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Maritime Law Association of the United States – 2017 Fall Meeting

International Organizations, Conventions, and Standards (IOCS) Committee

Autonomous Vessels – Key Legal Considerations

Napa, CA October 19, 2017

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Disclaimer: The information contained herein is abridged and summarized from numerous sources, the accuracy and completeness of which cannot be assured. This should not be construed as legal advice or opinion and is not a substitute for the advice of counsel.

The Issue

- Marine casualties = 96% Human error
- Seafarers = 44% vessel operating costs (wages, litigation, personal injury)
- Space otherwise be used for cargo
  - Crew quarters
  - Air-conditioning/heating, plumbing/piping
  - Bridge, Galley
  - No ballast
  - Other “hotel” amenities
- Maritime shipping = 2.5 percent of global greenhouse-gas emissions
- Potential seafarer shortages
- Tedious and dangerous maritime activities (oil spill response)
  - Dull, dirty, dangerous operations

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Threshold Questions

1. What type of “vessel”?
2. What level of autonomy?
3. Where is it operating?

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Autonomy in Vessel Operations

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Nomenclature

- **Unmanned Surface Vessels (USV)**
- Maritime Autonomous Surface Ships (MASS)
- Autonomous Surface Vehicles (ASV)
- Unmanned Maritime/Marine System (UMS)
- Unmanned Underwater/Undersea Vehicles (UUV)
- Unmanned Maritime Vehicles (UMV)
- Remotely Operated Vehicles (ROV)

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Courtesy of: Automated Ships Ltd and KONGSBERG to build first unmanned and fully-automated vessel for offshore operations, https://www.km.kongsberg.com/ks/web/nokbg0238.nsf/AllWeb/E8B6697288D25FAC125805E00281D507OpenDocument

Courtesy of: World's First Official Test Bed for Autonomous Shipping Opens in Norway, https://www.km.kongsberg.com/ks/web/nokbg0238.nsf/AllWeb/166309633E206651C1258042002509517OpenDocument

Courtesy of: Sea Machines, http://www.sea-machines.com/resources/Sea_Machines_V2_USV.pdf

Courtesy of: Robert Allan Ltd, Remotely Operated Vessels, RAmora series tug, http://ral.ca/series/ramora/

Courtesy of: Rolls Royce, Ship intelligence
Transforming future marine operationshttps://www.rolls-royce.com/~/media/Files/R/Rolls-Royce/documents/customers/marine/ship-intel-160

https://www.thetimes.co.uk/article/rules-of-the-sea-rewritten-to-let-unmanned-ghost-cargo-ships-set-sail-507b5rbpq

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Levels of Automation in Navigation

- Manual: No autonomous function
- Automatic Course Steering (Autopilot)
- On-board Decision-support (AL 1)
- On- & Off-board Decision Support (AL 2)
- 'Active' Human in the loop (AL 3)
- Human on the loop, Operator/ Supervisory (AL 4)
- Fully autonomous: Rarely supervised (AL 5)
- Fully autonomous: Unsupervised (AL6)
- *LR Code for Unmanned Marine Systems*

Courtesy of Kongsber: https://www.km.kongsberg.com/ks/web/nokbg0238.nsf/AllWeb/98A8C576AEFC85AFC125811A0037F6C4?OpenDocument
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https://www.dnvgl.com/technology-innovation/revolt/index.html

Legal and Regulatory Considerations

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Legal challenges

- Definitions – Domestic and Int'l uniformity
- Standards – common and equivalent
- Case law undeveloped
- Insurance Coverage and P&I Clubs

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Key Legal Considerations

- "Vessel" – defined?
- Minimum Manning requirements
- Watchkeeping
- Rendering assistance obligation
- Master or Person-in-charge
- "Seafarer"
- Piracy
- Environmental response
- Exemptions or derogation

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Legal Landscape

- U.S. courts have not considered USV issues
- References to USV in U.S. cases (past 5 yrs): 0
  - No clear guidance from the courts
  - Existing cases provide imperfect analogies

