Laser Megajoule Facility (L.M.J.)
Control system status report

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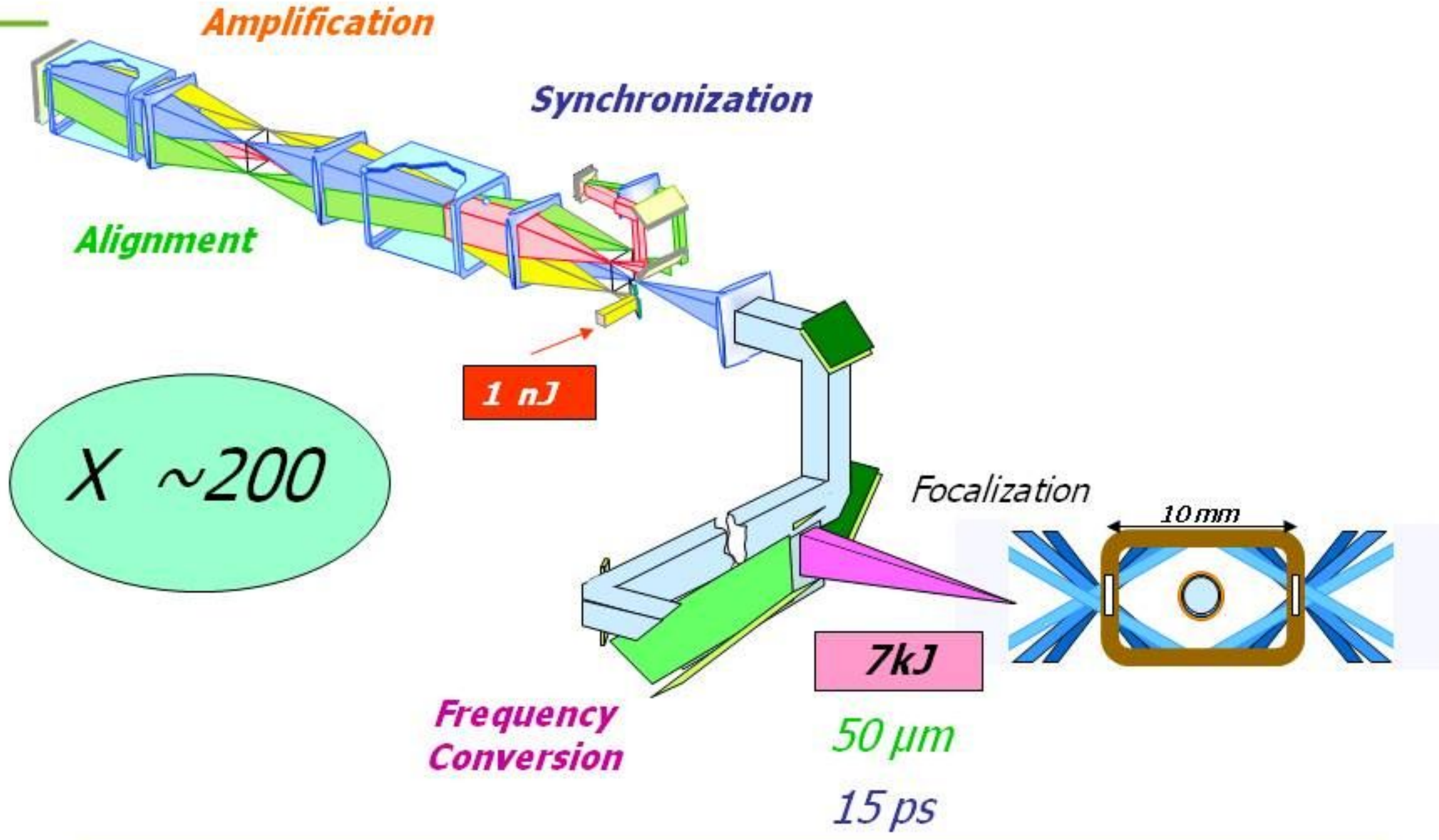
Presentation overview

- Laser Megajoule (L.M.J.) facility
- Laser Integration Line (L.I.L.) prototype
- Control system architecture and industrial policy
- Common components software framework
- High level supervisory software
- Control system road map

