MFT DCS Status

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for MFT DCS team
K.Shigaki and K.Yamakawa
Hiroshima Univ.

20th November, 2018

12th ALICE ITS Upgrade, MFT and O2 Asian Workshop

Outline

- MFT DCS team in Japan

- Development Progress of DCS
  -hardware architecture
  -final tuning of DCS and FSM
  -FSM panels
  -Logical view
- Test bench at Hiroshima

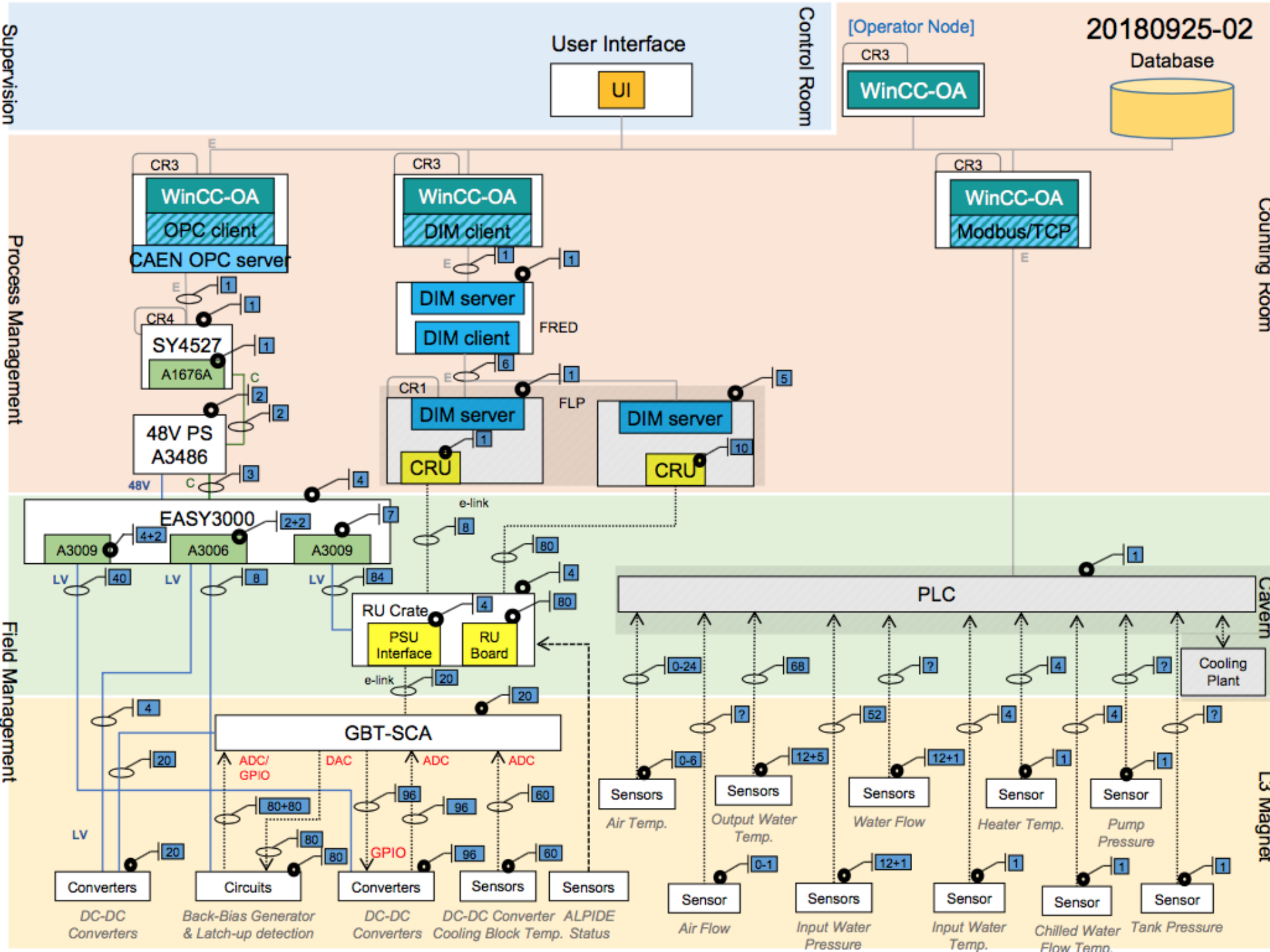
- Summary

MFT DCS team in Japan

- Kenta SHIGAKI (convener)
- Ken OYAMA (advisory)
- Kosei YAMAKAWA (PhD student)
- Motomi OYA (master's course from 2019)

Dr.YAMAGUCHI (new post doctor at Hiroshima Univ.)
will join MFT team from December

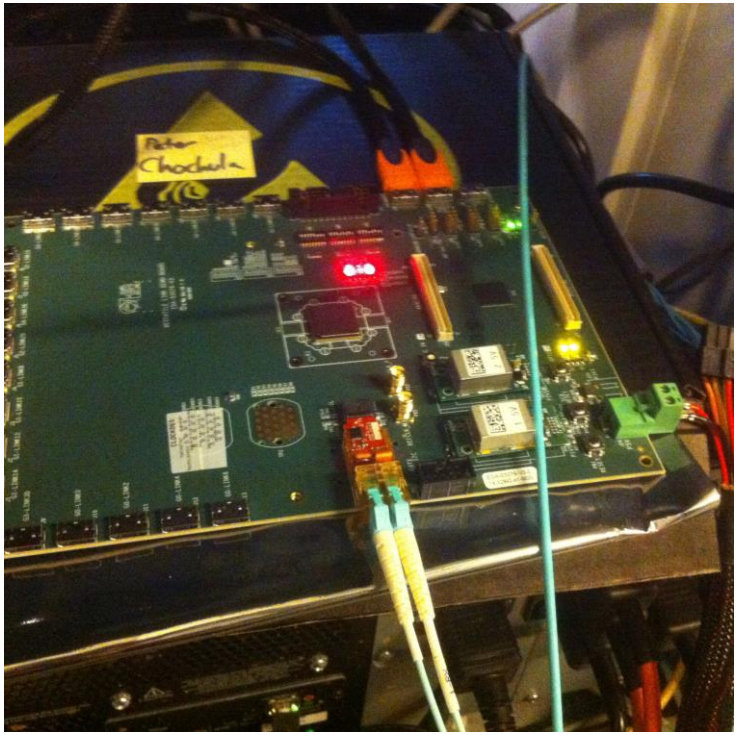
- Performance check for Physics
  - -Yuji KAWAMOTO
  - -Takumi OSAKO
  - -Kazuki YOSHIKAWA
  - -Kaede KAMANO
  - -Takehito KONDO


