

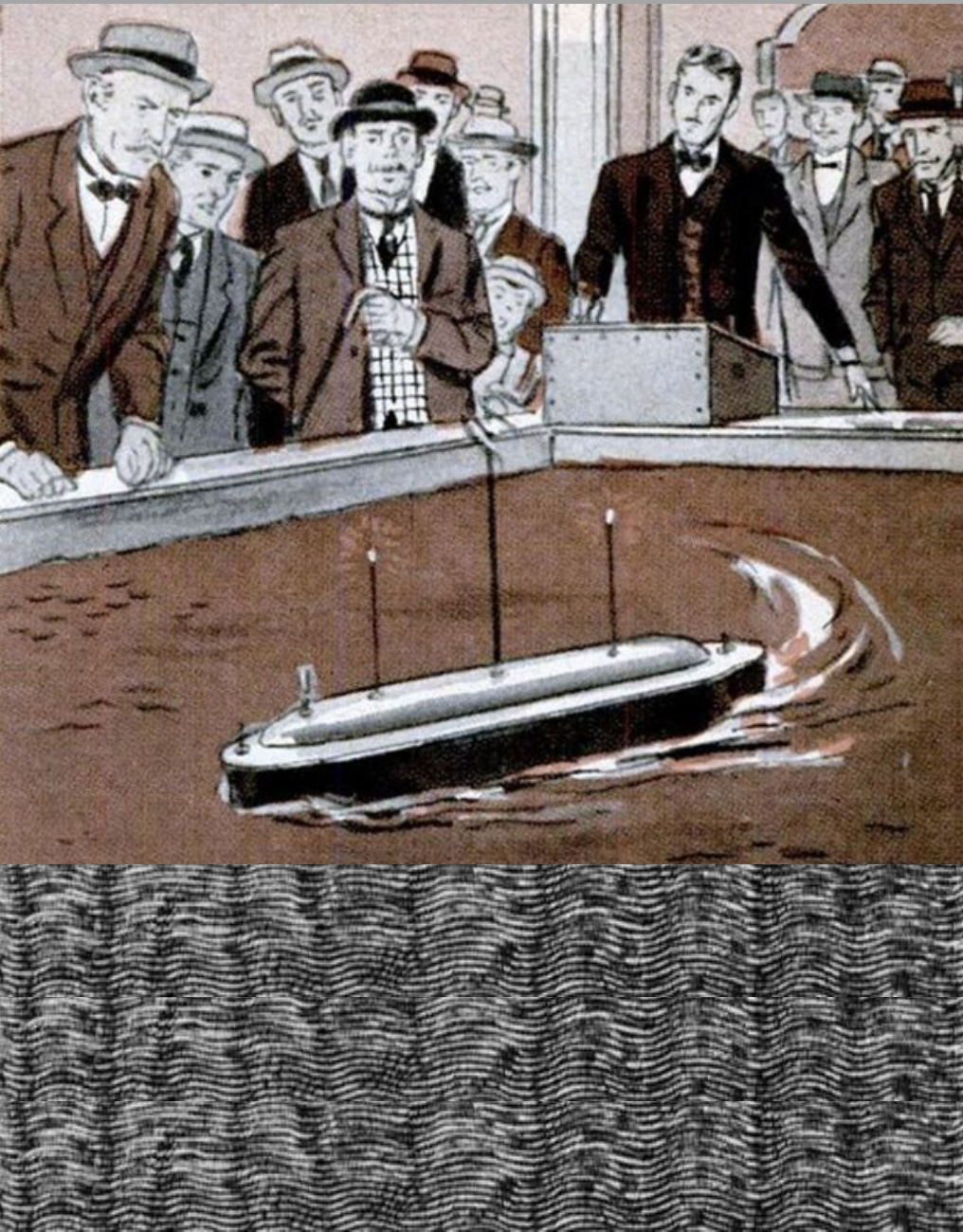


Maritime Autonomous Surface Ships



U.S. Coast Guard
LCDR Urdley Smith
LT Carmine Faul
19 November 2020

Tesla's 1898 Remote Control Demonstration



TECHNOLOGICAL INNOVATION

“TO CHERISH AND STIMULATE THE ACTIVITY OF THE HUMAN MIND, BY MULTIPLYING THE OBJECTS OF ENTERPRISE, IS NOT AMONG THE LEAST CONSIDERABLE OF THE EXPEDIENTS, BY WHICH THE WEALTH OF A NATION MAY BE PROMOTED. EVEN THINGS IN THEMSELVES NOT POSITIVELY ADVANTAGEOUS, SOMETIMES BECOME SO, BY THEIR TENDENCY TO PROVOKE EXERTION. ”

- ALEXANDER HAMILTON



Ongoing Journey



1969

- USCG releases guidance for reducing engineering watches based on automation.

1978

- USCG releases guidance for OSVs with unattended machinery spaces.

1984

- IMO establishes standards for minimally manned and unattended engine rooms.

1988

- Vital system automation, including provisions for minimally and unattended engine rooms added to the CFR.

2017

- IMO initiates regulatory scoping exercise.



Evolving Technology



Changes to Human Element

- Increased Reliance on Automated Systems



Changes to Risk Profile

- System Reliability
- Communication & Interaction
- Cyber Risk



Changes in Regulatory Framework

- Consensus Standards
- IMO Instruments
- Domestic Regulations



Sustained Resiliency & Performance





Vessel Autonomy Strategy



Goal:

Ensure the development and application of new technologies sustain maritime safety, security (cyber & physical) and environmental stewardship.

Strategy:

