



# MARITIME AUTONOMOUS SURFACE SHIPS (MASS) & UNMANNED SURFACE VESSELS (USV)

February 2025



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VERITAS

# SUMMARY



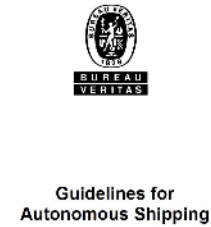
01

INTERNATIONAL  
CONTEXT  
& BV INVOLVEMENT



02

REGIONAL  
STATUTORY  
FRAMEWORK



October 2019

Guidance Note  
NI 541 DT R01 E

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03

BV APPROACH  
& REFERENCES

UNMANNED  
SURFACE  
VESSELS  
(USV)  
NR681- JULY 2022



04

NR681 USV  
JUL. 2022



01.

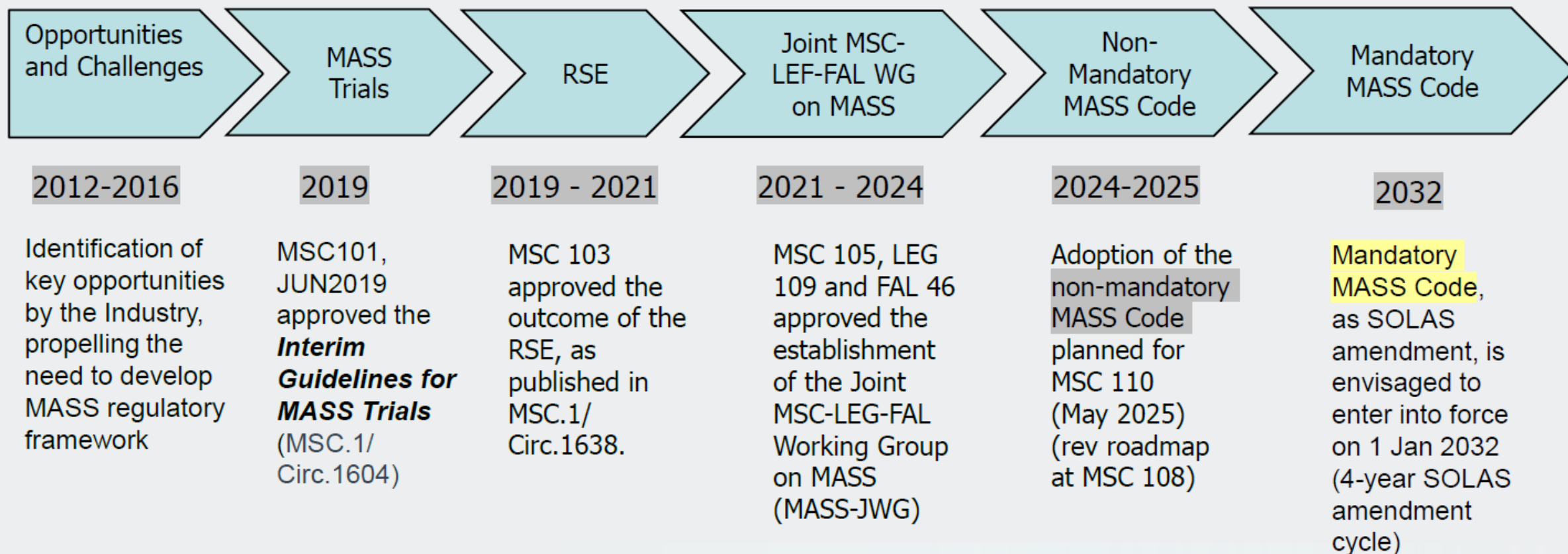
# INTERNATIONAL CONTEXT & BV INVOLVEMENT



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# IMO – REGULATORY DEVELOPMENT TIMELINE



3 meeting held so far – last MAY 2024.



# OTHER REGULATORS WORKING GROUPS

## IACS – DEFINITION OF HIGH LEVEL IACS POSITION ON MASS

BV M&O involved in IACS Safe Digital Transformation Panel (SDTP)



## ISO – TERMINOLOGY RELATED TO AUTONOMOUS SHIP SYSTEMS

BV M&O involved in ISO/DTS 23860 development (TC 8 / WG10)



## INSA – NAVAL BOAT CODE REVIEW

Participation in the working group on Unmanned Systems



## IMCA – SAFE & EFFICIENT USE OF USV, INSPECTION/AUDIT PLAN

Participation in the USV working group



## IHO – S-100 DEVELOPMENT

Participation in the S-123 WG for connectivity coverage mapping for MASS





02.

# REGIONAL STATUTORY FRAMEWORK



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## EU OPERATIONAL GUIDELINES ON TRIALS OF MASS

### Version 1 - 10/2020

The aim of these Operational Guidelines is to **provide assistance & guidance for relevant Administrations and the Applicant(s)** that want to **perform tests/trials on MASS systems** (at full or reduced geometrical scale of the ship) in a safe, secure and environmentally friendly manner, also when conducted within specified monitoring areas such as VTS areas and SRS operational areas.

EU OPERATIONAL GUIDELINES FOR TRIALS OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

### EU OPERATIONAL GUIDELINES FOR SAFE, SECURE AND SUSTAINABLE TRIALS OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

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## RESEARCH OUTCOMES OF THE AUTONOMOUS SHIPPING INITIATIVE FOR EUROPEAN WATERS

**MSC/ISWG/MASS 2/INF.2 – 09/2023**

This document informs of, and provides references to, the **research outcomes** of the Autonomous Shipping Initiative for European Waters (the **AUTOSHIP project**) on the topics of **terminology and definitions for MASS**, as well as **safe coexistence between uncrewed MASS and crewed ships**.

**BV M&O fully involved  
in this IMO input paper submission  
with the European Commission**

INTERSESSIONAL WORKING GROUP ON  
MARITIME AUTONOMOUS SURFACE SHIPS  
2nd session  
Agenda item 3

MSC/ISWG/MASS 2/INF.2  
15 September 2023  
ENGLISH ONLY  
Pre-session public release: X

### CONSIDERATION OF PROPOSALS FOR FURTHER DEVELOPMENT OF THE DRAFT MASS CODE

Research outcomes of the Autonomous Shipping Initiative for European Waters

Submitted by the European Commission

#### SUMMARY

*Executive summary:* This document informs of, and provides references to, the research outcomes of the Autonomous Shipping Initiative for European Waters (the AUTOSHIP project) on the topics of terminology and definitions for MASS, as well as safe coexistence between uncrewed MASS and crewed ships.

