



AŽD Praha s.r.o.

Použití FRMCS v železniční dopravě *„aneb kde se právě nacházíme“*

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ERTMS dle poslední TSI CCS 2023

- Specifikace nyní vstupující v platnost:
 - ETCS B4 R1
 - RMR GSM-R B1 MR1
 - FRMCS B0
 - ATO B1 R1

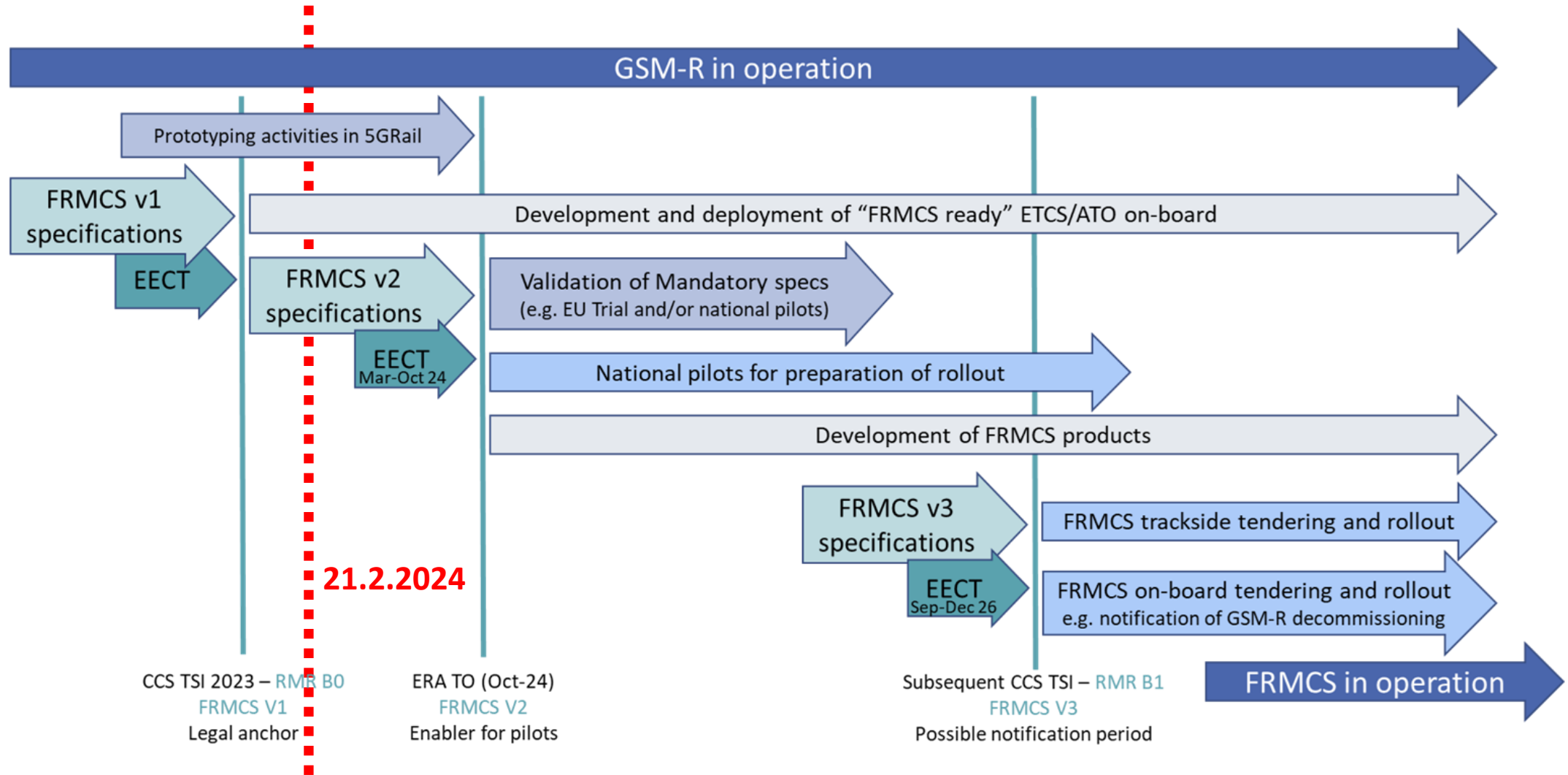
Postup prací na specifikacích

- **Stabilní návrh specifikace FRMCS v2** je naplánován na **konec března**.
 - UIC zřídilo informační panel, který bude do té doby informovat o pokroku (viz další slide).
- **Doplňující specifikace ETSI** plánovaná na **leden 2025**.
 - Zřízena zvláštní pracovní skupina pro dodání 8 technických specifikací.
- **ERA EECT naplánován od dubna 2024 se zaměřením na funkční specifikace**, poté na systém a nakonec na rozhraní/aplikace
 - Technické stanovisko ERA uzavírající přezkum a sloužící jako reference pro vnitrostátní a unijní zkoušky (včetně doplňujících specifikací ETSI).

Postup prací na specifikacích

- **Stav k 11/2023 přechod od** V1 to V2
 - **70%** FRMCS FRS -
 - **45%** Telecom On-Board System Architecture) FRS (Functional Requirements Specification)
 - **40%** FRMCS SRS (System Requirements Specification)
 - **40%** FIS (Functional Interface Specifications)
 - **20%** FFFIS (Form Fit Functional Specifications) -
- **Čipové sady**, pro systém a rozhraní/aplikace
 - Průmyslová iniciativa společností Funkwerk a Kontron
 - (spolupráce na čipové sadě / desce / rádiovém modulu)
 - Probíhající diskuze o spolufinancování vývoje

Aktuální stav specifikací



FRS Section	Completion (update v1 to v2)	Risk (V2)	Impact on V2	Lead	Comment
8: Common functions	100%	-	High		Two remaining common functions are for v3 (Assured Data, Billing)
