Memorandum

To: JCOP Steering Group

From: LHCb members of the JCOP Steering Group

Date: 12.04.99

Re: LHCb position about the future JCOP strategy.

Introduction

Motivated by the forthcoming meeting of the JCOP Steering Group, we thought to put in writing our views on the important issues to be discussed in the hope that this will facilitate the discussion.

We believe the JCOP project is a success. It is a success because we have made progress in understanding the controls problem in the different experiments. It is a success because we have made some progress towards the solutions. It is a success because we have achieved free exchange of technical information and experiences. We are starting to use even the same vocabulary! It is a success because the resources in IT/CO are better used and organised than they were before. We are in a position to say that LHCb has greatly profited from JCOP in our current scheduled activities, which are mainly focused on: user requirements, study architecture, perform evaluations, R&D in general (see the LHCb Controls project Gantt chart at the end of the document).

Despite the accomplishments of JCOP, we are concerned about the future direction of the project, which will be influenced in a major way by any decision to tender for a SCADA system to be used as a basis for the supervisory software. Our concerns stem from what we perceive to be two basic differences in the strategies of the 4 experiments. These are the priorities and time scales for taking such decisions and the overall scope of the Controls project.

Priorities and time scale for decisions

In order to build a control system we need to attack the problem (find a solution) at different levels. Starting form the hardware interface to the equipment and low-level protocols to the highest level that is the interaction of the system with the operator of the experiment. Given that everything cannot be done at once, due to limited resources, and also that some solutions have a very short lifetime (application software), we need to establish a priority list that is driven by the needs and constraints of the people developing the detectors and the electronics. We must also take into account the fact that for the fast evolving items we would like to wait as long as possible to benefit from the advances in technology. For instance, in no other part of the LHCb computing do we intend to take final decisions about software as early as being proposed for JCOP. It is more urgent for us to have a clear recommendation for the detector and electronics builders on what interface we would like to have to connect to the control system.

For us, the SCADA system falls into the category of fast evolving items that electronics and detector designers do not need to use now. For small tests, prototypes or team beam activities, JCOP has already identified an interim solution (BRIDGEVIEW) that can be used until the final solution is provided. The investment made by sub-detectors on the process control (low level control) can be easily preserved when going from the interim solution to the final one.

If we had a commercial SCADA system selected and purchased in one year from now we would not know what to do with it. We have not yet identified the people that need to start developing and using the final SCADA system. Therefore it would be hard to convince the LHCb management to invest a significant amount of money on this item now.

We believe that the evaluation of commercial solutions is needed. There is a genuine need to gather information on what commercial products can do and what are the typical assumptions that apply in industry generally that do not apply in our field. David's memo illustrates a limitation of currently available SCADA systems, namely the current incapability of handling arrays. In fact we have been proposing that other types of solution should also be investigated, for example component-ware, completely open systems based on open standards, homemade, etc. There is clearly an interest on our part to contribute to these investigations, but we certainly do not have sufficient resources to do this alone.

To conclude on this point, LHCb is not in a hurry to take a decision on the SCADA system. The low-level stuff (hardware interfaces, protocols, etc.) has higher priority because of the current needs of our designers. Before taking decisions all the potential solutions should be carefully evaluated and compared in a cost benefit study. Decisions concerning rapidly evolving products (software) should be taken as late as is reasonably possible.

Scope of the LHCb controls system

We would like to use the same software solution to control the LHCb detector and experimental infrastructure as well as to control, configure and monitor the data acquisition system. Although these two areas have traditionally been treated as distinct subsystems with their own independent solutions, we are convinced that the nature of the problem is very similar and that we can achieve a better-integrated solution for controlling the whole experiment as such. We also expect to be more economical in the use of manpower for development and also maintenance. This is our choice and we hope it will be respected.

The solution for controls we are looking for is something that could solve both problems at once. It is no good to restrict artificially the problem to one part (detector control) and find a solution that suits it very well. If that was the case, we would still to solve the problem of the control of the data acquisition system. This is by itself as big as the initial problem, if not bigger, with the added obstacle that we have not foreseen the extra human resources for that. Therefore, when LHCb will have to evaluate a solution, we will always do it for the complete system and not for a partial one. The solution to consider could be, of course, a mixture of some commercial parts together with some homemade pieces adapted to our needs.

The search for an adequate solution is more complex than just to evaluate the features of a commercial SCADA system. We need to understand very clearly what parts of the commercial system can be used as-is, and what parts need to be re-done or adapted etc., always having in mind the complete experiment controls problem. All this takes time and we don't have currently in the collaboration the manpower to assign to it now. Only when all the elements are there we will be able to be in a position to take a decision. Therefore, we re-iterate that we believe the intention to take the decision on SCADA by the end of September this year is unreasonable.

Our suggestions

- Do not put the JCOP project in a hurry to find solutions before they are required. Take the necessary time to take strategic decisions.

- Use the time to evaluate other alternative solutions (component-ware…).

- Delay decisions concerning fast-evolving solutions as late as possible.

- Put more emphasis on the front-end side of the system (hardware interfaces and protocols).

- Give consideration to the different scope for controls that other experiments may have.

Annexe 1: LHCb control project planning