

Maritime Cybersecurity

Sharing with ReCAAP
5 July 2023

About MPA

The Maritime and Port Authority of Singapore (MPA) was established on 2 February 1996, with the mission to develop Singapore as a premier global hub port and international maritime centre (IMC).



1

MISSION

To develop and promote Singapore as a premier global hub port and an international maritime centre, and to advance and safeguard Singapore's strategic maritime interests

2

VISION

A leading maritime agency driving Singapore's global maritime aspirations

3

VALUES

Forward thinking

Integrity

Respect

Service Excellence

Teamwork

3 Key Mission Objectives

Premier global hub port

- Port Authority
- Port Regulator
- Port Planner



International Maritime Centre

- IMC Promoter
- IMC Developer



Advance & safeguard Singapore's maritime interests

- National Maritime Representative at IMO and other regional/international fora



SINGAPORE'S 2022 MARITIME PERFORMANCE



SINGAPORE'S 2022 MARITIME PERFORMANCE

Home to more than
170 international
shipping groups

Reached
37.3m
TEUs of container
throughput in 2022

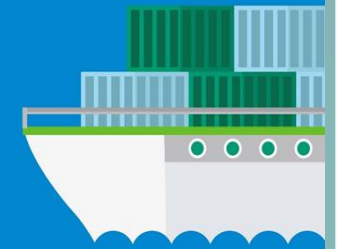


total business spending
by shipping companies:

\$4.3b



In 2022, vessel
arrival tonnage hit
2.83b GT



From 2018 to 2022, start-ups
under PIER71™ grew from

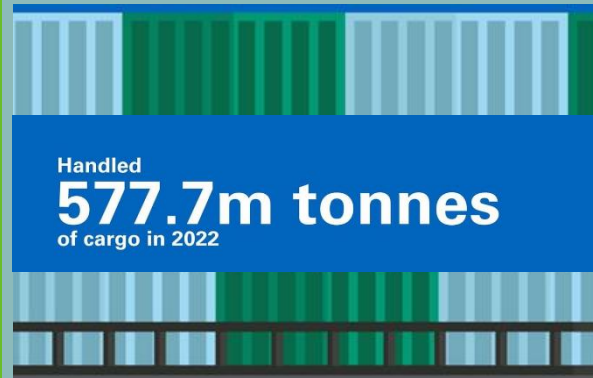
17 to 100

30 companies established
or expanded locally in 2022

Registered
47.9m
tonnes of bunker sales
in 2022, including
140,000
tonnes of biofuel
blends with
more than 90 biofuel
bunkering operations

*For biofuel blends where biofuel makes
up 50% of the marine fuel

Handled
577.7m tonnes
of cargo in 2022



The Singapore Registry of Ships (SRS)
is amongst the world's
top 5 largest ship registries.

25 Singapore-flagged ships
received Green Ship Programme
certificates in 2022, out of 650 ships



TOP Shipping Centre in Xinhua-Baltic
International Shipping Centre Development
Index in 2022

TOP international
maritime city in Menon
Economics-DNV's
Leading Maritime
Cities of the World
report in 2022



Types of Systems in Maritime Ecosystem

1

Enterprise IT Systems

2

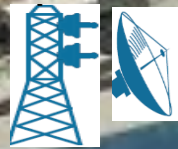
Shore-based Port Operations & Marine Services Systems (Informational, Transactional)

3

Shore-based Terminal Planning & Operations Systems (e.g. Quay/Yard cranes)

