



# ALBA-MXCuBE status

MXCuBE and EDNA integration @ XALOC

Jordi Andreu, Control Engineer @ ALBA

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# Integration of MXCuBE 2 @ ALBA

Xaloc Beamline (BL-13)

- Fully operative beamline: [SARDANA](#) + [TAURUS](#) Control System.
- Beamline responsible: Mr. Roeland Boer.



- ***NEW Microfocus Beamline for Protein Crystallography (XAIRA).***
- Beamline responsible: Mr. Jordi Juanhuix.
- Phase III beamline: Project already started, operation in 2020.

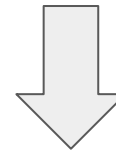
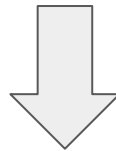
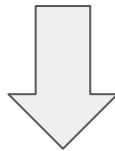
# Integration of MXCuBE 2 @ ALBA

## Current status

- Under development for XALOC Beamline (BL13) @ ALBA.
- Basic operations available (centering, autofocus, etc...)
- Early stage on the Qt4 implementation (*Qt3->Qt4 overhead*).
- *Limited access* for development due to beamline in fully operation.

we were:

Developing on branch 2.1	Qt3 Graphical Interface	EDNA @ workstation
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we are:

Developing on branch 2.2 (stable)	Qt4 Graphical Interface	EDNA @ cluster
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# Integration of MXCuBE 2 @ ALBA

## XALOC: Current status



The screenshot shows the MXCuBE control software interface. The main window is titled 'MXCuBE Qt4 - @bl13mxcube'. It features a menu bar (File, View, Graphics tools, Help) and a toolbar with buttons for Collect, Log, Chat, and Test. The interface is divided into several panels: 1. Top left: Sample centring controls for Omega (0.00), Phi (0.00), and Kappa (0.00), along with zoom and sample video controls. 2. Middle left: A large video window showing a sample with a scale bar (100 μm, 200 μm) and a coordinate system (X: 523 Y: 71). 3. Middle right: Collection method settings for 'Standard Collection', including acquisition parameters like Oscillation start, Number of images, Exposure time, Kappa, Energy, Resolution, and Transmission. 4. Right side: Machine status panel showing 'Machine current: 0.1 mA', 'Machine status: ON', and 'TopUp Remaining: 720.1 s'. It also includes a 'Sample list' table and a 'Current users' section. 5. Bottom left: Beam size and Slits controls for Horizontal and Vertical dimensions. 6. Bottom right: Processing parameters, Characterisation, and Helical Collection settings. The interface is highly detailed with numerous input fields, buttons, and status indicators.

[2016-06-16 09:52:59] Could not load beamline setup check configuration 1.  
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# Qt4 Graphical Interface

General: Camera in Qt4 (PR # 74 to branch 2.2)

- Modifications to the **Qt4\_LimaVideo.py** HwObj to provide support for Basler cameras *via* **LiMA** library.
- Supported pixel types:
  - *YUV 422 packed* (Color)
  - *Y8* (Black and White)
- The implementation is **QUB** independent.
- Depends on **OpenCV** library python interface.
- Easily extensible to other pixel formats.

## CONFIGURATION:

```
<device class="Qt4_LimaVideo" >
  <type>basler</type>
  <address>84.89.227.72 </address>
  <encoding>yuv422p</encoding>
  <gain>0.3</gain>
  <exposure>0.01</exposure>
  <interval>30</interval>
</device>
```

# Qt4 Graphical Interface

ALBA Specific: Xaloc Hardware Objects (PR # 73 to branch 2.2)

- The parent class of (ALBA specific) **XalocMinidiff** HwObj has been changed from **MiniDiff** to **GenericDiffractometer** class.
- Hutch menu brick works fine: Centering routines, focus (sardana macro), snapshot, etc...
- ...**BUT** we still using the old centering routines module.
  
- **Overhead:** We had the need to adapt some HardwareObjects which were already running for Qt3 version: MachineInfo, SafetyShutter, Beamstop, etc...

