

# LHC Experiments' Joint Controls Project Revised Mandate

## Purpose

To develop a common framework and components for detector control of the LHC experiments and to define the required long-term support.

## Background

JCOP was set up at the start of 1998 as the result of a report from the Working Group on Common Projects in the Field of Software/Computing and Trigger/DAQ at LHC<sup>1</sup>. The motivation for this was the realization that with the coming staff reductions it would be essential to avoid duplicate developments and reduce the effort needed for support and maintenance. The project is now well under way and many items from the first phase have been completed. Thus, a revision of the mandate is appropriate to cover implementation in a second phase.

## Scope

The scope of JCOP is to provide a common framework of tools and components to allow the experiments to build their own Detector Control System (DCS) applications. The purpose of the DCS is the initialization, monitoring and operation of the different sub-detectors and the interaction with the Data Acquisition system and external systems such as the CERN infrastructure services and the LHC accelerator.

## Deliverables

### *Tools, Services and Engineering Support*

1. A recommendation for the purchase and licensing of a Supervisory Control And Data Acquisition (SCADA) tool kit based on a market survey and tender.
2. An integrated set of tools, or "Framework<sup>2</sup>", to be built using the chosen SCADA tool kit and delivered in stages as defined in the detailed Programme Plan.
3. Guidelines and implementations for standard hardware items, interfaces and communication protocols, including OPC, PLCs and Field buses.
4. A communications mechanism between the supervisory level SCADA system and HEP-specific equipment, such as VME, based on a restricted number of operating systems including LINUX.
5. A communications mechanism between the experiments' DCS and CERN infrastructure services, such as Level 3 Safety (TCR), electricity supply, cryogenics and accelerators.
6. Services to handle: (a) distribution, training and first-line support of the chosen SCADA product; (b) distribution and support of the Framework; (c) support for the standard hardware items interfaces and communications protocols; (d) short-term support for interim solutions and help in replacing these by definitive ones.
7. Definition of a strategy for long-term support.

### *Controls support for common infrastructure*

8. Generic components, built on top of the communications mechanism mentioned above, to support the interface between each DCS and the various external systems. These include:

---

1. Report From the Working Group on Common Projects in the Field of Software/Computing and Trigger/DAQ at LHC: Detector Control Systems, <http://itcowww.cern.ch/jcop/hpage/thursdayprop.html>  
2. The Framework is for use by the control system developers and includes as far as possible all generic templates, standard elements and functions required in order to build a homogeneous supervision system.

- The LHC machine,
  - The Alarm Three Safety system (Technical Control Room),
  - Cooling and ventilation infrastructure services,
  - Magnets and Cryogenics
  - Electrical power.
9. Consultancy and, where appropriate, implementations for controls of common experimental infrastructure. Items to be decided on a case-by-case basis depending on whether sufficient commonality can be found and the availability of resources. A possible but non-exclusive list of items includes:
- Gas Working Group (already under way).
  - High and low voltage power control.
  - Rack control.
  - Crate control.
  - Sub-detector cooling and ventilation control.

#### *Sub-detector support*

10. Consult and/or collaborate with sub-detector teams on controls issues of common interest.

### **Sub-Projects and Activities**

The Project Leader is responsible for drawing up a Programme Plan in collaboration with the Executive Board. For individual deliverables, sub-projects and/or services must be set up with a leader who reports to the JCOP Project Leader. For each deliverable, it will be necessary:

- To specify detailed requirements and evaluate and prototype possible solutions.
- To ensure that manpower and financial resources are available.
- To implement, test and document the agreed solution
- To set up a system for configuration, support, maintenance and change management.

### **Participation and Management Structure**

The participants of the project are members of the four LHC experiments and collaborating support groups who form the Project Team. The management structure and reporting lines of the project have recently been clarified in a memorandum from the EP and IT Division Leaders<sup>3</sup>. This document defines the reporting lines for the experiments to be via their Technical Coordinators and reporting of the project to be to the LHCC concerning the LHC experimental programme and to the Technical Director for host laboratory issues.

The management of the project is carried out by the Project Leader who reports to a Steering Group which meets at least quarterly. The programme of work must be approved by the Steering Group which must identify and make available the necessary resources. Day-to-day decisions are made by an Executive Board, chaired by the Project Leader, and composed of the experiments' Controls Coordinators and a representative of each support group involved (until now, the controls group of IT division).

Note that whilst much of the effort would be expected to come from support groups, contributions will also be necessary from the experiments and people with particular expertise from one experiment may provide advice and support to the other experiments on topics of common interest.

---

3. Memorandum of November 23, 1999, from M. Delfino and G. Goggi to J. May, J. Englen and members of the JCOP Steering Group.