10.1: Basic voice application 11.1: Basic data application	95%	Low	Low	SG2	Interconnection & interworking to be added, minor consistencies to be resolved
10: 8 voice applications	95%	Low	High	SG2	Interconnection & interworking to be added, minor consistencies to be resolved
11: 13 data applications	95%	Low	Low	SG2	Interconnection & interworking to be added, minor consistencies to be resolved
12: Video application	-	-	-		For V3
13: Terminal requirements	-	-	-		For V3 (Handheld)
14: System management and configuration aspects	80%	Medium	Medium	SG2	Further inclusion of FCAPS needed; FWG is working on a proposal for a “European-railway-app store”
15: Digital resilience	25%	High	Medium	DMA	Cyber Security assessment started
Resolution of FIS and ATWG feedback	80%	Medium	Medium	EVB	Align and amend FRS based on FIS and ATWG feedback Gap analysis to be performed against FRS
Alignment FRS with SRS and also TOBA FRS	0%	Medium	High	All	Preparing gap analysis

TOBA FRS Item / Section	Completion (update v1 to v2)	Risk	Impact on V2	Leader	Comment	Dependencies
OB _{OM}	60%	Medium	Medium	MSC	Impact depends on LB certificates solution and on SIM Card configuration on BX (TBC) Includes OM Function	SRS, RT
OB _{RAD}	80%	Low	High	MRI	The work is complemented in RT, where a TR is about to be released	RT
AUX Function	40%	Low	High?	MRI	Gap analysis is ongoing	SRS
Positioning & Localization	30%	Medium	High	ALP	Finalizing the architecture principle, aligned with SRS Now detailing the Positioning Function	SRS, RT
Best Effort	0%	Medium	High	TBD	This communication mode implication to TOBA FRS is under assessment	SRS
OB _{ANT}	50%	Low	Medium	FMA, THE	Ongoing	

