ATLAS
DCS

ATLAS Control Room Interface

Prepared by Alex Barriuso Poy
Central ATLAS DCS

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Purpose

- **Advertise Developments**
  - Comments welcome
  - Common interest
- **Highlight Limitations**
  - Missing functionality
  - Limits of current version

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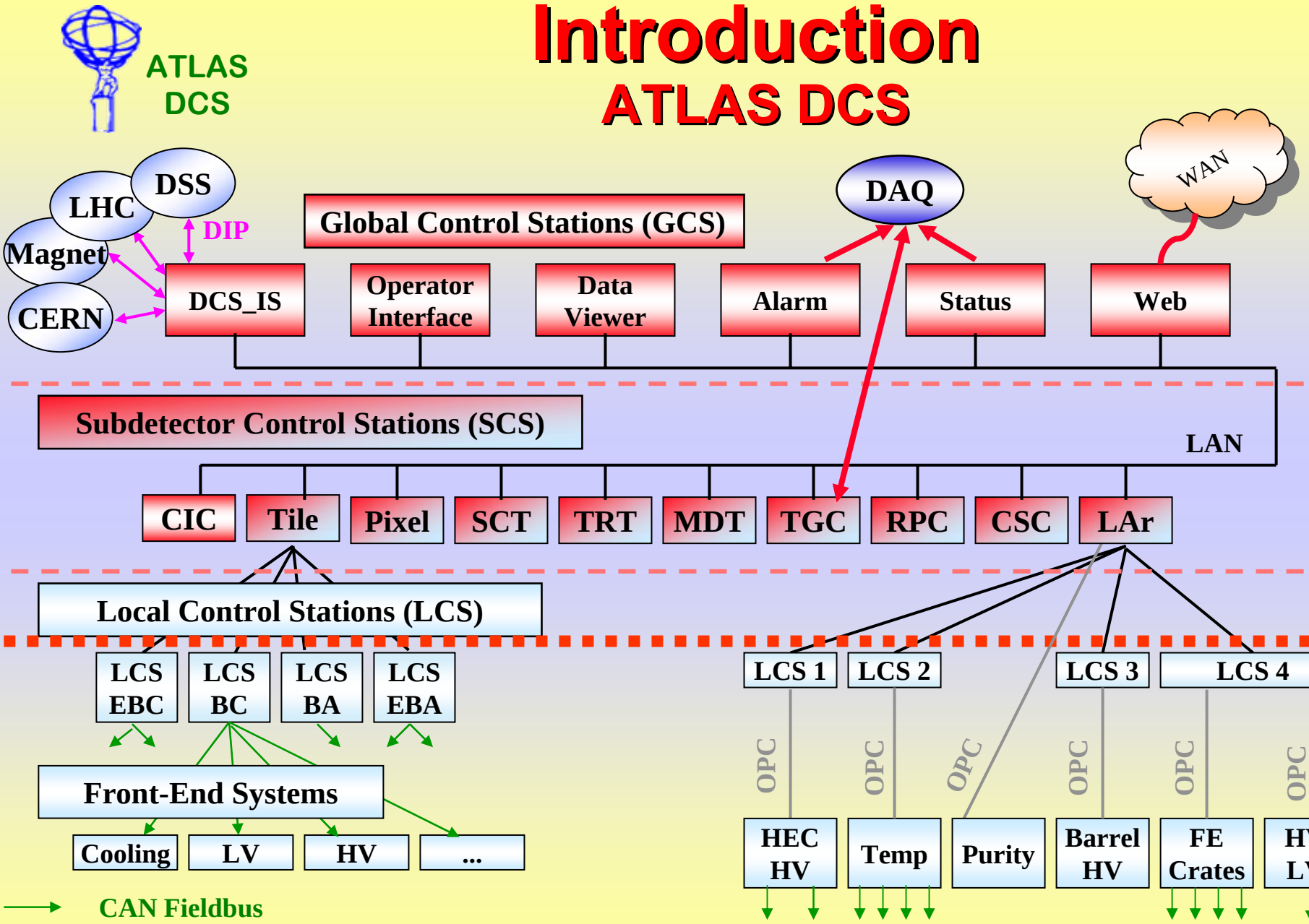
Outline

- Introduction. Top Level Interface
- The FSM tool
- Operator Interface. The “fwFsmAtlas” component
- *Demonstration*
- Conclusions


ATLAS
DCS
Introduction
ATLAS DCS
DSS
LHC
DIP
Magnet
CERN
DCS_IS
Global Control Stations (GCS)
Operator Interface
Data Viewer
DAQ
Alarm
Status
WAN
Web
LAN
Subdetector Control Stations (SCS)
CIC
Tile
Pixel
SCT
TRT
MDT
TGC
RPC
CSC
LAr
Local Control Stations (LCS)
LCS EBC
LCS BC
LCS BA
LCS EBA
Front-End Systems
Cooling
LV
HV
...
LCS 1
LCS 2
LCS 3
LCS 4
OPC
HEC HV
Temp
Purity
Barrel HV
FE Crates
HV LV
CAN Fieldbus
PVSS Connection

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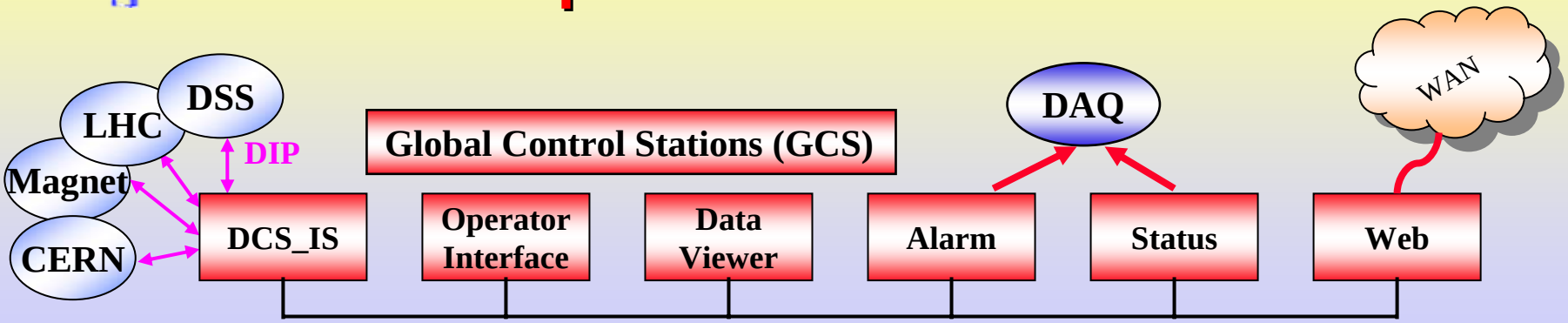
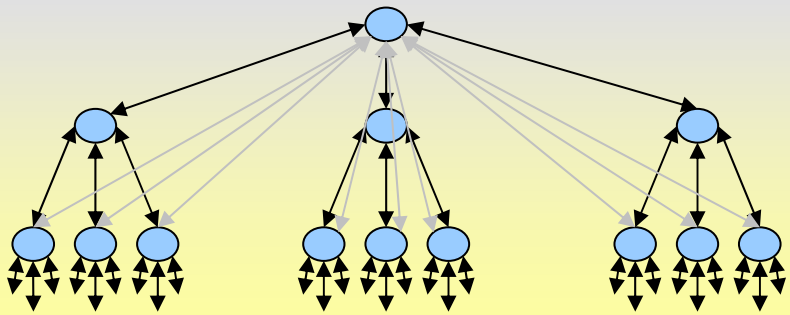
Introduction

Top Level Constituent Parts



- DSS works stand-alone independent of the DCS
- The top level DCS interfaces to ~160 PCs



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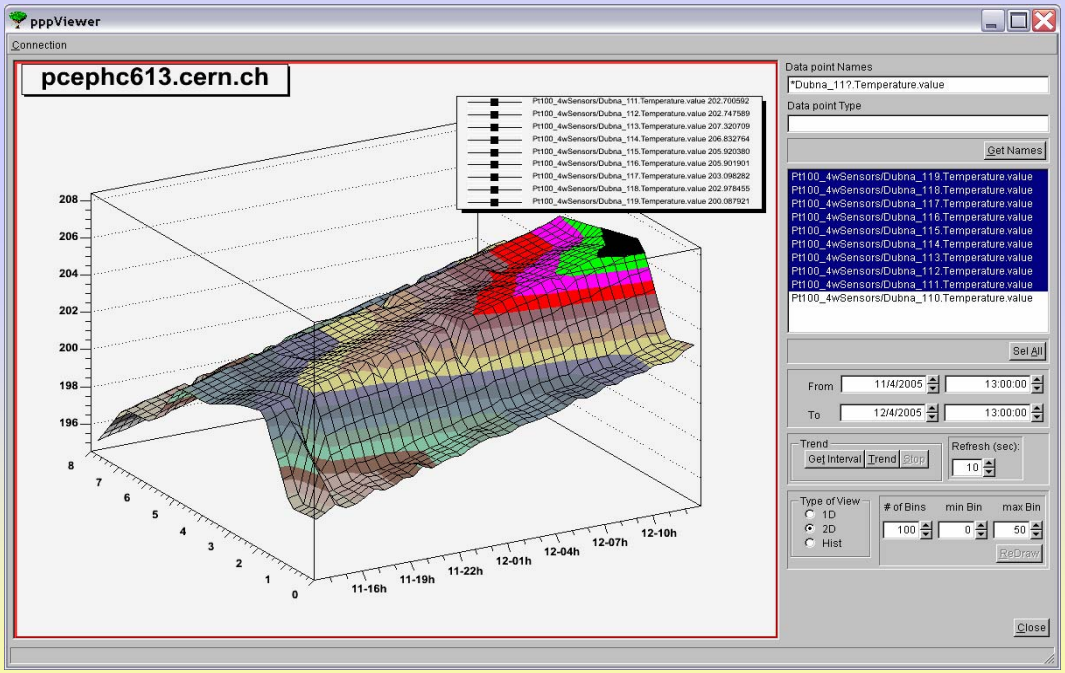
Data Viewer

- PVSS II functionality limited. Substantial improvements in next release
- Meanwhile users could use ROOT on demand
- Decision to be made when PVSS II 3.5 available



Real time data plotted in ROOT from the LAr cooldown test (April 05)

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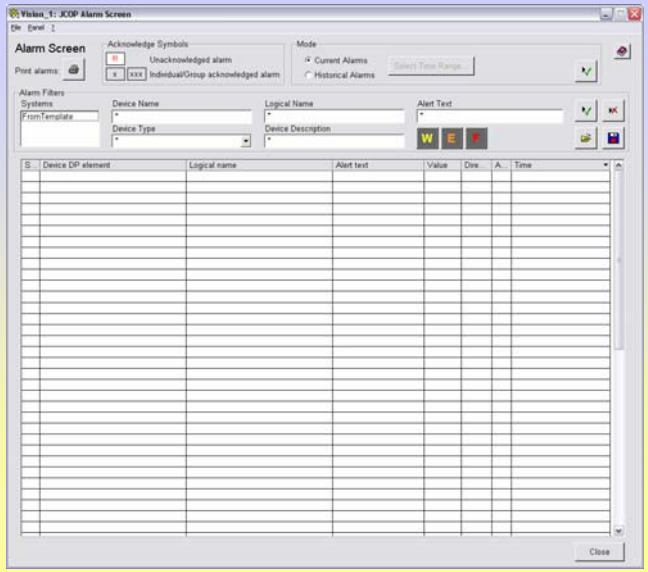
Alarm Screen

- Access to any alert in the system from a single Alarm Screen
- Alerts are sent if a value changes from one alert range to another
- Order of lines according to severity then time
- Possibility for limited filtering (button to return to default state)
- Possibility to acknowledge (and comment) when an alarm comes, but it is possible that it goes away without acknowledge
- Automatic functions can be assigned to alerts (sound signal)
- PVSS 3.5 new alert panel
  - June 06
  - *Improvements in filtering?*



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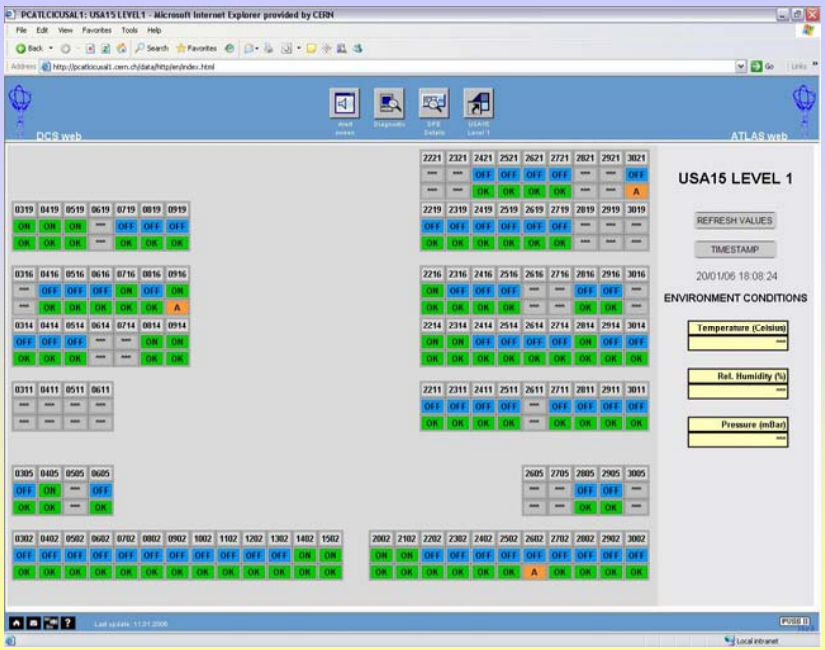
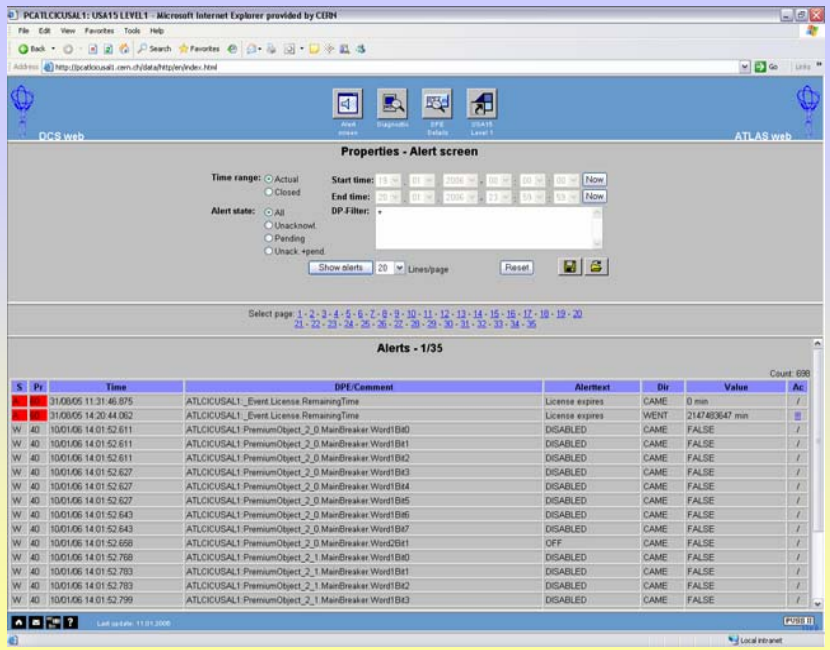
WEB

http://atlas.web.cern.ch/Atlas/GROUPS/DAQTRIG/DCS/dcshome.html

- DCS information available directly from your web browser
- Interaction not possible, only for data displaying
- Accessibility dependent on the ATLAS network policy. At present, special proxy setup needed
- Web applications already working in the pit for rack monitoring in USA15 level 1 and level 2
- *Improvements in PVSS II 3.5?*





