

Improving safety of navigation
and sustainability of shipping
through innovative
autonomous shipping
technologies in Asia Pacific:
Case Study of Thailand



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Gap Analysis of Autonomous Shipping in Thailand

As is: Used for Specific Purpose
and only for Internal Usage of Company



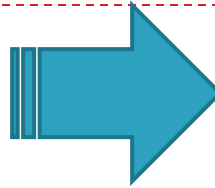
Used for
Collecting Data
of Water Quality
and Depth



Used for Farm
Watering



Collecting
Water
garbage and
Trash

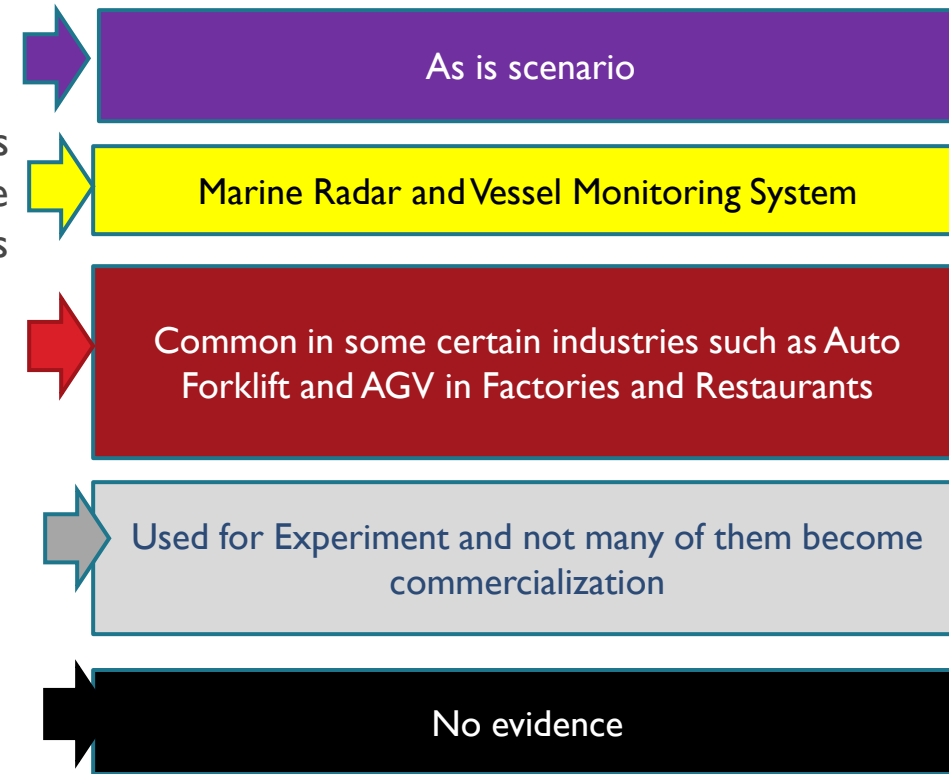


To be: To Carry Maritime Freight and Passenger



Autonomous Vehicle in Thailand

- ▶ Most of efforts to invest and operate autonomous vehicle are initiated in the manufacturing and service industries, especially to be used in transporting raw material and parts within factories to minimize cost and errors in production process.
 - ▶ **At Level 0:** fully operated by human
 - ▶ **At Level 1:** Manned ships with automated processes and decision support Some operations may be automated and at time be unsupervised but seafarers on board ready to take control
 - ▶ **At Level 2:** remotely controlled ship with seafarers on board. Ship may be controlled and operated from another location.
 - ▶ **At Level 3:** Remotely controlled ship without seafarers on boards by communication technology (5G); No seafarers on board
 - ▶ **At level 4:** Full autonomous ship. Automated ships can make decision and determine actions by itself.



Current Situation of Autonomous Vehicle in Thailand

- ▶ Thai Government has established investment privileges of manufacturing all kinds of autonomous vehicle and equipment with engineering design including automation system integration and control system configuration, given that the autonomous vehicle must be fully automated and can perform at least 2 tasks at once continuously and collectively. The privileges include 8 year income tax exemption, import duty exemption.
- ▶ All companies enjoying investment privileges are manufacturing automation equipment controlled by computerization used in limited space such as automated vending machine, automated electricity controllers, automated storage machine, automated guided vehicle (AGV), drone delivery, and factory robot. **The investment has not yet extend to autonomous shipping and other public transportation**
- ▶ Other attempts are carried on by innovation funding agencies to do pilot projects in autonomous vessels used for collecting garbage, water quality and depth, and watering gardens and farms.



Current Situation of Autonomous Vehicle in Thailand

- ▶ Until now, the demand for autonomous shipping used for commercialization in Thailand is relatively limited which is opposite to the growing demand for environmental friendly and clean energy vessels as well as the growing application of internet and digital communication in maritime shipping and port business.
- ▶ Other challenging issues are
 - ▶ Existing regulations are not in line with technological advancements
 - ▶ In the Act of Navigation in Thai Water Territory, responsibility related to following issues must be undertaken by ship master.
 - ▶ ship collision and ship in distress,
 - ▶ notification of ship arrival and department,
 - ▶ enter of ship in restricted area and designated navigation route,
 - ▶ report of any accident or unpleasant evidence on ship,
 - ▶ report on cargo discharge and loading at port
 - ▶ Handling of dangerous / hazardous cargoes on board
 - ▶ Ship anchorage
 - ▶ Liability
 - ▶ trust of navigation safety when ship encountering complicated scenarios



Pragmatic Measures to Promote Autonomous Vessels

1. Establishing Forum on Autonomous Vessel to raise awareness and strategies to promote the progressive adoption of autonomous vessel in domestic and international water territory
2. The philosophy of launching autonomous vessel into commercial services to save cost and energy should predominantly focus on the safety management of operations, design, construction, and liability to stakeholders while relevant stakeholders should open their minds to accept new technological advancement.
3. Experiment in closed system (Sandbox) must be done to ensure the commercialization of autonomous vessels
 - ▶ Designating specific sandbox in closed system of water territory to do experiment in the context of domestic and international navigation.
 - ▶ Specification of the vessels should be accorded to international standard recognized by specialized UN bodies or global professional engineering societies.
4. Government prepare to modernize or introduce regulations related of autonomous vessel design and construction, ship licensing, ship owner and ship controller licensing and qualification, safety management, safety assurance, cybersecurity, ship registration, and ship navigation in water territory, by basing on fact findings in sandbox experiment, if applicable.
5. Establishing platform to monitoring and communicating with autonomous vessels and ship owners/controllers as well as mechanism of ship reporting in emergency or collision circumstances, ship arrival and departures from ports, and liability for ship owners/controllers to relevant stakeholders.