Managing Early Adoption

Establish Approach

Leverage Existing Authorities

Guidance

Standards Development

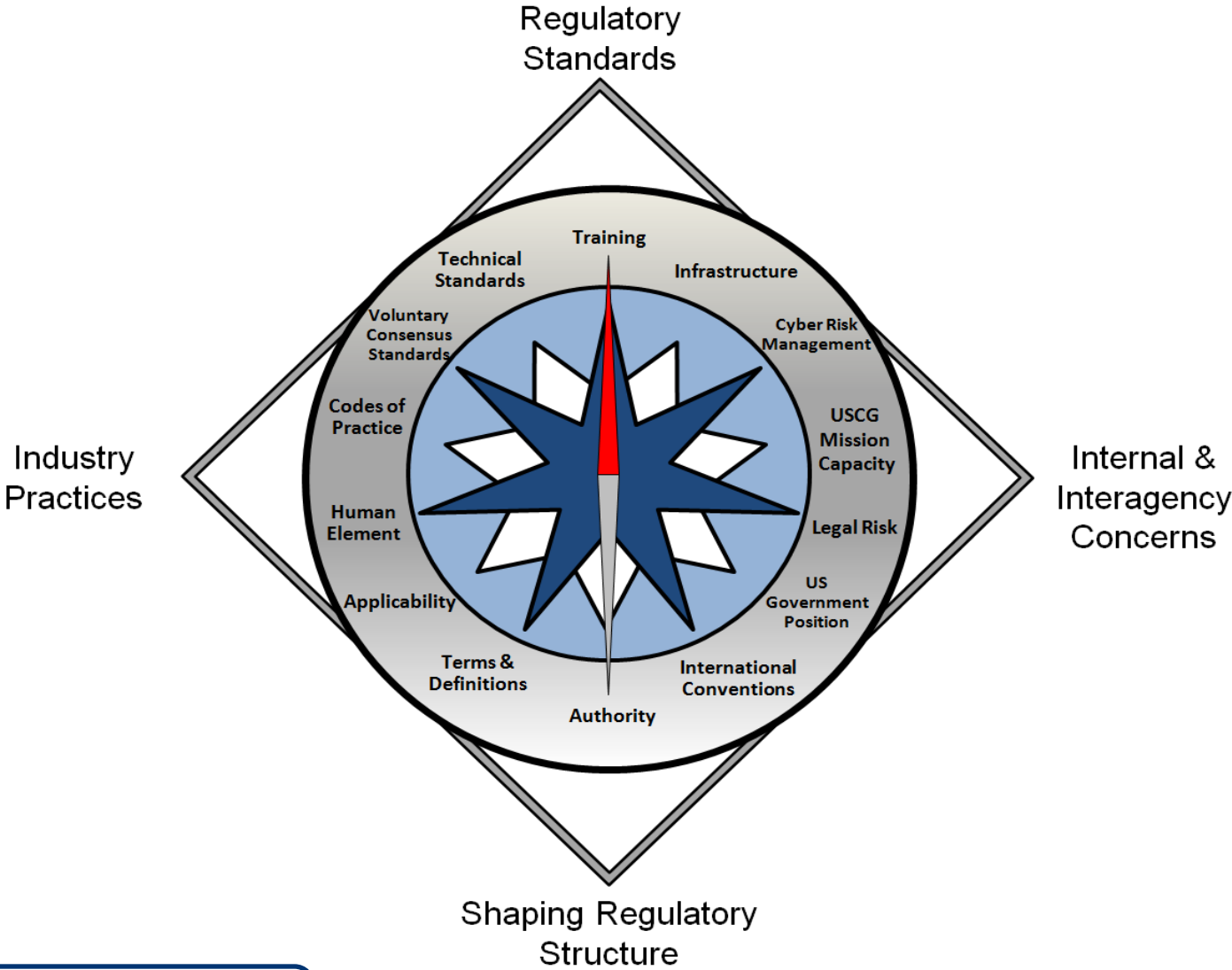
Consensus Standards

International Standards

Domestic Regulation



Plotting A Safe Course



Managing Early Adoption

Establish Approach

Leverage Existing
Authorities

Guidance



Consensus Standards



- Inform Regulatory Bodies
- Technical Standards for Industry
- Aid early adopters



Standards Development

Consensus
Standards

International
Standards

Domestic
Regulation



Int'l & Domestic Regulations