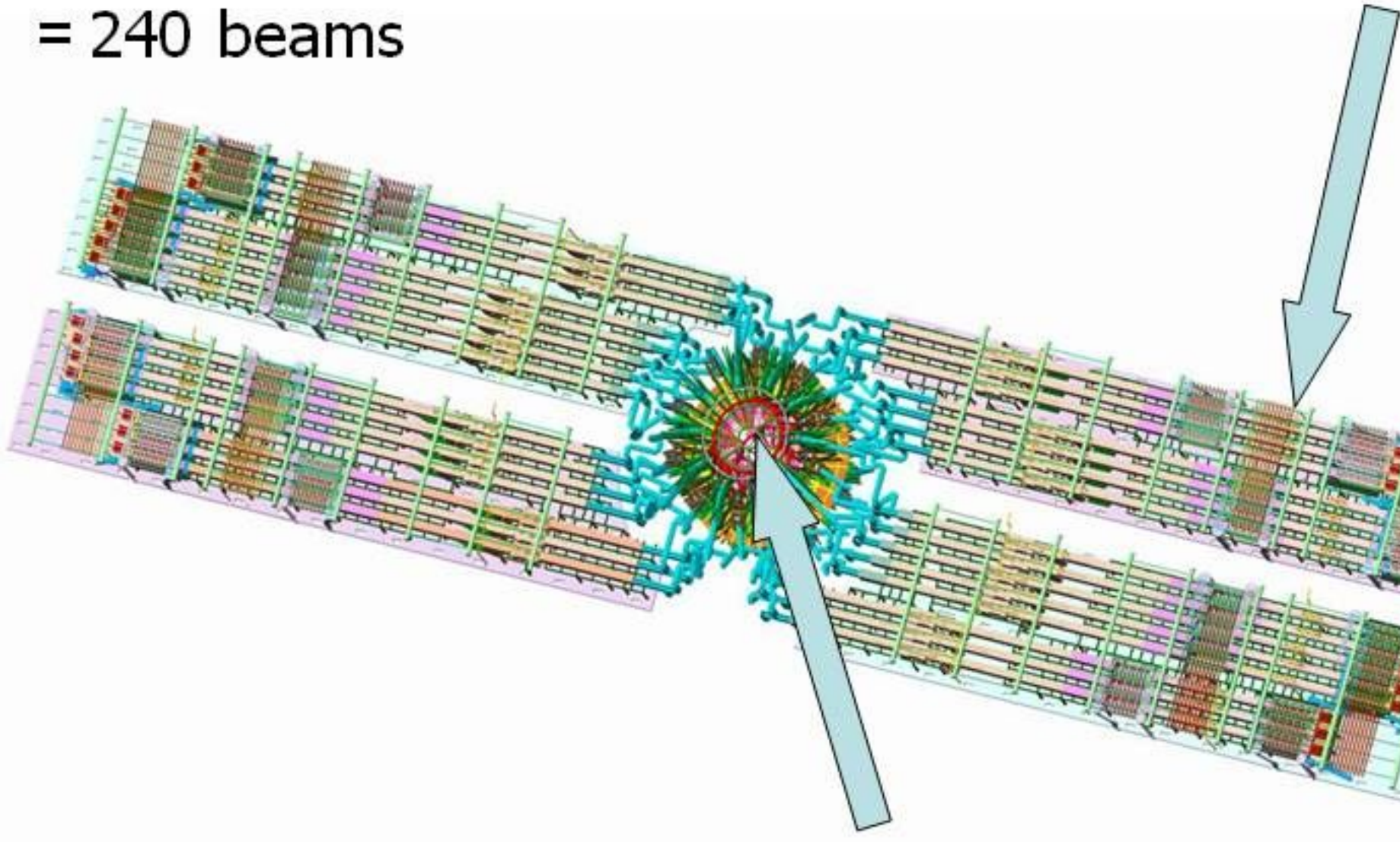
LMJ facility overview

LMJ is designed to deliver about 2 MJ of energy on tiny targets for high density plasma physics and fusion experiments



LMJ facility overview

Up to 30 bundles of 8 beams located in 4 bays
= 240 beams



More than 1 MJ of 350 nm UV light on a target

LMJ building

First laser bay, 5 bundles completed

Second laser bay, assembly of bundles is ongoing

Third laser bay

Target bay

LIL facility = LMJ prototype

- LIL was commissioned in March 2002

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LMJ Control system functionalities

