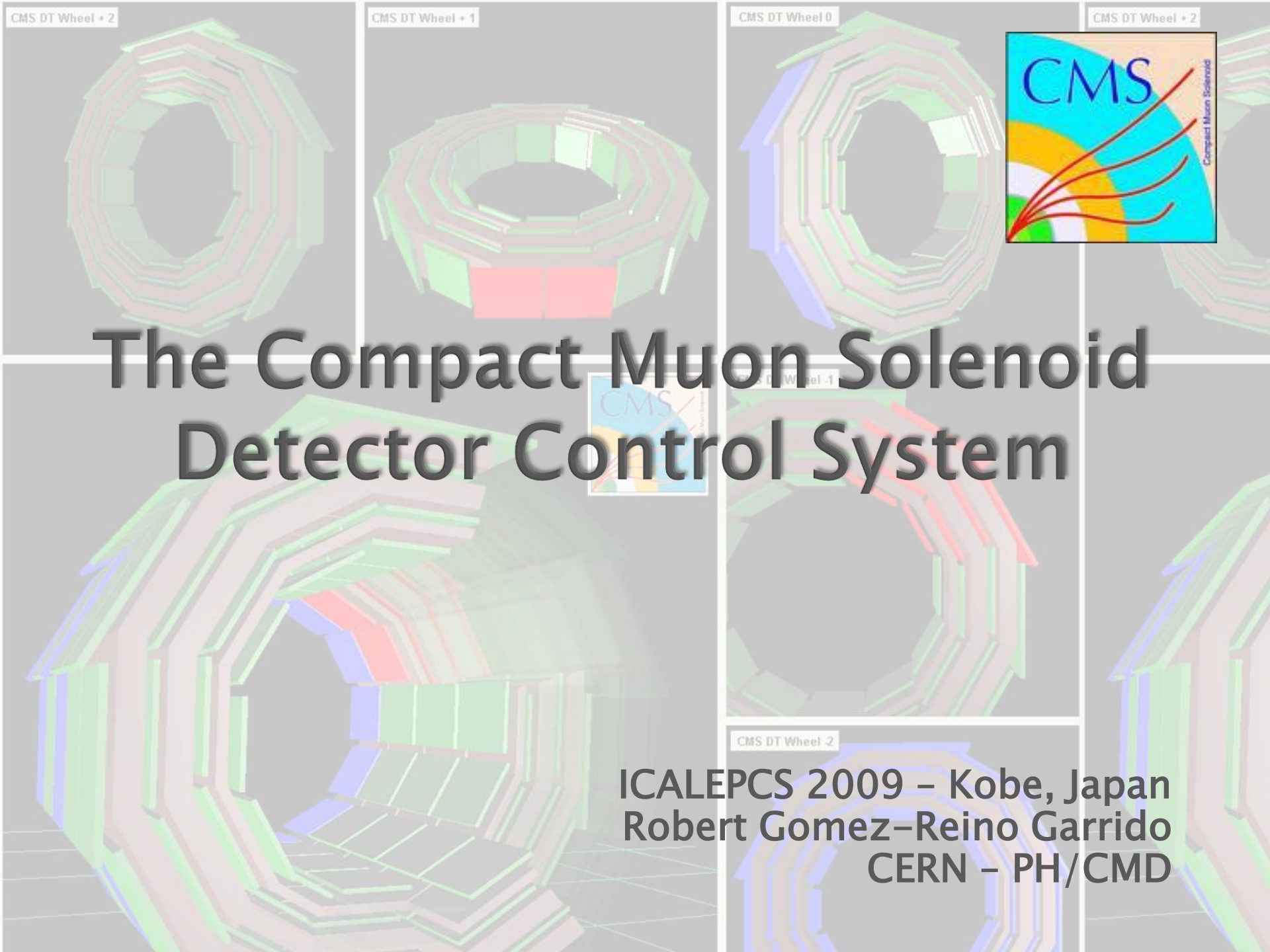


The Compact Muon Solenoid Detector Control System

ICALEPCS 2009 – Kobe, Japan
Robert Gomez-Reino Garrido
CERN – PH/CMD

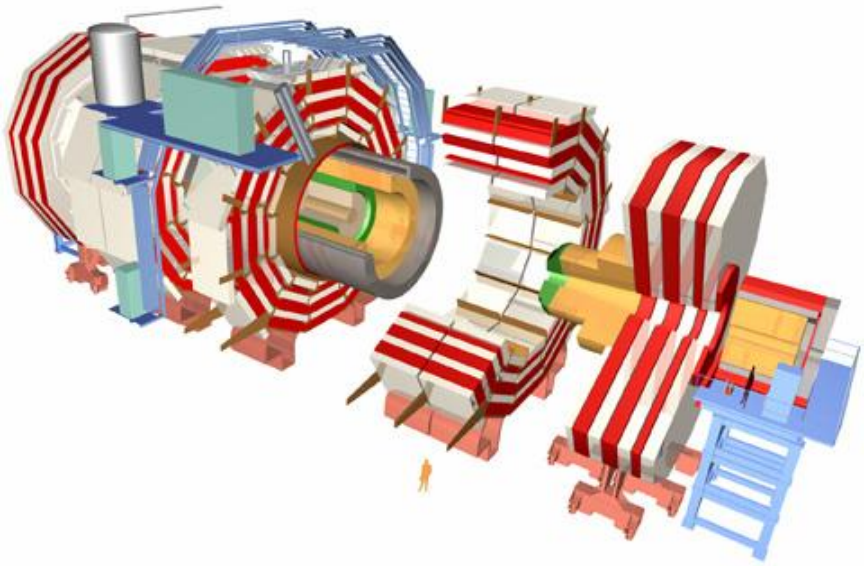
Outline