*Strategic direction, if applicable:* 2

*Output:* 2.23

*Action to be taken:* Paragraph 36

*Related documents:* MSC 107/20, MSC 107/5/3, MSC 107/WP.9, MSC 103/5/3 and MSC 102/5/18

#### Introduction and background

1 The AUTOSHIP project, the Autonomous Shipping Initiative for European Waters, is an EU funded H2020 framework project with grant number 815012 that responds to the European Unions' need to shift a significant amount of cargo transport from roads to sea, possibly using autonomous shipping.

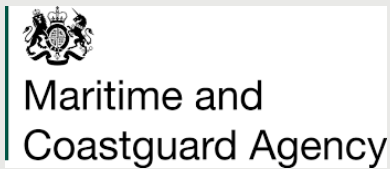
2 The project has developed and validated five key enabling technologies for autonomous ships and retrofitted these onto a general cargo ship and demonstrated autonomous and remotely controlled operations at Technology Readiness Level 7 – in real operational environment.

3 The project has carried out research on topics such as:

1. definitions and terminology for MASS;
2. risk assessment methodologies and safety assurance frameworks for MASS; and



# REGIONAL AGREEMENT



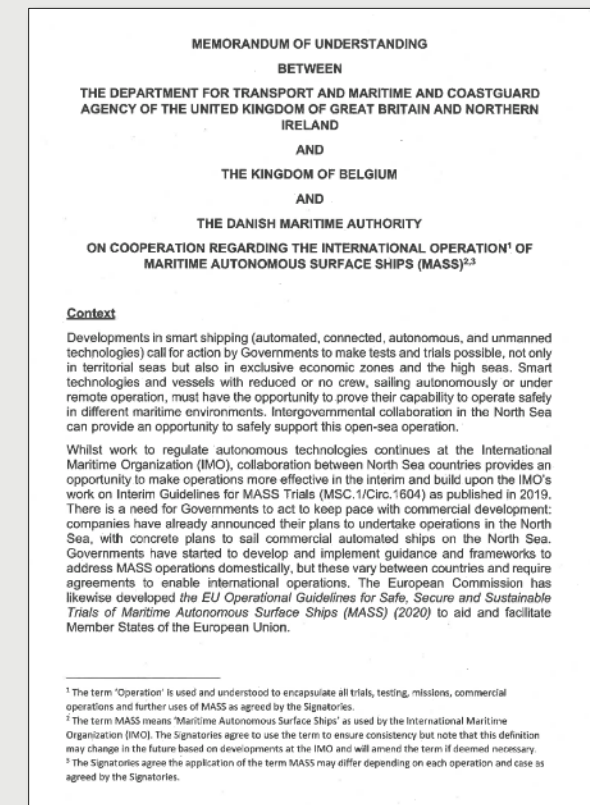
**DANISH MARITIME  
AUTHORITY**

## MEMORANDUM OF UNDERSTANDING (MOU)

**UK, BELGIUM, NETHERLANDS, NORWAY & DENMARK - 04/2024**

The Department for Transport and Maritime and Coastguard Agency of the United Kingdom of Great Britain and Northern Ireland, the Kingdom of Belgium, the Ministry of Infrastructure and Water Management of the Netherlands and the Danish Maritime Authority have signed a "Memorandum of Understanding" (MoU), with the aim to **enhance collaboration on facilitating the increased use of novel digital technologies and autonomous systems on board ships.**

With this MoU, the **signed nations have agreed to share knowledge** regarding ongoing activities, and efforts are made to involve other North Sea countries.



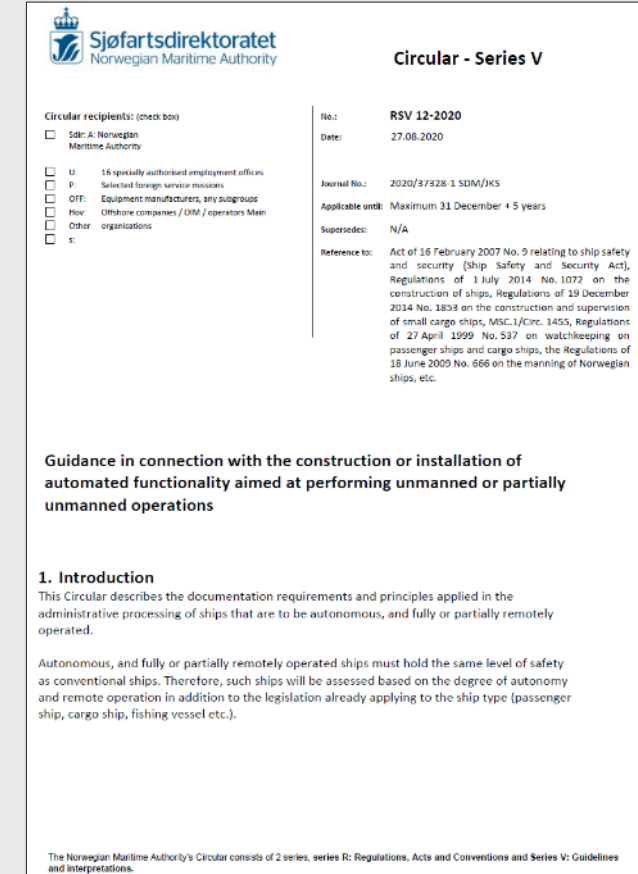
# NORWEGIAN MARITIME AUTHORITY

## Guidance in connection with the construction or installation of automated functionality aimed at performing unmanned or partially unmanned operations

**RSV 12-2020 – 08/2020**

This Circular describes the documentation **requirements and principles** applied in the administrative processing of ships that are to be autonomous, and fully or partially remotely operated.

1. Preliminary Design	1.1 Concept of operation - CONOPS
	1.2 Pre-HAZID
	1.3 Safety philosophy
	1.4 Design philosophy
	1.5 Operation and maintenance philosophy
2. Analysis of preliminary design	2.1 Updated Pre-HAZID with associated
	2.2 Risk analyses/assessments
	2.2 Gap analysis
	2.3 HAZID and risk assessments
3. Analysis of final design	3.1 HAZID and risk assessments
4. Performance approval tests & analyses	4.1 Failure Mode and Effect Analysis (FMEA)
	Test requirements



**Sjøfartsdirektoratet**  
Norwegian Maritime Authority

**Circular - Series V**

Circular recipients: (check box)  
☐ Sdir: A: Norwegian Maritime Authority  
☐ U: 15 specially authorized employment officers  
☐ P: Selected foreign service missions  
☐ OFF: Equipment manufacturers, any subgroups  
☐ Hov: Offshore companies / OIM / operators Main  
☐ Other organisations  
☐ S:

No.: **RSV 12-2020**  
Date: 27.08.2020  
Journal No.: 2020/37328-1 SDM/JKS  
Applicable until: Maximum 31 December + 5 years  
Supersedes: N/A  
Reference to: Act of 16 February 2007 No. 3 relating to ship safety and security (Ship Safety and Security Act), Regulations of 1 July 2014 No. 1072 on the construction of ships, Regulations of 19 December 2014 No. 1858 on the construction and supervision of small cargo ships, MSC.1/Circ. 1455, Regulations of 27 April 1999 No. 537 on watchkeeping on passenger ships and cargo ships, the Regulations of 18 June 2009 No. 666 on the manning of Norwegian ships, etc.

