



D3.5 Report on preparation for update of CESNI standards with a view to alternative fuels skills

Grant Agreement No.	101006364
Start date of Project	01-01-2021
Duration of the Project	30 months
Deliverable Leader	CCNR
Dissemination level	Public
Status	V0.5
Submission Date	27-03-2023
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This deliverable has not yet been approved by CINEA

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006364. The opinions expressed in this document reflect only the author's view and in no way reflect the European Commission's opinions. The European Commission is not responsible for any use that may be made of the information it contains.

Version

Version #	Date	Author	Organisation
V0.1	12-01-2023	J. Rusche, C. Daloze	CCNR
V0.2	02-02-2023	M. Chaffart, A. Mintjes, H. Schreuders, J. Smallegange	ETF, MAH, KBN, STC
V0.3	14-02-2023	C. Daloze, J. Rusche	CCNR
V0.4	01-03-2023	Myriam Chaffart, Peter Zandhuis, K. de Schepper,	ETF, MAH, INE
V0.5	03-03-2023	C. Daloze, J. Rusche	CCNR

Release Approval

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Executive Summary

This deliverable is providing follow-up of the Platina3 deliverable on competence for the use of alternative fuels and of the Platina3 deliverable on refresher classes for such fuels, the Platina3 deliverables D 3.1 and D 3.2.

Within the consortium, experts from international organisations in charge of safety of transport on inland waterways such as the Secretariat of the Central Commission for the Navigation of the Rhine (CCNR) and the Secretariat of the Danube Commission, social partners (represented by the European Transport Workers Federation (ETF) and IWT platform) and education institutes tried to propose what could be the best way to deal with future competences of the personnel related to the use of zero or low emission propulsion systems.

This deliverable shows how the PLATINA3 findings related to competences on zero or low emission propulsion systems can be **concretely** integrated into the CESNI standards.

This deliverable recalls the dialogue between the scientific research carried out within PLATINA3 and the transformation of this research into European-wide usable technical standards.

This report provides:

- the methodology used in CESNI/QP to use the PLATINA3 input and make it an applicable standard;
- a collection of the first feedbacks from experts from CCNR and EU Member States united in CESNI and questions of principle that remain to be discussed, even outside CESNI when it comes to police regulations, which are most of all related to:
 - the responsibility of the proposed experts for alternative fuels in relation to the responsibility of the boatmaster who has the overall responsibility for the craft, the persons on board and the cargo.
 - the number and periods of presence that could be required from the experts (e.g. presence only in case of maintenance and replacement of batteries or at all times).
- a possible approach for the future, including draft standards for practical examination for relevant qualifications identified by CESNI experts (to be submitted to CESNI).

CESNI will first focus on the definition of the specific experts following the timing developed for the update of the European Standard on Technical Requirements in Inland Navigation (ES-TRIN). In parallel, competent legislators such as River Commissions and Member States may wish to introduce the specific experts in the applicable manning requirements or use the standards developed by CESNI/QP to enrich recommendations for individual craft serving as pilot projects, before new regulations have been added to ES-TRIN and ES-QIN.

The first stage of receipt of PLATINA3 deliverables by CESNI/QP is **very positive and conclusive**. In general, it can be said that **the work performed in PLATINA3 gives both a very concrete approach** with the proposal of competence tables but also **paves the way for future reflections** that will have to be done to consolidate the new competences. They contributed to a certain **awareness** of the global challenges that CESNI/QP will work on in the coming months and years.

List of abbreviations

AC/DC	Alternative current / Direct current
CCNR	Central Commission for Navigation of the Rhine
CESNI	European Committee for the Elaboration of Standards In the field of Inland Navigation (French acronym: Comité européen pour l'élaboration de standards dans le domaine de la navigation intérieure)
CESNI/QP	Working group on professional qualifications
CESNI/QP/Crew	Working group on crew-related requirements
CESNI/QP/QM	Working group on quality management
CINEA	European Climate, Infrastructure and Environment Executive Agency
DNV	Det Norske Veritas
ES-QIN	European Standard for Qualifications in Inland Navigation
IWT	Inland Waterway Transport
LNG	Liquefied Natural Gas
MAH	Maritieme Academie Harlingen
ML	Management Level
OL	Operational Level
STCW	Standards of Training, Certification and Watchkeeping for Seafarers

1. Introduction

Inland Waterway Transport (IWT) is recognised as an environmentally friendly and safe mode of transport, and one of the most appropriate means of transportation in the pursuit of a sustainable development strategy. But like every other mode of transport, technological change forces inland navigation personnel to adapt their competences (knowledge and skills) throughout their career.

In the age of time, inland navigation and its crews are currently undergoing in-depth changes: both in terms of greening (i.e. new modes of propulsion, eco-driving) and of modernising vessels in terms of steering (increasingly automated vessels in a near future).

a. How ES-QIN provides a solid basis for introducing new harmonised competences at European level

In 2022 a new European system for education and training has been introduced. The “historical” system was based on an experience-oriented approach. Now, a competence-based system entered into force which materialises within the ES-QIN (European Standard for Qualifications in Inland Navigation). Directive (EU) 2017/2397¹ and the new CCNR Regulations for Rhine Navigation Personnel (RPN)² both refer to the CESNI standards of ES-QIN 2019.

CESNI standards are elaborated and adopted by the CESNI Committee (European Committee for drawing up standards in the field of inland navigation – French acronym - Comité européen pour l’élaboration de standards dans le domaine de la navigation intérieure). The purpose of the committee is to bring together experts from the Member States of the European Union and the CCNR and representatives of international organisations with an interest in inland navigation³.