- Overview and requirements
- Deployment Strategy
- Status

CMS Overview

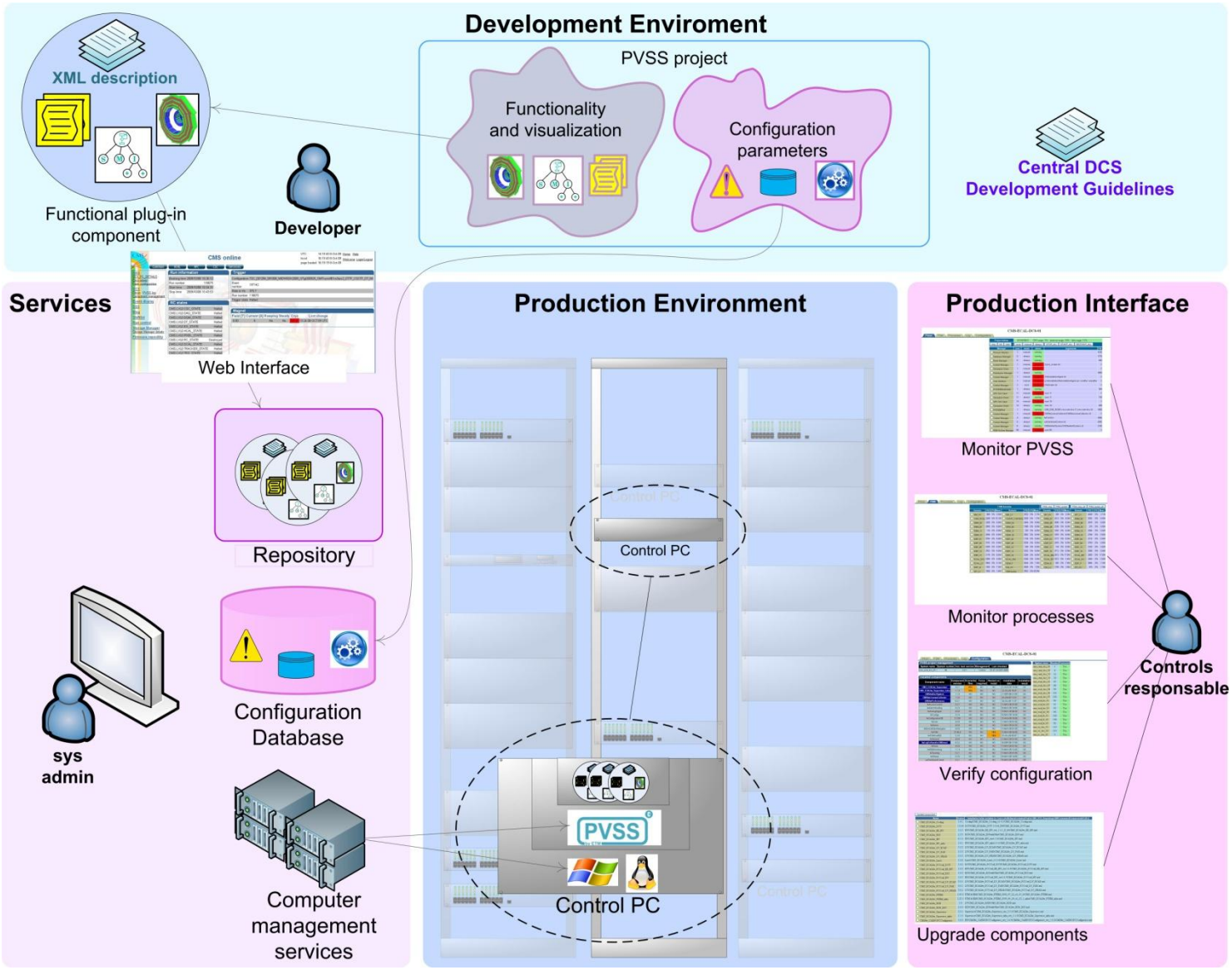
- The Compact Muon Solenoid (CMS) is one of the Large Hadron Collider general purpose particle detectors

