



국립 한국해양대학교
KOREA MARITIME UNIVERSITY

Introduction of Korea's Autonomous Ship Projects

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Kwangil Lee, KMOU



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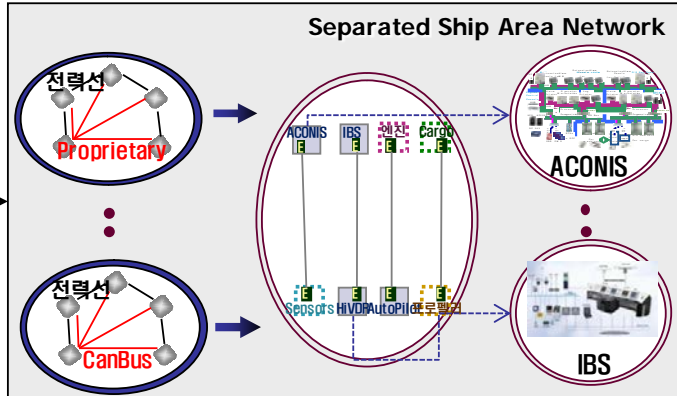
Korea is..

- Korea has
 - Korea has three major ship builders in the world (HHI, DSME, Samsung)
 - Good infrastructure for ICT technology
 - Government investigation focused on the 5G, Smart factory (Industry 4.0s), AI, autonomous car, drone,...,etc.
- Maritime Industry
 - Global leader for the advanced and large ships , large container ship, LNG, FPSO, ..., etc.
 - Many works on ICT technology since 2007
 - Developed for smart ship and Eco-ship
 - But the maritime industry has difficulties. So what is next??

Smart Ship - SAN

Provisioning all Value-added Maritime Services
by Connecting all equipment and system with Wired-/Wireless Networks

- 선박 시스템 중심의 개별적 네트워크 구축
- 선박 시스템간 통합 및 연동 부재
- 부분적, 단편적 선박 관리

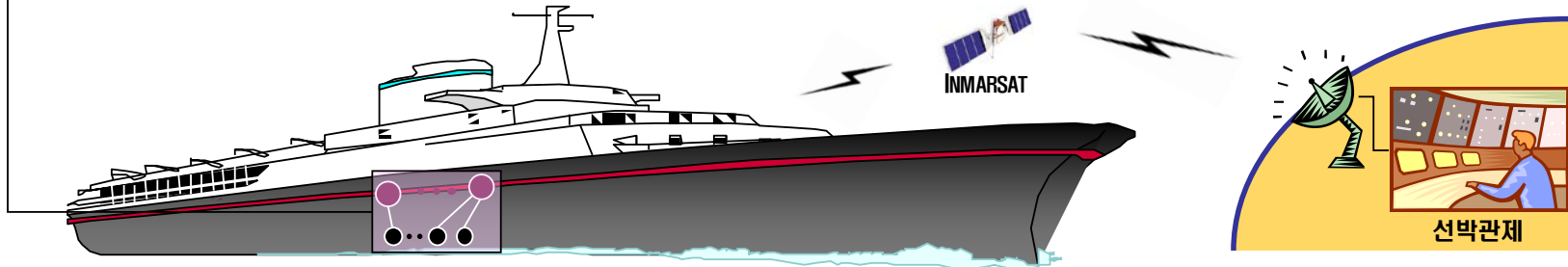
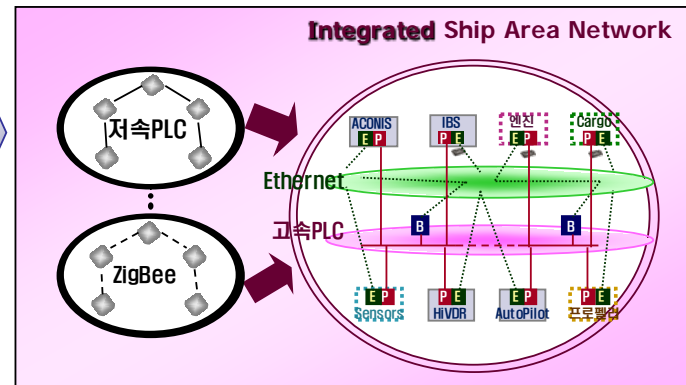


