

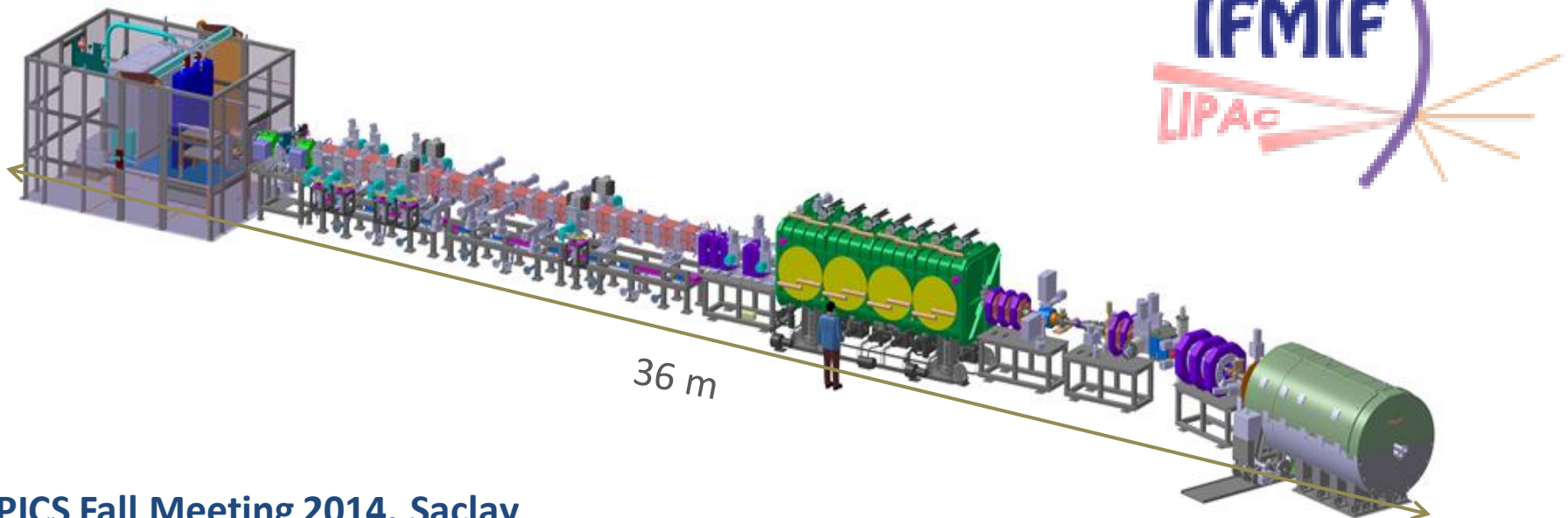
LIPAc status report

EPICS Integration and Commissioning
+ RFQ LCS status at INFN/LNL

Alvaro Marqueta

LIPAc Project Team

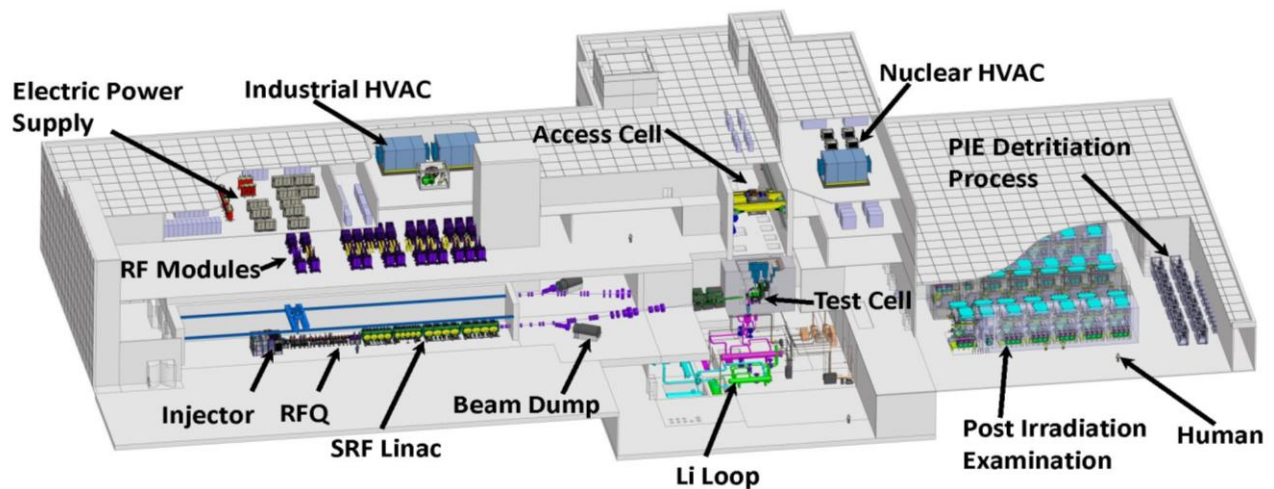
on behalf of the LIPAc Control Systems family



LIPAc -> Linear IFMIF Particle Accelerator

IFMIF -> International Fusion Materials Irradiation Facility

(the fusion relevant neutron source)

