



2018 Korean–Hellenic
Maritime Cooperation Forum at Posidonia

Korean Smart Ship Technology

6th June 2018

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1. Background
2. Smart Ship Technology in Korea
3. Autonomous Ship
4. Smart Shipyard



1. Background : Why is Smart ship ?

The paradigm is changing !

Next generation Ship
Smart ship

Cargo



Environmental issue

~1960

Beginning



Cargo



Environmental issue

~ 2010

Conventional
ship



Cargo



Environmental issue

2010 ~

Eco/green
Ship



Cargo



Environmental issue

2015 ~

Smart Ship



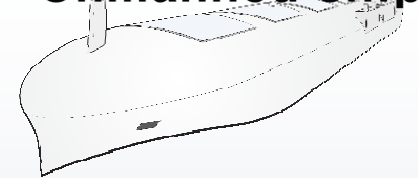
Cargo



Environmental issue

2030~

Unmanned ship



1. Background : What is Smart ship ?

Main functions



Smart
Connectivity



Smart Control



Efficient
Energy



Smart
Maintenance



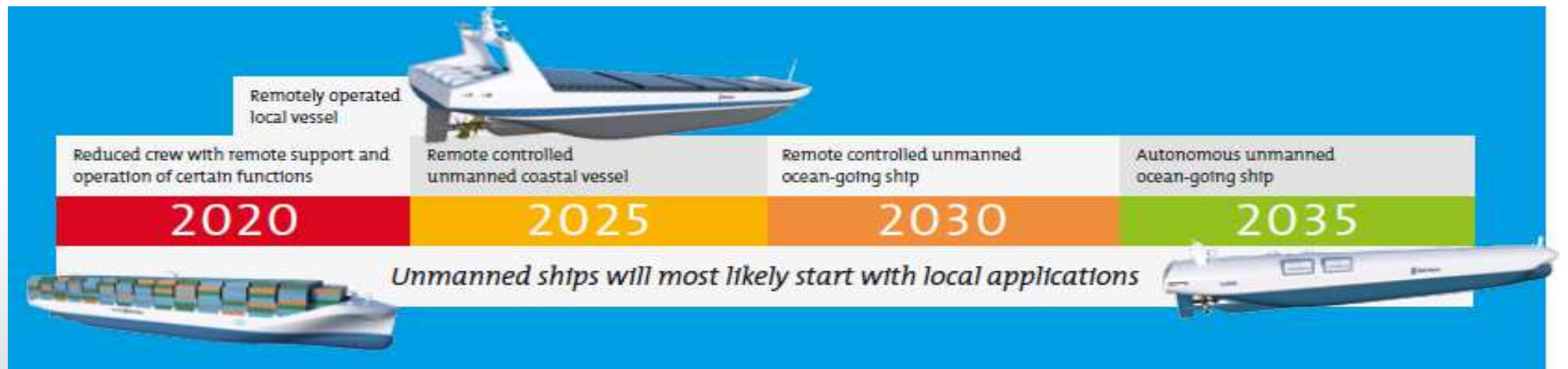
Self Diagnostics
& Safe



Autonomous
Navigation

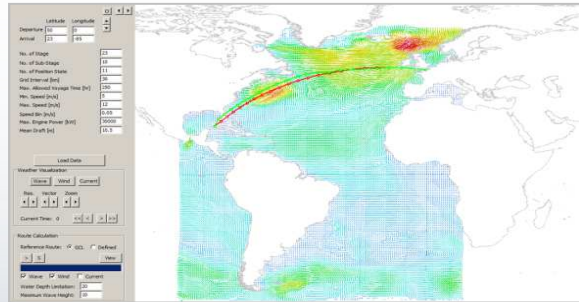


(from Rolls Royce)



(from Rolls Royce)

2. Smart Ship Technology in Korea

Shipyard	Technology
	<p>➤ INTEGRICT smart ship solution</p> <ul style="list-style-type: none"> - Dashboard and Energy Flow Monitoring - Weather Routing and Trim Optimization - Machinery Condition Monitoring 
	<p>➤ INTELLIMAN smart ship solution</p> <ul style="list-style-type: none"> - Monitoring energy consumptions - Cyber-securing data communication - Onshore monitoring & remote access 
	<p>➤ SMART SHIP solution</p> <ul style="list-style-type: none"> - Autonomous navigation system - DSME smart ship platform - Optimal navigation system 