Supervision
Control Room
User Interface
UI
[Operator Node]
CR3
WinCC-OA
20180925-02
Database
Process Management
Counting Room
CR3
WinCC-OA
OPC client
CAEN OPC server
CR4
SY4527
A1676A
48V PS
A3486
48V
CR3
WinCC-OA
DIM client
DIM server
DIM client
FRED
CR1
DIM server
CRU
FLP
DIM server
CRU
CR3
WinCC-OA
Modbus/TCP
Field Management
Cavern
L3 Magnet
EASY3000
A3009
A3006
A3009
LV
e-link
RU Crate
PSU Interface
RU Board
PLC
Cooling Plant
GBT-SCA
ADC/ GPIO
DAC
ADC
ADC
GPIO
Converters
DC-DC Converters
Circuits
Back-Bias Generator & Latch-up detection
Converters
DC-DC Converters
Sensors
DC-DC Converter Cooling Block Temp.
Sensors
ALPIDE Status
Sensors
Air Temp.
Sensor
Air Flow
Sensors
Output Water Temp.
Sensors
Water Flow
Sensors
Input Water Pressure
Sensor
Heater Temp.
Sensor
Input Water Temp.
Sensor
Pump Pressure
Sensor
Chilled Water Flow Temp.
Sensor
Tank Pressure

Hardware Architecture

- Test Bench of CAEN System at CERN
- GBT-SCA Command Sequence

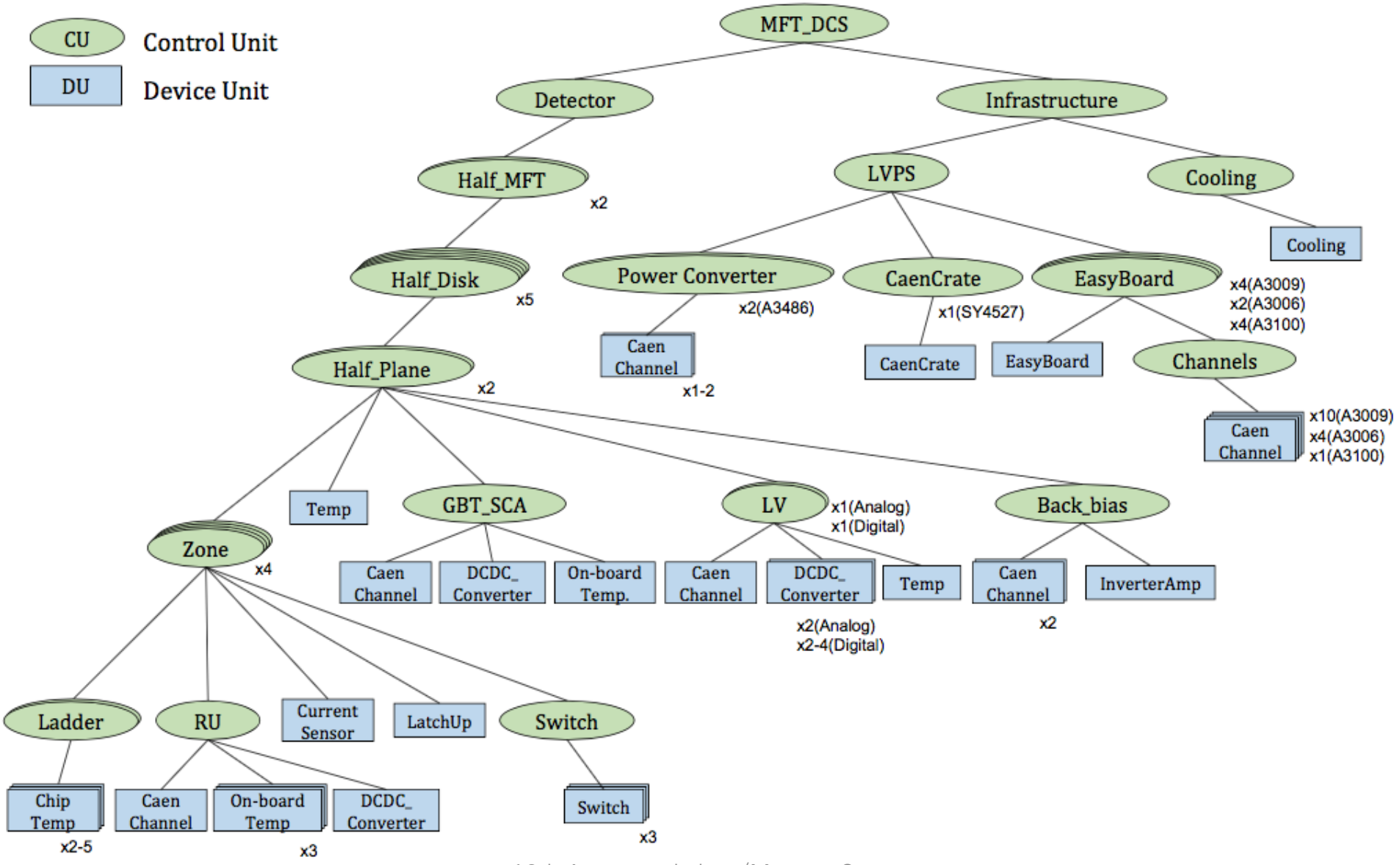
Test bench of CAEN system



VLDB(The Versatile Link Demonstrator Board)