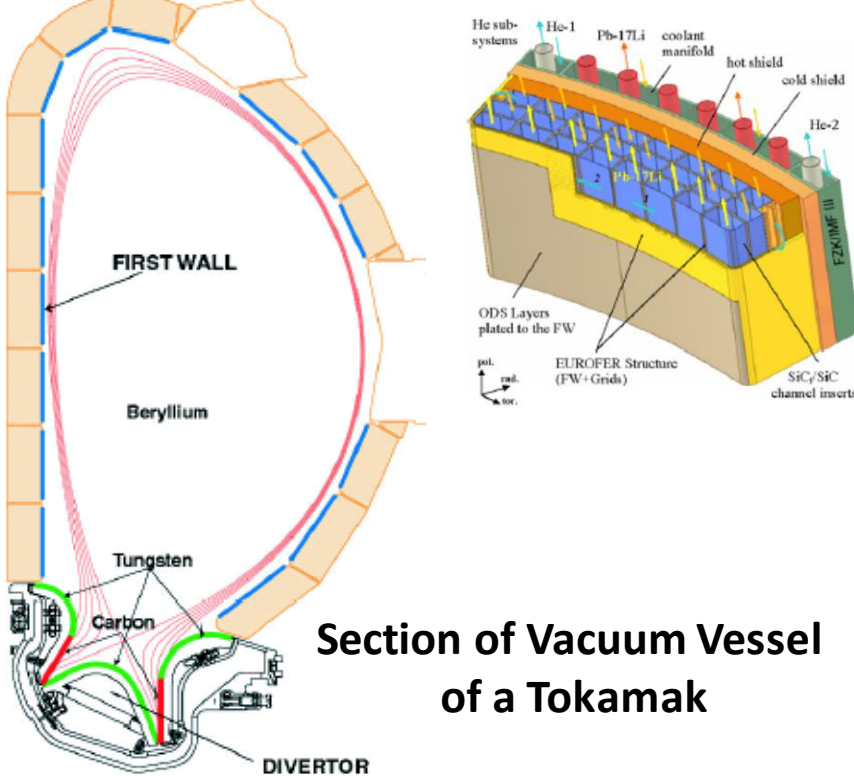


Neutrons in first wall

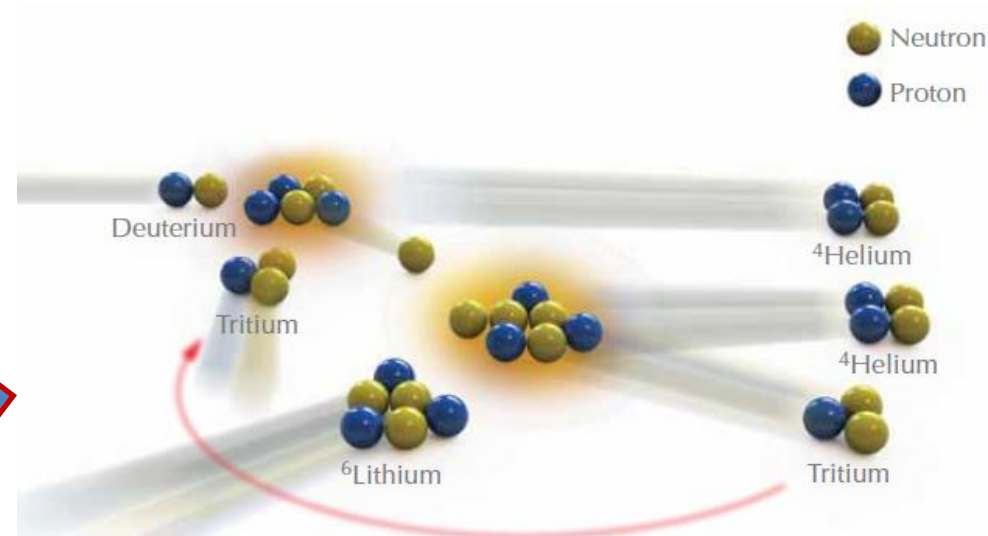
ITER first wall will present <2 dpa at the end of its operational life

In a Fusion power plant ~150 dpa within 5 years are expected

Existing neutron sources do not provide the needed answers

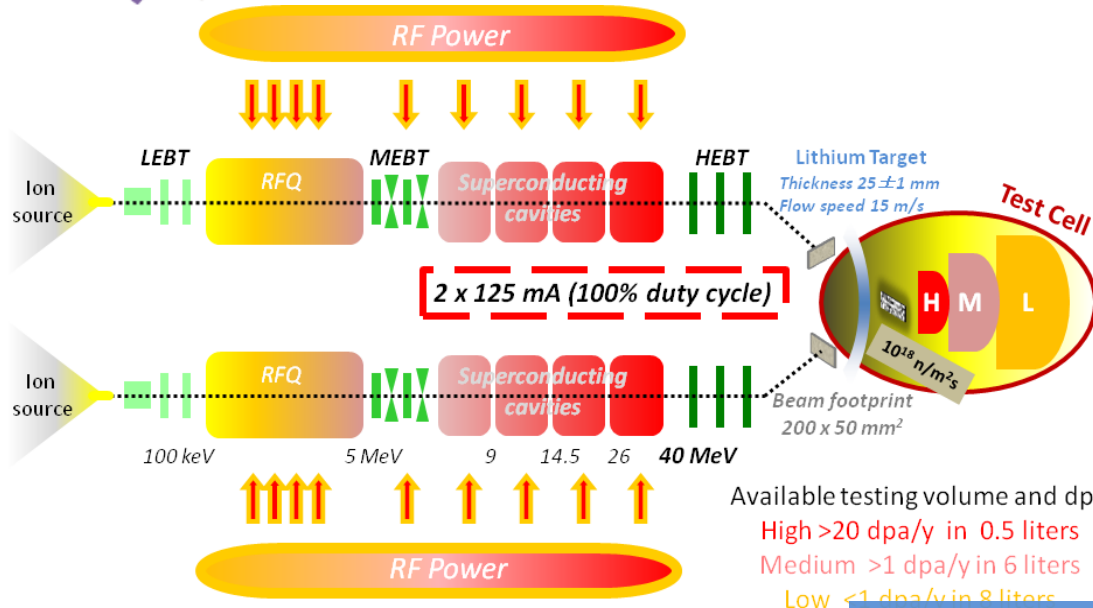


The first wall of the reactor vessel shall absorb neutrons energy and breed tritium