2. Smart Ship Technology in Korea

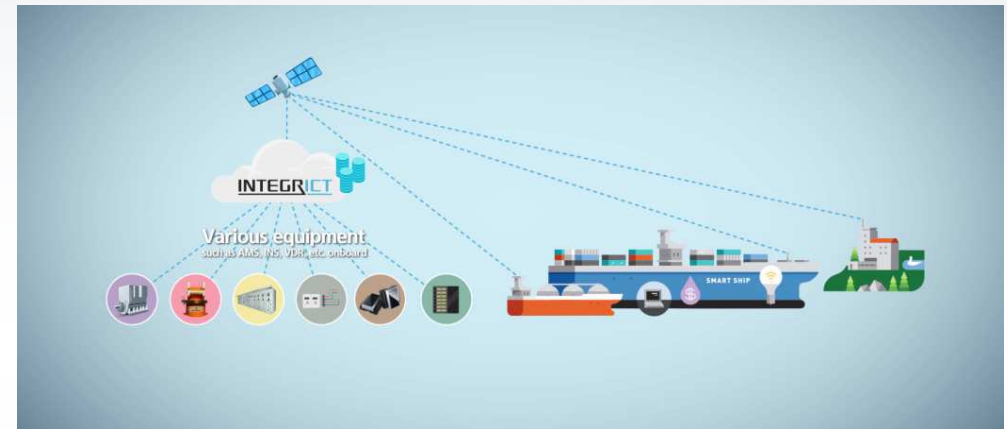
HHI INTEGRICT

Smart ship Solution (ISS)

- ❖ Strong Point(Contracted over 60 vessels, 2017~2018)
 - Insight based on Domain Knowledge as a Shipbuilder
 - Integrated Monitoring and Efficient Operation Guide based on ICT Platform

Smart ship Solution

Smart Ship Solutions is the next-generation solution service that uses an ICT platform to connect all systems and devices on board to support integrated monitoring/control and safe, energy-efficient operation and management.



