GUIs for ALBA.
Accelerators subsystem experts

Accelerator Controls Group

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Summary

- ALBA control room.
- Control System GUI
- Control Section widgets
- Questions

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- **ALBA control room**
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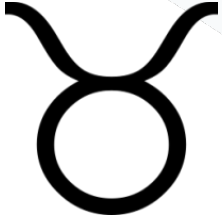
- Questions



ALBA Control Room

- 7 workstations for stable operation.
- 4 virtual machines for remote connections from outside control room.
- 1 virtual machine with old versions.
- 1 workstation for test and new developments.

ALBA Control Room

- Control room software ecosystem:
  - Debian 9
  - Taurus 4.7
  - Python 2.7
- Upgrade plan for 2023:
  - Debian 10
  - Taurus 5.0
  - Python 3

ALBA Control Room
Upgrade

Debian 10: Control Room GUI migration

Package name	Debian 10 package?	Debian 10 package installed at cbadev01?	Working?	Related Ticket
cbdbcon	3.0.3-1~bpo10~c106	3.0.3-1~bpo10~c106	Yes	~~cbdbcon~~ - cbdbcon (cbdbcm, cbdbcmexpert) DONE
cbdbld (bzar script, seems to work)	??	??	Yes	~~cbdbld~~ - cbdbld DONE
cbdgui	2.1.0-1~bpo10~c177	2.1.0-1~bpo10~c177	Yes	~~cbdbldb~~ - cbdbldb DONE
cbdbldb			**Not needed!**	~~cbdbldb~~ - cbdbldb NEXTTIC
cbdbugs	3.1.3-1~bpo10~c1135	3.1.3-1~bpo10~c1135	Yes	~~cbdbugs~~ - cbdbugs (cbfgscd) DONE
circulatorgui	1.7.2-1~bpo10~c6	1.7.2-1~bpo10~c6	Yes	~~circulatorgui~~ - CirculatorGUI (cirkincalar) DONE
conditioningpyq4	1.15.1-1~bpo10~c108	1.15.1-1~bpo10~c108	Yes	~~conditioningpyq4~~ - ConditioningQt4 (cirforcedbrang) DONE
cameodoroconfigd	**NOT INSTALLED AT CALIGULA**			~~cameodoroconfigd~~ - cdc2 TO DO
countdown	1.2.1-1~bpo10~c29	1.2.1-1~bpo10~c29	??	~~countdown~~ - Countdown TO DO
cbdcign	Not migrate, dependency rv2 not supported	Not used by the operators		~~cbdcign~~ - cbdcign NEXTTIC
cbdcigo	1.5.0-1~bpo10~c136	1.5.0-1~bpo10~c136	Screenshot error but not needed	~~cbdcigo~~ - cbdcigo DONE
cbdbgmonitor	1.1.1-1~bpo10~c2	1.1.1-1~bpo10~c2	Yes	~~cbdbgmonitor~~ - cbdbgmonitor DONE
cbdbcnd	4.16.19-1~bpo10~c1275	4.16.19-1~bpo10~c1275	Yes to test if widget that failed on last release works	~~cbdbcnd~~ - cbdbcnd DONE
