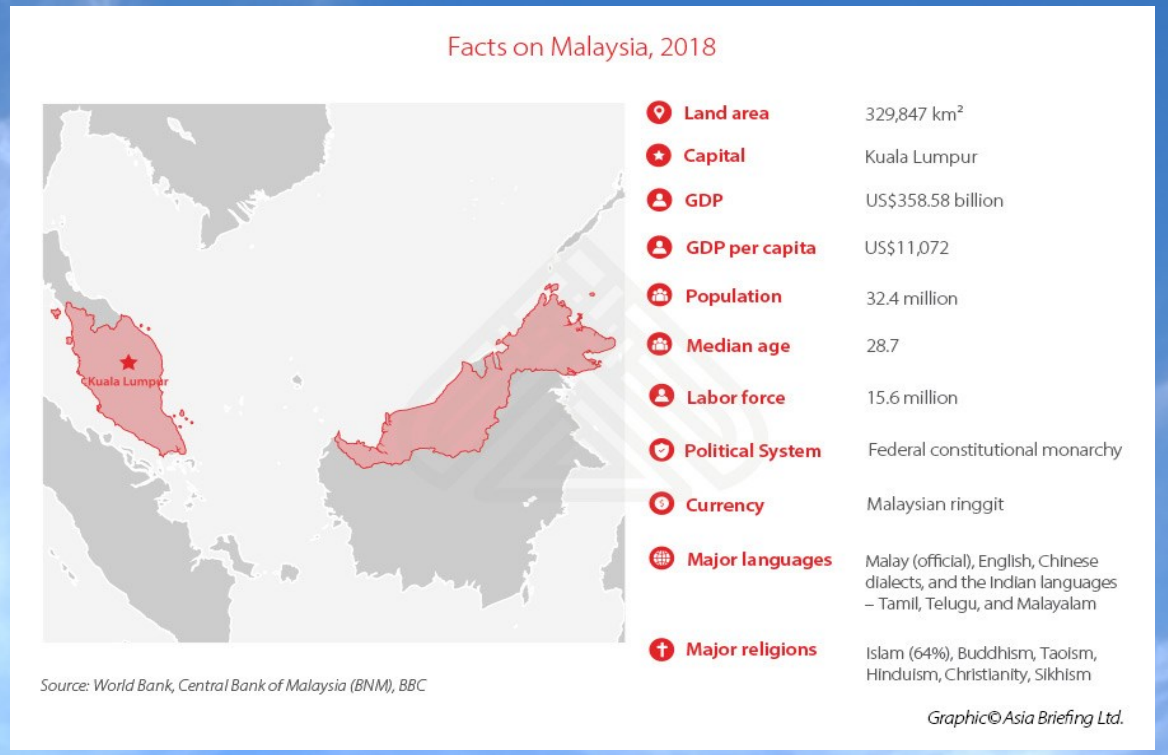
- Malaysia is blessed with its strategic location in the region

✓ West of Peninsular Malaysia borders the Straits of Malacca,

✓ East of Peninsular Malaysia and Sabah & Sarawak border the South China Sea.

✓ Long coastline of 4,675 km.

- The 5th best connected & busiest ports nation handling 26.4 M TEUs in 2019 (UNCTAD)
- One of the strong economies in ASEAN with GDP expected to reach USD 387.90 billion by end of 2023 (Trading Economics)