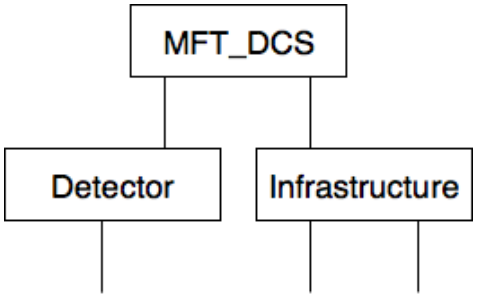
Finite State Machine

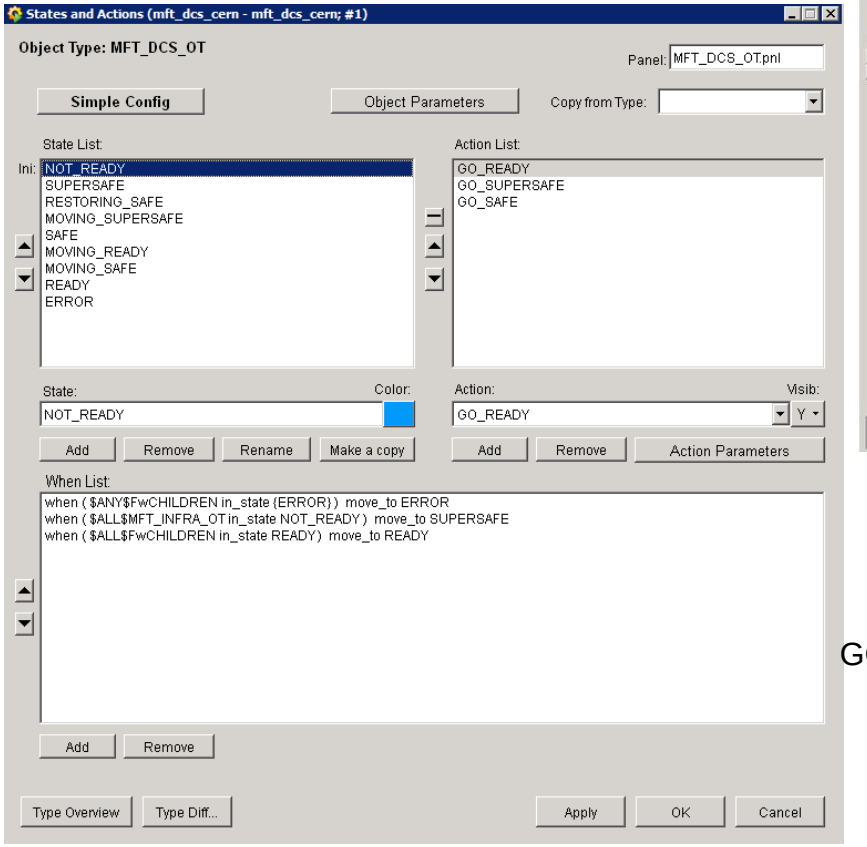
Ver. 20180204_1

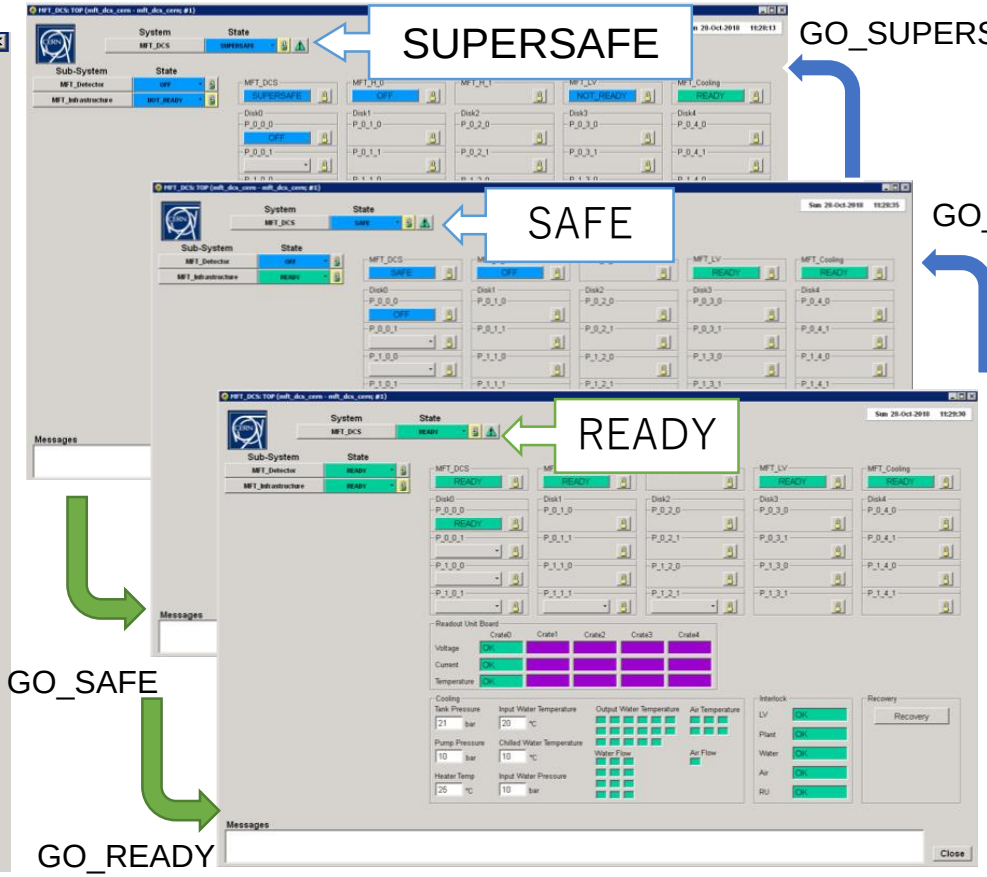


Finite State Machine

- Implementation of FSM tree is completed
- Testing and making a small modification