4

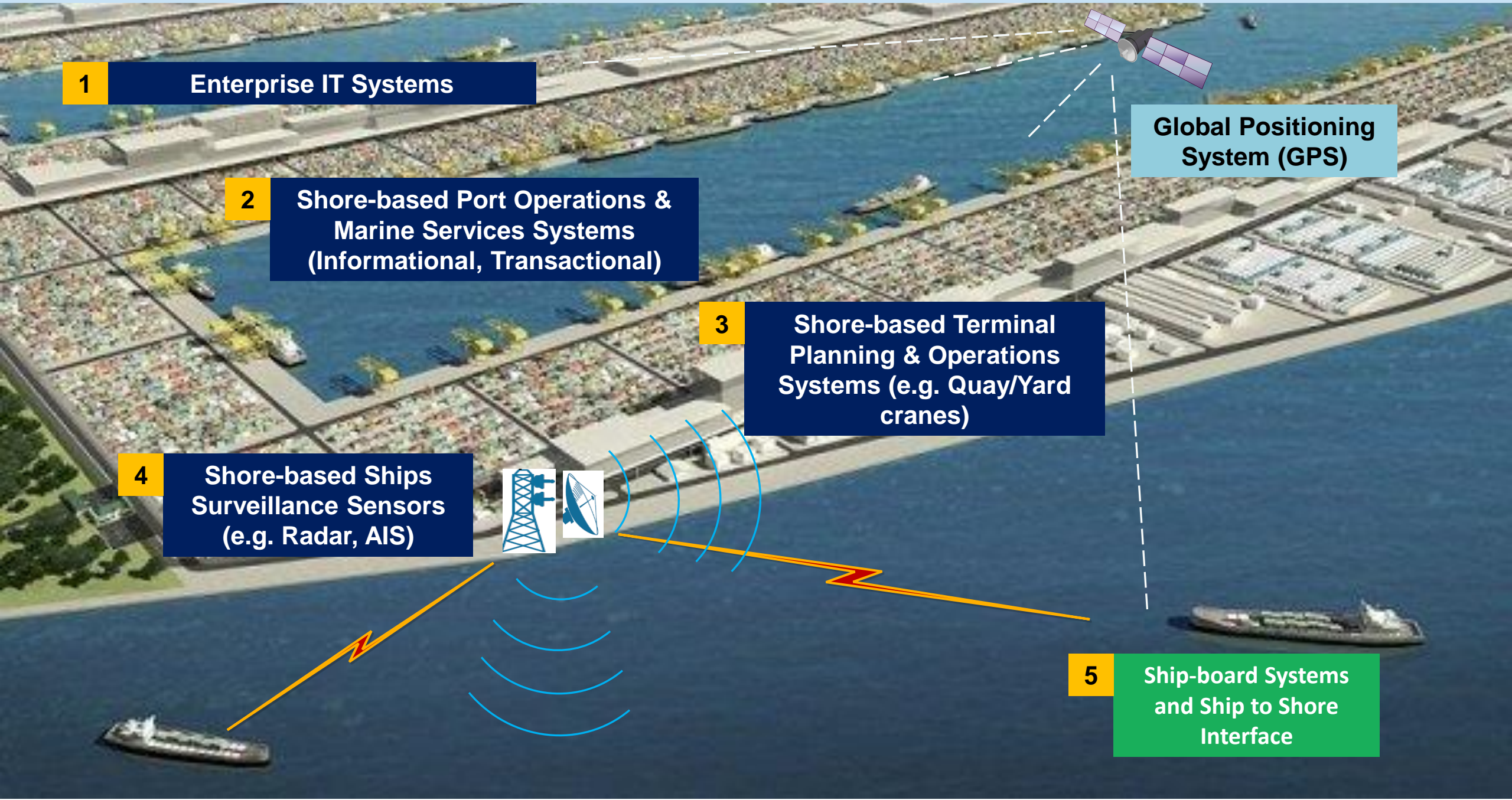
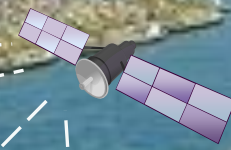
Shore-based Ships Surveillance Sensors (e.g. Radar, AIS)



5

Ship-board Systems and Ship to Shore Interface

Global Positioning System (GPS)