**Guidance in connection with the construction or installation of automated functionality aimed at performing unmanned or partially unmanned operations**

**1. Introduction**  
This Circular describes the documentation requirements and principles applied in the administrative processing of ships that are to be autonomous, and fully or partially remotely operated.

Autonomous, and fully or partially remotely operated ships must hold the same level of safety as conventional ships. Therefore, such ships will be assessed based on the degree of autonomy and remote operation in addition to the legislation already applying to the ship type (passenger ship, cargo ship, fishing vessel etc.).

The Norwegian Maritime Authority's Circular consists of 2 series, series R: Regulations, Acts and Conventions and Series V: Guidelines and Interpretations.



# UK – MARITIME AND COASTGUARD AGENCY



Maritime and  
Coastguard Agency

## The Workboat Code – Edition 3 – 11/2023

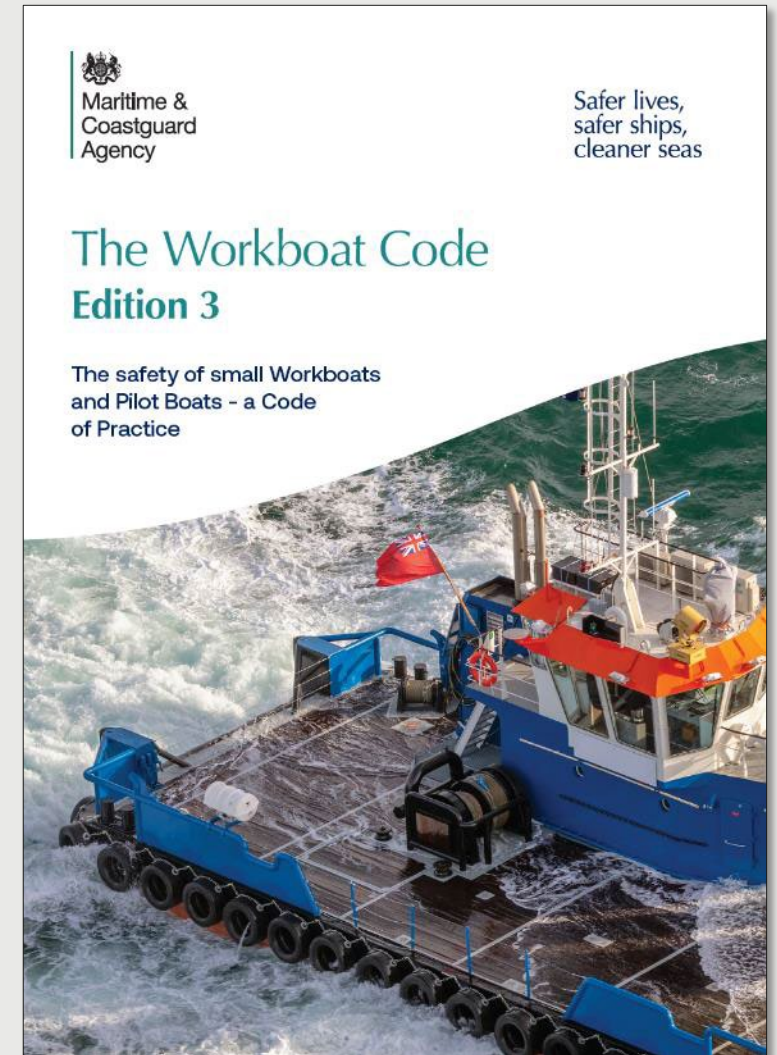
### The Safety of Small Workboats and Pilot Boats - a Code of Practice

A vessel intending to operate as a **Remotely Operated Unmanned Vessel** shall meet the requirements set out in **Annex 2** in addition to the relevant sections of the Code.

#### Annex 2

##### Remotely Operated Unmanned Vessels

This Annex provides additional requirements to be complied with for a **Remotely Operated Unmanned Vessel** of **<24m Load Line Length** operating as a **workboat**. **Vessels** intending to operate as a **Remotely Operated Unmanned Vessel** must comply with both this Annex and the main body of the **Code**.



# FRANCE – DGAMPA

Direction Générale des Affaires Maritimes, de la Pêche et de l'Aquaculture



RÉPUBLIQUE  
FRANÇAISE

## Decree no. 2024-461 (24 May 2024) : regime applicable to autonomous vessels and maritime drones

Regulatory separation between:

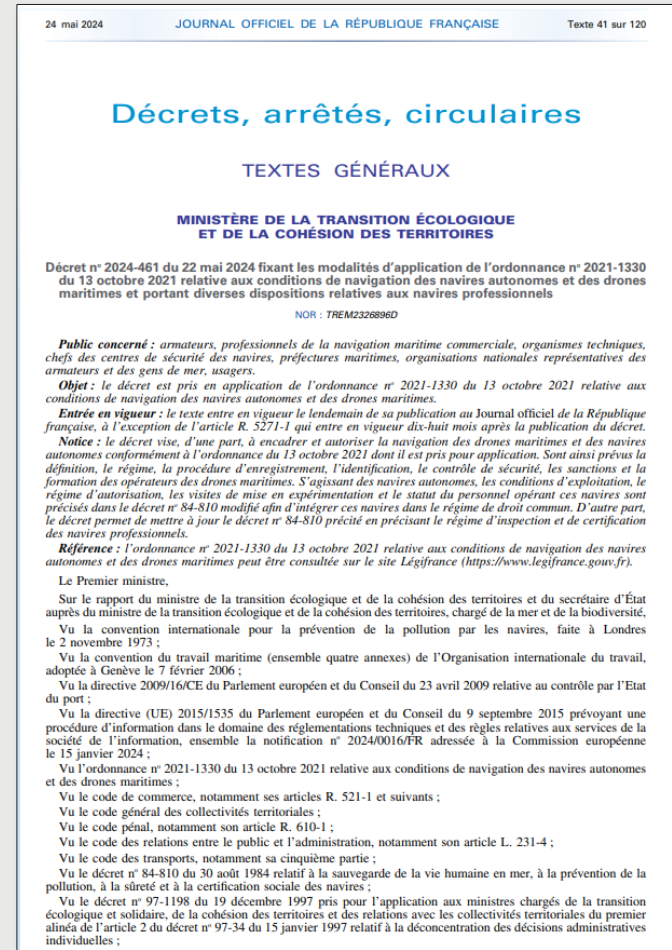
- **MASS** with a specific **case-by-case authorization regime** for maxi 2 years
- **Smaller unmanned "maritime drone"** with a simplified procedure

