The road towards autonomous shipping

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The Road towards Autonomous Shipping

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Trusted to deliver excellence

Disruptive change
Digitalisation – disruptive change

Change driven by digitalization
Integrated operation

Integrated part of supply chain and end customer process

New roles in shipping?

Investors

Digital market place

Asset management
Digital management

“Total awareness”

Power by the hour

Intelligent asset management

Remote assistance

Remote operations center
Remote and autonomous shipping

Safety

Safer than before
Fewer accidents
No piracy victims
Human error factor
Humans away from danger
**Cost - transport**

20 000 dwt general cargo vessel

Transport cost (cost / ton * nm)

- **Conventional**
- **Unmanned**

![Graph showing cost vs speed for conventional and unmanned vessels](image)

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**Remote & autonomous ships**

- **More cargo**
- **Lower power demand**
- **No hotel systems**
- **No deck house**
- **Increased automation and sensors**

![Image of remote & autonomous ships](image)

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Energy reduction

Lower weight: 700 – 1,000 ton
Wind resistance: ~1% saving
Reduced hotel load: 200 – 270 kW
10-15% fuel savings

The evolution of unmanned vessels

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Remote and autonomous operation

Fully autonomous or manning onboard?
## R&A markets vs ship segments

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<th>R&amp;A technology</th>
<th>Low manning</th>
<th>Unmanned</th>
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## Roadmap towards autonomous shipping

**2015**
- Remote support and situational awareness

**2020**
- Remote controlled and autonomous offshore vessels

**2025**
- Remotely operated local vessel
- Autonomous ocean going cargo vessels

**2030**
- Autonomous ships will start with local applications!
World’s first remotely controlled commercial tug

RR/Svitzer
Remote Controlled Tug Demo

Remote operation station
Situational awareness

Enhancing safety through intelligent data fusion

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Autonomous ships will start with local applications!

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R&A ships – first movers

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First automatic control systems to Fjord1

- The automatic crossing system ensures safe and energy efficient transit by automatically controlling the vessel’s acceleration, deceleration, speed and track.
- The captain will supervise the system, and intervene if needed
- The vessels are due for delivery in 2017

Autonomous

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Re-design of conventional vessel or totally new ship type?

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Autonomous supply vessel drone

ROV with autonomous surface vessel
Changing shipping scene

Technical development  Logistic development  Cost  Environmental regulations

What is the right investment decision today?

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Low cost smart shipping

Cost is focus  Leasing schemes  Low onboard manning  Ship intelligence (new way of operating)

Low emissions  New standardised fuel efficient ships  Point-to-point routes  Digital market places and IoT - “Uber of the sea”

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New business models - disruption

Existing shipping

Low cost, smart shipping

Towards zero emissions

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"Redefining shipping with innovation and design"