

Ferry Go! workshop 26.02.2025

*Rules and regulation for the use of autonomous
systems / AI*

Frank Stevens

Overview

- ships are not robots ...
- intelligence required
- if *human* intelligence leaves the ship, *artificial* intelligence is required
- relevant rules & regulations:
 - manning requirements
 - technical requirements
 - AI regulation
 - (insurance)
 - ('administrative' requirements)



Manning requirements

- explicit, e.g.:
 - SOLAS V/14

1. Contracting Governments undertake, each for its national ships, to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned.
- Art. 1.08 (2) CEVNI

All vessels, except vessels in a pushed convoy other than the pusher, shall have a crew sufficient in number and sufficiently skilled to ensure the safety of those on board and safe navigation.
- Regulations for Rhine Navigation Personnel (RPN)
 - Chapter 19, Minimum Crew on Board

Manning requirements

- implicit, e.g.:
 - Art. 1.02 (3) CEVNI, Art. 1.02 (4) Rhine Police Regulations (RPNR)
 - *"When a vessel is under way the boatmaster shall be on board ..."*

Technical requirements

- SOLAS, e.g. V/19.6

Integrated bridge systems shall be so arranged that failure of one sub-system is brought to immediate attention of the officer in charge of the navigational watch by audible and visual alarms, and does not cause failure to any other sub-system. In case of failure in one part of an integrated navigational system, it shall be possible to operate each other individual item of equipment or part of the system separately.

- classification societies

- e.g. DNV

AROS Class Notations



Technical requirements

- ES-TRIN

- e.g. Art. 6.01 .1

Vessels shall be fitted with a reliable steering system which provides at least the manoeuvrability required by Chapter 5.

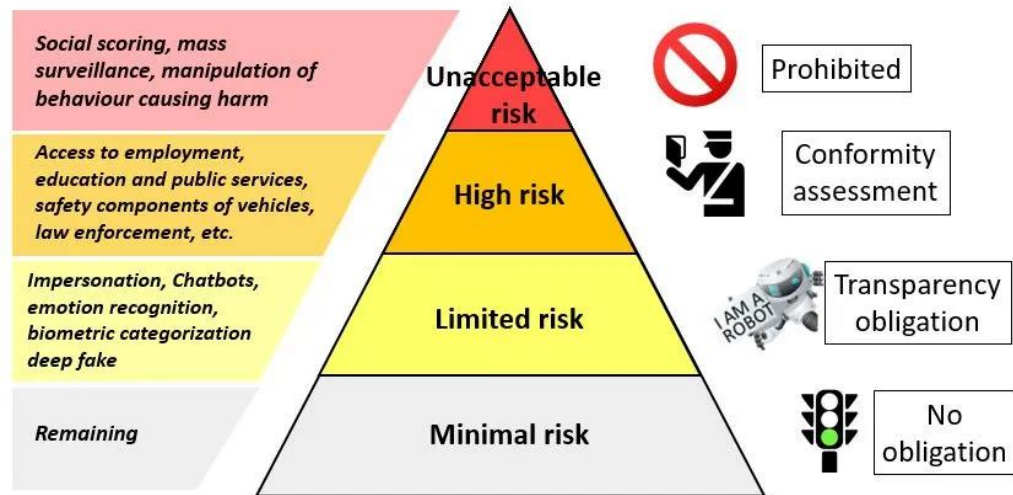
| | |
|---|--|
| ES-TRIN | Chapter 12 Electronic equipment and systems |
| CHAPTER 12 ELECTRONIC EQUIPMENT AND SYSTEMS (left void) | |

- classification societies

EU Artificial Intelligence Act: Risk levels

AI regulation.

- AI Act (Regulation 2024/1689)
- scope: "AI systems"
 - Art. 3.(1)
 - Recital 12
- a machine-based system
- designed to operate with *varying levels of autonomy*
- *may* exhibit adaptiveness after deployment
- that *infers* from input how to generate outputs (predictions, content, recommendations, or decisions)
- outputs that can influence physical or virtual environments
- for explicit or implicit objectives



AI regulation.