User Information

Expert Information

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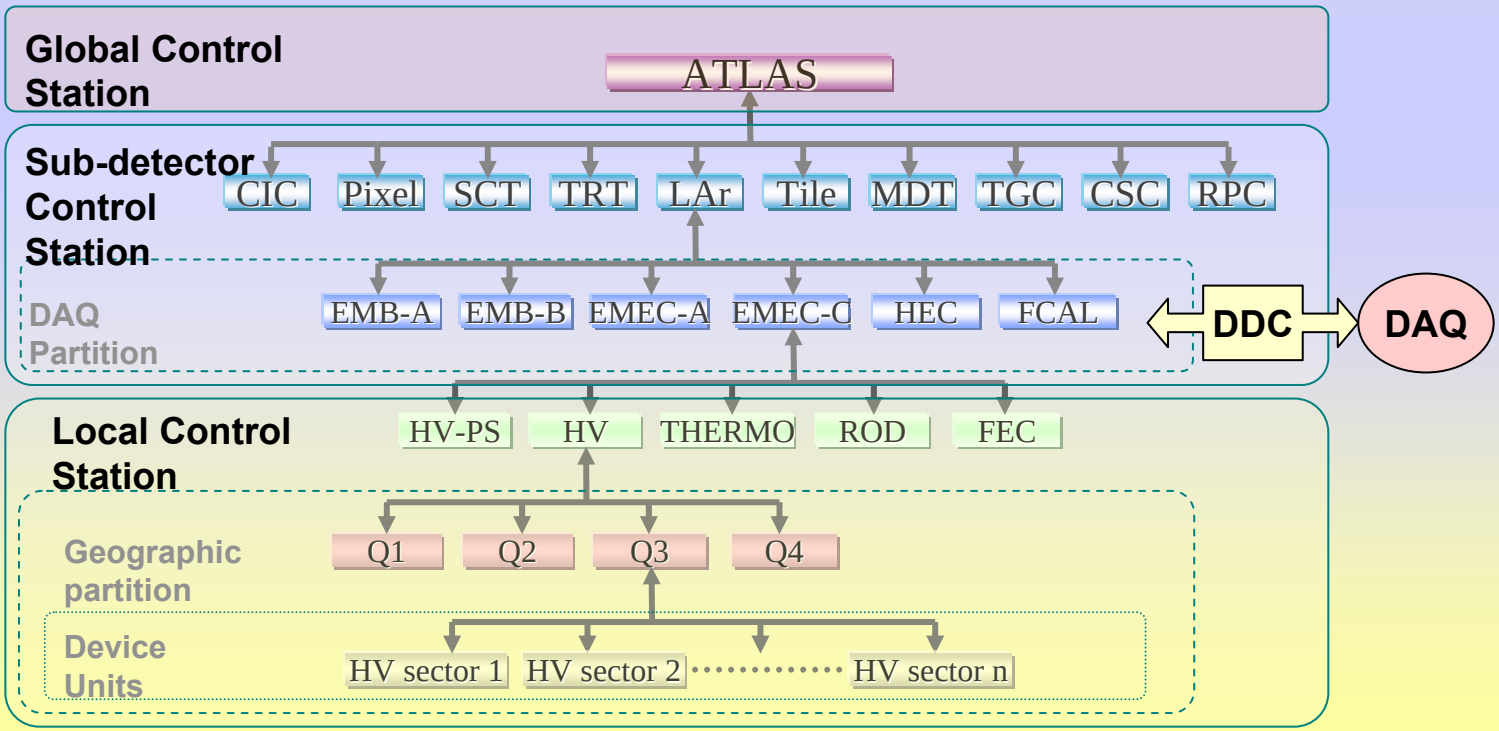
Operator Interface
Finite State Machine (FSM) Architecture

- **The FSM (part of the JCOP Framework) is the main tool for the implementation of the full control hierarchy in ATLAS**
- **It is envisaged that the shift operators will operate DCS ONLY through the Operator Interface (based on the FSM) and the PVSS alarm screen**
- **Documentation:** https://edms.cern.ch/file/691473/1_0/FSM_Integration_Guideline_1_0.pdf



The FSM Tool

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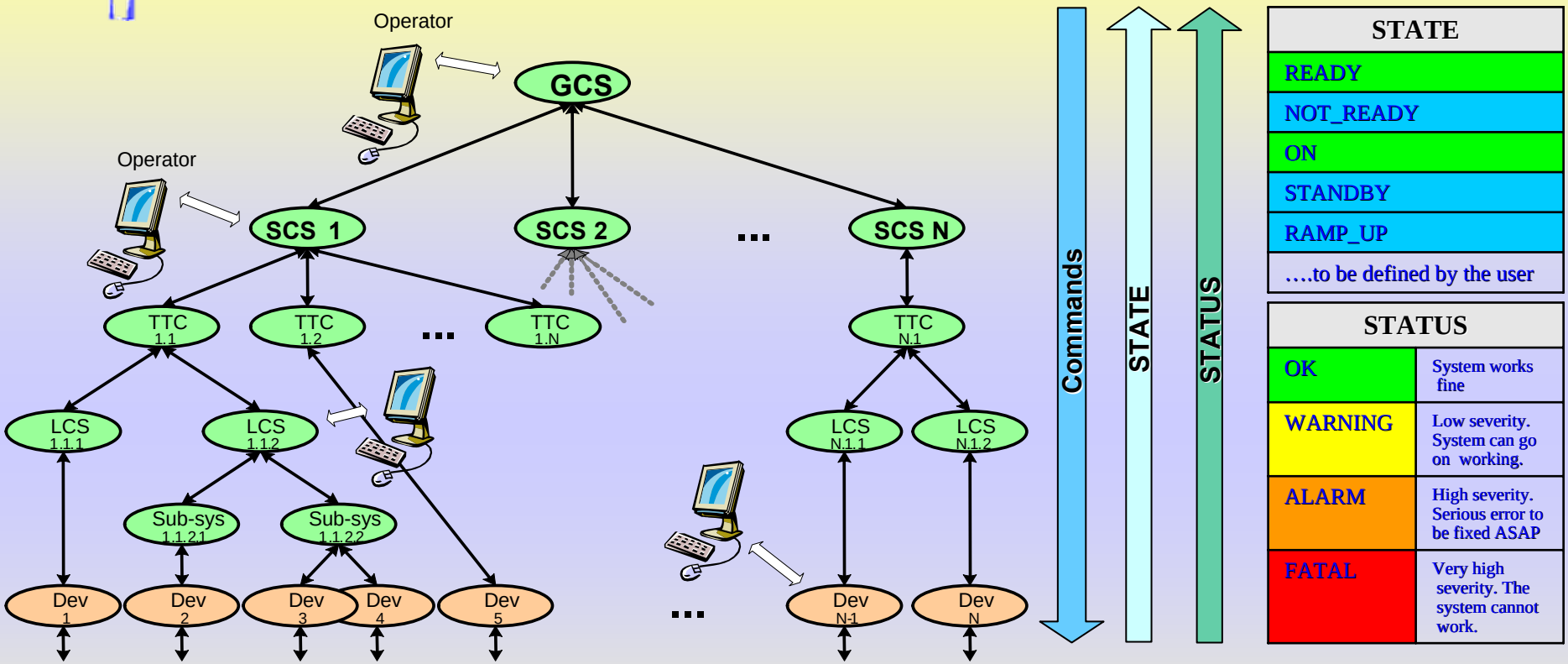

Messages via a double Information Path – STATE & STATUS

- **STATE** defines the operational mode of the system (ON, OFF, etc)
- **STATUS** defines how well the system is working (OK, WARNING, ALARM, FATAL)
- Two parallel information paths. E.g. HV system is in RAMPING_UP state (which takes several minutes) and an error triggers. The error is propagated through the STATUS while keeping the same STATE

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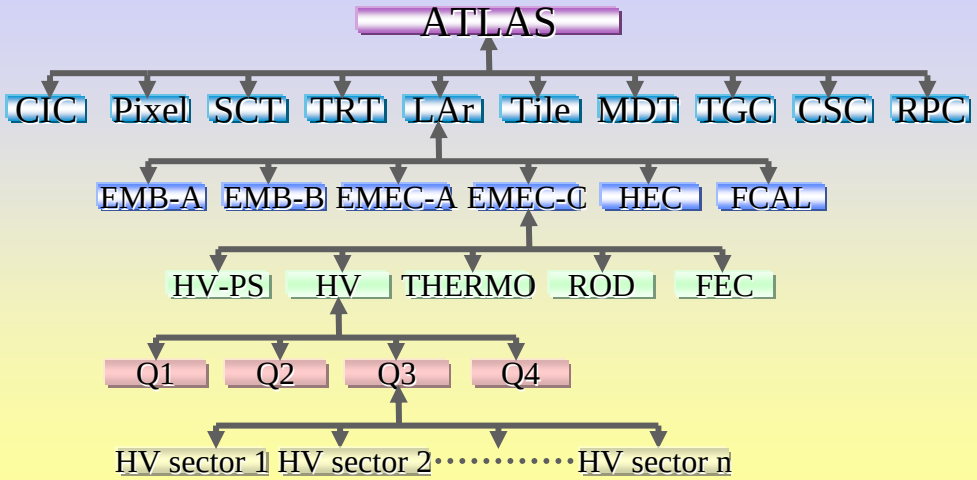
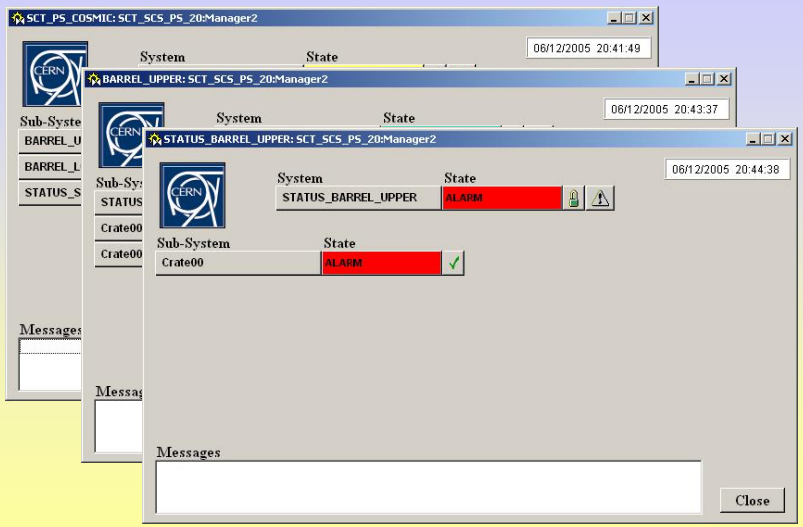
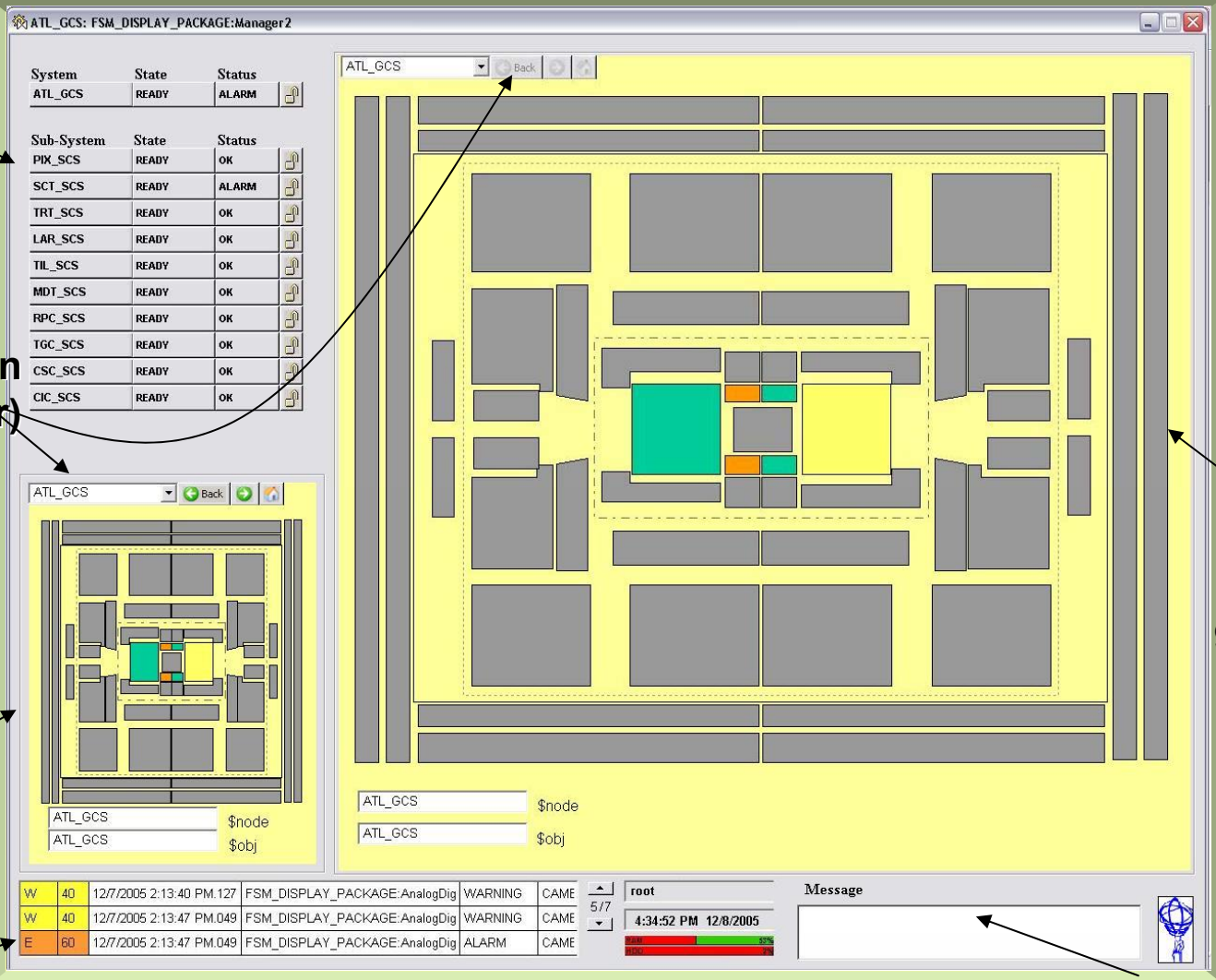
Operator Interface
Motivation

- **Motivation:**
  - In final ATLAS it is envisaged to have around 1000 different control domains which will control ~ 200.000 DCS channels
  - How to integrate the different sub-detectors and sub-systems within a single display?
- **Target :**
  - Only one window which permits quick fault detection
  - Not desired to search for information across windows, all INFORMATION should be available IN PARALLEL
- **Solution :**
  - A common user interface layout with NAVIGATION tools which allow moving through all different sub-detectors and sub-systems
  - Based on the FSM hierarchy. The FSM provide us with a clear structure of all DCS components
  - To be used in GCS, SCS and LCS





Operator Interface
Integration of the UIs



FSM Module

Panel Navigation (as web browser)

