# CCRCC 2019

https://github.com/OCORA-Public

The purpose of this document is to provide basic information about the OCORA collaboration for CCRCC 2019 conference attendees.

**OCORA** stands for **O**pen **C**CS **O**n-board **R**eference **A**rchitecture.

OCORA is a collaboration of railway companies with 5 founding members that decided to combine **engineering resources** in the CCS domain to work on **ERTMS and beyond**.

Founding Member

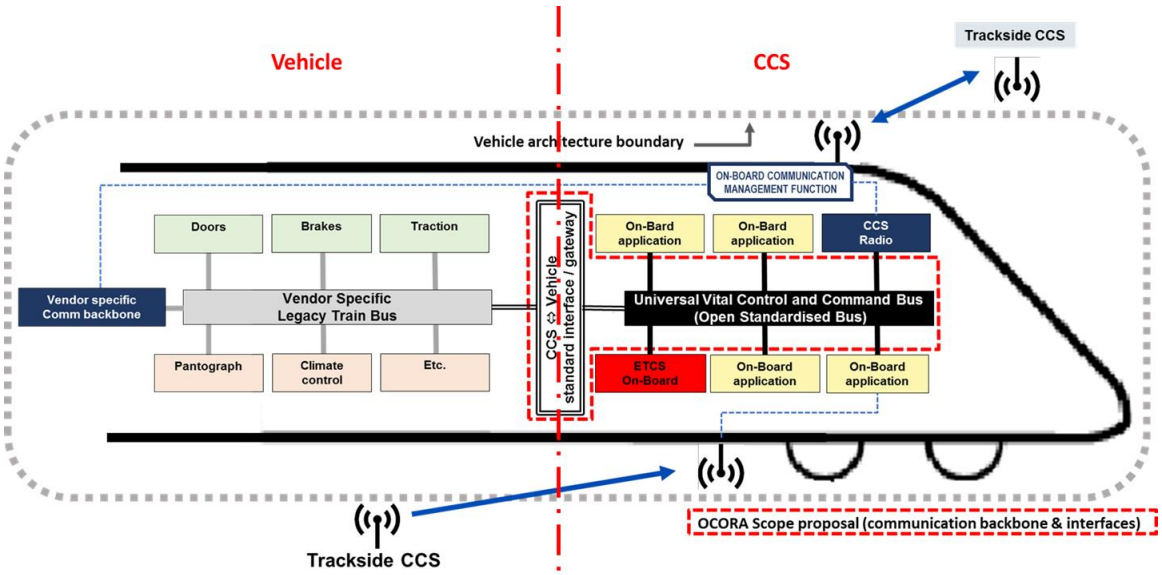
We started in March 2019 with a Memorandum of Understanding and OCORA is now entering its full Operational Phase with a **Steering Committee. OCORA is now ready to share its vision on the on-board architecture and its principles**.

**OCORA architectural main principles in five words are:**

- **Openness**
- **Independence (between software and hardware)**
- **Modularity**
- **Evolvability (meaning upgradability and interchangeability)**
- **Simplification**

## Overview of the OCORA reference architecture

OCORA currently focuses on the internal communication backbone and interfaces of the CCS on-board subsystem of existing and new rolling stocks:




OCORA has the ambition to feed the railway sector with proven specifications along with their economical assessment to attain **cost-effective, reliable, safe and secure CCS on-board subsystems over the life cycle of vehicles.**

## OCORA is an open collaboration

The "openness" of OCORA is defined as the principle based upon **collaboration and sharing, publicly available standards and models, facilitating cost-effective industrialisation** without any barrier and in line with the competition laws.

## OCORA intent

OCORA intends to remain a **collaborative platform**.

As defined in the OCORA MoU, results of the OCORA activities are:

- To define standardized interfaces and a reference architecture for all major evolvable on-board CCS components.
- To analyze the need to improve the Regulatory framework.
- To bring new technology and to ensure that technological progress from other sectors reaches the railways.
- To provide proven solutions, which will be validated by e.g. demonstrators. To ensure a cost-effective migration, the OCORA results should be promoted within the sector to be applied under voluntary basis.

The OCORA collaboration has no intent to substitute sectorial representative bodies. For instance, Change Request´s will be proposed by OCORA through the regular sectorial representative bodies.

## What deliverables can be expected from OCORA?

Anticipated deliverables of OCORA are **specifications**. For the short term, OCORA aims at providing a comprehensive and coherent set of interface specification for a modular OCORA on board CCS environment to serve as **voluntary tender templates.**

Additional deliverables include supporting material for **IVV (Integration, Verification and Validation)**. Also, part of OCORA is material helping to plan for an OCORA-based system (such as business case mechanics, supported reference architecture etc…) and material to help the decomposition of the OCORA subsystem.