원격관제/감시

육상유지보수

통합모니터링

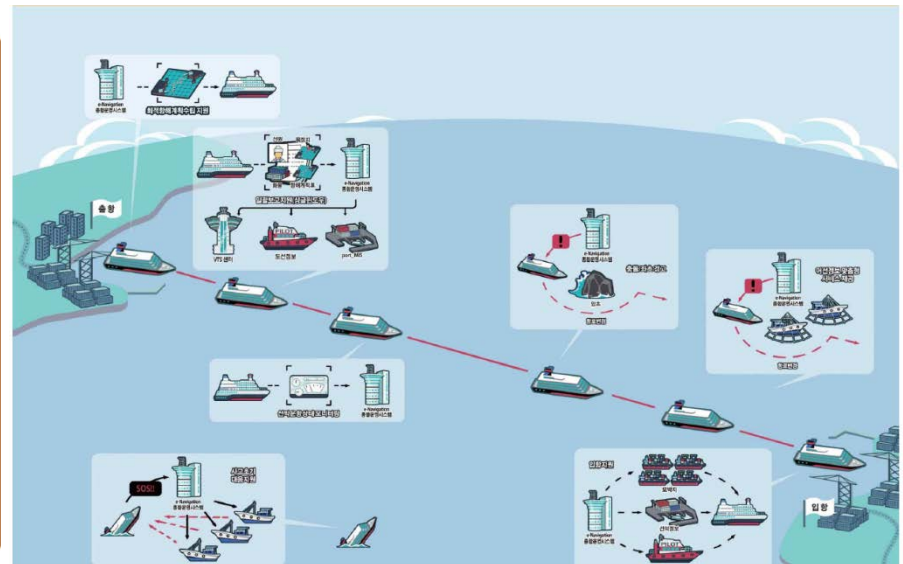
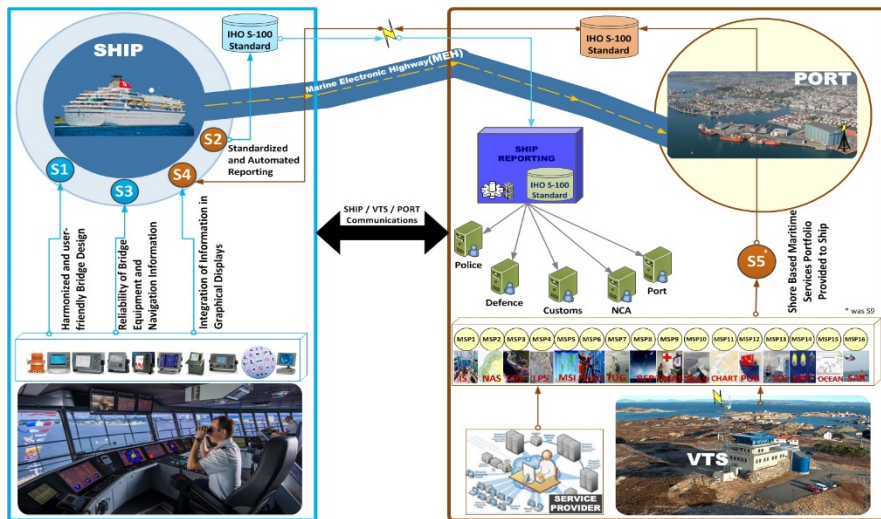
- 선내 시스템을 연결하는 선내 백본 구축
- 선내 시스템간 상호연동 제공
- 통합적 선박 관리



SMART-NAVIGATION

- Smart-Navigation Projects
 - Develop e-navigation services for SOLAS and Non-SOLAS vessel
 - 2016~ 2020, 120 M dollars
 - S-10x, LTE-M, 16 MSP services, Maritime Cloud, VDES and S-mode
 - 43 organizations including KRISO, ETRI, KMOU and Shin-dong