Secondary Module 310x410

Alert Module

Main Module 900x860

Message Module

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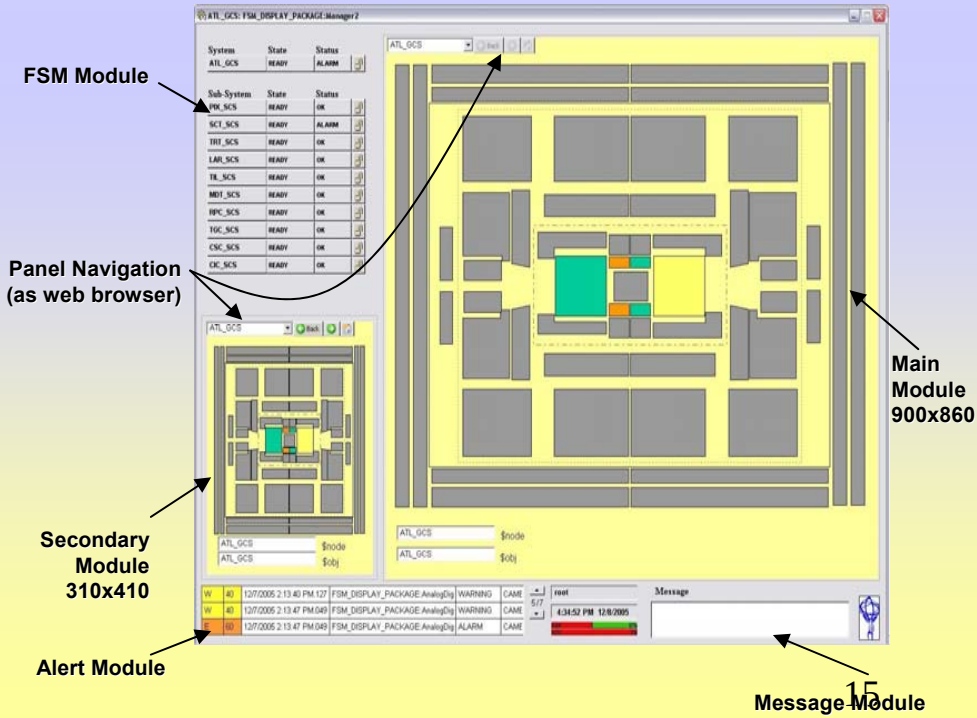
Operator Interface

Screen Layout - 5 Constituent Parts

- **FSM Module**: Providing all FSM functionality. The module has a limited size (in case of many FSM children a scroll bar appears)
- **Main Module**: Dimensions 900x860. The main panel for the selected FSM node, this can be a SCS, a HV system, etc
- **Secondary Module**: Dimensions 310x410. PURPOSE: to keep a main view of a certain sub-detector while studying more in detail a problem that triggers deeper in the hierarchy
- **Message module**: important messages with its time stamp
- **Alarm module**

Navigator within the Main and Secondary module allows the navigation though the different levels of the hierarchy. It 'acts' as a web browser

Widgets for display and navigation



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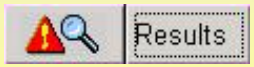
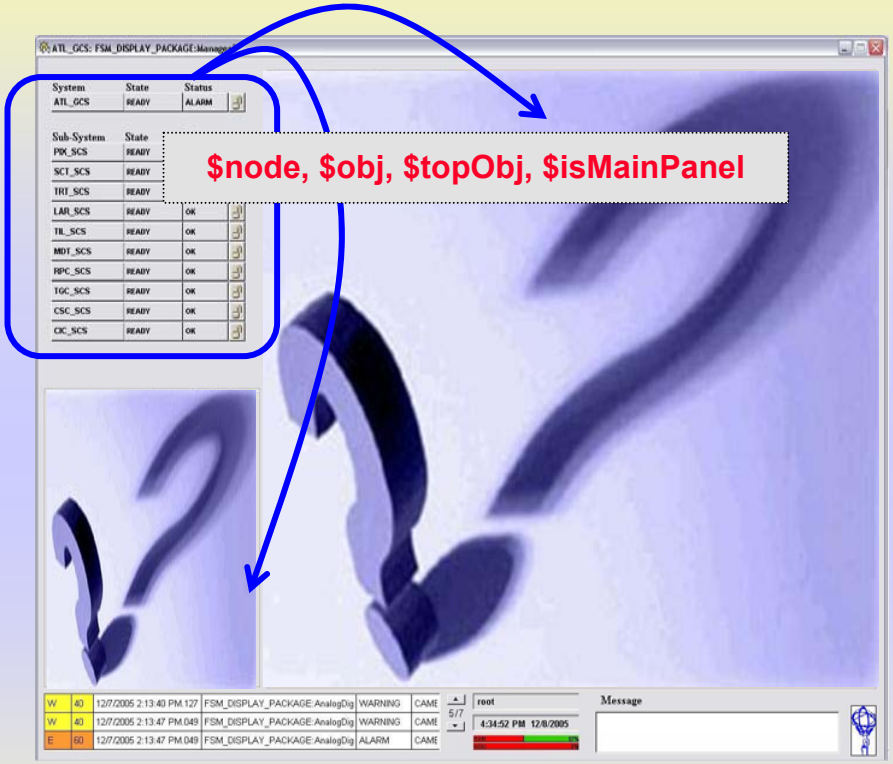
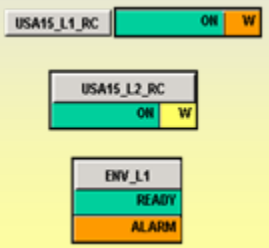
Common Screen Layout
How it works

- For easier integration within SCSs and GCS, we use standardized panel sizes
  - Screen resolution 1280x1024
  - Main panel 900x860
  - Secondary panel 310x410
- Both Main and Secondary panel have all FSM functionality.
  - Four dollar parameters are sent
  - $node, $obj → FSM functionality is also available within the operators panels
  - $topObj, $isMainPanel → References used for navigation
- Main and Secondary Panel work independently
- The sub-detectors must create 2 panels for FSM object
- Additional widgets for displaying and navigation available







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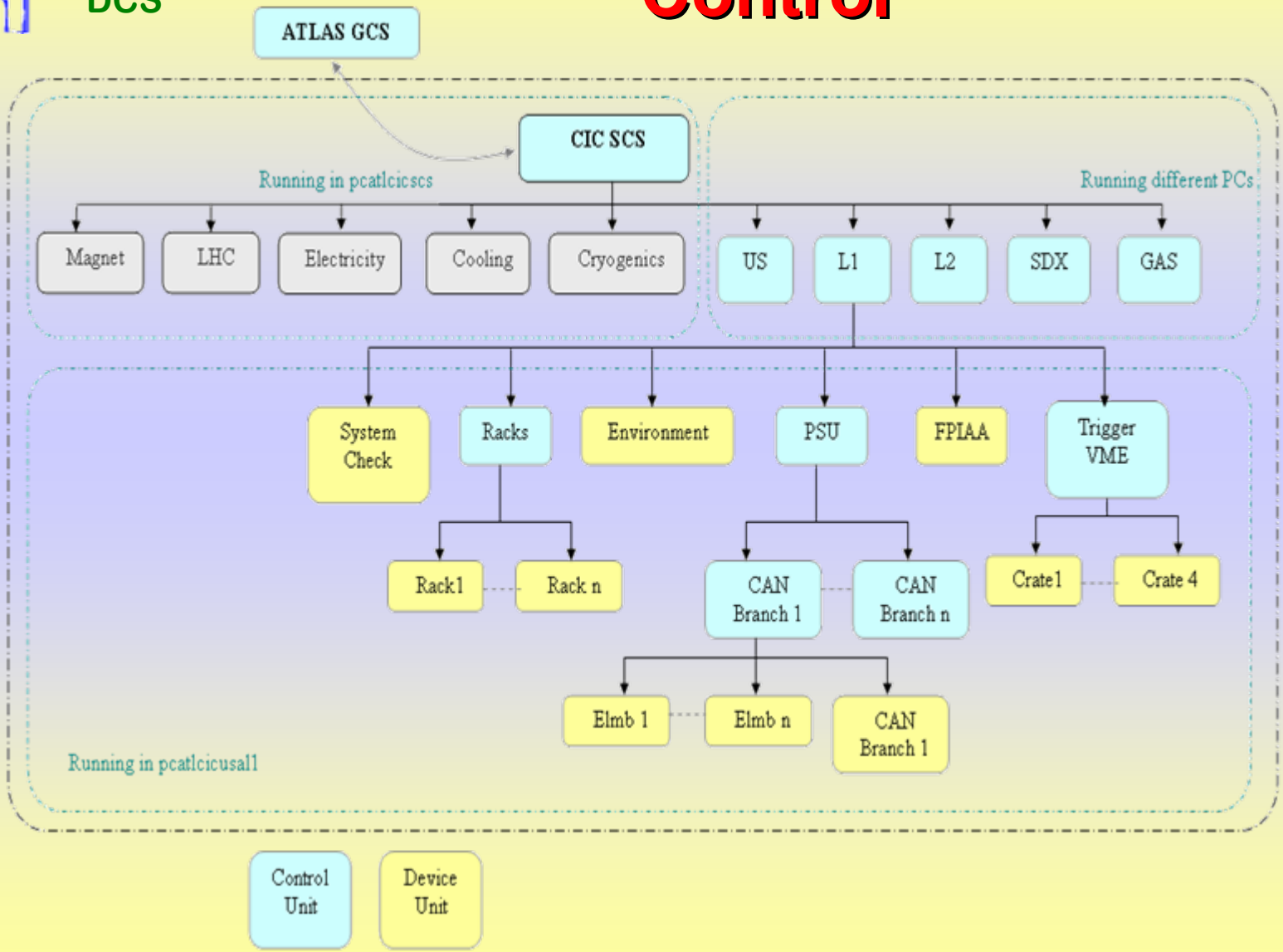
Common Infrastructure Control



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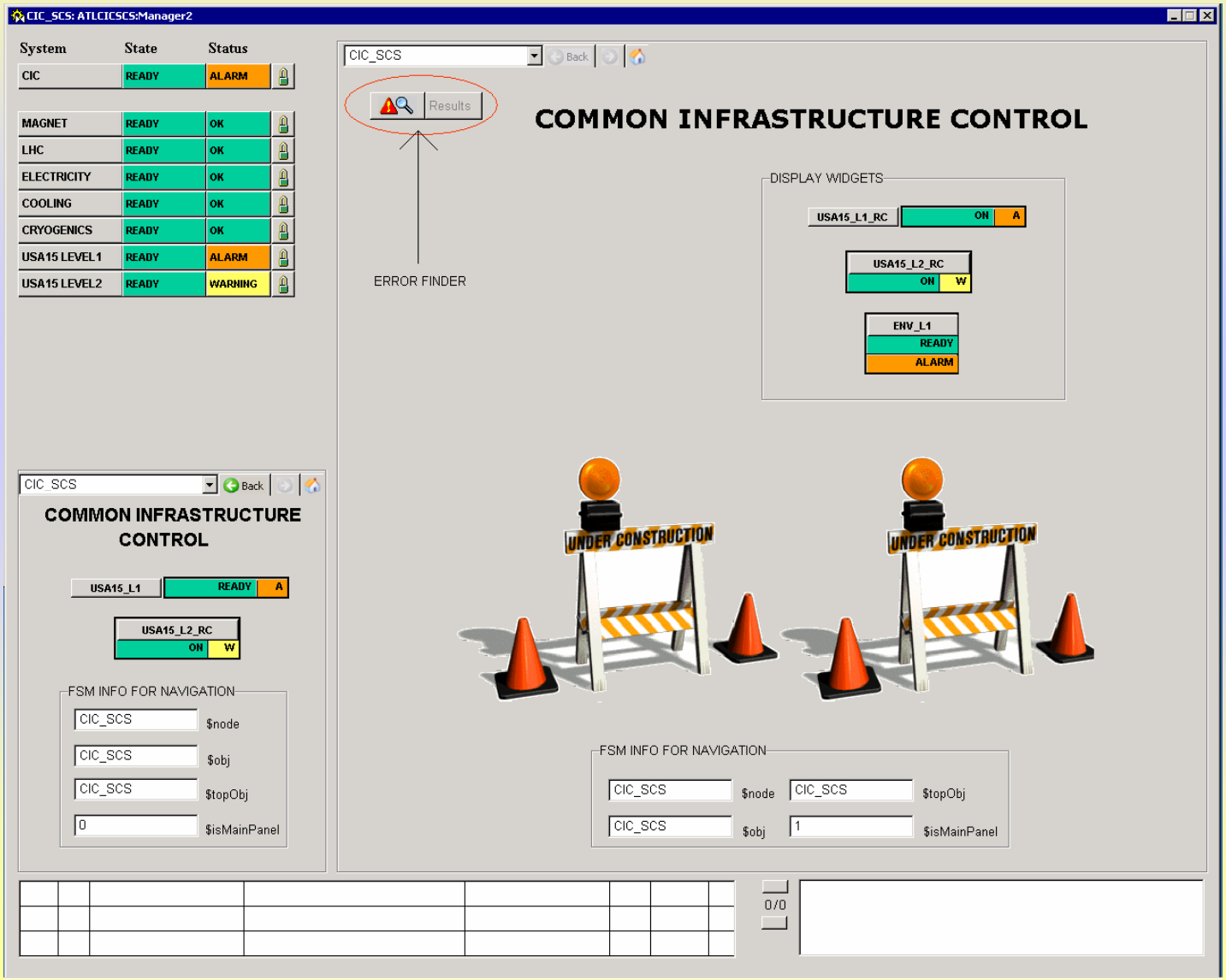
Demonstration



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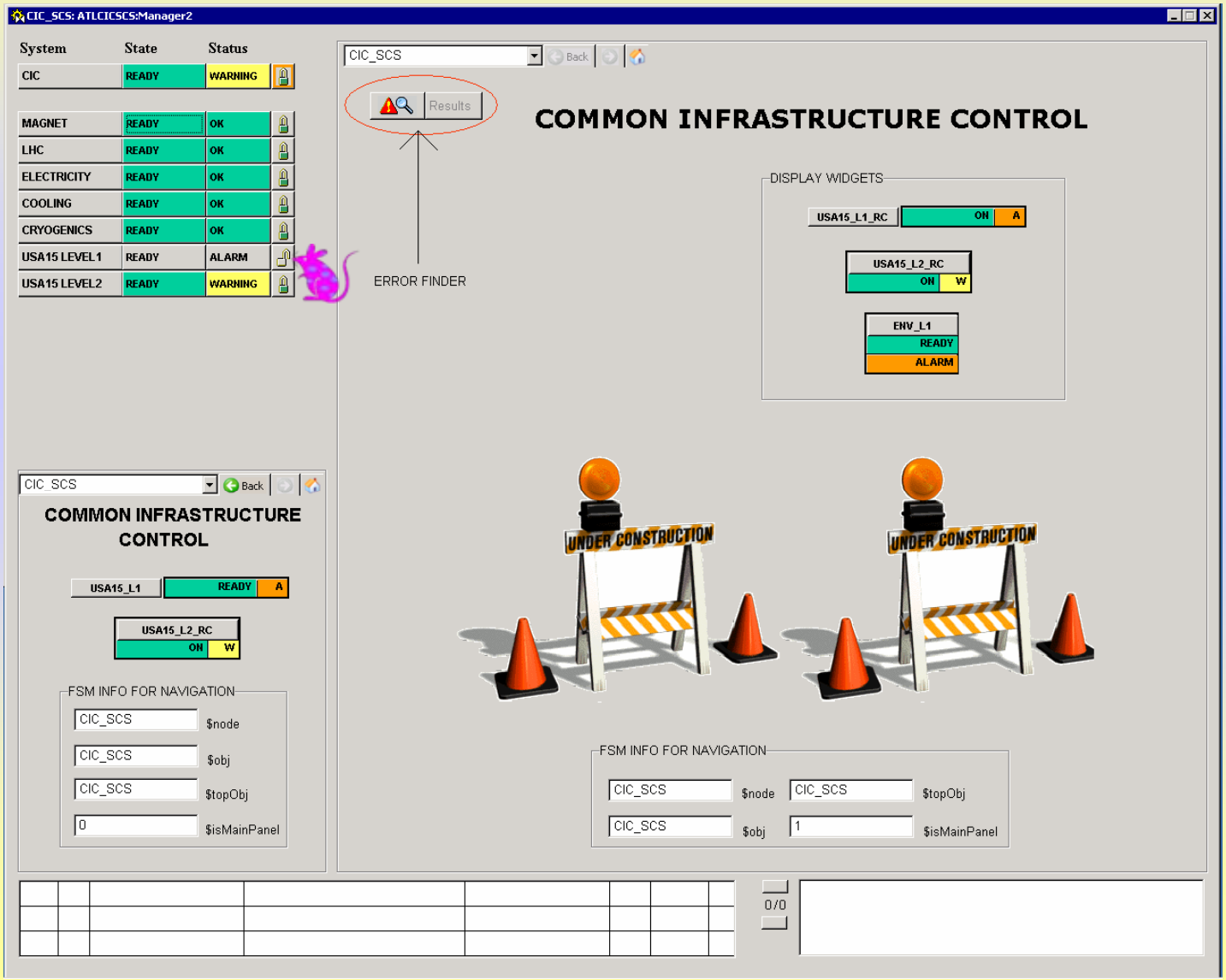