System Name	Number of PCs	Monitored Parameters
Tracker	14	350k
Calorimeter	14	115k
Muon	30	435k
Trigger DCS	2	1k
Alignment	3	3k
Services	35	20k
Total	**98**	**934k**



~ 10^6 control system parameters

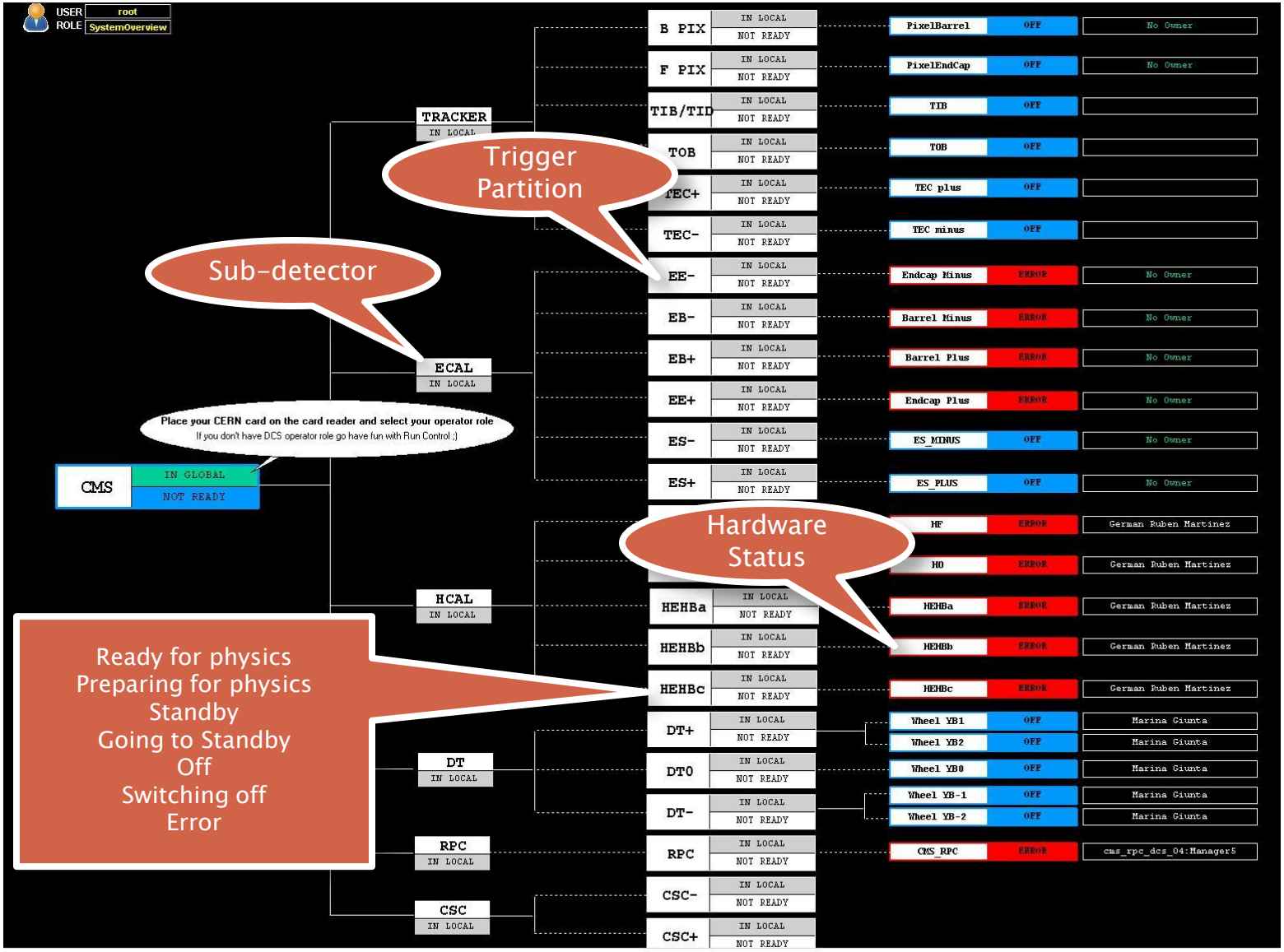
Deployment Strategy



Status

- Running 24h/d
- Deployment strategy easing maintenance
  - Recovering nodes
  - Updating packages
- A hierarchy of Finite State Machines based nodes summarize states and propagates commands. The most top layer:
  - Provides control over CMS DCS trigger partitions
  - Communicates with experiment Run Control
  - Handle the handshake with the LHC

