CCNR
CENTRAL COMMISSION
FOR THE NAVIGATION OF THE RHINE

Danube Commission,
Working Group on Technical Matters
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CCNR's Vision to support the harmonised development of remote and automated navigation:

state of play of work

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1. The organisation - CCNR

- **Oldest international organisation** in operation (1815)
- **5 Member States**, 11 Observer States
- **Cooperation** with
  other international organisations, such as EU,
  industry (shipowners, yards, equipment manufacturers...)
- Governs navigation on the Rhine:
  freedom, safety and **promotion** of navigation
- **Binding regulations** from Basel to the sea
  - » Police/operational rules
  - » Vessel technical requirements
  - » Crew (qualification and composition)
- Other competencies relating to infrastructure, economics, legal issues and dangerous goods



2. Policy objectives

Automation and remote operation

→ Wide range of processes and applications - from track guidance assistant to uncrewed vessels
→ Fast development in inland navigation
→ Potential answers to challenges like lack of attractiveness and shortage of personnel
→ Hopes of economic benefits with reduction of operational costs and creation of business models
→ Measures needed to maintain a high level of safety in inland navigation

Ministerial declaration in Mannheim (2018)

§.5 “press ahead with development of digitalisation, automation and other modern technologies, thereby contributing to the **competitiveness, safety and sustainability of inland navigation**."

Swiss presidency priorities (2026-2027)

“**pursue its commitment to innovation** in the field of digitalisation and automation.”

“Whether a vessel is operated from the wheelhouse or from the shore, with or without assistance systems, the **safety of people and the environment must remain the top priority**. Switzerland is therefore committed to promoting high safety standards and the continuous updating of CCNR regulations.”

3. Vision to support harmonised development (2021)

Adopt an **international definition** of levels of automation in inland navigation

Create a **framework for the authorisation of pilot projects** which require temporary derogations from CCNR regulations

→ Gather experience and inspire Member States for projects on their own national waterways or transnational projects

Establish a **dedicated committee (RN)** to allow pilot projects on the Rhine and coordinate the regulatory work given the cross-sectoral nature of automation / remote control

Develop simultaneously the requirements for the operation of vessels, the training of personnel and the composition of crews, as well as the vessel technical requirements and those relating to information technology and liability

4. International definition (first edition in 2018 and revised in 2022)

framework for a shared understanding of automated navigation

	Level of automation[1]	Designation	Craft command (steering, propulsion, wheelhouse, etc.)	Monitoring of and responding to navigational environment	Fallback performance of dynamic navigation tasks
BOATMASTER PERFORMS PART OR ALL OF THE DYNAMIC NAVIGATION TASKS	0	**NO AUTOMATION** the full-time performance by the boatmaster of all aspects of the dynamic navigation tasks, even when supported by warning or intervention systems			
	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 boatmaster performs all remaining aspects of the dynamic navigation tasks			
	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 boatmaster performs all remaining aspects of the dynamic navigation tasks			
SYSTEM PERFORMS THE ENTIRE DYNAMIC NAVIGATION TASKS (WHEN ENGAGED)	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 boatmaster will be receptive to requests to intervene and to system failures and will respond appropriately			
	4	**HIGH AUTOMATION** the sustained context-specific performance and fallback performance by a navigation automation system of all dynamic navigation tasks, without expecting a boatmaster responding to a request to intervene[2]			
	5	**AUTONOMOUS = FULL AUTOMATION** the sustained and unconditional performance and fallback performance by a navigation automation system of all dynamic navigation tasks, without expecting a boatmaster responding to a request to intervene			

Example - Level 2

Advanced system with control of **steering and propulsion**

like advanced track guidance assistance for inland navigation (advanced TGAIN).

This system may have a function of collision avoidance warning.