Part 2: Current Challenges to Shipping in Malaysia

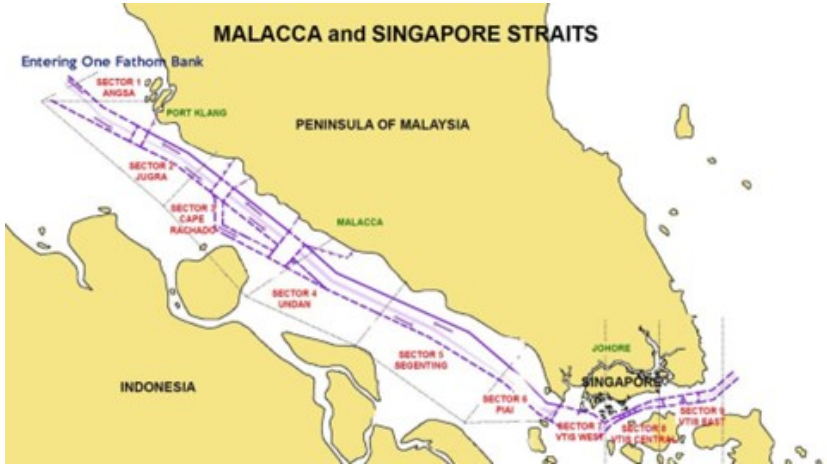
- As a council member of the IMO, Malaysia:
  - ✓ Complies with **IMO instruments** such as the SOLAS, COLREG, MARPOL & ISPS Code
  - ✓ Participates in the **IMO's programs** on safety of navigation & reduction of greenhouse gas emissions from ships & ports
- However, the **safety of navigation** & the **sustainability in shipping** remain as major concerns in Malaysia

Malaysia's participation in the IMO programs

(Source: Ministry of Transport Malaysia)

Part 2: Current Challenges to Shipping in Malaysia: The Safety of Navigation

- Malaysia collaborates the IMO & neighboring nations to improve the **safety of navigation** by:
  - ✓ **The Malacca Strait Patrols** and **Traffic Separation Scheme** help prevent collisions
  - ✓ **Malaysian Maritime Enforcement Agency (MMEA) & the Marine Department** enforce maritime laws and regulations
- However, there are still **marine incidents** happening in Malaysian waters.



Traffic Separation Scheme in the Strait of Malacca
(Source: https://mehsoms.net)

A recent ship's fire in the Malaysian waters
(Source: Local daily)

Part 2: Current Challenges to Shipping in Malaysia: The Sustainability of Shipping

- Shipping has an impact on **marine ecosystems** and contributing to about 3% of the **global carbon emission** (UNCTAD)

- **Maritime law enforcement** by relevant agencies on environmental protection in Malaysian waters

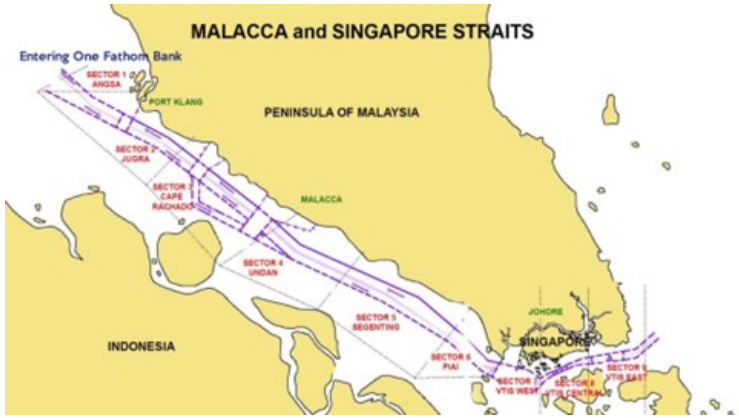
- However, the Strait of Malacca is still challenged with some **maritime sustainability issues such as marine pollution.**

Maritime regions in the Peninsular Malaysia
(Source: MMEA)

A recent oil spill from ships' collision in the Strait of Malacca
(Source: MMEA)

Part 2: Malaysia's Efforts to Improve Safety of Navigation

- Malaysia collaborates the IMO & neighboring nations to improve the **safety of navigation** by:
  - ✓ **The Malacca Strait Patrols** and **Traffic Separation Scheme** help prevent collisions
  - ✓ **Malaysian Maritime Enforcement Agency(MMEA)** enforces maritime laws and regulations



Traffic Separation Scheme in the Strait of Malacca
(Source: https://mehsoms.net)

Source: MMEA

Part 2: Malaysia's Efforts to Improve Sustainability in Shipping

- Shipping has an impact on **marine ecosystems** and **climate change**
- **Maritime law enforcement** & **collaborations** among relevant agencies on environmental protection in Malaysian waters
- Malaysia Participated in the IMO's Green Voyage 2050