e-navigation Concept

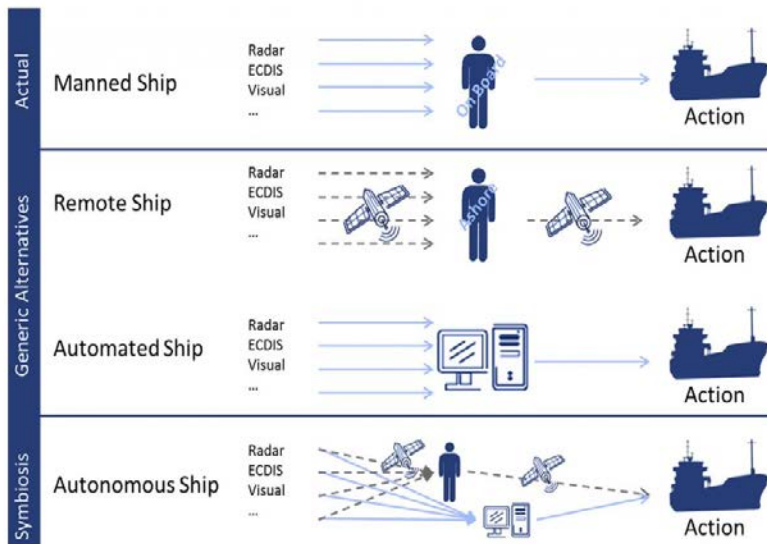


Autonomous Ship – Background

Definition

이해당사자들과 연결되어 정보와 서비스를 제공하고, 스스로/원격으로 진단·관리하여 최적의 에너지 효율로(efficient) 안전(safe)하게 자율 혹은 무인 운항하는 선박

Next generation modular control systems and communications technology will enable **wireless monitoring and control functions both on and off board**. These will include **advanced decision support systems** to provide a capability to operate ships remotely under semi or fully autonomous control.



Autonomous Ship – Background

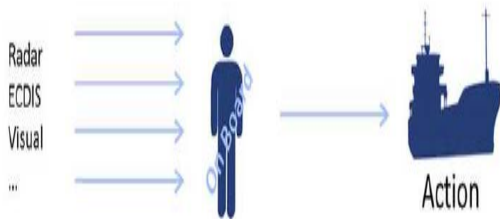
Reducing Human Error and Accidents with ICT

사람이 모두 알아서
(Manned Ship)

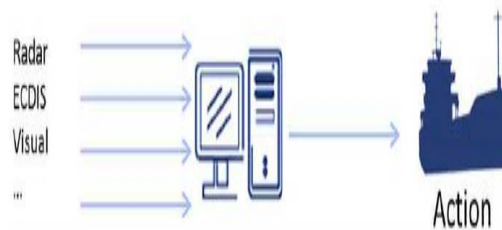
정해진 항로를 자동으로
(Automated)

똑똑한 운항 플래너
(Autonomous)

