IVR Congress 2018

Safety at Sea in an Autonomous Era

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Chairman UK MASRWG

17th May 2018

UK Marine Industries Alliance

The Maritime Environment

UK Marine Industries Alliance

- **Life at sea is 3D**
  - **Above, On and Below the waves**
- **Well established order for:**
  - **Inland Waterways**
  - **Navigational safety**
  - **Air safety and airspace management**
  - **Water space management below the waves**
- **Maintaining the status quo wherever possible for all manned and unmanned craft using existing principles, laws, rules and regulations is critical.**
  - **Principle of 'Equivalence'**

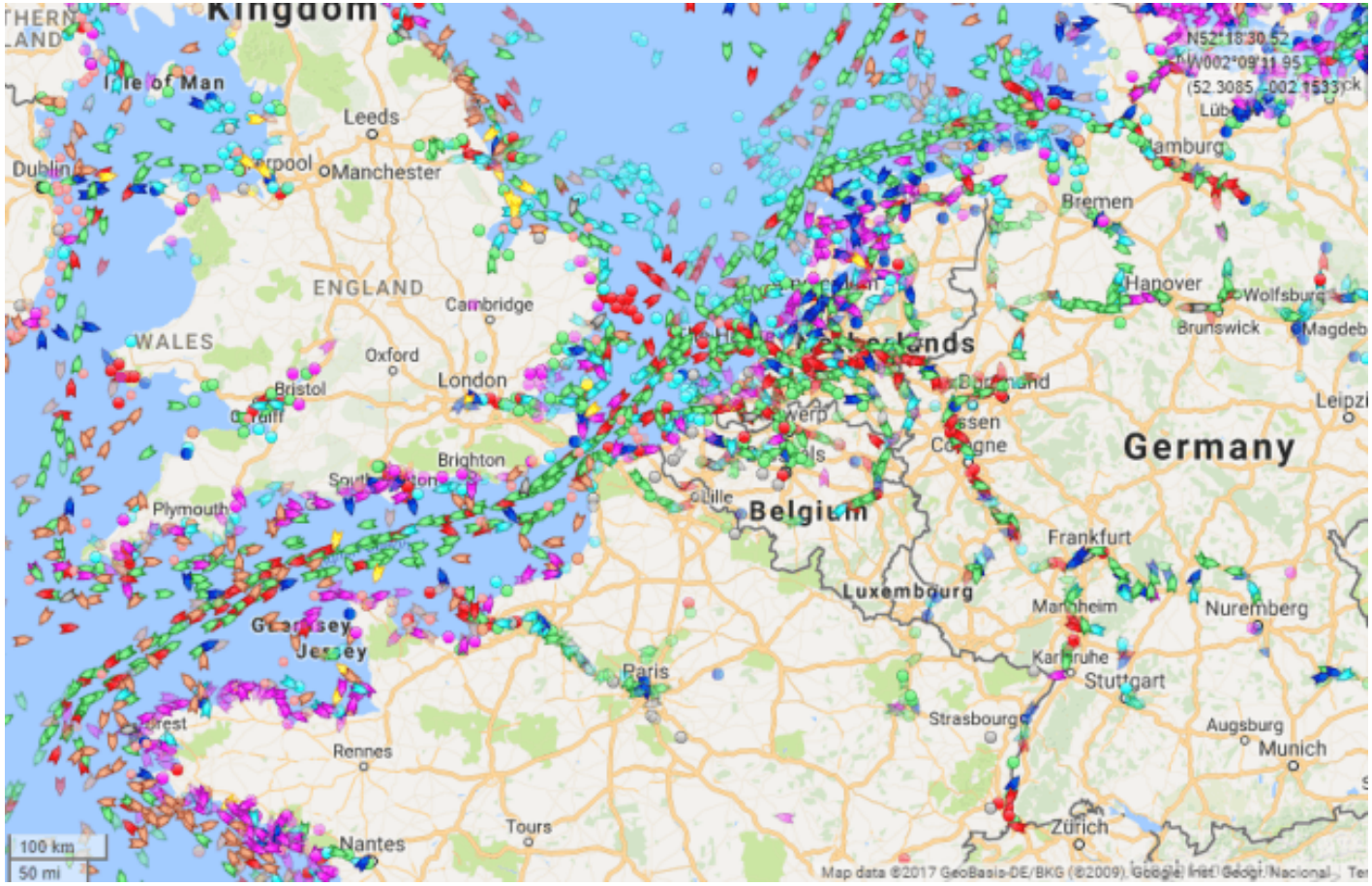
Life at sea is dangerous

HMY BRITANNIA

HERALD OF FREE ENTERPRISE

HMS CLEOPATRA

Maritime Traffic



Maritime Accidents

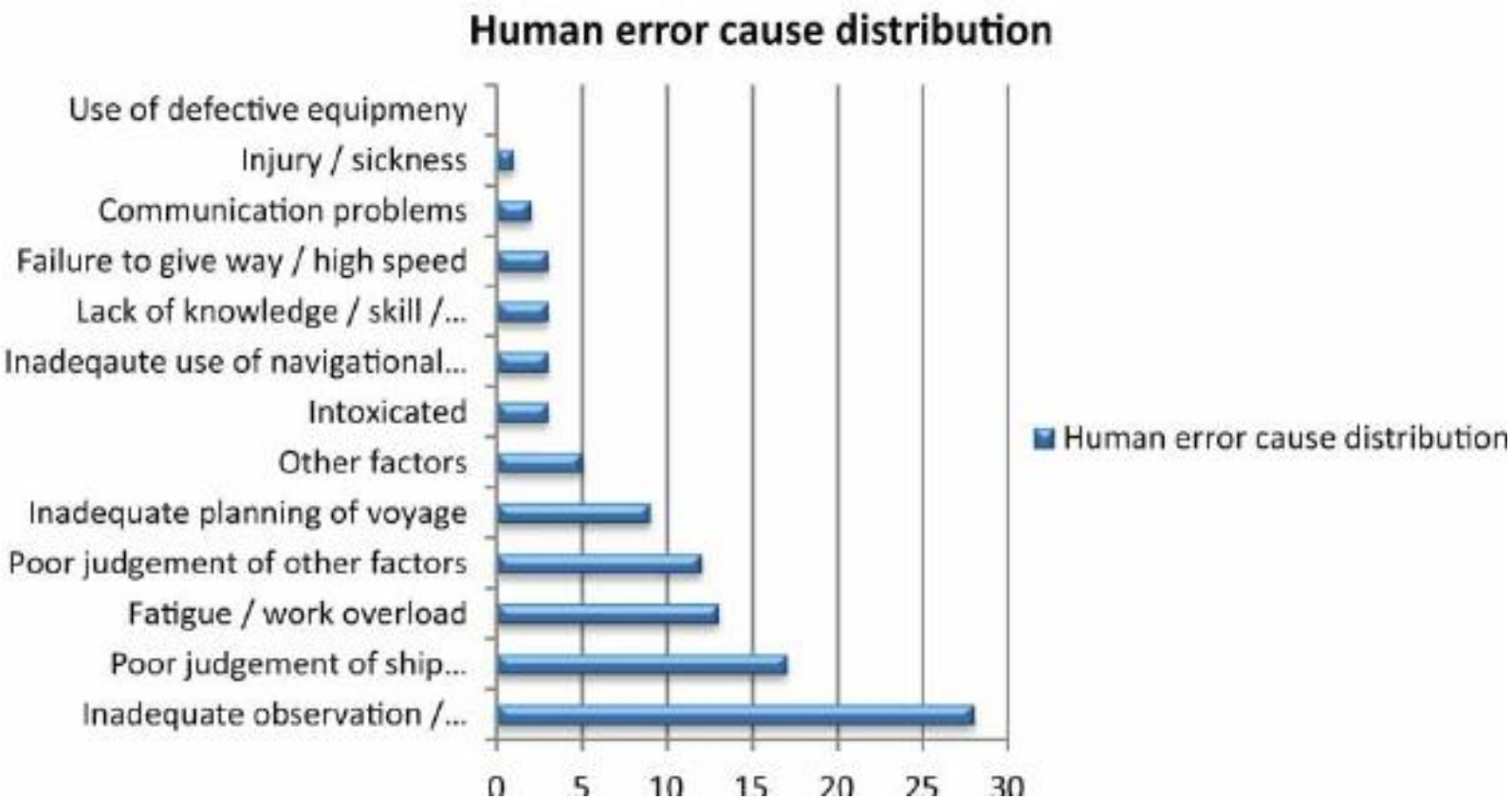
OCEAN BREEZE 2012

SANCHI 2018

About 75-96% of marine casualties are caused, at least in part, by some form of human error. Studies have shown that human error contributes to:

- 84 - 88% of tanker accidents
- 79% of towing vessel groundings
- 89 - 96% of collisions
- 75% of allisions
- 75% of fires and explosions

Maritime Accidents



Source: International Maritime Organization, International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, International Maritime Organization, London, 2011, p. 30.

Maritime Autonomous Systems

- **Commercial operations**
- **Inland Waterways**
- **Oil and Gas**
- **Marine Scientific Research**
  - **Marine Survey**
  - **Oceanography**
  - **Passive acoustic monitoring**
  - **Offshore research**
  - **Deep sea mining**
  - **Fishing and aquaculture**
- **Underwater asset management**
- **Defence operations**
- **Maritime and Border Security**
- **Communications Relay (e.g. SAR)**

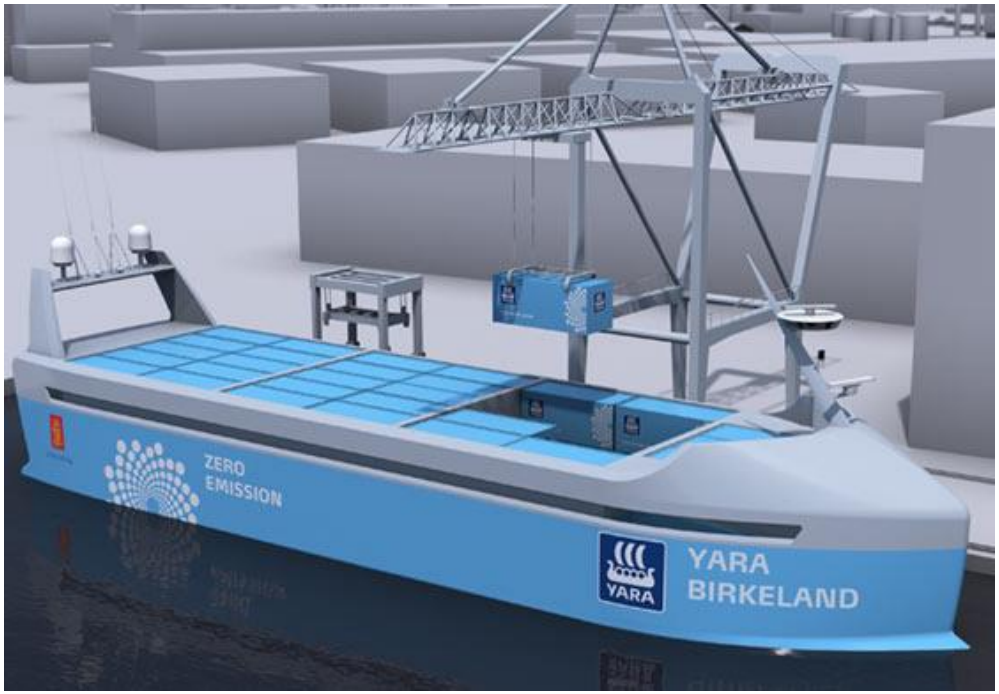
Maritime Autonomous Surface Ships (MASS)