Economical operation



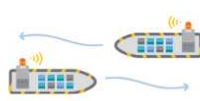
Propulsion system monitoring analysis



Remote maintenance



Power system monitoring analysis



Safe operation



Asset management service

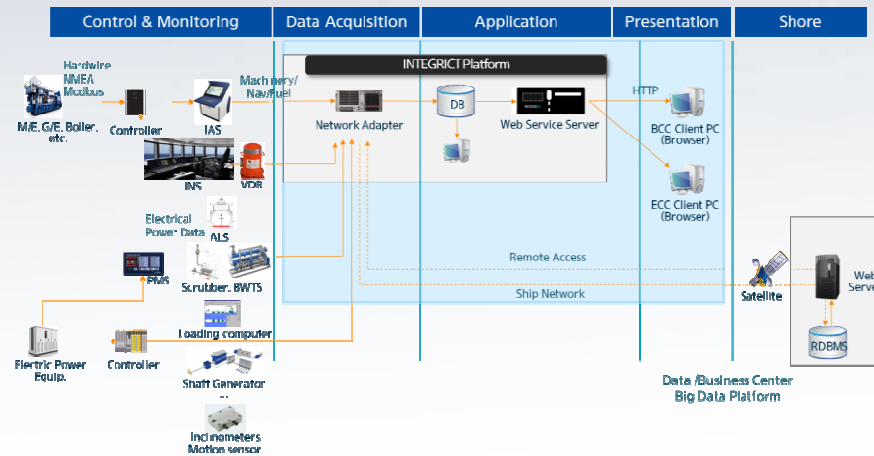


2. Smart Ship Technology in Korea

HHI INTEGRICT

System Layout and Main Functions

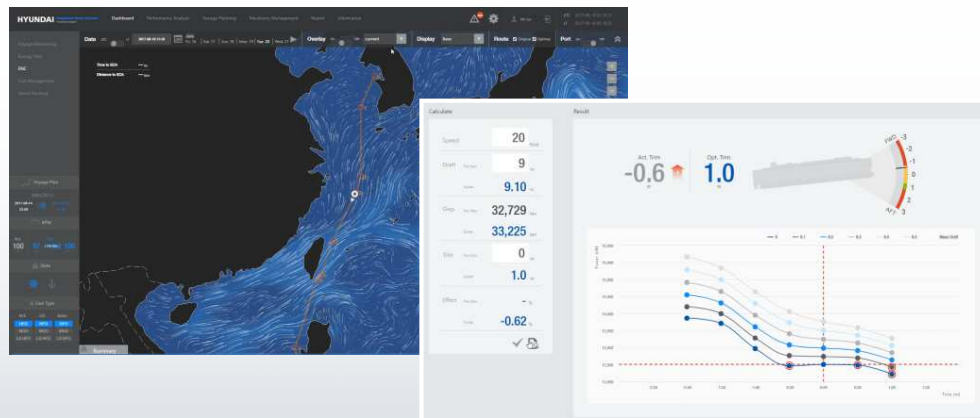
➤ System Layout



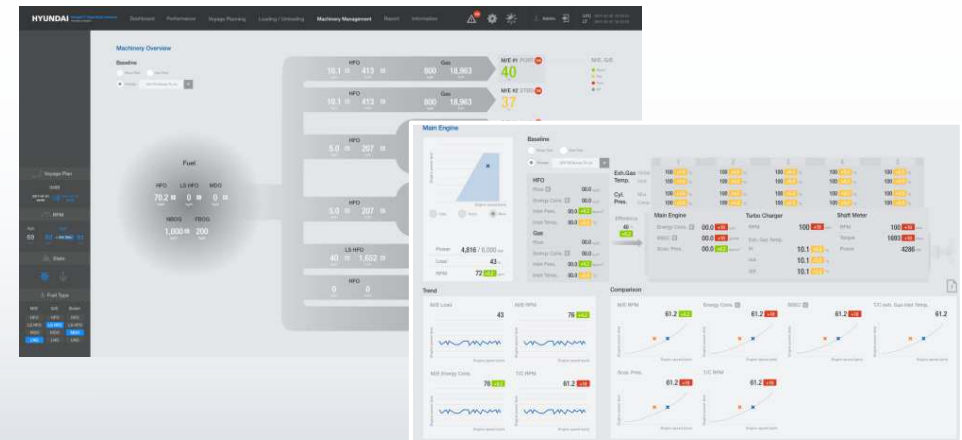