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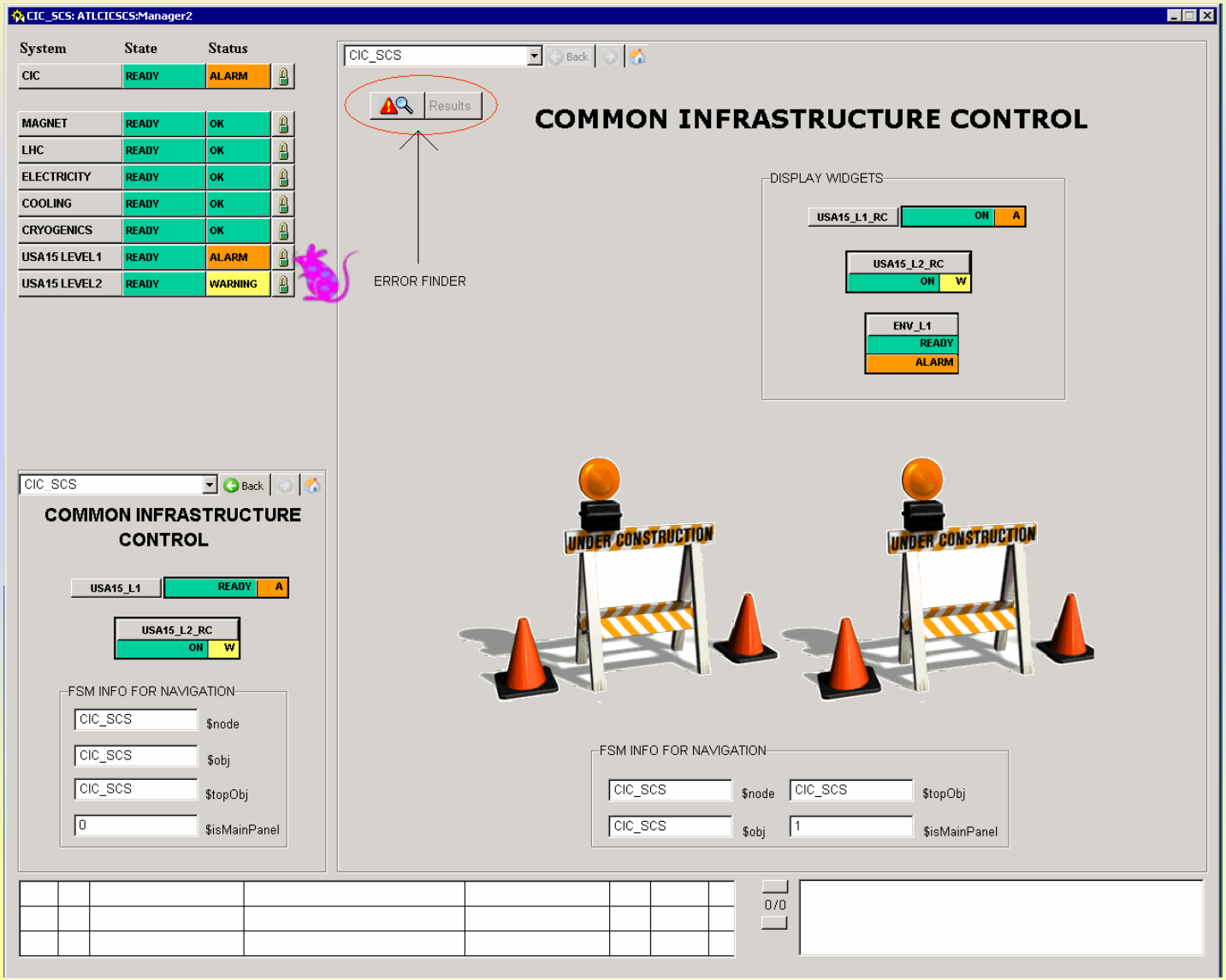

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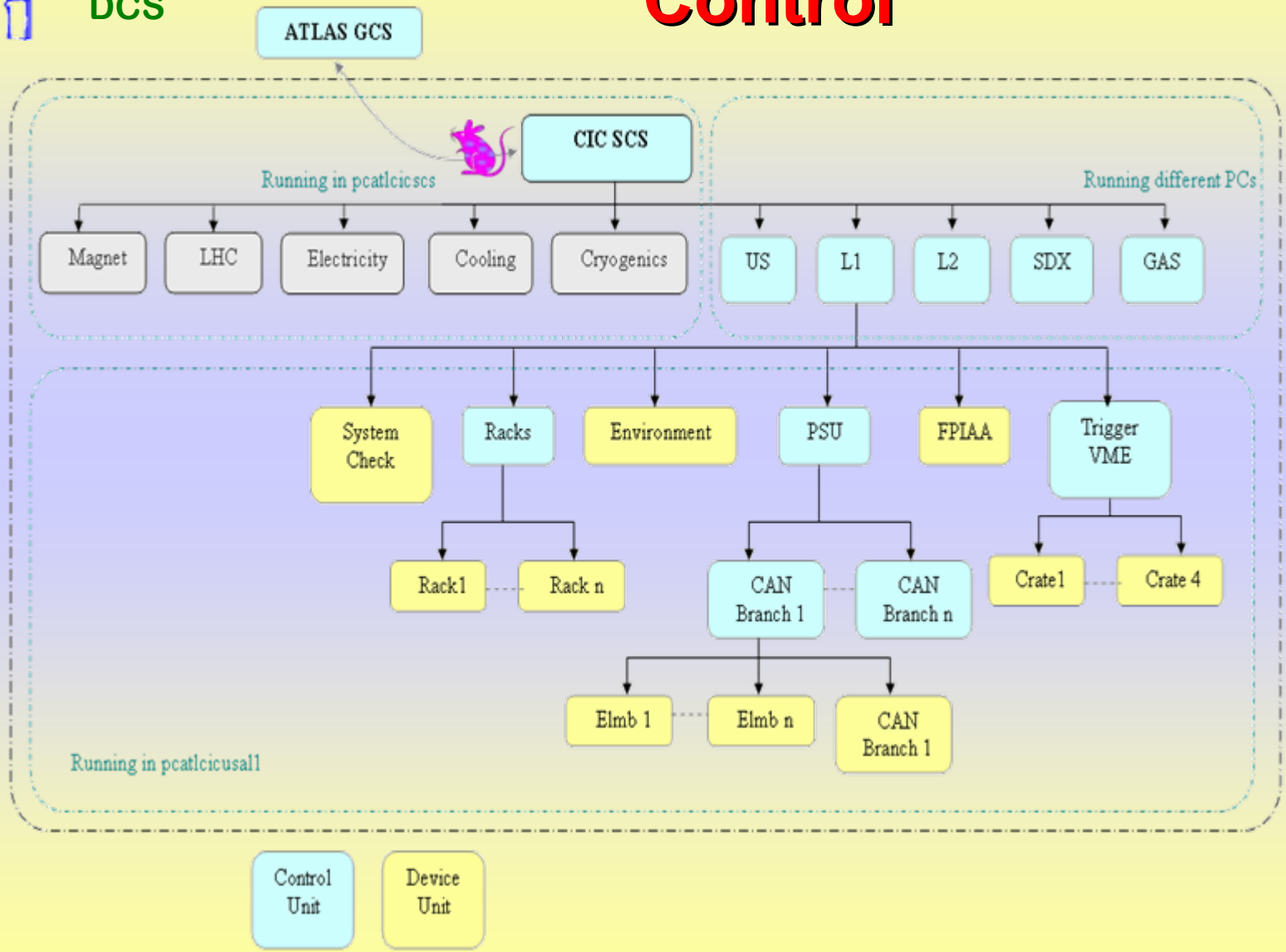

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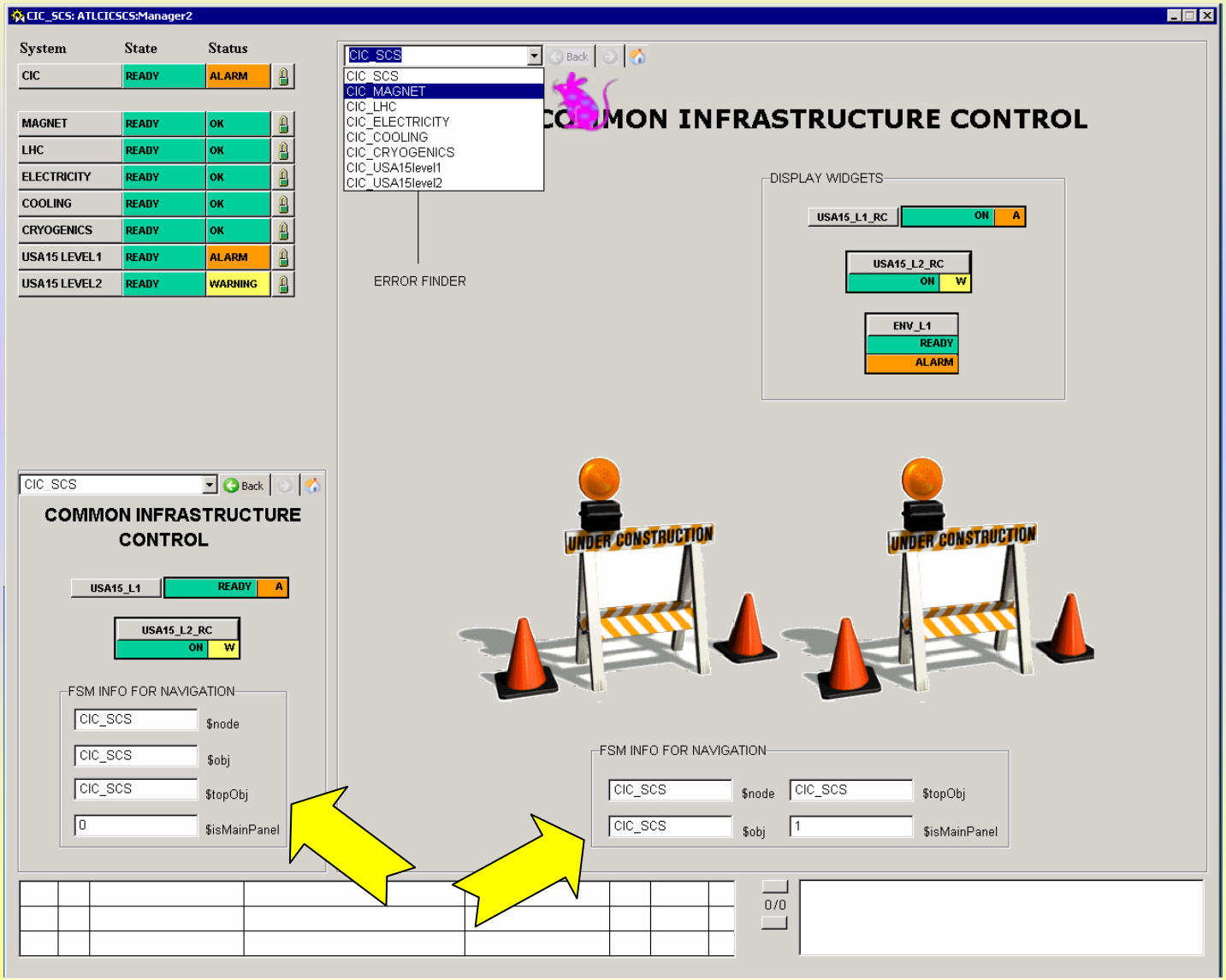

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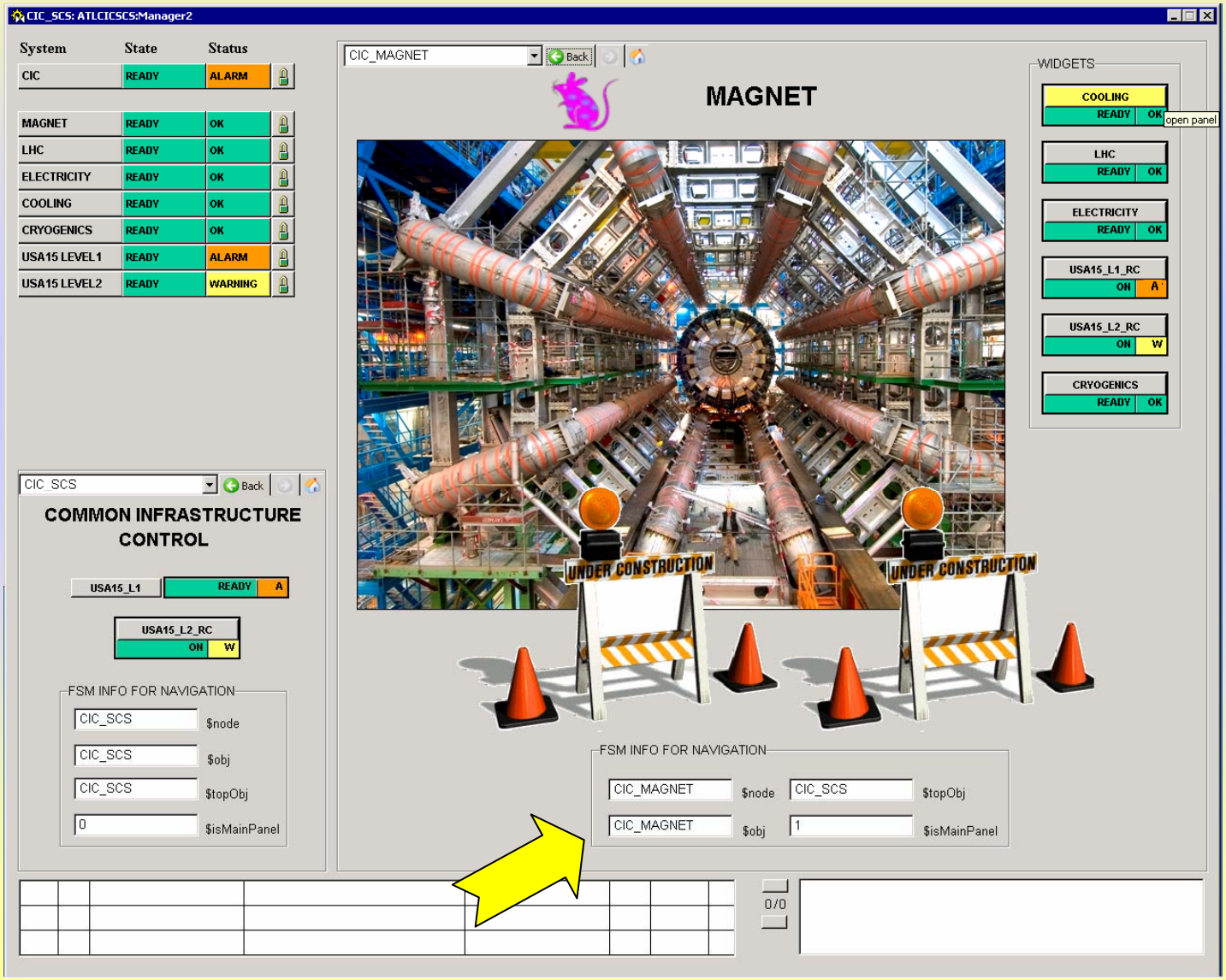

