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Future of CCS TSI, what is the target system?

| 20.01.26 | Prague



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Agenda

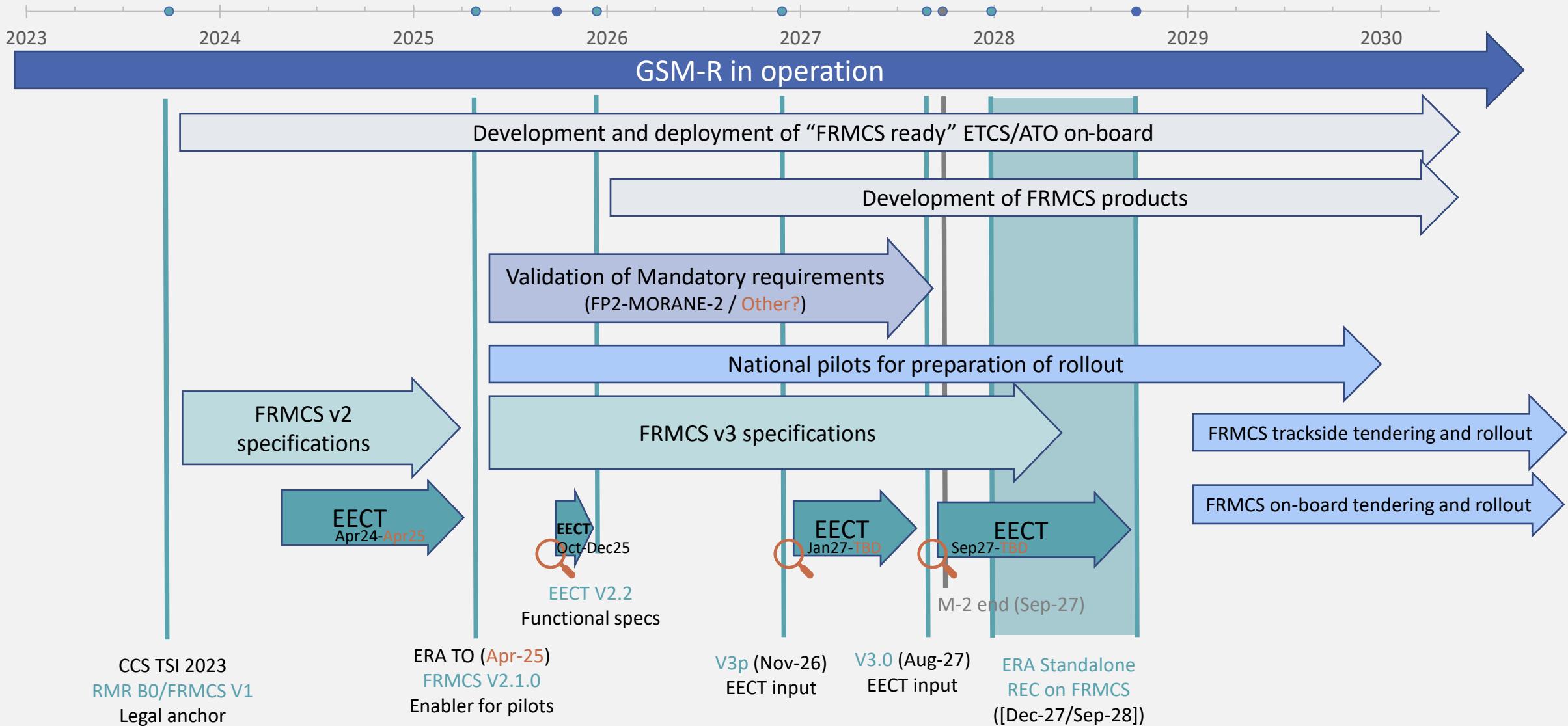
- **Topic 1: ERTMS > FRMCS part**
- Topic 2: ERTMS > ETCS/ATO part
- Topic 3: Path towards industrial approach

