Slide 1

Quench Protection System control

Hervé Milcent LHC/IAS,

Felix Rodriguez-Mateos LHC/ICP

Slide 2

Content

- Definition of the QPS
- Architecture
- Dependencies
- Status
  - Present status
  - On-going work

Slide 3

Simple view of the LHC operation interfaces

QPS definition

Architecture

Dependencies
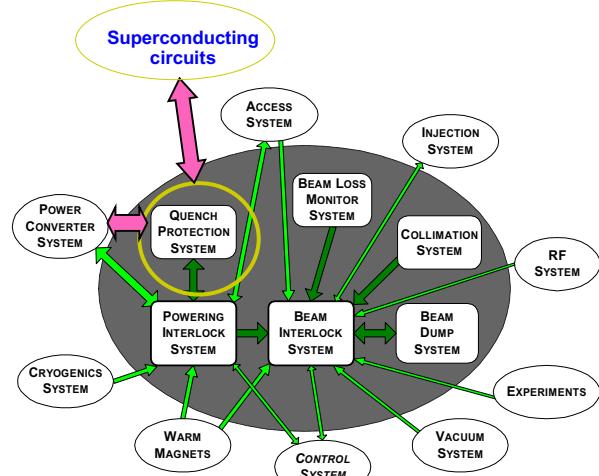
Status

Courtesy: Rudiger Schmidt

Slide 4

# What to install (and integrate)?

QPS definition

Architecture

Dependencies

Status

Location of LHC QPS equipment
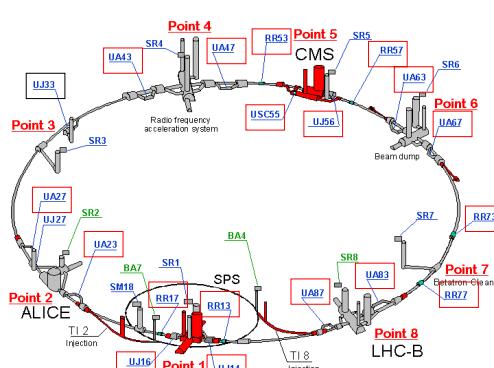
DQAMC	2434
DQAMS	208
DQSMB	16
DQSMQ	16
DQRMB	16
DQRMQ	16
DQEMC	200
DQWCS	32

DQQDL	2048
DQDDB	80
DQQDC	652
DQQDT	32
DQQDI	188
DQQDG	422
DQQLC	8
DQHDS	6132
DQGTW	68

Slide 5 — QPS Control

QPS Control

- QPS Control is not an active control
  - No feedback control
  - Just monitoring
- Monitoring and supervision must work from the beginning of the commissioning:
  - To do things systematically
  - In a retraceable manner
  - Record and document properly the results of the different tests and checks.

Sidebar:
QPS definition
Architecture
Dependencies
Status

Slide 6 — Operational modes

Operational modes

- Test mode (no current, no beam)
  - All data must be available to the QPS expert
  - Independent console in PCR
- Machine cycle
  - Only alarm to the highest supervision
  - Snapshots
  - Logging of defined variables
- Machine abort
  - Alarm go up
  - On request, LHC operators can get the data for post-mortem diagnostics
  - All archived data must be available to QPS specialist

Sidebar:
QPS definition
Architecture
Dependencies
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Slide 7 — Installation procedures

Installation procedures

- Racks will be installed under the dipole magnets
- At installation the racks will be:
  - Connected to fieldbus: WorldFIP
  - Checked using simple debugging routines
  - Installation documented in the installation database

  Ł Basic supervision including test mode capability, timing and "installation" logging must be available over the installation phase.

Sidebar:
QPS definition
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Slide 8 — Hardware/software

Hardware/software
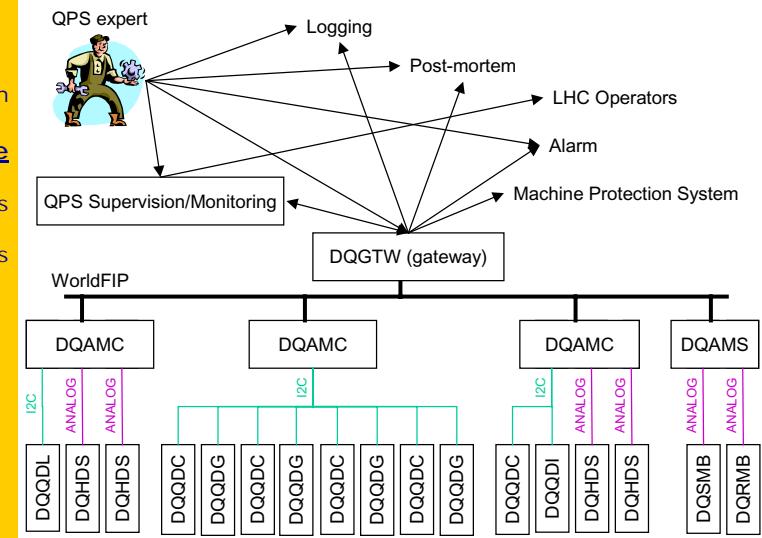
Sidebar:
QPS definition
Architecture
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QPS is client of

- Time distribution
  - To the DQAMC and DQAMS via WorldFIP
- Alarms
- Logging
- Post-mortem
- Installation data base
- Hardware and software of the gateway
- Ethernet and fieldbus

QPS definition

Architecture

Dependencies

Status

QPS is provider for

- Post-mortem data as far as "production of signals" is concerned
- Diagnostics and machine operation (across-system hardware tests)

QPS definition

Architecture

Dependencies

Status

Present status

- Collaboration between LHC/IAS and LHC/ICP
  - Definition QPS supervision and the interfaces to the common accelerator operation tools (logging, post-mortem, alarm)
- Presented to the working group: "Controls Project Planning for 1rst sector"
  - Task and dependencies
  - Time duration worked out "counting backwards" from the dates the equipment is needed to be operational (based on summary installation schedule revision 2.0, May 2001)

QPS definition

Architecture

Dependencies

Status

On-going work

- Signal list: end of April 2002
  - List of signals
    - Functionalities
    - Data flow
    - Bandwidth
    - Usage: logging, post-mortem, etc.
- Gateway requirements: end of April 2002
  - Functionalities
  - Hardware/software Interfaces
- QPS supervision requirements: end of June 2002

QPS definition

Architecture

Dependencies

Status