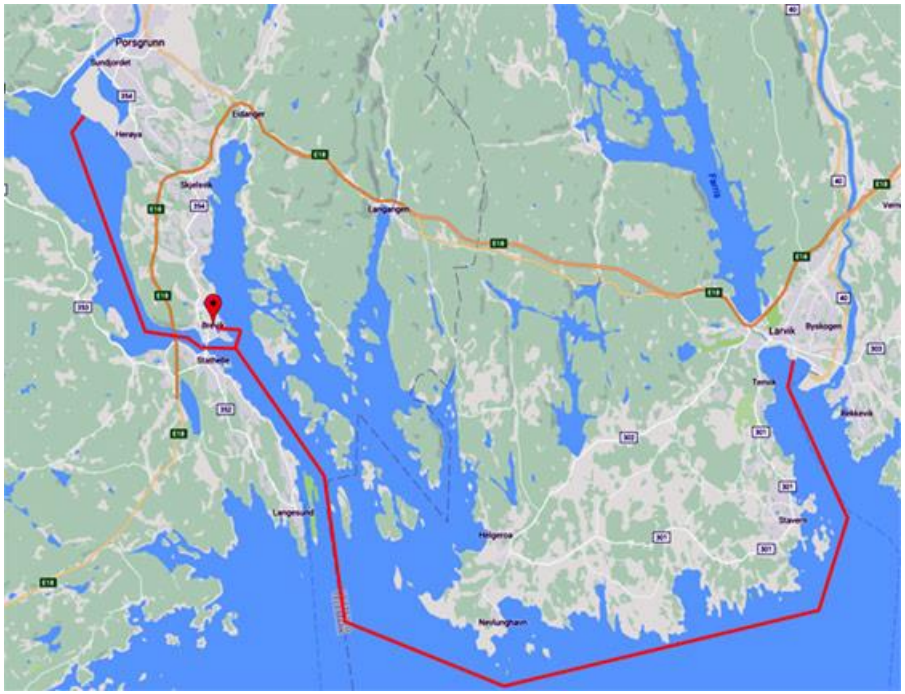
AutoNaut

SEA-KIT International

ASV C-Sweep

Yara Birkeland





- **LOA**: 80 m **Beam**:15 m **Depth**: 12 m
- **Draught (full)**: 5 m **Draught (ballast)**: 3 m
- **Service speed**: 6 knots **Max speed**: 10 knots

Capacity

- **Cargo capacity**: 120 TEU **Deadweight**: 3 200 mt

Propulsion

- **Propulsion system**: Electric **Propellers**: 2 Azimuth pods
- **Thrusters**: 2 Tunnel thruster **Battery pack**: 7,5 – 9 MWh

KONGSBERG

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ASV Base Control Station

Unmanned Underwater Vehicles operated from a MASS

SEA-KIT with embarked Hugin UUV

Unmanned Air Systems at Sea

MASS Safety

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- **Responsible Ownership**
- **Safe Operation**
- **Recognised Accreditation, Training and Standards**
- **Effective Integration into the Maritime domain**

MASS Regulation Challenges

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- **Harmonised Definitions**
- **Application**
- **Common Standards**
- **International Consensus**
- **Flexibility, Innovations & Mutual Trust**
- **Legal Precedents**
- **Education of Mariners**

Industry Codes

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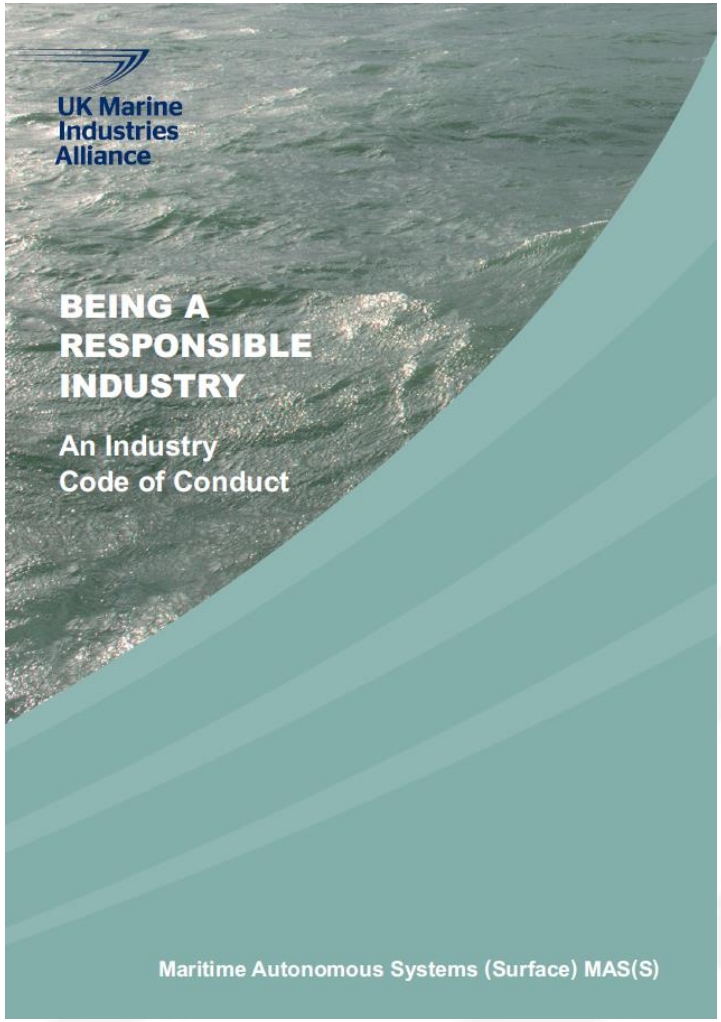
- **Pan industry agreement on aspects of MASS development, design, production and operation**
- **Best practice**
- **Assurance**
- **Safety and professionalism**
- **Training, conduct and personal responsibility**
- **Compliance and self-regulation**
- **Improved communications within the industry and the wider maritime community**

