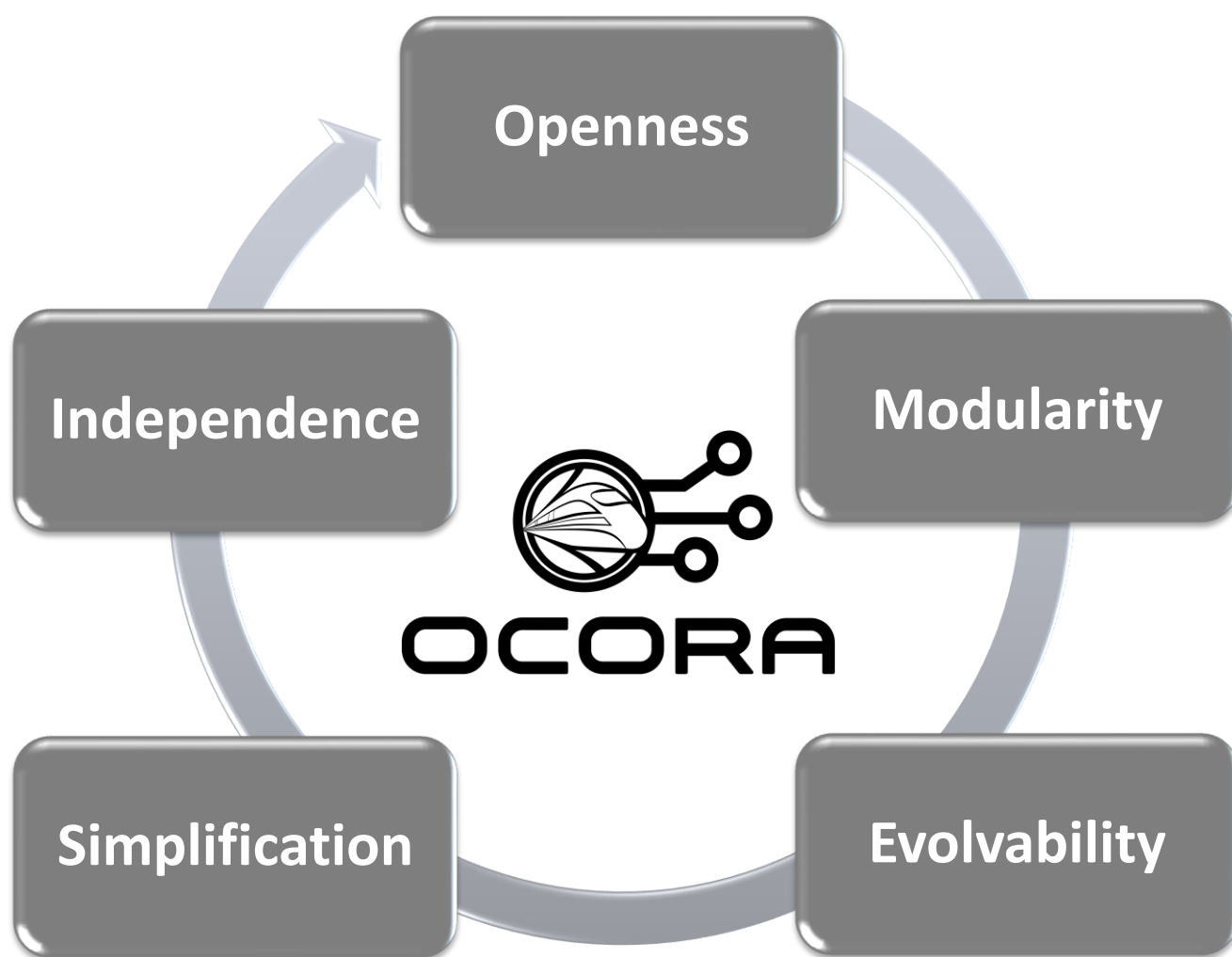


## DESIGN PRINCIPLES



OCORA is an open collaboration targeting an open and powerful CCS On-board reference architecture.

## PROBLEM STATEMENTS

### Current ETCS On-board solutions:

1. are based on the TSI specifications ensuring interoperability, but the **subset specifications are incomplete and ambiguous**. Therefore, interoperability is not a given.
2. are **more expensive than technologically justifiable**. This seems to be a result of high integration engineering and certification efforts, as well as small batch sizes and high project risks.
3. are **difficult to be integrated into existing vehicles**.
4. are **difficult and time consuming to adapt/change/update/upgrade**:
  - In the case of patching in non SIL area (e.g. cyber- security patching)
  - In the case of error correction in SIL area
  - In the case of baseline upgrade (e.g. ETCS baseline 2 to 3)
  - In the case of functional enrichment (ex. base for game changer introduction is not a given)
5. do **not respect different, non-overlapping life cycles** (e.g. vehicle vs. CCS vs. connectivity)
6. are **difficult to maintain** (e.g. maintenance, monitoring, diagnose possibilities very limited)
7. are **lacking built-in cyber security**, since this is a newer topic, especially in combination with 4 + 6.
8. are **performing below expected availability and reliability** (from overall ETCS system perspective).