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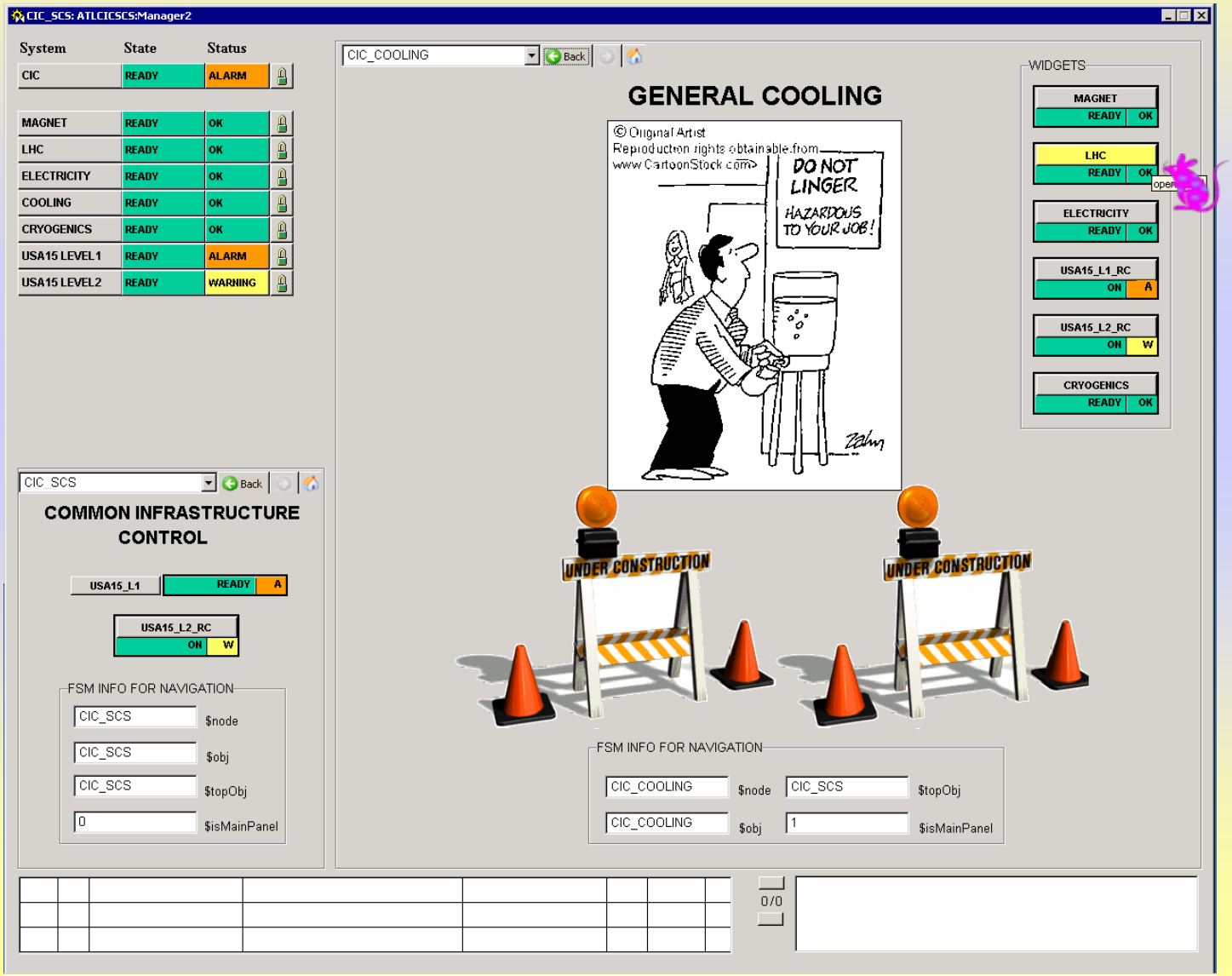

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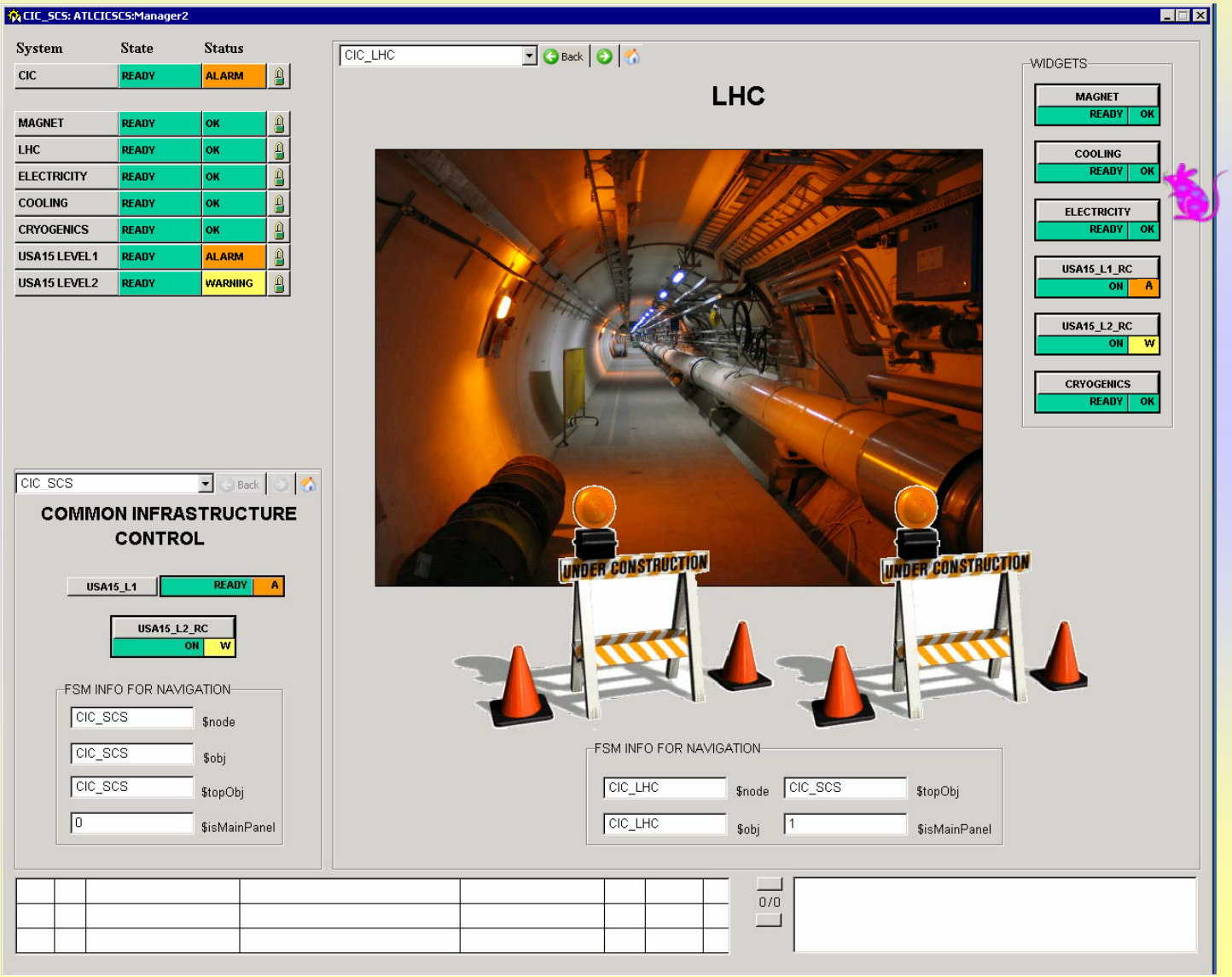

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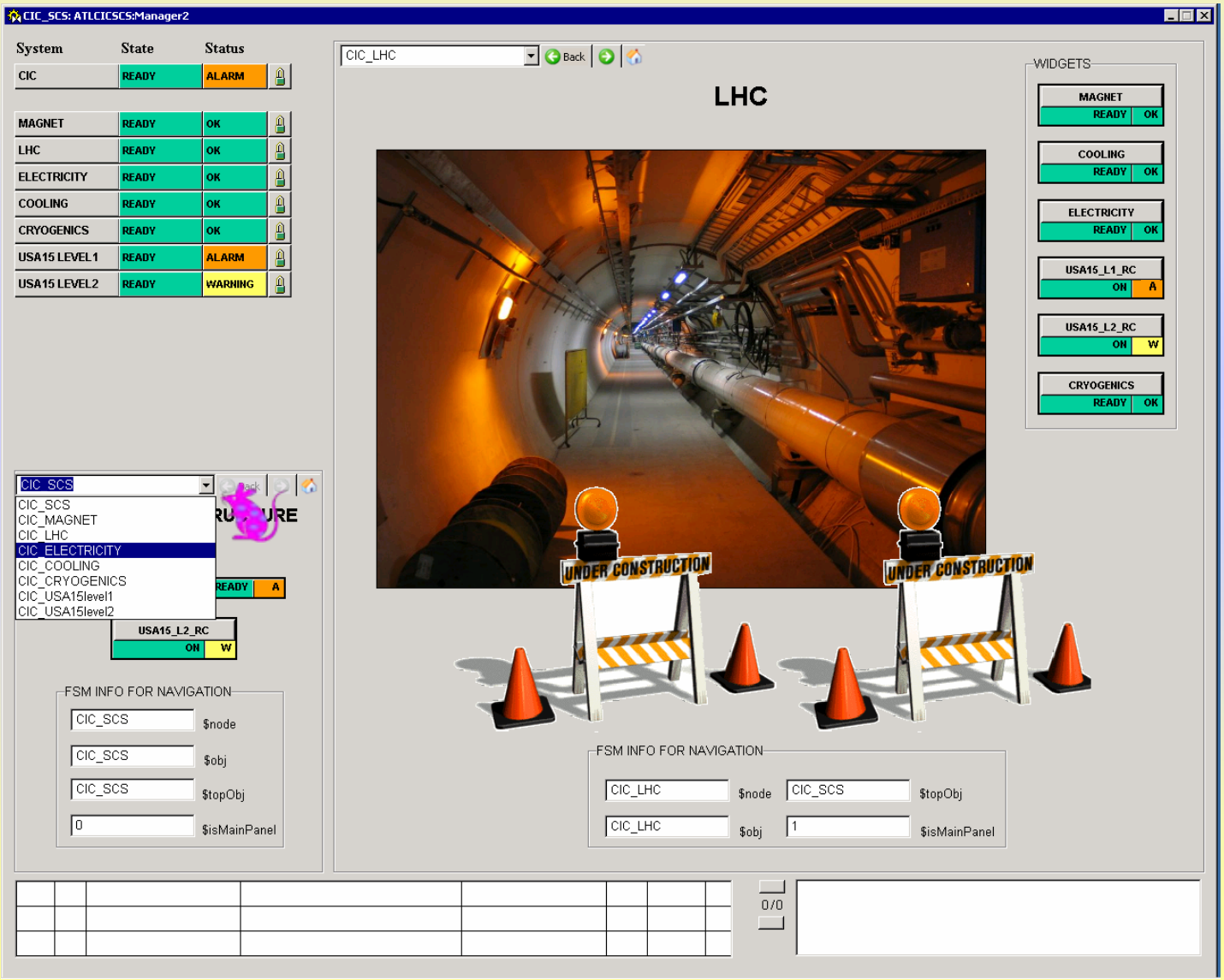

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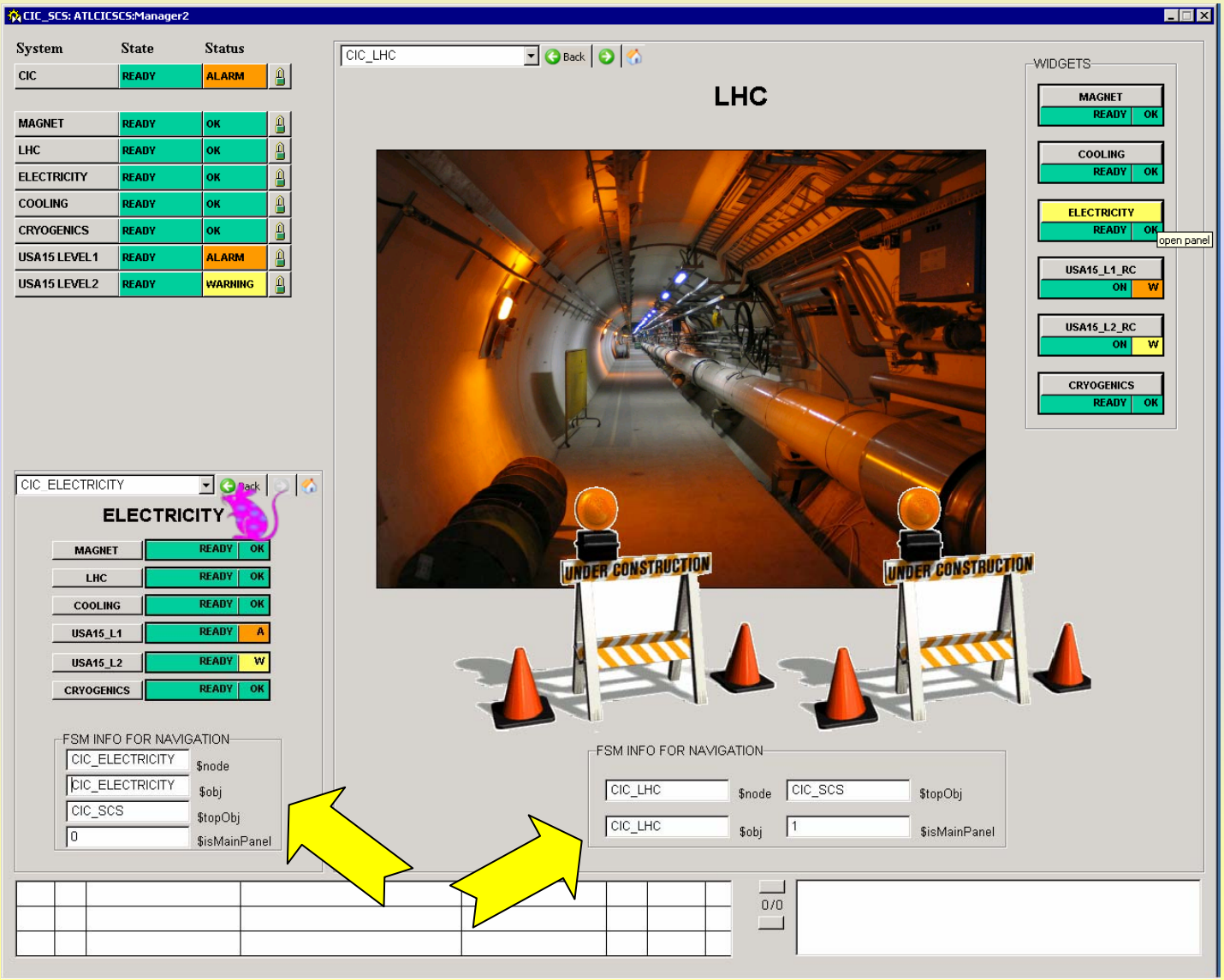