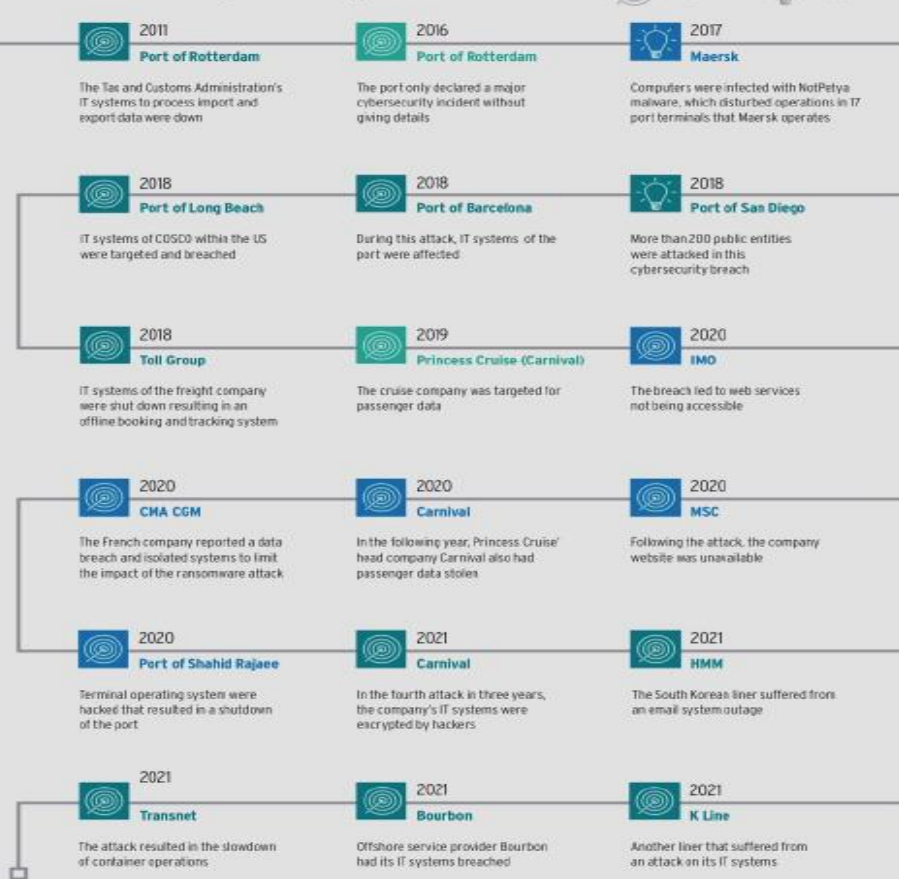
STRENGTHEN MARITIME SAFETY, SECURITY AND RESILIENCY...

Digitalisation increases potential vulnerabilities and attack surfaces

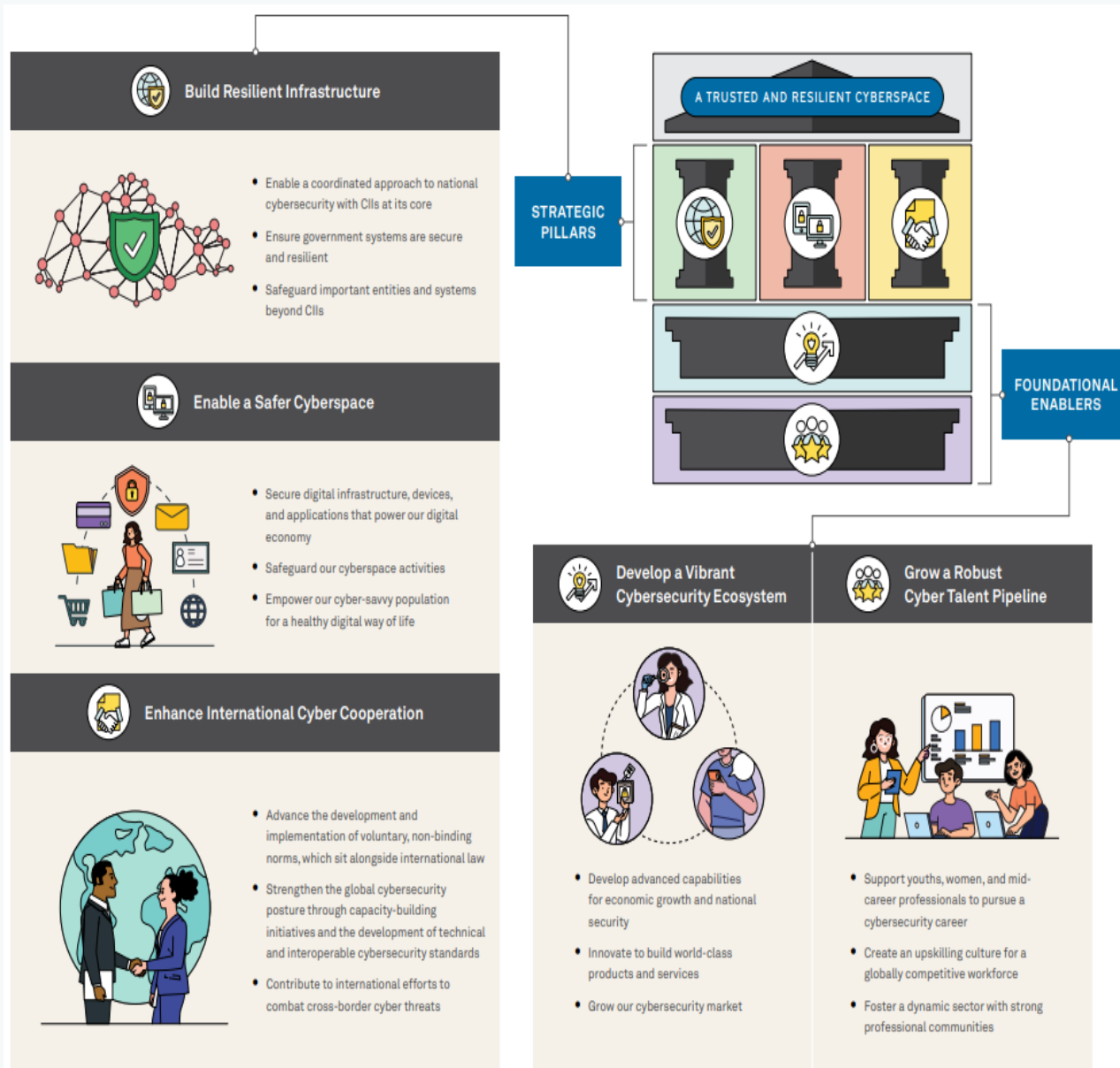
Maritime cyber incidents in last 10 years



