

The logo consists of a large white circle on a dark green background. Inside the circle, the words "DIGI" and "RAIL" are stacked vertically in a bold, dark green, sans-serif font. There are several horizontal green lines of varying lengths and thicknesses, some with small dots at their ends, scattered around the circle and across the top and bottom of the slide.

DIGI RAIL

**Digirail – Digital and
intelligent rail traffic in
practice**

Rata 2023

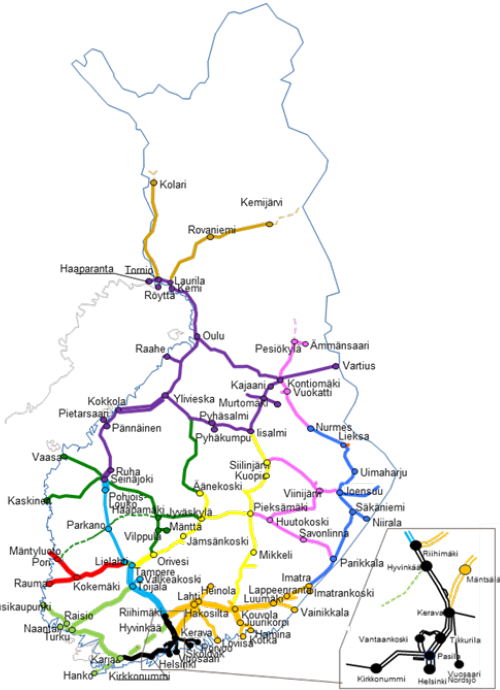
Juha Lehtola & Jari Pylvänäinen

Digirail – Phases

2019-
2021

2021-
2027

2028
(2025)
- 2040



Study and preparation

Development and verification

Deployment

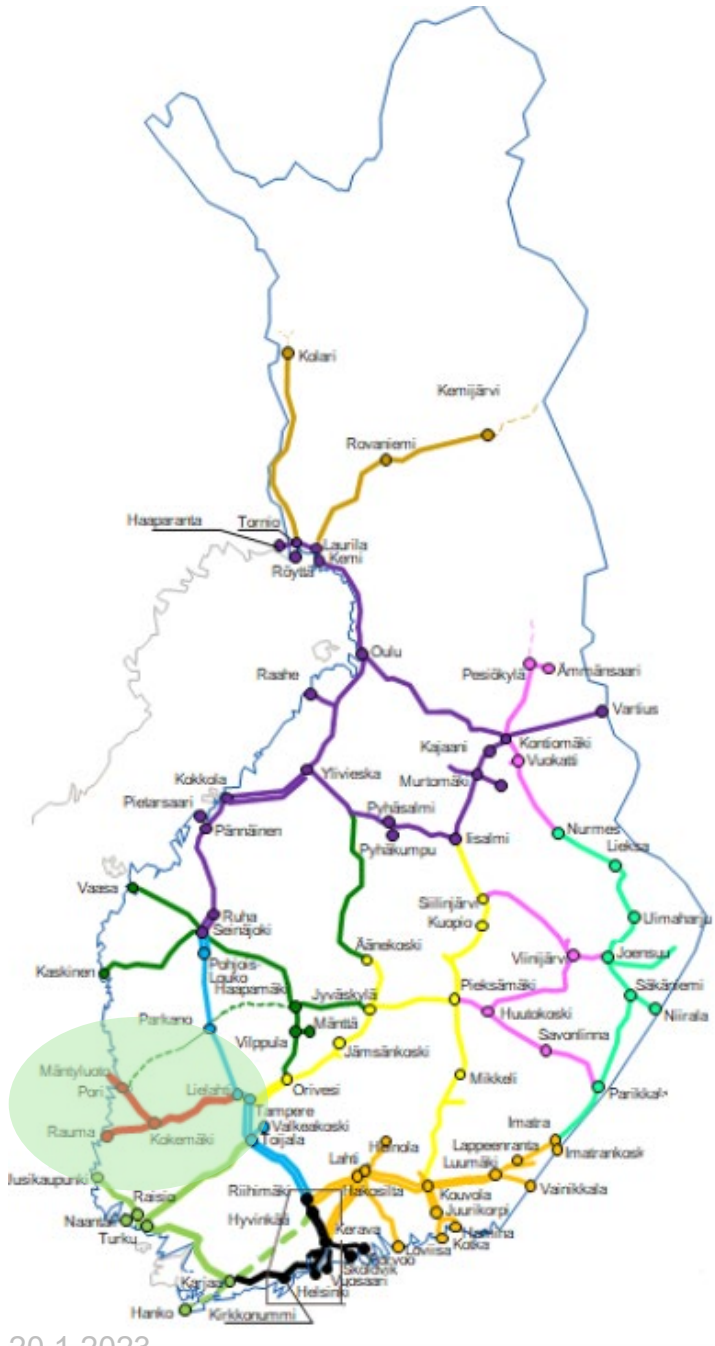
Targets for Development and verification

