

## SICOTIR 71-084

The project 'Embedded Systems for Real Time Networked Systems' aims to implement following objectives:

- Clear and complete definition of a developing research field : use of embedded systems for real time control of network-distributed systems (RTNCS – Real-Time Networked Control Systems)
- Highlighting advantages of RTNCS : low costs for implementation, exploitation and troubleshooting, increasing flexibility, diagnostic capabilities, use of intelligent sensors or actuators
- Highlighting disadvantages of RTNCS : poor global control system performances, difficult and complex controller design procedure caused by network-induced delays, packet loss in the network or by scheduling policy
- Determinarea caracteristicilor specifice ale acestor sisteme și a problemelor specifice generate de utilizarea unei astfel de arhitecturi de control (influența strategiei de alocare a taskurilor, a întârzierilor induse de rețea sau a pierderilor de pachete de informație asupra performanțelor sistemelor de reglare)
- Presentation of an integrated environment for modeling and simulation of RTNCS (TrueTime)
- Presentation of an embedded real-time kernel (xPC under Matlab/Simulink) used for experimental determination of Ethernet network parameters.
- Joint design of controller and scheduler for optimizing RTNCS performances.
- Implementation of an experimental test-bench for testing RTNCS applications.
- Adaptation of a free RTOS (FreeRTOS) to a specific microcontroller architecture (dsPIC30F6014A)
- Design of a communication stack for CAN for dsPIC30F6014A microcontroller
- Implementation of software modules for embedded applications (drivers, interfaces/handlers, managers) following AUTOSAR standard (modularization, layers, interfaces)

Building a knowledge database in this research field (technical project, documentation, methods, techniques)