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Item 8 of the provisional agenda

Automation in inland navigation

Definitions related to automation in inland navigation and smart shipping

Note by the secretariat*,**

Mandate

1. This document is submitted in line with the programme of work of the Transport subprogramme for 2020 (ECE/TRANS/2020/21, chapter IV, table, section A, para. 11) adopted by the Inland Transport Committee (ITC) at its eighty-second session (ECE/TRANS/294, para 136).
2. At its sixty-third session, the Working Party on Inland Water Transport (SC.3) started discussion on the terms and definitions of automation in inland navigation and smart shipping and asked the secretariat to prepare a working document with an overview of the existing general terms and definitions (ECE/TRANS/SC.3/210, para. 62).
3. The annex to this document contains general terms and definitions given in the working documents of SC.3 and the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) and “Maritime Autonomous Surface Ships (MASS) UK¹ Industry Conduct Principles and Code of Practice”, version 3.0.²

* The present document was submitted after the deadline in order to reflect the most recent information.

** The present document is being issued without formal editing.

¹ The United Kingdom of Great Britain and Northern Ireland.

² www.maritimeuk.org/media-centre/publications/maritime-autonomous-surface-ships-industry-conduct-principles-code-practice/.

Annex

I. Definition of automation levels in inland navigation adopted by the Central Commission for the Navigation of the Rhine (Resolution 2018-II-16)³

Automation level 0. **No automation:** the full-time performance by the human boatmaster of all aspects of the dynamic navigation tasks, even when enhanced by warning or intervention systems.

Automation level 1. **Steering assistance:** the context-specific performance by a steering automation system using certain information about the navigational environment and with the expectation that the human boatmaster performs all remaining aspects of the dynamic navigation tasks.

Automation level 2. **Partial automation:** the context-specific performance by a navigation automation system of both steering and propulsion using certain information about the navigational environment and with the expectation that the human boatmaster performs all remaining aspects of the dynamic navigation tasks.

Automation level 3. **Conditional automation:** the sustained context-specific performance by a navigation automation system of all dynamic navigation tasks, including collision avoidance, with the expectation that the human boatmaster will be receptive to requests to intervene and to system failures and will respond appropriately.

Automation level 4. **High automation:** the sustained context-specific performance by a navigation automation system of all dynamic navigation tasks and fall-back operation, without expecting a human boatmaster responding to a request to intervene.

Automation level 5. **Autonomous = Full automation:** the sustained and unconditional performance by a navigation automation system of all dynamic navigation tasks and fall-back operation, without expecting a human boatmaster will respond to a request to intervene.

The Central Commission for the Navigation of the Rhine has limited the validity of the definition of automation levels in inland navigation by 31 December 2020, given that it may be subject to modifications based on the experience and knowledge acquired.

II. Terms related to smart shipping⁴

“**Smart vessels**” are equipped with automated systems that use external data to optimize key functions of the vessel’s, e.g. navigation, fuel consumption, real-time planning, etc.

“**Smart infrastructure**” ensures two-way communication between smart vessels and their surrounding environment. The use of highly automated and organized corridors renders efficient traffic management.

“**Smart communication**” has digitalized various forms of contact between vessels and third (government) parties in a smart, smooth and flexible process that meets the internationally standardized procedures.

“**Smart regulations**” is the link that overarches the three areas of “smart + vessels – infrastructure – communications”.

³ See ECE/TRANS/SC.3/WP.3/2019/20.

⁴ See ECE/TRANS/SC.3/2019/13.

III. Terminology used in the “Maritime Autonomous Surface Ships UK Industry Conduct Principles and Code of Practice”

“**Automatic**”: Pertaining to a process or device that, under specified conditions, functions without human intervention (ISO/TR 11065).

“**Autonomy**”: In the context of ships, autonomy (e.g. as in "Autonomous Ship") means that the ship can operate without human intervention, related to one or more ship functions, for the full or limited periods of the ship operations or voyage.

“**Autonomous Ship System**”: All physical and human elements that together ensure sustainable operation of an autonomous ship in its intended operations or voyage.

“**Remote Control**”: Operational control of some or all ship operations or functions, at a point remote from the ship.

“**Remote Control Centre**” (RCC) is a site off the ship from which control of an autonomous ship can be executed. The RCC may be located either ashore or afloat and may exercise varying degrees of control as defined under “Levels of Control”. An RCC may consist of more than one Control Station or Room.

“**Remote Monitoring**”: Monitoring some or all ship operations or functions at a point remote from the ship.

“**Unattended**”: Used for a control position, e.g. an unattended bridge, without a crew available to operate it.

“**Unmanned**”: This term is reserved for a ship with no crew on board. Crew does not include passengers or special personnel.

IV. Other terms and definitions

SC.3 may wish to complement the list with the terms and definitions of ship-to-ship communication, test area and to extend the definition to sea-going vessels to make it also applicable for maritime shipping, as it was mentioned at its sixty-third session (ECE/TRANS/SC.3/210, para. 62). Currently, the information on test areas for autonomous ships is available on the website of the International Network for Autonomous Ships at www.autonomous-ship.org/testarea.html#H1, however, the available test area guidelines do not apply the definition of the test area.

SC.3 may also wish to take note of the existing definitions related to automation, used in the annex to resolution No. 61 for automation systems for electrical equipment. It concerns, in particular, the following definitions:

“**Automation system**”: is the complex of automation elements, appliances and connections intended for performing prescribed functions in the field of control and monitoring;

“**Automated remote control system**”: is an automation system that provides control and monitoring of the operation of the vessel’s machinery from a remote control station by means of single manipulating of the control element (e.g. handle) by the operator and performs automatically all intermediate operations on preparation for putting into operation, switching on, changing operation modes, reversal, blocking and switching off the main and auxiliary machinery and its systems;

“**Remote control system**”: is an automation system that provides control and monitoring of the operation of an individual vessel’s machinery from a remote control station by means of manipulating the control element by the operator for performing all operations including intermediate ones;

“**Element of an automation system**”: is electric, electronic or other device being the part of the automation system (sensor, relay, amplifier, chip, logic element, etc.).