The CESNI fulfils the following missions:

- *adopt **technical standards in various fields**, in particular as regards vessels, information technology and **crew** to which the respective regulations at the European and international level, including the European Union and the CCNR, will refer with a view to their application,*
- ***deliberate on the uniform interpretation and application of the said standards**, on the method for applying and implementing the corresponding procedures, on procedures for exchanging information, and on the supervisory mechanisms among the Member States;*
- *deliberate on derogations and equivalences of technical requirements for a specific craft;*
- *deliberate on priority topics regarding safety of navigation, protection of the environment, and other areas of inland navigation.*

The ES-QIN is based on a well-established system for the competencies:

1) Standards for competences (Part I of ES-QIN)

For each competence, the corresponding knowledges and skills are listed.

¹ Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC, OJ L 345 27.12.2017

² CCNR, Regulations for Rhine Navigation Personnel (RPN), as revised by CCNR resolution in the autumn plenary meeting 2022, see <https://ccr-zkr.org>

³ See also “About CESNI”, <https://www.cesni.eu/en/about-cesni/>

Figure 1: Example of a table of competences for the management level

1. Navigation

1.1. The boatman shall be able to assist the management of the craft in situations of manoeuvring and handling a craft on inland waterways. The boatman shall be able to do so, on all types of waterways and all types of ports.

In particular, the boatman shall be able to:

COLUMN 1 COMPETENCE	COLUMN 2 KNOWLEDGE AND SKILLS
<p>1. assist with mooring, unmooring and hauling (towage) operations;</p>	<ol style="list-style-type: none"> 1. Knowledge of equipment, material and procedures used on board for mooring, unmooring and hauling (towage) operations. 2. Ability to use required equipment on board e.g. bollards and winches for mooring and unmooring and hauling manoeuvres. 3. Ability to use materials available on board such as ropes and wires considering relevant safety measures including the use of personal protective and rescue equipment. 4. Ability to communicate with the wheelhouse using intercom communication systems and hand signals. 5. Knowledge of the effects of water movement around craft and local effects on sailing circumstances including the effects of trim, shallow water relating to craft's draught. 6. Knowledge of the water movement affecting the craft during manoeuvring, including the interaction effects when two craft pass or overtake each other in narrow fairways, and the interaction effects on a craft moored alongside when another craft proceeds in the fairway and passes at a short distance.

Source: ES-QIN 2019/1

This structure allows training institutes to have a **readable overview of the competences, knowledges and skills** they have to train learners for. This allows clear curricula to be established. Furthermore, it allows future crew members to know exactly what they are expected to learn and acquire.

In addition to these core standards for competence, Part I of ES-QIN contains standards of competence for the **following specific authorisations:**

- competence for sailing on inland waterways with a maritime character
- competence for sailing with the aid of radar
- competence for passenger navigation experts
- **competence for liquefied natural gas (LNG) experts.**

Figure 2: Example of a table of competences for liquefied natural gas (LNG) experts

Chapter 6: Standards of competence for liquefied natural gas (LNG) experts

(Resolution CESNI 2018-II-7)

1. **The expert shall be able to ensure compliance with legislation and standards applicable to craft that use LNG as fuel, as well as with other relevant health and safety regulations.**

The expert shall be able to:

COLUMN 1 COMPETENCE	COLUMN 2 KNOWLEDGE AND SKILLS
1. ensure compliance with relevant legislation and standards applicable to craft using LNG as fuel;	<ol style="list-style-type: none"> 1. Knowledge of regulations relating to craft using LNG as a fuel such as relevant police regulations, relevant regulations on technical requirements and ADN. 2. Knowledge of classification society rules. 3. Ability to instruct and monitor crew member operations in order to ensure compliance with legislation and standards applicable to craft using LNG as a fuel on board the craft and in particular with the bunkering procedure.
2. ensure compliance with other relevant health and safety regulations when sailing and moored.	<ol style="list-style-type: none"> 1. Knowledge of relevant health and safety regulations including relevant local requirements and authorizations in particular in port areas. 2. Ability to instruct and monitor crew member operations in order to ensure compliance with other relevant health and safety regulations.

Source: ES-QIN 2019/1

2) Standards for practical examination (Part II of ES-QIN)

These standards list the **abilities** (from the competence standards) and determine the priority items to be examined. They also introduce a rating methodology. They are a major tool for examiners. The Part II of ES-QIN contains standards for practical examination for:

- obtaining a specific authorisation for sailing with the aid of radar
- obtaining a certificate of qualification as a passenger navigation expert
- **obtaining a certificate of qualification as a LNG expert**
- obtaining a certificate of qualification as a boatmaster
- the additional module on supervision in the context of the practical examination for obtaining a certificate of qualification as a boatmaster.

The standards for the practical examination for obtaining a certificate of qualification for the operational level (OL) is not part of ES-QIN (because not required by the Directive), but it is published on CESNI's website as "other standards"⁴.

3) Standards for the approval of a simulators (Part III of ES-QIN)

Simulators are increasingly used to test candidates for qualifications during practical examinations. Ample experience has been built up with reference to radar exams, not only as specific authorisation but also as

⁴ Standards for the practical examination for obtaining a certificate of qualification for the operational level (OL) https://www.cesni.eu/wp-content/uploads/2022/05/practical-exam-OL_EN.pdf

refresher class. Simulators must be (technically and functionally) able to test the abilities listed in the standards for practical examinations. For this reason, the ES-QIN contains the technical and functional requirements necessary for simulators to be approved. For this reason, the addition of any new competence must also lead to a review of the need to adapt Part III of the ES-QIN; both are necessarily linked.

Additional requirements for professional qualifications outside ES-QIN

Apart from simulator standards and other CESNI standards, legislators like the EU and CCNR may want to consider whether minimum requirements for age, administrative compliance, competence (in terms of essential competence requirements as the essence of CESNI standards) and navigation time may have to be drafted to address e.g. experience of crew members using alternative fuels.