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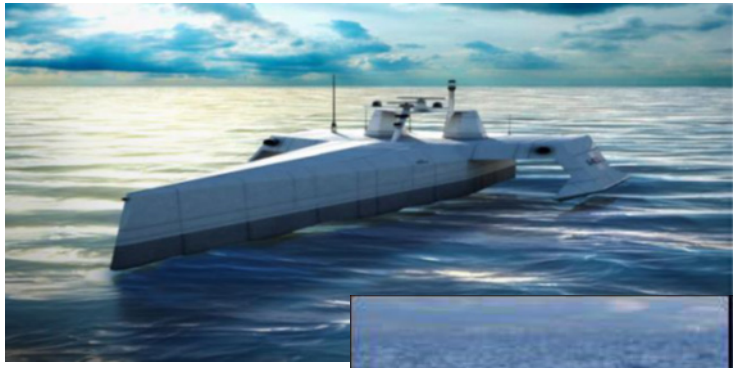
Courtesy of DNV GL

MARITIME

What are these?



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Key International Legal Instruments

- International Regulations for Preventing Collisions at Sea (**COLREGS**)

- International Convention for the Prevention of Pollution from Ships (**MARPOL**)

- International Convention for the Safety of Life at Sea (**SOLAS**)

- International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (**STCW**)

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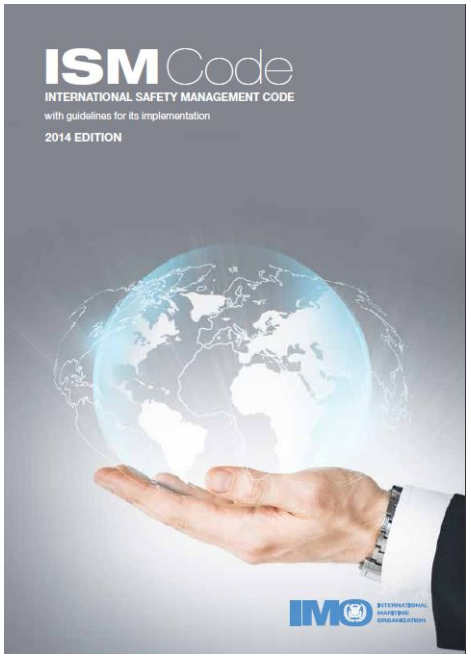
Key International Legal Instruments

- SAR Convention
- 1951 Convention on the Status of Refugees
- 2006 Labour Convention
- ISM Code



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Rules of the Road

- **Rule 5: Proper lookout**
  - sight and hearing
  - all available means
- **Rule 7: Risk of collision**
  - 12, 14, 15, 17, 18: identification of a risk of collision
- **Rule 8: Actions to avoid collision**
  - “vessels in sight of each other” (visual observation)
  - “restricted visibility”
- “Human” not specifically referenced

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What is a Vessel or Ship?
No universally accepted definition

- **1 U.S.C. §3**: "Every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water."
- **COLREGS (Rule 3):** "Every description of watercraft, including non-displacement craft and seaplanes, used or capable of being used as a means of transportation on water."

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What is a Vessel or Ship?
No universally accepted definition

- **1982 U.N. Convention on the Law of the Sea (LOSC):**
  - "Ship" or "vessel" undefined
  - Contemplates manned vessels only?
  - Government obligations?
  - Did drafters conceive USVs could or would exist?
- **London Dumping Convention:** vessel=waterborne craft
- **SUA Convention:** ship=any vessel, floating craft
- **MARPOL**: ship=any vessel, floating craft
- **Salvage Convention:** Vessel=any ship or craft, or any structure capable of navigation

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Options to defining operations

- New USV framework – create regs/law
  - How likely under current Administration? "Significant" rulemaking?
- Expand interpretations case-by-case
  - Will this work across the spectrum? Role of OCMI?
- U.S.: Mirror language used in Europe and IMO
  - What is the role of the United States?
- What is long term solution to integration?