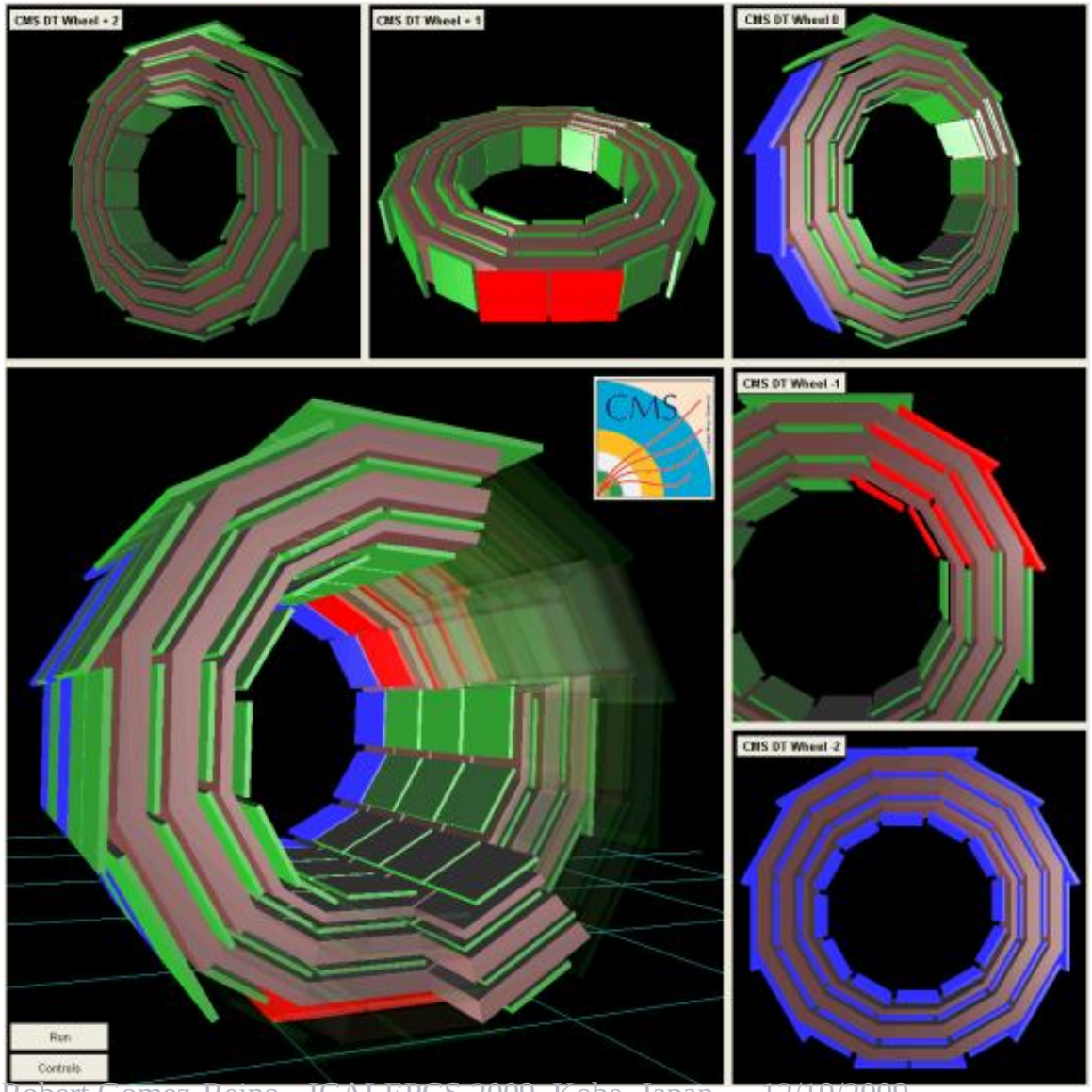
Main DCS Operator Screen



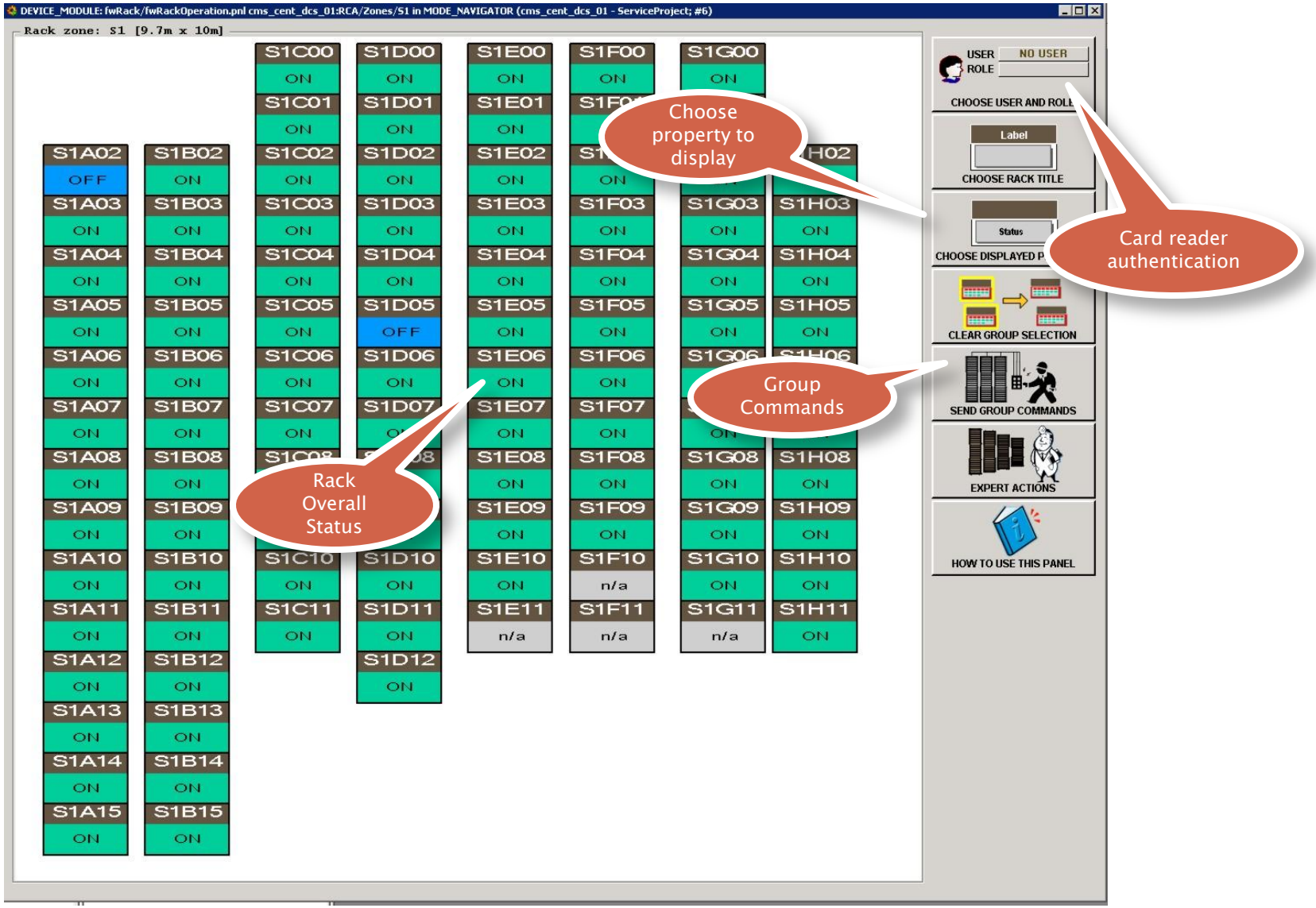
Status: HMI

- Aimed for an intuitive HMI for operators
  - No need for courses
  - No need for extensive documentation
  - Software helpers guiding operator
- Touch screen operation panels in underground cavern
  - Card reader authentication
  - Functionality enabled depending on user privileges
- 3D technology for geometrical error correlation

3D DCS View


CMS DT Wheel +2
CMS DT Wheel +1
CMS DT Wheel 0
CMS DT Wheel -1
CMS DT Wheel -2
CMS
Run
Controls