In summary it can be said that the ES-QIN mechanism provides flexibility. Thanks to its holistic approach, ES-QIN makes it possible to consider the **addition of new competences as a whole**: from the training to the issuance of the certificate. As ES-QIN is the core reference for the EU and the CCNR, it has a **European vocation** and allows a pan-European level-playing field. Harmonisation of rules also allows for a **centralised quality management**, for which CESNI/QP is tasked.

b. Input for competences for operation of vessels with zero or low emission

PLATINA3 Work Package 3, Jobs & Skills, addresses new developments in the IWT sector faced by the IWT workforce, which are aligned with targets that are supported by waterway managers and European IWT associations for a fit-for future waterway system. The overwhelming support received for the Mannheim Declaration of Transport Ministers of the CCNR and for the Communication of the European Commission on NAIADES III outlines developments paths and initiatives focus at:

1. Integration & digitalisation of IWT in view of modal shift & multimodal transport
2. A zero- emission, automated & climate resilient fleet
3. Smart & climate resilient waterway and port infrastructure with clean energy hubs

It is within this framework that a very concrete deliverable⁵ was developed to identify the competences, subdivided in knowledges and skills, required for the operation of vessels with zero or low emission. This deliverable identifies competences, knowledge and skills, dealing with alternative fuels, propulsion technology and exhaust gas after treatment that could be proposed to update the ES-QIN. The proposed draft standards have been the result of broad consultations: PLATINA3 Work Package team⁶, CESNI/QP Chair and CESNI/PT Chair, classification societies, sector and more. They were also introduced in the 5th Stage Event in Budapest on 19 and 20 October 2022⁷. Feedback from CESNI/QP experts allow to design and fine-tune a first approach of defined concrete functions for experts for alternative fuels. Following the example of the LNG expert, a practical examination could be discussed in CESNI after the definition of the tasks of such an expert, as it has been done in ES-QIN. This deliverable is providing for a first draft of such standards.

Main key takeaways from Deliverable 3.1

Given the main takeaways from PLATINA Deliverable 3.1, 2 approaches have been discussed:

- Option 1: define a specific additional qualification, using the LNG expert as a blue print
- Option 2: integrate new competences into the general set of competences of the boatmaster (competence standards for the management level).

⁵ Report on required competence for operation of vessels with zero or low emission D3.1, PLATINA3 project, 31 August 2022.

⁶ Consisting of Maritieme Academie Harlingen, BLN-Schuttevaer, STC-Group and CCNR

⁷ Report D5.8 Platina 5th Stage Event, 17 November 2022 (see Minutes, session 2)

The feedback of CESNI/QP experts has helped to choose **option 1** for the following reasons:

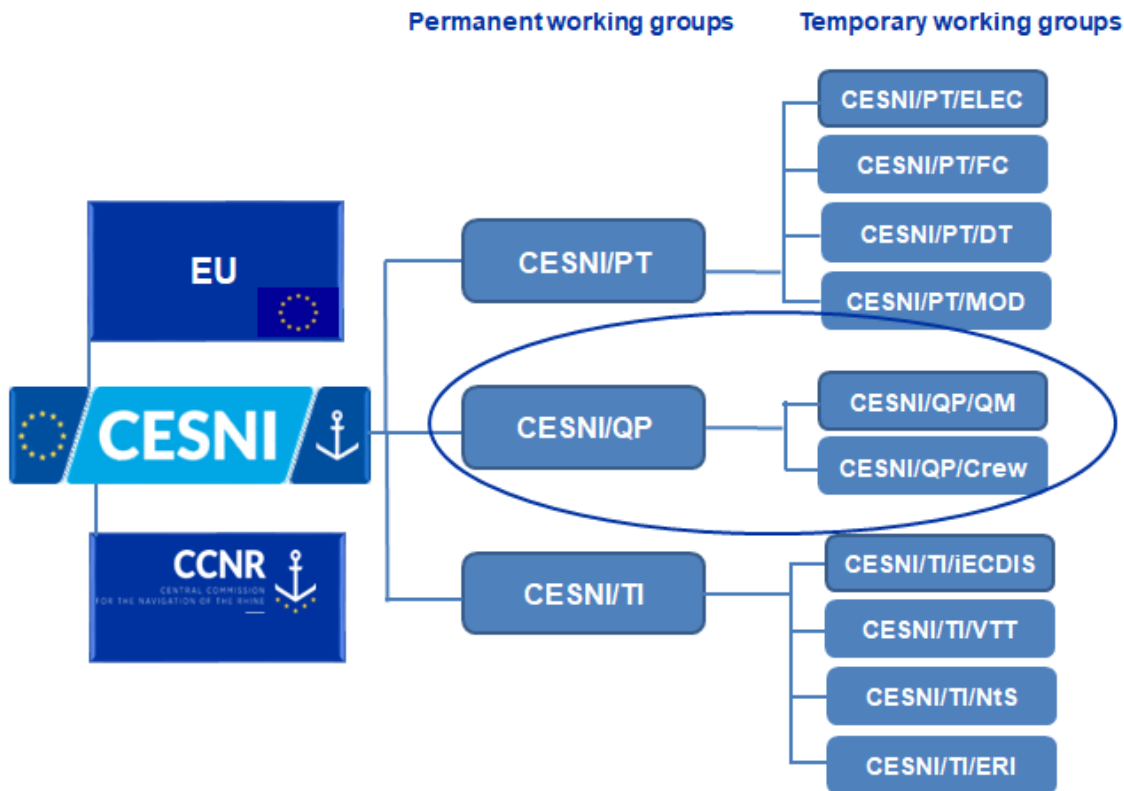
- addressing persons not crew members but providing external help on shore for crew members when performing bunkering/battery replacement activities including swapping battery containers and installing them on board and removing them from the craft (this could not be possible with competences integrated in the initial training). Experts did not look into tasks related to battery charging (yet);
- a modular approach could target specific dangers related to electricity that differ from dangers specific to fuels such as for example methanol.
- the diversity of pilot projects at present may suggest that there will not be a “1 size fits all” solution, the individual expert approach allows for tailor-made solutions.

According to these discussions, the draft CESNI standards have been re-designed with these orientations.