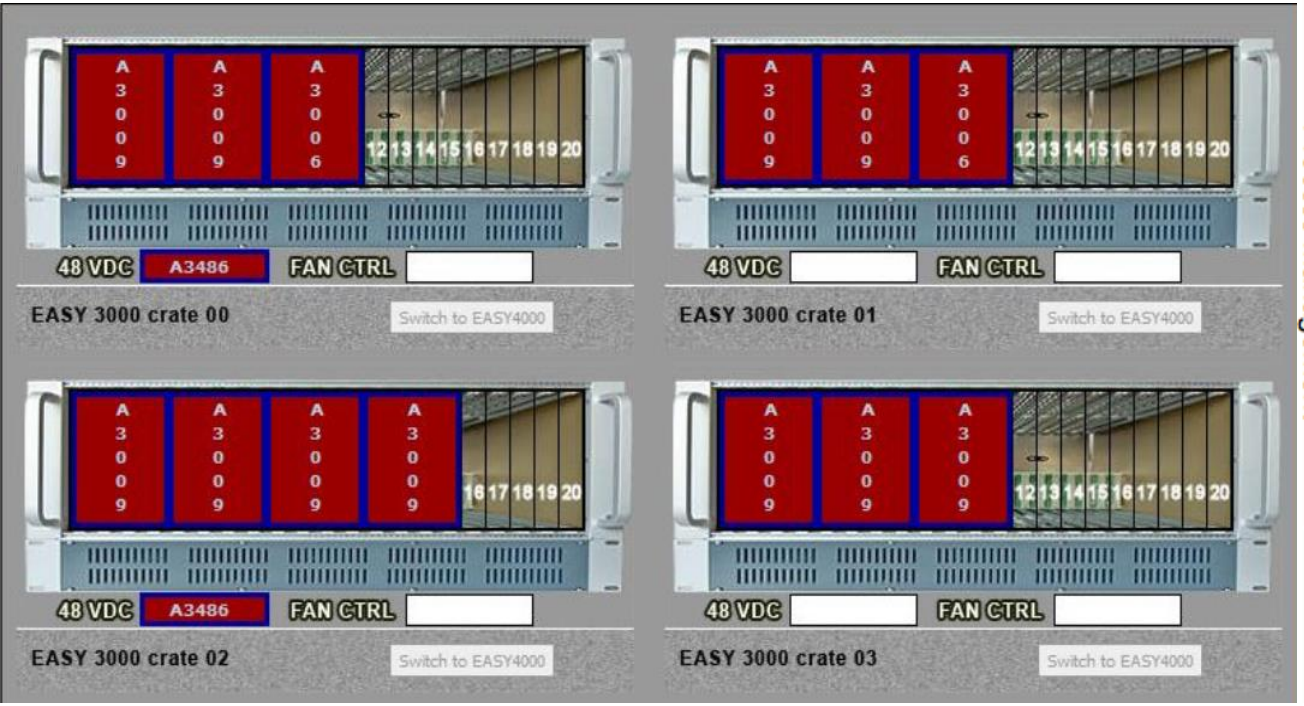


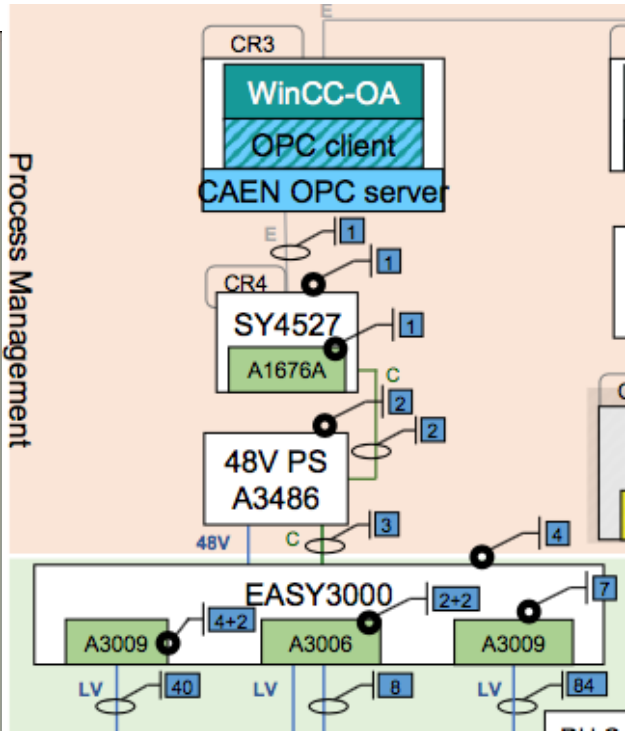




Final tuning

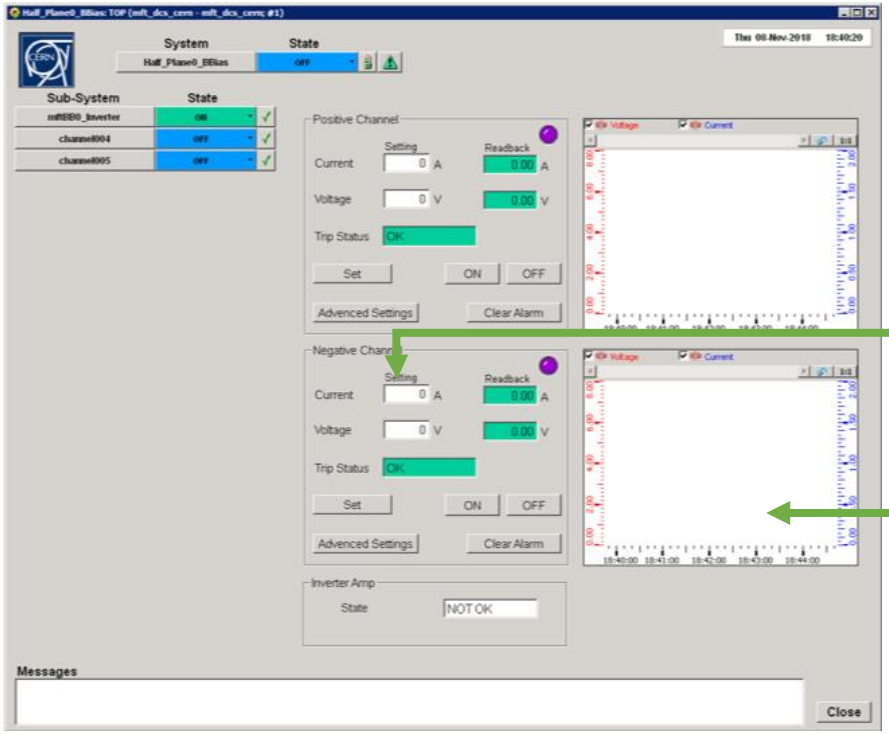
- A3009× 4 →DCDC Converter→Zone
- A3009× 7 →DCDC Converter→RU Board
- A3006→Back-Bias Generator→ALPIDEs
- A3006→DCDC Converter→GBT-SCA





FSM Panels

- Implementation of FSM Panels
- For both MFT experts and ALICE shifters
- Panels show each states clearly



