

Minutes of LHC-CP Link Meeting 2

Subject	:	LHC Controls Project	
Date	:	16:00 20 th June 2000	
Place	:	30 7-012	
Participants	:	Bruning, O Carlier, E Ciapala, E Di Maio, F Epting, U Gavaggio, R Gras, JJ Jonker, M King, Q Lauckner, R Pezzetti, M Ribeiro, P Vanden Eynden, M Walckiers, L Wolf, R	SL-AP SL-BT SL-HRF PS-CO ST-MO LHC-VAC SL-BI SL-CO SL-PO SL-DI LHC-ECR SL-CO SL-CO LHC-MTA LHC-MMS
Excused	:	Billen, R Brahy, J Gayet, P Lamont, M Rodriguez Mateos, F	SL-MR LHC-IAS LHC-ACR SL-OP LHC-ICP
Absent	:	De Rijk, G Martel, P	SL-MS EST-ISS
Distribution	:	Via LHC-CP website: http://lhc-cp.web.cern.ch/lhc-cp Notification via: lhc-cp-info@listbox.cern.ch	
Agenda	:	1. Minutes from previous meeting 2. Purpose of LHC-CP meetings 3. Control of Vacuum 4. Future Front End Systems 5. AOB	R. Lauckner R. Gavaggio P. Ribeiro

1. Minutes from Previous Meeting

The minutes from the first meeting were approved.

2. Purpose of LHC-CP meetings

R. Lauckner

The objectives of the LHC-CP meetings were reiterated by the chairman (see attached slide)

3. Control of Vacuum

R. Gavaggio

Richard Gavaggio presented an overview of the control issues related to LHC vacuum systems (see attached slides). This began with an overview of the scale of the system. In effect there are three vacuum systems: for the QRL, the lattice cryostats and the beam pipe. There are several on going projects at CERN which are seen as stepping stones for the LHC development, including the AD project, SPS upgrades and String2.

The initial architecture to be used in String2 is based upon Siemens PLCs (S7/400s and S7/200s) linked by Profibus with supervision via PCs running PCvue32 under WindowsNT. However, radiation tests have shown that the S7 series PLCs are not suitable for use in the LHC tunnel. Alternative arrangements are being considered, including placing all the PLCs in the alcoves and linking to vacuum elements via long cables.

Naming conventions are complicated by the need to have large numbers of mobile pumping stations to be used during shutdowns. These will need to be able to be plugged in at any of the large number of sockets along the tunnels, and there may be more than one mobile unit at the same location, leading to potential ambiguity under the present naming convention.

The first deployment of real LHC vacuum hardware will be for the QRL in 2002, however, new SPS equipment is due in 2001.

In the discussion which followed, Q. King mentioned that SL/PO also faced a serious radiation issue for it's tunnel based equipment. He reported that initial results from a memory error correction scheme appeared to show that single bit errors could be corrected. He also mentioned previous results from tests with the WorldFIP microFIP interface component when operating in "standalone" mode (in this mode the device provides two 8-bit ports which can be either inputs or outputs). In the 1999 tests, five microFIP cards operated successfully while receiving about 150 Grays. R. Gavaggio replied that there was a similar component for Profibus, which might be considered.

M. Jonker brought up the question of middleware for the access of vacuum system data. He pointed out that turn-key industrial solutions normally contain their own data logging systems, but the same information should be available via a middleware, so that data from different systems can be compared. R. Gavaggio explained that they have no resources to work on higher levels of the system and were only directly concerned with "expert" interfaces to support the operation of the PLCs. M. Vanden Eynden noted that integrating industrial solutions was not a high priority for the middleware project. M. Jonker replied that it should be possible to make a bridge between CERN applications and an industrial system which is independent of the choice of the middleware.

4. Future Front End Systems

P. Ribeiro

Pedro Ribeiro presented an overview of the work of the Future Front Ends Working Group (see <http://pedror.home.cern.ch/pedror/FFEWGRep.doc>). This began with an overview of the FFEWG, which has been set up following the SL Beam Instrumentation group's need for large numbers of new FE systems for LHC BPM and BLM systems. The working group is co-ordinating research into hardware and software solutions for FE systems which will eventually be part of the SL/CO supported FE services.