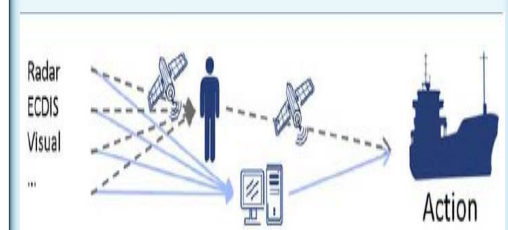
- 항해자가 선박 운항과 관련된 모든 의사 결정과 제어 수행



- 선박내의 모든 것이 자동화된 수단에 의해 선박을 운항



- 분석, 경험 공유·확장을 통해 선박이 알아서 운항



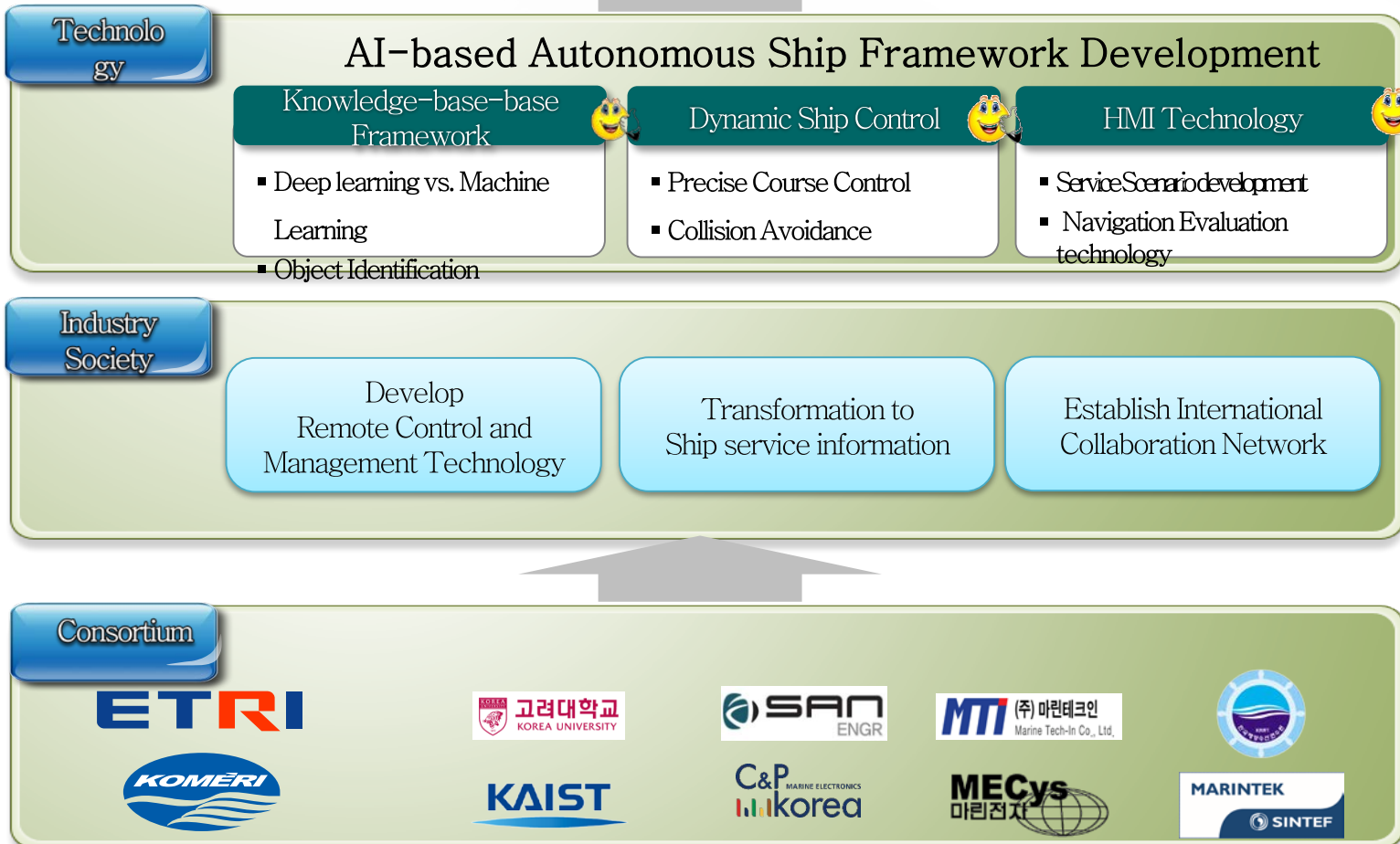
경험(Experience)

학습(Artificial Intelligence)

Vision and Goal

Develop Core technology of the Eco-friendly and Smart ship for the Autonomous Ship