Notable maritime cybersecurity attacks 2011-21



SINGAPORE'S NATIONAL CYBERSECURITY STRATEGY



Build Resilient Infrastructure



- Enable a coordinated approach to national cybersecurity with CIs at its core
- Ensure government systems are secure and resilient
- Safeguard important entities and systems beyond CIs

Enable a Safer Cyberspace



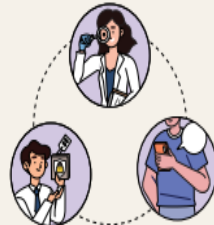
- Secure digital infrastructure, devices, and applications that power our digital economy
- Safeguard our cyberspace activities
- Empower our cyber-savvy population for a healthy digital way of life

Enhance International Cyber Cooperation



- Advance the development and implementation of voluntary, non-binding norms, which sit alongside international law
- Strengthen the global cybersecurity posture through capacity-building initiatives and the development of technical and interoperable cybersecurity standards
- Contribute to international efforts to combat cross-border cyber threats

Develop a Vibrant Cybersecurity Ecosystem



- Develop advanced capabilities for economic growth and national security
- Innovate to build world-class products and services
- Grow our cybersecurity market

Grow a Robust Cyber Talent Pipeline



- Support youths, women, and mid-career professionals to pursue a cybersecurity career
- Create an upskilling culture for a globally competitive workforce
- Foster a dynamic sector with strong professional communities

Ministry of Communications and Information

CYBER SECURITY

CYBERSECURITY ACT

Cybersecurity Act

The Cybersecurity Bill was passed on 5 February 2018 and received the President's assent on 2 March 2018 to become the Cybersecurity Act.

Cybersecurity Act 2018

- Singapore's Cybersecurity Bill which aims to strengthen the protection of **Critical Information Infrastructure (CII)** was passed into law on **February 5, 2018**
- 11 critical sectors: (1) Aviation, (2) Banking & Finance, (3) Energy, (4) Government, (5) Healthcare, (6) Infocomm, (7) Land Transport, (8) **Maritime**, (9) Media, (10), Security and Emergency Services, (11) Water

SINGAPORE'S NATIONAL CYBERSECURITY EFFORTS



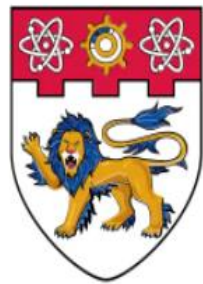
CYBERSECURITY
SERVICES
REGULATION
OFFICE



CYBER
ESSENTIALS



CYBER TRUST



NANYANG
TECHNOLOGICAL
UNIVERSITY
SINGAPORE



CYBERSECURITY GUIDELINES AND NOTATION



Maritime and Port Authority of Singapore > Singapore Registry of Ships > About SRS and What's New > SRS Notation