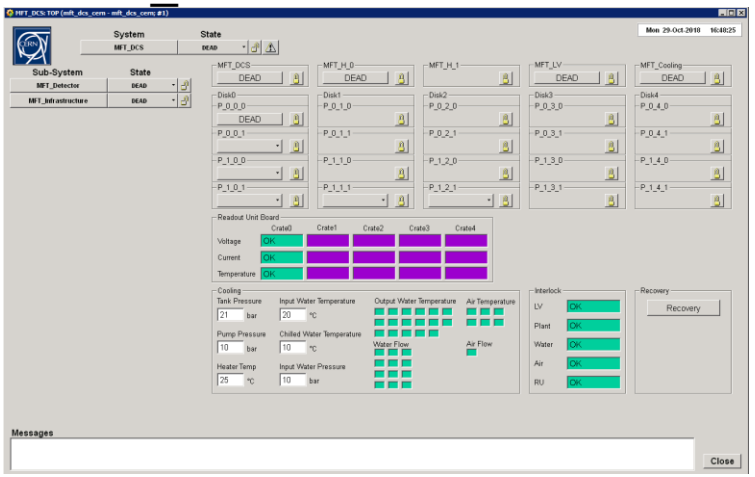
Half_Plane_0_Bbias

Display voltage and current

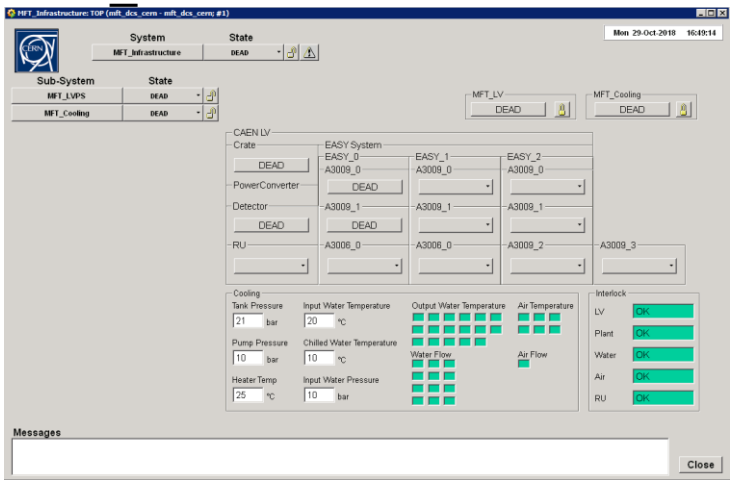
Trending

FSM Panels

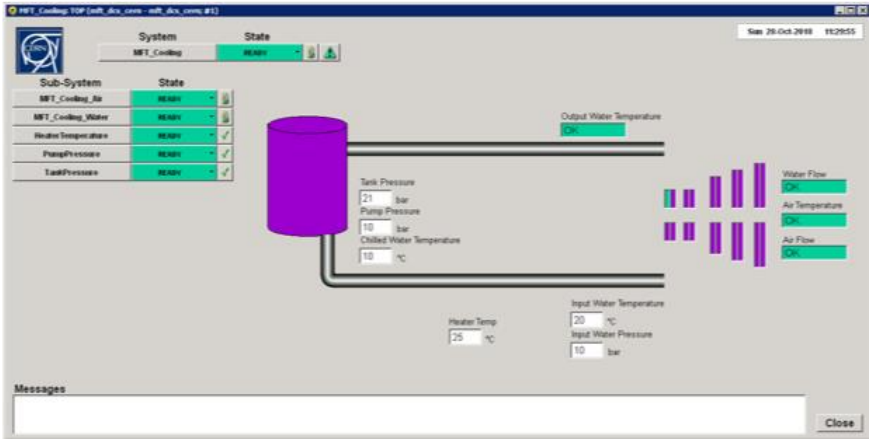
MFT_DCS