This was followed by a brief review of the history of front end systems in SL which included an era of VME card building in the 1980's. A CERN designed HAMAC-1 MC68010 processor card was passed around as an example from this period. OS9 was the original real-time operating system, and many systems still run with OS9. However, in the 1990's LynxOS was selected for FE systems and this remains the OS of choice today

The objectives of the WG were then reviewed, along with work done so far and work in progress. The results will affect hardware and software choices for SL/BI, SL/CO, SL/BT and SL/RF. More information is available from <http://pedror.home.cern.ch/pedror/Pedror.htm>.

In the discussion which followed L. Walckiers asked about the integration of the future Magnetic References Multipoles Factory into the LHC RT controls infrastructure. P. Ribeiro replied that this was not in the scope of the FFEWG but he was already in discussion with L. Bottura and an RT connection was clearly required. Q. King commented that a fundamental requirement for the Multipoles Factory was a true real-time operating system (i.e. not Unix). He asked P. Ribeiro if LynxOS was still “healthy” and was expected to be used in the future. P. Ribeiro said it was.

F. Di Maio asked about the time scale for the choice of FE for SL/BI. JJ. Gras replied that the final hardware would have to be ready for installation in the first sector at the end of 2003. He confirmed that SL/BI face a significant challenge because of the radiation in the tunnel. An important choice will be between the system buses VME and Compact PCI. VME is well known at CERN but is a more expensive format.

5. AOB

1. Marc Vanden Eynden explained that the mandates for two new LHC-CP sub-projects were being developed and would be presented at the next LHC-CP meeting for comments. The mandates will then be submitted to the LHC-CP steering committee (SLTC) for approval. The sub-projects will work on a top down analysis of the LHC control system and Alarms.

2. Quentin King mentioned that two new listbox mailing lists have been set up to support the work of the LHC-CP. These are:

lhc-cp@listbox.cern.ch For LHC-CP core team and link people. This will be used for circulating the meeting agendas, and can be used by LHC-CP members to communicate with each other.

lhc-cp-info@listbox.cern.ch For LHC-CP core team, link people, group leaders and other interested parties. This will be used to circulate notification of the publication of the minutes of meetings (which will be on the web).

Both lists are private (i.e. only registered users can mail to the list), unmoderated and archived. List membership is controlled by Robin.Lauckner@cern.ch, Quentin.King@cern.ch and Nicole.Boimond-Lopez@cern.ch.

3. Robin Lauckner mentioned two future subjects for LHC-CP meetings: Philippe Gayet will report on the UNICOS working group and Mike Lamont and Louis Walckiers will report on the control of the series measurements of the lattice magnets (following magnet test benches review at the beginning of July).

Actions	People
Review RT requirements for end of 2000.	M. Lamont, R Lauckner
Prepare mandate for two new LHC-CP sub-projects (Top Down Analysis of LHC Control System and Alarms) to be presented at the next LHC-CP meeting.	LHC-CP Core Team

LHC-CP Meetings

- This meeting is the focus for the LHC-CP project
- The initial aim is to establish good communication
- The project will be coordinated by the meeting
- Sub-projects will be launched at this meeting (with approval by the steering committee, SLTC)
- Sub-projects will be the forum for technical work and preparing solutions and decisions
- The LHC-CP meeting will formalize the decisions
- The meeting will coordinate the production of the 1st version of the project milestones in 2000

However

- The steering committee will approve sub-projects and allocate resources
- The core team will continue to assist the project leader

LHC vs LEP

* 3 Vacuum Systems :

- QRL Line Insulation Vacuum
- Cryostats Insulation Vacuum
- Beam Vacuum
(+ Injection Lines, Dumps, Exp. Areas)

* Local Automatic Processes for :

- Penning Gauges
- Pumping Groups

* "Plug & Play" Mobile Equipment

* Naming Convention

<Equipment code>.<Position>.<Vacuum System & Sector Nbr>

LHC VACUUM EQUIPMENT

* Arcs :

- 1416 Gauges
- 880 Ion Pumps
- 368 Valves
- 184 Pumping Groups

==> More than 7000 I/O

- 55~96 plugs / Arc for Mobile Equipt.