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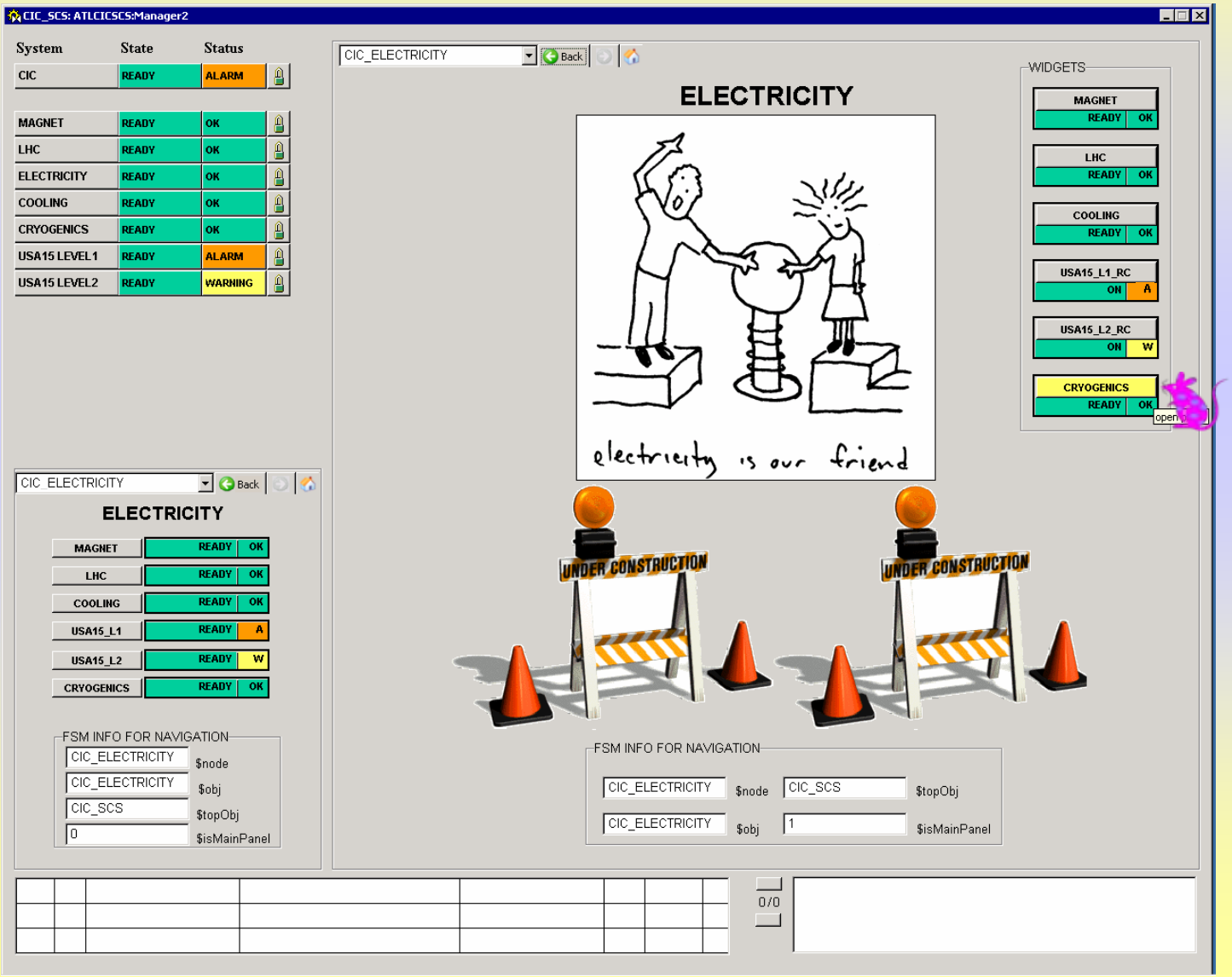

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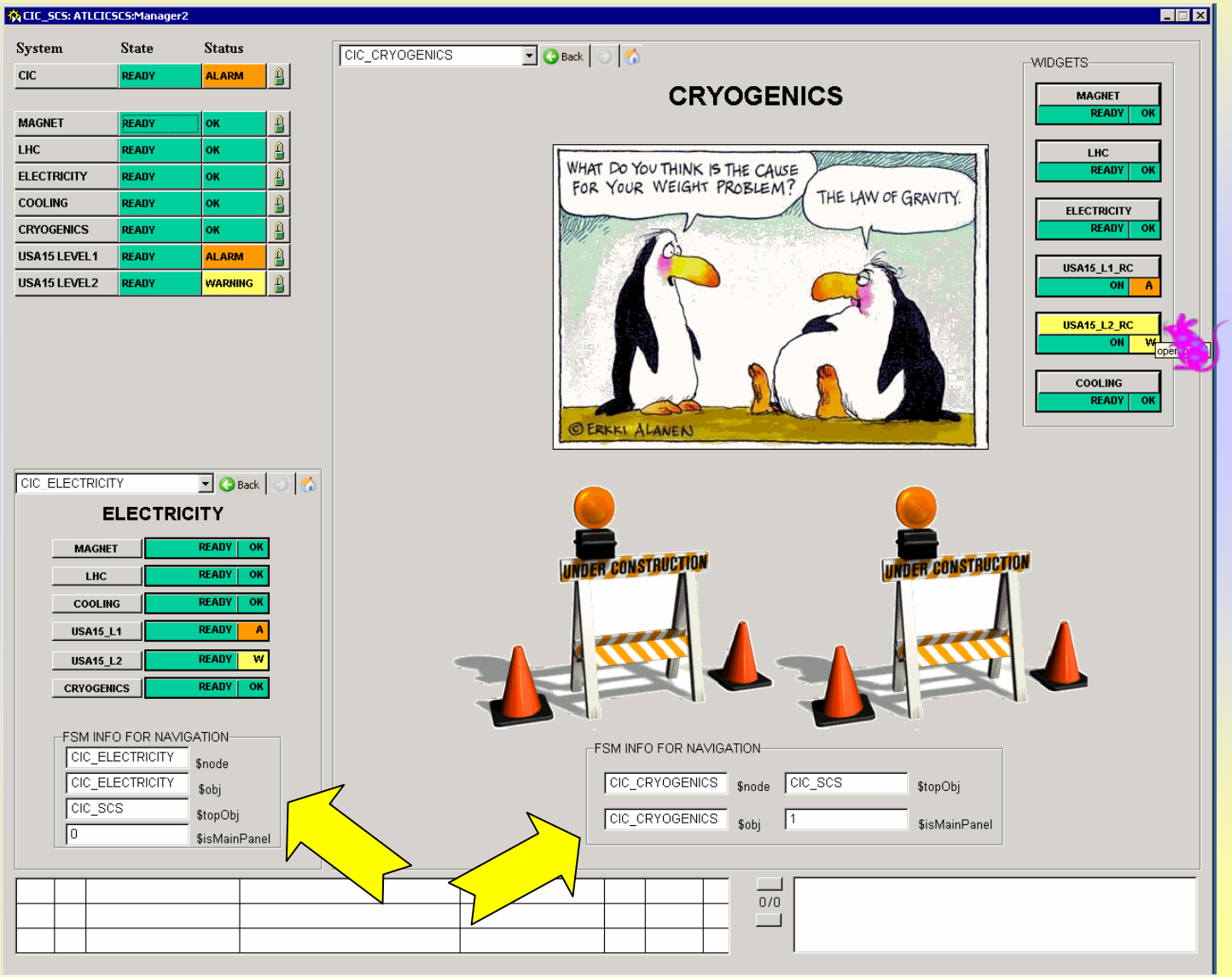

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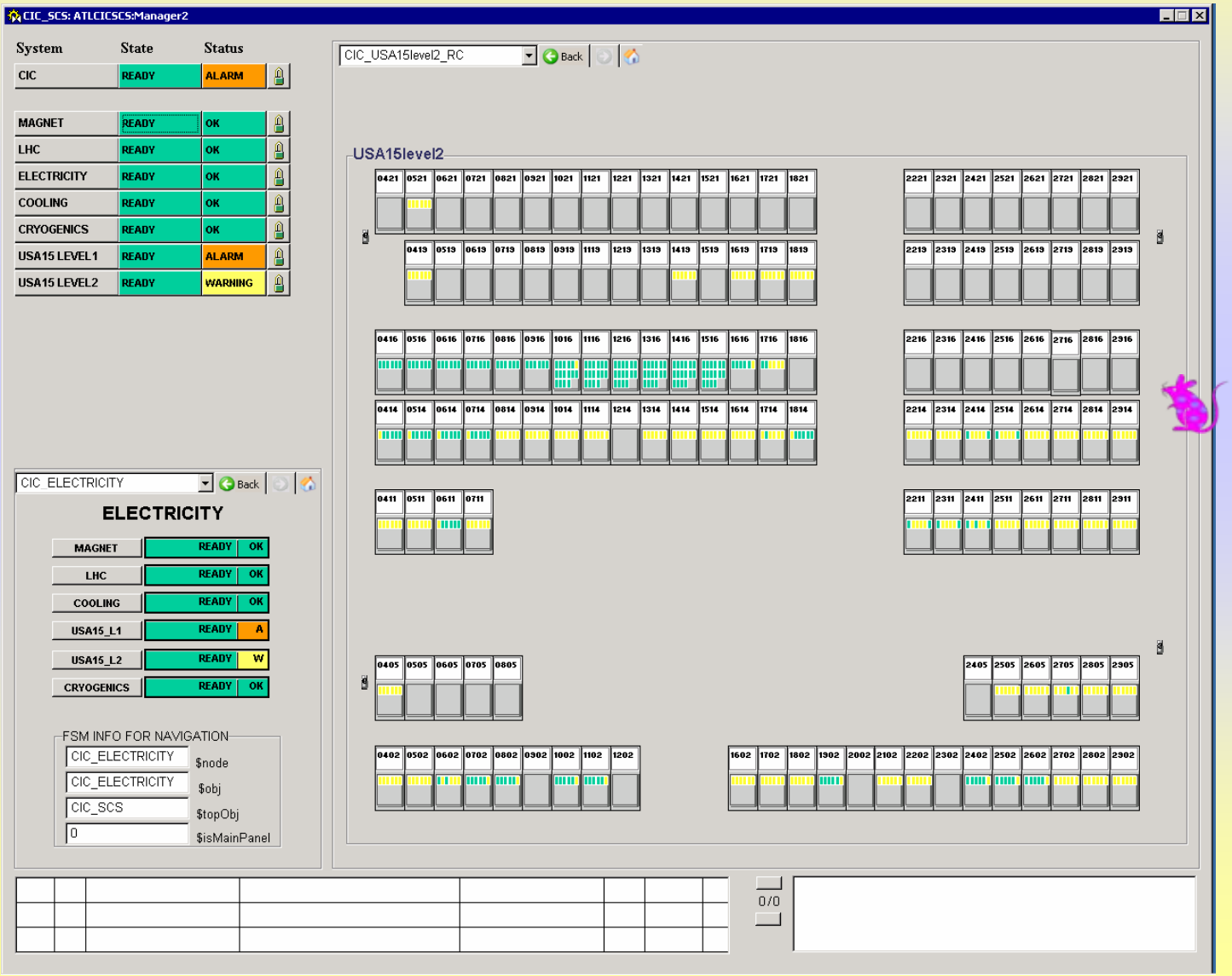

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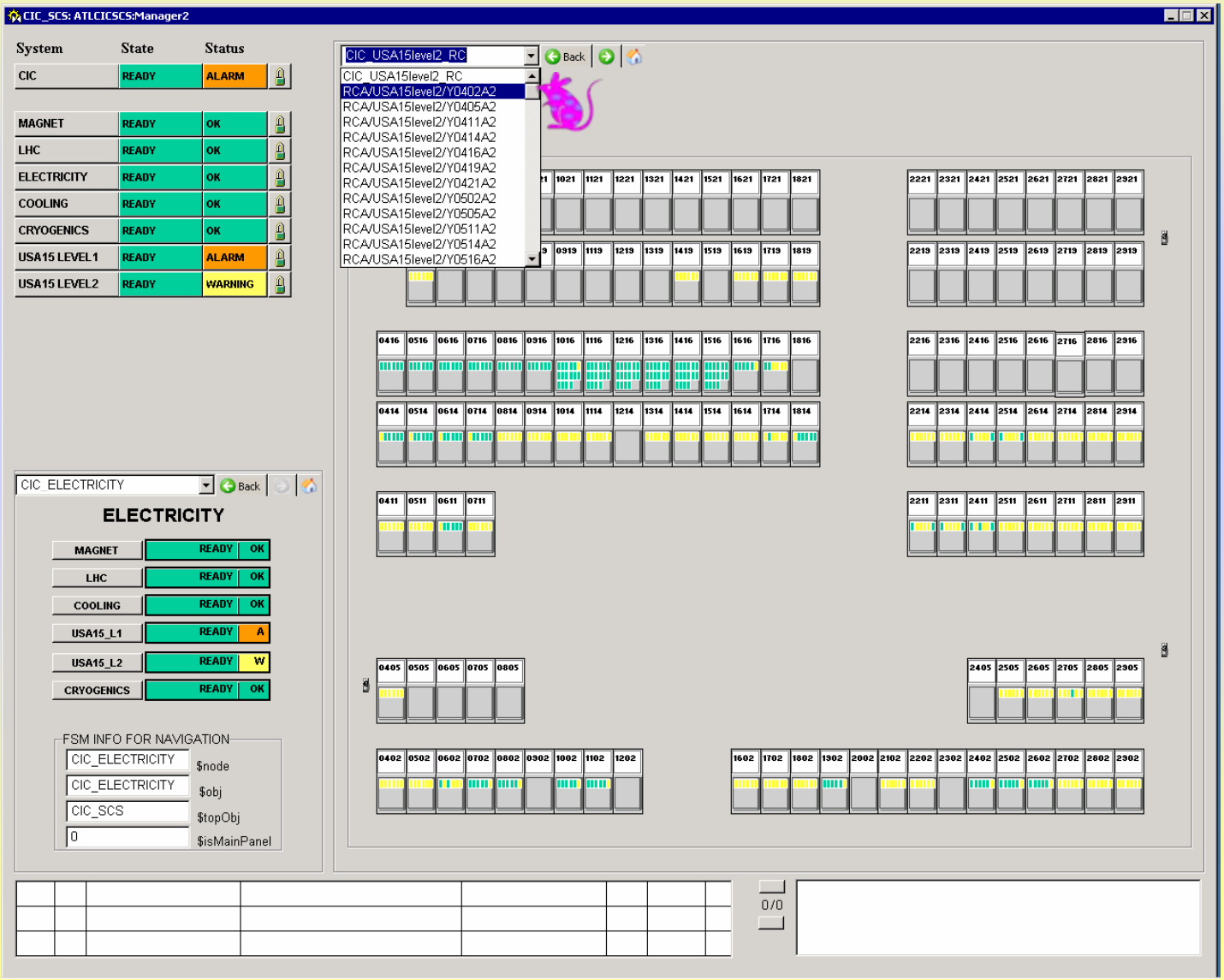

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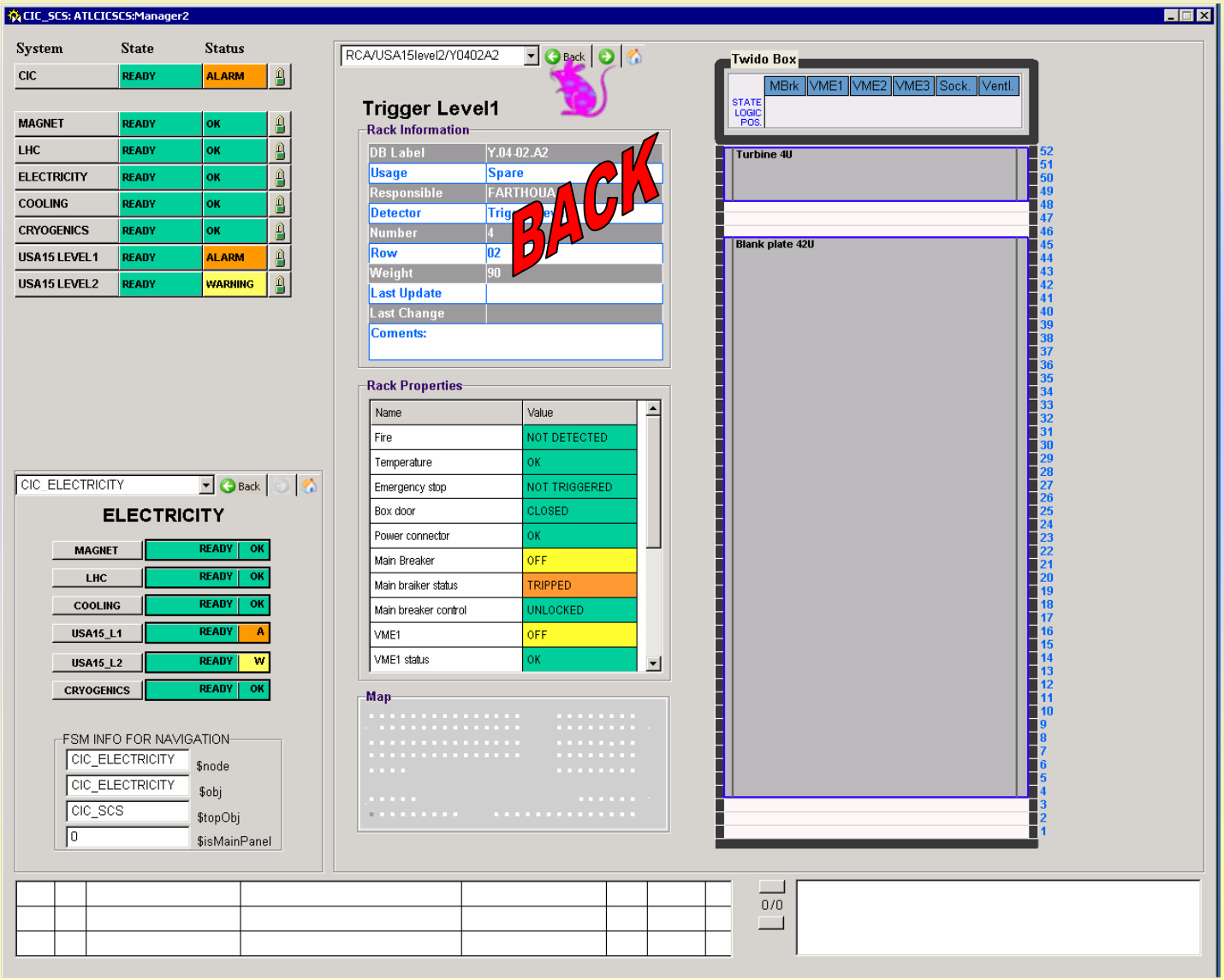