"A **maritime drone** is a floating surface or underwater craft operated remotely or by its own operating systems which meets the following cumulative conditions:

- **No personnel**, passengers or cargo on board
- A gross tonnage of **less than 100 UMS**
- Its overall length is greater than 1 meter and **less than 16 meters**
- Its maximum speed is less than or equal to **20 knots**
- Its kinetic energy is less than 300 kJ"

Refer also to MSC 107/INF.12 - Report on the Regulatory Framework for MASS implemented in France

[https://www.legifrance.gouv.fr/download/pdf?id=WydCEdeT6c6yTa\\_23yl-8M9p3J3zfapliu8ftLkzVE=](https://www.legifrance.gouv.fr/download/pdf?id=WydCEdeT6c6yTa_23yl-8M9p3J3zfapliu8ftLkzVE=)





03.

# BV APPROACH & REFERENCES



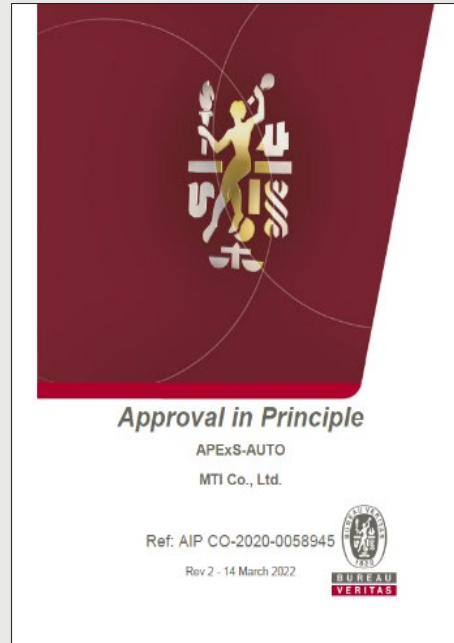
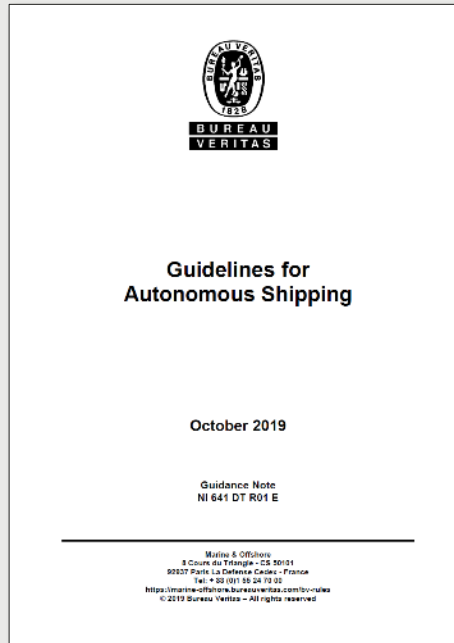
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# TWO LEVELS OF TECHNICAL OFFERS

## APPROVAL IN PRINCIPLE (AIP)

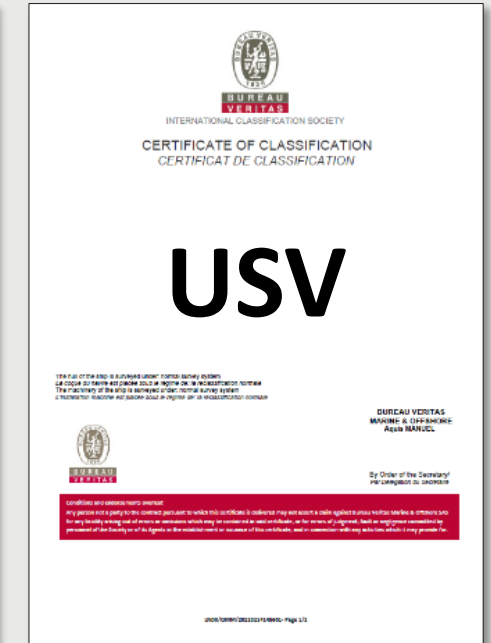
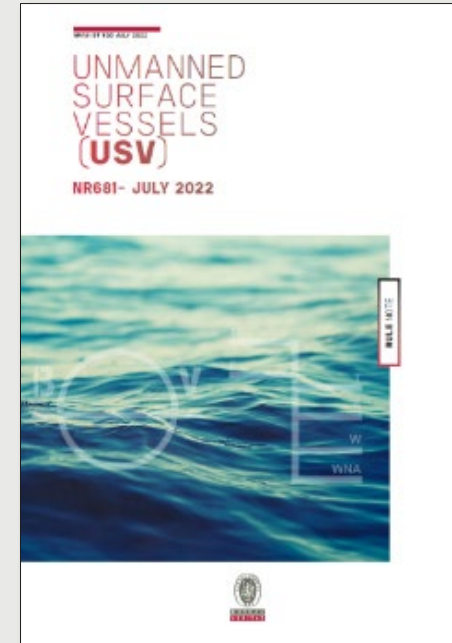
- Design review according to Guidelines for Autonomous Shipping (**NI 641**)
- Scope defined by the Applicant



Since 2018

## CERTIFICATE OF CLASSIFICATION

- Design review and surveys according to Rules Notes for USV (**NR 681**)
- Scope defined by the Rules



From July 2022



# NI 641 – CONTENT

## General

Scope & definitions

General requirements about Safety & Security

Rules & Regulations

## Risk and technology assessment

Risk identification and mitigation for autonomous ships

## Functionality of autonomous systems

Minimum level of functionality for essential systems

Goal based recommendations

## Reliability of autonomous systems

Recommendations on design and level of performance

Quality assurance methodology



GUIDANCE NOTE NI 641

Guidelines for Autonomous Shipping

---

SECTION 1	GENERAL
SECTION 2	RISK AND TECHNOLOGY ASSESSMENT
SECTION 3	FUNCTIONALITY OF AUTOMATION SYSTEMS
SECTION 4	RELIABILITY OF AUTOMATION SYSTEMS

# DIFFERENT DEGREES OF AUTOMATION

The concept of autonomy contains varying degrees – and the shipping industry has yet to settle on a framework to define them. At Bureau Veritas, we determine four degrees of automation in our NI 641 Guidelines for Autonomous Shipping based on the degree of decision making deferred from the human to the system.