cbdbcdf	2.0.2-1~bpo10~c138	2.0.2-1~bpo10~c138	Yes	~~cbdbcdf~~ - cbdbcdf DONE
cbdbdfp	1.0.0-1~bpo10~c156	1.0.0-1~bpo10~c156	Yes	~~cbdbdfp~~ - cbdbdfp DONE
Multiplexer/BUS	2.2.2-1~bpo10~c1	2.2.2-1~bpo10~c1	Yes	~~cbdbmux~~ - cbdbmux DONE
cbdbpcdsharp	2.0.1-1~bpo10~c117	2.0.1-1~bpo10~c117	Yes	~~cbdbpcdsharp~~ - cbdbpcdsharp DONE
cbdbtune	2.0.0-1~bpo10~c19	2.0.0-1~bpo10~c19	Yes	~~cbdbtune~~ - cbdbtune DONE
cbdbtunemostation	2.0.7-1~bpo10~c15	2.0.7-1~bpo10~c15	Yes	~~cbdbtune~~ - TuneMostationGui (cbdbtunemostation) DONE
cbdbvbir	1.0.0-1~bpo10~c17	2.0.0-1~bpo10~c1117	Yes	~~cbdbvbir~~ - cbdbvbir DONE
cfb/cbldg	2.0.0-1~bpo10~c114	2.0.0-1~bpo10~c114	Yes	~~cfb/cbldg~~ - cfb/cbldg DONE
cfb/fb	2.0.0-1~bpo10~c197	2.0.0-1~bpo10~c197	Yes	~~gui-fb~~ - cfb/fb (cfb/fb) DONE
cfb/cbldgt	Not backport			~~cbldgt~~ - cbldgt_deb (cfb/cbldgt) DONE
cfgd	3.0.0-1~bpo10~c1262	3.0.0-1~bpo10~c1262	Yes but right now the clang editor has no runtime version for pyqtgraph so it's disabled.	~~cfgd~~ - cfgd (cfgpyqt, cfgpyqt4) DONE
cfb/gtk4	2.0.0-1~bpo10~c116	2.0.0-1~bpo10~c116	Yes	~~cfb/gtk4~~ - cfb/gtk4_deb (cfb/gtk4) DONE
cfb/manager	2.0.0-1~bpo10~c196	2.0.0-1~bpo10~c196	Yes	~~cfb/manager~~ - cfb/manager_deb (cfb/manager) DONE
cfb/monitor	2.0.0-1~bpo10~c1	2.0.0-1~bpo10~c1	Yes	~~cfb/monitor~~ - cfb/monitor_deb (cfb/monitor) DONE
EPS_GUI	7.0.0-1~bpo10~c1213	7.0.0-1~bpo10~c1213	GUI refactored, now every type of device, fixit, digital, and so on have separated widgets. The GUI has been packaged for python2 for stretch and python3 for buster	~~EPS_GUI~~ (clapa, clapamagnet, clapamaster) DONE
Bldbld	2.0.1-1~bpo10~c1160	2.0.1-1~bpo10~c1160	Yes	~~Bldbld~~ (cldbldd, cldbldl3, cldbldm) DONE
fastarchiver	1.1.0-1~bpo10~c1237	1.1.0-1~bpo10~c1237	Yes	~~fastarchiver~~ (fa-viewer, fa-audit) TO DO
fdtranslationtangu	6.0.2-1~bpo10~c1001	6.0.2-1~bpo10~c1001	Yes, properties feature has been disabled due to the fact that there is performance issues when setting the width of the curves more than 1px.	~~fdtranslationtangu~~ - IN PROGRESS
fmgui	2.0.2-1~bpo10~c109	2.0.2-1~bpo10~c109	Yes	~~fmgui~~ (cfb, cfbcsl) DONE
fmmodsytagui	2.0.0-1~bpo10~c114	2.0.0-1~bpo10~c114	Yes	~~fmmodsytagui~~ - gui (cfb/fm_modsytak) DONE