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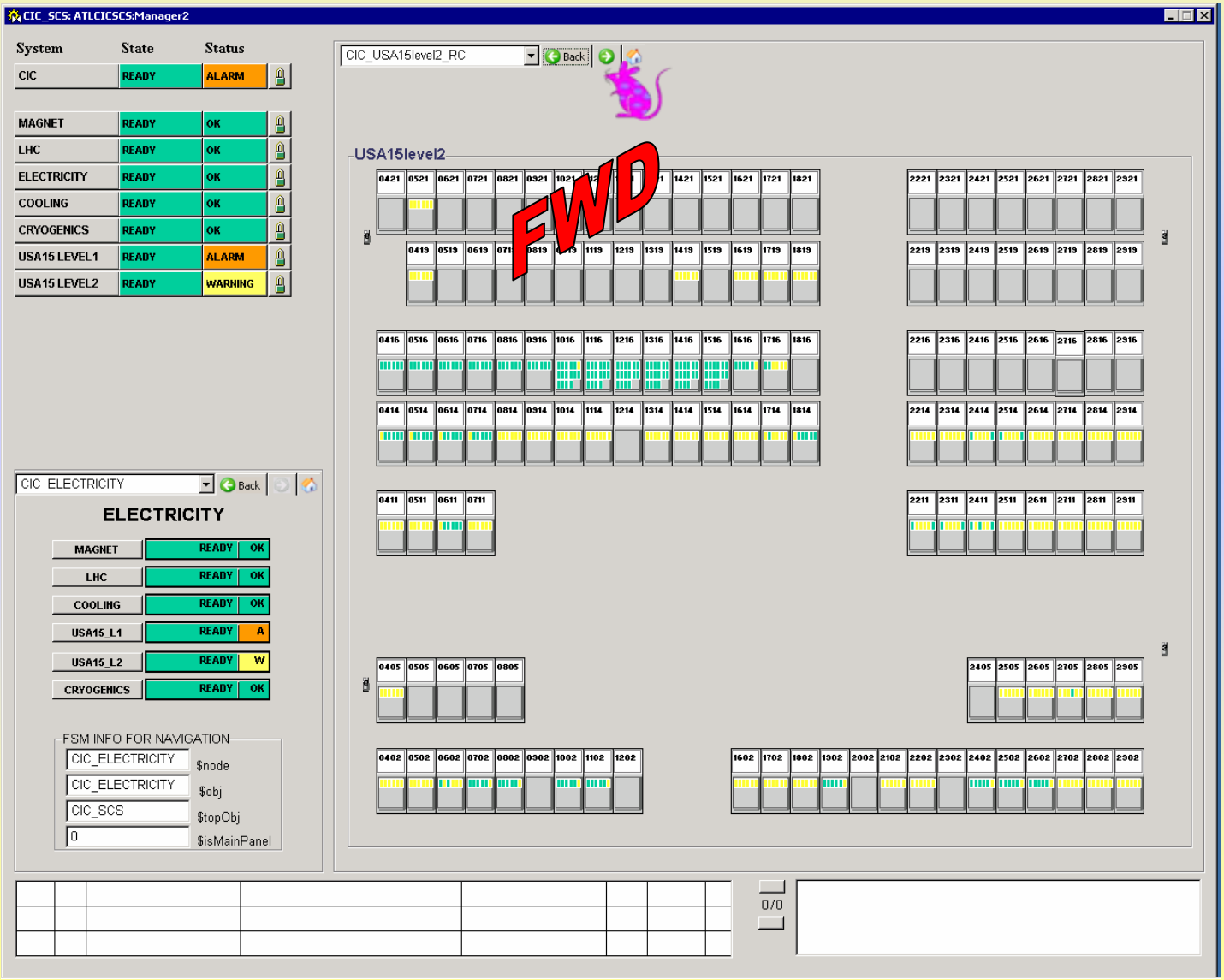

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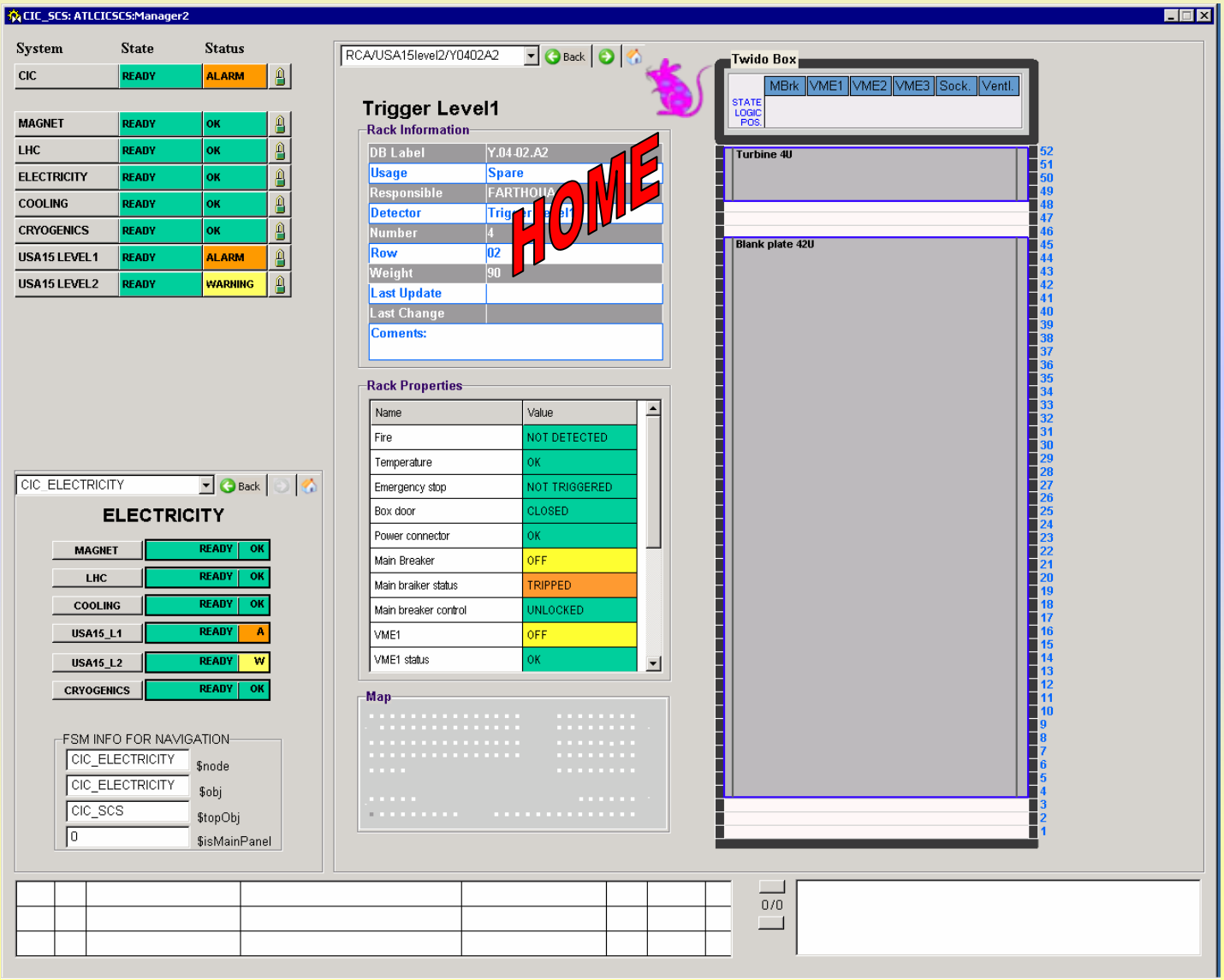

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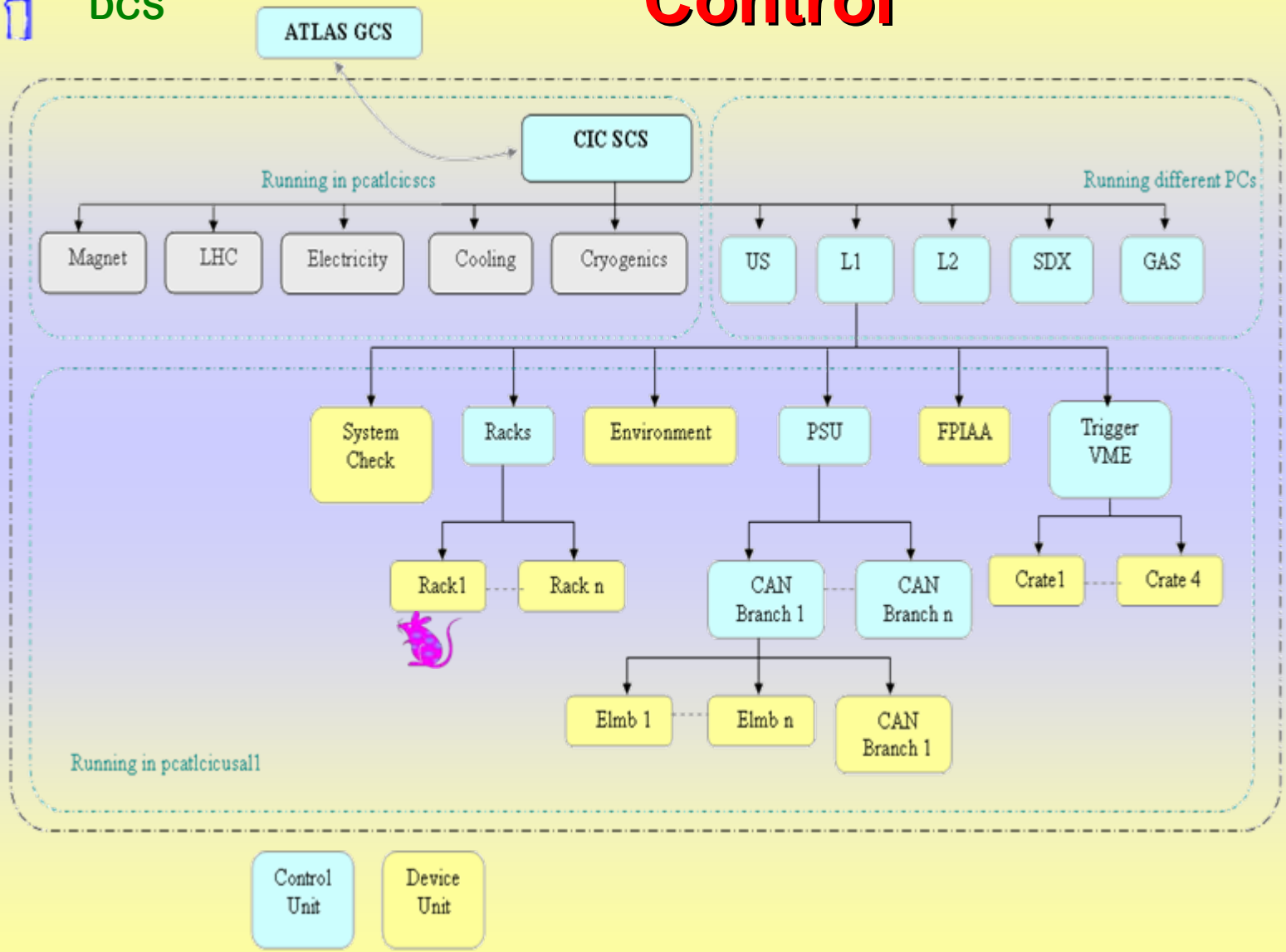
Common Infrastructure Control



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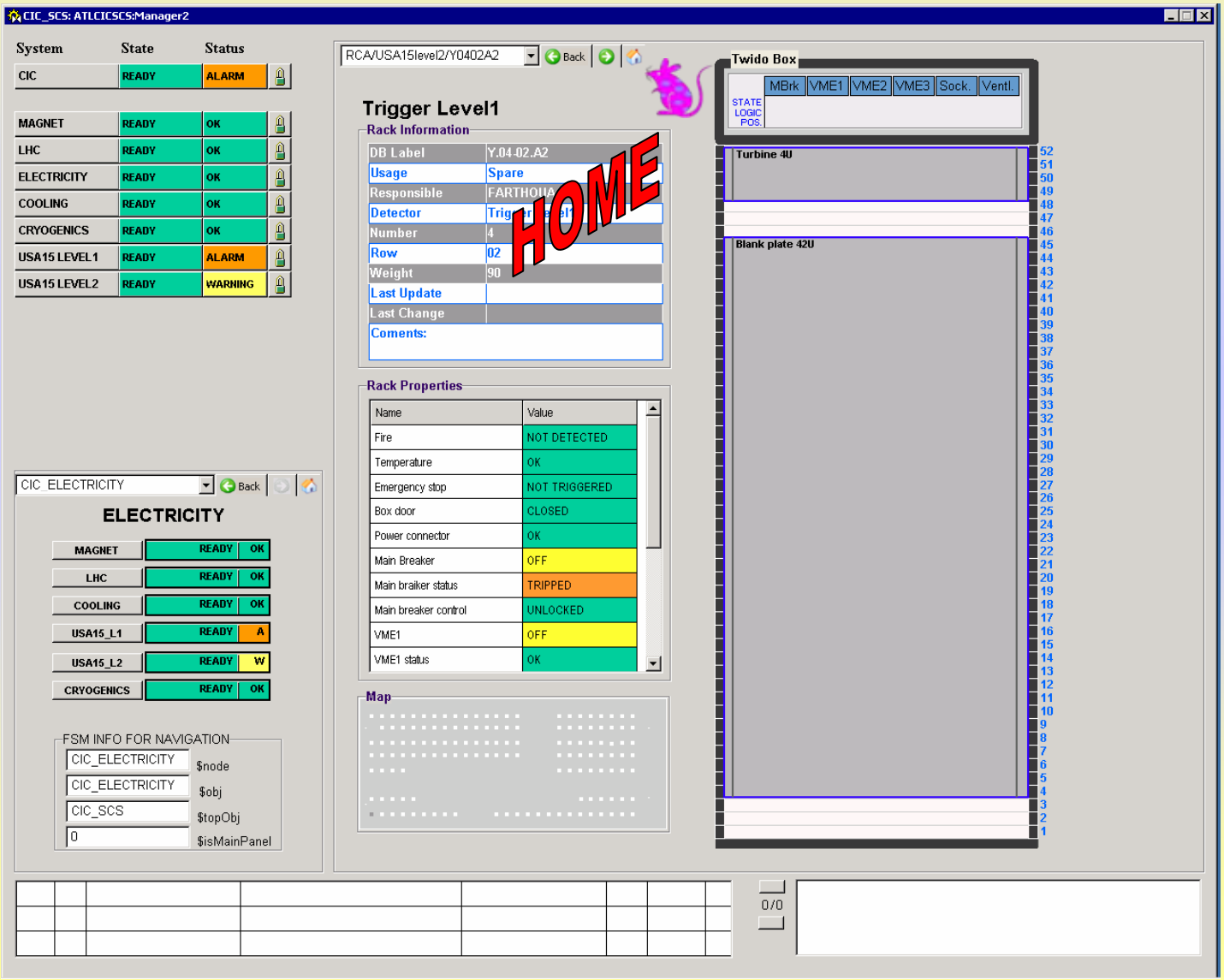

