Towards autonomous ships

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Disruptive change
Digitalization – Disruptive change

Internet of Things

Industry 4.0

Big Data
Digitalization in marine market

The dawn of the Ship Intelligence era
What is Ship intelligence

- Asset management
- Optimisation & decision support
- Remote & Autonomous operations

Enabling technologies

- Object detection
- Internet of things
- Satellite communications
- Big data
- Automation & robotics
- Applications & cloud
Shipping trends - Operation

Integrated part of supply chains
Shipping trends - Management

Asset management

Health management
Integrating ship and shore
Shipping trends - Business

Consolidation

New Players & Digital alliance
New roles in shipping?

Owning

Running the business

Managing
Shipping trends - Construction

System Integrator

Shipyard consolidations
Shipping trends - Construction
Goals of ship intelligence

- Efficient and safe operations
- Integrated transport systems
- Transparent business performance
- Automated and Streamlined functions
- Data to value
- Health and performance
- Personnel management
Unmanned vessels
Unmanned trend in society

It is not IF, but WHEN…
Why Unmanned
Cost structure

General cargo annual costs

- CAPEX: 27%
- Manning: 38%
- Insurance: 7%
- Stores: 2%
- Maintenance: 4%
- Management & Administration: 17%
- Lubricating Oils: 2%
- Fuel: 3%
Remote controlled ships - Features

- More cargo
- Lower power demand
- No deck house
- No hotel systems
- Redundant machinery
Energy reduction

Lower operating speed?

Lower weight: 700 – 1 000 ton

Wind resistance: ~1% saving

Reduced hotel load: 200 – 270 kW

- 10-15%
Cost - Transport

20 000 dwt general cargo vessel

Transport cost (cost / ton * nm)

Conventional

Unmanned

-22%

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Safety

- Safer than before
- Fewer accidents
- No piracy victims
- Human error factor
- Humans away from danger
What is safe?
Cyber security
Remote and autonomous operation
Remote and autonomous operation
Remote control in port
Communication
Leading the development
Development areas

- Cyber Security
- Remote control center
- Remote controlled systems
- Health & safety management
- Communications
- Operation optimization
- Situational awareness systems

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Rules and Regulations

DNV·GL

IMO

Lloyd’s Register

SOLAS
Legal aspects

Marine liability

Product liability
Unmanned ships will start with local applications!

- **2020**: Reduced crew
  - Remotely operated local vessel

- **2025**: Remote controlled unmanned coastal vessel
  - Remote/autonomous unmanned ocean going ship

- **2030**: Fully autonomous ocean going ship

- **2035**: Further advancements in unmanned shipping technology
First movers
First movers
The dawn of the ship intelligence era
"The best way to predict the future is to create the future."