- To set up an implementation plan for Digirail
- To develop and verify technical specifications to be ready for Deployment phase
- To find out the needs from the sector and define operational models and instructions to handle the changes because of Digirail deployment
- End results must be secured in laboratory environment and if possible at the test track
- To set up an efficient migration plan for the nationwide roll-out
- To make sure all risks are noted, secured and mitigation methods are in place
- To describe the Digirail's architecture clearly
- To minimize trackside equipment in the future
- To make sure that cyber security is in-built as part of the architecture
- To make sure Digirail meets the milestones from RRF funding

Development and verification phase – "EKA project"

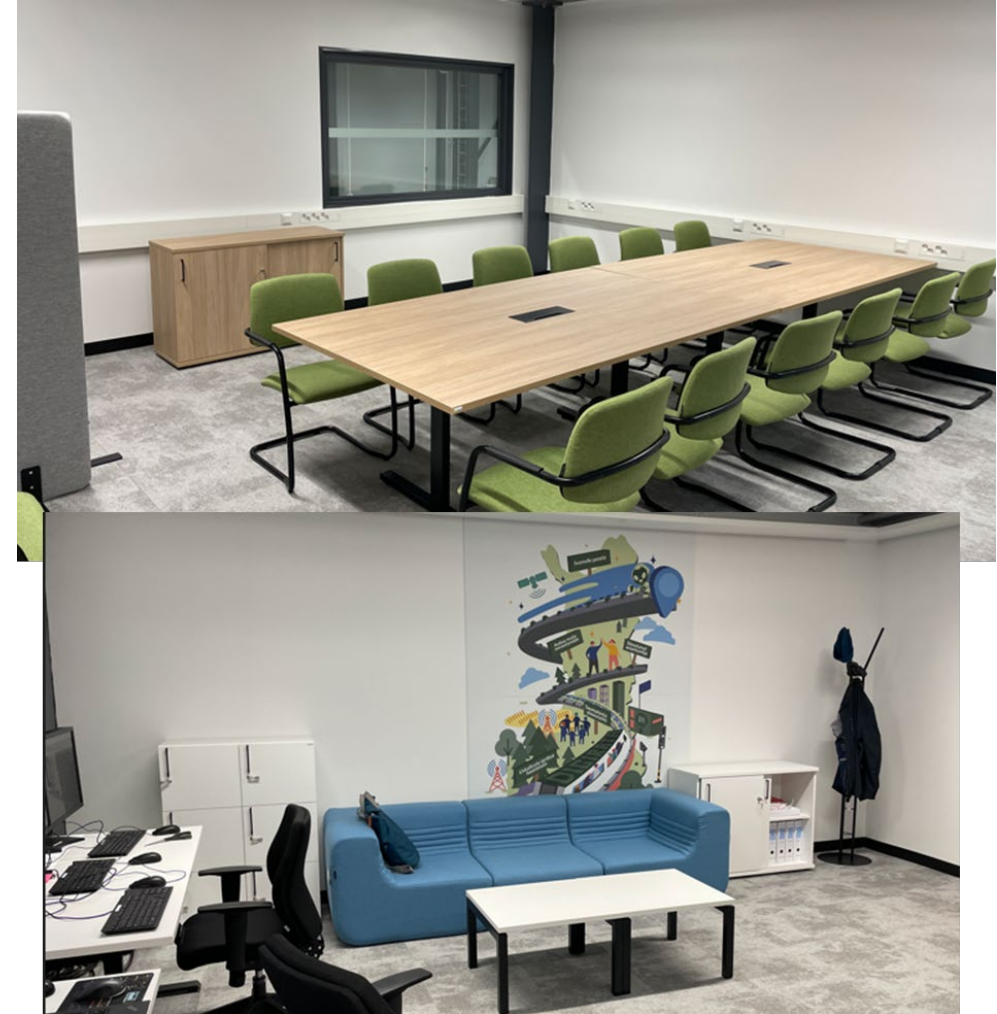
The intelligent base is tested in (tampere)Lielahti-Rauma/Pori
–track section