➤ Dashboard and Energy Flow Monitoring



➤ Weather Routing and Trim Optimization



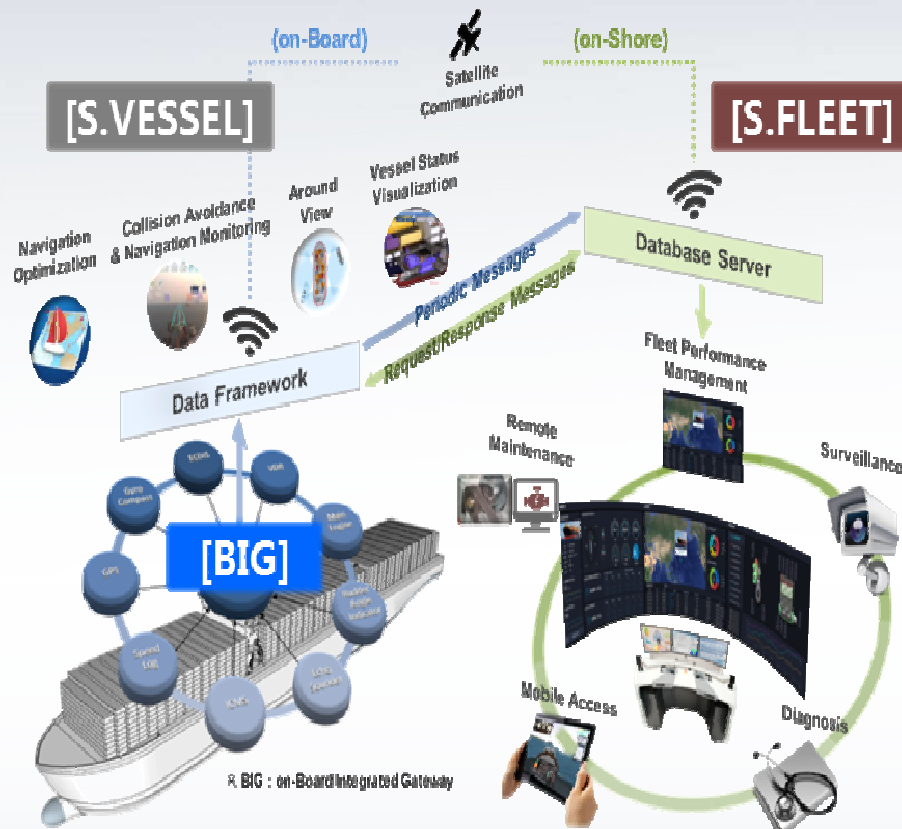
➤ Machinery Condition Monitoring



2. Smart Ship Technology in Korea

SHI INTELLIMAN

Intelligent & Lifecycle-Managed Ship to enhance operational efficiency & safety



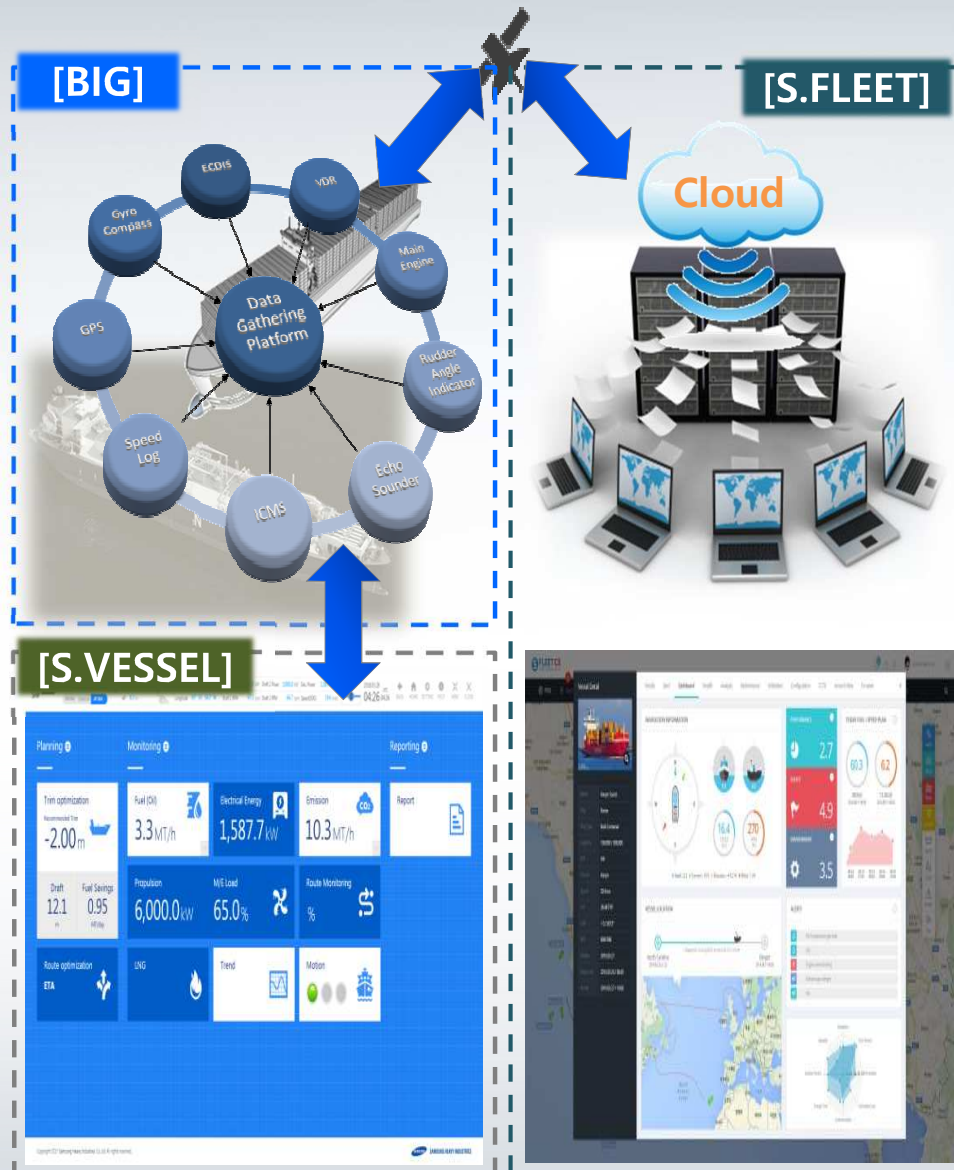
- **BIG:** Data gathering & communication
- **S.VESSEL:** Onboard solutions
- **S. FLEET:** Onshore solutions