**A0**

**SYSTEMS  
OPERATED  
BY A HUMAN**



**A1**

**SYSTEMS  
DIRECTED  
BY A HUMAN**



**A2**

**SYSTEMS  
DELEGATED  
BY A HUMAN**



**A3**

**SYSTEMS  
SUPERVISED  
BY A HUMAN**

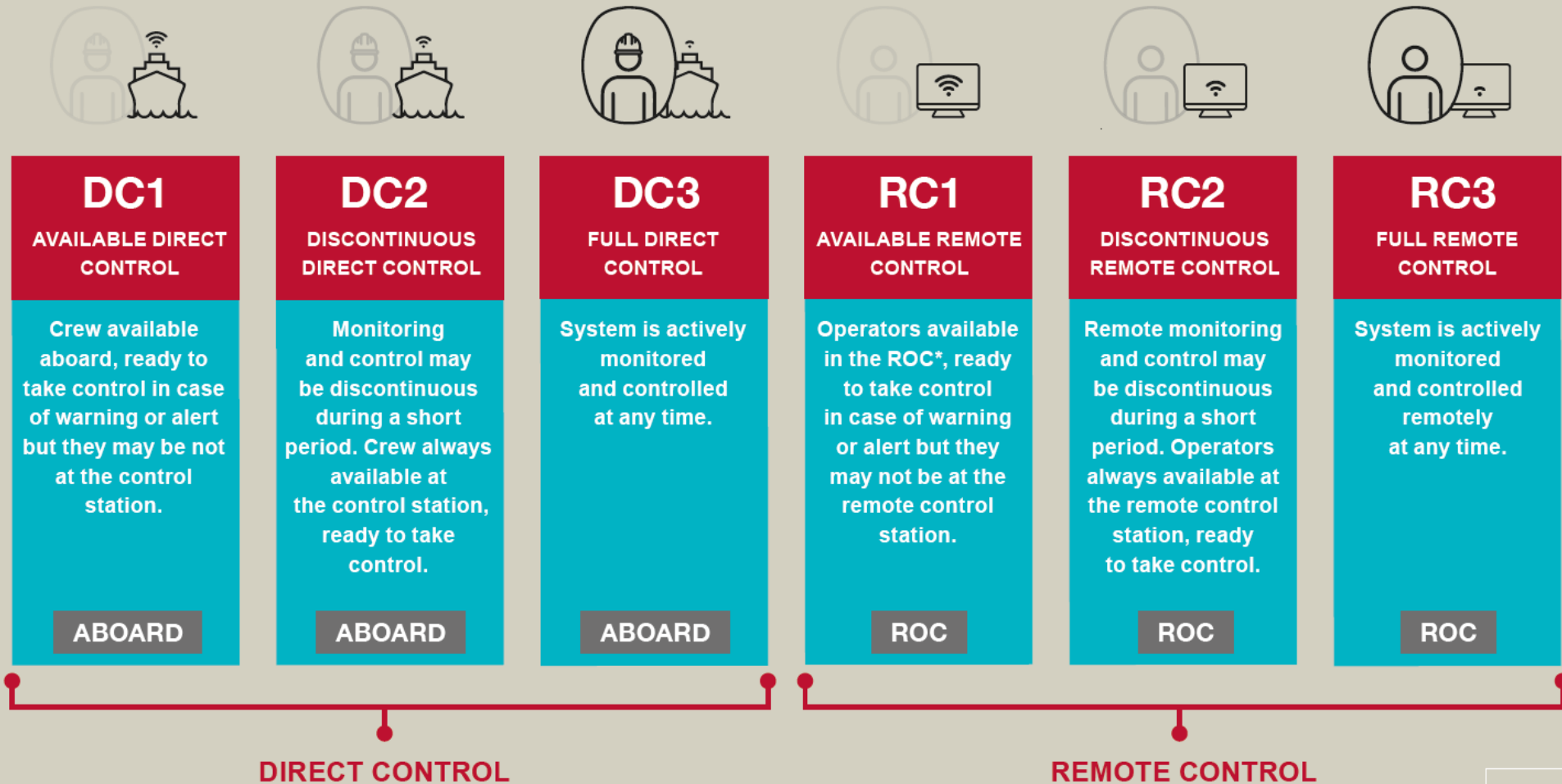


**A4**

**FULLY  
AUTOMATED  
SYSTEMS THAT  
ONLY REQUIRE  
HUMAN  
INTERVENTION  
IN CASE OF  
EMERGENCY**



# DIFFERENT DEGREES OF CONTROL



\*ROC: Remote Operations Center

# APPROVAL IN PRINCIPLE (AiP)

At the request of the designer, shipyard, manufacturer and/or owner, BV M&O may propose an **Approval in Principle (AiP)** based on the content of the Guidance Note NI641.

The purpose of the AiP is to **confirm the feasibility** of a project and to **identify any critical points** with regard to the recommendations of the NI641.

The AiP may be delivered based on a minimum documentation.

The conclusion of the AiP is to include the **list of actions, documents, studies and analyses** to be carried out further.

**When a flag is involved**, it is mandatory to get at the beginning of the AiP process a written statement of the flag specifying:

- the deliverables expected by the flag
- the matrix "who does what" between the customer / the flag / BV / BVS

**A dedicated project management** should be set up for each AiP process, in particular when a flag is involved.



# AiP – DOCUMENTS TO BE SUBMITTED

Topic	Plans and documents to be submitted
Classification	Plans and documents to be submitted according to Society Rules in the scope of the classification of the ship and relevant to the service notation applied for
Additional class notations	Plans and documents to be submitted according to Society Rules in the scope of the additional class notations as specified in this Guidance Note, see Sec 3, [2.3.1], Sec 3, [4.3.1], Sec 3, [5.3.1] and Sec 4, [7.1.1]
Operational limitations	Details of parameters to which the crew or operators must refer for the control of the ship, see [2.3]
Identification	Details of provisions for identification, see [2.4]
Interactions	Details of provisions for interactions, see [2.5]
Automation systems	<p>Detailed specification of all automation systems, including:</p> <ul style="list-style-type: none"> <li>• Specification of the Navigation system, see Sec 3, [2]</li> <li>• Specification of the Communication network and system, see Sec 3, [3]</li> <li>• Specification of the Machinery system, see Sec 3, [4]</li> <li>• Specification of the Cargo management system, see Sec 3, [5]</li> <li>• Specification of the Passenger management system, see Sec 3, [6]</li> <li>• Specification of the Remote Control Centre, see Sec 3, [7]</li> </ul> <p>These specifications should clearly specify for each function the distribution of roles and responsibilities between the human and the system, see [2.6] and [1.8.2]</p>