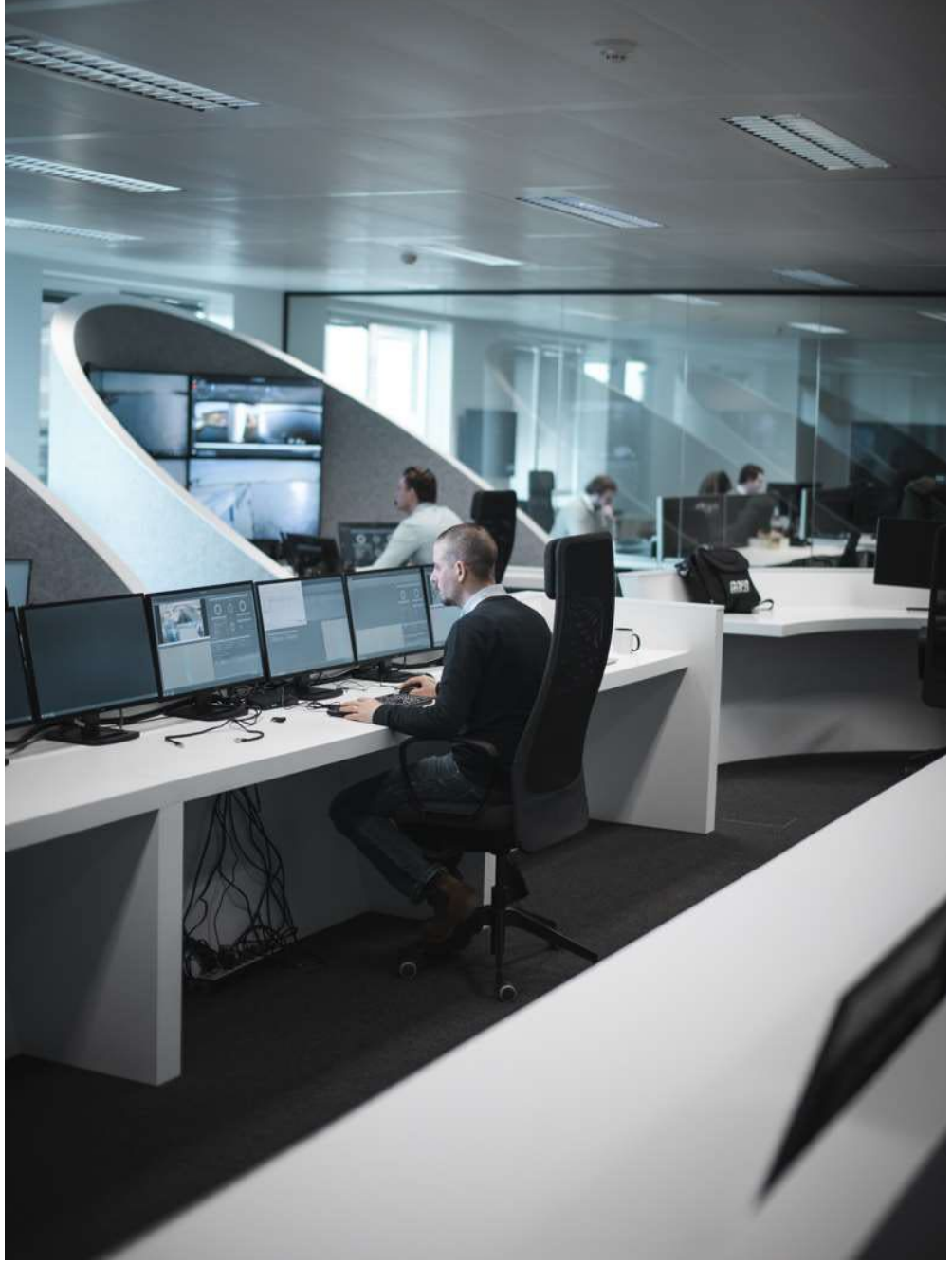
=> Widely used by pilot projects in inland navigation, national authorities, and international institutions such as UN/ECE or associations such as PIANC.

4. International definition

Automated navigation:
Action taken over by a system

≠

Remote operated vessel:
Action performed remotely by a human or a system



Source : seafar

5. Framework for allowing pilot projects and first derogations approved

CCNR regulations (vessel, police, crew) were **updated to allow derogations** on the Rhine

Defined procedure outlining stakeholder roles, national authority, and CCNR Member States

→ Although ongoing efforts are being made to streamline the procedure, thorough preparation at the national level continues to be crucial.