- ① **Monitoring energy consumptions** ※ SEEMP Guide
 - FOC, Emission, Machinery, Energy Management
- ② **Reducing operational costs thru. 'optimized voyage & safe operation guide'**
 - Trim, Route & Speed optimization
- ③ **Cyber-securing data communication**
 - Class Cyber Security Approval ※ From ABS, At Mar. 2018
- ④ **Providing automated & eco-friendly reporting**
 - Standard daily report, MRV solution
- ⑤ **Reinforcing safe voyage managements**
 - Motion risk assessment, Vision solution
- ⑥ **Enabling onshore monitoring & remote access**
 - Fleet management, Digitalized A/S service etc.

2. Smart Ship Technology in Korea

SHI INTELLIMAN

Each function & full system has been verified



2013

Ship monitoring product released

- En-Saver : Monitoring Trim/Route optimization (Installed over 60 vessels)

2015~16

INTELLIMAN ship function test completed

- 4 container vessels
- BIG system test completed
- S.VESSEL & S. FLEET basic performance proved

2017

Entire system tested & validated

- BIG – S.VESSEL – S.FLEET fully connected
- 6 container vessels (21K TEU)
- 2 LNG carriers (174K)
- Cloud-based data center operation

2018

Advanced solutions planned

- Cargo handling functions, AR-based Vision etc.
- Data analytic solution service