- Current IMO Efforts
- Anticipated Progression
- IMO efforts inform Domestic Regulations



Standards Development

Consensus
Standards

International
Standards

Domestic
Regulation



Request for Information (RFI)



- On Integration of Automated and Autonomous Commercial Vessels and Vessel Technologies Into the Maritime Transportation System
- Published in the Federal Register on 11 Aug 2020
- Comment period for the public closed on 13 Oct 2020

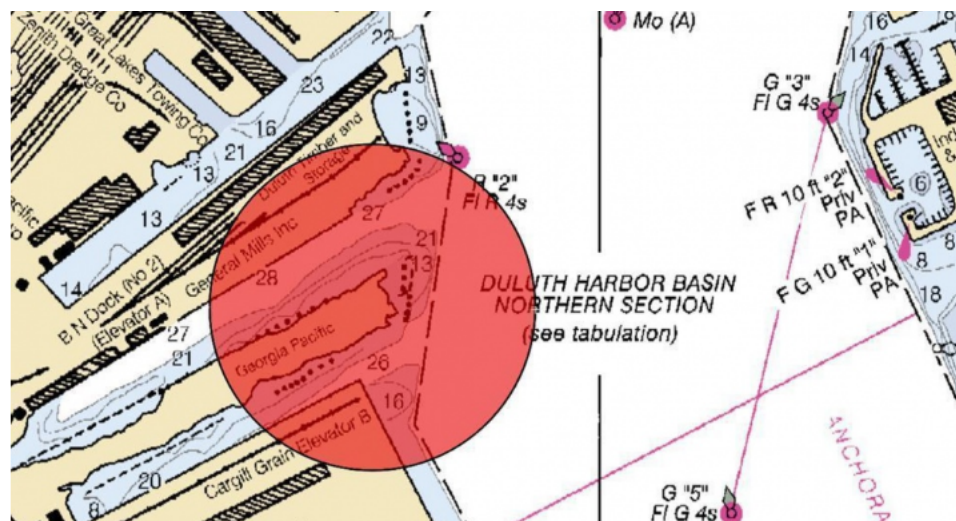
Link to RFI: [Federal Register Docket Number USCG-2019-0698](#)