2. Preliminary examination of the draft standards by CESNI/QP

Before the preliminary examination of the draft standards by CESNI/QP, it is important to understand the organisation of CESNI. Figure 3 below provides that concise overview.

Figure 3: CESNI's organisation in January 2023



Source: CCNR Secretariat

The permanent working group on professional qualifications (CESNI/QP) is assisted in its mission by two temporary working groups:

- CESNI/QP/Crew: the working group on crew-related requirements⁸
- CESNI/QP/QM: the working group on quality management⁹.

The content is worked on by the experts in the temporary working groups, who have a particular interest and expertise. CESNI/QP provides guidance and decides when the deliverables and inputs (draft standards, roadmaps, organisation of a specific workshop) are mature enough to be submitted to the Committee. The permanent and temporary working groups meet 4 times per year, in week-session (usually: February, May, September, November).

The following task is included in the part “Professional qualifications” of the CESNI’s work programme 2022-2024: “Draft competence standards for new and innovative technologies including the use of relevant alternative fuels, batteries and electric propulsion systems¹⁰”. This task was proposed by a joint problem analysis¹¹, emphasising the importance of Platina’s input for this task. The task is planned with a **priority I**, meaning that work is ongoing or

⁸ Mandate: see Resolution CESNI 2021-II-1: https://www.cesni.eu/wp-content/uploads/2022/02/cesni21_37en_final2.pdf

⁹ Mandate: see Resolution CESNI 2021-II-1: https://www.cesni.eu/wp-content/uploads/2022/02/cesni21_37en_final2.pdf

¹⁰ https://www.cesni.eu/wp-content/uploads/2021/12/CESNI_work_prog_22_24_EN.pdf

¹¹ See the document CESNI/QP (21) 87 for the problem analysis.

needs to be started in the first half of the 3-years mandate (2022-2024), meaning before Mid- 2023. This PLATINA3 deliverable therefore fits perfectly into the programme and timetable of the CESNI/QP working group.

Presentations and discussions in CESNI/QP meetings in 2021-2022

20 May 2021 (CESNI/QP)¹²: Mr Boll from the Maritieme Academie Harlingen (MAH) explained that Battery Electric, Fuel Cells and Hydrogen, Ammonia and Methanol as combustion fuel will be considered. E-Fuels (Hydrogen based synthetic Diesel-like fuel) is still in an experimental stage. Mr Boll presented the preliminary findings:

- Electric propulsion in combination with battery packs and/or generators (alternative fuels) is most likely to play a main role in future propulsion systems. Fuel cells also require battery packs as a mean of temporary storage and these systems require profound knowledge to be operated and manipulated safely. Therefore, there is a need for an improved set of skills for the work with High Voltage/High Current systems on board inland Vessels.
- There are different bunkering procedures for different fuels, by taking into account the characteristics of the different fuels: liquid at ambient temperatures and pressure (Ammonia/Methanol/E-Fuels), pressurized and Cryogenic (liquid Hydrogen), Standardized bundles of high-pressure storage bottles with a common manifold in a transportable cage (Hydrogen as pressurized gas at ambient temperatures), Charging/exchange of batteries.
- The use of any propulsion system must be safe and manageable for the crew, and new trainings are then needed.
- there is still a very dynamic development regarding alternative fuels and concluded to keep the regime open for new developments in the field of fuels, batteries and propulsion systems.

14 February 2022 (CESNI/QP/QM)¹³: the experts examined a revised draft submitted by MAH. The conclusions were following:

- mitigation measures to fight the risk of fire still need to be more precise,
- there is a tendency not to make the new competence standards mandatory for all boatmasters,
- experts prefer not to integrate the full set of competences needed to sail on vessels using alternative fuels for propulsion into the general standards of competence for boatmasters. If, however, elements of knowledge on locking procedures, signals, emergency situation should be known by all boatmasters, these elements must be known and duly covered by the standards of competence, just as it is the case with LNG or ADN vessels,
- experts show sympathy for an approach like for the competence, examination and assessment of an LNG expert according to ES-QIN. Once there are different experts, their competences could be defined in different competence standards,
- on the manning requirements, the presence of experts on board and when bunkering could be already reflected upon in CESNI/QP/Crew in addition to the current focus on technological progress.

12 May 2022 (CESNI/QP)¹⁴

Experts take note of a preliminary analysis from DG MOVE experts if new qualifications or specific authorisations are allowed under the new legal framework on professional qualifications. As a preliminary finding with a view to the possibility to establish new specific authorisations for boatmasters sailing craft propelled by alternative/zero emission fuels, the imperative of safety and the protection of the environment allow Member States to introduce additional competence requirements not covered by the current legal framework of professional qualifications in inland navigation, if safety of navigation of the protection of the environment were at stake.

¹² See minutes: CESNI/QP (21)m 47

¹³ See minutes: CESNI/QP (22)m 12

¹⁴ See minutes: CESNI/QP (22)m 28.

19 September and 15 November 2022 (CESNI/QP/QM): experts examined the draft standards, as submitted to CINEA translated into the 4 CESNI languages.

The German delegation mentioned a threshold above which it is impossible for someone outside the electrical sector to deal with electrical systems in Germany: 1000 V AC (1500 V DC).

In the meantime, the STCW Convention has changed its definition of high voltage: “high-voltage” means an alternating current (AC) or direct current (DC) voltage in excess of 1000 volts¹⁵.

The Secretariat emphasised that in the framework of the CCNR for the evaluation of pilot projects, there is an input from classification societies which always foresee that the sensibilisation of all crew members should be provided (in analogy with the LNG expert).

Feedback from the CESNI/QP (temporary and permanent) working groups

1) Using the LNG approach as a blueprint (specific authorisation)

The use of a specific authorisation for LNG has proved its worth and it is naturally this way that the CESNI/QP experts wish to explore in order to add new skills. The advantages of this option have already been mentioned above. In line with the ES-QIN approach, these autonomous competences can also be tested individually and potentially on simulators. It is also easier to develop refresher classes based on autonomous standards (see the dedicated report on refresher classes, D3.2)

From a human point of view, the specialisation of a member of the crew on a particular topic is an argument for employability and therefore attractiveness. It is also a good way to reward and develop non-boatmaster crew members on new skills. This "upskilling" approach on a voluntary basis also gives the sector flexibility in training its crews.

