



# Early warning system for CMS equipment failure in the experimental cavern

Code	EP7566
Programme	FCT
Department	EP
Responsible	33762 - Dr. Duccio Abbaneo

## Title

Early warning system for CMS equipment failure in the experimental cavern

## Description

The goal of the internship will be to design a DSP (Digital Signal Processing) system to act as an early warning generator informing CMS Technical Coordination that some equipment in the CMS detector cavern is reaching the end of its operational lifetime. Rotating parts, in particular, need to be regularly replaced (e.g. cooling fans in electronics racks). The effect of the CMS magnetic field is influential in some cases and leads to accelerated ageing. The DSP system will be based on the idea that the cavern background noise can be modeled and averaged to the point that when a new frequency arises it signals an abnormal operation of a piece of equipment. Designing a microphone based system that will be radiation and magnetic field tolerant will be in itself a challenge, and in addition, the system should be light enough to be put on board inspection robots that are being designed by other CMS teams. Having the system on the robot will allow for a much more precise and geographically mapped measurement of the ambient noise.

The candidate would need to be skilled in instrumentation and electronics engineering with an interest in robotics.

## Skills

Low and High Frequency Engineering: Measurement techniques. Networks and Systems: Sensors. Theory of Electrical Engineering: Signal processing  
Electronics design, instrumentation, robotics, team player

## Disciplines

Electrical Engineering, Electronic Engineering

To edit this project go to [https://hrapps.cern.ch/auth/f?p=131:4:::P4\\_ID:7566](https://hrapps.cern.ch/auth/f?p=131:4:::P4_ID:7566)