Maritime regions in the Peninsular Malaysia
(Source: MMEA)

GREEN VOYAGE 2050

Source: The IMO

Part 2: Analysis of the Study: Potential Impacts of Autonomous Shipping on the Safety of Navigation in Malaysia

- **Strengths**:
  - ✓ **Safety improvement**
  - ✓ Enhanced situational awareness
  - ✓ Faster response time
- **Weaknesses**:
  - ✓ Lack of human oversight
  - ✓ **Limited regulatory framework**
  - ✓ Limited infrastructure
- **Opportunities**:
  - ✓ **Enhance the sustainability of shipping**
  - ✓ Real-time risk management
- **Threats**:
  - ✓ Public acceptance
  - ✓ **Cybersecurity vulnerabilities**
  - ✓ Economic implications

Illustration of an autonomous ship

Source: https://sync.cobham.com/

Part 2: Analysis of the Study: Potential Impacts of Autonomous Shipping on the Sustainability in Shipping in Malaysia

- **Strengths**:
  - ✓ Reduced emissions
  - ✓ Increased use of renewable energy
  - ✓ Improved coastal monitoring
- **Weaknesses**:
  - ✓ Potential for environmental accidents
  - ✓ Disruption of marine life
  - ✓ **Limited regulatory framework**
- **Opportunities**:
  - ✓ **Improved environmental sustainability**
  - ✓ Real-time monitoring and response
  - ✓ Advancements in sustainable technology
- **Threats**:
  - ✓ Potential environmental accidents
  - ✓ Disruption of marine ecosystems and wildlife
  - ✓ Inadequate enforcement of environmental regulations

Illustration of an autonomous ship

Source: https://www.porttechnology.org/

Part 2: Findings of the Study: Potential Impacts of Autonomous Shipping in Malaysia

1. Improved Safety of Navigation (Strength)

- Autonomous shipping reduces the **risk of human error**

  ✓ Advanced sensors, computer systems, and AI can enhance **navigation safety**

  ✓ Improved **efficiency** and **reduced costs**

Illustration of an autonomous ship

Source: https://sync.cobham.com/

Part 2: Findings of the Study: Potential Impact of Autonomous Shipping in Malaysia

2. Reduced Environmental Impact (Opportunity)

- Autonomous shipping can reduce **greenhouse gas emissions**

  ✓ Use of alternative fuels and energy-efficient technology

  ✓ Potential for better management of marine ecosystems and reduced pollution

Kongsberg-Yara Birkeland

Source: https://www.offshore-energy.biz/worlds-1st-zero-emission-container-vessel-yara-birkeland-delivered/

Part 2: Findings of the Study: Potential Impact of Autonomous Shipping in Malaysia

3. Increased Cybersecurity Risks (Threat)

- **Autonomous ships** are vulnerable to **cyber attacks**

  ✓ **VTMS** could be a risk to cyber attacks as the current **AIS system** which is an integral part of its system is vulnerable to security breach

  ✓ Threats to **safety** and **security protection**

AIS & Cybersecurity Attack

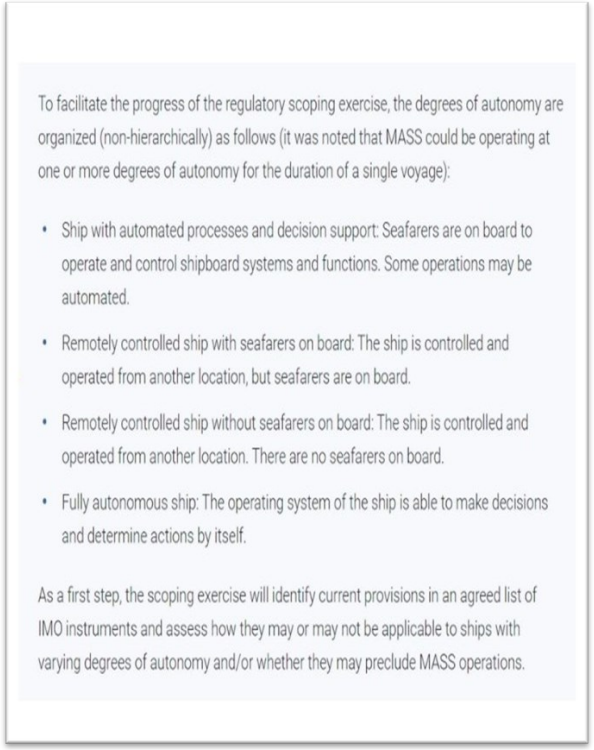
Source: conference.hitb.org

Part 2: Findings of the Study: Potential Impact of Autonomous Shipping in Malaysia