### In addition:

- The benefit of ETCS On-board only pays off, if the ERTMS rollout progresses in Europe on large scale.
- The ETCS On-board functions as such also need some improvements (e.g. braking curve, odometry accuracy, etc.) to serve current operational needs.
- Difficult, expensive and time consuming ETCS On-board fitments in general, are delaying national deployment plans, impacting trackside investments, and postponing ERTMS rollouts.

## RELEASE CONTENT

### Release Information

- OCORA-BWS01-010 – Release Notes
- OCORA-BWS01-020 – Glossary
- OCORA-BWS01-030 – Question and Answers
- OCORA-BWS01-040 – Feedback Form

### Communication Material

- OCORA-BWS02-010 – Executive Summary Slide Deck
- OCORA-BWS02-020 – Program Slide Deck
- OCORA-BWS02-030 – Technical Slide Deck
- OCORA-BWS02-040 – Program Posters
- OCORA-BWS02-050 – Technical Posters
- OCORA-BWS02-060 – Confidentiality Clause

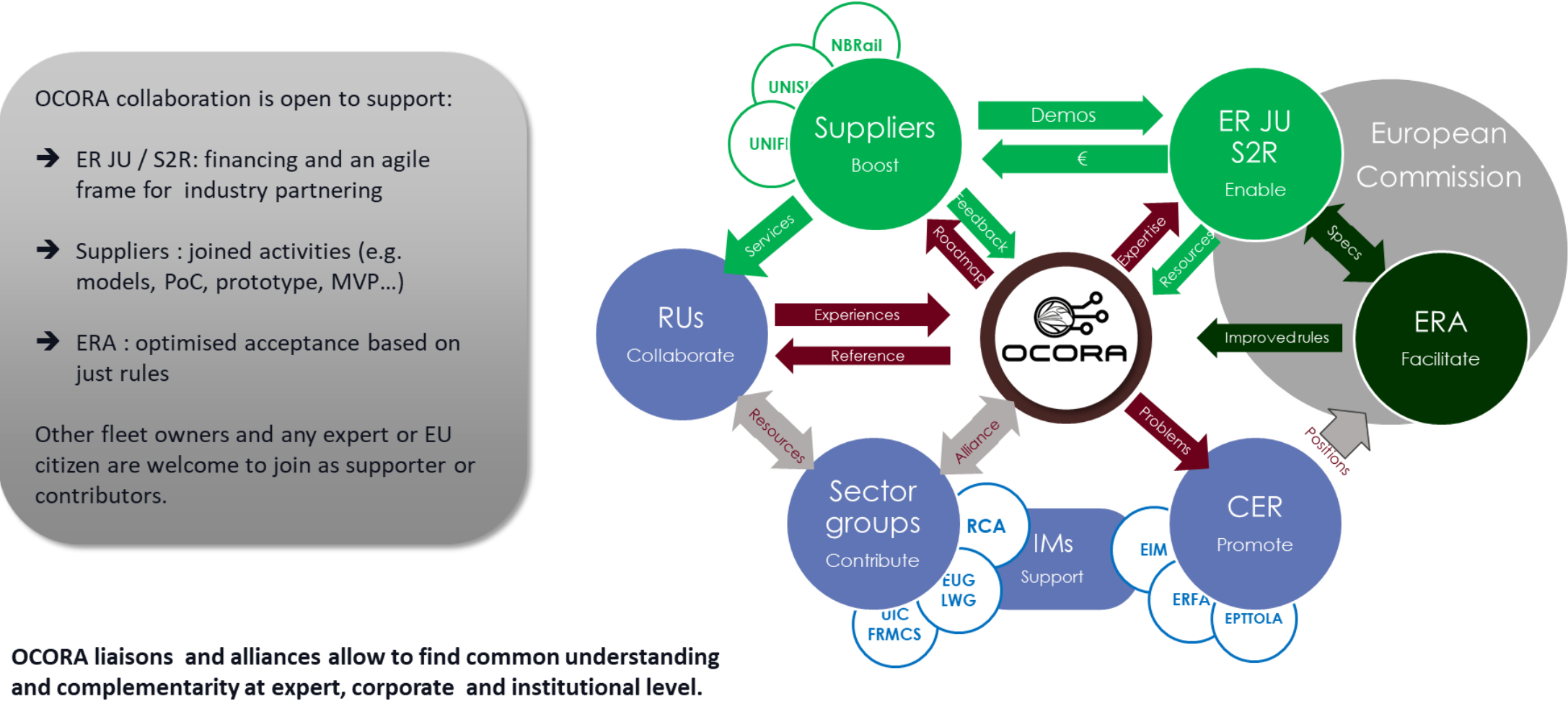
### Program Documentation

- OCORA-BWS03-010 – Introduction to OCORA
- OCORA-BWS03-020 – Guiding Principles
- OCORA-BWS04-010 – Problem Statements
- OCORA-BWS05-010 – Road Map
- OCORA-BWS05-020 – Minimal Viable Product
- OCORA-BWS06-010 – Economic Model – Introduction & Overview
- OCORA-BWS06-020 – Economic Model
- OCORA-BWS07-010 – Alliances
- OCORA-BWS07-020 – CCS On-board for Europe's Rail Joint Undertaking
- OCORA-BWS08-010 – Methodology
- OCORA-BWS08-020 – Tooling
- OCORA-BWS09-010 – Acceptance of Global Standards
- OCORA-BWS09-020 – Acceptance of Global Standards – Focus on Safety in CCS