Rack Control Touch Screens



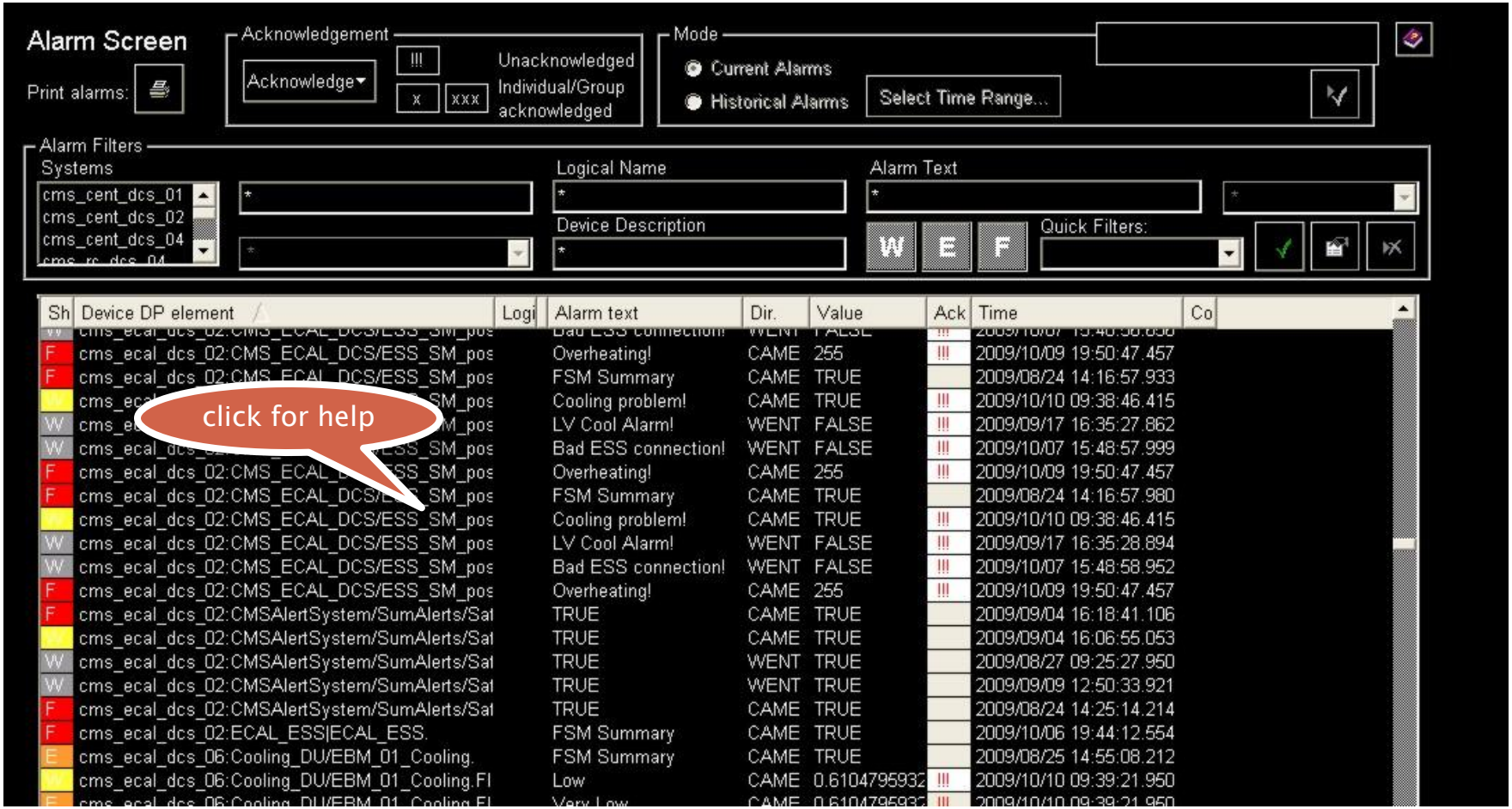
Status: Authentication

- PVSS users and privileges are synchronized with CMS LDAP server
- Web base applications allow control group responsible to provide privileges to users
- Synchronized with CMS Shift List tool

Status: Alerts

- Alarm screen summarizes all CMS DCS alerts
- Alert help engine
  - Web forms for DCS experts to add help content
  - Dynamic Web pages for Operators with incremental alert help

