Project Details:

Place: Institute of Systems and Robotics (ISR), Coimbra, Portugal

Duration: 4 – 6 month

Abstract:

The mobile platforms nowadays consist of a central control unit (CCU), intelligent actuator units (IAU) and several intelligent sensors units (ISU). The latter ones often work with Sensor Fusion techniques implemented on embedded PCs. Usually the raw data of two sensors is fused to a set of data which is more useful for the CCU. Many systems already use the CANbus to transfer the fused data from the ISU to the CCU.

While designing the main functionality questions shown up like which signals should the fused data package contain, how often should the data package be sent, how should the ISU/IAU react if it detects a failure? These and other questions need to be answered properly at a very early stage of the development process. The communication structure of the several ISUs and the CCU need to be defined in at once. Changes at later stages will be very time consuming and the reliability of the whole system usually suffers.

To overcome those problems a higher level protocol like CANopen can be used. Using an object oriented transfer mechanism object dictionaries can be defined for the CCU and the ISU/IAUs. By accessing the Object Dictionary the CCU has the possibility to initialise and parameterise the ISU via the CANbus. The content of the process data can be defined. The sample time for the process data can be changed or different sample times can be assigned to different process data. Finally the system could benefit from network management functionality already provided by the CANopen structure.

Work Schedule:

- Completion and set-up the Object Dictionaries with descriptions of the functionality of the ISUs and CCU.
- Implementation of the Object Dictionaries in the ISUs and the CCU.
- Implementation of Service Data Objects.
- Implementation of Process Data Objects.
- Implementation of Synchronisation and Emergency Objects.
- Implementation of NMT module control services.