IFMIF concept



Available testing volume and dpa

High >20 dpa/y in 0.5 liters

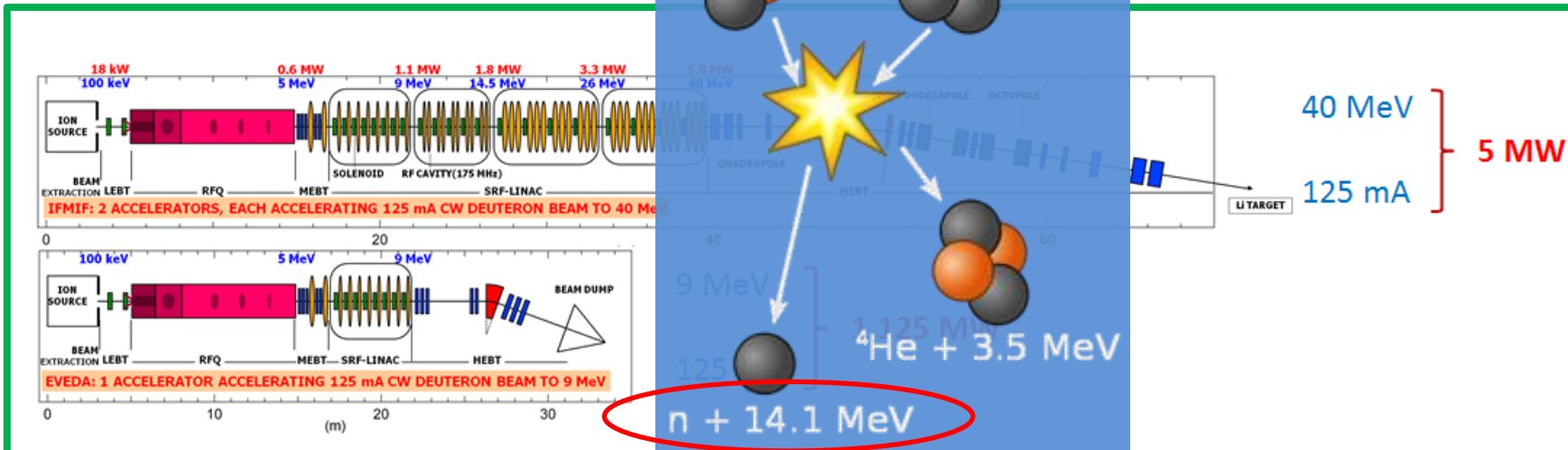
Medium >1 dpa/y in 6 liters

Low <1 dpa/y in 8 liters

Deuterons at 40 MeV
collide on a liquid Li screen
flowing at 15 m/s

A flux of 10^{18} n·m⁻²·s⁻¹
is stripped
with a broad peak
at 14 MeV

EVEDA Phase: LIPAc

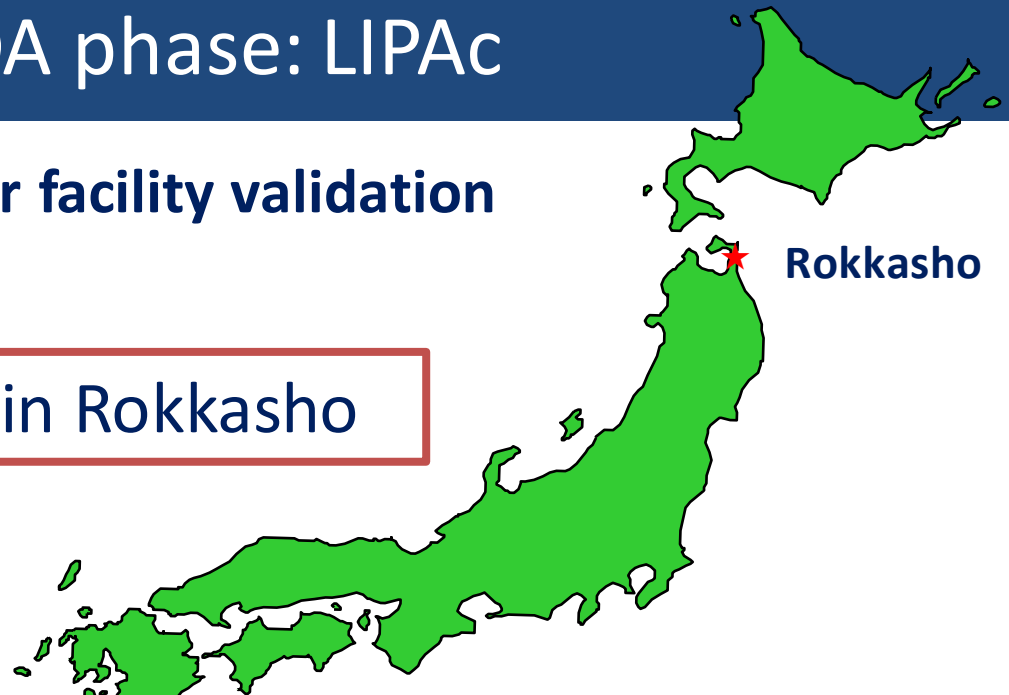




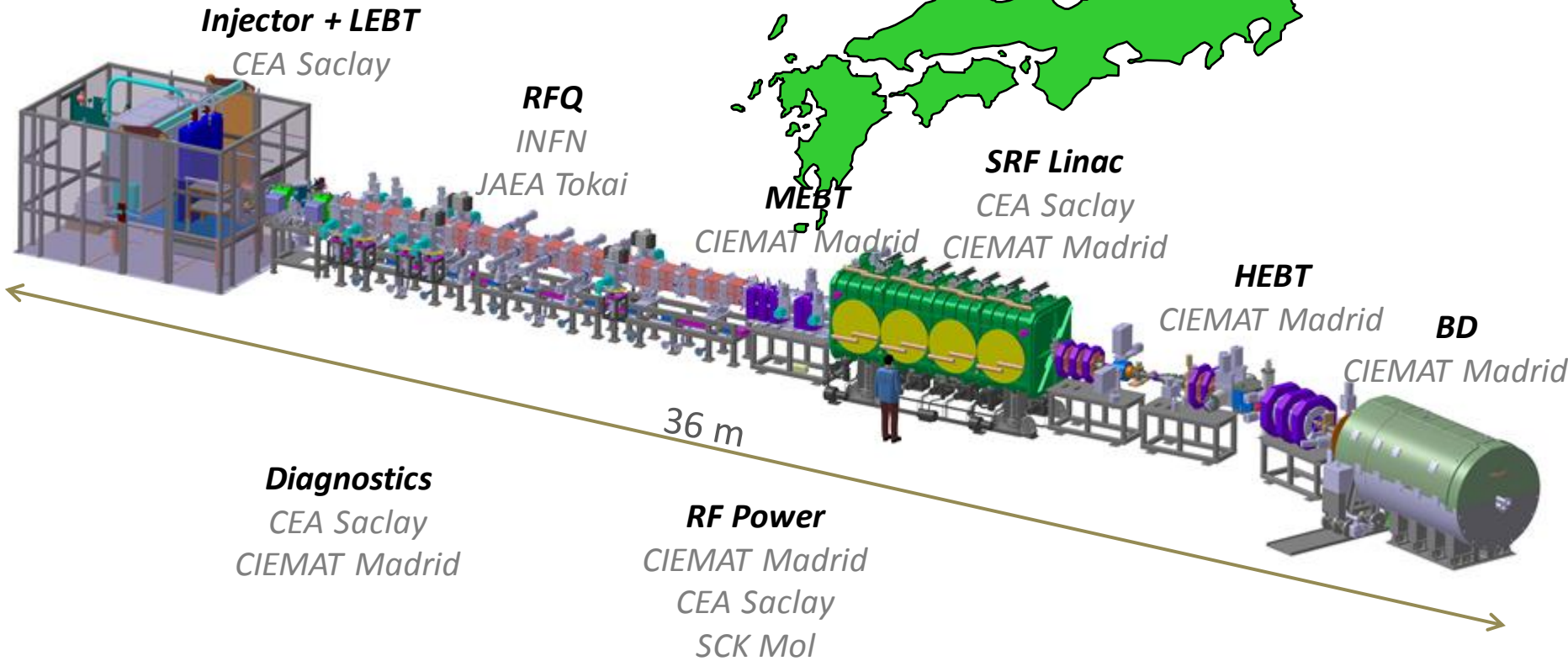
EVEDA phase: LIPAc

Accelerator facility validation

Installed and commissioned in Rokkasho



Rokkasho



IFMIF/EVEDA

A fruitful Japanese- European International collaboration
(under the Broader Approach Agreement)

LIPAc contributions:



Japanese
implementing agency



European
implementing agency

Central systems:

- Network infrastructure
- Central control system
- Machine Protection system
- Personnel Protection system
- Timing system



(European coordinator)



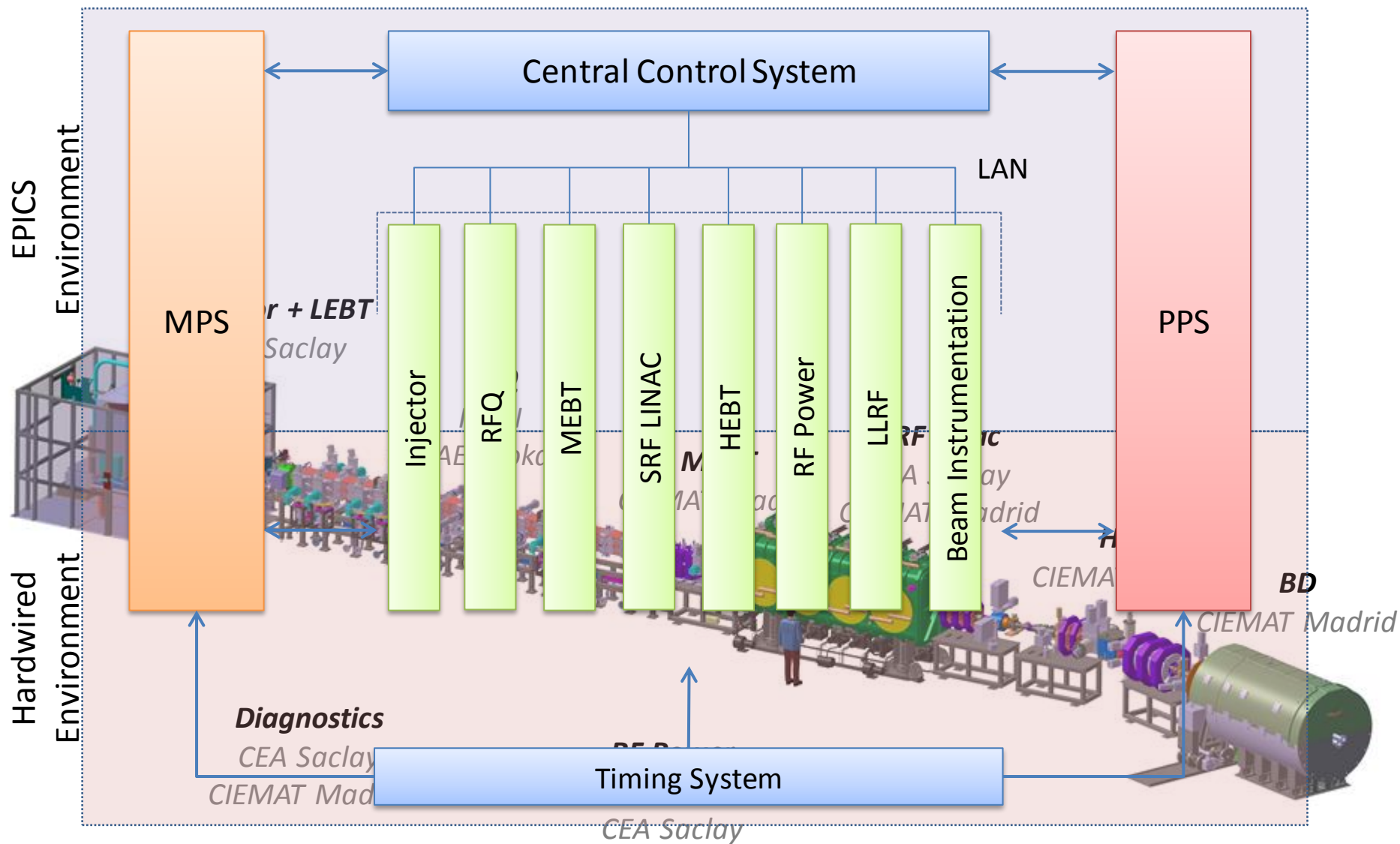
Local control systems:

- Injector + LEBT
- RFQ
- LLRF
- MEBT
- + (...)