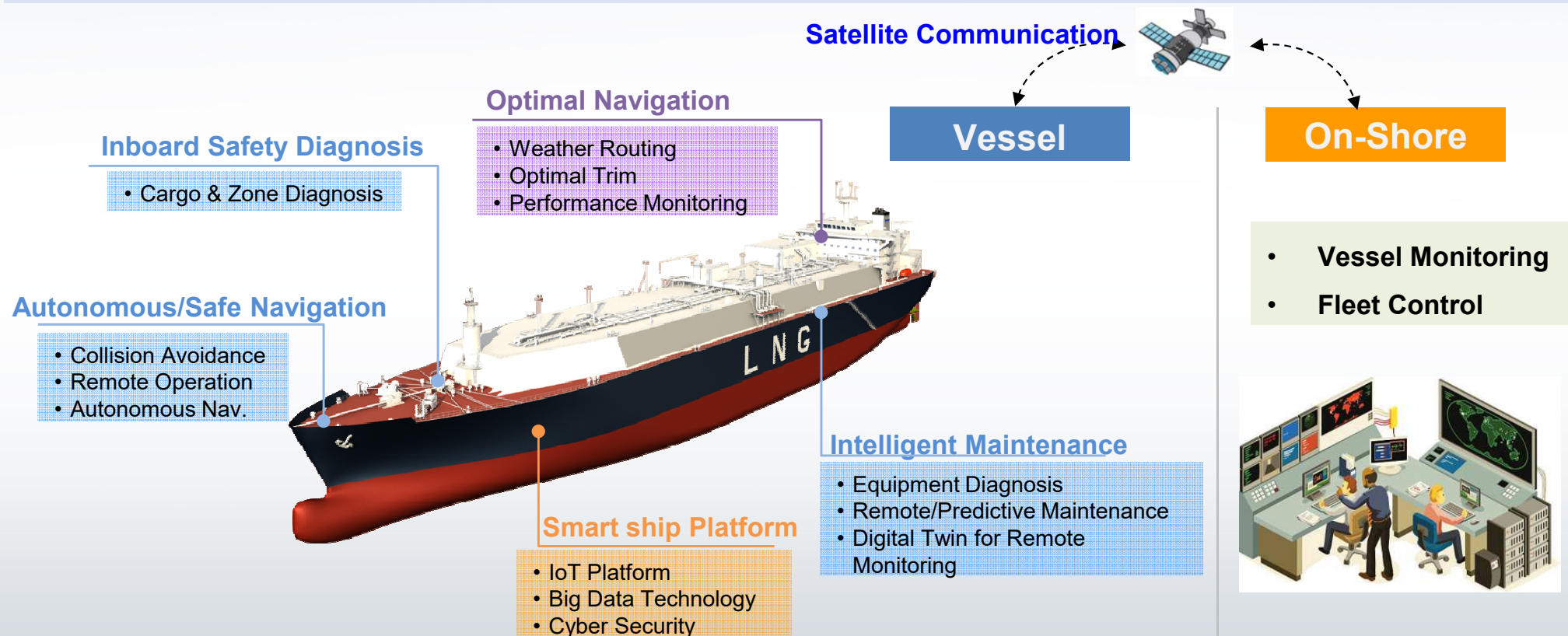


※ New 23K TEU 6-Container vessels scheduled

2. Smart Ship Technology in Korea

DSME SMART SHIP

- “**Economic, Safe, Transparent, and Convenient**” Vessel based on State-of-the-art IT Tech.
- “**Innovative**” Vessel to Create New Value through Data Connection between owner, charterer and equipment supplier
- Stepwise application of autonomous technology to ocean going vessel [**Innovative vessel design concept**]



R&D activities have been undergoing for the development of DSME Smart ship.

-

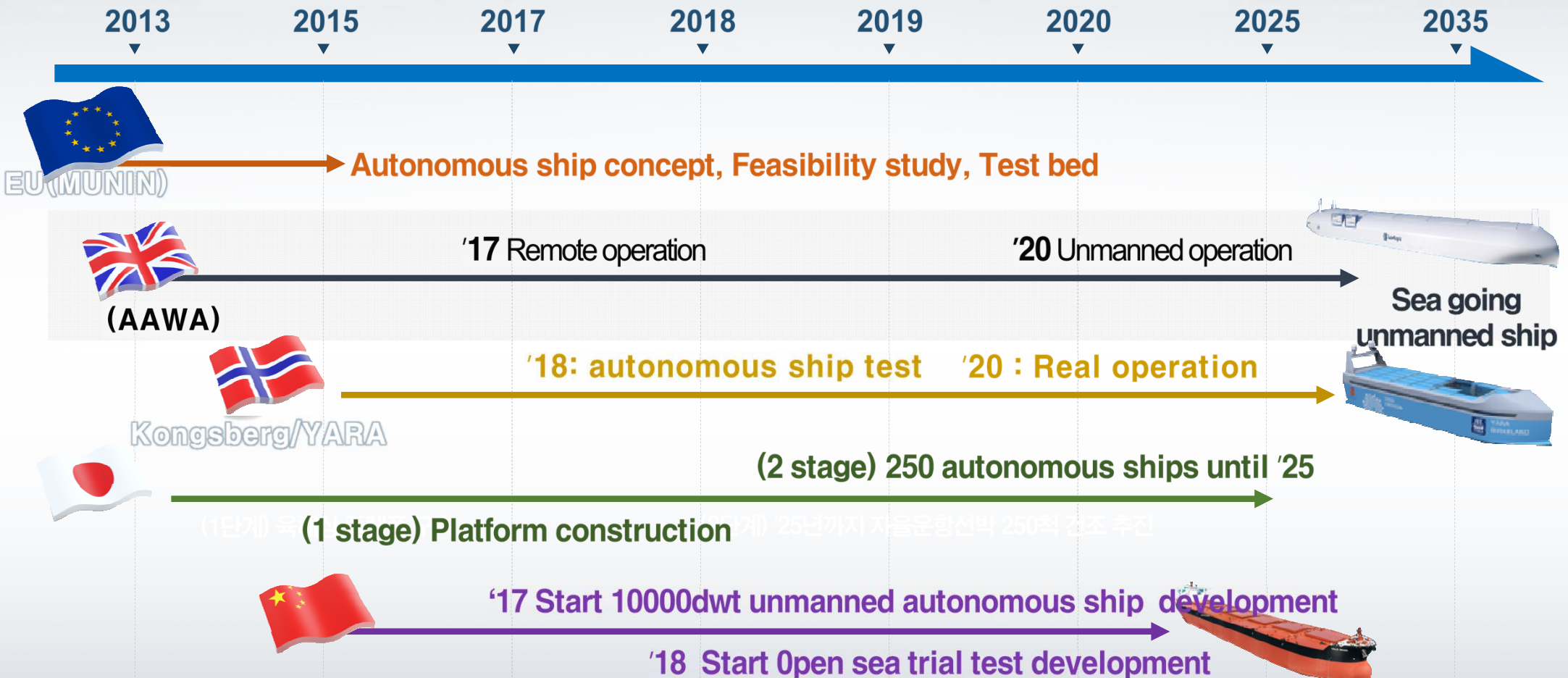
-
- The screenshot displays the FVCOM GUI interface. On the left, there are input fields for 'Latitude' (40), 'Longitude' (-70), 'Distance' (10), and 'Area' (10). Below these are checkboxes for 'No. of Stages', 'No. of Sub-Stages', 'No. of Water Vectors', 'Grid Interval [m]', 'No. of Horizontal Layers', 'No. of Vertical Layers', 'Max. Speed [m/s]', 'Max. Depth [m]', 'Max. Angle [deg]', and 'Max. Angle [deg]'. A 'Load Data' button is present. The main window shows a map of the North Atlantic with a color-coded bathymetry overlay. A color bar on the right indicates the depth scale from 0 to -10000 meters. The map shows the coastline of North America and Europe, with bathymetry ranging from 0 to -10000 meters. A color bar on the right indicates the depth scale. The GUI includes various input fields for simulation parameters and a 'Load Data' button.