Strategic Planning

- EC-request with short, mid and long-term objectives
- EC-request: short term request with CCS TSI impact

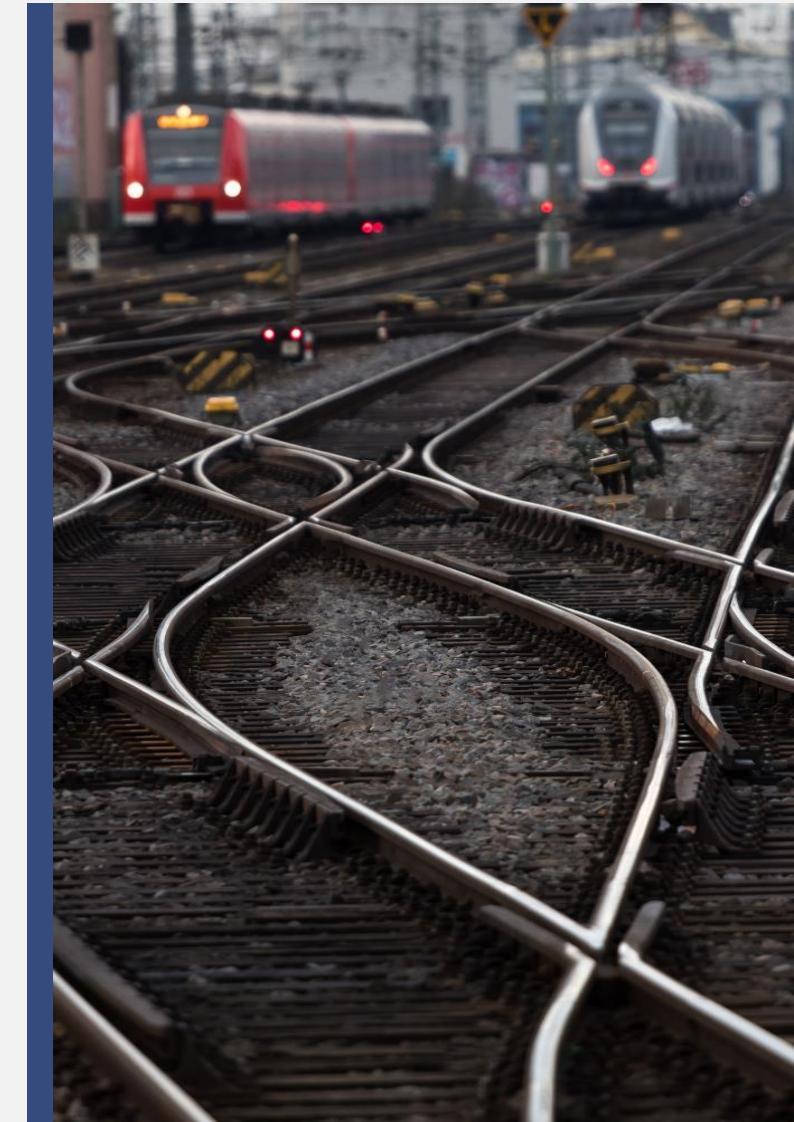
CS-02 Train Detection Systems	★	IU-14 Integration of ERA registers
CS-04 Consolidation of ESC/RSC	★	IU-16 Digitalisation of driver-signaller communication
CS-20 Public availability of station accessibility data (ERSAD)		IU-15 Cybersecurity
CS-31 Provisions related to rest time after an accident		IU-17 Digital infrastructure information
CS-37 Technical and operating requirements regarding safety on loading		IU-19 Digital capacity management
IU-01 DAC specifications	★	IU-20 Digital traffic management and train information
IU-04 FRMCS and optional ETCS compatibility	★	AS - Additional Studies

ERA view on FRMCS v2/3 Timeline (post-SP Report)