4. Regulatory Framework (Weakness)

Regulatory framework on autonomous shipping will pose as a challenge:

- Need to comply with the IMO's **MASS Code** to ensure safe and sustainable implementation
- Malaysia to collaborate with other international organisations on autonomous shipping



To facilitate the progress of the regulatory scoping exercise, the degrees of autonomy are organized (non-hierarchically) as follows (it was noted that MASS could be operating at one or more degrees of autonomy for the duration of a single voyage):

- Ship with automated processes and decision support: Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated.
- Remotely controlled ship with seafarers on board: The ship is controlled and operated from another location, but seafarers are on board.
- Remotely controlled ship without seafarers on board: The ship is controlled and operated from another location. There are no seafarers on board.
- Fully autonomous ship: The operating system of the ship is able to make decisions and determine actions by itself.

As a first step, the scoping exercise will identify current provisions in an agreed list of IMO instruments and assess how they may or may not be applicable to ships with varying degrees of autonomy and/or whether they may preclude MASS operations.

The International Maritime Organization (IMO)'s News: IMO takes first step to address Autonomous Ships

Source: https://www.imo.org/en/MediaCentre/PressBriefings on May 25, 2018 ·

Part 3: Recommendations by the UN's Study for Malaysia

1. Enhancing Safety of Navigation

- ✓ Develop **regulations and guidelines** for autonomous ships based on IMO's MASS Code
- ✓ Provide **training and education programs** for stakeholders
- ✓ Conduct regular **safety assessments** to evaluate performance and identify potential risks

Malaysia's participation in the IMO programs

(Source: Ministry of Transport Malaysia)

Part 3: Recommendations by the UN's Study for Malaysia

2. Mitigating Environmental Impact

- ✓ More stringent enforcement on **environmental laws**
- ✓ Incentivize the use of **clean energy sources**
- ✓ Promote **sustainable port infrastructure & waste management**

Malaysia's Contribution to the United Nations' Sustainable Development Goals (SDGs)

(Source: Mazlin Mocktar, Lee K E & S Sivapalan)

Part 3: Recommendations by the UN's Study for Malaysia

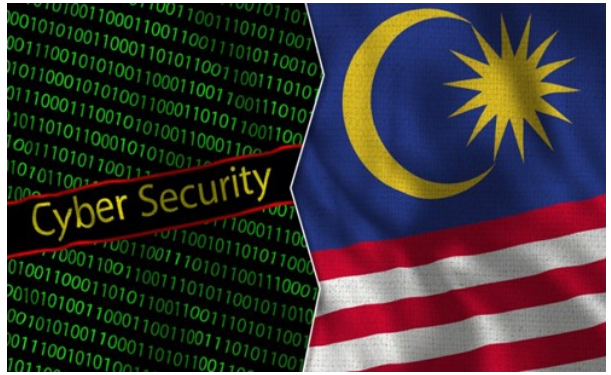
3. Mitigating Cybersecurity Risks

- ✓ Guided by The **National Cyber Security Policy (NCSP) &** The **Malaysia Cyber Security Strategy (MCSS)** 2020 – 2024. the **Cyber Security Malaysia (CSM)** & the **National Cyber Security Agency (NACSA**) are to further mitigate cybersecurity risks.

