

HELEN Program: Final Report on The Development of the Detector Control System for the ACORDE detector of ALICE.

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1 Grant Description

Academic Year	2005 – 2006
Host Institution	CERN France/Switzerland
Grant Type	Latin America to Europe, no. 6, RT type
Duration	Two months

2 Introduction

The ALICE Experiment will be operated through the Experiment Control System (ECS): a standardize software for the four LHC experiments. Each sub detector in ALICE is responsible for its particular control system which must follow the standards of the ECS but also the particular standards of ALICE. These standards range from the software to be used to the naming convention of devices in the user interface or variables in the code.

The software LHC has chosen for the control of the four experiments and the LHC machine itself is PVSSII, a commercial distributed control software developed by the austrian company ETM. Besides, the Controls Group of the Information Technology Department of CERN has developed a tool for easing the setup of the most common instruments into PVSSII. This so-called Framework helps the sub detector controls experts in implementing all the aspects of the DCS in PVSSII and serves at the same time as a standardizing tool. The Framework consists of a collection of independent libraries —called Components— of complex PVSS subroutines and panels that perform different tasks. There is, for example, a component for each of

the most common hardware devices used in the control of the sub detectors that automatically set up the device into PVSS; there also exist components for accessing an Oracle database from PVSS, for managing the access rights to the DCS of the different users, for packaging and 'unpackaging' PVSS projects for deploying the DCS, etc.

ACORDE (A COsmic Ray DETector) is the cosmic ray trigger of ALICE that will detect atmospheric muons in the energy range 10^{15} - 10^{17} eV. It consists of 120 plastic scintillator palettes measuring 2×0.2 m² coupled in 60 modules that will be installed in the upper faces of the ALICE magnet.

The Detector Control System (DCS) will monitor and control the high voltage (HV) supply for the PMTs and the low voltage (LV) supply for the electronics. The calibration procedure at each run will also be managed by the DCS. This includes correcting the PMTs HV level in case of additional gain is needed. Another tasks of the DCS are the updating of the configuration and conditions databases that store the preset values of the power supplies and electronics parameters, and the current values of them at predefined time intervals, respectively.

The ACORDE DCS has been under development from summer 2004 and by now the final version of it is in the way of being completed and installed in the ALICE control network.

3 Grant Activities

During the first week of my stay at CERN I attended the ALICE-DCS week where an advanced course of the Framework was given. This course addressed important upgrades made to the Framework such as the database and the access control components.

Then I discussed with the ACORDE team leader and people from the ALICE Control Coordination (ACC) on the definition of the final version of our DCS. We agreed on the definitive configuration of the architecture of the software (the configuration of our control tree in PVSS). I also started discussions with the Offline group of the experiment to learn how the DCS would interact with the DAQ and the offline software to perform the calibration procedure of ACORDE and to define the calibration procedure itself.

I developed the new version of the ACORDE DCS to implement the agreed control hierarchy in the Framework/PVSS complying with all the LHC and ACC standards. This is the current (and almost final) version of our DCS which unfortunately I was not able to test with the hardware (CAEN HV *SY2527* and LV *EASY* power supplies) during my stay at

CERN¹.

Currently part of the ACORDE modules (40 of them) have been installed and cabled on the top of the ALICE magnet. We expect to be able to complete the DCS before the end of this year and to submit it to the ACC group to be approved so it can be deployed in the dedicated DCS network at CERN. However the production of the EASY LV power supplies has been delayed by CAEN and only a limited type and number of EASY crates and boards are expected to be delivered before the end of this year. ACORDE, as one of the firsts sub detectors in the process of installation, will be granted with some of these equipments. This of course has made impossible to test the LV part of the DCS with the EASY power supply. We plan to have our DCS ready to be tested as soon as we receive the LV power supplies.

¹The DCS lab of the ACC group did not have the specific boards we use in our DCS.