

# AREAL Control System (Current Status)

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# 1. Introduction

- Control system overview
  - Control system architecture
  - AREAL subsystems control
    - Vacuum and Cooling Systems
    - RF System
    - Diagnostics
    - Laser system
  - Operator applications
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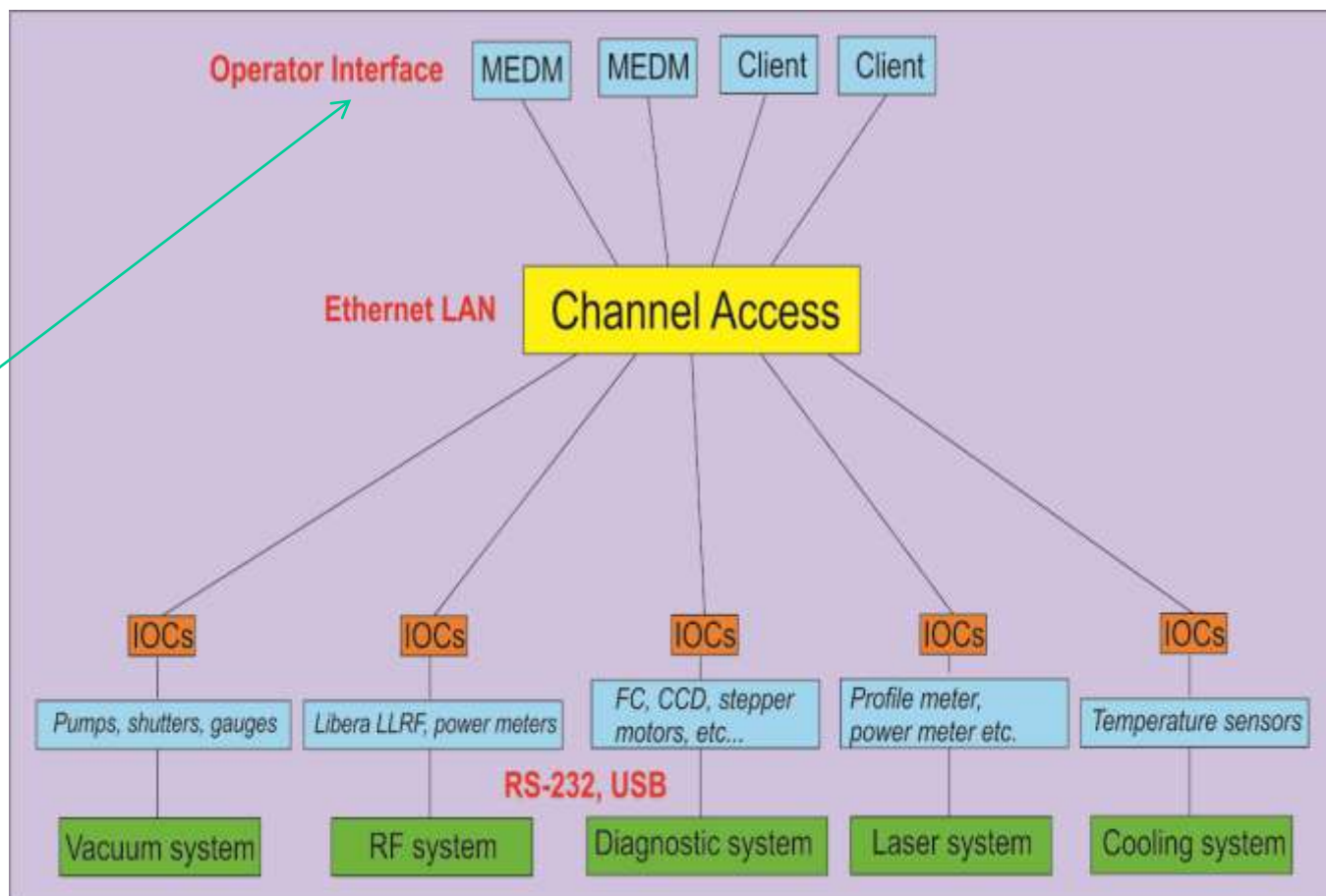


# Control system architecture overview

Linux and EPICS are selected as the primary platform for the control and data acquisition system in AREAL.

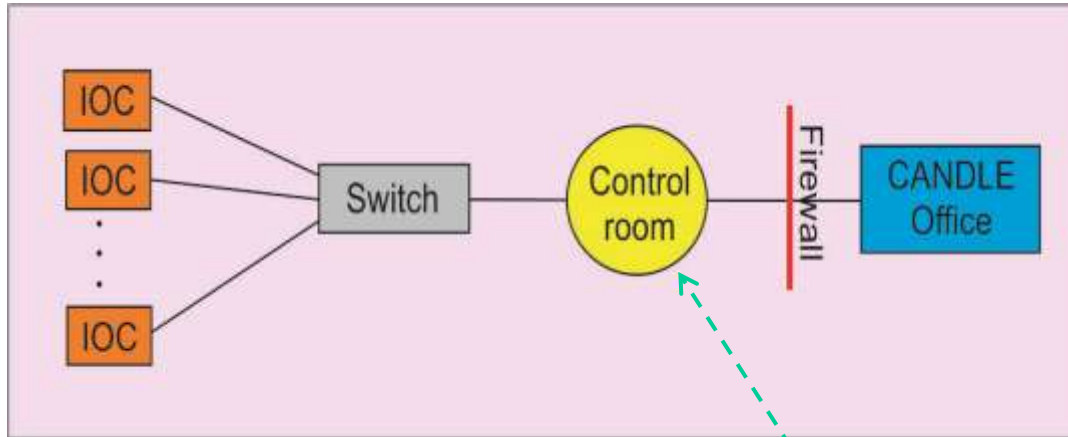
## EPICS extensions

- MEDM
- Channel Archiver
- Alarm Handler
- Channel Access client library for Matlab





## Control system architecture



Local Area Network (LAN) will be used at the AREAL running on a common hardware layer. The network infrastructure will be between the IOCs, operator interface and office Network.

