



# **GUIs at ALBA Synchrotron Light Source**

Guifré Cuní  
on behalf of ALBA Controls Section

14-15/03/2023

Taurus Workshop; ESRF

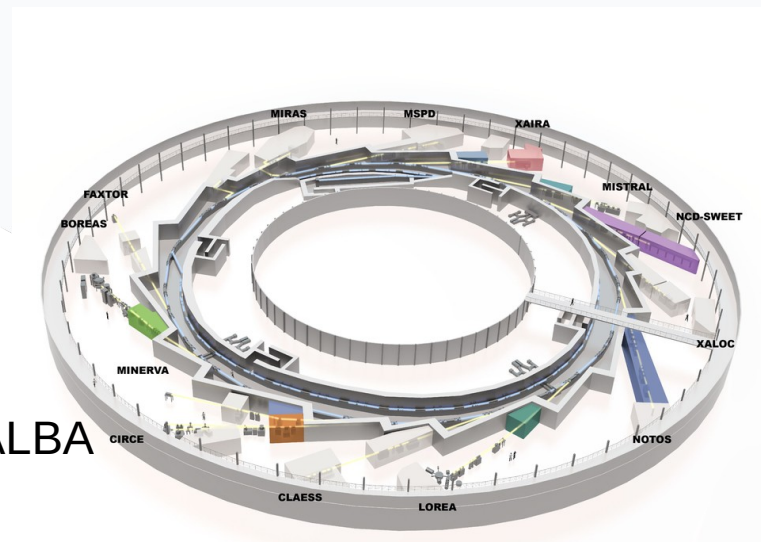
# OUTLINE

- ALBA Synchrotron Light Source
- ALBA Control System
- ALBA GUIs Catalog
- ALBA II
- ALBA GUI Strategy