Beam Instrumentation



Overview of LIPAc Control Systems



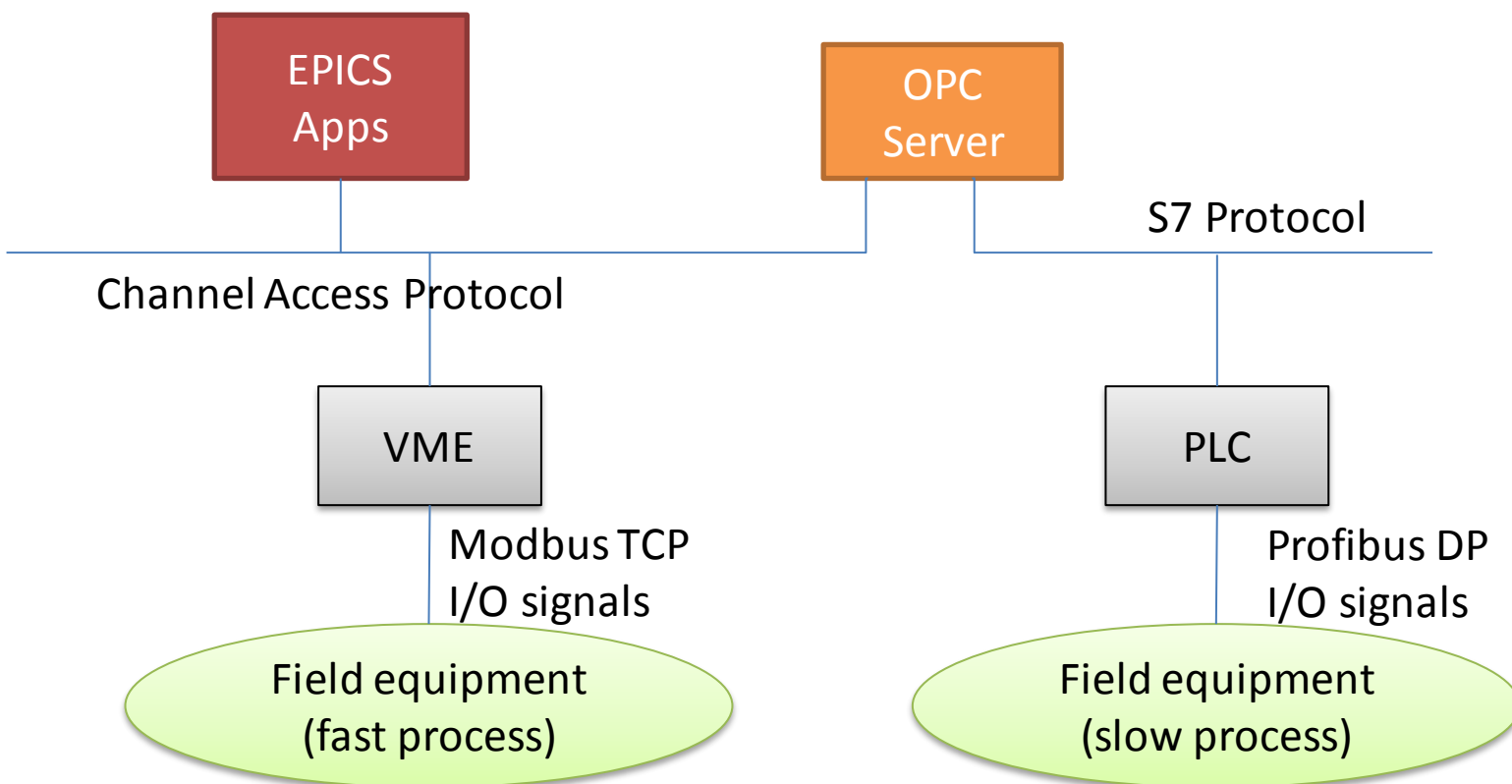


LIPAc Control System: Main characteristics

- Modular design, following the architecture of the whole LIPAc, based on procurement 'in-kind':
 - independent subsystems with common interface.
- Based on EPICS and CSS for software applications (OPI, archiving, alarms...)
 - common standardized EPICS platform
- Around 20.000 process variables managed globally
 - considered medium size facility
- MPS fastest response (beam shutdown, hardwired loop) of around 20us
 - But also has to manage slower PLC signals

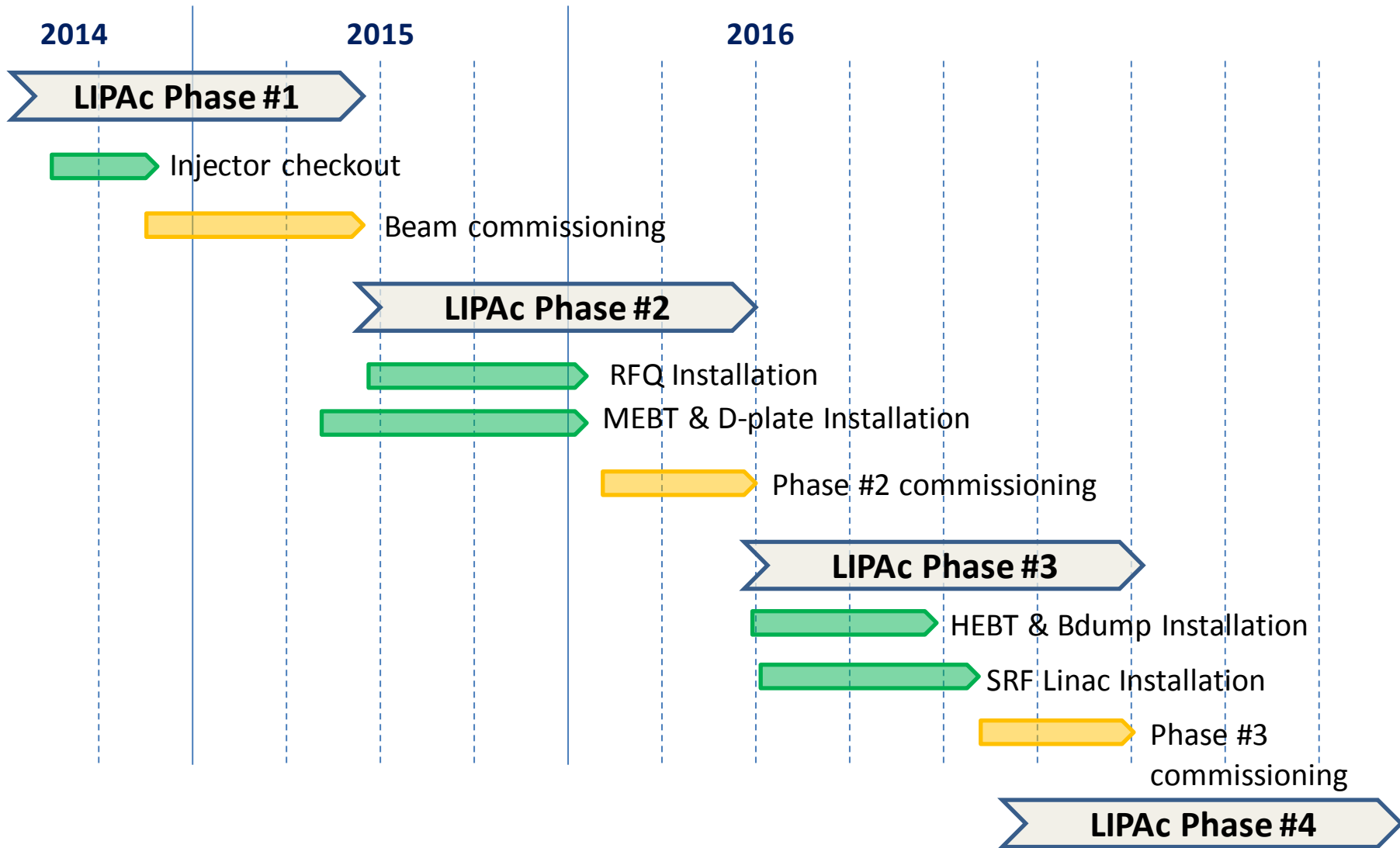
Standard LCS architecture (standalone configuration)