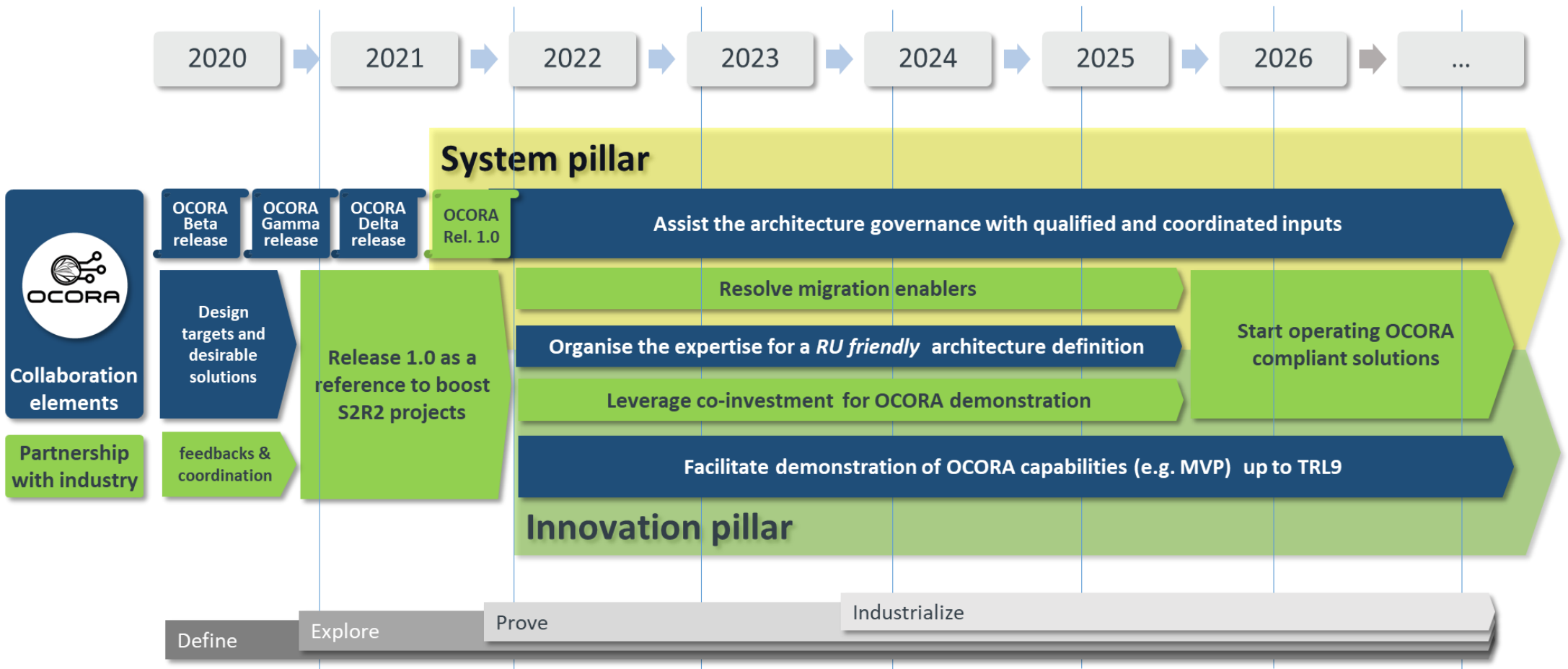
### Technical Documentation

- OCORA-TWS01-030 – System Architecture
- OCORA-TWS01-040 – Capella Modelling
- OCORA-TWS01-050 – Capella Model Export
- OCORA-TWS01-910 – CENELEC Phase 1 – Concept
- OCORA-TWS02-010 – CCN – Evaluation
- OCORA-TWS02-020 – CCN – Proof of Concept (PoC)
- OCORA-TWS03-010 – Computing Platform – Whitepaper
- OCORA-TWS03-020 – Computing Platform – Requirements
- OCORA-TWS04-010 – Functional Vehicle Adapter – Introduction
- OCORA-TWS04-011 – Functional Vehicle Adapter – Requirements
- OCORA-TWS04-012 – Functional Vehicle Adapter – Standard Communication Interface Specification
- OCORA-TWS04-013 – Functional Vehicle Adapter – Design Guideline
- OCORA-TWS05-010 – Requirements – Management Guideline
- OCORA-TWS05-020 – Stakeholder Requirements
- OCORA-TWS05-021 – Program Requirements
- OCORA-TWS05-022 – Design Requirements
- OCORA-TWS06-010 – (Cyber-) Security – Project Security Management Plan
- OCORA-TWS06-020 – (Cyber-) Security – Guideline
- OCORA-TWS07-010 – Modular Safety – Strategy
- OCORA-TWS09-010 – Testing – Strategy (Guideline for modular testing)
- OCORA-TWS09-020 – Testing – Benchmarking Report Modular Testing
- OCORA-TWS15-010 – Prototyping – ATO Demonstrator - Case Study - S2R-IP-5-ARCC
- OCORA-TWS15-020 – Prototyping – CCS-TCMS-Interface-ETCS-Functionality
- OCORA-TWS15-021 – Prototyping – CCS-TCMS-Interface-ATO-Functionality