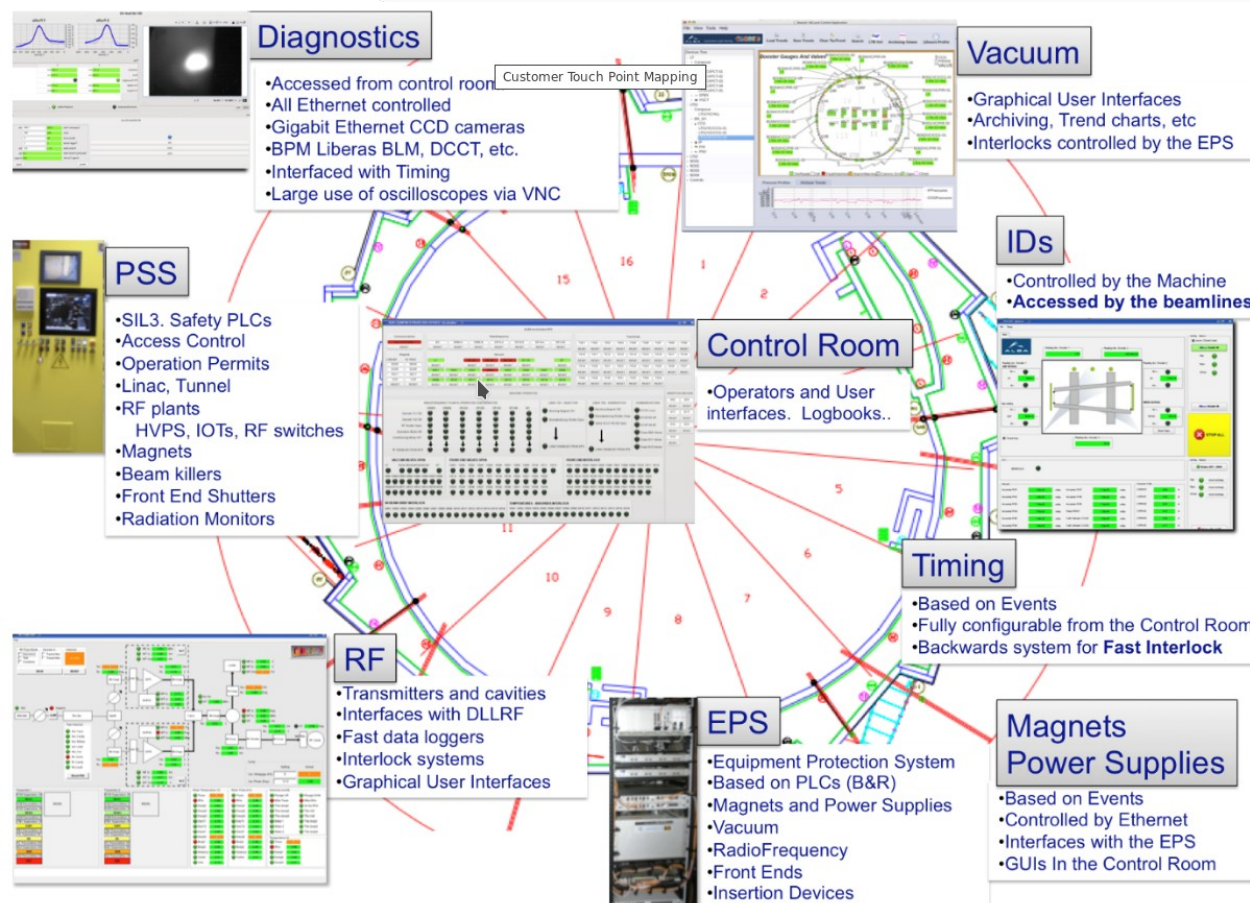


# ALBA Synchrotron Light Source

- 3rd generation Synchrotron Light Source
  - Accelerator: Linac, Booster and Storage Ring
  - Beamlines: 10 in operation; 4 in construction
  - Laboratories with users: Optics and ID
  - JEMCA: Joint Electron Microscopy Center at ALBA
- Operation mode(s):
  - Top-Up mode, Multi Bunch (440 buckets), eventually Hybrid Filling Pattern
  - 24/6 & 184 days of beam for BLs (6.5% reduction due to 37.5 h working week)
- System availability constraints
  - Target: > 98% of availability