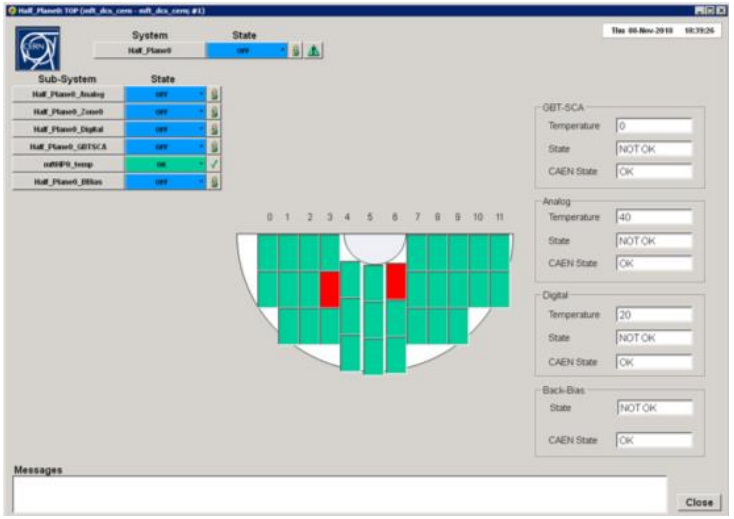
MFT_Infrastracture



MFT_Cooling

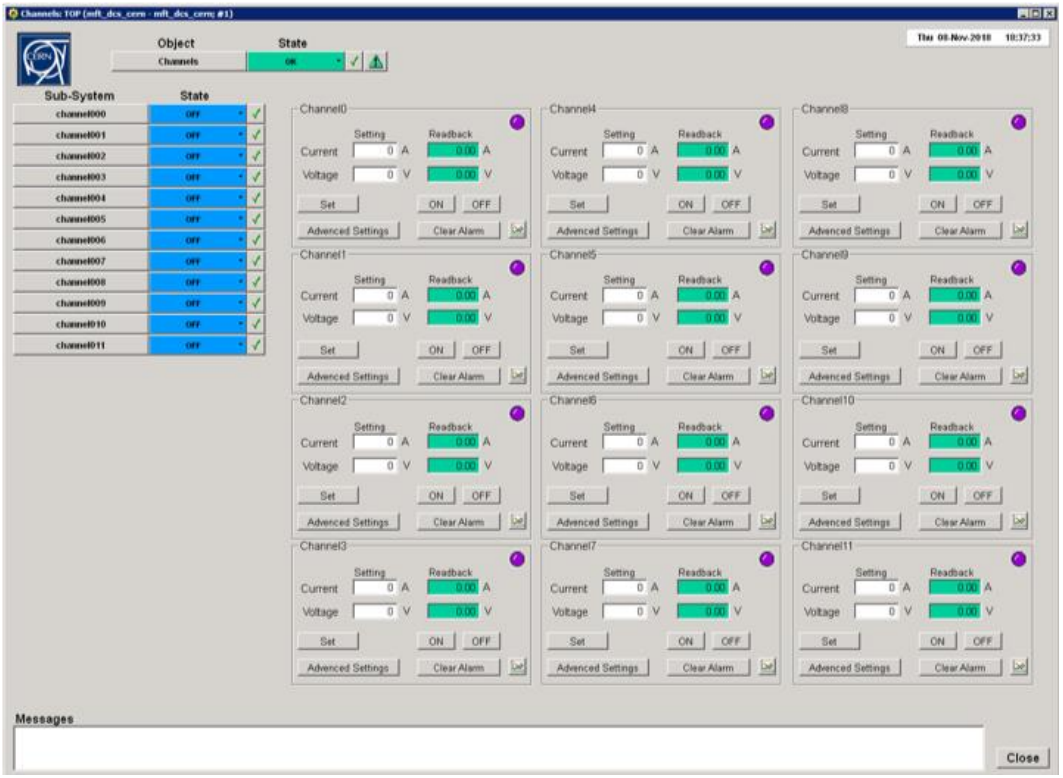


Half_Plane

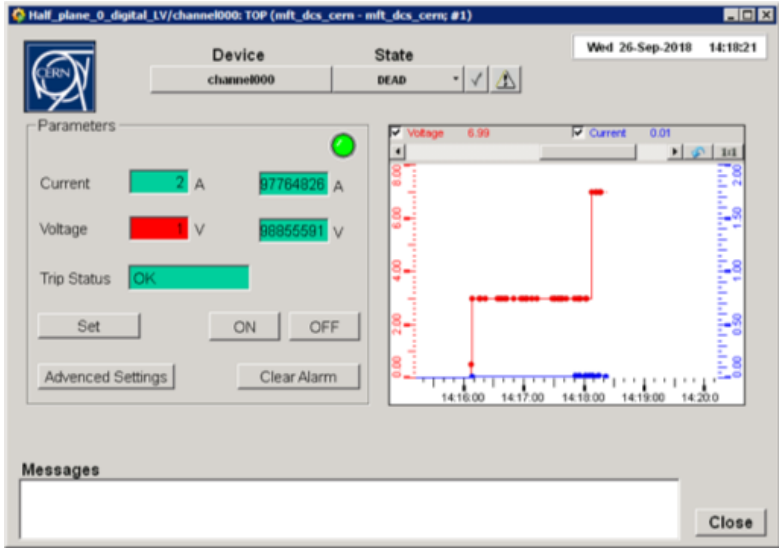


FSM panels

CAEN Channels

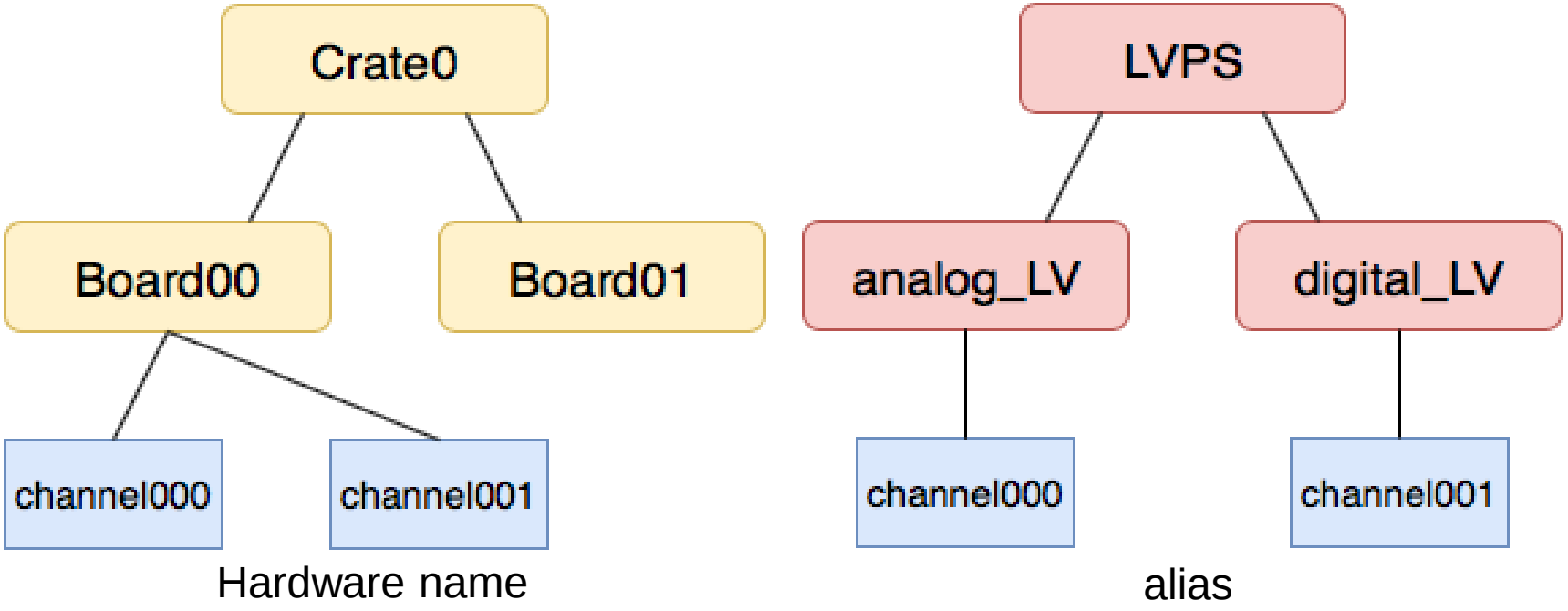


