Prepared by	Date	Rev
P. Delmastro	2/19/2018	V0.01

Stage proposal (FW)

Table of Contents

Prepared by	Date	Rev
P. Delmastro	2/19/2018	V0.01

1 Revision History

Rev	Date	Prepared by	Changes Made
V0.01	05/12/2017	P. Delmastro	First Issue of the document

2 General

DAC System is a young company based in Manno (TI), active in the Broadcast industry. In the last three years we have been developing and marketing our patented system: DACS (Direct Antenna Control System).

The system is designed to monitor, in-service and in real time, the health of high power transmission systems, typical of broadcast transmissions (DVB-T, DAB, FM Radio).

DAC System is open to host students in its structure to implement development projects in cooperation with internal R&D. In this document one of the opportunities will be described.

3 Project Description: Firmware Development for the Microcontroller Board of 2nd Generation DAC Sensors

The new generation of DAC Sensors will evolve from a purely analog electronic to a more sophisticated object, able to execute analog to digital conversion of sensor's signals as well as communication with the indoor equipment utilizing the industrial standard Modbus protocol. This function is accomplished by a microcontroller board based on ARM Cortex M3 or M4 architecture, with embedded Analog to Digital converter.

Very schematically, the architecture of the system is represented in the picture:
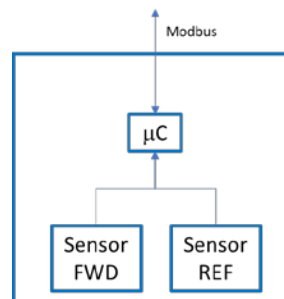
The scope of this project is to participate to the design of the microcontroller application, that will include at least the following functionalities:

- Communication based on Modbus protocol over serial interface

Prepared by	Date	Rev
P. Delmastro	2/19/2018	V0.01

- At least two channels of ADC to be sampled periodically
- Specific data processing on the samples from the ADC
- Storage of the data in a FIFO structure
- System Clock synchronization with the Modbus Master
- In-service secure FW upgrade
- P-mode for production test and calibration data storage

4   Technology

The specific Microcontroller is still to be defined but it will be based on ARM Cortex M3/4 architecture. The specific device will likely be from one of the three vendors:

ST Microelectronics

Silicon Labs

Atmel/Microchip

The application will be developed in C language.

HW Prototypes, debugging tool and test instruments will be available.

5   Expected competences

The student will be expected to have followed an electronic or telecommunications engineering study address. Specifically, the following skills will be required and exercised during the stage:

- Solid theoretical of C program language
- At least some practical experience of development of C applications
- At least a basic knowledge of embedded systems concepts and microcontroller programming
- Fluent writing and reading in English
- Some experience with common electronics lab tools (oscilloscopes, debuggers)

6   Tasks included in the assignment

The contents of the stage assignment can be agreed. Depending from the duration in time of the assignment, a subset of the functionalities listed above will be assigned to the student.

Minimum Duration: 3 months

Preferred Duration: 6 months

Expected start: Q2 2018

Prepared by	Date	Rev
P. Delmastro	2/19/2018	V0.01