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MLA Marine Torts & Casualties Committee CMI Questionnaire

- 1. Would a “cargo ship” in excess of 500 grt, without a master or crew onboard, controlled remotely by radio communication constitute a "ship" under US law?
- 2. Would a “cargo ship” in excess of 500 grt, without a master or crew onboard, which is controlled autonomously by, inter alia, a computerized collision avoidance system, without any human supervision constitute a “ship” under US law?
- 3. Under US general maritime law, do any of the following constitute the unmanned ship’s “master”? (select all that apply)
- 4. Could other remote-controllers constitute the "crew" for purposes of US law?
- 5. The International Convention on Standards of Training Certification and Watchkeeping, 1978 (STCW Convention) purports to apply to “seafarers serving on board seagoing ships”. Would the STCW Convention apply to a remotely controlled unmanned ship?
- 6. As interpreted under US law, for vessels in general, can the STCW requirement that the watchkeeping officers be physically present on the bridge and engine room control room be satisfied where the ship is remotely controlled?
- 7. If a ship usually operates with significantly reduced manning, can the STCW requirement that the watchkeeping officers be physically present on the bridge and engine room control room be satisfied where the ship is remotely controlled?
- 8. Suppose a “ship” was navigating autonomously, i.e. through an entirely computerized navigation / collision avoidance system, and the system malfunctions. The malfunction is the sole cause of collision damage. How should liability be apportioned between shipowner and the manufacturers of the autonomous system under US law?
- 9. Arts. 3 and 4 of the 1910 Collision Convention provide for liability in cases of fault. As interpreted under US law, does the fact that the non-liability situations listed in Art. 2 are not conversely linked to no-fault, leave room for the introduction of a no-fault (i.e. strict) liability (for e.g. unmanned ships) at the federal level?

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Current Endeavors

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IMO Regulatory Action - Scoping Exercise

IMO INTERNATIONAL MARITIME ORGANIZATION E

MARITIME SAFETY COMMITTEE
98th session
Agenda item 20

MSC 98/20/2
27 February 2017
Original: ENGLISH

WORK PROGRAMME

Maritime Autonomous Surface Ships
Proposal for a regulatory scoping exercise

Submitted by Denmark, Estonia, Finland, Japan, the Netherlands, Norway, the Republic of Korea, the United Kingdom and the United States

SUMMARY

Executive summary:	The use of Maritime Autonomous Surface Ships (MASS) creates the need for a regulatory framework for such ships and their interaction and co-existence with manned ships. This document invites the Committee to undertake a regulatory scoping exercise to establish the extent of the need to amend the regulatory framework to enable the safe, secure and environmental operation of MASS within the existing IMO instruments.
Strategic direction:	5.2 and 5.4
High-level action:	5.2.1, 5.2.2, 5.2.4 and 5.4.1
Output:	No related provisions
Action to be taken:	Paragraph 25
Related document:	MSC 95/INF.20

IMO INTERNATIONAL MARITIME ORGANIZATION E

MARITIME SAFETY COMMITTEE
98th session
Agenda item 20

MSC 98/20/1
13 April 2017
Original: ENGLISH

WORK PROGRAMME

Maritime Autonomous Surface Ships
Proposal for a regulatory scoping exercise

Comments on MSC 98/20/2

Submitted by the International Transport Workers' Federation (ITF)

SUMMARY

Executive summary:	This document provides comments on MSC 98/20/2, Maritime Autonomous Surface Ships and proposes expansion of the outputs to permit a broader examination of the issues
Strategic direction:	5.2 and 5.4
High-level action:	5.2.1, 5.2.2, 5.2.4 and 5.4.1
Output:	No related provisions
Action to be taken:	Paragraph 12
Related documents:	MSC 95/INF.20; resolution A.947(23) and LEG/MISC.8

IMO INTERNATIONAL MARITIME ORGANIZATION E

MARITIME SAFETY COMMITTEE
98th session
Agenda item 22

MSC 98/22/7
28 March 2017
Original: ENGLISH

ANY OTHER BUSINESS

Impact of new and advancing technologies to maritime transport and the regulatory framework