Minimum content for applications for derogations:

→ a comprehensive list of requested derogations from CCNR regulations, a risk assessment, and mitigation measures addressing the identified risks…

Dedicated web page

https://www.ccr-zkr.org/12050000-en.html



5. Framework for allowing pilot projects and first derogations approved

12 derogations granted on the Rhine, including vessels transporting dangerous goods

→ 3 more under examination

→ Max stretch allowed Gorinchem-Karlsruhe (with the exception of Gebirge)

→ derogations from a number of provisions in the police (RPR) and vessel regulations (RVIR)

→ Full crew on board and on duty. Boatmaster on board always responsible even when the vessel is remotely operated by an operator on shore "called Phase 2"

→ No derogation to RPN (Personnel Regulation) or to ADN in Phase 2

Objective of the pilot projects

→ collection of experience (safety parameters, different stretches, weather conditions, takeovers from onboard crew…) throughout standardised reports every 6 months.

→ pave the way towards the next phase, ie reduction of crew

→ for time being, limited operating hours on the Rhine (less than 400 hours in total end - status Q1 2026)

Next steps

CCNR Member States are working together to set criteria of a successful "phase 2" to prepare the next step of experimentation on the Rhine (e.g. derogation to crew requirements)

6. Evolution of the legal framework and associated standards



REMOTE OPERATION – develop simultaneously the requirements

Most likely scenario: a **remotely operated vessel with reduction of minimal crew**, up to automation level 2

→ “A qualified boatmaster is on board and shares the navigation time with an equivalently qualified operator in the remote control center. During the boatmaster’s rest time, a qualified person is present at all times in the wheelhouse, in order to intervene in case of difficulties, either on the instructions of the shore-based operator or independently, depending on the situation.”

CCNR : Technical requirements

Ongoing preparation of draft requirements for remote operation centres and vessels

→ Ease the approval of derogations by recognising accepted solutions

6. Evolution of the legal framework and associated standards



REMOTE OPERATION – develop simultaneously the requirements

CCNR : Minimum crew and professional qualifications

→ No practical experience of operation with a reduced crew (no basis for regulatory work)

→ examining additional competences required for the “boatmaster on shore” and the “qualified person in the wheelhouse” that has to take over in case of emergency

CCNR : Police requirements

→ Awaiting feedback from the pilot projects

→ Currently finalising its gap analysis of RPNR (60 articles could be potentially affected)

→ Recognition that adapting its police regulations over the long term is unavoidable. It is expected that the “boatmaster on shore” will become responsible for many nautical tasks (in case of crew reduction).

CCNR : Investigation of legal issues (such as liability with remote operator and vessel in different Member States)

6. Evolution of the legal framework and associated standards



REMOTE OPERATION – develop simultaneously the requirements

CESNI has several tasks on its work program

→ PT-9 To draft requirements for the equipment on remotely operated craft on the basis of the experience collected, and then subsequently, to draft requirements and recommendations relating to remote operation centres”

=> awaiting CCNR Input

→ QP-7 Standards and recommendations relating to operators in remote operation centres (ROC) and crew members (OL and ML) on board of remotely operated vessels

=> awaiting collect of experience from pilot projects

→ TI- 27 Develop guidelines concerning implementation of digital technologies supporting automated navigation or remote operation systems, including cybersecurity aspects

=> Preliminary reflexions on requirements for remote operation centres for cybersecurity

6. Evolution of the legal framework and associated standards

AUTOMATION – mainly track guidance assistants (TGAIN)

Increase in vessels equipped with TGAIN (roughly 17% of the Rhine fleet)

Serious accidents at locks Iffezheim (Rhine) and Müden (Mosel) in 2025

TGAIN : "navigation equipment fitted aboard a vessel for steering the vessel automatically along a track to follow. This equipment indirectly commands the steering apparatus to change the rudder angle (vessel's heading) and possibly the propulsion system (vessel's speed) »

CCNR - New (temporary) police rules from 1 June 2026 until 31 December 2027

→ TGAIN user must

→ Hold the required qualifications (boatmaster or under supervision of)