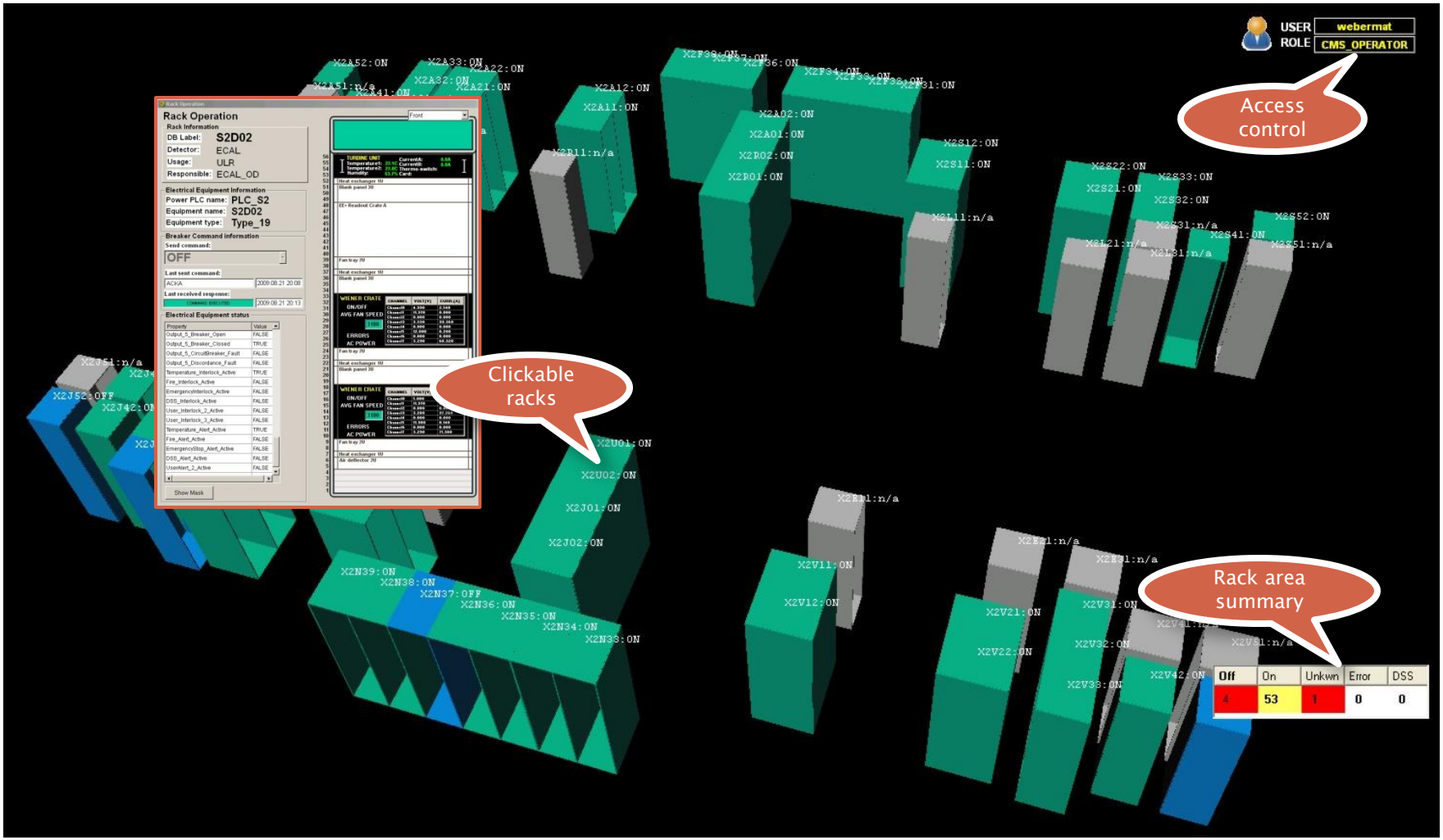
Alarm Screen



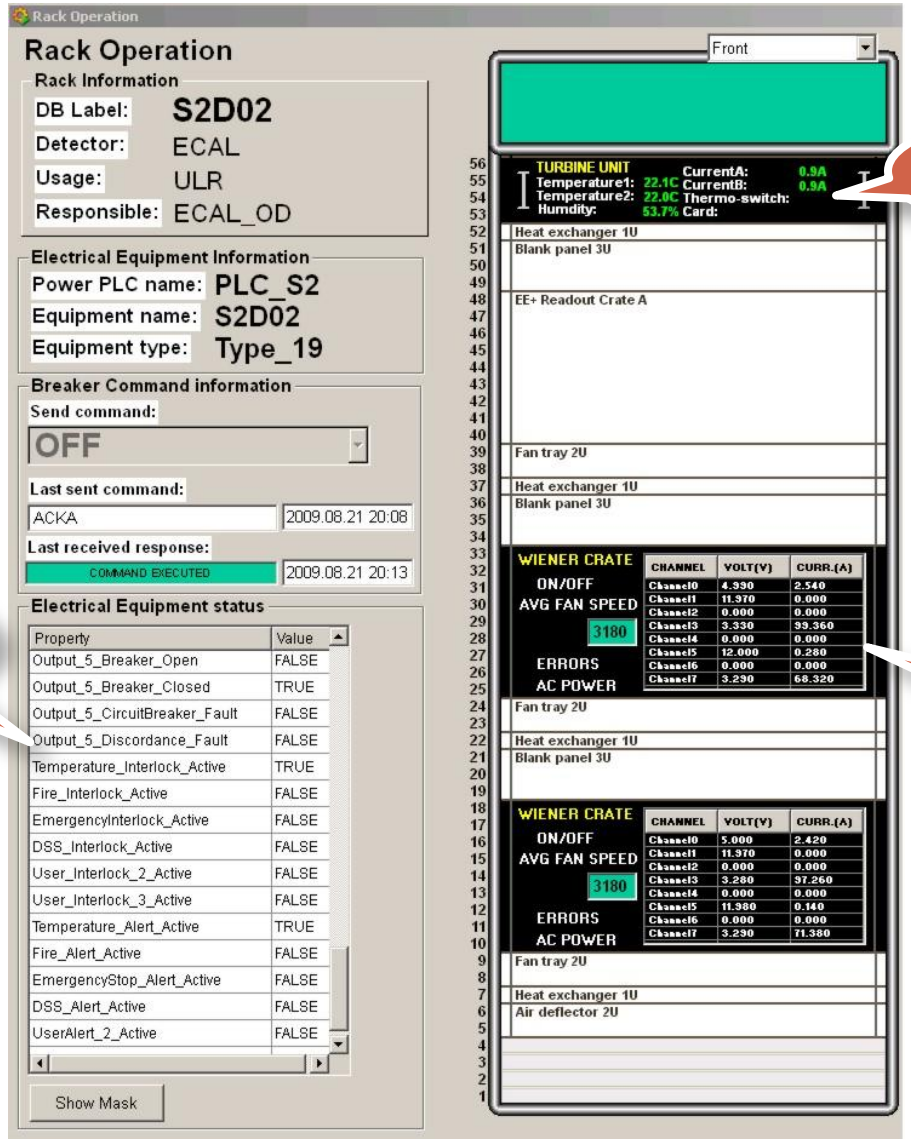
Status: DCS services

- Central DCS services integrated
  - Rack and crate control