- European contribution, coordinated by CEA
- EPICS standardization through guidelines, common EPICS/CSS platform
- Delivered in local configuration to Rokkasho (to undergo acceptance tests before integration)





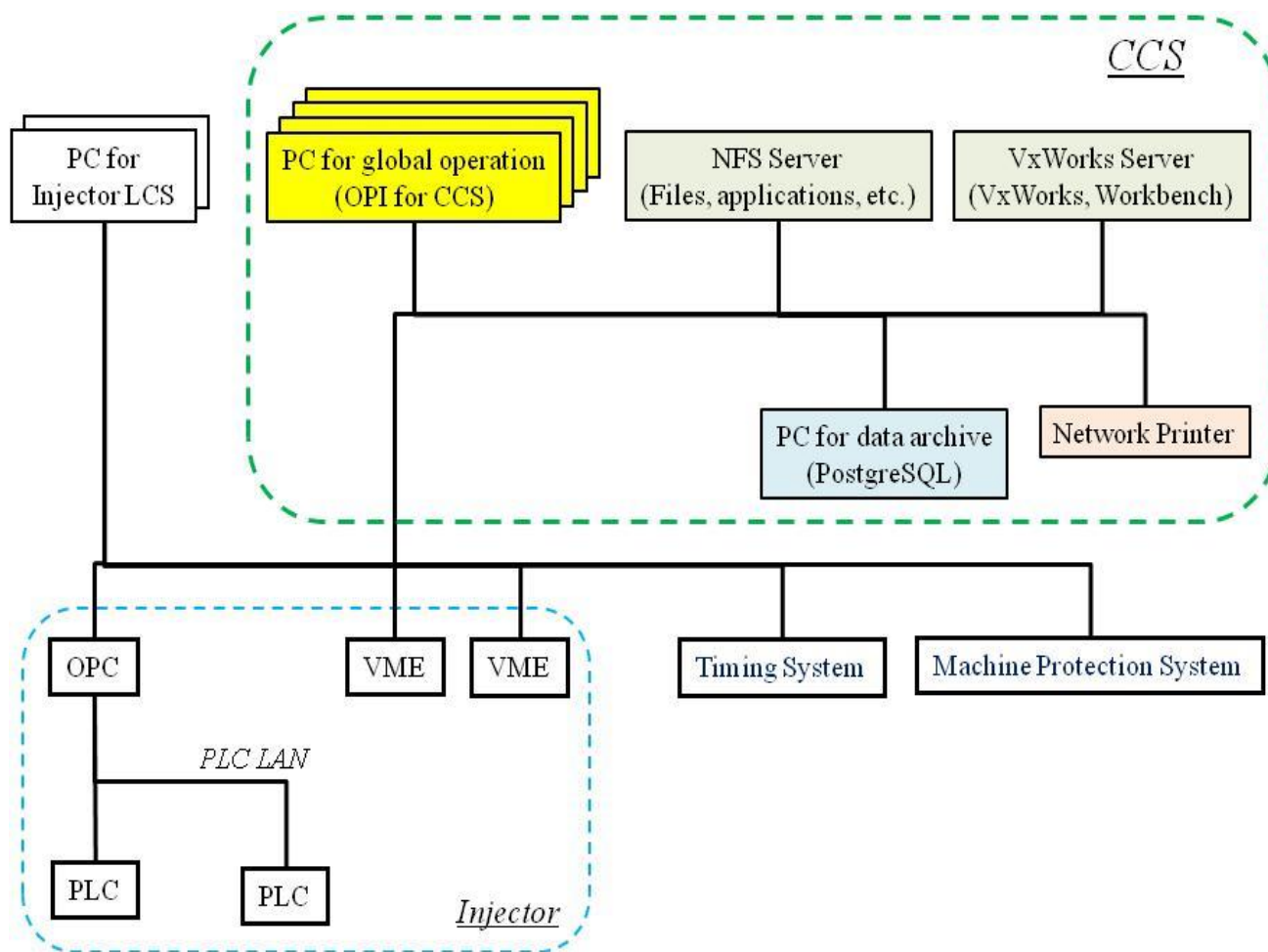
LIPAc Schedule





Overview of LIPAc Control Systems

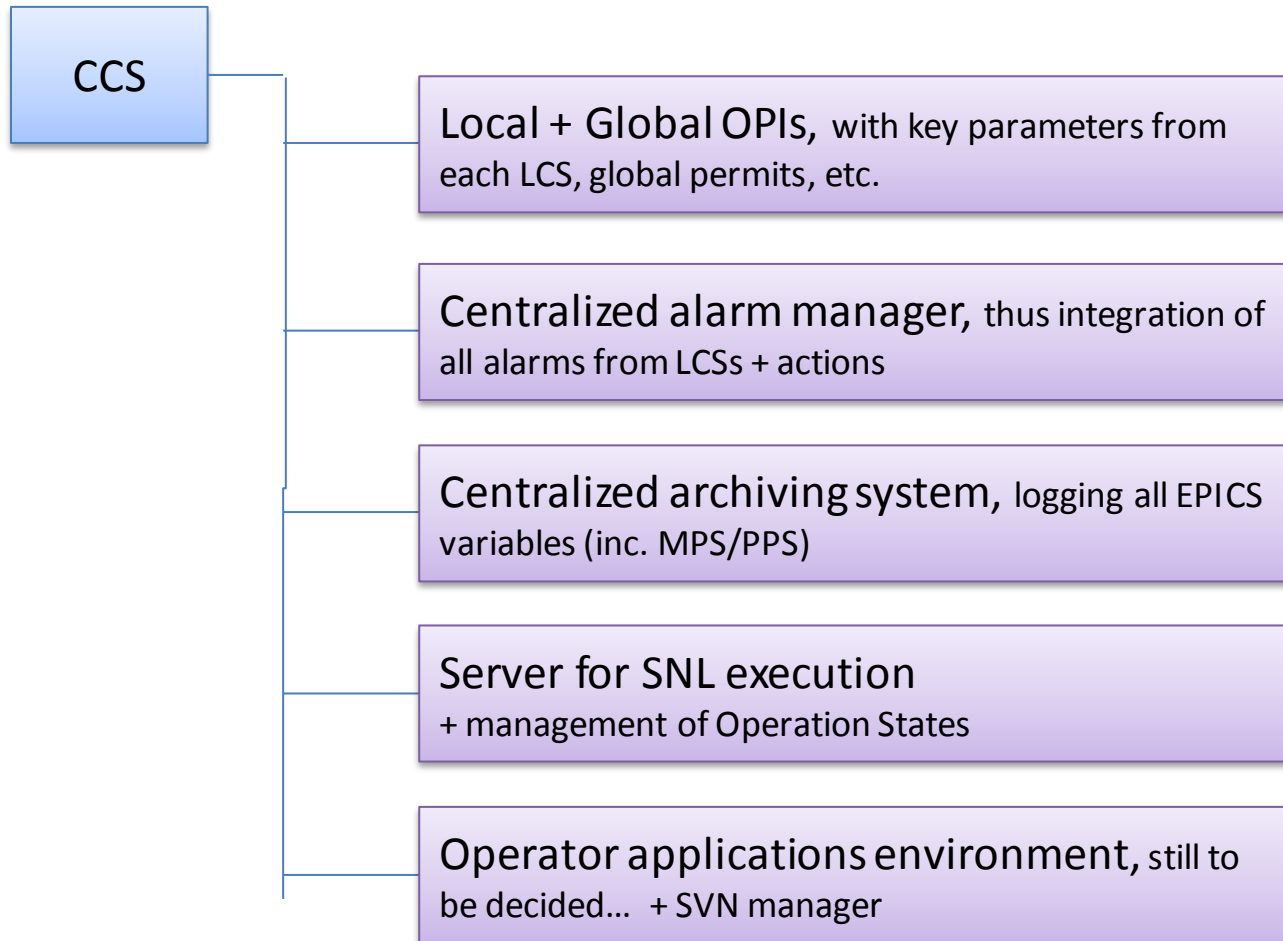
LIPAc Central Control System (Phase I):