* LSS : to be defined

* Injection Lines : to be defined

* Dump Lines : to be defined

* Exp. Areas : to be defined

CURRENT PROJECTS

* **QRL Test Bench**

* **Radiation Tests**

* **STRING 2**

* **AD Pumping Groups**

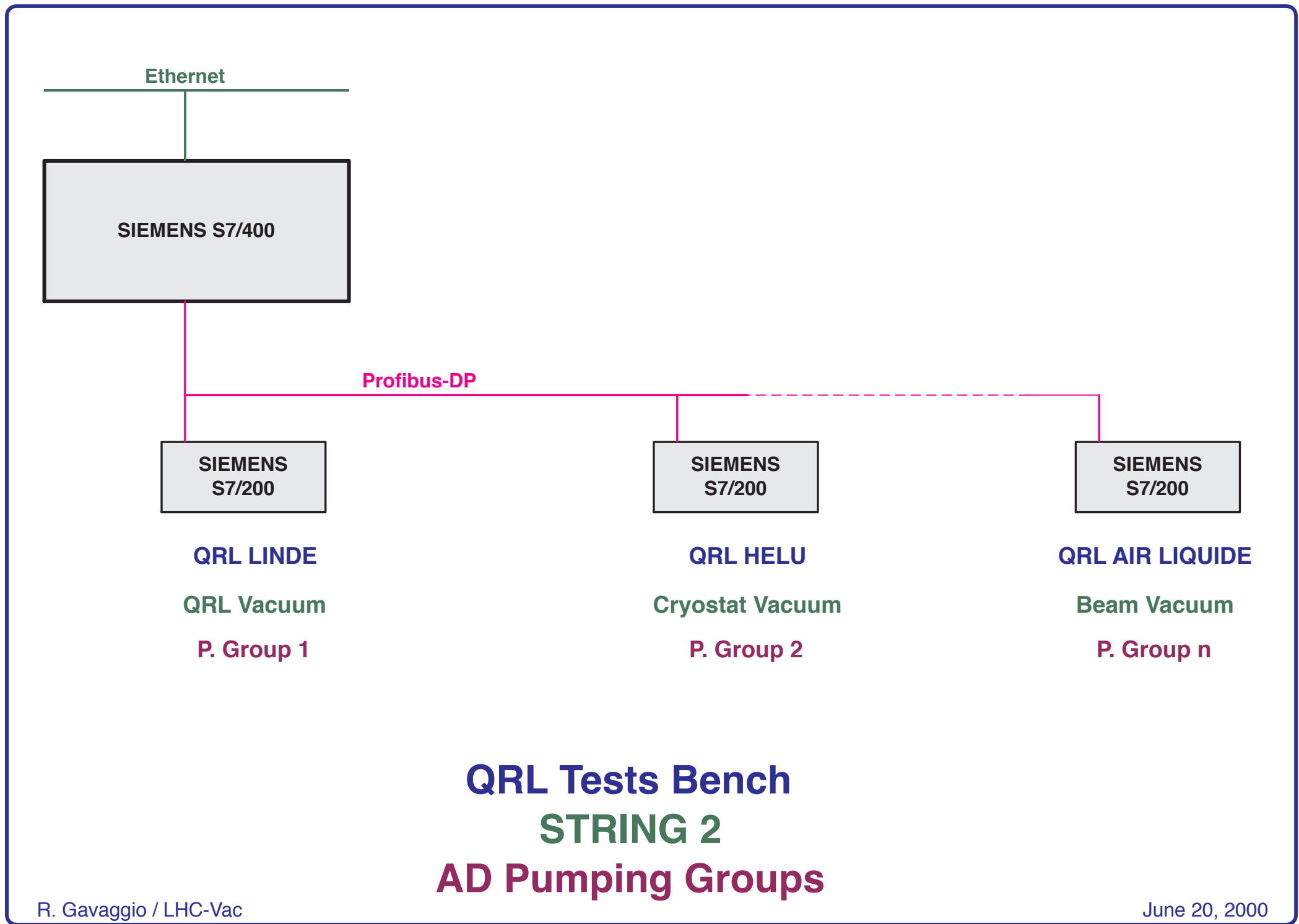