Codes of Conduct & Practice



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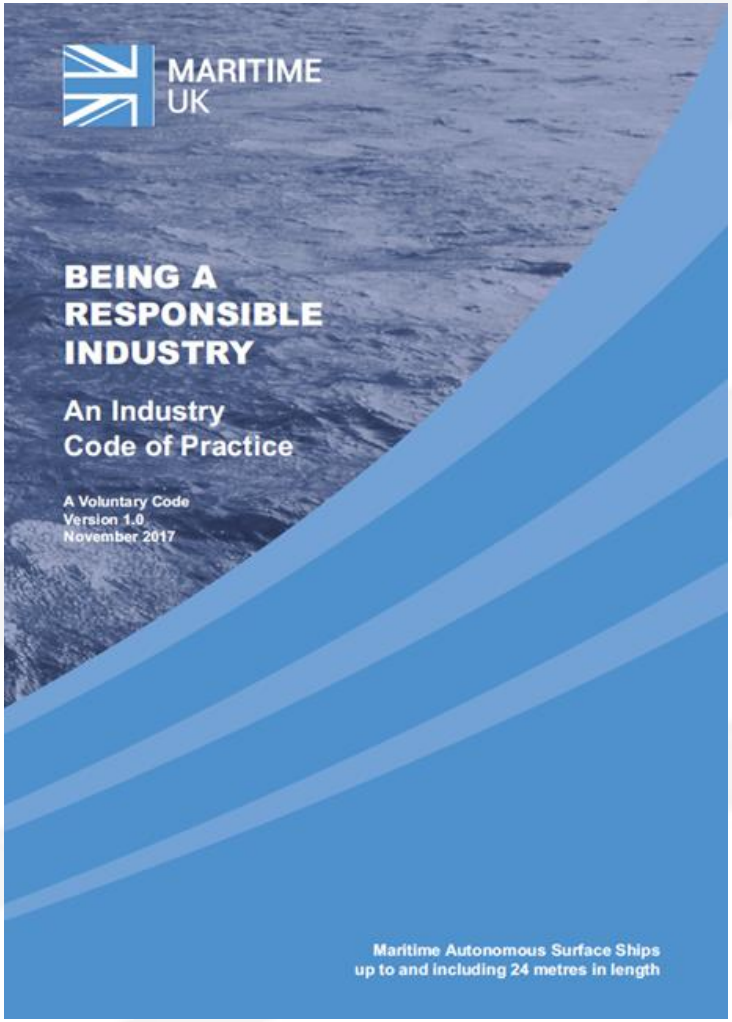