a function
=
a subsystem

Shot Director

Maintenance Management System

Power Conditioning Control

Laser Parameters Settings

Laser Diagnostics Acquisition

Laser Alignment

Vacuum Control

Target Alignment

Target Diagnostics Acquisition

Personnel Safety

CAPACITOR BANK

PULSE GENERATION

AMPLIFIER

EXPERIMENT

LMJ BUILDING

Access Control

Building monitoring

TIMING

Shot Data Processing

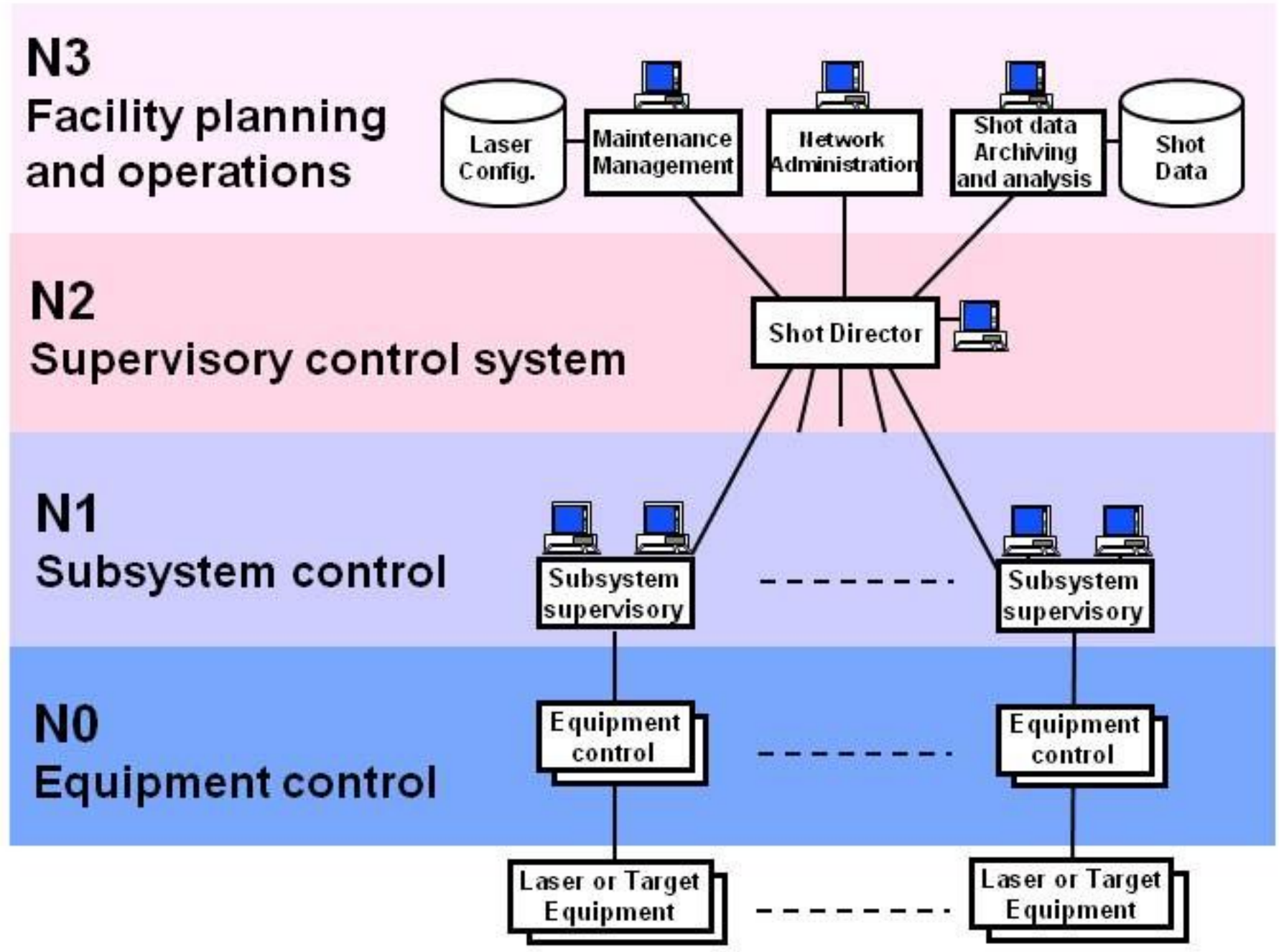
LMJ control system architecture

Control Points
500 000

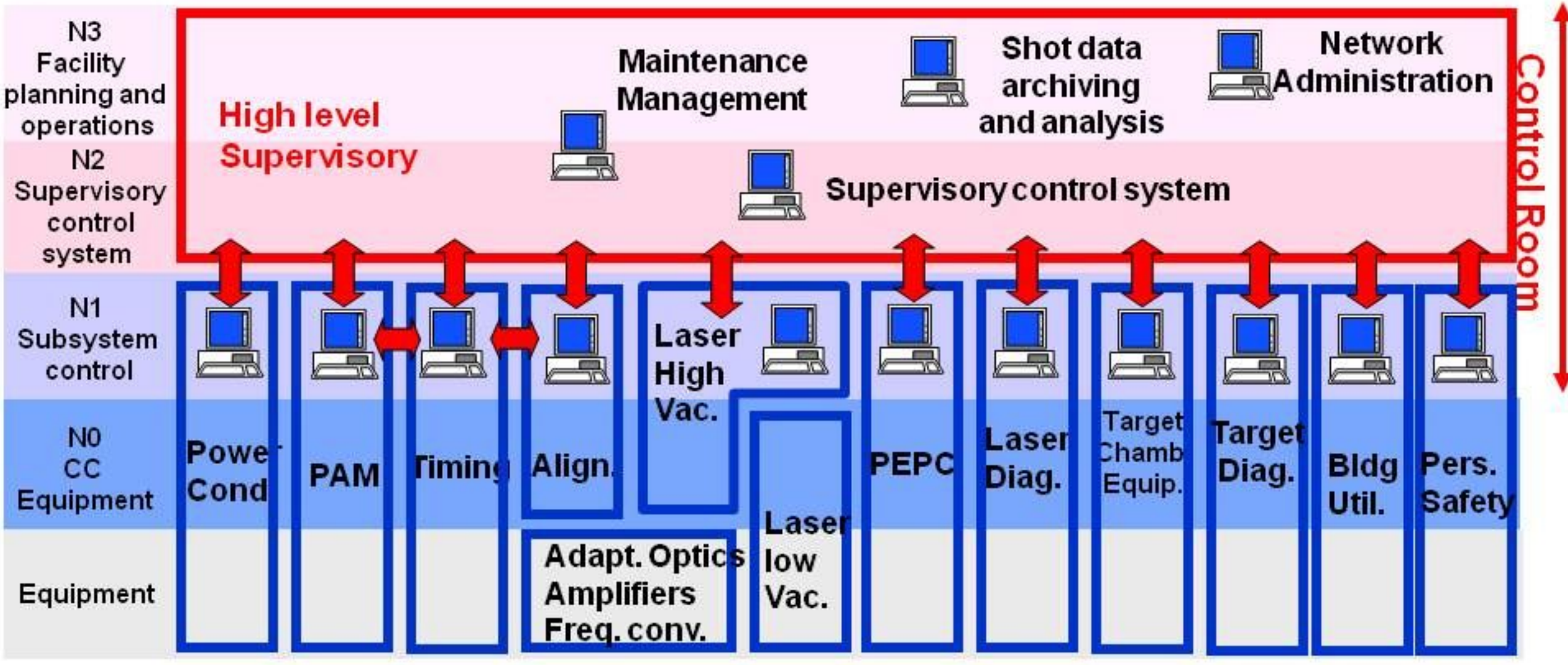
Alarms
100 000