# ALBA Control System - Accelerators

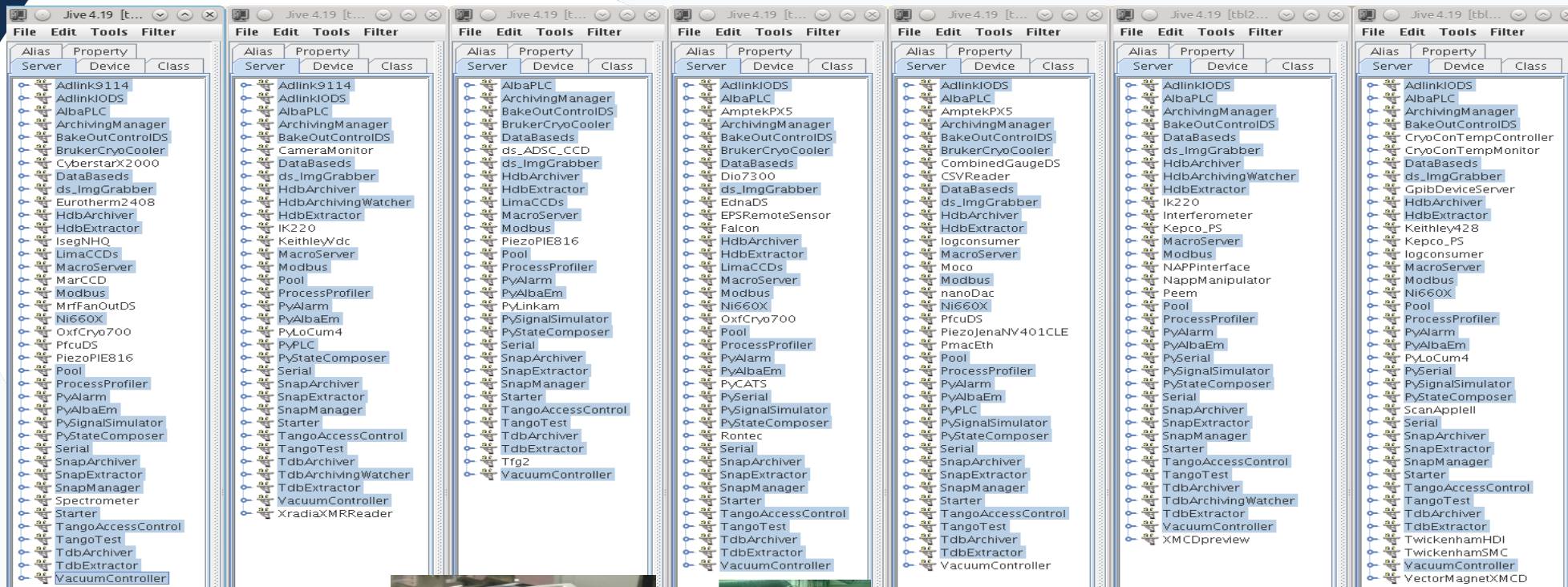




# ALBA Control System - Beamlines



# ALBA Control System - Beamlines



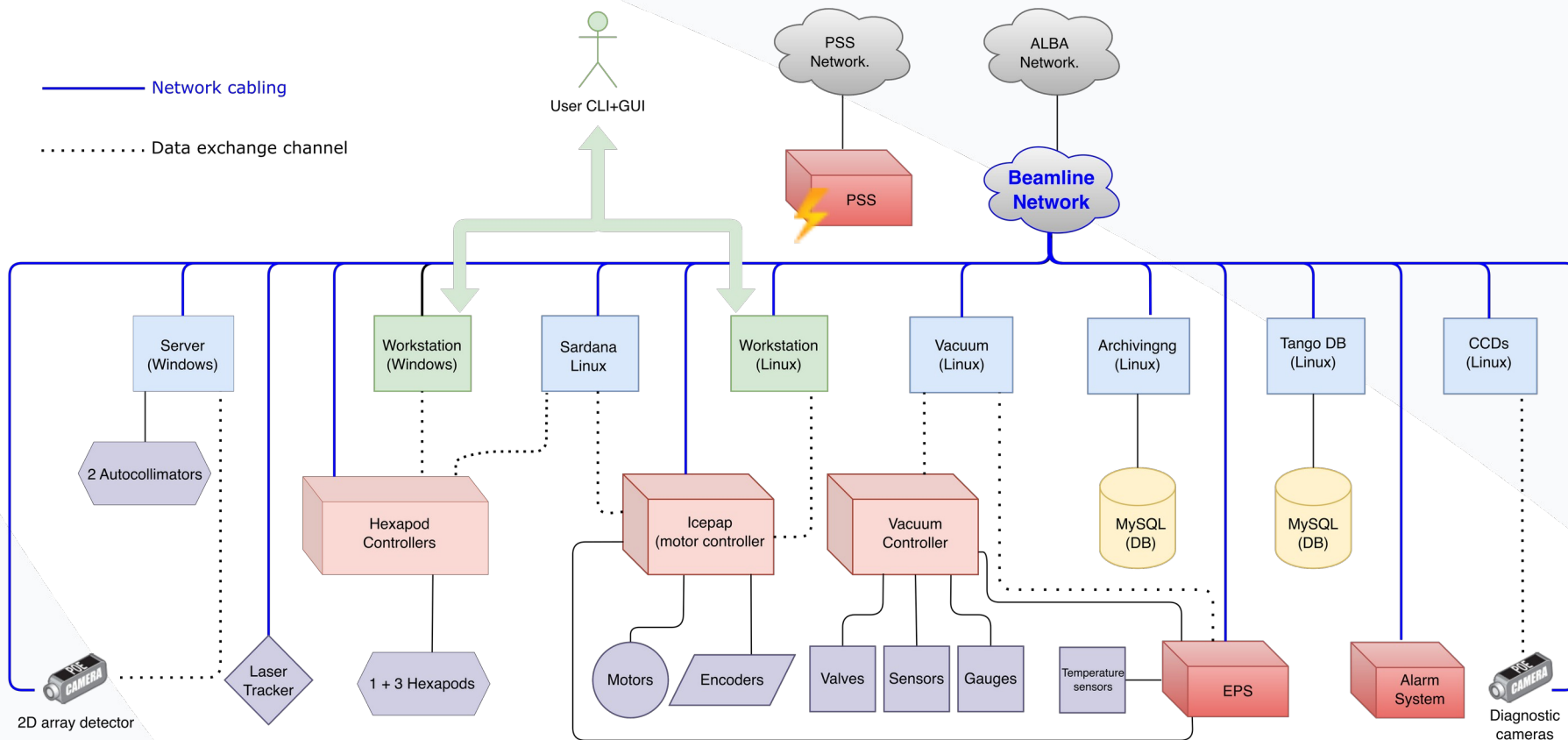
The screenshots show the Jive 4.19 software interface, specifically the 'Server' tab, displaying a list of beamline components. The components are organized into a tree structure with columns for 'Server', 'Device', and 'Class'.

The components listed across the seven screenshots include:

- Adlink9114
- AdlinkIODS
- AlbaPLC
- ArchivingManager
- BakeOutControlDS
- BruckerCryoCooler
- CyberstarX2000
- DataBaseds
- ds\_ImgGrabber
- Eurotherm2408
- HdbArchiver
- HdbExtractor
- IK220
- KeithleyVdc
- MacroServer
- Modbus
- ProcessProfiler
- PyAlarm
- PyAlbaEm
- PyLinkam
- PySignalSimulator
- PyStateComposer
- Serial
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoTest
- TdbArchiver
- TdbExtractor
- VacuumController
- XradiaXMRReader
- AdlinkIODS
- AlbaPLC
- AmptekPX5
- ArchivingManager
- BakeOutControlDS
- BruckerCryoCooler
- DataBaseds
- ds\_ADSC\_CCD
- ds\_ImgGrabber
- HdbArchiver
- HdbExtractor
- LimaCCDs
- MacroServer
- Modbus
- PiezoPIE816
- Pool
- ProcessProfiler
- PyAlarm
- PyAlbaEm
- PyLinkam
- PySignalSimulator
- PyStateComposer
- Serial
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoTest
- TdbArchiver
- TdbExtractor
- VacuumController
- AdlinkIODS
- AlbaPLC
- AmptekPX5
- ArchivingManager
- BakeOutControlDS
- BruckerCryoCooler
- DataBaseds
- Dio7300
- ds\_ImgGrabber
- EdnaDS
- EPSRemoteSensor
- Falcon
- HdbArchiver
- HdbExtractor
- LimaCCDs
- MacroServer
- Modbus
- nanoDac
- Ni660X
- OxfCryo700
- Pool
- ProcessProfiler
- PyAlarm
- PyAlbaEm
- PyCATS
- PySerial
- PySignalSimulator
- PyStateComposer
- Rontec
- Serial
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoTest
- TdbArchiver
- TdbExtractor
- VacuumController
- AdlinkIODS
- AlbaPLC
- ArchivingManager
- BakeOutControlDS
- DataBaseds
- ds\_ImgGrabber
- HdbArchiver
- HdbExtractor
- IK220
- Interferometer
- Keithley428
- KeithleyPS
- logconsumer
- MacroServer
- Modbus
- NAPPInterface
- NappManipulator
- Peem
- Pool
- ProcessProfiler
- PyAlarm
- PyAlbaEm
- PySerial
- PySignalSimulator
- PyStateComposer
- Serial
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoTest
- TdbArchiver
- TdbExtractor
- VacuumController
- XMCDpreview
- AdlinkIODS
- AlbaPLC
- ArchivingManager
- BakeOutControlDS
- CryoConTempController
- CryoConTempMonitor
- DataBaseds
- ds\_ImgGrabber
- GpibDeviceServer
- HdbArchiver
- HdbExtractor
- Keithley428
- KeithleyPS
- logconsumer
- MacroServer
- Modbus
- Ni660X
- Pool
- ProcessProfiler
- PyAlarm
- PyAlbaEm
- PyLoCum4
- PySerial
- PySignalSimulator
- PyStateComposer
- ScanApplell
- Serial
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoTest
- TdbArchiver
- TdbExtractor
- TwickenhamHDI
- TwickenhamSMC
- VacuumController
- VectorMagnetXMCD



# ALBA Control System - Beamlines



# ALBA Control System - numbers

- Accelerator
  - devices: 8k (defined) / 6.2k (exported)
  - device servers: 2.3k (defined) / 1.8k (exported)
  - attributes: 154k
  - databases: 1
- Beamlines
  - devices 251-1k (defined) / 217-1k (exported)
  - device servers: 58-125 (defined) / 42-112 (exported)
  - attributes: 4.5k-17k
  - databases: 1 per BL
- Laboratories: in average smaller than a BL



# ALBA GUI Catalog

- GUIs for ALBA accelerators operation (David's talk)
- GUIs for ALBA accelerators subsystem experts (Emilio's talk)
- GUIs for ALBA experiment control (Miquel's talk)
  - Non-Taurus specific GUIs:
    - Lavue, MXCuBE, TXM Zeiss, Prodigy, Cockpit CryoSim, Matlab, EPICS BBB etc.

# ALBA II

- Upgrade planned for 2028 – 2029
  - PSS system to be upgraded, including hardware
  - Few BLs expected to be relocated
  - Most BLs to be upgraded
- Computing Preliminary Study WP08
  - DevOps
  - Distributed System & Events
  - GUIs
  - TANGO
- Project Plans - under preparation



- ALBA II Computing Preliminary Study
  - General Documents & presentations
  - WP01 - InputOutput Controller architecture
  - WP02 - Power Supplies
  - WP03 - Timing System
  - WP04 - Equipment Protection System
  - WP05 - Personnel Safety System
  - WP06 - IT Architecture
  - WP07 - Motion Control
  - WP08 - Control System Stack
  - WP09 - Configuration Management and Stock Management
  - WP10 - Machine Learning
  - WP11 - Realtime Processing needs

# ALBA II GUI Strategy

- Considering desktop applications, a priori, we don't see a need to replace Taurus, but we should **invest time in improving scalability and performance of Taurus GUIs**.
- Web technologies needs to be explored as a **complementary solution** because of the cross-platform compatibility, reduced cost of maintenance and native remote access (concerning the security aspects).
- Regarding web application we selected: **Taranta** and **Jupyter Lab** because of their generic approach and a strong community (Taranta Community is gaining more popularity and is a lead Web project in Tango).
- In terms of the technology stack the most common within our community (ICALEPCS) is **React (+Redux)**, **Plotly**, **GraphQL** and **REST** and we will follow this trend.

# ALBA II GUI Strategy

- Actions in 2023
  - Taurus Performance Optimization
  - PoC: Grafana, IpyWidgets, JupyTango and Taranta



# Thank You