2017. 04. 01 ~ 2019. 12. 31



Products

Semantic-based Information System

Common Data Modeling

Knowledge-base

Multi-level Knowledge Model

Sensor Fusion for Object Classification

AI-learning model

Safe Navigation Control

Course/Track Control

Local Route Calculation

Optimal and Safe Navigation System

Optimal Global Route Planning

Ship-Human Interaction

Evaluation

Simulator

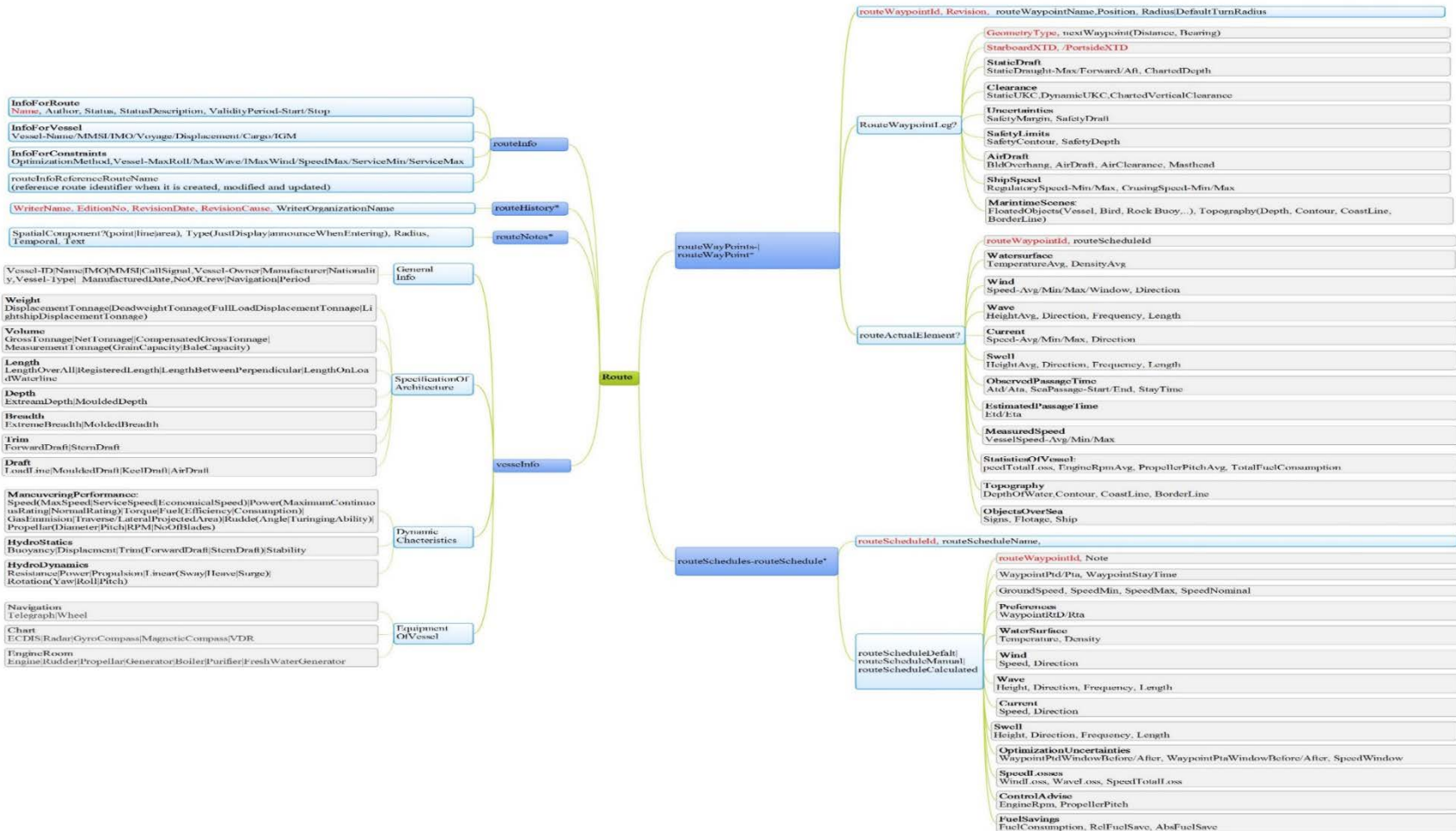
Secured Remote Control System

Remote Control System

Secured Messaging

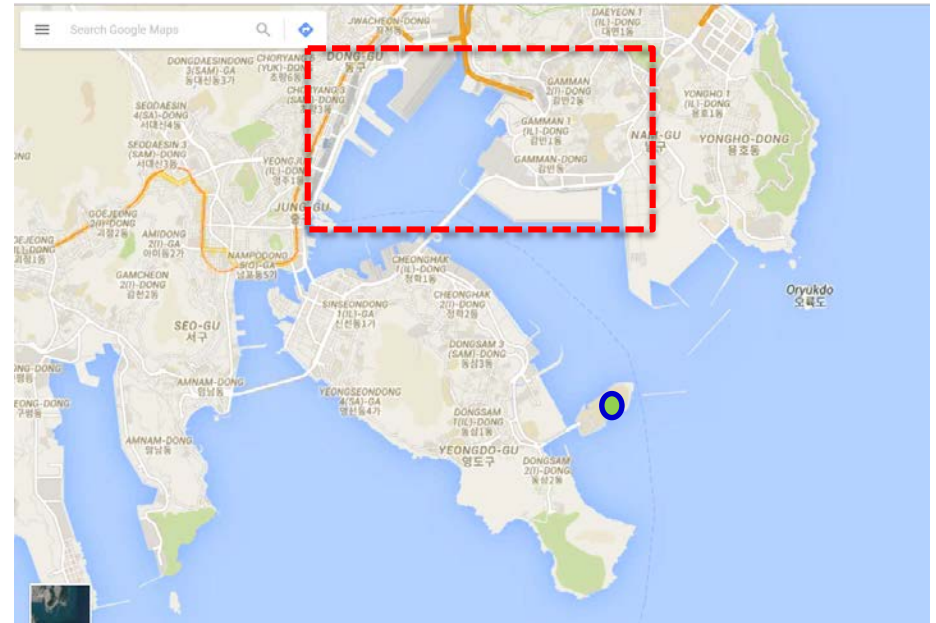
Metadata

- Identifying all data elements for the remote monitoring and control



Test-bed

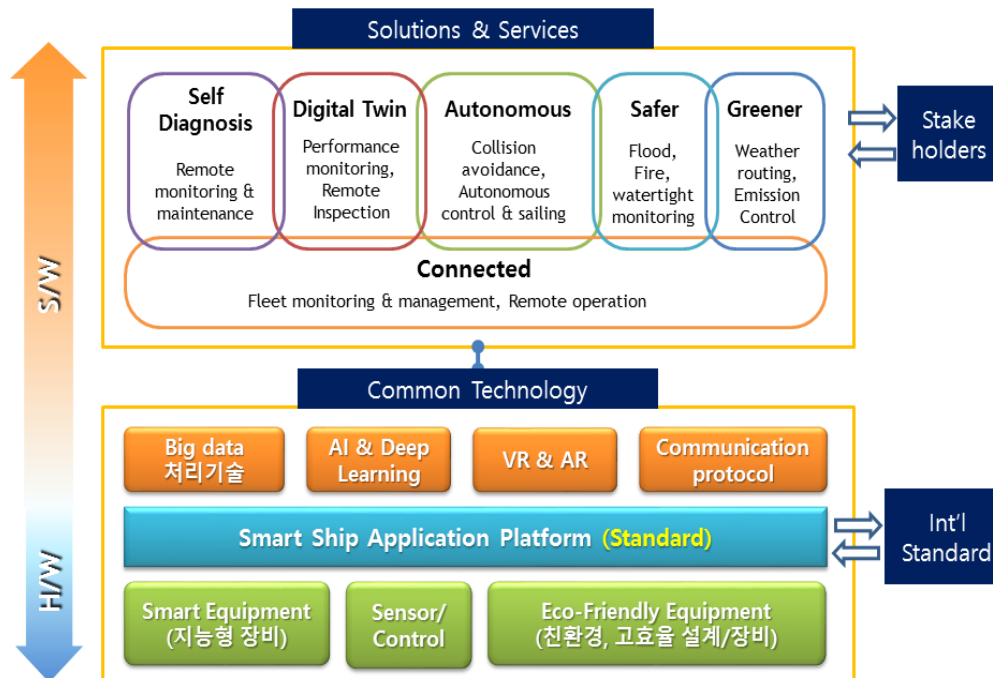
- KMOU has two training ships (about 100 m, 250 persons)
- Various types of digitalized data and used for many projects
- Located in near Busan Port and its own port



Current Activitis

• Government •

- MOTIE (Ministry of Trade, Industry and Energy)
 - Launched initial AI-based Autonomous Ship Project in 2017
 - Prepare the Autonomous Ship Project for 2,000 TEU container or bulk ship



Current Activities

• Government •

- MOF (Ministry of Fisheries)
 - Currently works on the e-navigation projects
 - MOF makes plan for the autonomous ship projects
 - MOF performs the evaluation of the effect on the technology, society and environment of the autonomous ship
- MSIP (Ministry of Science and ICT)
 - Works on the autonomous services and ICT technology
 - Study on the technology and standards roadmap for autonomous ship
 - Launches the large scale research project for the smart mobility projects
 - Worked on maritime communication technology and infrastructure
 - work on the development of autonomous ship project

Current Activities

• KAUS •

- KAUS
 - Korea Autonomous and Unmanned Ship Forum
 - Organized by Kwangil Lee, KMOU
 - Participates from the research institute, academy, industry and government officials
 - Official web site is prepared (www.autonomous-ship.net)
 - Will be publicly available in late Nov. or Dec, 2017

Conclusion

- Conclusion
 - Korea has many large ship building companies
 - Several maritime ICT Projects are undergoing for autonomous ship
 - Korea are ready to start several autonomous ship projects
 - Has a good environment for the test-bed and the evaluation (KMOU)
 - Ready for an autonomous forum in Korea
- Comments
 - Korea has an interest on international collaborations and test-beds
 - Contribute to the international regulations, standards and technology
 - Ready to participate and contribute to the international Autonomous ship forum

Thank You