# EDNA plugins

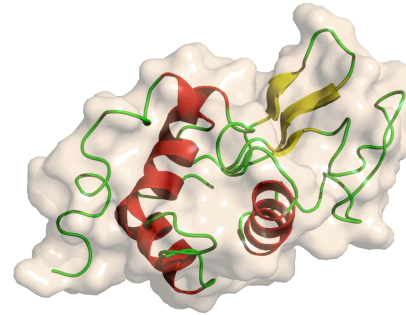
## Strategy & Fast autoproc plugins

- **EDNA Strategy: EDPluginControlInterfaceToMXCuBEv1\_3**
  - Already in production (Tango EDNA server).
  - Running on workstation (8 cores) Intel(R) Xeon(R) CPU E31275 @ 3.40 GHz.
- **EDNA Fast Autoproc plugin: EDPluginControlAutoprocV1\_0**
  - Testing @ Cluster (direct batch queue).
  - Running on a HPC node (16 cores) Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz

# EDNA performance

## Strategy & Fast autoproc plugins

- Lysozyme (1800 images set)

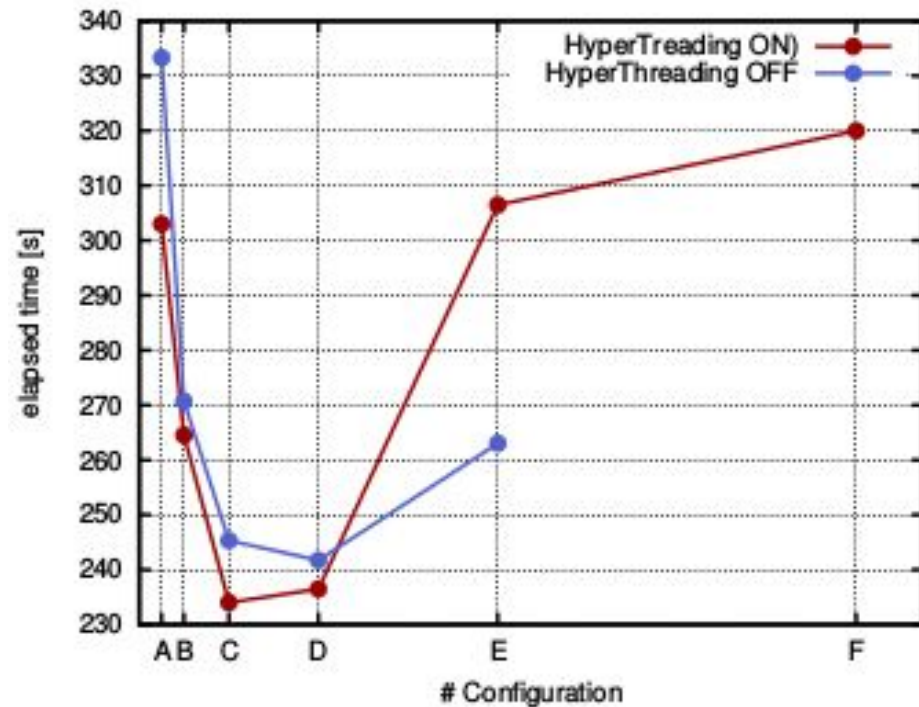


Cluster geometry for XDS

[http://xds.mpimf-heidelberg.mpg.de/html\\_doc/xds\\_parameters.html](http://xds.mpimf-heidelberg.mpg.de/html_doc/xds_parameters.html)

config	# procs	# jobs
A	1	32
B	2	16
<b>C</b>	<b>4</b>	<b>8</b>
<b>D</b>	<b>8</b>	<b>4</b>
E	16	2
F	32	1