fimgui	3.0.0-1~bpo10~c116	3.0.0-1~bpo10~c116	Yes	~~fimgui~~ - FIM_Gui (cfb/fim) DONE
idb11	3.1.7-1~bpo10~c1142	3.1.7-1~bpo10~c1142	Yes	~~idb11~~ - idb11 (cfb/idb11) DONE
nxdb2	3.2.2-1~bpo10~c1268	3.2.2-1~bpo10~c1268	Yes	~~nxdb2~~ - nxdb2 (cfb/nxd) DONE
loracdysmt	0.3.1-1~g9bb3182-1~bpo10~c1270	0.3.1-1~g9bb3182-1~bpo10~c1270	Yes	Not needed
loracgui	2.75.7-1~bpo10~c1210	2.75.7-1~bpo10~c1210	No. Working to migrate to python3	~~loracgui~~ - LoracGUI (cfb, cfbevents, cfbbrkup, cfbgpsmonpy) DONE
loracfyrtechfdgui	1.6.3-1~bpo10~c123	1.6.3-1~bpo10~c123	Yes	~~loracfyrtechfdgui~~ (cfb/fd_fyrtech) DONE
loracfyrtackgui	3.0.1-1~bpo10~c109	3.0.1-1~bpo10~c109	Yes	~~loracfyrtackgui~~ (cfb/fytack) DONE
LTB/cryogenGUI	2.0.9-1~bpo10~c105	2.0.9-1~bpo10~c105	Yes	~~LTB/cryogenGUI~~ (cfb/cryogen) DONE
lyrtech/FdGUI	3.3.3-1~bpo10~c1199	3.3.3-1~bpo10~c1199	Yes	~~lyrtech/FdGUI~~ (cfb/fd_lyrtech, cfb/fd_globalfytech, cfb/fd_lyatlyrtech) DONE
lyrtechGUI	5.0.6-1~bpo10~c1255	5.0.6-1~bpo10~c1255	Yes	~~lyrtechGUI~~ (cfb/lyrtech, cfb/lyrtecfd) DONE
MPS	2.20.1-1~bpo10~c105	2.20.1-1~bpo10~c105	Version is working but modification done 1 year ago is not needed. Pending to revert and create new package.	~~MPS~~ (clmps, clmps_newlad) IN PROGRESS
mpvgui	3.0.5-1~bpo10~c1162	3.0.5-1~bpo10~c1162	Yes	~~mpvgui~~ - cbdmpvdd DONE
pgprldaucher	0.2.3-g5f3b9c-1~bpo10~c1124	0.2.3-g5f3b9c-1~bpo10~c1124	Yes	~~pgprldaucher~~ (cbplauncher) TO DO
pcgprlmgmtgui	1.6.0-1~bpo10~c22	1.6.0-1~bpo10~c22	Yes	~~pcgprlmgmtgui~~ (cbdbcgm) DONE
pcmcia	1.1.5-1~bpo10~c108	1.1.5-1~bpo10~c108	Yes	~~pcmcia~~ (cbdpcdcd) DONE
vacca			@Sergio Rubio Manrique is working on it.	~~vacca~~ - cfw2 (vacca-by.pyhigh) STALLED
rfgengui	2.65.1-1~bpo10~c156	2.65.1-1~bpo10~c156	Yes	~~rfgengui~~ (cfb/rfgen) DONE
rfgltestgui	2.70.0-1~bpo10~c1120	2.70.0-1~bpo10~c1120	Yes	~~rfgltestgui~~ (cfb/rfgltest) DONE
scwgui	1.3.38-1~bpo10~c123	1.3.38-1~bpo10~c123	Working	~~scwgui~~ (cfb/cwXX) DONE
sygnagui	2.3.2-1~bpo10~c156	2.3.2-1~bpo10~c156	Yes	~~sygnagui~~ (cfb/syg) DONE
thermoregtgui	2.20.0-1~bpo10~c113	2.20.0-1~bpo10~c113	Yes	~~thermoregtgui~~ (cfb/thermoreg) DONE
voegui	2.0.0-1~bpo10~c15	2.0.0-1~bpo10~c15	Yes	~~voegui~~ (cfb/voe) DONE