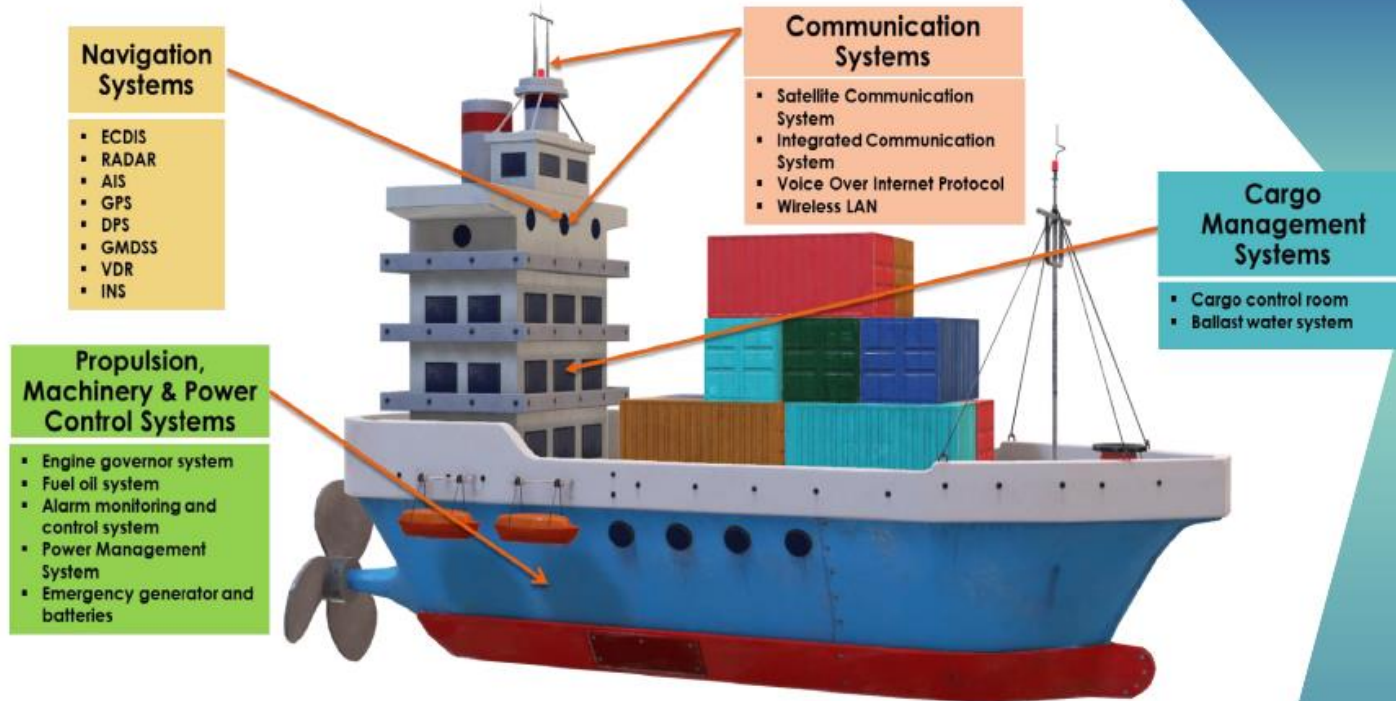
SRS Notation

Notations for Singapore Registry of Ships (SRS Notations)

The Singapore Registry of Ships (SRS) has introduced voluntary notations for Singapore ships to drive and promote sustainable shipping, digital transformation and seafarers well-being. The SRS Notations serve to encourage SRS ship owners, operators and managers to adopt solutions to enhance Singapore ships' safety, security, environmental protection, operational efficiency as well as crew well-being.

The four categories of notations are:

- Green
- Cyber
- Smart
- Welfare



A Cyber Risk Mgt Study in Shipboard Systems

A Cyber Risk Management Study in Shipboard Systems

Team: Jianying Zhou (SUTD, PI)
Huaqun Guo (Research Scientist, to be hired)
Mark Goh (SUTD, Subject Matter Expert)