Single channel



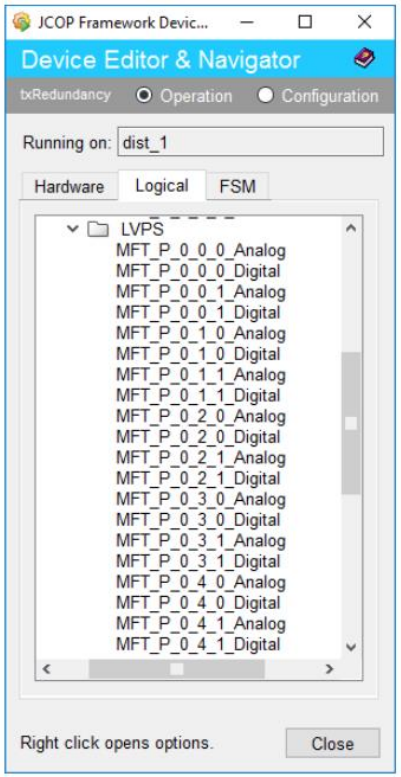
Logical View

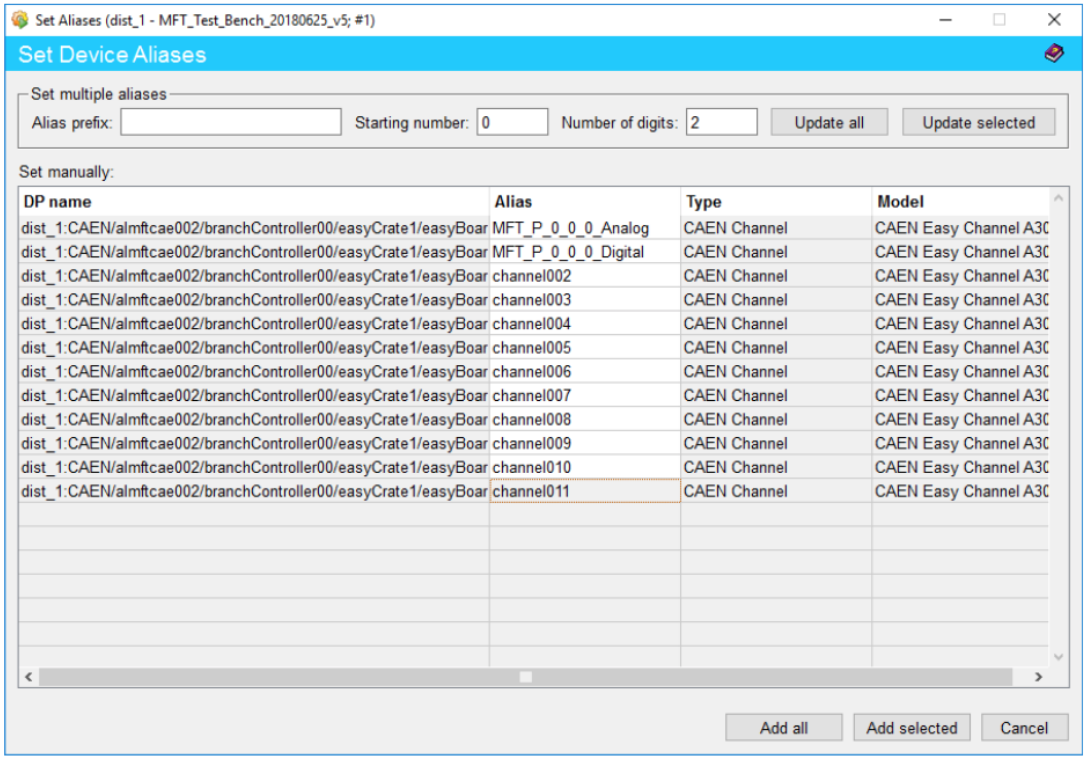
- Creation alias
- Alias clarify what things are used for
- FSM and script can use alias