- 190 kilometers single track
 - 18 stations
 - Level crossings
 - Shunting operations



Lab development – new direction

- The development of ERTMS lab is driven more and more by the needs of Deployment
- Main focus is to set up systems to support testing
- Development of infra models and digital twin
- Current KoKoHa laboratory remains as a basis for radio based ETCS knowhow and verification of using commercial radio networks



Needs for the test track

- Rolling stock testing
- Compatibility testing in real and even in harsh environmental conditions
- Testing of operational models and rules in real life environment



Need for intelligence - Finnish railway traffic in numbers

- **Traffic:**

- Passengers 34 million train km (70%), freight 14 miljoonaa train km (30%) (2017)
- Driven trains or shunting units 590 938 pieces (2019)
- Approved shunting 467 000 pieces (2020)
- Track work activities c. 140 000 pieces (2020)

- **Traffic management:**

- Permanent capacity 579 700 pieces, ad-hoc capacity 94 557 pieces (2020)
- Routes in total over 16 000 000 pieces

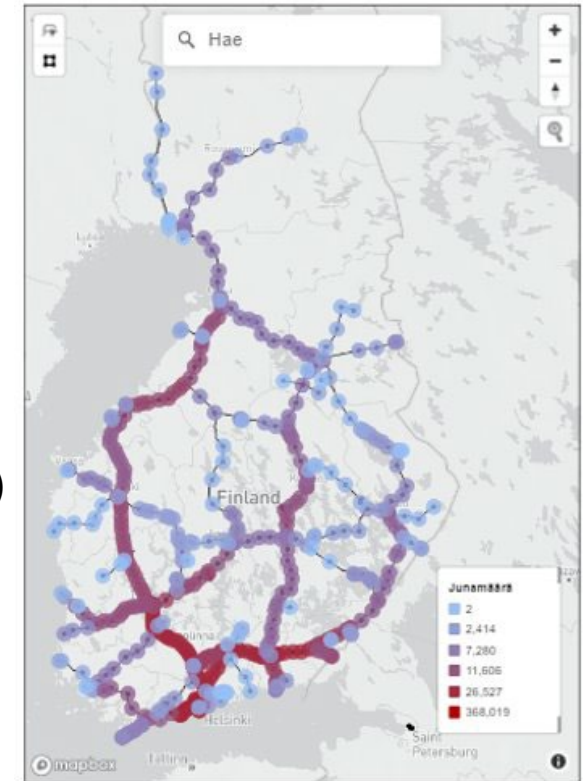
- **Infrastructure:**

- Single track / multiple tracks (88%/12%) in total 5926 km, 5308 points, 5634 level crossings (2017)

- **Rolling stock:**

- 700 locos, 13 different types
- Yellow machinery 64 pieces,
- 1300 Passenger wagons and 9000 freight wagons (2017)

Junamäärä liikennepaikoittain



Bridge to the next level

Digirail objectives – 3 points:

1. Technology (supplier neutrality):

- Hybrid Level 3
- Modularity - EULYNX
- Radio network by MNOs
- ATO GoA2
- Axle counters for TVP
 - L2 functions and L3 backup
- Localisation
 - Odometry + TIMS → L3 functions
- Level crossing system
 - Interface for train speed dependency