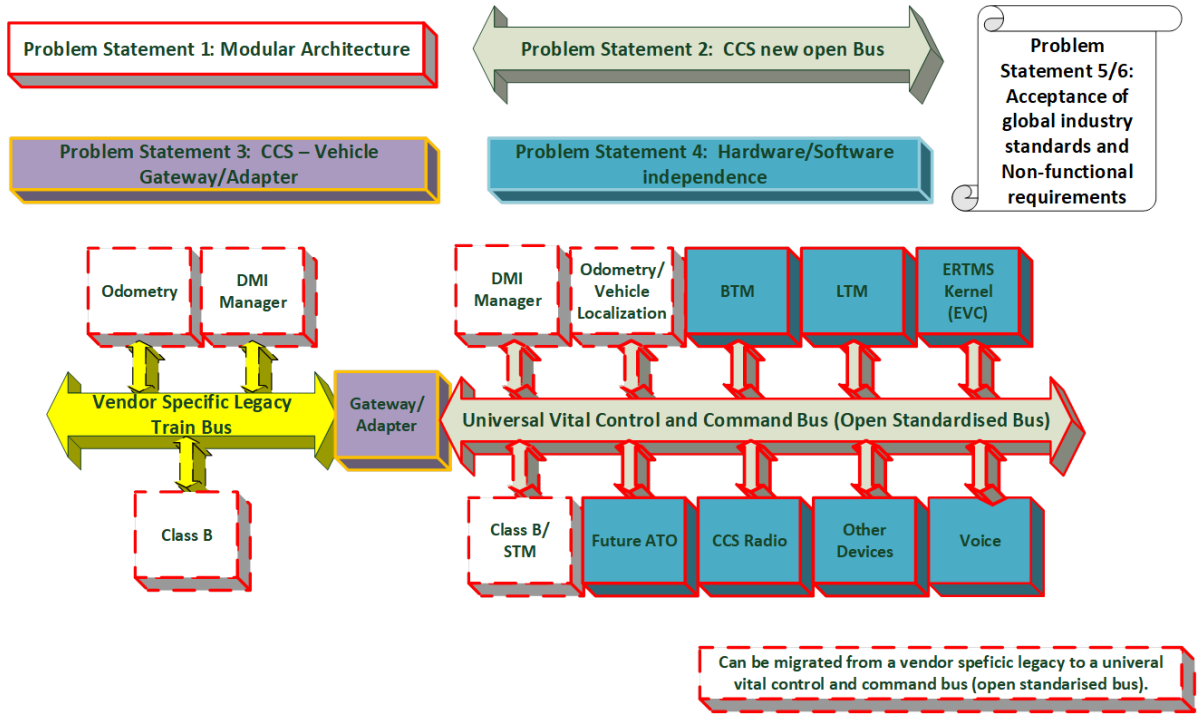
## Is OCORA a standard?

Although OCORA aims at standardisation of the on-board CCS, it does not envisage to set up a formal, "de iure" standard. OCORA will develop specifications serving procurement and innovation purposes.

## What are short-term bottlenecks to achieve OCORA objectives?

In the short terms, OCORA aims at preparing solutions for six major problems identified in the current CCS TSI. These include the lack of modularity (including the lack of an open CCS bus), hardware-software independence, regulations that prevent innovation, and the lack of non-

functional requirements (e.g. performance indicators). These will be formulated as problem statements for an alternative Open CCS On-board Reference Architecture.




*Note: All figures in this document are high-level simplified representations to explain OCORA concepts.*

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# ANNEX - OCORA Objectives

1. **To define an Open CCS On-board Reference Architecture – which is referred to as OCORA, - by e.g.:**

   - **Open standardisation** of the ETCS/ATP and ATO train-interfaces and -functions and other on-board subsystems as plug and play solution.
   - Establishing the principles and necessary requirements of the OCORA initiative.
   - Aligning initiatives and ideas already started and finding synergies to combine scarce resources.
   - Streamlining industrialisation processes in particular certification.

2. **To foster and develop the open ETCS/ATP source initiative by utilizing and benefitting from the existing results of the "openETCS" initiative and sharing common understanding on this initiative.**

3. **Validate the viability and relevance of the OCORA approach by using, for instance, demonstrators.**

4. **To promote the use of OCORA for the on-board in Europe in order to make it more cost effective, reliable, safe and secure by e.g.:**

   - Enabling consistency and complementary on a railway system scale between OCORA and other similar initiatives. This will be done in relationship with sectoral organizations (e.g. CER, EIM, EPTTOLA, ...), and joint undertakings in charge of the definition of the whole or parts of the reference CCS architecture (e.g. Shift2Rail, EuG, EULYNX, UNISIG, JPCR, UIC, …)
   - Building consensus and getting support from railway companies through regular information towards sectoral associations (e.g. members of the group of representative bodies)
   - Facilitating the industrialisation of OCORA results notably certification, through input to and discussions with associations sectorial organizations, manufacturing companies and joint undertakings (for instance UNIFE, UNISIG, Shift2Rail, ERL - European Reference Laboratories, …)