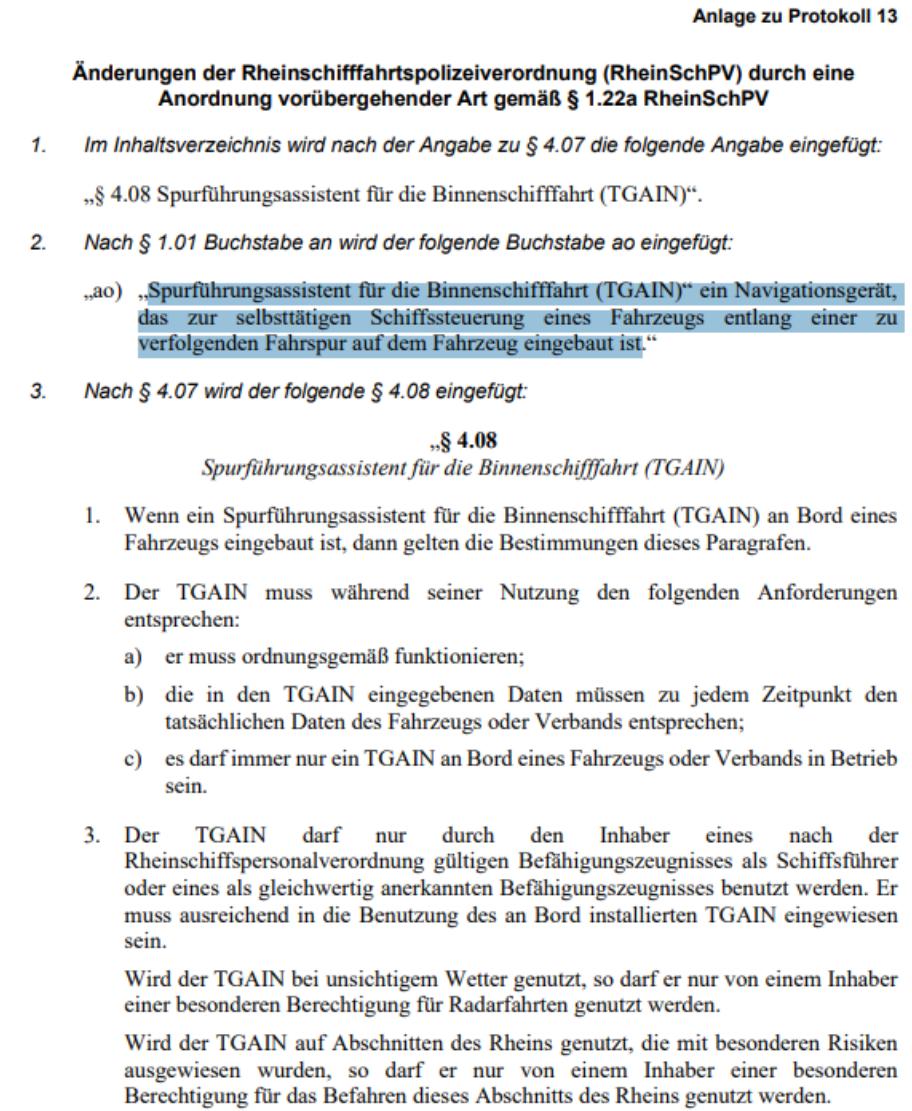
→ Be present in the wheelhouse, activate the awareness monitoring system and confirm their presence at least every 5 minutes

→ Deactivate the TGAIN in good time before entering a lock

→ Some operational data recorded and retained for four days

CCNR – Definitive police rules from 1st January 2028 (2026-I-8)

→ Reference to ES-TRIN



Anlage zu Protokoll 13

Änderungen der Rheinschifffahrtspolizeiverordnung (RheinSchPV) durch eine Anordnung vorübergehender Art gemäß § 1.22a RheinSchPV

1. *Im Inhaltsverzeichnis wird nach der Angabe zu § 4.07 die folgende Angabe eingefügt:*

„§ 4.08 Spurführungsassistent für die Binnenschifffahrt (TGAIN)".

2. *Nach § 1.01 Buchstabe an wird der folgende Buchstabe ao eingefügt:*

„ao) „Spurführungsassistent für die Binnenschifffahrt (TGAIN)" ein Navigationsgerät, das zur selbsttätigen Schiffssteuerung eines Fahrzeugs entlang einer zu verfolgenden Fahrspur auf dem Fahrzeug eingebaut ist."