2) Without excluding the need of reviewing the initial training

CESNI/QP also takes into account other arguments raised by its members or by classification societies: while the specialisation of an expert seems to be an appropriate solution, all the other crew members who will be working on vessels equipped with new propulsion systems should not be put aside. This is why CESNI/QP will also proceed to a review of the OL and ML competence standards at the light of the new competences linked to these new vessels.

In particular, emphasis may be put on the chapters 7 (both for OL and ML) related to health and safety and environmental protection. For example, the report D3.1 pointed out that the procedure to extinct fire of burning LI-ION accumulators is much more complex than the procedure to fight fire on board a classic vessel and different from the procedures for some other alternative fuels like methanol for example. Given the importance of training crew members to react to accidents, basic knowledge could be included in the initial training.

3) Modular approach

CESNI/QP experts also find that a modular approach helps to target specific dangers related to electricity that differ substantially from dangers that are specific to fuels, for example such as methanol.

It also gives the sector the opportunity to offer training in line with their fleet greening strategy and to have qualified personnel for this purpose.

The modular approach also gives flexibility to Member States to chose to refer or not to these standards, which conducts to a better acceptance of these standards. This is key from the CESNI perspective. The ultimate goal is to have a uniform standard throughout Europe. But for standards that are not (yet) made mandatory by the

¹⁵ STCW, MSC.486(103) : the resolution is effective from 01/01/2023.

CCNR, the EU or other international organisations, a synchronised implementation is unlikely (adaptation of regulatory frameworks necessary). But these standards provide the basis for a regulatory tool.

4) Methodology for the next steps

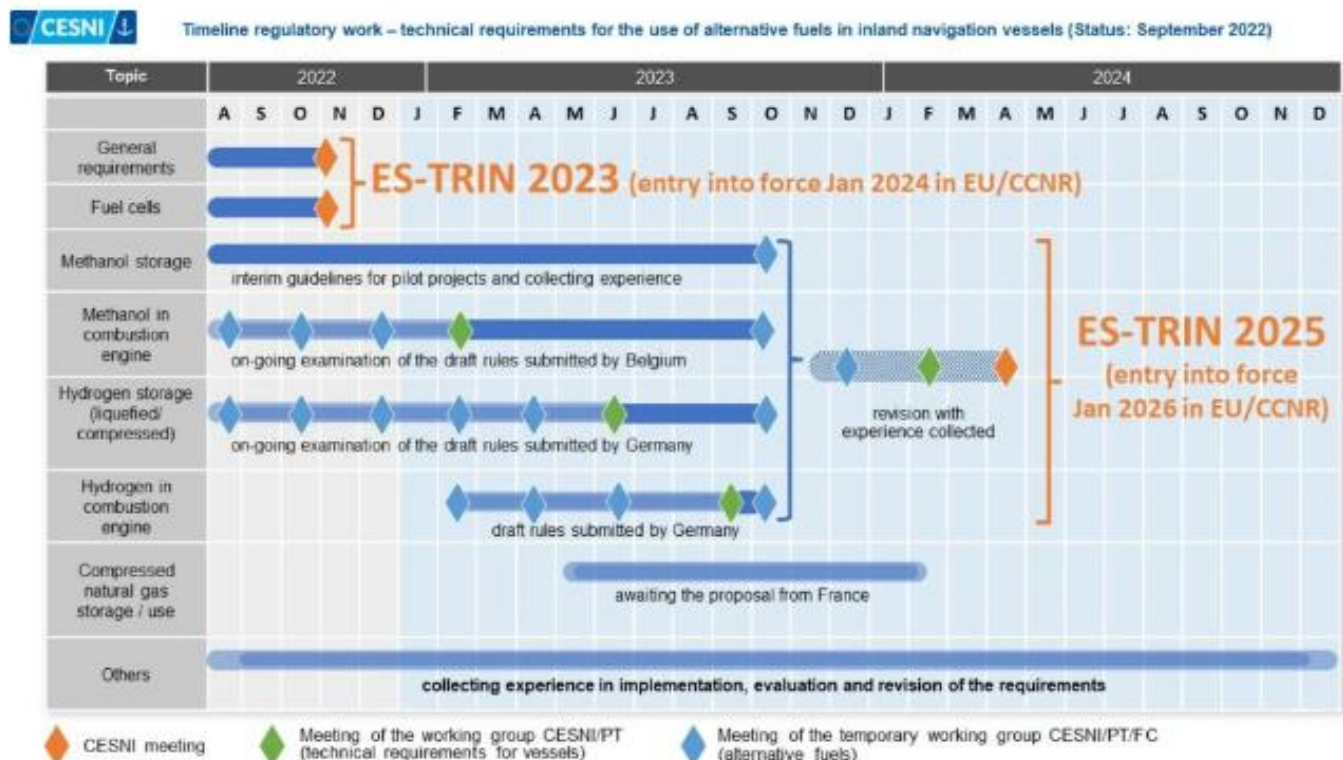
In its meeting on 23 February 2023, CESNI/QP discussed and suggested the following approach:

- Member States and Social Partners suggested a careful approach without too ambitious requirements, given the shortage of qualified personnel and given the need to define the exact tasks that experts in green and more automated vessel operation will have to carry out;
- The experts pleaded for a reasonable approach and wished to examine further the risks that each new technology poses in concrete terms to the crew members concerned; a workshop on these risks will be held in March 2023 to unite CESNI expertise in the field of technical requirements and professional qualification;
- Once the tasks expected of experts have been more accurately designed for the specific fuels in question defined, CESNI/QP will be able to better assess what the requirements for competences, their teaching and testing may look like. At this point, the CCNR Secretariat may wish to table a revised draft standard for practical examination to update the draft standards annexed to this deliverable;
- The experts consider it preferable to follow the timetable of the technical requirement for the good consistency of the CESNI standards.