==> Integration of PLCs in PS Control

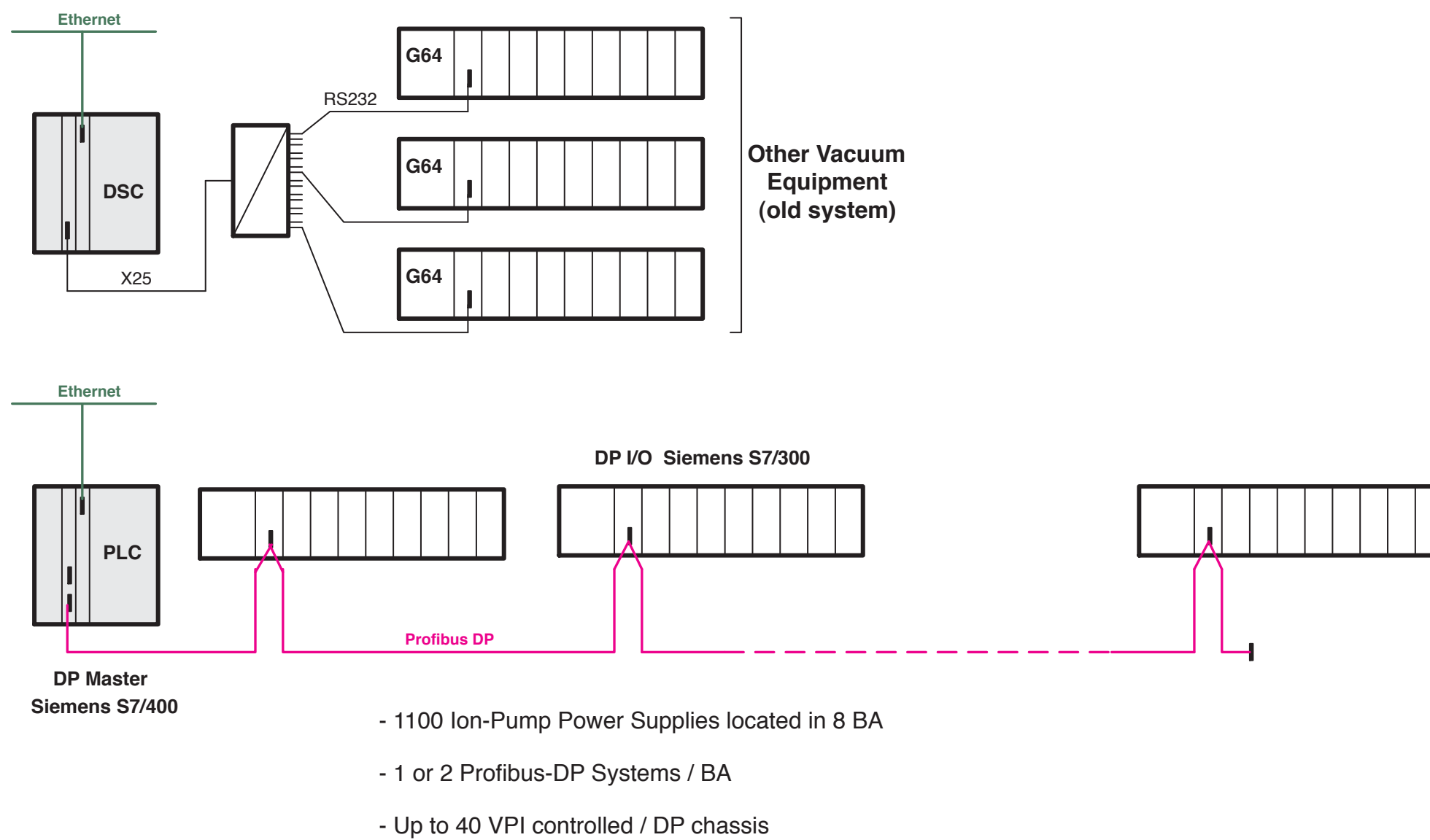
* **SPS Ion-Pumps Replacement**

==> Integration of PLCs in SPS Control

* **LHC Vacuum System**

- Pumping of the 1st QRL Line : **2002**





SPS Ion-Pumps Control System