JOBS: independent subprocesses  
PROCS: parallel OpenMP





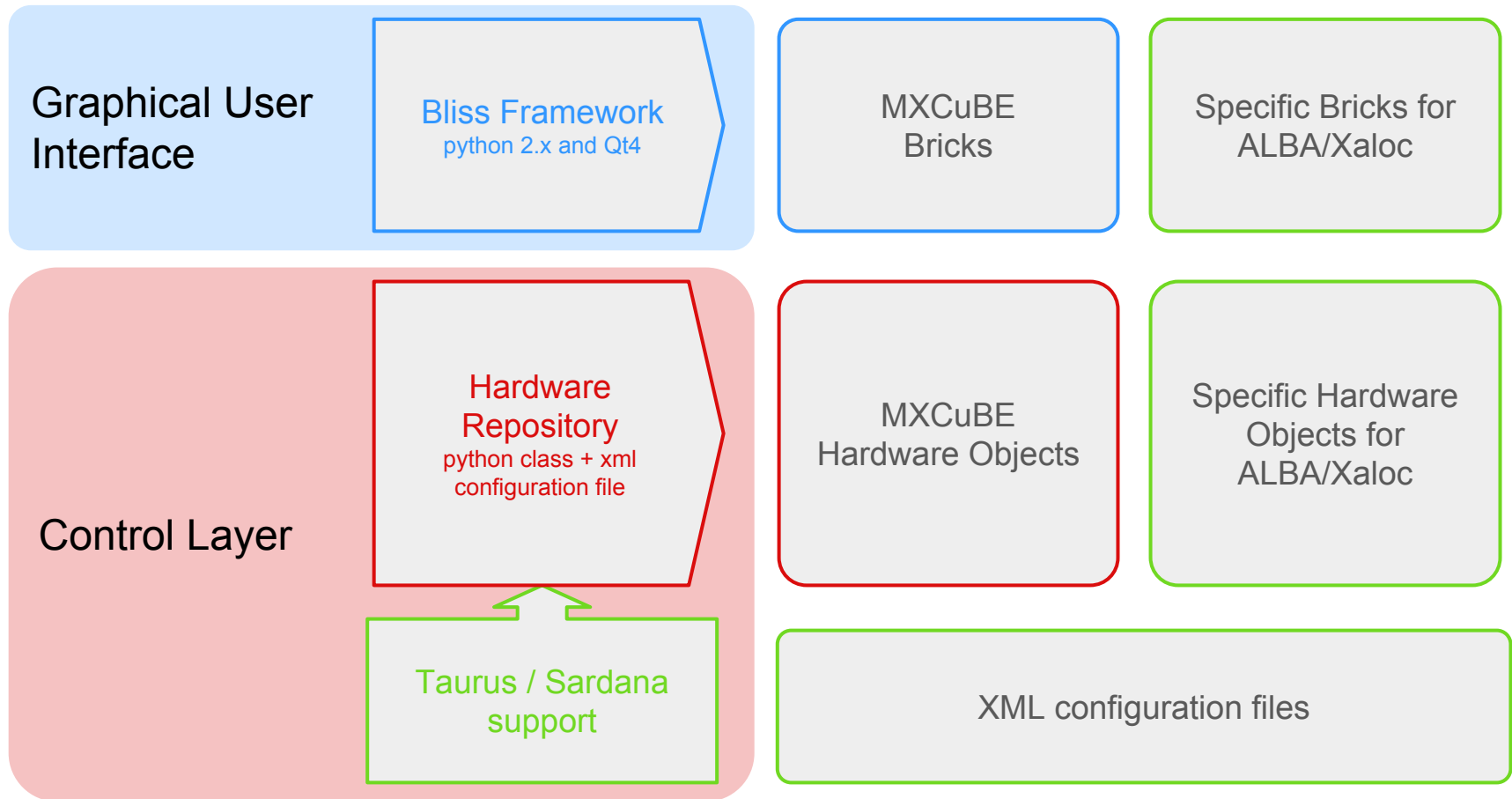
**Thank you for  
your attention**

# MXCuBE 2 @ ALBA

Based on SARDANA & TAURUS Control System

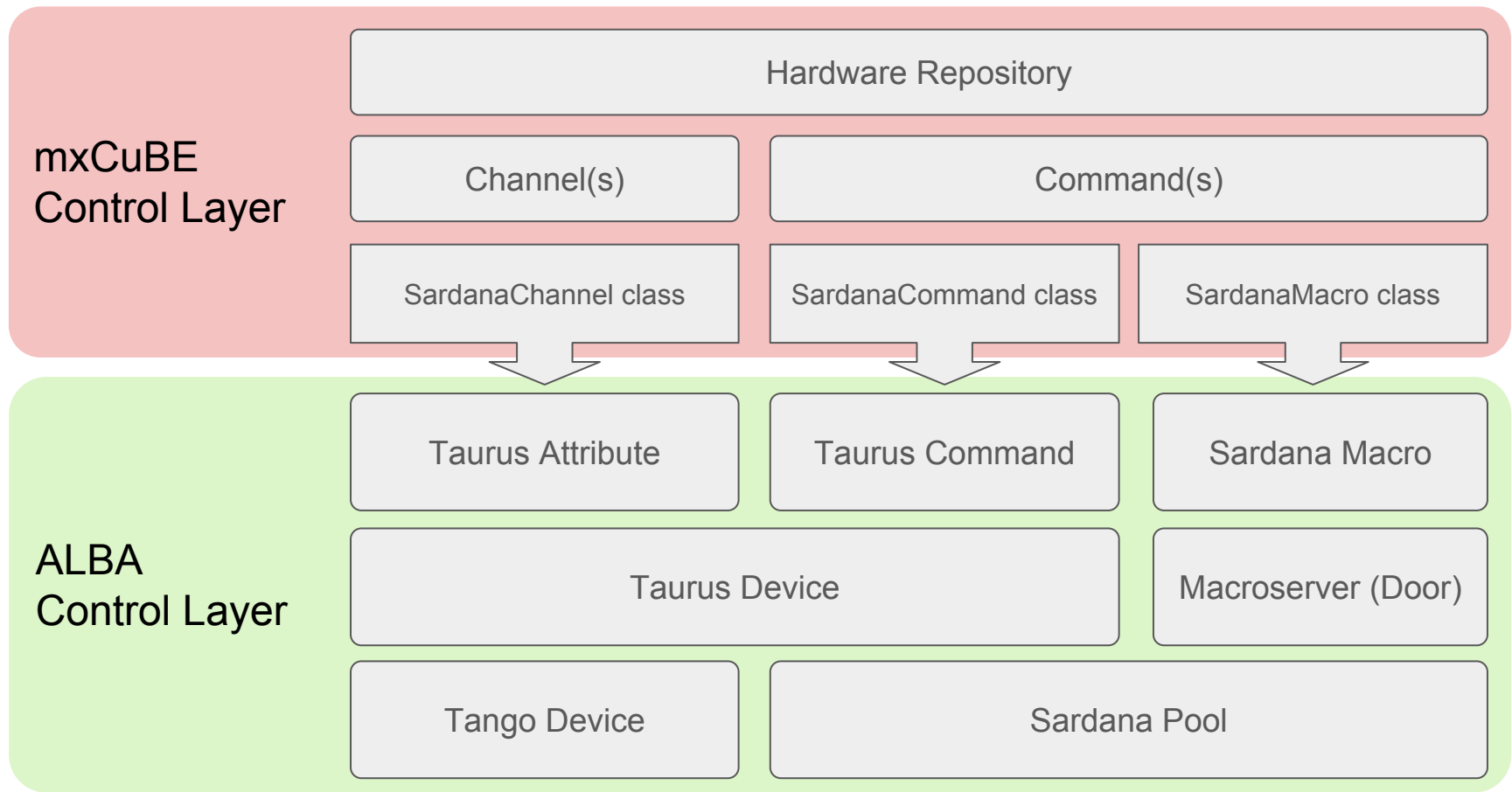
# Integration of MXCuBE 2 @ ALBA

Over Sardana Control layer



# Integration of MXCuBE 2 @ ALBA

Sardana Support for Hardware Repository (V. Rey)



\*Implemented by V. Rey in *CommandContainer.py* and *Sardana.py* files from Hardware Repository (ALBA branch @ github)

# Integration of MXCuBE 2 @ ALBA

## Sardana Support for Hardware Repository

### Hardware Object configuration (Sardana Layer):

```
<object class="SardanaXfeSpectrum">
  <doorname>door/mxcube/1</doorname>
  <command type="sardana" name="configure">senv ActiveMntGrp mg_fluodet</command>
  <command type="sardana" name="acquire">ct %s</command>
  <channel type="sardana" taurusname="fluodet_timer" name="spectro">spectrum</channel>
</object>
```

macro name

taurus device name

attribute name

# Integration of MXCuBE 2 @ ALBA

## Sardana Support for Hardware Repository

### Sardana Motor:

Position and State (channels) and Stop (command) are defined by default...

```
<device class="SardanaMotor">  
  <username>Omega Z</username>  
  <taurusname>omegaz</taurusname>  
</device>
```

...even they can specified in the configuration file:

```
<device class="SardanaMotor">  
  <username>Omega Z</username>  
  <taurusname>omegaz</taurusname>  
  <channel type="sardana" polling="events" name="position">Position</channel>  
  <channel type="sardana" polling="events" name="state">State</channel>  
  <command type="sardana" name="stop">Stop</command>  
</device>
```

# Integration of MXCuBE 2 (Qt4) @ ALBA

Evolution of MXCuBE & EDNA implementation @ ALBA



Bessy (June 2015)



ALBA (December 2015)



DESY (June 2016)