Ideally, delegations could take the lead on technologies of which they have a better knowledge, for example through national pilot projects that have been submitted to the competent working group of CCNR who may grant recommendations that allow the vessel to sail on the Rhine and all European waterways.

In terms of timeline, ES-QIN update should go hand in hand with ES-TRIN updates. The timeline for the ES-TRIN updates is illustrated in figure 4.

Figure 4: ES-TRIN updates



Source: CESNI website, see cesni.eu

CESNI/QP could develop a similar timeline, based on the input received from PLATINA3 and on the schedule targeted in the field of the technical requirements.

Comparison of the maritime vs. IWT approach

In November 2022, the classification society DNV published an exhaustive report on the update of skills of maritime staff: *“Insights into seafarer training and skills needed to support a decarbonized shipping industry”*¹⁶. In this study, DNV makes a try to describe the skills that every seafarer needs to have or develop with view to new technologies (propulsion modes or automation).

The report proposes a first table on the personal, organisational and management skills and competencies that enable the implementation of new technology in shipping.

Table 1: personal, organisational and management skills and competences that enable the implementation of new technology in shipping

Personal skills and competencies	
Skills	<ul style="list-style-type: none"> • Ability to make use of new working methods • Ability to learn new skills as technology changes • Ability to be creative and interact socially with others • Multi-lingual skills for communication in a global operation
Competencies	<ul style="list-style-type: none"> • Innovation mindset to understand business development and take advantage of digital technology • Analytical thinking (including risk and systems analysis) to interpret and understand the need for change and the measures required
Organizational and management skills and competencies	
Skills	<ul style="list-style-type: none"> • Ability to communicate and negotiate, to promote required change to colleagues and customers • Ability to market and promote greener products and services • Ability to consult and advise end-users about green solutions and to spread the use of green technologies
Competencies	<ul style="list-style-type: none"> • Ability to implement change management • Ability to develop and implement management systems • HR and knowledge management • Advanced knowledge in project management to implement new technology • Ability to work strategically, to enable policymakers and business executives to set the right incentives and create conditions to achieve goals • Ability to manage teams and people working remotely and/or in dispersed teams • Ability to coordinate and manage holistic and interdisciplinary approaches incorporating economic, social and ecological objectives

Source: Report Insights into seafarer training and skills needed to support a decarbonized shipping industry (DNV, 2022)

This first general table is mostly based on “soft skills”: communication, change management, social behaviour etc. This is partially due to the fact that the table also covers post-automation qualifications.

The report proposed a second table, which is more based on operational competences:

¹⁶ Insights into seafarer training and skills needed to support a decarbonized shipping industry, Report N°2022-0814, rev. 0, 4 Nov. 2022, available online on the following link: https://safety4sea.com/wp-content/uploads/2022/11/DNV-Seafarer-Training-and-Skills-for-Decarbonized-Shipping-2022_11.pdf

Table 2: skills and competencies for the operation of craft using alternative fuel technologies

Safety skills and competencies	
Skills	<ul style="list-style-type: none"> • Seafarers on vessels operating with conventional fuels will have to adopt the safety mindset of the tanker/gas fleet when working with new fuel types • Ability to implement updated emergency preparedness procedures such as first aid, fire detection and fire fighting
Competencies	<ul style="list-style-type: none"> • Knowledge of potential hazards of the fuel on board and how these apply to equipment operation and maintenance • Knowledge of gas testing and atmosphere monitoring procedures • Knowledge of fuel-specific chemistry and physics to understand potential safety hazards • Understanding the basic concepts and properties of the different fuel types
Skills and competencies to master complex maritime operations	
Skills	<ul style="list-style-type: none"> • Ability to perform safe vessel and equipment maintenance with more hazardous fuels on board • Ability to handle the digital and manual systems for bridge, deck, engine, manoeuvring and propulsion that are introduced with the new fuel technology • Ability to master new bunkering methods • Ability to operate complex hybrid and zero-emission machinery • Ability to operate hydraulic components and pneumatic equipment
Competencies	<ul style="list-style-type: none"> • Knowledge of engine functions and manoeuvring characteristics • Knowledge of how to operate the vessel in an energy efficient manner
Sustainability skills and competencies	
Competencies	<ul style="list-style-type: none"> • Knowledge of emission monitoring and documentation • Knowledge of environmental economics and the use of performance management systems • Knowledge of logistics and optimization methods to achieve high vessel utilization and advanced routing • Knowledge of environmental awareness and sustainable development of businesses
Digital skills and competencies	
Skills	<ul style="list-style-type: none"> • IT and digital skills • Data fluency and ability to interpret and analyse large amounts of data • Ability to operate equipment using digital controls • Ability to solve tasks digitally through operations monitoring and system management • Ability to update, service and repair digital systems
Competencies	<ul style="list-style-type: none"> • Remote control of operations, logging and analysing data from several sources • Basic digital technology knowledge (IoT, sensors, networks, cyber security, connectivity). Advanced analytics and use of data to optimize the fleet • In-depth technical knowledge to understand complex systems (seafarer as systems manager) • Knowledge of cybersecurity
Automation skills and competencies	
Skills	<ul style="list-style-type: none"> • Manage automation failure, with onshore support • Detailed knowledge of and proficiency in the use of automated systems. Ability to monitor and correct their function (S/C)
Competencies	<ul style="list-style-type: none"> • Ability to diagnose defects and rectify via automated systems • Advanced knowledge of electrical systems • Knowledge of programmable logic controllers (PLCs)

Source: Report Insights into seafarer training and skills needed to support a decarbonized shipping industry (DNV, 2022)

In contrast to the approach chosen within PLATINA3 (with the support of CESNI/QP), this recent study has chosen a very generalist and non-technology-oriented approach. It should be noted that this approach also includes automation-related skills, which PLATINA3 has chosen to treat separately. Platina's draft standards offer a more operational, concrete and tailor-made approach, which also include the soft skills as corner piece (for automation).