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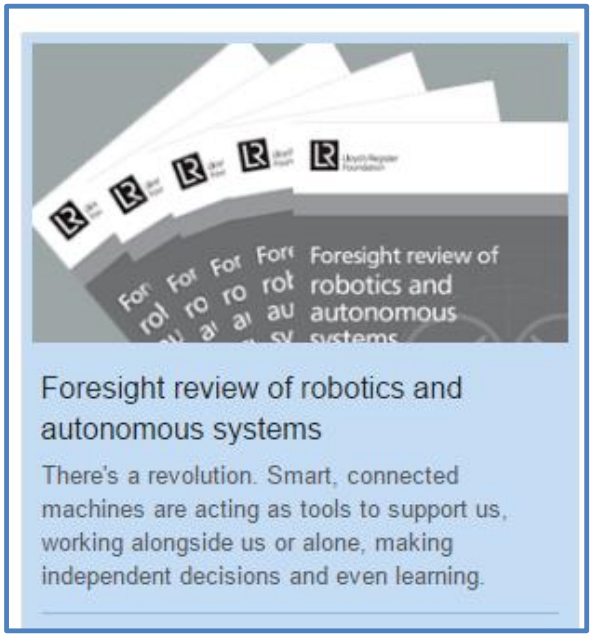
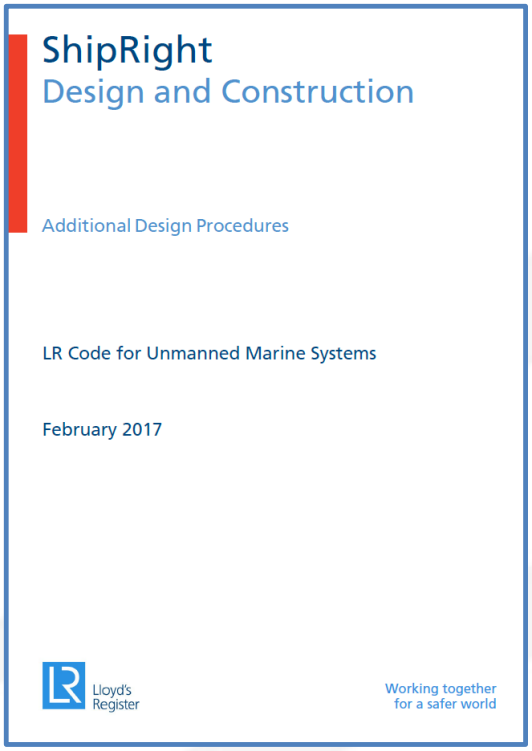
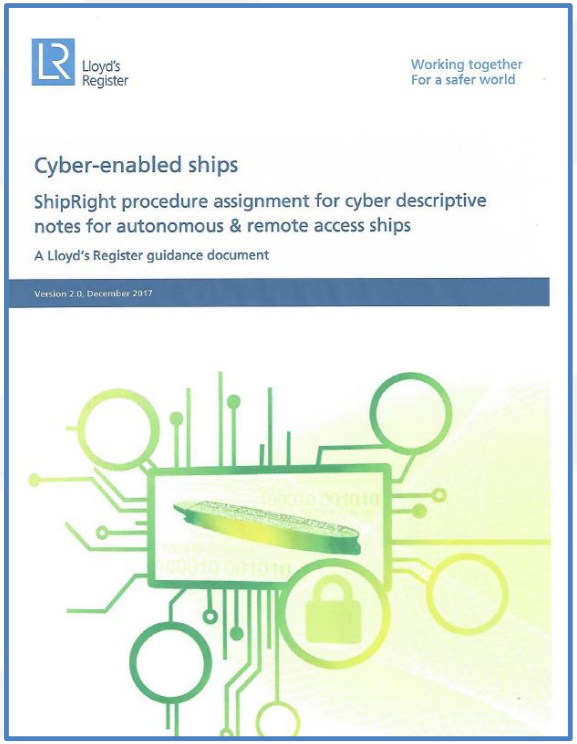
Lloyds Register

UK Marine Industries Alliance





www.lr.org/cyber



International Regulation

UK Marine Industries Alliance

- **IMO Instruments**
  - **International Regulations for the Prevention of Collisions at Sea (COLREGS)**
  - **Marine Pollution (MARPOL)**
  - **Safety of Life at Sea (SOLAS)**
  - **Standards of Training Certification and Watchkeeping (STCW)**
- **MASRWG IMO Interaction**
  - **Short INF Paper – MSC 95, June 2015**
  - **IMO lunchtime brief – MSC 96, May 2016**
  - **Proposal for a Scoping Exercise at MSC 98 by the MCA - June 2017**
  - **MSC 99 – May 2018**
- **MASRWG Links with International Partners and Organisations**

UK Marine Industries Alliance

Discussion

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