Taurus Workshop – ESRF 2023.

14-15/03/2023

ALBA Control Room
Upgrade

Package name	Debian 10 package?	Debian 10 package installed at ctsadev01?	Working?	Related Ticket
				ctdibpmsorbit DONE
ctdiccd	4.16.19-1~bpo10~ci275	4.16.19-1~bpo10~ci275	Yet to test if widget that failed on last release works with data on operation	~~CS4-2386~~ - ctdiccd DONE
ctdidcct	2.0.2-1~bpo10~ci38	2.0.2-1~bpo10~ci38	Yes	~~CS4-2387~~ - ctdiccd DONE
ctdimfp	1.0.4-1~bpo10~ci16	1.0.4-1~bpo10~ci16	Yes	~~CS4-2388~~ - ctdimfp DONE
MultiplexerGUI	2.2.2-1~bpo10~ci1	2.2.2-1~bpo10~ci1	Yes	~~CS4-2389~~ - ctdimux DONE
ctdipicoharp	2.0.1-1~bpo10~ci17	2.0.1-1~bpo10~ci17	Yes	~~CS4-2390~~ - ctdipicoharp DONE
ctditune	2.0.0-1~bpo10~ci9	2.0.0-1~bpo10~ci9	Yes	~~CS4-2394~~ - ctditune DONE
ctdituneexcitation	2.0.7-1~bpo10~ci35	2.0.7-1~bpo10~ci3	Yes	~~CS4-2912~~ - TuneExcitationGui [ctdituneexcitation] DONE
ctdivmir	1.0.4-1~bpo10~ci3	2.0.0-1~bpo10~ci117	Yes	~~CS4-2395~~ - ctdivmir DONE
ctfilling	2.0.0-1~bpo10~ci14	2.0.0-1~bpo10~ci14	Yes	~~CS4-2913~~ - ctfilling DONE
ctfofb	2.0.0-1~bpo10~ci97	2.0.0-1~bpo10~ci97	Yes	~~CS4-2402~~ - gui-fofb [ctfofb] DONE

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- Control Section widgets
- Questions

- **Some numbers**
- Operator GUI
- Accelerators Control Group

Control Section GUI
Some numbers

- More than **10 years** of opertation with **Taurus**.
- More than **50 GUI** in production with **Taurus**.
- Variety of GUI complexity:
  - Vaccagui: **1250** devices with more than **4500** attributes.
  - PCGrid: more than **3000** attributes from **568** devices.
  - LyrtechGUI: more than **550** attributes from **3** devices.
- Interactive JDRAW synoptics.
- Some Matlab GUI for legacy systems.
- 1 EPICS GUI.

Control System GUI

- Some numbers
- **Operator GUI**
- Accelerators Control Group

See D.Yépez presentation.