Dissemination video for PLATINA3

Some CESNI/QP experts gave a dynamic feedback by participating in a dissemination video for PLATINA3. They were invited to explain their expectations of the PLATINA3 deliverables and the added value of these deliverables for CESNI/QP.

The various key messages testify of the positive receipt of the PLATINA3 deliverables within CESNI/QP, being at least a Member State representative, an expert from the CESNI Secretariat, a representative from the European Commission and a representative from agreed organisation, representing civil society.

3. Possible approach for implementation of PLATINA3 proposals

CESNI/QP will deal in the coming meetings with the draft standards.

A priori, CESNI/QP is moving towards a combination of:

- separate competence standards for new technologies: which will be part of a specific authorisation. The legal basis for this approach is examined and validated.
- an update of the initial competences (OL and ML) to ensure that all crew members on board have the basic knowledge and awareness of risks linked to the new technology, in particular responsiveness in case of accidents.

As a logical follow-up to the ES-QIN and as foreseen in the work programme, CESNI/QP experts will then have to develop standards for the simulators (priority II), if needed, and for the practical examinations (priority III). Draft standards for the practical examinations are annexed to this report (Annex 2).

When setting up ES-QIN, CESNI experts first defined standards of competence and proceeded to drafting of standards for practical examination afterwards. In practical exams, examiners can choose between a certain number of category I and II elements. In category I, 7 out of 10 points must be reached to pass the examination element. A poor performance in one of the category I elements cannot be made up for by a better result in a category II element. In category II, applicants may fail to pass a certain examination element, if a total score of 60 per cent of all tested category II is reached.

International or national legislators could still wish to decide for which tasks the expert really needs to be present onboard. For some alternative fuels or energy sources, like batteries, CESNI will examine if the experts need to be present at all times during vessel operation or if the presence is only required during bunkering/(re-)placing of accumulators on board and during maintenance.

4. Conclusions

The first stage of receipt of PLATINA3 deliverables by CESNI/QP is **very positive and conclusive**.

As the draft standards were coordinated with CESNI/QP at a very early stage, the final version that was sent to CESNI/QP already incorporated important concepts for CESNI. They are therefore already delivered in an advanced state. However, this requires a thorough examination by the competent experts.

Given the priority I and the emergence of many pilot projects, CESNI/QP will need to work with some urgency on the issue. CESNI/QP noted the strong demand from the sector and the training institutes for a harmonised, consolidated training framework to which national or international regulations refer.

In general, it can be said that **the work performed in PLATINA3 gives both a very concrete approach** with the proposal of competence tables but also **paves the way for future reflections** that will have to be done to consolidate the new competences. They contributed to a certain **awareness** of the global challenges that CESNI/QP will work on in the coming months and years.

Annex 1: source list

Legal sources

- CESNI, European Standard for Qualifications in Inland Navigation (ES-QIN), edition 2019 (including ES-QIN 2018), https://www.cesni.eu/wp-content/uploads/2020/03/ES-QIN_2019_en.pdf
- CCNR, Regulations for Rhine Navigation Personnel (RPN), January 2022, <https://www.ccr-zkr.org/13020500-fr.html>
- Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC, OJ L 345 27 December 2017

Studies and reports

- Insights into seafarer training and skills needed to support a decarbonized shipping industry, Report N°2022-0814, rev. 0, 4 Nov. 2022, available online on the following link: https://safety4sea.com/wp-content/uploads/2022/11/DNV-Seafarer-Training-and-Skills-for-Decarbonized-Shipping-2022_11.pdf

Annex 2: Draft standards for practical examination for applicants for a specific authorisation in new and innovative technologies including the use of relevant alternative fuels, batteries and electric propulsion (State 13/02/2023)

Table 3 below shows what experts for alternative fuels or energy carriers shall be able to do.

Table 3: competences and examination elements

No	Competence	Examination elements	Category I-II
Electrical propulsion			
1	1.1.4	instruct and monitor crew member operations in order to ensure compliance with legislation, standards and instructions applicable to craft using high voltage and high current electrical propulsion and auxiliary systems;	II
2	1.2.6	perform inspection and daily maintenance of the high voltage and high current electrical propulsion and auxiliary systems in a safe and efficient manner;	I
3	1.2.7	take remedial action necessary during malfunctions in a high voltage and high current system;	I
4	1.3.4	check if components can be touched without risk and to avoid fire risks related to high voltage;	I
5	1.3.5	use proper fire extinguishing equipment on burning electrical equipment;	I
6	1.3.6	take measures to prevent or mitigate the dangers of an electric arc.;	I
7	1.4.4	detect failure modes based on the available parameters of an electrical propulsion system (e.g., cooling water temperature, winding temperature, Ampere and Voltage levels);	I
8	1.4.5	regain steerageway to the craft in case of a failure of the power electronics or failure in the regulation and control of the propulsion system;	I
9	1.4.6	handle the power management between the several power sources and electrical drives during normal and emergency operation (e.g. damage on side of the craft);	I