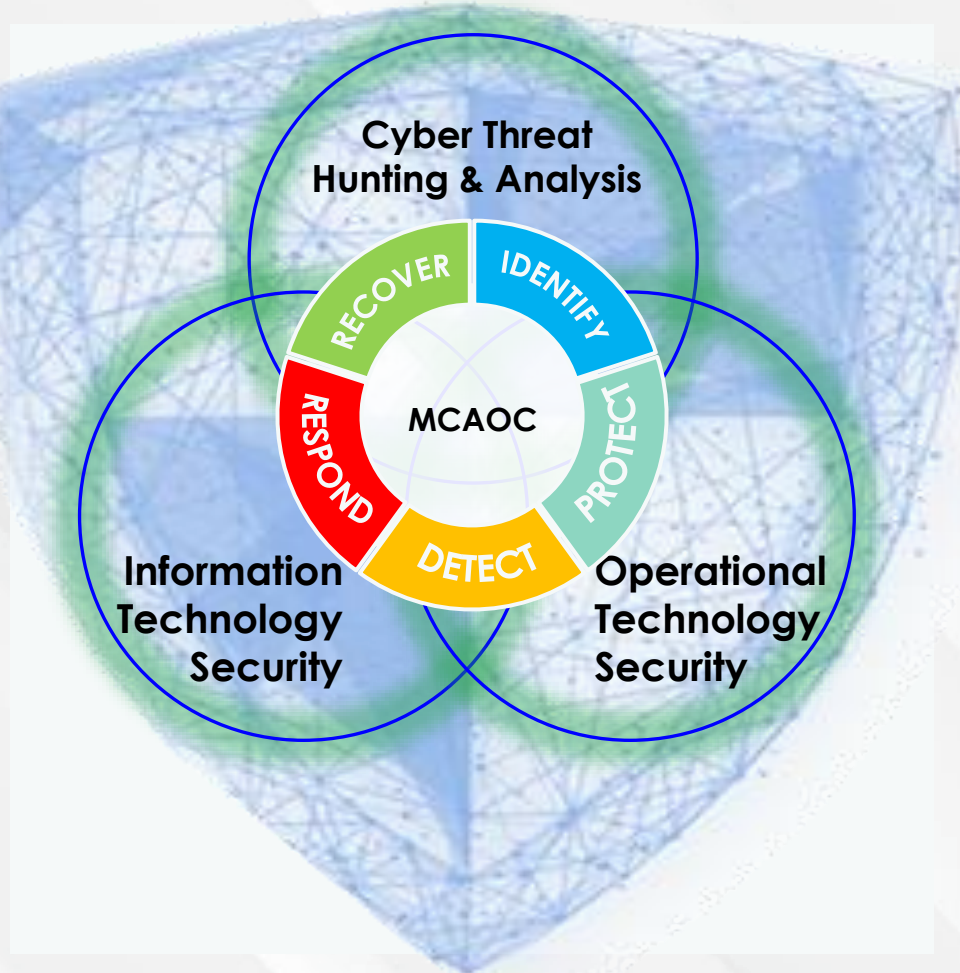
Presented by: Prof Jianying Zhou



Project from Sep 2020 to Feb 2022

Deepening cybersecurity capabilities towards a safe and secure port

Building a capable Maritime Cybersecurity Assurance and Operations Centre with synergistic cyber threat hunting & analysis capabilities and IT & OT security functions for maritime industry constituents



Maritime Cybersecurity Assurance and Operations Centre (MCAOC)

- Improve cyber-physical situation awareness through integration of physical events from Operational Technology (OT) sensor input.
- Enhance the capability to detect and correlate cyber and physical events.
- Strengthen the resiliency of Singapore's port operations with the industry constituents.

Comprehensive approach by converging Information Technology and Operational Technology Security

... AND STRONG PARTNERSHIPS.

Port Authorities CIO Cybersecurity Network (PACC-Net)

- Led by MPA, PACC-Net is a global network that brings together a **community of like-minded port authorities** to share actionable information and respond to potential cybersecurity threats



Maritime Cybersecurity Roundtable



- MPA, SSA and 7 industry partners signed an MOU to strengthen cybersecurity capabilities

ChainPORT Cybersecurity Resilient Group

- MPA is also the co-chair for ChainPORT Cybersecurity Resilient Working Group involving North America and European ports (Port of LA, Hamburg Port Authority, Port of Rotterdam, etc.) to share cyber threat intelligence, best practices and collaborate on potential projects

IAPH Data Collaboration Technical Committee Cybersecurity Working Group

- MPA contributed in the development of the technical guidelines for risk and vulnerability assessment



IAPH Cybersecurity Guidelines
for Ports and Port Facilities
Version 2.2





M P A
SINGAPORE

Justin Zhou
Senior Consultant (Cyber Capability Dev)
Maritime and Port Authority of Singapore

Justin_zhou@mpa.gov.sg



MARITIME
SINGAPORE

Thank you!