# AiP – DOCUMENTS TO BE SUBMITTED

Topic	Plans and documents to be submitted
Risk assessment	<p>Detailed risk assessment report including:</p> <ul style="list-style-type: none"> <li>• Groups of functions considered, see Sec 2, [2.2]</li> <li>• List of hazards considered, see Sec 2, [2.3]</li> <li>• Risk analysis outcome, see Sec 2, [2.4]</li> <li>• Risk Control Options considered, see Sec 2, [2.6]</li> </ul>
Technology assessment	Detailed technology assessment report, if applicable, see Sec 2, [3]
Reliability	<p>Details of provisions for improving the reliability of systems including:</p> <ul style="list-style-type: none"> <li>• General system design, see Sec 4, [2]</li> <li>• Human machine interface, see Sec 4, [3]</li> <li>• Network and communication, see Sec 4, [4]</li> <li>• Software quality assurance, see Sec 4, [5]</li> <li>• Data quality assurance, see Sec 4, [6]</li> <li>• Cybersecurity, see Sec 4, [7]</li> </ul>
Testing	<p>Detailed tests specifications and reports, including:</p> <ul style="list-style-type: none"> <li>• Software tests, see Sec 4, [8.1]</li> <li>• Simulation tests, see Sec 4, [8.2]</li> <li>• Full scale tests, see Sec 4, [8.3]</li> </ul> <p>All tests reports should include the targeted objective, the followed procedure, the expected results and the outcome achieved</p>



# CYBER SECURITY

## ADDITIONAL CLASS NOTATION CYBER SECURE

Concerning the cyber security, reference is made to the applicable requirements related to the assignment of the **additional class notation CYBER SECURE** from Society Rule Note **NR659, Cyber Security for the Classification of Marine Units**.

**7.1.1** The computer based systems and networks should be compliant with the applicable requirements related to the assignment of the additional class notation **CYBER SECURE** from Society Rule Note NR659, Cyber Security for the Classification of Marine Units.

*NI641 R01 Oct 2019 - Sec 4 – 7.1.1*



# RISK & TECHNOLOGY ASSESSMENT + FAILURE ANALYSIS



**COMPULSORY in all cases**

**If necessary**

Risk  
assessment  
(HAZID)

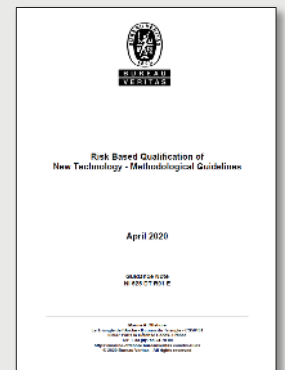


Failure Mode  
and EffeCt  
Analysis  
(FMECA)



Risk Based Qualification of New Technology -  
Methodological Guidelines” NI 525

IMO guidelines  
MSC circ.1002,  
1212, 1455



**Appropriate preventive and mitigating risk reduction measures**

Design, CONOPS, ...



## Global service delivery

# PORTFOLIO OF AUTONOMOUS AND REMOTE CERTIFICATION



# SEAOWL



BUREAU VERITAS AND THE FRENCH FLAG DEVELOP INNOVATIVE COMPLIANCE APPROACH FOR SEAOWL'S 'ROSS' REMOTE OPERATIONS

Sep. 19 2020

Paris La Defense, September 15, 2020 - Bureau Veritas (BV), a world leader in testing, inspection, and certification (TIC) services has been working with the French flag to support and enable Seaowl's innovative remote-operated vessel project.



BUREAU VERITAS DELIVERS APPROVAL IN PRINCIPLE TO DRIX - AN INNOVATIVE UNMANNED SURFACE VESSEL

# exail

...n, and certification, has delivered an ... company and a pioneer in the field of ... ice vessel (USV) named Drix. This AIP ... which operates under the novel concept of ... remotely supervise autonomy.

The Maritime Executive

News Features Podcasts Magazine Newsletter Blogs Directory

PORT OF LAND & SEE

TOP STORIES

- U.S. Navy Tests Out RF Emission Ship Tracking Using Satellite Data
- USCG Medevacs Two Cruise Ship Crewmembers With Chemical Burns
- Germany's Win Calls for 10GW Green Hydrogen

3074 85 Views Shares

Japan Demonstrates Long Distance Autonomous Ship Operations

EDITORIALS TOP STORIES

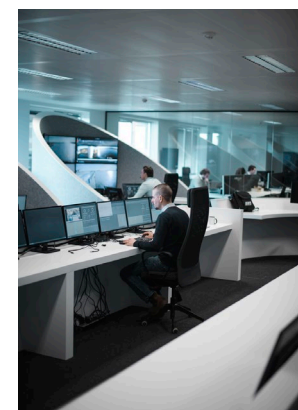
- Profile: Fletch Burton, a Hero of the D-Day Landings
- Is the U.S. Really Committed to an Indo-Pacific Trade Agreement?
- Titanic at 110: The Legacy of the International Ice Patrol
- Mar-Shipping Predicts Post-Pandemic Rebound at 2023 Conference
- Better Cybersecurity at Sea Starts With the Crew

Japanese cargo ship Suzaku sailed 426 nm in latest autonomous ship demonstration (Report Foundation)