No	Competence	Examination elements	Category I-II
10	2.0.1.4	instruct and monitor crew member operations in order to ensure compliance with legislation, standards and instructions applicable to craft using high-capacity accumulator systems;	II
11	2.0.2.8	conduct risk-inventarisation and risk-evaluation;	II
12	2.0.2.9	perform first aid in case of contact with uncovered accumulator material such as electrolyte or powder on the skin or in the eyes;	I
13	2.0.2.10	instruct and monitor crew members' operations in order to ensure compliance with safety standards when interacting with accumulators;	II
14	2.0.3.3	use proper fire extinguishing equipment or trigger the fire extinguishing system on burning accumulators;	I
15	2.0.3.4	prevent spreading of thermal runaway on board;	I
16	2.0.3.5	handle accumulators affected by a thermal runaway and to evacuate them onshore for external connection and additional foam supply in due time;	I
17	2.0.3.6	take cooling measures in the accumulator room;	I
18	2.1.1.2	verify proper functioning of the components of the charging and exchange systems;	I
19	2.1.1.3	properly respond to alarms and taking necessary actions including registering and notifying the boatmaster;	I
20	2.1.1.4	operate accumulator systems taking into account relevant technical aspects;	I
21	2.2.1.3	perform the allowed daily, weekly and regular periodic maintenance;	I
22	2.2.1.4	correct malfunctions document checks and maintenance work;	I II
Fuel cell systems			
23	3.0.1.4	instruct and monitor crew member operations in order to ensure compliance with applicable legislation, standards and instructions, including applicable individual derogations containing additional provisions and precautions to prevent incidents and protect crew, craft and environment;	II

No	Competence	Examination elements	Category I-II
24	3.0.2.2	instruct and monitor crew member operations in order to ensure compliance with relevant health and safety regulations;	II
25	3.1.1.5	deal with hazards related to fuels in fuel cells;	I
26	3.1.1.6	operate specific systems of fuel cells;	I
27	3.2.1.2	respect characteristics of fuels used in daily operation;	I
28	3.2.1.3	verify characteristics with design parameters and perform corrections in line with specific storage conditions if needed;	I
29	3.2.2.2	perform emergency shut down and blow off procedures;	I
30	3.2.2.3	conduct risk management and to assess and control dangerous areas, fire safety and to use personal protective equipment;	I
Fuels other than diesel and LNG			
31	4.0.1.4	instruct and monitor crew member operations in order to ensure compliance with legislation, standards and manufacturer's instructions applicable to craft using cryogenic systems on board the craft and in particular with the bunkering procedure;	II
32	4.0.1.5	perform safe bunkering procedures;	I
33	4.0.2.7	conduct daily maintenance and monitoring of the cryogenic system including management of fuel boil-off, taking into account what maintenance and repair work that must be done by specially trained personnel;	I
34	4.0.2.8	perform allowed maintenance tasks, as specified by the manufacturer;	I
35	4.0.2.9	safely remedy or mitigate a spill or leakage, in liquid or gaseous form;	I
36	4.0.2.10	register and notify any (near) incident with the installation operating on board;	II
37	4.0.3.2	instruct and monitor crew member operations in order to ensure compliance with relevant health and safety regulations, including police regulations;	II
38	4.0.4.2	perform and supervise bunkering procedures in order to ensure a safe operation, taking into account the correct use of personal	I

No	Competence	Examination elements	Category I-II
		safety equipment and the strict adherence to safety procedures;	
39	4.0.4.3	fill in mandatory bunkering checklists;	II
Non-cryogenic gaseous fuels			
40	4.1.1.3	instruct and monitor crew member operations in order to ensure compliance with legislation and standards applicable to craft using gas as a fuel on board the craft and in particular with the bunkering procedure;	II
41	4.1.2.6	operate ventilation systems;	I
42	4.1.2.7	conduct daily maintenance and monitoring of the system including knowledge of maintenance and repair work that must be done by specially trained personnel;	I
43	4.1.2.8	perform allowed maintenance tasks;	I
44	4.1.2.9	safely remedy or mitigate a spill;	I
45	4.1.3.2	instruct and monitor crew member operations in order to ensure compliance with relevant health and safety regulations;	II
46	4.1.4.2	prevent leakage and to understand malfunctions and to instruct and monitor crew members' activities during the general operation of the fuel system, especially during bunkering procedures in order to ensure a safe operation. Taking into account the correct use of personal safety equipment and the strict adherence to safety procedures;	I
47	4.2.1.3	instruct and monitor crew member operations in order to ensure compliance with legislation and standards applicable to craft using liquid fuel on board the craft and in particular with the bunkering procedure involving flammable liquids;	II
48	4.2.2.5	perform daily control and maintenance on the fuel system;	I
49	4.2.2.6	use the correct bunker connections for various liquids;	I
50	4.2.2.7	deal with spills with a view to possible toxicity of some of the proposed liquid fuels, especially in case of leakage below deck;	I
51	4.2.3.2	prevent leakage;	I

No	Competence	Examination elements	Category I-II
52	4.2.3.3	react on malfunctions and to instruct and monitor crew members' activities during the general operation of the fuel system, especially during bunkering procedures in order to ensure a safe operation, taking into account the correct use of personal safety equipment and the strict adherence to safety procedures, including reporting procedures for (near) incidents, spills and failures during bunkering operations;	I
53	4.2.4.2	respect bunkering check list;	II
54	4.2.4.3	prevent leakage and to understand malfunctions and to instruct and monitor crew members' activities during the general operation of the fuel system, especially during bunkering procedures in order to ensure a safe operation, taking into account the correct use of personal safety equipment and the strict adherence to safety procedures;	I
55	4.3.1.3	perform offloading/recycling procedures in compliance with legislation and standards applicable to systems producing reaction products on board the craft;	I
56	4.3.1.4	monitor crew member operations in order to ensure compliance with legislation and standards applicable to systems producing reaction products on board the craft and in particular with the offloading/recycling procedure;	II
57	4.3.2.3	use required safety equipment (i.e. protective eye - glasses and protective clothing);	I
58	4.3.2.4	apply relevant safety standards;	I
59	4.3.3.2	instruct and monitor crew member operations in order to ensure compliance with other relevant health and safety regulations;	II
60	4.3.4.2	operate systems producing reaction products taking into account relevant technical aspects.	I



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This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006364. The opinions expressed in this document reflect only the author’s view and in no way reflect the European Commission’s opinions. The European Commission is not responsible for any use that may be made of the information it contains.



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Funded by the Horizon H2020 Programme of the European Union under grant agreement No 101006364