Courtesy of:

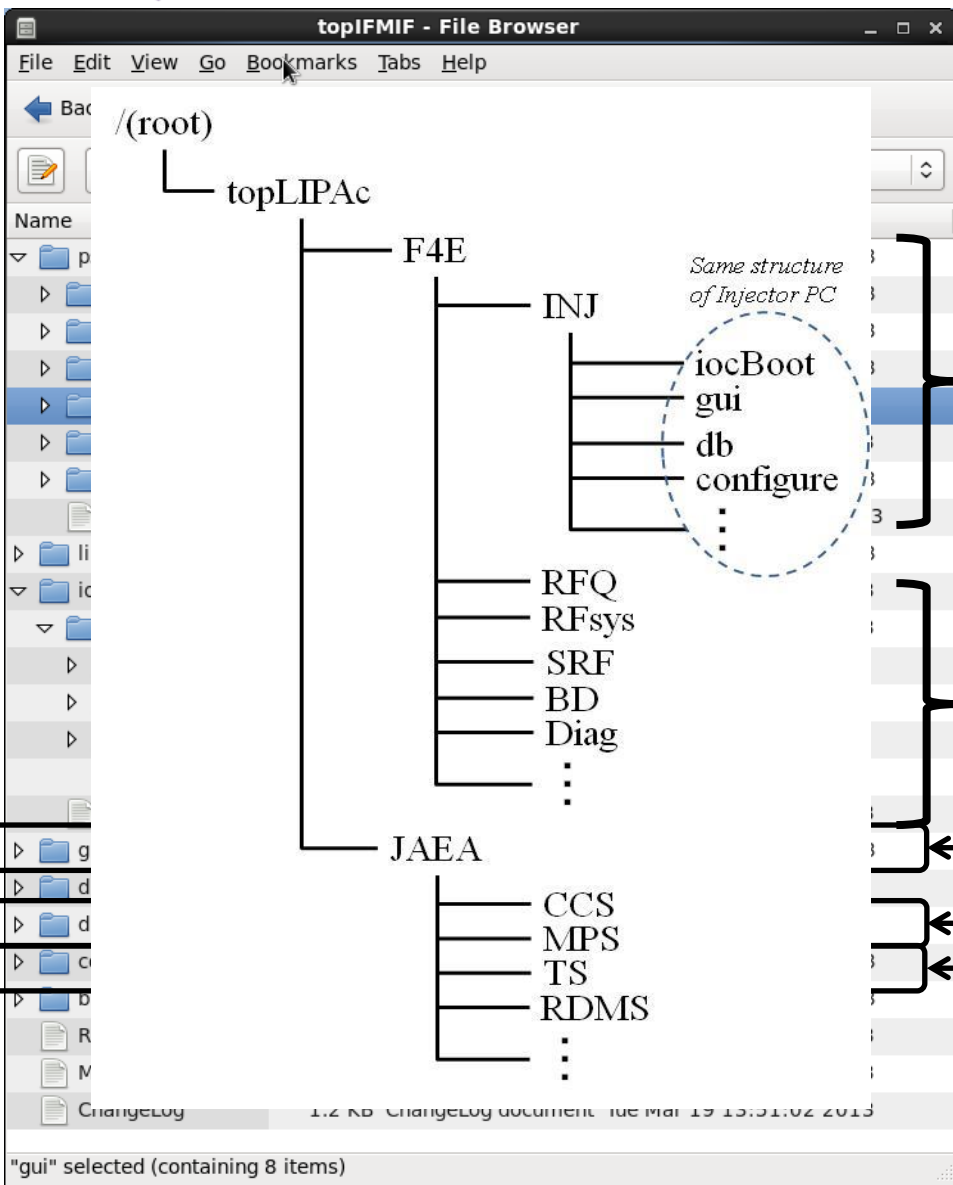


CCS will consist of a number of services...





EPICS integration: topIFMIF tree



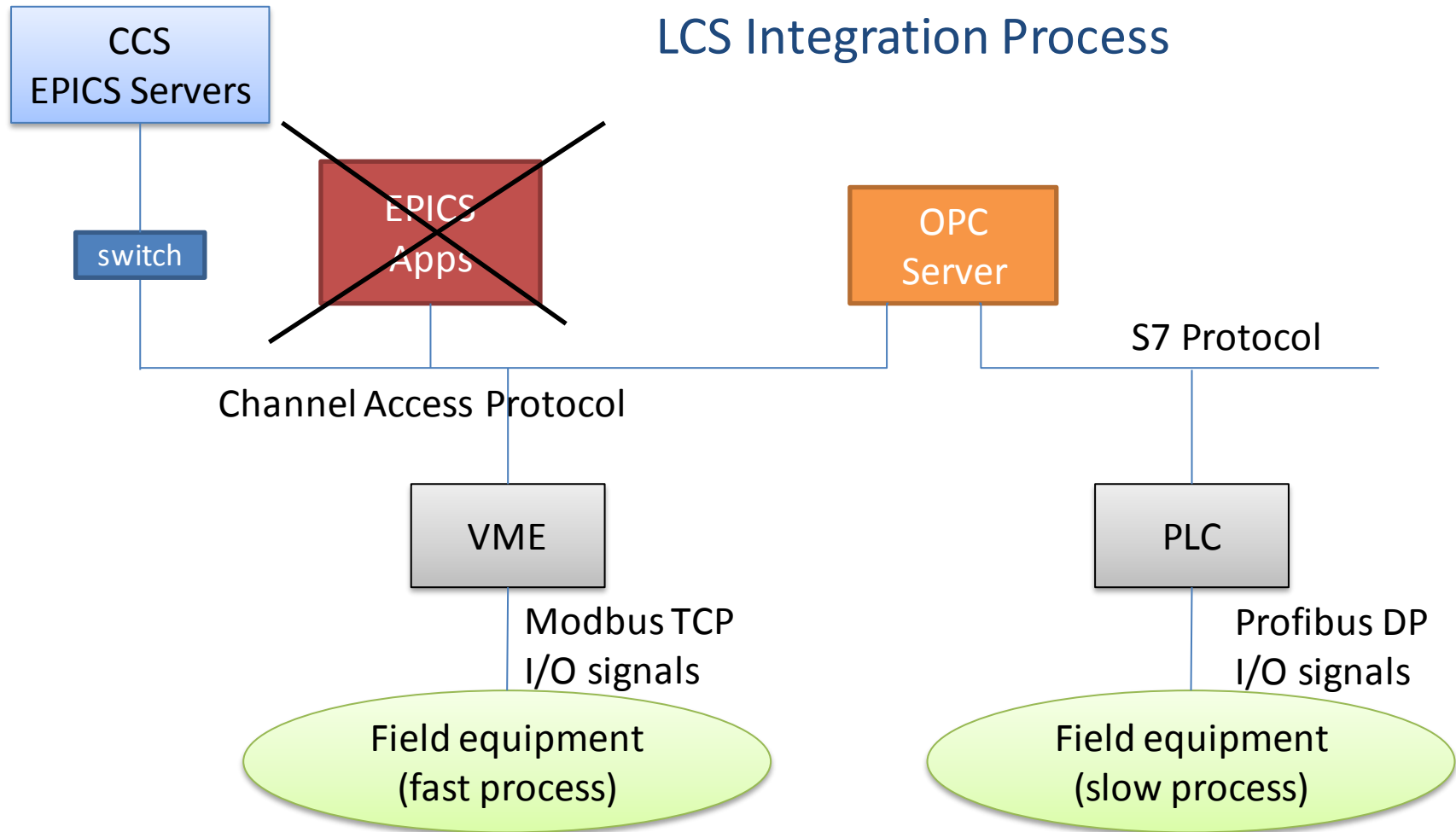
Application tree (Db, Gui, etc...)