PUBLISHED MAR 15, 2022 8:54 PM BY THE MARITIME EXECUTIVE



NYK CONFIDENCE



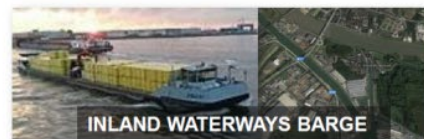
# SEAFAR



NR407 INTERNAL WEBINAR



## Participation in major EU projects

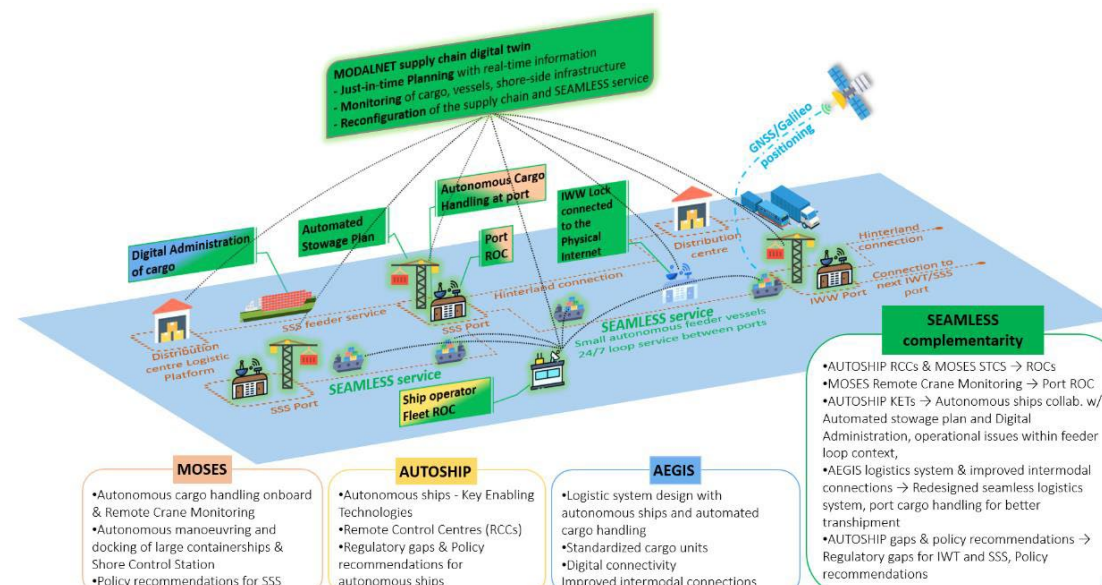


**AUTOSHIP**  
Autonomous Shipping Initiative for European Waters

<b>Operational focus</b>	Transit, docking & undocking, lock navigation, continuous operation	Transit, docking & undocking, cargo operation, fish farm interaction, weather window
<b>Autonomy level</b>	4. Constrained Autonomous & Continuously Unmanned	3. Constrained autonomous & Periodically unmanned bridge - high degree of automatic operations
<b>Area of operation</b>	Inland Waterways	Open Sea
<b>Rules &amp; regulations</b>	National Authorities and local governing bodies	Flag state, Classification Societies, IMO
<b>Shore operation</b>	Logistical and transport planning, monitoring, exception handling	Route planning, monitoring, remote controlled operations, exception handling, decision support
<b>Infrastructure</b>	RIS (River Information System), VTS, Lock interaction	Local / Coastal VTS
<b>Connectivity</b>	Near land possible use of mobile networks and shorter range communication	Shorter range communication where available, otherwise satellite communications



**SEAMLESS**



**NOVIMAR**  
VESSELTRAIN

# PARTICIPATION IN R&D PROJECTS FOR AUTONOMY



04.

NR681 USV  
July 2022



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# NEW SERVICE NOTATION USV FOR **CIVIL** & NAVAL UNITS



## Unmanned Surface Vessel (USV)

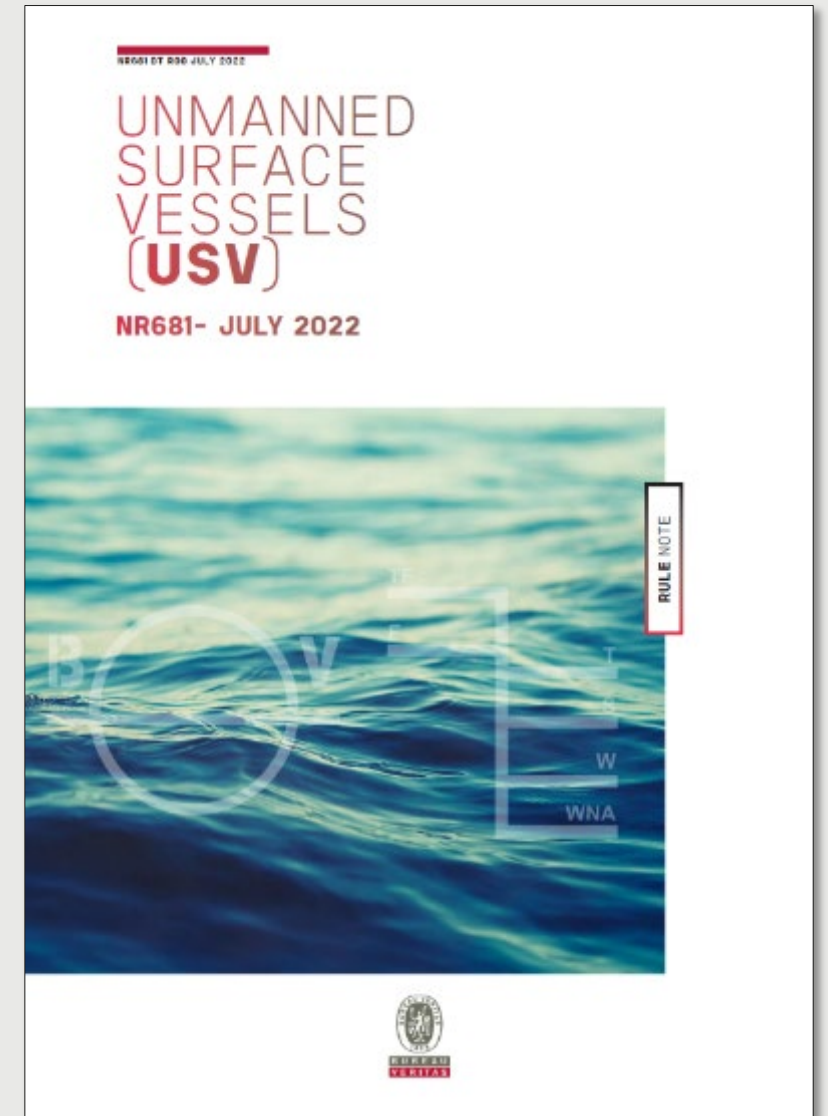
The service notation **USV** is assigned to unmanned surface units.

The type of service is to be specified after the service notation.

Example: **USV / hydrographic survey ship**

Example: **USV / minehunter**

The scope of application and the requirements for the assignment of the service notation **USV** are given in the Rule Note NR681.