Vessel & Waterway Safety



- OCMi Authority
- Equivalencies
- COTP Authorities



Managing Early Adoption

Establish Approach

Leverage Existing
Authorities

Guidance



Waterways Management's Role



- Ensure safety and security for MTS users
- Facilitate health and promotion of a globally competitive American MTS.





Risk & Mitigation



Identification

- Navigation Safety Risk Assessment
- Operational
- Environmental

Mitigation

- Meet & formulate strategies
- Local Notice Mariners
- Broadcast Notice to Mariners
- Establish LAA or RNA



**U.S. Department of Homeland Security
United States Coast Guard**

LOCAL NOTICE TO MARINERS

District: 11 Week: 47/17

CORRESPONDENCE TO:
COMMANDER
DISTRICT SEVEN (DPW)
COAST GUARD ISLAND BUILDING 50-2
ALAMEDA, CA 94512-5100

REFERENCES: COMPTON P16502 & Light List Volume VI, 2017 Edition, U.S. Chart No. 1 12th Edition, and Coast Pilot Volume 7 49th Edition. These publications, along with corrections, are available at: <http://www.nauticalcharts.noaa.gov/ned/download.htm>.

BROADCAST NOTICE TO MARINERS - Information concerning aids to navigation and waterway management promulgated through BRM HB-0017-17, SP-0247-17, LA-0189-17, and SO-0123-17 have been incorporated in this notice, or will continue if still significant.

SECTION I - SPECIAL NOTICES

This section contains information of special concern to the Mariner.

SUBMITTING INFORMATION FOR PUBLICATION IN THE LOCAL NOTICE TO MARINERS

A complete set of guidelines with examples and contact information can be found at <http://www.pacificarea.uscg.mil/Our-Organization/District-11/Prevention-Division/Requests/> or call BMT Adam Claude at 510-437-2980 or e-mail D11LHM@uscg.mil. Please provide all Local Notice to Mariners submissions 14 days prior to the start of operations.

BRIDGE INFORMATION- PROJECTS, DISCREPANCIES, CORRECTIONS & REGULATORY

For all bridge related issues, including lighting, operation, obstructions, construction, demolition, etc. contact the Eleventh Coast Guard District Bridge Administrator 24 hour toll phone at 510-219-4366. Pilots may accumulate on and near bridge piers and obstructions. Mariners should approach all bridges with caution. A vessel delay at a drawbridge may be reported to the District Bridge Administrator by telephone, or by using the DelayReport2007.pdf included in the Enclosures section of the Local Notice to Mariners.

CAUTION TO BE USED IN RELIANCE UPON AIDS TO NAVIGATION

The aids to navigation depicted on charts comprise a system of fixed and floating aids to navigation with varying degrees of reliability. Prudent mariners will not rely solely on any single aid to navigation, particularly a floating aid to navigation. With respect to buoys, the buoy symbol is used to indicate the approximate position of the buoy body and the streamer which secures the buoy to the seabed. The approximate position is used because of the practical limitations in positioning and maintaining buoys and their streamers in precise geographical locations. These limitations include, but are not limited to, inherent imprecision in position fixing methods, prevailing atmospheric and sea conditions, slope of and the material making up the seabed, the fact that buoys are moored to streamers by varying length of chain, and the fact that the buoy body and/or streamer positions are not under continuous surveillance, but are normally checked only during periodic maintenance visits which occur more than a year apart. Due to the forces of nature, the position of the buoy body can be expected to shift inside and outside the charted symbol. The mariner is also cautioned that buoys may be extinguished or sound signals may not function as the result of natural causes, collisions, or other accidents. For the foregoing reasons, a prudent mariner must not rely completely upon the position or operation of floating aids to navigation, but will also utilize bearings from fixed objects and aids to navigation on shore. Furthermore, a vessel attempting to pass close aboard always risks collision with a yawing buoy or with the obstruction that the buoy marks.