Logical View

- Use alias to implement FSM and hardware.
- Whether to link with the database is under discussion





Full Scale Test Bench

- Setup a test bench at Hiroshima

- Component
  - -WinCCOA PC for operator/worker node
    - ↪Dell PowerEdge R310
  - -FRED
    - ↪ Dell PowerEdge R310
  - -CAEN simulator

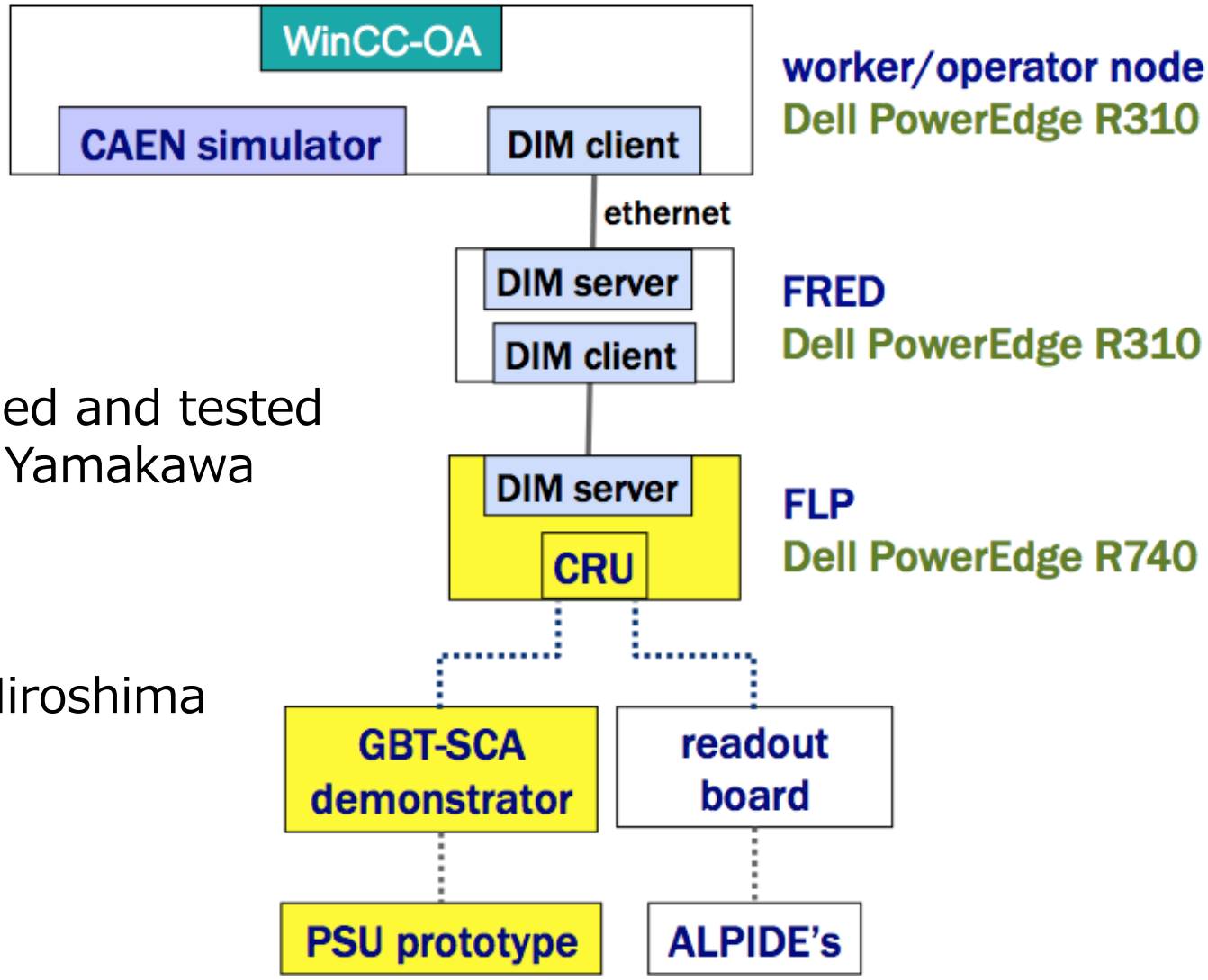
  - -FLP(already delivered at CERN)
    - ↪ Dell PowerEdge R740
  - -CRU(installation will be done)
  - -GBT-SCA demo board (VLDB)
  - -PSU prototype

Purchase or loan
from CERN/ALICE/MFT

Full Scale Test Bench

To be commissioned and tested at CERN by Kosei Yamakawa

To be started at Hiroshima from December



Future Work

- Testing and tuning DCS and FSM
- Detector design
  - on-detector sensors
  - on-detector GBT-SCA I/O port map
- Interlock scenarios
- Full scale test bench

Summary

- Dr.YAMAGUCHI will join in December 2018
- Development of DCS is in progress
  - -create FSM panels
  - -alias CAEN channels
  - -final tuning
- A few remaining things to do
- Test bench at Hiroshima will start in December