- Some numbers
- Operator GUI
- **Accelerators Control Group**

Control System GUI

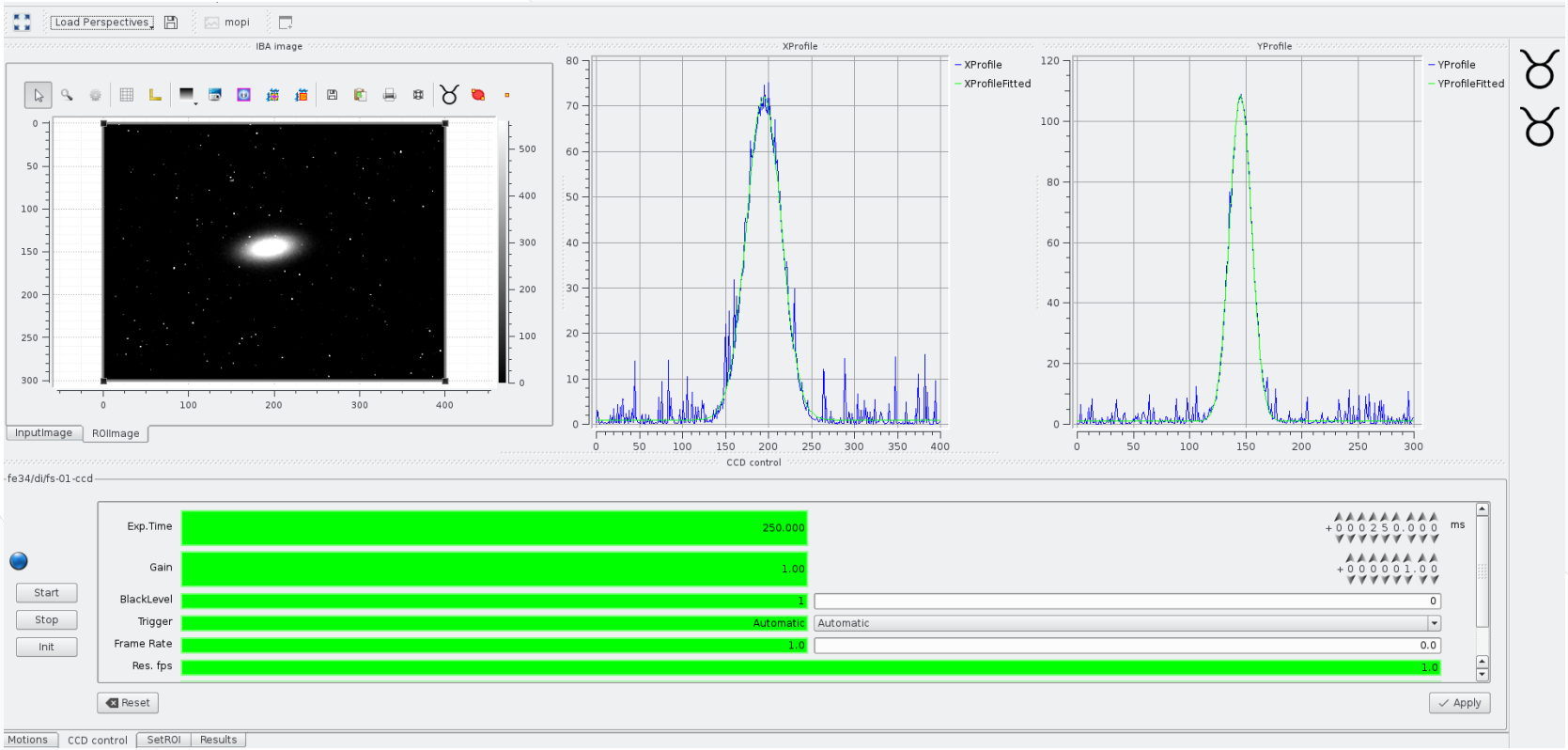
- Accelerators Control Group
  - **Taurus GUI**
  - Taurus as a library + Qt.
    - Synoptics
    - Multiwindow

- Taurus GUI as a production, support and development tool.
- Minimal code implemented by developers. Sometimes no code.
- Save all default views and configs from user side.
- User customizable:
  - New panels
  - New views
  - Add attributes
  - …