SRS Section	Completion (update v1 to v2)	Risk	Impact on V2	Leader	Comment	Dependencies
Trackside Architecture	40%	Medium	High	CWA	Early Draft in discussion TSapp for TC to be decided Clarified within SG (ETCS H-2-H finalized)	FFFIS
Routing and IP Plans	60%	Medium	Medium	SAK	In SG	
H2H Addressing	95%	Low	High	PRU	Ongoing	
H2N Addressing	30%	Medium	High	PRU	Linked with PKI, KMS	Best Effort
Best Effort	40%	Medium	High	GGA	Concept in discussion - Weight depends on PKI solution	H2N
OB _{OM} , O&M Function FS _{OMR}	40%	High	Medium	MRI	BX SIM and Profile update uses cases in discussion FS _{OMR} could potentially be pushed for V3	TOBA FRS
AUX Function	30%	Medium	High	MRI	V2 - On/Off (OBapp-TSapp), and Positioning info	TOBA FRS, FFFIS
Positioning & Location	70%	Low	High	GGA	Accuracy to be finalized	
OB _{ANT}	40%	Low	Low	THE / FMA	Ongoing	UGFA
MNO Bands	0%	Medium	Low	JNO/SAK/THE/ DMA	UGFA proposal based on ER JU Report remit delivered, request (EIM) to revisit scope	UGFA
RF coverage quality	40%	High	High	JNO/ SAK	Modular concept proposed by UGFA, in discussion	UGFA

SRS Section	Completion (update v1 to v2)	Risk	Impact on V2	Leader	Comment	Dependencies
Network Transitions	50%	High	High	SAK	2UEs main, one UE as option, under FFS (waiting for MCX interconnection and migration). Item stalled so far due to Multipath, and Start of Operation - Partially tested in 5Grail	3GPP
Bearer Flexible	70%	Medium	High	SAK/JNO	Multipath use cases released for RT; next steps are input in SRS and agree the Multipath protocol (risk of inadequate solution to cover our needs) - Risk of concept misuse	RT
QoS & Priorities	70%	Low	Medium	RFR		
Cybersecurity	20%	High	High	DMA	Risk Assessment planned to be deliver first draft mid December	TOBA FRS
FRMCS Profiles	20%	Medium	Medium	MAL	Concept agreed - Lead issue, new spec to host (FFFS) - Should be available mid January	
Arbitration	10%	Low	Low	CDA		
Voice Function	40%	Medium	High	DMA	Lead issue - Voice apps available in FRS Voice function functional architecture agreed Level of specification for Dispatcher System in discussion OB HMI to be developed post V2 (612-4 update).	FFFIS (TC), TS Architecture
Gap analysis between FRS and SRS	30%	Medium	Medium	GFR	V2 FRS alignment with SRS.	FRS. FIS, 3GPP

FIS Section	Completion (update v1 to v2)	Risk	Comment
3.1 Role management	70%	Low	Specification in FIS should be limited
3.2 Location Services	70%	Low	Specification in FIS should be limited but some specification still to be defined for location reporting mechanism
3.3 Arbitration	25%	High	Gap analysis with FRS identified ongoing
3.4 Multi-user Talker	FFS	N.A.	Not supported for R18 Ad hoc Group Calls
4.1 Signaling Train Protection	70%	Medium	Addressing option4 agreed Dependency on TSapp and BX
4.2 Automatic Train Operation	70%	Medium	Addressing option4 agreed Dependency on TSapp and BX
4.3 Railway Emergency Com	85%	Low	Gap analysis will be finalized soon
4.4 Voice Com	25%	High	Decision to perform gap analysis with AHGC as a basis for all critical voice com taken during last FIS WG
4.5 TCMS	0%	Low	Work item not started
4.6 Messaging Services	0%	Low	Work item not started
4.7 Passenger information	0%	Low	Work item not started
5. Coordination function for Voice	N.A.	N.A.	Agreed to consider it is out of FIS scope in discussion with FWG currently
6. FRMCS-GSM-R Interworking	N.A.	N.A.	Agreed to consider it is out of FIS scope