Processors
500

Shot data
~1 GB / shot
2 years on line

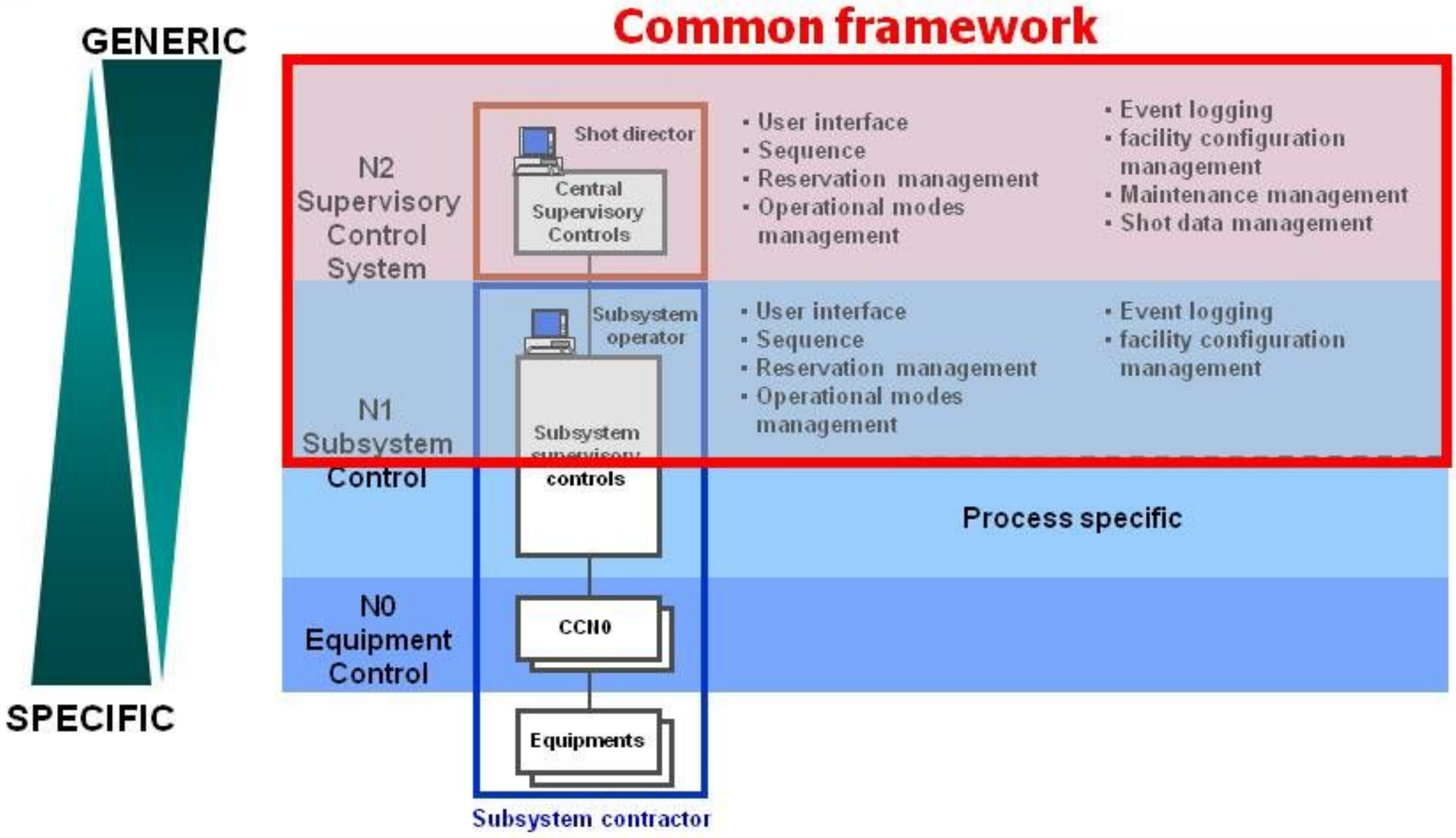


LMJ industrial policy



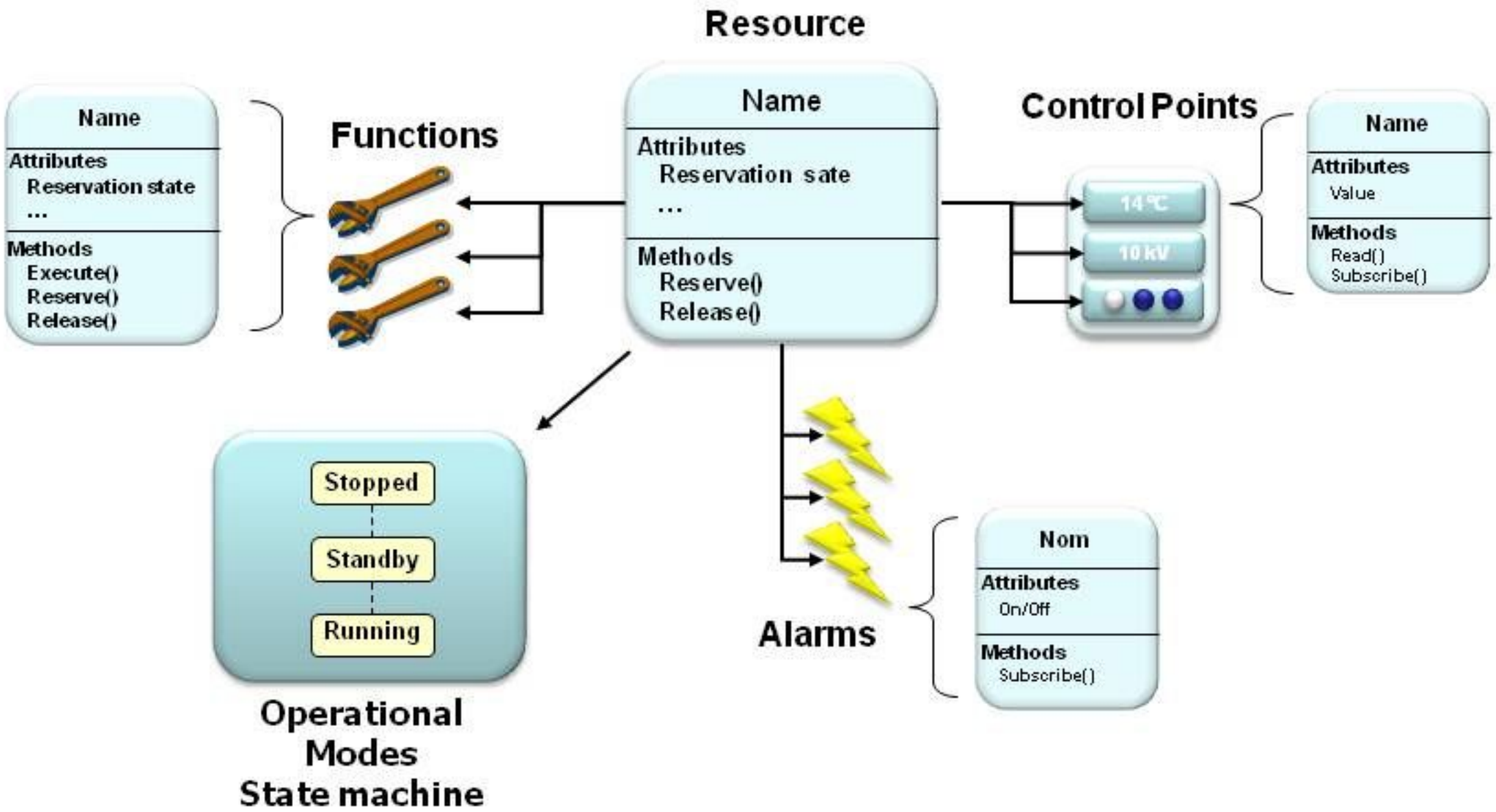
General framework

During the N2-N3 conception phase we have identified common functional components with N1 level



