



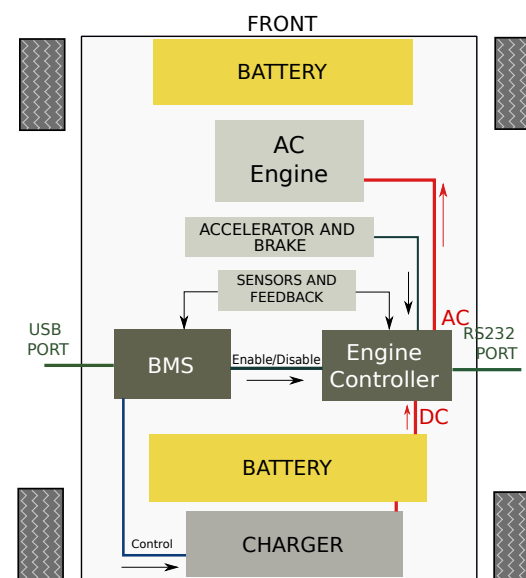
Wireless Network for In-Car Communication

The Open-Source Vehicle (OSV) platform and objective

- ▶ Simple platform made of a chassis, a powertrain and a mechanical drivetrain
- ▶ In-vehicle communications are performed using point-to-point wired communications
- ▶ The objective of this demo is to build a dashboard for the driver using wireless communications



The Open-Source Vehicle platform at IMT Atlantique



Architecture and electronic components of the OSV's powertrain

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Protocol Stack and exposed resources

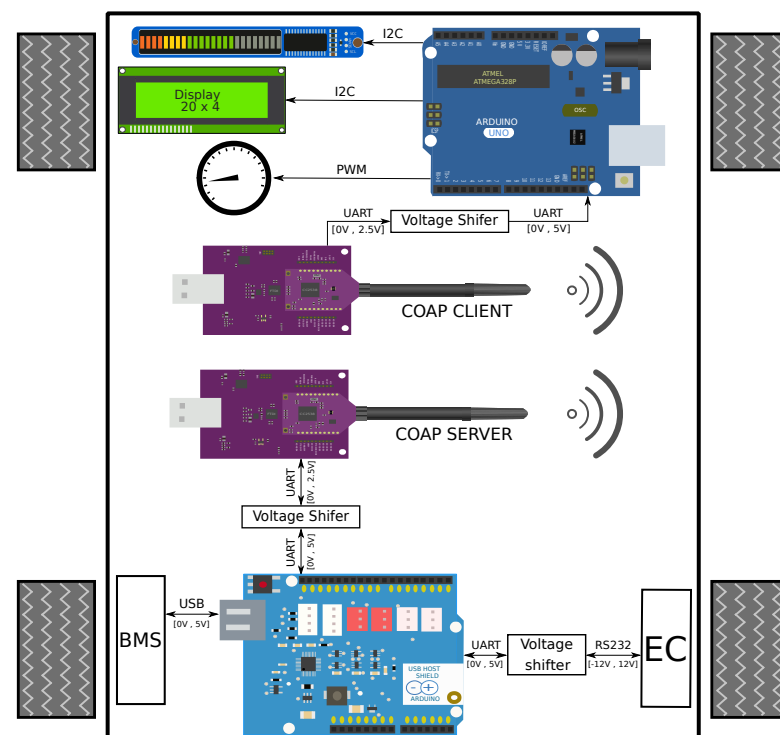
- ▶ The application layer used is Constrained Application Protocol (CoAP)
- ▶ CoAP resources are monitored using the Observe feature, so the dashboard is updated as soon as a value changes
- ▶ The server reads some of the values only when it is relevant (*i.e.* reads the traveled distance only when the speed is not 0)
- ▶ The exposed data is: Vehicle speed and traveled distance, battery State of Charge (SOC), battery cells temperature and voltage, and charger status

Application	CoAP
Transport	UDP
Network	RPL
Adaptation	6LowPAN
MAC / PHY	IEEE 802.15.4-TSCH

Protocol stack used for the wireless communication link

Demo set-up and hardware

- ▶ The communication is performed by two OpenMote CC2538 boards, running the Contiki Operating System
- ▶ A default set-up is used for the scheduler
- ▶ The data collection is performed by an Arduino Uno board with a USB shield
- ▶ The display are handled by an Arduino Uno board
- ▶ So far, the most challenging issue has been the voltage supply and adaptation (for wired communications)
- ▶ This platform can be used in the future to test PHY and MAC layer reliability, and try to improve the TSCH scheduler



Proposed architecture for the demonstration

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