  - Gas
  - Cooling
  - Ventilation
  - Magnet

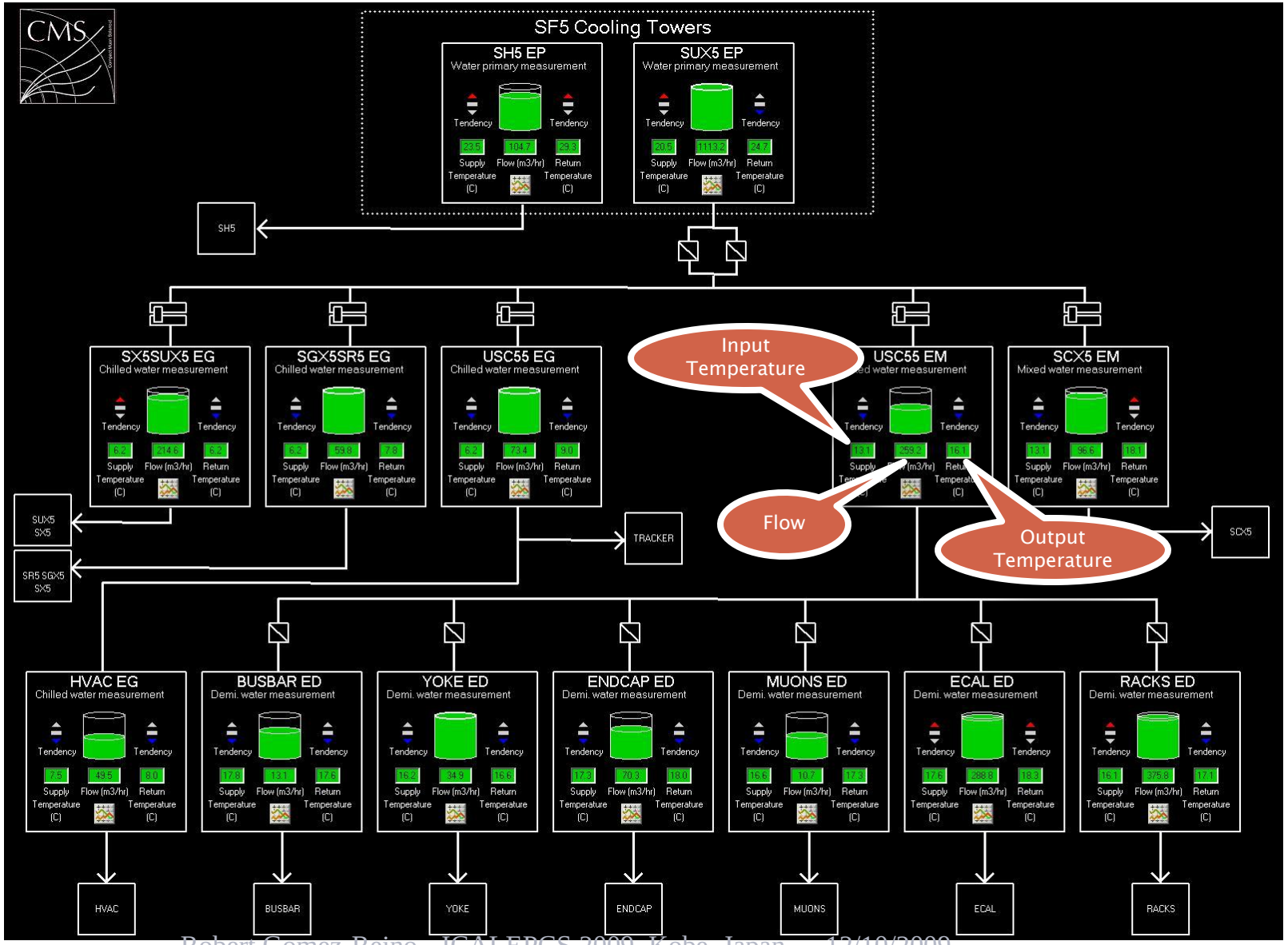
Rack and Crate Control



Rack details



Cooling Monitoring



どうもありがとう
Thank you！