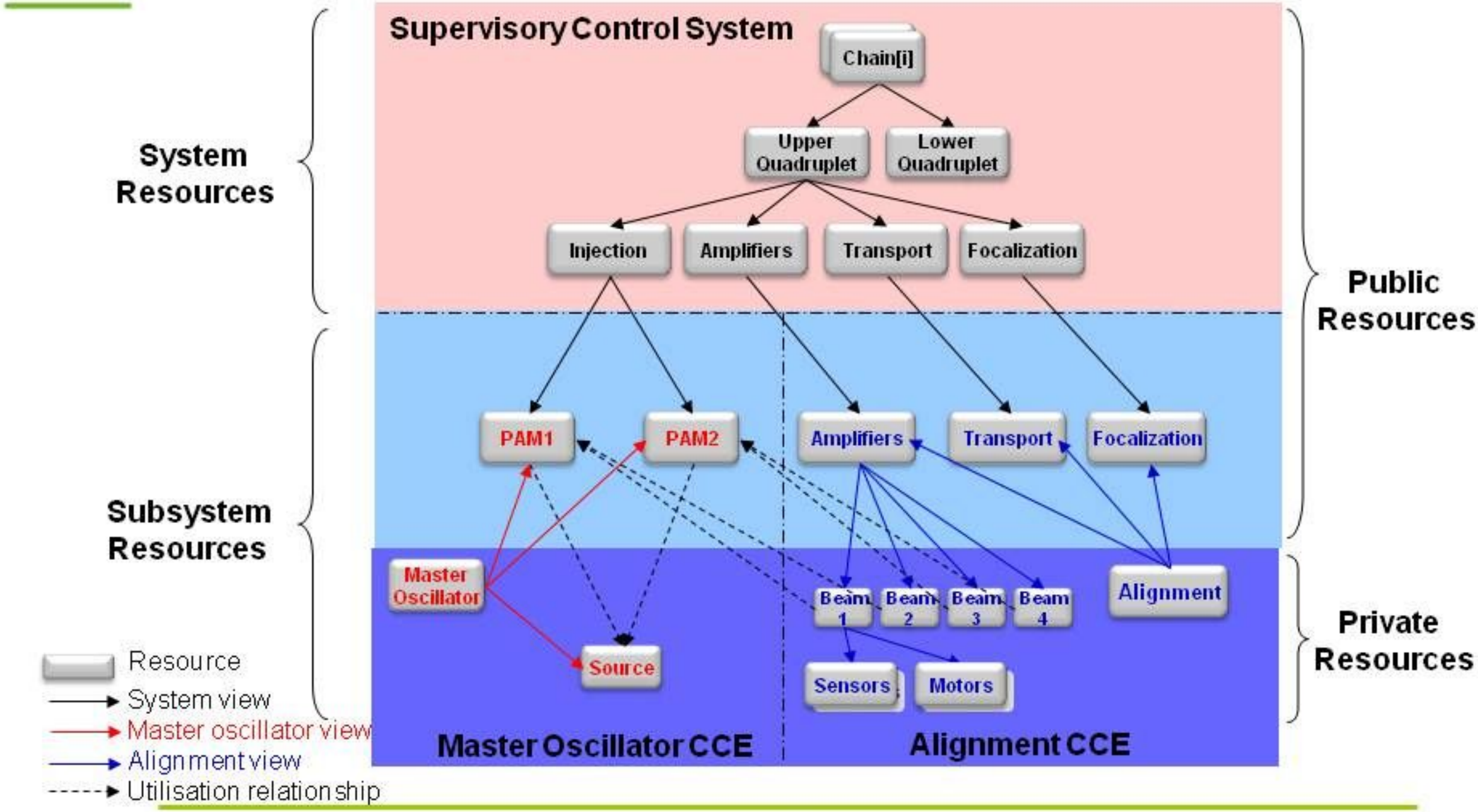
General framework data model

Resources



General framework data model

Functional trees



General framework common components

Supervisory Control Contractors Developments

Maintenance Management

Facility Configuration Management

Shot director

PANORAMA Application

Séquences Management

Resources Management

Shot database

Event Logging

Fully Standardized External Interface Protocol (PIE)