Submitted by Denmark, Estonia, Finland, Japan, Norway, Singapore, Sweden and IMarEST

SUMMARY

Executive summary:	This document provides information on future possibilities for developments in the automation of ships, digitalization and the use of information technology
Strategic direction:	5.2
High-level action:	5.2.1
Output:	No related provisions
Action to be taken:	Paragraph 15
Related documents:	None

IMO INTERNATIONAL MARITIME ORGANIZATION E

MARITIME SAFETY COMMITTEE
98th session
Agenda item 22

MSC 98/INF.13
4 April 2017
ENGLISH ONLY

ANY OTHER BUSINESS

A pre-analysis on autonomous ships

Submitted by Denmark

SUMMARY

Executive summary:	This document contains a pre-investigational report on autonomous ships – Maritime Autonomous Surface Ships (MASS). The purpose of the report is to describe the potentials of autonomous ships, on the basis of international activities of direct relevance to the investigation. The report briefly summarizes how to define various levels of autonomy
Strategic direction:	5.2 and 5.4
High-level action:	5.2.1, 5.2.2, 5.2.4 and 5.4.1
Output:	No related provisions
Action to be taken:	Paragraph 7
Related documents:	MSC 98/20/2 and MSC 98/22/7

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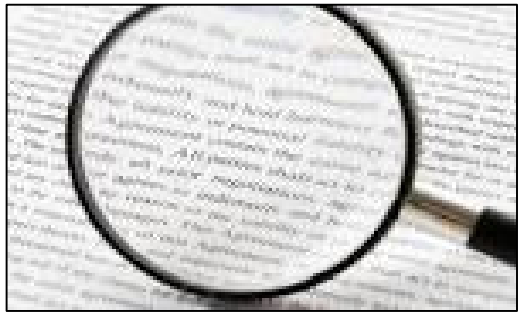
IMO Regulatory Action - Scoping Exercise

- Maritime Safety Committee
  - Establish a new international legal framework for the safe operation of Autonomous ships
  - Address different levels of automation
  - Discuss ‘autonomous ship’ definition
  - Over four MSC sessions, through to **mid-2020**



Industry Organizations

- Navigation Safety Advisory Council (NAVSAC)
- UK Maritime Automomous Systems Regulation Working Group (MASRWG)
- EU Safety and Regulations for European Unmanned Maritime Systems (SARUMS)

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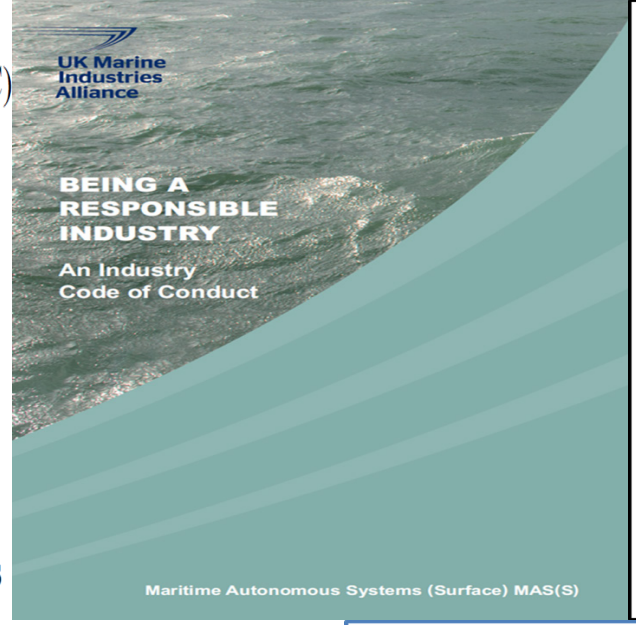
Navigation Safety Advisory Council (NAVSAC)

Resolution 16-01

(Supersedes Resolution #13-05)

(Introduced as Task Statement #15-01)