EECT V2.2 December status

- TOBA FRS V2.2: Review **completed**
 - 132 comments handled, resulting in 83 modifications of the input file
 - Mostly error corrections and editorial improvements
 - Version 2.2.0 developed by UIC as output of EECT
- FRS V2.2: Review **almost completed**
 - 525 comment handled, resulting in 277 modifications of the input file
 - Content discussions on the V3 scope requiring detail technical justification
 - 142 requirements have been modified in the "*summer discussion*" without sufficient justification (e.g. recategorized from "M/M-V3" to "M-V3/O-V3/M-Vx")
 - ➔ Clarification requested by EECT, more time needed than originally anticipated by UIC
 - 148 requirements to be further discussed after review (e.g. "Handled in V3p")
 - Version v2.1.6 to be distributed for review on 18/12, final comment by EECT until 15/01
 - ➔ FRS v2.2.0 expected for mid-January as expected
- Next steps for EECT V2.2
 - ERA to document post EECT all re-categorized requirements compared to v2.1.0 (CRs in CCM DB to trace changes from V2.1.0 to V2.2.0 for TOBA FRS / FRS)
 - Input expected from UIC, with initial estimation of the level of completeness of ERA OP after EECT V2.2 exercise



ERA Open Points

- ERA Technical Opinion identifies 26 Open Points (ERA OPs)
<https://www.era.europa.eu/sites/default/files/2025-05/opi-2024-10-addendum%20v1.0.pdf?t=1756124878>
 - Functional / System / Implementation (or combination)
 - Empty or not fully defined requirement in FRMCS specifications that need be solved before V3 publication
 - Some ERA OPs could be solved at V2.2 milestone, some will be left open until V3p (e.g. ERA OP 10.3)
 - Results from T&V activities expected to refine fully defined requirements at V3.0 milestone
→ **Theoretical risk** of having some requirements without validated solutions for v3
- After EECT V2.2, ERA OPs list to be updated (EECT internal)
- To be discussed: UIC **procedure** to update FRMCS specifications taking into account other inputs?
 - ERA OPs with input from other stakeholders (e.g. UNISIG, ERA OP17.2/24.1)
 - ERA OPs not considered in UIC workplans (e.g. coexistence studies, ERA OP15.1)
 - ERA OPs not tested in FP2-MORANE-2

Timely delivery of V3 specifications: Risks

- New timeline for post-addendum EECT RMR process for FRMCS V3
 - Agreed timeline for V3 in 2023 SP Report on FRMCS not valid anymore
→ [Updated SP Report on FRMCS capturing the sector agreement on a revised V3 timeline](#)
- Planning of activities prior to EECT RMR process for FRMCS V3
 - Good planning and preparation = no delay in publication of FRMCS V3 in CCS TSI
→ [EECT V2.2: discrepancy between plan and reality \(c.f. track change justification and comments handling\)](#)
 - TO REC #3: EECT review to be organized on per-OP resolution rather than on per-specification
→ Agreed by UIC: "*From V2.2, tagging of modifications in documents with associated reference list*"
→ [ERA view: room for improvement at V3p milestone \(tags per OP and justification on changes made compared to v2.1.0\)](#)
 - TO REC #7: commitment from UIC on a detailed program and timely delivery of the draft V3
→ V3 plan proposed by UIC: "*Provision of Functional V2.2 (FRS and TOBA), then V3p and V3*"
→ [Based on V2.2 exercise, a better planning needs to be considered for V3p, including resolution of comments per OP](#)
 - TO REC #8: pre-review by Industry of the input to EECT RMR process for FRMCS V3 advisable
→ Agreed by UIC: "*Full & permanent access to all working documents for UNITEL members*"

Agenda

- Topic 1: ERTMS > FRMCS part
- **Topic 2: ERTMS > ETCS/ATO part**
- Topic 3: Path towards industrial approach

CCS TSI 2023/1695 (ETCS/ATO part)