- ✓ To enhance the **VTMS/AIS monitoring system** to counter risks to cyberattacks through:

  - ❖ Information-sharing on cybersecurity to prevent threats to safety and security protection

  - ❖ Coordinate training on countering cybersecurity measures



Cybersecurity in Malaysia

(Source: https://techwireasia.com)

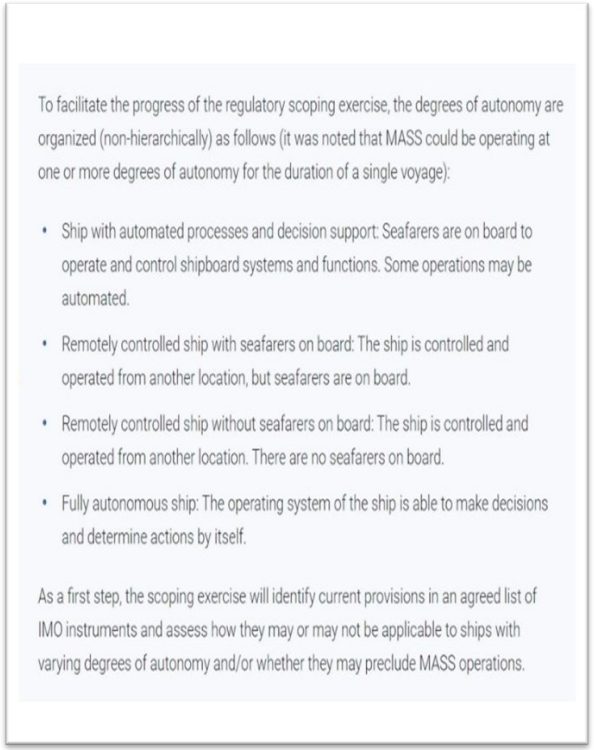
Vessel Traffic Management System (VTMS)

(Source: http://rds.co.in/Marine.html)

Part 3: Recommendations by the UN's Study for Malaysia

4. Enhancing Regulatory Framework

- ✓ Enhance regulatory framework with the **IMO's MASS Code**
- ✓ Collaborate with international organizations to develop and implement safe & sustainable shipping practices
- ✓ Coordinate research and development in autonomous technology



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Part 3: Recommended Strategies for Autonomous Shipping In Malaysia

1. **Invest in Technological Infrastructure**: To Invest in the necessary technological infrastructure to **support the development and operation of autonomous ships**, including its **regulatory framework**.