3. *Nach § 4.07 wird der folgende § 4.08 eingefügt:*

„§ 4.08

Spurführungsassistent für die Binnenschifffahrt (TGAIN)

1. Wenn ein Spurführungsassistent für die Binnenschifffahrt (TGAIN) an Bord eines Fahrzeugs eingebaut ist, dann gelten die Bestimmungen dieses Paragrafen.

2. Der TGAIN muss während seiner Nutzung den folgenden Anforderungen entsprechen:

   a) er muss ordnungsgemäß funktionieren;

   b) die in den TGAIN eingegebenen Daten müssen zu jedem Zeitpunkt den tatsächlichen Daten des Fahrzeugs oder Verbands entsprechen;

   c) es darf immer nur ein TGAIN an Bord eines Fahrzeugs oder Verbands in Betrieb sein.

3. Der TGAIN darf nur durch den Inhaber eines nach der Rheinschiffspersonalverordnung gültigen Befähigungszeugnisses als Schiffsführer oder eines als gleichwertig anerkannten Befähigungszeugnisses benutzt werden. Er muss ausreichend in die Benutzung des an Bord installierten TGAIN eingewiesen sein.

   Wird der TGAIN bei unsichtigem Wetter genutzt, so darf er nur von einem Inhaber einer besonderen Berechtigung für Radarfahrten genutzt werden.

   Wird der TGAIN auf Abschnitten des Rheins genutzt, die mit besonderen Risiken ausgewiesen wurden, so darf er nur von einem Inhaber einer besonderen Berechtigung für das Befahren dieses Abschnitts des Rheins genutzt werden.

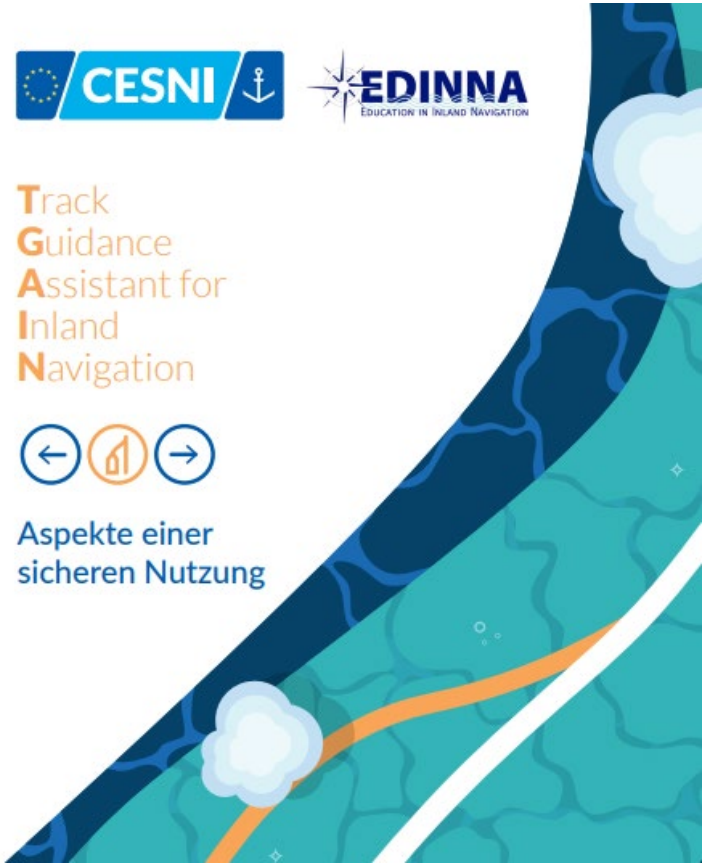
6. Evolution of the legal framework and associated standards

CESNI – Certification and installation requirements in ES-TRIN 2027
from Jan 2028 (new and existing equipment)
→ Among others, warnings and alarms (including before a foreseeable lock passage and presence monitoring)

CESNI – Visualisation of TGAIN tracks standardised in ES-RIS 2027
from Jan 2028

CESNI – Publication of a leaflet “TGAIN - Aspects of Safe Use”
→ Basic lesson material for manufacturers and training institutes for the training of crew members

CESNI – Draft amendment for the next update of ES-QIN (Initial training of boatmasters)
→ Covers the knowledge of the TGAIN’s characteristics, applications and limitations



7. Conclusions

- Policy commitment to accompany these fundamental changes of inland navigation
- CCNR as laboratory for inland navigation
  → Essential to allow pilot projects and gain experience – ongoing on the Rhine
- Comprehensive set of regulations
  → Address competitiveness and safety simultaneously
- Close cooperation with the sector / solution providers to develop targeted and workable rules
- Track pilot (TGAIN) = one building block.



