Planning Activity for LHC Control System

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What is Planning?

Scheduling of activities to ensure on time delivery

- **What needs to be done?**
  - Controls components
- **For what / whom?**
  - What are the systems that need control
- **How it will be done?**
  - Depends on architecture, life cycle, ...
- **By when should it be done?**
  - Scheduling and milestones

How do we proceed?

(so far 6 meetings: 11/01, 2/02, 16/02, 15/03, 28/03, 29/03 and numerous discussions)

- **Identify LHC systems needing controls**
- **For each system**
  - identify “Link-Persons” in matters of control
  - define what operations will be performed
    - “Requirements” for these operations
      - ⇨ infrastructure (process & controls)
      - ⇨ control functionality
- **List according to agreed LHC target milestones**
  - QRL Commissioning: …….. Aug. 03
  - Sector Tests: …….. Apr. 04
  - First beam: …….. Feb. 06
- **Plan (QRL)**

Systems to be installed

- **Systems to install (needing Controls)**

Controls System Components

- **Control System Components**

Proposed Planning & Scheduling Scheme (1)

- **During this exercise, it appeared necessary to clarify the scope of the planning and scheduling activities at the level of the**
  - LHC technical coordination
  - Equipment and controls groups
  - LHC-CP project

Proposed Planning & Scheduling Scheme (2)

- **LHC Technical Coordination Level**
  - ☛ **LHC general coordination schedule of the construction, installation and commissioning of all major hardware systems of the LHC machine**

  In particular :
  - definition of major construction, installation and commissioning time frames and milestones for complete systems (e.g. QRL, LHC machine in sector 7-8, ...)
  - coordination of logistics and procurement activities such as transport, installation and cabling (including the electronics racks).

  done in conjunction with several other working groups: TEWG (Tunnel Electronics), MPWG (Magnet Protection), UILWG (Underground Installation and Layout)

Proposed Planning & Scheduling Scheme (3)

- **Equipment Groups**
  - ☛ **Detailed planning of their local systems within the time-frame defined by the LHC general coordination schedule**

  In particular:
  - specification, design, implementation, installation, testing and commissioning of their local hardware and software control facilities (actuators, sensors, fieldbuses, PLCs, SCADA, etc)
  - Installation of their local control rooms (e.g. CRYO, TCR, etc)
  - Most of these technical choices are being made in coordination with the LHC-CP project and CERN controls groups

Proposed Planning & Scheduling Scheme (4)

- **LHC-CP Project**
  - ☛ **Planning of the overall controls facilities required to operate the machine as a whole as well as its subsets (e.g. QRL, LHC machine in Sector 7-8, …) within the time-frame defined by the LHC general coordination schedule, the planning of the Equipment Groups and in the light of the LCC (LHC Commissioning Committee) requirements**

Typically:

- generic control system services: logging, post-mortem, alarms, timestamp, ...
- software communication protocols and interfaces (i.e. middleware, RT)
- systems integration
- monitoring facilities and procedures from PCR, CRYO & TCR control rooms
- PCR control room software (e.g. PCR S/W & H/W required for the sector test)

Planning: Example for QRL (1)

- **LHC general coordination schedule**
  - QRL ready for installation (incl. General services): 6 Jan. 03
  - QRL Commissioning & Reception **Must Finish** on 22 Aug. 03
- **Equipment Groups**
  - VAC Controls ready: mid. Feb. 03
  - QRL CRYO controls ready: early Mar. 03

Planning: Example for QRL (2)

- **Based on previous time frames and milestones**
  - Identify tasks for which LHC-CP is responsible and estimate their duration
  - —> “backwards” Planning
  - No resources (and thus no leveling)
  - No contingencies

Planning: Example for QRL (3)

- **Major Tentative Milestones for Control Components**
  - May. 01 : Define which SCADA will be use
  - Mar. 03: Interlocks, Database, Logging, CRYO control room, TCR for QRL
    - Database: 1st Q. 02
    - Logging / Archiving: end 02
  - Jun. 03 : Alarms (testing with QRL)
    - Alarm Prototype: end 02

Open questions & Next Steps

- **Open Questions**
  - Agree on planning scheme (cf. Previous §)
- **Next Steps**
  - Define & Plan: Alarms, Logging, Database, Time-stamping, Control Room operation, Communication needs, … for QRL
  - Extrapolate for Sector Tests including other systems and Control components
  - Baseline
  - Track Progress