IOC tree

All GUIs

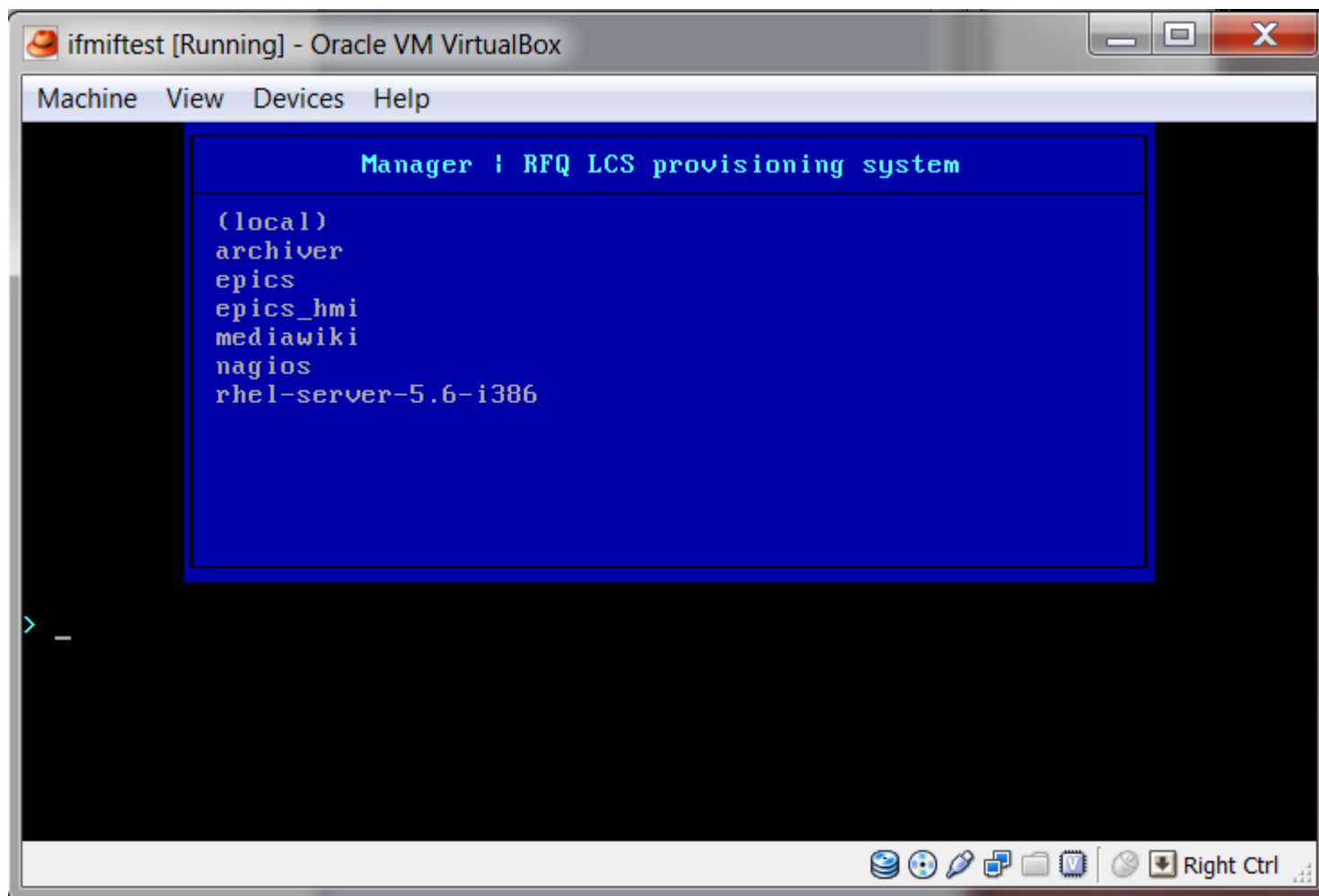
All database files (Db)