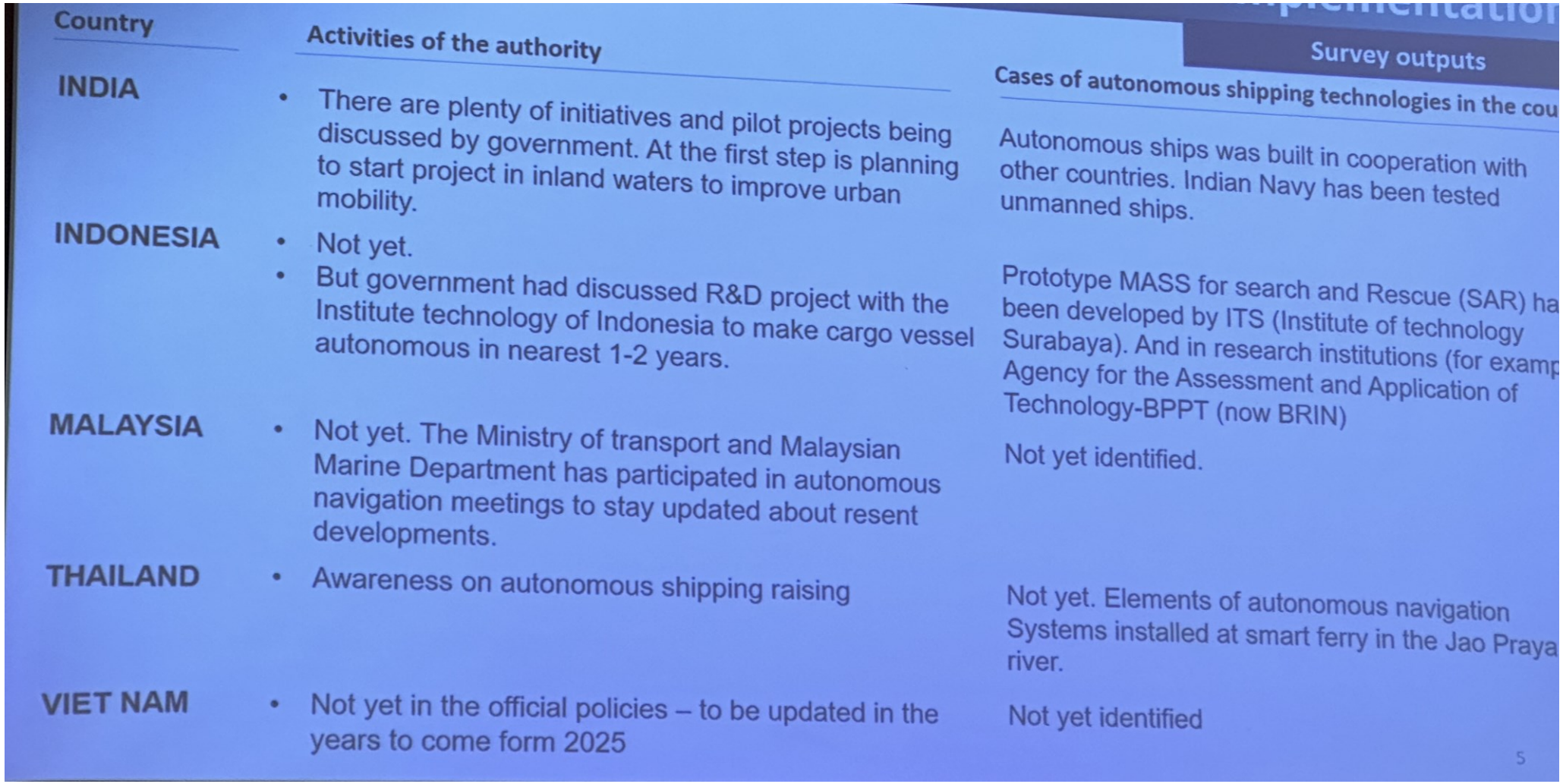
2. **Enhance Navigation Safety**: To Enhance **navigation safety** by promoting the use of advanced technology such as collision avoidance systems, electronic chart displays, and automated identification systems.

3. **Promote Sustainable Shipping**: To Promote **sustainable shipping practices** by encouraging the use of low-emission fuels, such as liquefied natural gas (LNG) and biofuels.

4. **Develop a Skilled Workforce**: To Develop a **skilled workforce** to support the development and operation of autonomous ships.

5. **Foster Collaboration**: To Foster **collaboration with other countries**, international organizations, & the private sector to promote the safe and sustainable development of autonomous shipping

Part 3: Readiness of Selected Countries to Embrace Autonomous Shipping



Country	Activities of the authority	Survey outputs Cases of autonomous shipping technologies in the cou
INDIA	• There are plenty of initiatives and pilot projects being discussed by government. At the first step is planning to start project in inland waters to improve urban mobility.	Autonomous ships was built in cooperation with other countries. Indian Navy has been tested unmanned ships.
INDONESIA	• Not yet. • But government had discussed R&D project with the Institute technology of Indonesia to make cargo vessel autonomous in nearest 1-2 years.	Prototype MASS for search and Rescue (SAR) ha been developed by ITS (Institute of technology Surabaya). And in research institutions (for examp Agency for the Assessment and Application of Technology-BPPT (now BRIN)
MALAYSIA	• Not yet. The Ministry of transport and Malaysian Marine Department has participated in autonomous navigation meetings to stay updated about resent developments.	Not yet identified.
THAILAND	• Awareness on autonomous shipping raising	Not yet. Elements of autonomous navigation Systems installed at smart ferry in the Jao Praya river.
VIET NAM	• Not yet in the official policies – to be updated in the years to come form 2025	Not yet identified

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Summary of Presentation

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2024 Maritime Silk Road Port Cooperation Forum

The United Nations' Study on Autonomous Shipping in the Asia Pacific:

Improving the Safety of Navigation & the Sustainability of Shipping through the Introduction of Innovative Autonomous Shipping Technology in Malaysia

Thank You （谢谢）

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