- Recital 12:

*(...) the **definition** should be based on key characteristics of AI systems that distinguish it from simpler traditional software systems or programming approaches and should **not** cover systems that are based on the **rules defined solely by natural persons to automatically execute operations**. A key characteristic of AI systems is their capability to infer. This capability to infer refers to the process of obtaining the outputs, such as predictions, content, recommendations, or decisions, which can influence physical and virtual environments, and to a capability of AI systems to derive models or algorithms, or both, from inputs or data. The techniques that enable inference while building an AI system include **machine learning** approaches that learn from data how to achieve certain objectives, and **logic- and knowledge-based approaches** that infer from encoded knowledge or symbolic representation of the task to be solved. The capacity of an AI system to infer transcends basic data processing by enabling learning, reasoning or modelling.*

AI regulation.

- (very) vague definition ...
 - not *all* software should be considered "AI" (see Recital 12)
 - although (almost) all software *could* probably be considered "AI" based on the wording
- where will the line between "AI" and "non-AI" be drawn?
- which (sub-) systems of an autonomous vessel will count as "AI" within the meaning of the AI Act?

AI regulation.

- if an "AI system" is involved, is it a *high-risk* AI system?
- high-risk (Art. 6):
 - AI system is intended to be used as a *safety component* of a product, and
 - the product is required to undergo a *third-party conformity assessment* pursuant to listed EU legislation
- what is (or is not) a "safety component"?

AI regulation.

- Art. 2.2

*For AI systems classified as high-risk AI systems in accordance with Article 6(1) related to products covered by the Union harmonisation legislation listed in **Section B** of Annex I, only Article 6(1), Articles 102 to 109 and Article 112 apply.*

Article 57 [AI Regulatory Sandboxes] applies only in so far as the requirements for high-risk AI systems under this Regulation have been integrated in that Union harmonisation legislation.

- Section B of Annex I includes:

- Directive 2014/90/EU on marine equipment

- marine equipment = equipment placed or to be placed on board an EU ship and for which the approval of the flag State administration is required

AI regulation.

- AI Act:
 - complex scope of application
 - boundaries will have to be established in practice / case law
- NB. proposal for AI Liability Act will be withdrawn
- Commission Work Programme 2025

| | | | |
|-----|---------------------------------------|--|---|
| 32. | COM(2022)496 final 2022/0303 (COD) | Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on adapting non-contractual civil liability rules to artificial intelligence (AI Liability) | No foreseeable agreement - the Commission will assess whether another proposal should be tabled or another type of approach should be chosen. |
|-----|---------------------------------------|--|---|

Insurance requirements

- (proposed) exemption and testing schemes require (information about) insurance

- e.g. Dutch proposed 'Regeling', Art. 2.3.(i)
- e.g. German Binnenschiffverkehrsstraßen-Ordnung, § 1.28, 4, I)

Für das Fahrzeug ist eine Haftpflichtversicherung abzuschließen, die auch den Fall einer Fernsteuerung des Fahrzeugs umfasst.

'Administrative' requirements

- SOLAS V/19.2.1
 - .4 all ships shall have nautical charts and publications ... ECDIS is accepted*
 - .5 **back-up arrangements** to meet the functional requirements of subparagraph .4, if this function is partly or fully fulfilled by electronic means;*
- SOLAS V/21.1 and .2
 - all ships are required to carry the International Code of Signals and the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual*

'Administrative' requirements

- Art. 1.10 CEVNI

1. The following documents shall be available on board if required by other regulations:

(a) to (x)

and any other documents relating to navigation required under other international conventions or agreements.

(...)

4. The documents required to be carried on board under these regulations or any other provisions applicable shall be produced whenever requested by officials of the competent authorities.

- Art. 1.10 Rhine Police Regulations (RPNR)

*2. Some of the ship's documents and other documents referred to in Annex 13 to this Regulation may, in accordance with the conditions laid down in Annex 13 to this Regulation, be made available in the form of a copy which can be consulted in **electronic format** at any time.*

'Administrative' requirements

- not a major impediment
- but not adapted / efficient anymore
 - will competent authorities be able to board autonomous vessels?
 - will they have to look for paper documents on a crewless vessel?
- digital certificates, available online (to the competent authorities) are the way forward
- NB. in some cases, authorities may still need to be able to *physically board* an autonomous vessel ...