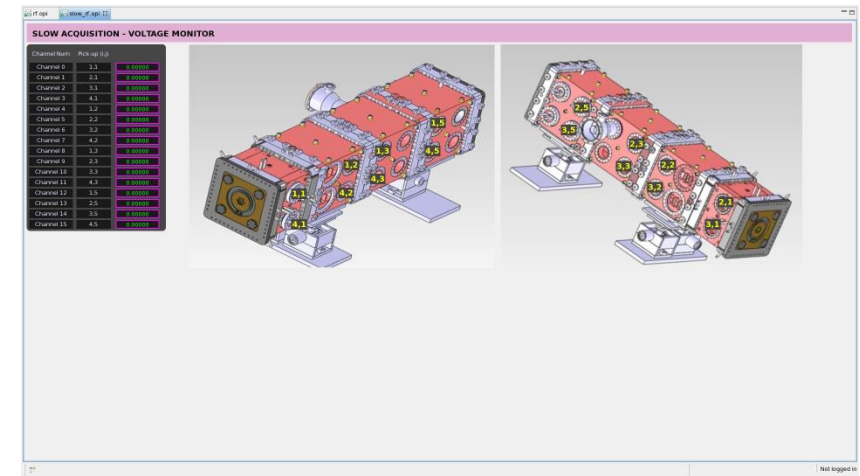
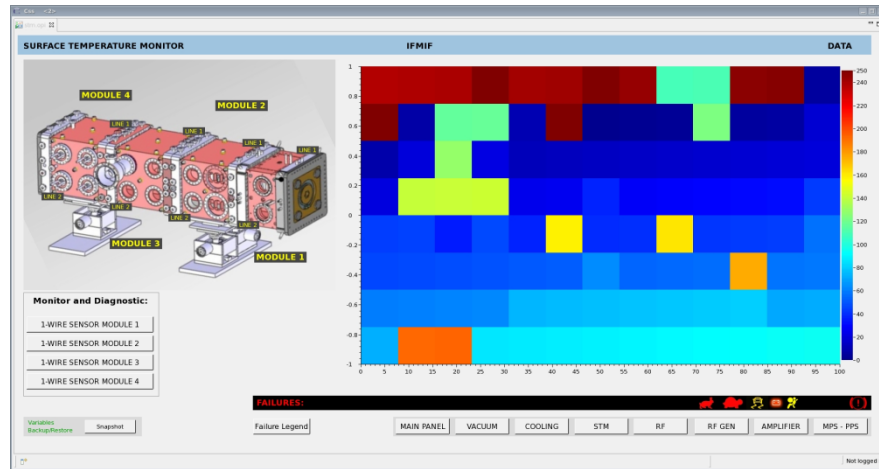
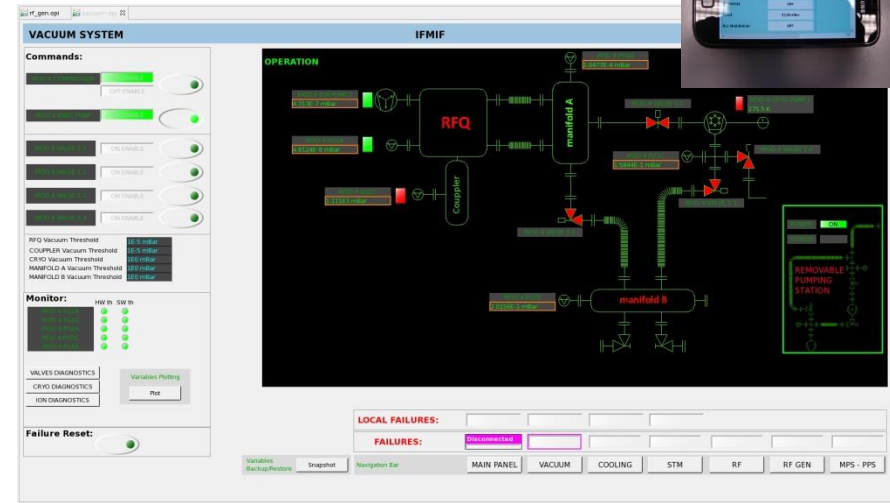
Configuration files of topIFMIF





Service: provisioning system





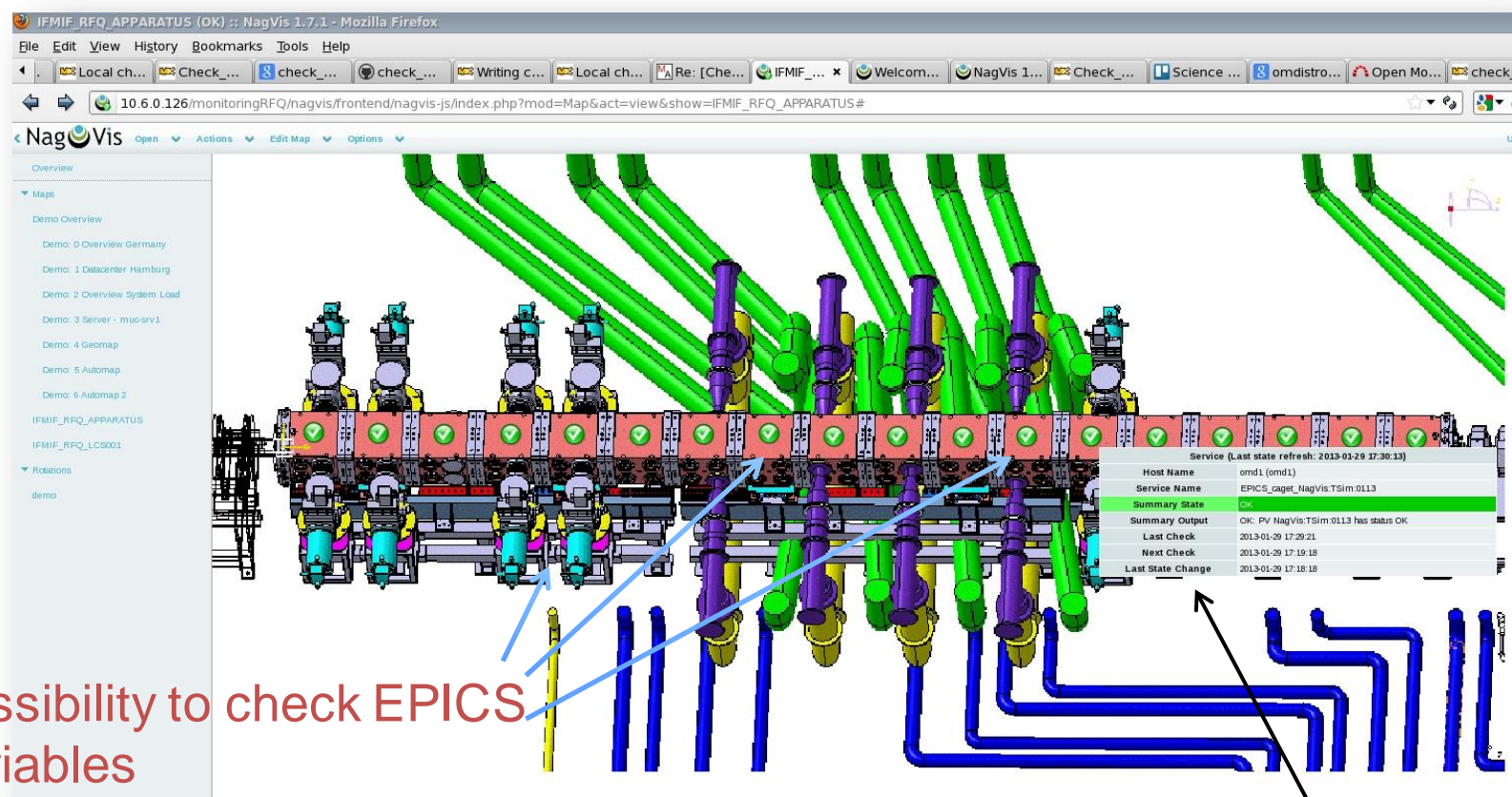


Service: Surveillance

The screenshot shows the NagVis web interface. On the left, a server rack is visible with several green status indicators. The main content area displays a detailed view of a 'Wiki and Subversion Repository Server'. The status is 'DOWN (HARD - SILENT)'. The output shows a critical error: 'CRITICAL - 2013-03-28 16:31:46: Host unreachable @ 10.6.0.126: rta: run, lost 100%'. Below this, a table lists various services and their states:

Service Name	State	Output
Check_mk	CRITICAL	CRIT - Cannot get data from TCP port 10.6.0.33:8556: [20176 113]: No route to host, execution time 3.0 sec
Netool Process Creators	OK	OK - U's in last 59 secs
Netool Major Page Faults	OK	OK - 0's in last 59 secs
LOG /var/log/messages	OK	OK - no error messages
Memory used	OK	OK - 0.96 GB used (0.06 GB RAM + 0.08 GB SWAP) this is 12.0% of 8.49 GB RAM
Netool Context Switches	OK	OK - 27's in last 59 secs
Interface 2	OK	OK - (up) 100MB/s, in: 142.8KB/s(0.0%), out: 233.128KB/s(0%)
CPU load	OK	OK - 15min load 0.00 at 1 CPUs
CPU Utilization	OK	OK - user: 0.1%, system: 0.1%, wait: 0.0%
Disk IO SUMMARY	OK	OK - 0.000/sec read, 13.83KB/sec write, IOs: 10.07/sec, Latency: 0.94ms





■ Possibility to check EPICS Variables

Detailed Information

Special thanks to Mauro Giacchini and his team...

Thank you for your attention

www.ifmif.org

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