Mandate/scope for specifications in CCS TSI 2023/1695	Link with strategic objectives	Status
Automated Train Operation GoA 1 and 2	ATO provides capacity benefits and reduces energy consumption (green rail).	
ETCS Readiness for FRMCS 5G based communication	GSM-R (2G) will become obsolete between 2035-2040 and shall be replaced by FRMCS (5G). Further digitalisation of rail as 5G opens many possibilities.	
Digital ETCS reducing trackside assets	<p>Hybrid Train Detection: Train integrity allows capacity increase and/or reduced trackside train detection systems.</p> <p>Supervised manoeuvre: Supervised manoeuvre allows safety increase and when using digital automatic coupling will allow to get rid of shunting signals</p>	
On-board modularity	On-board modularity enables further market opening which allows integration of different interoperability constituents/subsystems from different suppliers (open market). ERTMS specifications include additional specifications which provide on-board modularity focusing on a common Ethernet based system and providing harmonised interfaces between ATO, ETCS, FRMCS parts and RST-subsystem.	
Additional changes to further optimise capacity, safety & security, cost reductions	The ERTMS specifications are further optimised with additional change requests based on return of experience of ERTMS projects.	

Strategic Planning (ETCS/ATO part)

Short term

- ETCS/ATO-part: **Cyber-security** (i.e. Cybersecurity Resilience Act)
- ETCS/ATO-part: Maintenance release for error CRs (i.e. return of experience from projects).
- Timeline: if possible, same timeline as **FRMCS**-specifications

Medium term

- ETCS/ATO-part: **Optimisations** based on operational harmonisation, on-board modularity, ergonomic aspects (i.e. DMI related CRs)
- Timeline: optimisation package depending on ERJU input for **operational harmonisation** (TSI OPE & TSI CCS engineering rules) and **DAC**-program (incl. electrical & communication part)

Long term

- ETCS/ATO-part: **innovation of ATO GoA3/4** (and integration with full ASTP)
- Timeline: depending on ERJU

- Topic 1: ERTMS > FRMCS part
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- **Topic 3: Path towards industrial approach**

Path towards industrial approach

ERTMS is currently a standardised toolbox (trackside) in a non-harmonised railway system

- Non-harmonised operational and trackside engineering rules
- Non-harmonised vehicle types (i.e. ETCS retrofitting in non-harmonised vehicle types + different ETCS product branches)

Stabilise ETCS toolbox (medium term > optimisation/standardisation)

- High number of remaining enhancement CRs to extend ETCS/ATO toolbox

⇒ 58 new enhancement CRs submitted by ERJU/EUG in December 2025 and 43 remaining enhancements!

Condition: additional functional enhancement CRs will only be considered based on availability of European operational and trackside engineering rules and based on comprehensive European railway system approach.

Steer innovation (long term)

- Business and railway system view for new (significant) innovations like ATO GoA3/4 or full ASTP (tool: pre-assessment)

Objective: research & innovation projects to be 'business driven' and not 'technology driven'

Path towards industrial approach (ETCS/FRMCS massive retro-fittings)

Amendment of PAVA (regulation 2018/545) with 'Standard Retrofit Package'

Objective: simplification of certification & authorisation in case of industrial approach (EC-OR-12)

- First new authorisation for a family of vehicle types/vehicles
- Requires standard risk analysis for cluster of family/vehicle types
- SRP-concept applicable to all types of retrofitting programs, e.g. ETCS/FRMCS retrofit and DAC retrofit;

ETCS Baseline 3 upgrade towards ETCS Baseline 4 (up to SV3.0) for FRMCS-integration

UNISIG-feedback: some existing specific Baseline 3 product branches are not part of the supplier's target product line.

- Problem-driver 1: How to manage these specific product branches?