Subsystem Configuration Management

Subsystem Operator

PANORAMA Application

Resources Management

Séquences Management

Process Specific

N0: Equipment Controls

Event Logging

Subsystem Contractor Developments

Equipments

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Process specific

N0: Equipment Controls

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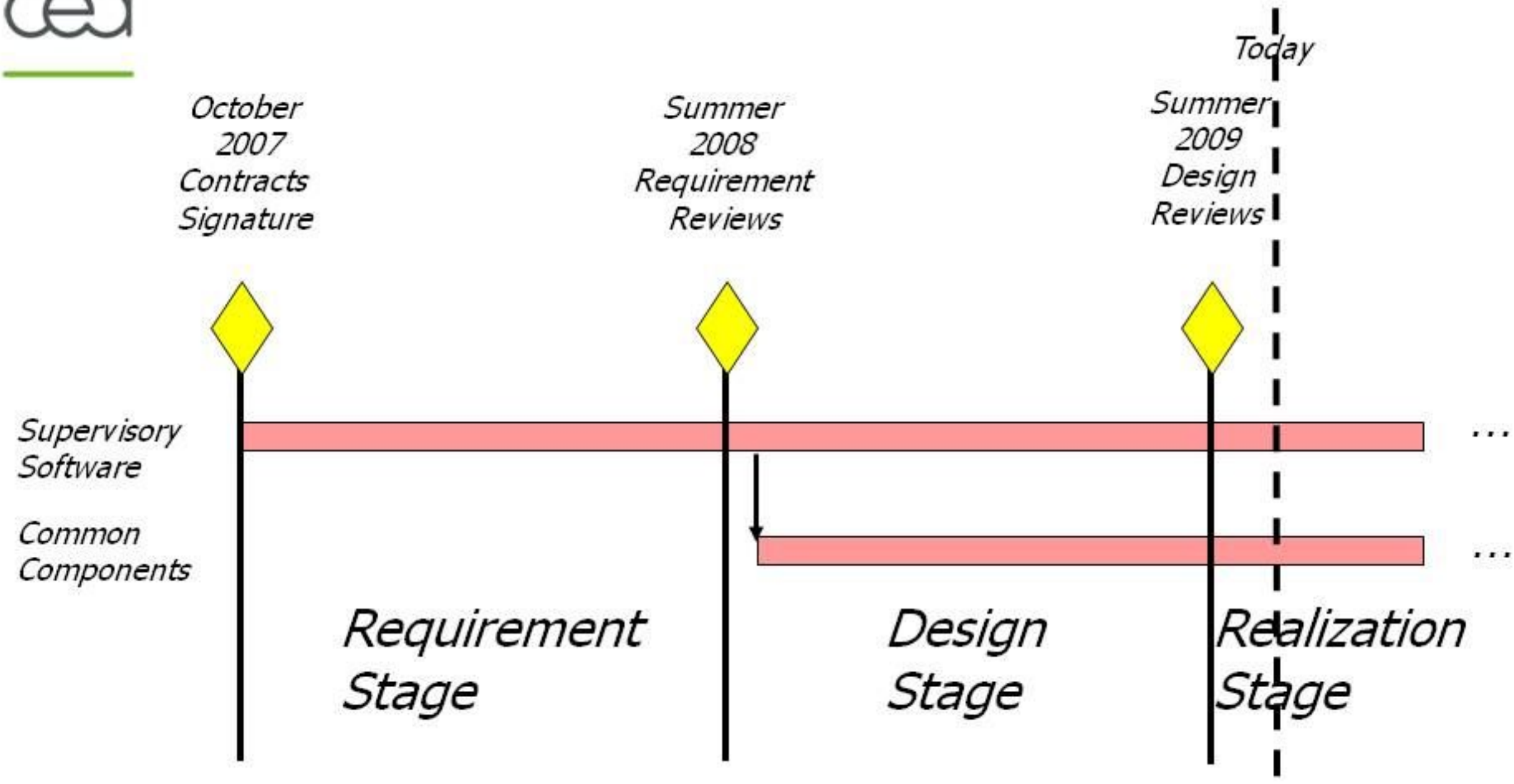
Equipments