# NEW RULE NOTE NR681 USV - SCOPE



- The scope of the service notation **USV** is limited to units with the following characteristics:
  - **unmanned surface** vessel (no human aboard)
  - **less than 500 GT**
  - built in **steel, aluminium, or composite** materials
  - with the following degrees of automation, direct control and remote control as defined in NI641 Sec1 Table 1 & 2:
    - A1 - DC0 - RC3** (human directed, no direct control, full remote control)
    - or
    - A2 - DC0 - RC2** (human delegated, no direct control, discontinuous remote control)
    - or
    - A3 - DC0 - RC1** (human supervised, no direct control, available remote control)
  
- **Underwater** vehicles & **non-manoeuving** units, such as drifting buoys used for scientific research are **out of scope**

# NEW RULE NOTE NR681 USV - SCOPE

NI 641 Sec 1 Table 1

Degree of automation		Manned	Definition	Information Acquisition	Information Analysis	Authority to make decisions	Action initiated by
A0	Human operated	Yes	Automated or manual operations are under human control. Human makes all decisions and controls all functions.	System Human	Human	Human	Human
A1	Human directed	Yes/No	Decision support: system suggests actions. Human makes decisions and actions.	System	System Human	Human	Human
A2	Human delegated	Yes/No	System invokes functions. Human must confirm decisions. Human can reject decisions.	System	System	Human	System
A3	Human supervised	Yes/No	System invokes functions without waiting for human reaction. System is not expecting confirmation. Human is always informed of the decisions and actions.	System	System	System	System
A4	Full automation	Yes/No	System invokes functions without informing the human, except in case of emergency. System is not expecting confirmation. Human is informed only in case of emergency	System	System	System	System

NI 641 Sec 1 Table 2

Degree of control		Human presence	Location of control station
Direct control	DC0	No direct control	No crew available to monitor and control the system, nor to take control in case of warning or alert.
	DC1	Available direct control	Crew available aboard, ready to take control in case of warning or alert But they may be not at the control station
	DC2	Discontinuous direct control	Monitoring may be discontinuous during a short period Crew always available at the control station, ready to take control
	DC3	Full direct control	System is actively monitored and controlled at any time
Remote control	RC0	No remote control	No operator available to monitor and control remotely the system, nor to take control in case of warning or alert.
	RC1	Available remote control	Operators available in the RCC, ready to take control in case of warning or alert But they may be not at the remote control station
	RC2	Discontinuous remote control	Remote monitoring may be discontinuous during a short period Operators always available at the remote control station, ready to take control
	RC3	Full remote control	System is actively monitored and controlled remotely at any time
(1) See also [2.8.3]: there may not be any integrated control station			

Characterisation according to NI641 Sec1 Table 1 & 2

**A1 - DC0 - RC3** = human directed, no direct control (nobody on board), full remote control

**A2 - DC0 - RC2** = human delegated, no direct control (nobody on board), discontinuous remote control

**A3 - DC0 - RC1** = human supervised, no direct control (nobody on board), available remote control

# NR681 – ADDITIONAL CLASS NOTATIONS REQUIRED



**Sec 1, [4.2.1]** Unmanned surface units assigned the service notation **USV** are to comply with the applicable requirements related to the assignment of the following additional class notations, as applicable:

a) for integrated bridge system:	notation <b>SYS-IBS</b>	→ NR467, Pt F, Ch 4, Sec 2
b) for dynamic positioning with redundancy:	notation <b>DYNAPOS AM/AT R</b>	→ NR467, Pt F, Ch 11, Sec 5
c) for integrated machinery spaces:	notation <b>AUT-IMS</b>	→ NR467, Pt F, Ch 3, Sec 4
d) for automated operation in port:	notation <b>AUT-PORT</b>	→ NR467, Pt F, Ch 3, Sec 3 for civilian units → NR483, Pt E, Ch 4, Sec 2 for naval units
e) for availability of machinery:	notation <b>AVM-IPS</b> notation <b>AVM-IPS1-(V)</b>	→ NR467, Pt F, Ch 2, Sec 3 for civilian units → NR483, Pt E, Ch 3, Sec 3 for naval units
f) for liquid cargo in bulk:	notation <b>CARGOCONTROL</b>	→ NR467, Pt F, Ch 12, Sec 4
g) for liquid cold cargo:	notation <b>COLD CARGO</b>	→ NR467, Pt F, Ch 8, Sec 4
h) for refrigerated cargo:	notation <b>REF-CARGO</b>	→ NR467, Pt F, Ch 7, Sec 2
i) for cyber security:	notation <b>CYBER SECURE</b>	→ NR659
j) for synchronous communication	notation <b>SYNC-COM-R</b>	→ NR467, Pt F, Ch 4, Sec 3 (Jan. 2024)
k) for data centric evaluation	notation <b>DATA CENTRIC</b>	→ NR690 (Apr. 2024)

**Sec 1, [4.2.2]** The applicable requirements related to the assignment of these additional class notations may be adjusted according to the results of the risk and technology assessment (refer to NI641, Sec 2), the navigation notation, the operational limitations, the possibility of external rescue, etc., in particular for small units, to the satisfaction of the Society and the Flag or Naval Authorities.



# NR681 - MAIN SPECIFICS INTRODUCED IN THE RULES COMPARED TO MANNED SHIPS

## Main specific requirements taking account no human aboard – HULL PART

- **Alternative arrangements** may be accepted related to **bulwark and guard rails**
- Rapid and easy deployment of **anchoring and towing arrangements** are to be demonstrated, even in the **absence of main power** on the unit
- **Number of openings** are to be limited are to be kept to a minimum
- When required, **closing appliances** on ventilation openings are to be **controllable from the remote-control station**

# NR681 - MAIN SPECIFICS INTRODUCED IN THE RULES COMPARED TO MANNED SHIPS

## Main specific requirements taking account no human aboard – **SYSTEMS PART**

- Required **actuators** shall **not** be fitted with **manual means** of actions **only**
- In case of loss of normal power source for the automation system, an **automatic change-over** to a **continuously available** standby source shall be arranged
- **Insulation level to earth**, when required to be monitored, is to be available in the remote-control station
- **Circuit breakers** are to be controllable from the remote-control station
- **Indicators & alarms** that should normally be available in the control command room of the unit should be available the remote-control place.
- **Control and alarm systems** shall have self-check facilities: in case of failure, an alarm shall be activated at the remote-control station
- **Bilge level alarm** at remote control sensors
- **Fixed fire detection and extinguishing systems** shall be installed in all **spaces of the unit**
- No specific **fire insulation**
- Remote control available for **inlets and outlets of ventilation systems**

# NR681 - MAIN SPECIFICS INTRODUCED IN THE RULES COMPARED TO MANNED SHIPS

## Main specific requirements taking account no human aboard – NAVAL UNITS

- Additional hazards in the scope of the risk analysis :
  - ammunition explosion,
  - blast and recoil effects of weapons,
  - temporary or permanent communication blackout due to discretion imperatives
- For ammunition storage, temperature and temperature gradient detection information shall be reported to the remote-control station



## KEY MESSAGE

1. The international statutory context for MASS & USV is still under construction
2. Two types of technical offers may be proposed:
  - **AiP** based on **NI641** for **MASS**
  - **Classification** based on **NR681** for **USV**



## Point of Contact

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