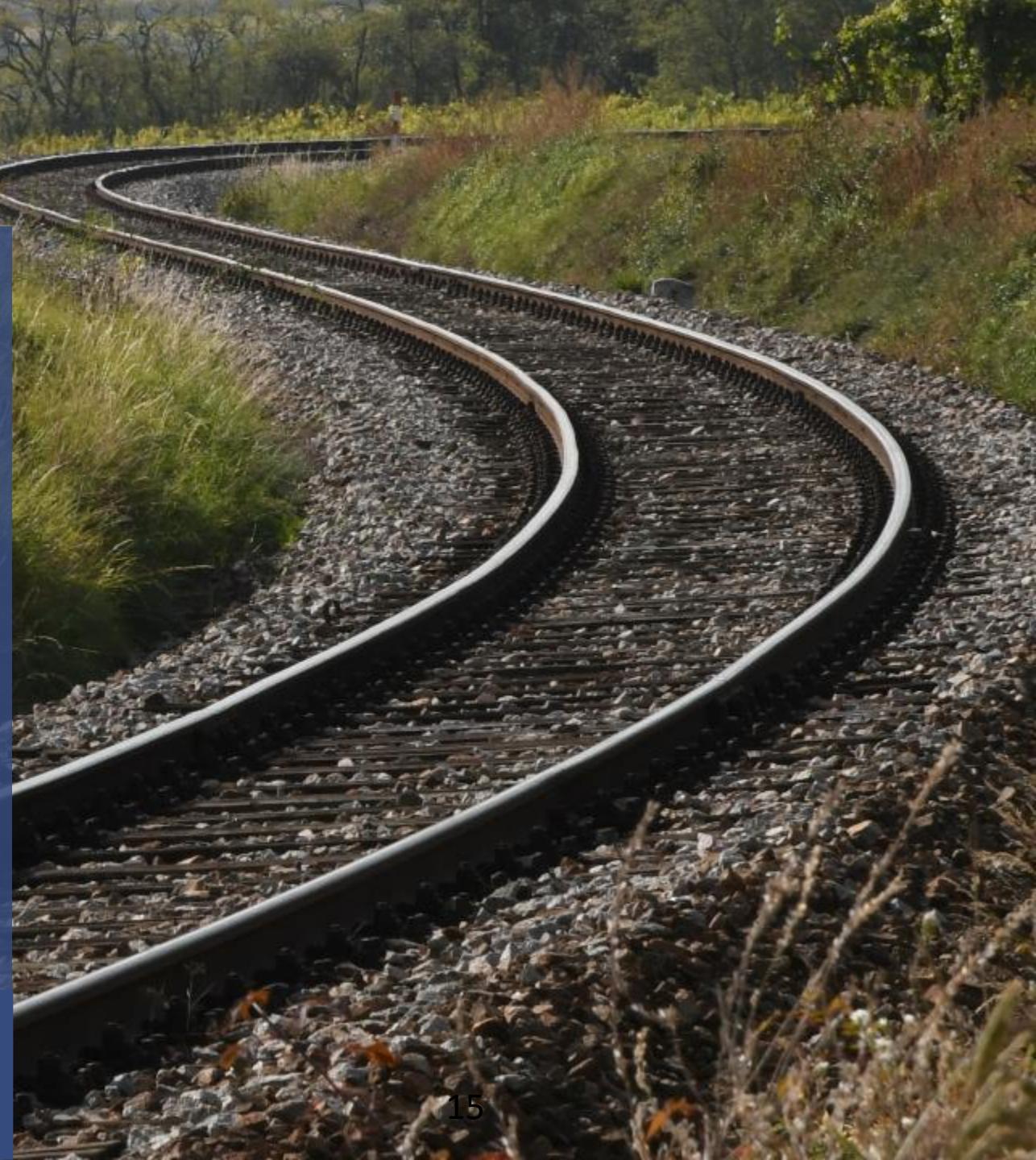
Ongoing actions to evaluate if there is a migration path to allow a fragmented/lean upgrade from Baseline 3 towards FRMCS without negative consequences to safety and innovation.

- Problem-driver 2: How to avoid in future specific ETCS On-Board IC product branches?

THANK YOU

Moving Europe towards a sustainable and safe railway system without frontiers.

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CCS TSI 2023/1695 (ETCS/ATO part)