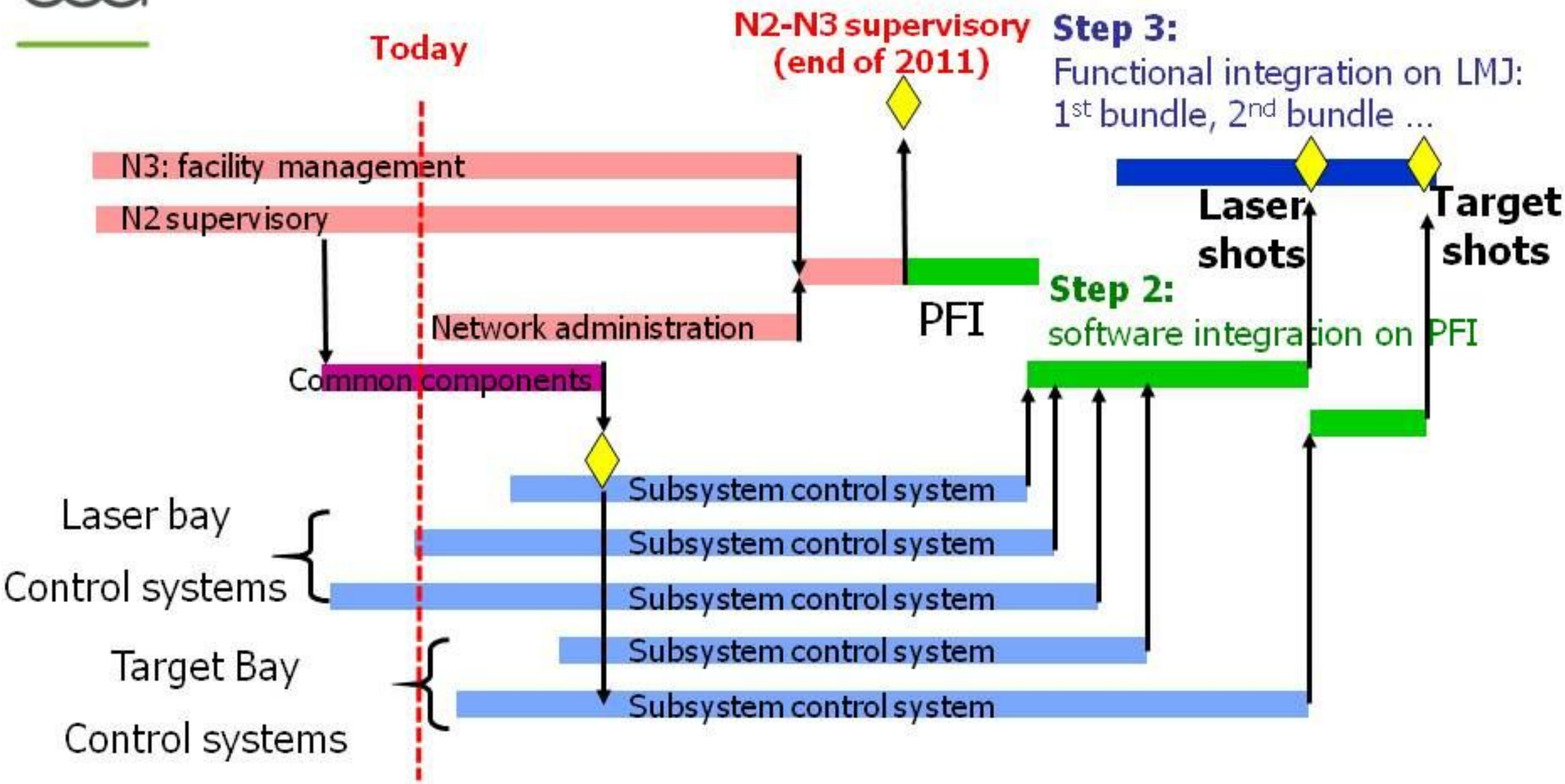
Supervisory software technical choices

- SCADA: Panorama E^2 from CODRA
- Specific developments: .Net
- Database: Oracle 10g, N-Hybernate
- Shot data storage: XML and HDF5
- CMMS: D7i product from Datastream

Supervisory software status



LMJ control system road map



Any questions?