*The control room will be the central location from where programs, mostly for commissioning, are run.*

- **MEDM and MCA** – to display and/or change the values of EPICS process variables,
- **ALH** - to display and monitor EPICS database alarm states
- **Channel Archiver** – to store information about linac operation

## 1. Vacuum System

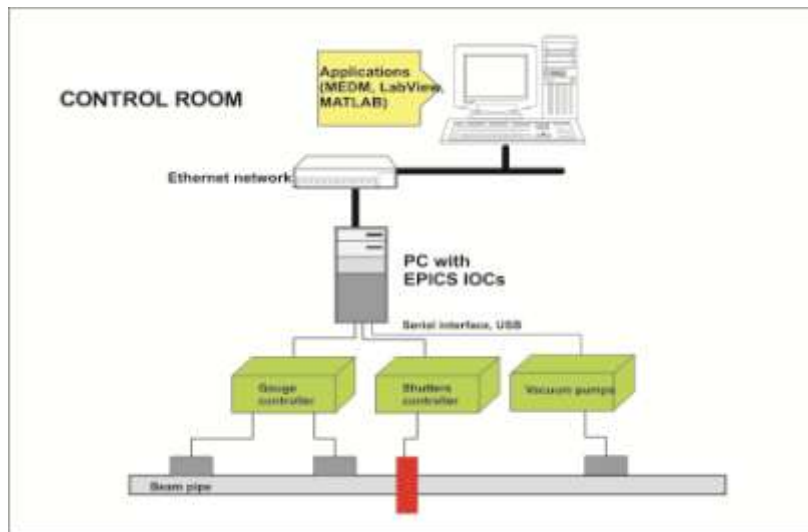
Gauge controller, Vacuum pumps,  
Shutter controllers

**RS-232, USB**

## Cooling System

Temperature sensors

**RS-232**



**LLRF** – LIBERA LLRF controller

## 2. RF System

*The RF control system will provide remote control for all RF components, to enable the change of the necessary parameters such as waveguide tuners, phase shifters, etc.*

### 3. Diagnostics

- Two Faraday cups,
- Two YAG screens (CCD, pneumatic motors)
- Pepper-pot (CCD, stepper motor)

**CCD** - will be interfaced to EPICS via the PC/Linux servers

**Pneumatic/stepper motors**- custom made controllers



**NI PXI-5152 digitizer**



**Control electronics**

### 4. Laser System

The following parameters must be monitored and controlled

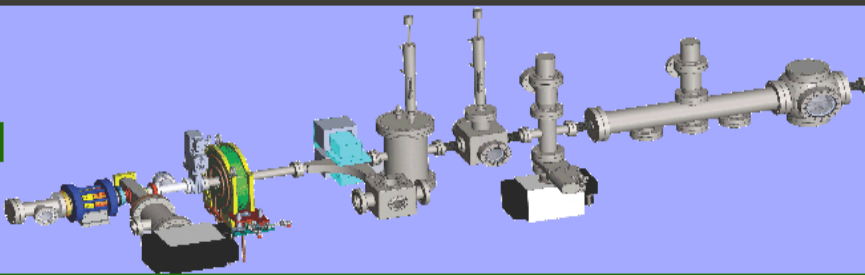
- the currents to the laser diodes, laser diode temperature, internal humidity rate, repetition rate adjustment, oscillator status, shutter status, the safety interlocks, etc..

**RS-232**



# Operator console layout

AREAL Control



Beam main parameters

Energy	0.00	MeV
Beam charge	0.00	pC
Emittance	0.00	mm-mrad
Beam size(trv.)	0.00	mm

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### Vacuum & Cooling

Pumps

ION1  Off  On  Torr

ION2  Off  On  Torr

Gauges

HFIG1  Torr

HFIG2  Torr

IMG1  Torr

IMG2  Torr

Shutters

S1  Off  On

S2  Off  On

S3  Off  On

Cooling

T1  C

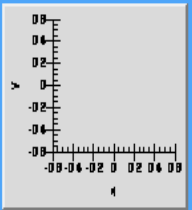
T2  C

T3  C

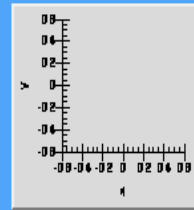
### RF System

HV

MOD1

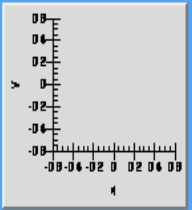


MOD2

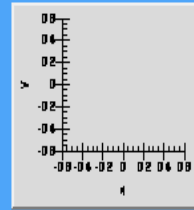


Power meter

Forward



Reflected



LLRF

### Diagnostic System

Beam charge


FC1  pC

FC2  pC

FC2 mover  OUT  IN

Beam profile


YAG1



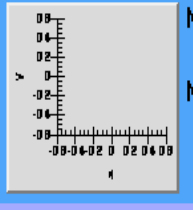
YAG1 mover  OUT  IN

YAG2 mover  OUT  IN

YAG2



Pepper-pot



Motor1: CCD position

Motor2: Grid position

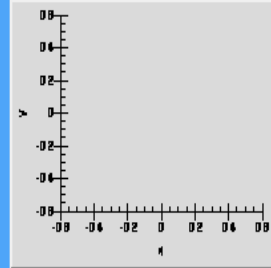
Mirror  OUT  IN

### Laser System

Laser  Off  On

Beam energy  mJ

Beam view



Hor. position | Ver. position

Details