Use case — In the use case "Agile process and Electric/Electronic Architecture of a vehicle for professional applications", TEK develops the demonstrator of a Prognostics and Health Management (PHM) system, for anomalies detection and classification and for condition-based maintenance of the on-board power electronics. The demonstrator considers the inverter and is experimented in an electric minivan prototype.

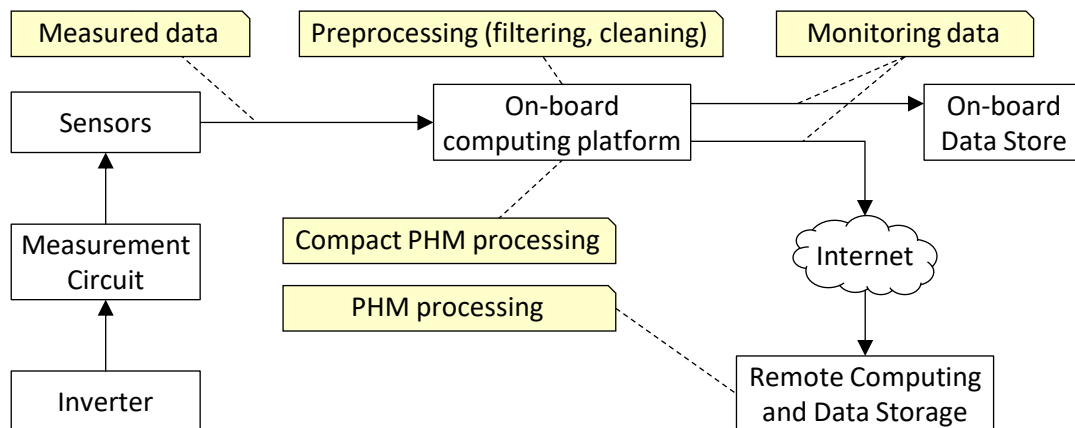The system is depicted in Figure 1.

Figure 1 Schematics of the TEK use case

The on-board processing is said compact because it has computational limitations due to the resources that are available to it, the remote computing can provide full capabilities.

There are three use case scenarios. TEK_UCS_01 (see below), TEK_UCS_02 for software verification, and TEK_UCS_03 for run-time monitoring.

Use case scenario — The use case scenarios TEK_UCS_01 "Design choices verification" deals with verification of the models and with design space exploration. The goal is to verify the adequacy (the functional aspects, as well as the response versus the resources) of the target components that the system architect has in mind to map/realize the design of the system.

Collaboration with UNIVAQ — The UNIVAQ solution HEPSYCODE supports many of the activities the system designer carries out to arrive at the final hardware and software implementation, such as dealing with non-functional requirements, specific HW technologies, scheduling policies and inter-process communication. Under the UNIVAQ guide, TEK modelled an ANN (a basic Artificial Neural Network for the PHM system that works on data generated through simulation) in a HEPSYCODE project, conducted timing simulation, and interpreted the results—this is what was shown during first AIDOaRt Hackathon. The collaboration continues through modelling more complex ANNs, to define the specific HEPSYCODE features that are needed to find the optimal architecture together with the mapping of model elements on real components.

Further collaborations — Collaborations with S3D and SoSIM solutions from UCAN can be explored in the next period.