- 11

3. Autonomous ship : Definition

Maritime Autonomous Surface Ship

MASS could include ships with different levels of automation, **from partially automated systems** that assist the human crew **to fully autonomous systems** which are able to undertake all aspects of a ships' operation without the need for human intervention. (From IMO)



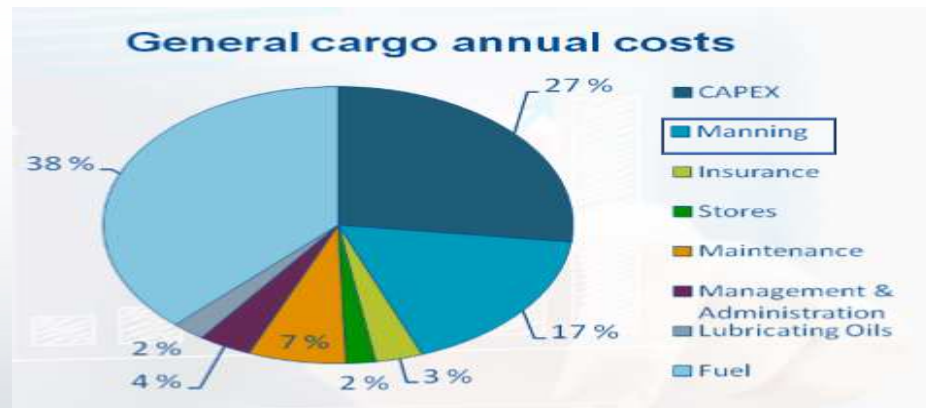
3. Autonomous ship : Benifits



Fuel	Bunker C (25ton/day)	LNG fuelled driven
Cargo cap.	3,000TEU	3,100TEU deckhouse variation
Maintenance	Abt. 1.0~2.0 million USD/y	Abt. 1.5~2.5 million USD/y
Labor cost	Abt. 28 million USD/20y	Abt. 7,2 million USD/20y
Insurance		Hull : 10~20% increase Crew : 60% decrease

OPEX 10~20% reduction

From Korean ship owner' s internal data (2017) & YARA project



From Rolls Royce

3. Autonomous ship Plan : Korea

- Smart Autonomous Ship Development project
- Duration : 2019 ~ 2024
- Participants : Universities, Classification, Shipyards, Owners etc
- Achievements :
 - . 1700TEU Container ship(LNG fuelled, 4 crews ready)
 - . Sea trial center

Smart autonomous ship



- Autonomous operation
- Economic operation
- Safety operation
- Intelligent maintenance

Sea trial Centre



- Collision avoidance
- Cyber security
- Communication/Remote control
- Equipment monitoring

4. Smart Shipyard



Thank you.