Controls for Technical Services
Session Summary

- 08:40  Electricity Distribution  S. Poulsen
- 09:10  Cooling and Ventilation  H. Jena
- 09:40  Radiation Monitoring  G. Segura Millan
- 10:30  Level 3 Alarms  L. Scibile
- 11:00  Personnel Access  E. Cennini
- 11:30  Technical Services Communications  P. Sollander

Topics

- Major User Requirements
- Proposed architecture
- Major technical choices, outstanding issues
- Infrastructure requirements (location, technical services, control system services, communications ...)
- Plans for installation and commissioning
- Milestones for the work

Electrical Network Supervisor
S. Poulsen

- Centralized
  - SCADA applications
  - Configuration and logging databases
  - Web services
  - Integrated in TCR
- Distributed
  - Data acquisition interfaces (front ends)
  - Serial lines to equipment
  - Field-buses
- Electronic equipment interfaces
  - Digital input
  - Analogue input via transducers (limited usage)
  - Output

ENS Planning

- SPS
  - Partial installation (no complete SPS renovation yet)
  - BA4 completed, BA7 planned for 2003
  - SPS electrical renovation not yet funded
- LHC
  - Surface buildings completed by September 2003
  - Underground not yet started – limited installation
  - Some LEP equipment still operational in alcoves!
- Meyrin
  - Planned for shutdown 2003-2004
**CV Control System Architecture**

Layer 1: Acquisition and regulation
- Data archiving and web-based supervisory tools
- Trouble Diagnosis
- Post-mortem analysis
- Archiving station

Layer 4: Data handling and WEB supervision
- Web-access to local process supervision (layer 2)

CERN technical data monitoring
- CERN reference
- Standardization of interfaces

Communication to:
- Central Alarm Server(CAS)
- Technical Data Server(TDS)
- New : WEB-Access to layer 2

Layer 2: Local supervision
- Process control and supervision
- Windows NT Workstations
- Windows 2000 Workstations
- SCADA: Wizcon
- Network: Ethernet TCP / IP
- PLC: Schneider / Siemens

Layer 3: TCR remote supervision
- Process regulation
- Flexibility
- Process-customized solutions
- Windows NT Workstations
- Windows 2000 Workstations
- SCADA: Wizcon
- Network: Ethernet TCP / IP
- PLC: Schneider / Siemens

Layer 1: Acquisition and regulation
- Process regulation
- Flexibility
- Process-customized solutions
- Windows NT Workstations
- Windows 2000 Workstations
- SCADA: Wizcon
- Network: Ethernet TCP / IP
- PLC: Schneider / Siemens

**ST/CV Projects and Contracts**

- **F - 292** New pumping stations for LHC experimental points 1 & 5 (2002)
- **F - 300** Air conditioning of new LHC surface buildings (1999-2004)
- **F - 310** Chilled water production for LHC experimental points 1 & 5 (2003)
- **F - 405** Air handling installations for two experimental areas ATLAS / CMS (2004)
- **F - 480** Supply and installation of air-conditioning for the SCX 1 building (2004)
- **F - 472** Supply and installation of electric-mechanical modifications of LEP water cooling (2004)
- **F - 478** Supply and installation of underground cooling plants for ATLAS (2003)
- **CA-1281377** Ventilation of ALICE Control room (2003)
- **CD-1000869** Supply and installation air extraction for T12 and T8 injection tunnels (2003)
- **CD-1000931** Demineralised water circuits for CMS surface tests (2003)

Examples for some projects (PLC configuration and SCADA Mimic Diagrams) ...

**RAMSES Project**

- **Overall Planning**
  - 12 June 2003: Project Launched
  - 7/2002: Market Survey launched
  - 10/2001: Project Launched
  - 7/2003: Invitation to Tender
  - 12/2003: FC contract launched
  - 1st LHC beam:
    - 7/2003: Invitation to Tender
    - 10/2001: Project Launched
    - RF test 4th quarter
  - 2003:
    - 7/2003: Invitation to Tender
    - 12/2003: FC contract
  - 2004:
    - 1st LHC beam
  - 2005:
    - 7/2003: Invitation to Tender
    - 12/2003: FC contract
  - 2006:
    - 1st LHC beam

**Examples**
- RAMSES Project
- ST/CV Projects and Contracts (running and terminated)
The safety alarm monitoring systems included in the ST/MA deliverables are:
- The SCR and TCR central monitoring systems
- All LHC safety zones (10) alarm acquisition and display systems

Main Functions:
- A local monitoring from the 10 LHC safety zones
- Fire Brigade central monitoring, archiving, display and reporting
- Non-interruptible 24h/365d system based on redundant networks
- Specific human computer interfaces and tools for the alarm handling

Milestones for the work
- Detailed design completed by September 2002
  - Safety validation of proposed architectures
- System realisation completed by January 2003
  - Practical integration of all the safety systems in CSAM
- Pilot installation in SM18 in June 2003
- CSAM running in background until October 2003
- Acceptance Testing by October 2003
- If acceptance successful
  - CSAM OPERATIONAL in SCR and TCR
- After First Acceptance - One LHC point per month
Architecture du système de sûreté d’accès (Control Room)

Interlock Management & Configuration System (IS-PMCS)

Access Safety Remote Monitoring (AS-PM) general display

Safety controller (concentrator)

Optical switch module

Architecture du système de contrôle d’accès (site)

LHC Access Points (access to LHC interlocked service areas)

JT network

LHC Access Points (access to LHC interlocked beam areas)

JT network

TIM Hardware Architecture

Home users: Oracle specialists may connect to the system through the CERN VPN

Office users: User interfaces and administration tools run from offices on the general network

DIP Gateway: Collects data from other domains, publishes technical data as requested

Control room consoles: Windows machines running user interfaces

Database cluster: Configuration database and data persistence

Application server and MOM cluster: Hosts Oracle9iAS and SonicMQ software.

File server: Reliable server for application files (views etc) and web server for operations portal

Scada: Wizcon and ENS scada systems communicating directly with application server

Data acquisition: Acquires data from PLCs and updates application server

Technical Services Communications
Conclusion

- **System design completed, installation in progress**
  - \(\rightarrow\) ST/CV, Electrical Network Supervisor, CSAM (Alarm 3)

- **Contract in preparation, following CERN design**
  - RAMSES, Access Control System

- **In-house development**
  - TCR monitoring, LASER, AB logging clone, Sonic MQ to replace RT SmartSocket

- **Reliability, Availability (24h/365d) design**

- **AB concerns:**
  - How do we get the technical services data \(\rightarrow\) DIP
    - Post-mortem, logging
  - Data Time-stamping and time synchronisation