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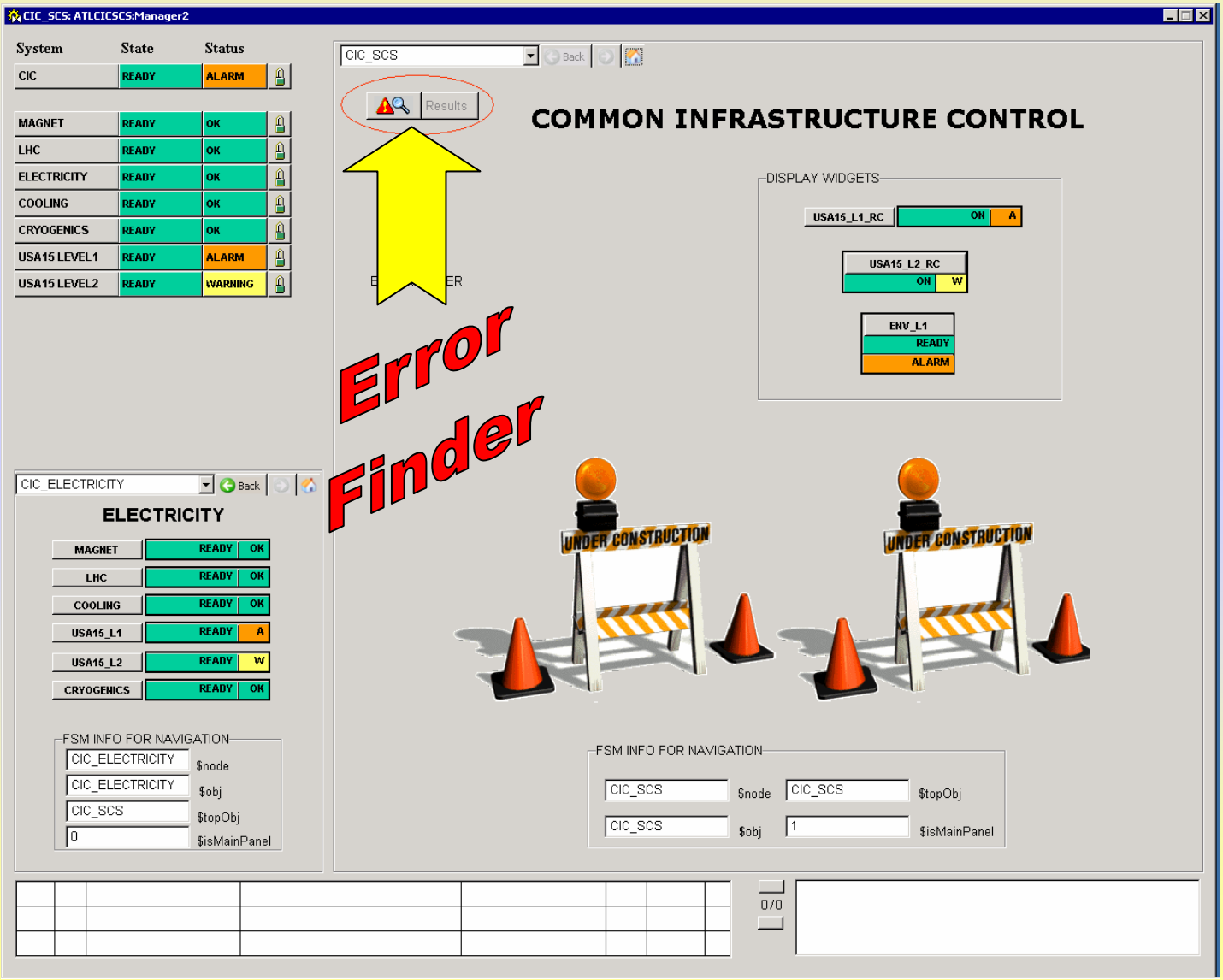

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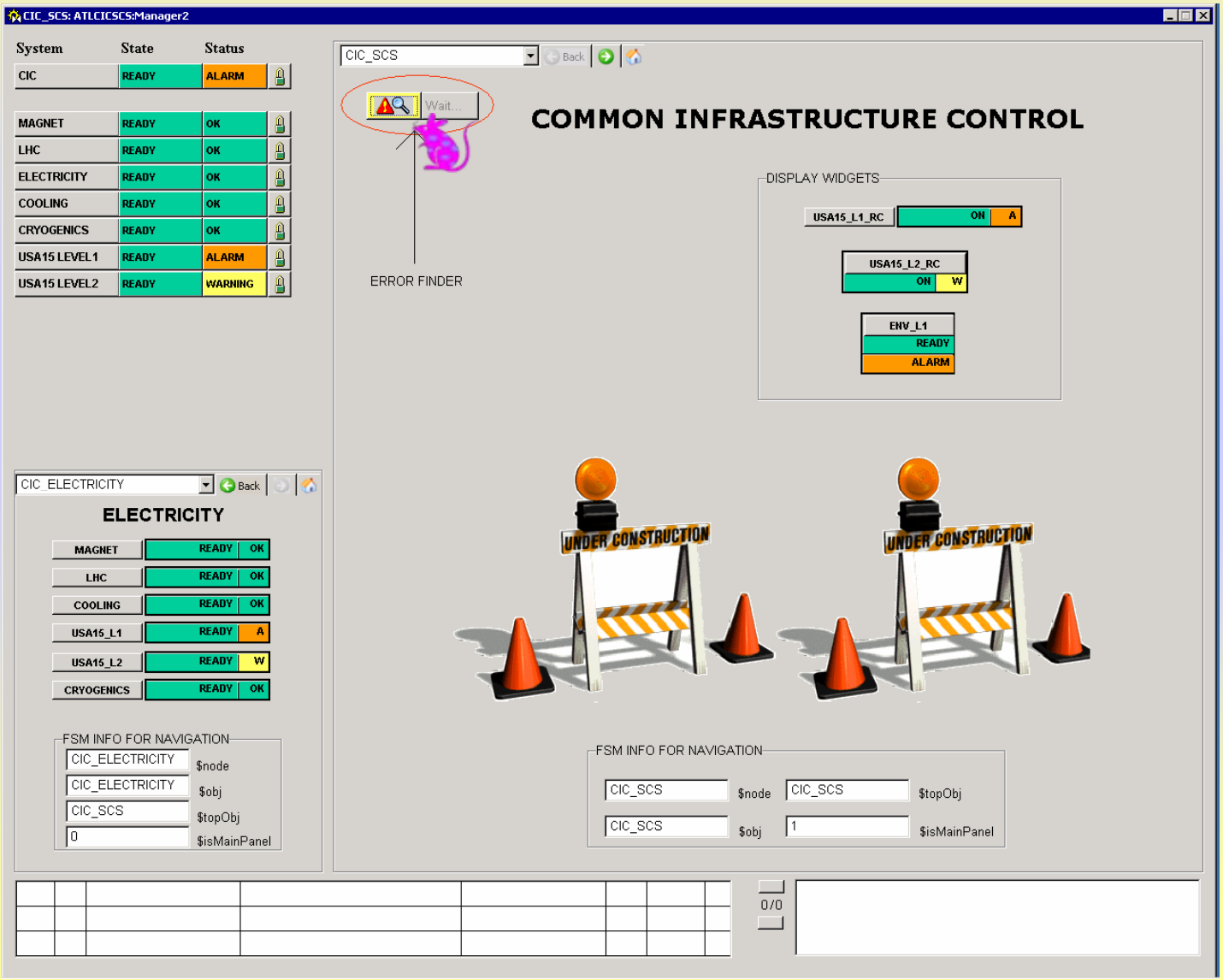

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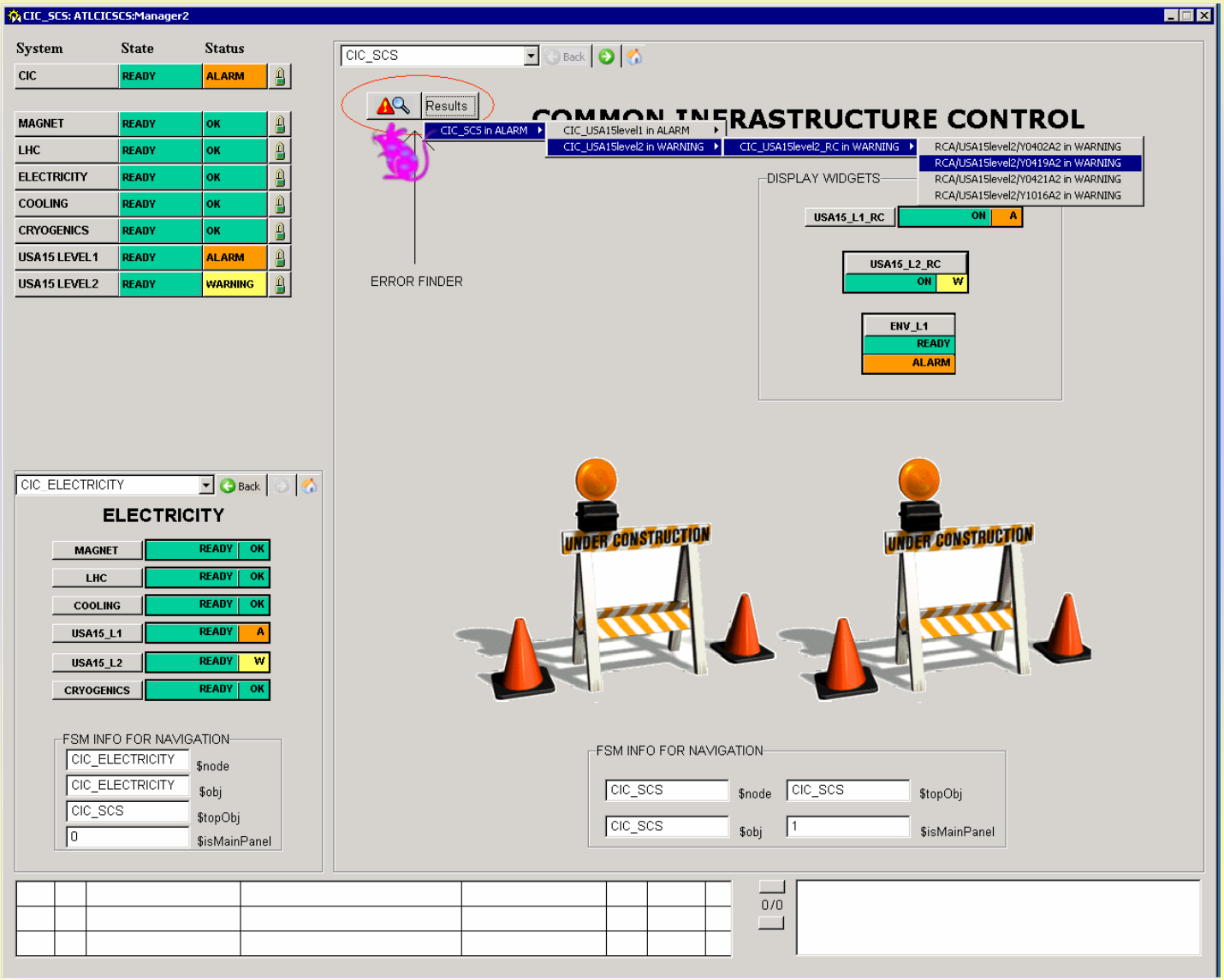

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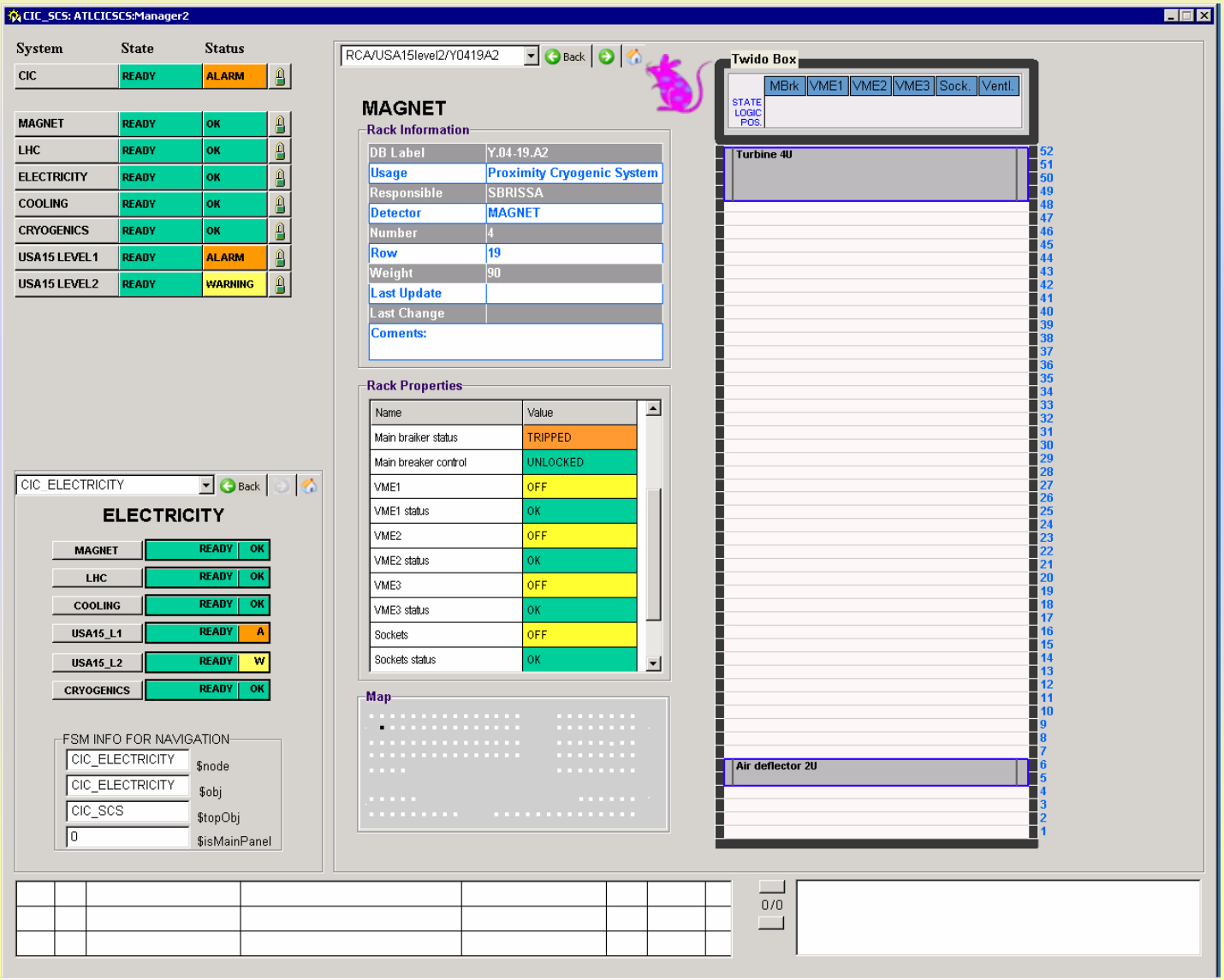

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Conclusions

- The FSM is the main tool to operate the ATLAS DCS
- Frame, with the basic functionality, for building the Operator Interface ready: feedback from sub-detectors needed
- In order to get a consistent Operator Interface a set of rules need to be applied during the integration of the DCS BE

- Documentation :
  - "DCS Integration Guide", see: https://edms.cern.ch/file/685451/1/ATLAS_DCS_Integration_Guidelines.pdf

Thank you!