Unmanned Maritime Systems Best Practices



Lloyd's Register

Working together for a safer world

Cyber-enabled ships

ShipRight procedure – autonomous ships

First edition, July 2016

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Sunnmøre, Trondheimsfjord, Jaakonmeri

- Official test beds for autonomous shipping
- Collaborative: government and industry

In the meantime…

- Operate under current regulations **at least as safely as a manned ship** (MUNIN)
- Best Practices
  - Navigation
  - Cybersecurity
- COLREGS
  - Concerns with SAR tasking
- Educating maritime public
- Testing sites (U.S.)
- Consortiums

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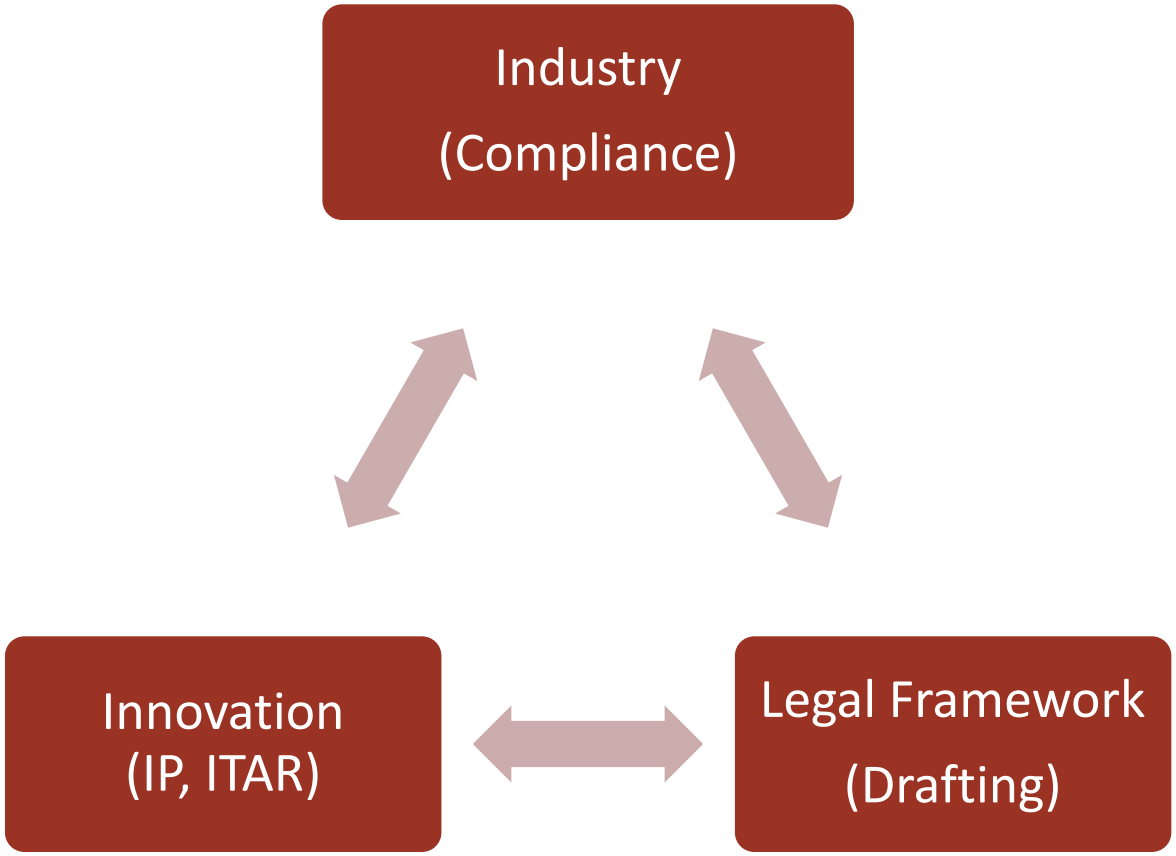
Requirement for Success – Role of Counsel



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Questions?

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Lloyd's List
North American Awards | 2016
Maritime Services Award - Legal
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