Any questions?



THANK YOU FOR YOUR ATTENTION!

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Need of derogations

- Up to now, automation or remotely operated vessels are not allowed in legislation (maybe exception in Vlaanderen)

- Need to obtain a deviation from relevant applicable regulations

- For operating a vessel, following regulations might be relevant

    - Rhine Vessel Inspection regulation / Directive 2016/1629 (technical requirements) => ES TRIN
    - Locally applicable police regulation (example : Rhine police regulation)
    - Locally applicable Crew regulation (example Rhine navigation personnel regulation)
    - ADN

Technical requirements

Derogations from vessel technical requirements (ES-TRIN)

- If vessel operates solely on national waterways, Member State is authorised to grant a derogation from ES-TRIN (basis Art. 24(2) Directive 2016/1629) for “limited journeys of local interest or in harbour areas”

- if vessel operates on Rhine or on waterways belonging to another member of the European Union, it depends on vessel’s certificate nature:
  => Rhine vessel inspection certificate: only CCNR authorised to approve recommendation (Art. 2.20 RVIR)
  => based on a CCNR recommendation, a Member State can derogate from technical requirements and update Rhine vessel inspection certificate

- if vessel has European Union certificate for inland navigation vessels, EC authorised to grant derogation (Art. 25 Directive 2016/1629)
  => request examined by CESNI/PT Working group and then adopted as implementing act by EC

- derogation obtained is valid on Rhine and all waterways in European Union
- certain Union certificates issued by the EU (before 2008) not valid on the Rhine

Police regulation

Derogations from one (or more) police regulations

- police regulations apply to specific waterway

- three distinct cases:
  => if vessel is operating on international Rhine, CCNR authorised to grant derogation (Art. 1.26 RPR)
  => if vessel is operating solely in national waters (single set of police regulations), Member State authorised to grant derogation from its own police regulations
  => if vessel is operating on several national waterways, or on other international waterways, it must obtain derogation for each set of police regulations (national or international) to which it is subject during its journey

- Manager of the pilot project will need to submit a request for derogation to each competent river commission and/or each Member State

Crew

Derogations to regulations relating to crews

- if vessel is operating on Rhine, CCNR is authorised to grant derogation (Art. 17.02 RPN)

- if vessel is operating solely on national waterways, only State concerned is authorised to grant a derogation from its personnel regulations

- if vessel is operating on several national waterways, and/or on other international waterways, project manager must obtain a derogation for each set of personnel regulations (national or international) to which it is subject during its journey.

  => request for derogation to each competent river commission and/or Member State concerned

ADN

Derogations for the carriage of dangerous goods

- ADN Safety Committee competent authority if pilot project requires derogation from ADN

- experience with LNG vessels or hydrogen
  => in practice, ADN Safety Committee waited for recommendation by CCNR before taking decision

- report of 46th session of ADN safety committee states for phase 2:

(a) the main responsible boat master and the ADN expert are on board the vessel and a boat master is in the wheelhouse;

(b) the general requirements and conditions laid down in the current recommendations of the CCNR to the competent authorities […] and subsequent national authorisations issued by the competent authority are complied with

- Belgium's request for phase 3(a) limited to national waterways
  => Safety Committee recommended to follow legal framework of EU (Directive 2008/68)
- For Phase 3, some preparatory work could be undertaken by CCNR and experts from CCNR Committee for dangerous goods. It could facilitate subsequent review by ADN Safety Committee

Conclusion

Links between the derogations (feedback from phase 2)

- examination of first pilot projects:
  => derogations from a regulation were possible thanks to additional technical equipment or technical requirements
  => these additional equipment /requirement may require a derogation from ES-TRIN
  => this interdependence makes the assessment of derogations **VERY** complex