MARINE SAFETY INFORMATION BULLETIN

Mariners directing the movement of large ships in or near the offshore approaches to San Francisco Bay have indicated to the Coast Guard that the high-intensity "work lights" on decks used by commercial fishing vessels prevent vessel operators from seeing the commercial fishing vessel's navigation lights at night and in low-visibility conditions.

A clear and present threat to navigation safety exists when one vessel cannot see the navigation lights of another vessel. If navigation lights are obscured, the aspect of the latter vessel cannot be determined making it extremely difficult for both vessels to successfully execute the nautical rules of the road. International Navigation Rule 20 states that no other lights that may impair the visibility of the lights specified in the

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Coast Guard DISTRICT 11

LNK: 4717
23 November 2017



Current Efforts



Seek equitable solutions to shared waterways use for traditional users and autonomous systems by applying Ports and Waterways Safety Act authorities and policies.

- Encourage engagement with local stakeholders to promote equal waterway access and constraints.
- Employ current authorities under PWSA (46 U.S. Code, Chapter 700) and policies to find solutions.
- Continue collaboration across USCG.





Available Resources



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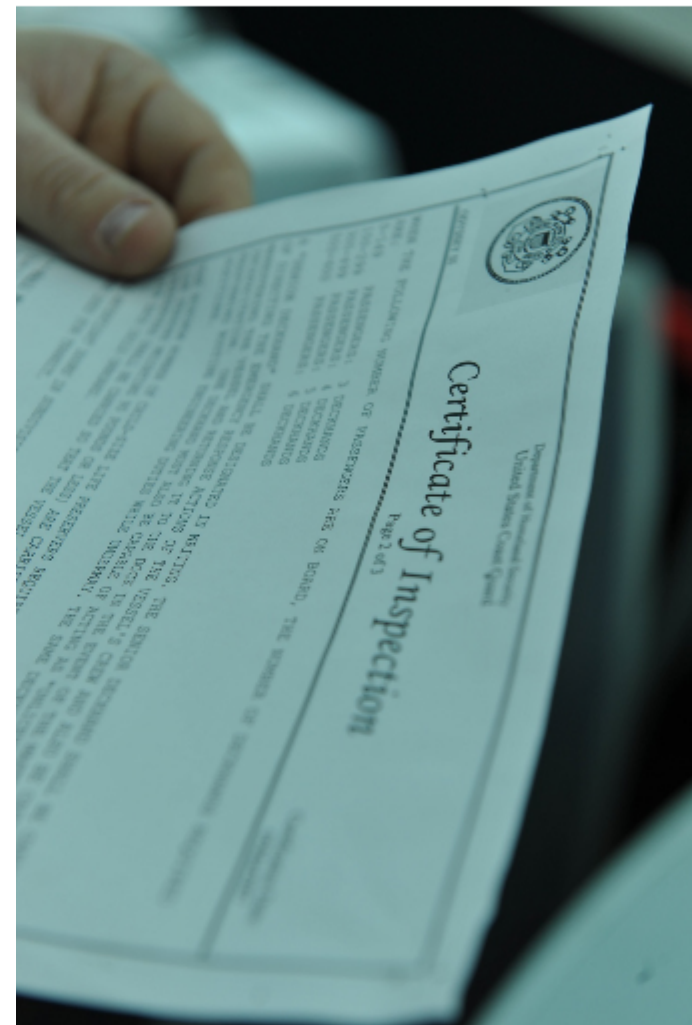
202-372-1357

LCDR Urdley Smith

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Questions?



U.S. Coast Guard
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19 November 2020