2. Possibility for a technology leap

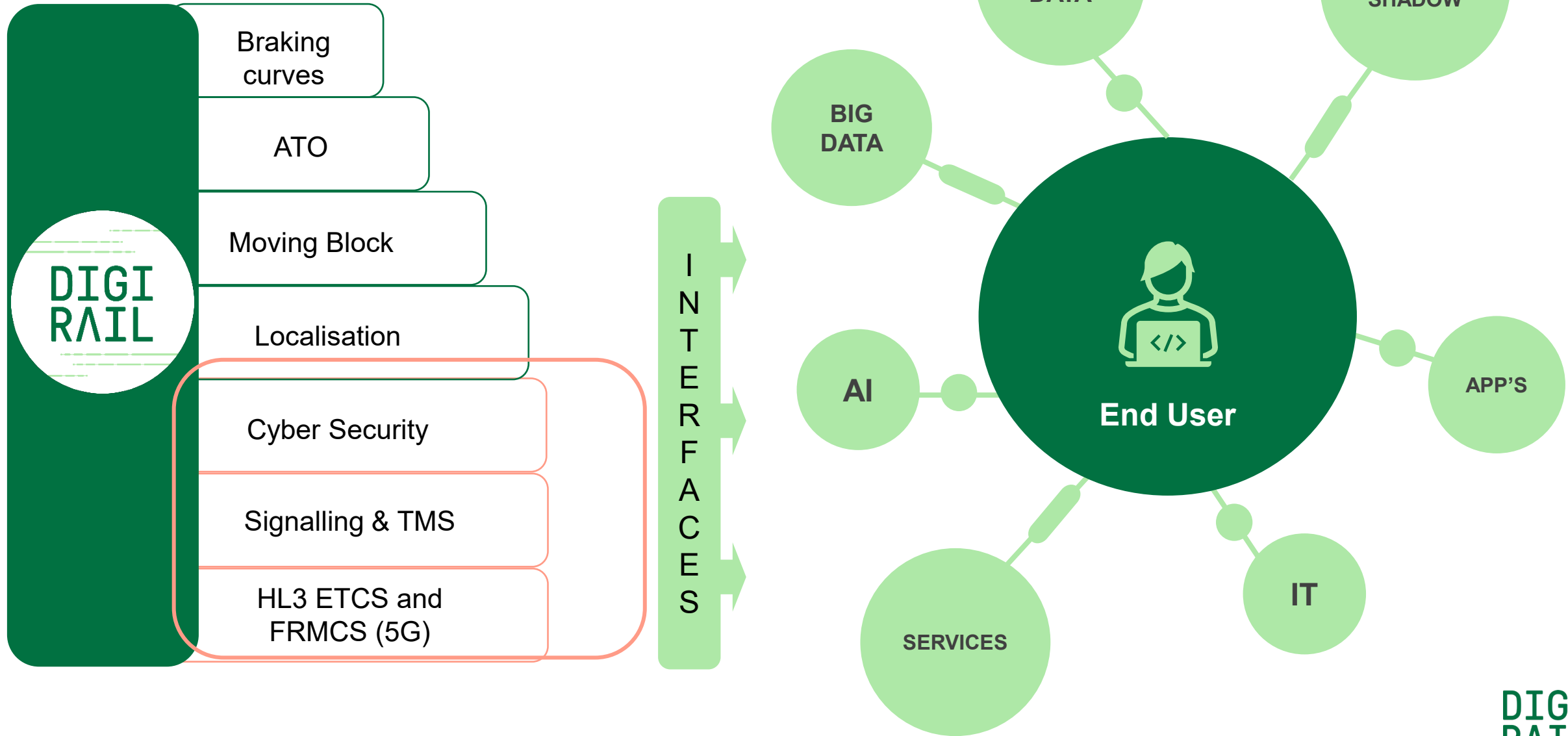
- Migration vs. no migration

3. TSI compliance

20.1.2023



Technological "Big Picture"



The logo consists of the words "DIGI" and "RAIL" stacked vertically in a bold, green, sans-serif font. They are centered within a white circle. The background is a dark green with decorative horizontal lines of varying lengths and colors (light green and white) that have a segmented, digital appearance.

**DIGI
RAIL**

Thank You!

Further discussions at the Digirail stand!
Welcome!

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