FFFIS Section	Completion	Risk	Impact on V2	Comment	Dependencies
Tight Coupling	30%	Medium	Low	Info for OB now available	TS Architecture
TS _{APP}	30%	Medium	High	Clarification for voice still ongoing	TS Architecture
IPV4/V6	10%	Medium	Medium	ETCS requirement	
Best Effort	10%	Medium	High	Dependency on PKI solution	SRS
AUX Function	20%	Medium	High	V2 AUX Function will carry On/Off and Positioning - QoS also in discussion	SRS

ETSI plán

Annex I Table 1	TS	Responsible TB and associated WI	Timetable for execution
1. FRMCS System Architecture	103 764	RTS/RT-0082	31 Jan 2025
2.1 FRMCS Building Blocks and Functions – Transport Stratum	103 765-1	RTS/RT-0083	31 Jan 2025
2.2 FRMCS Building Blocks and Functions – Service Stratum	103 765-2	RTS/RT-0084	31 Jan 2025
2.3 FRMCS Building Blocks and Functions – On-Board	103 765-3	RTS/RT-0085	31 Jan 2025
2.4 FRMCS Building Blocks and Functions – Trackside	103 765-4	RTS/RT-0086	31 Jan 2025
2.5 FRMCS Building Blocks and Functions – UE capabilities	103 765-5	RTS/RT-0087	31 Jan 2025
3. FRMCS Radio Characteristics (900/1900 MHz)	103 793	RTS/RT-0089	31 Jan 2025
4. FRMCS interworking with GSM-R	103 792	RTS/RT-0088	31 Jan 2025

Test & Validation

- Hlavní cíl: Testovat a ověřit kompletní specifikace, aby se zajistila přiměřenost požadavků FRMCS V3 a umožnilo se zadávání zakázek na palubní FRMCS.
- Soubor specifikací v3 bude integrovat výsledky z projektu EU-RAIL - SNS SYNERGY: Digitální a automatizované testování a provozní validace příštího železničního komunikačního systému EU (HORIZON-ER-JU-2024-FA2-SNS)

The screenshot shows the European Commission's 'Funding & tender opportunities' page for the Single Electronic Data Interchange Area (SEDIA). The main heading is 'EU-RAIL – SNS SYNERGY: DIGITAL & AUTOMATED TESTING AND OPERATIONAL VALIDATION OF T... HORIZON-ER-JU-2024-FA2-SNS'. The page is categorized as a 'Call for proposal' under the 'Topic' section. It provides general information including the programme (Horizon Europe Framework Programme (HORIZON)), the call (EU-RAIL JU Call Proposals 2024-01 (HORIZON-ER-JU-2024-01)), the type of action (HORIZON-JU-IA HORIZON JU Innovation Actions), and the type of MGA (HORIZON Lump Sum Grant (HORIZON-AG-LS)). The opening date is 25 January 2024, and the deadline date is 07 May 2024 17:00:00 Brussels time. There is a 'Budget overview' button and an 'Open for submission' button.

Budget overview

Topic	Budget (EUR) - Year : 2024	Stages
HORIZON-ER-JU-2024-FA2-SNS - HORIZON-JU-IA HORIZON JU Innovation Actions	13 500 000	single-stage

Výzvy a problémy pro FRCMS

- Testování a ověřování specifikací FRMCS
- Plánování / financování / zpětná vazba ze zkoušek EU a členských států
- Dostupnost produktů FRMCS a ETCS B4
- Včetně čipových sad Spektrum RMR
- Proveditelnost a podmínky pro používání veřejných sítí
- Přeshraniční uspořádání
- Synchronizace FRMCS s ETCS a dalšími digitalizačními systémy (DAC)
- Výzva pro masivní retrofit
- Masivní výzva pro (re)autorizaci
- Plánování nabídek pro traťové i palubní systémy
- Financování a financování

FRCMS je nutnost

Avšak má před sebou velmi mnoho problémů k řešení

Nutno

Zdroje informací:

- *Prezentace EK pro výbor RISC*
- *Prezentace UIC pro Správní radu programu*



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