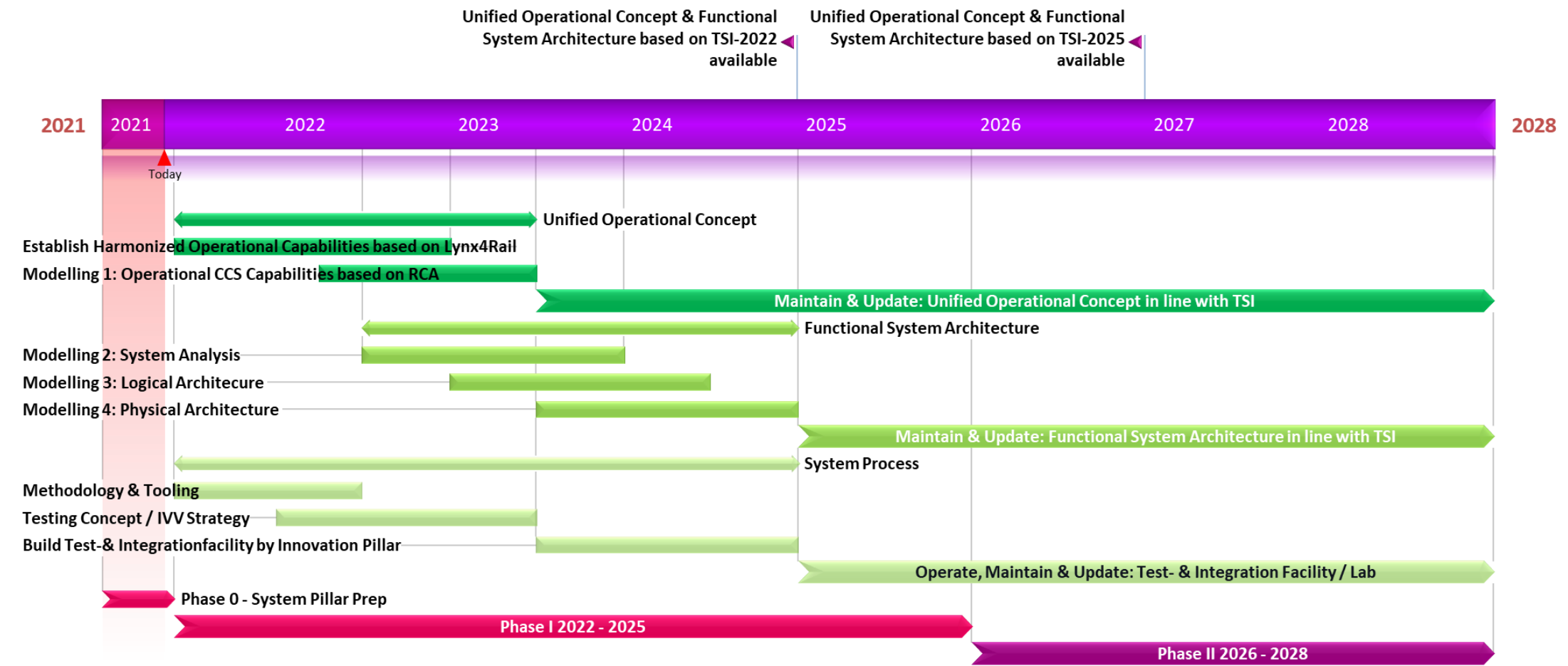
## SECTOR STAKEHOLDER MAP



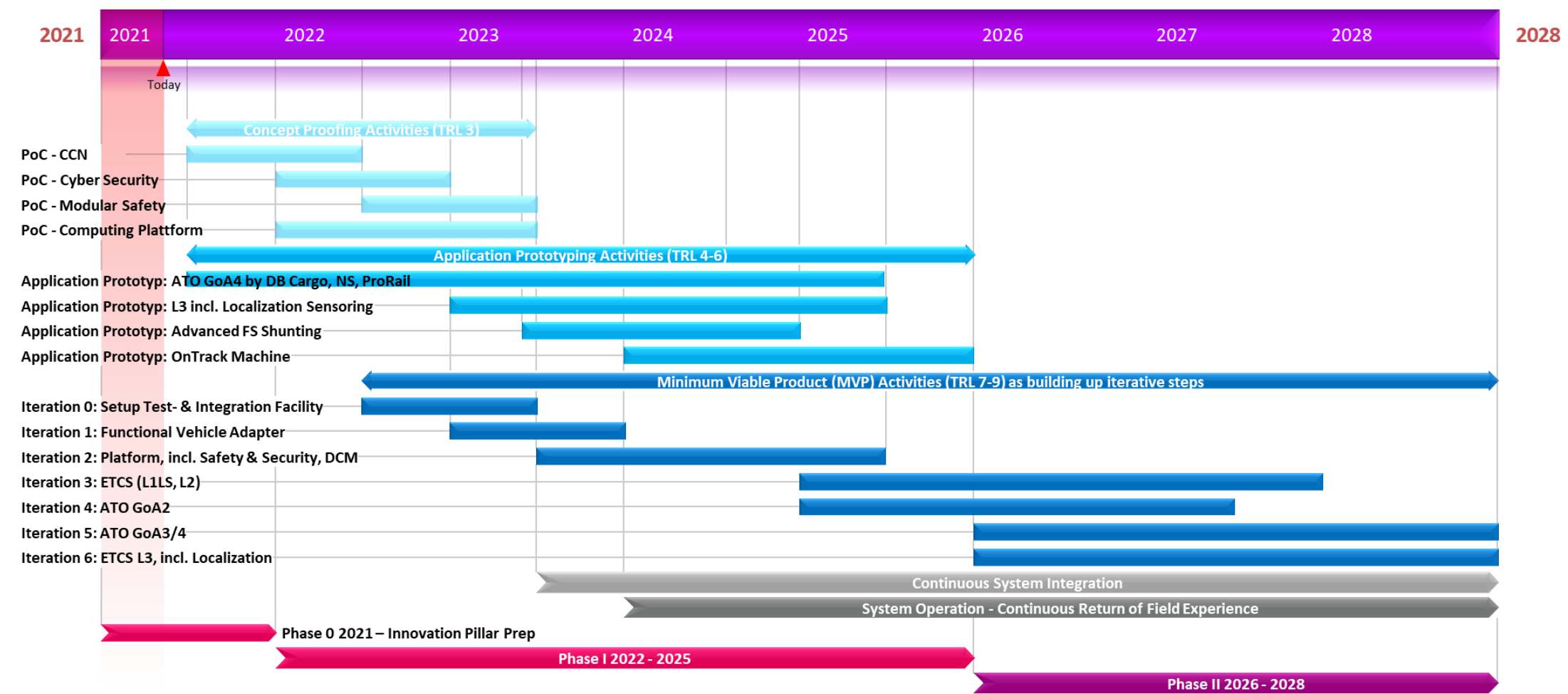
## ROADMAP



## EUROPE'S RAIL JU – ROADMAP FOR CCS ON-BOARD – SYSTEM-PILLAR



## EUROPE'S RAIL JU – ROADMAP FOR CCS ON-BOARD – RESEARCH- & INNOVATION-PILLAR



Remark: TRL = Technology Readiness Level, see separate slide