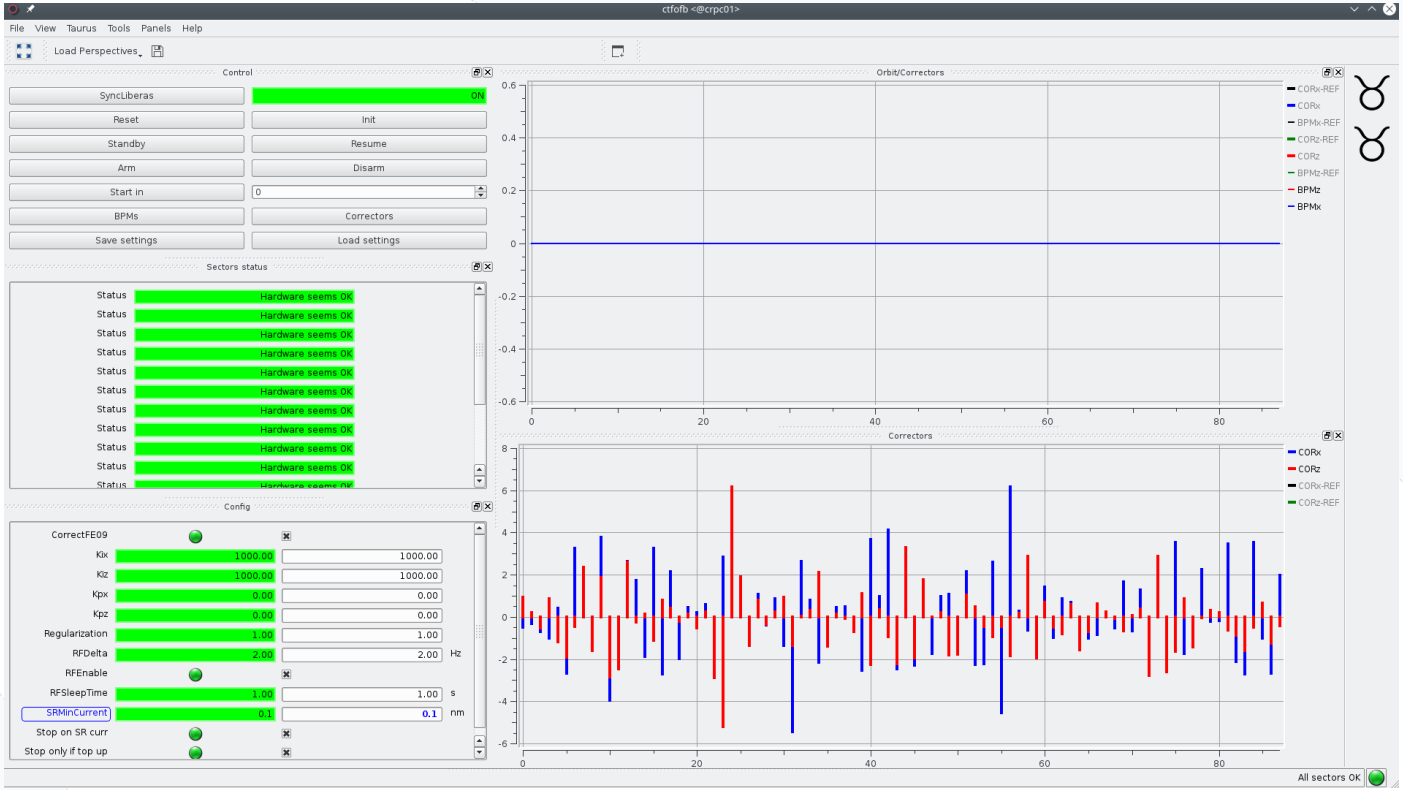
```python
#!/usr/bin/env python

"""
This file was autogenerated by taurusgui --new-gui.
"""

from __future__ import absolute_import

import click
from .config import *

@click.command("vmir")
@click.pass_context
@click.option('--safe-mode', 'safe_mode', is_flag=True, default=False,
              help=('launch in safe mode (it prevents potentially problematic '
                    'configs from being loaded)')
              )
def run(ctx, safe_mode):
    from taurus.qt.qtgui.taurusgui.taurusgui import gui_cmd
    ctx.invoke(gui_cmd, confname="vmir", safe_mode=safe_mode)
```

```python
#!/usr/bin/env python

XML_CONFIG = 'config.xml'

# ==========================================================================
# Import section. You probably want to keep this line. Don't edit this block
# unless you know what you are doing
from taurus.qt.qtgui.taurusgui.utils import PanelDescription
# (end of import section)
# ==========================================================================


IBA = PanelDescription('IBA', classname='TaurusForm',
                       model=['tango://alba03:10000/bl34/di/srm-01-iba/'
                              'userroioriginx',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'userroioriginy',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'userroiwidth',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'userroiheight',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'enableuserroi',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'pixelsizex',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'pixelsizey',
                              'tango://alba03:10000/bl34/di/srm-01-iba/'
                              'opticalmagnification'])
```

Accelerators Control Group
Taurus GUI



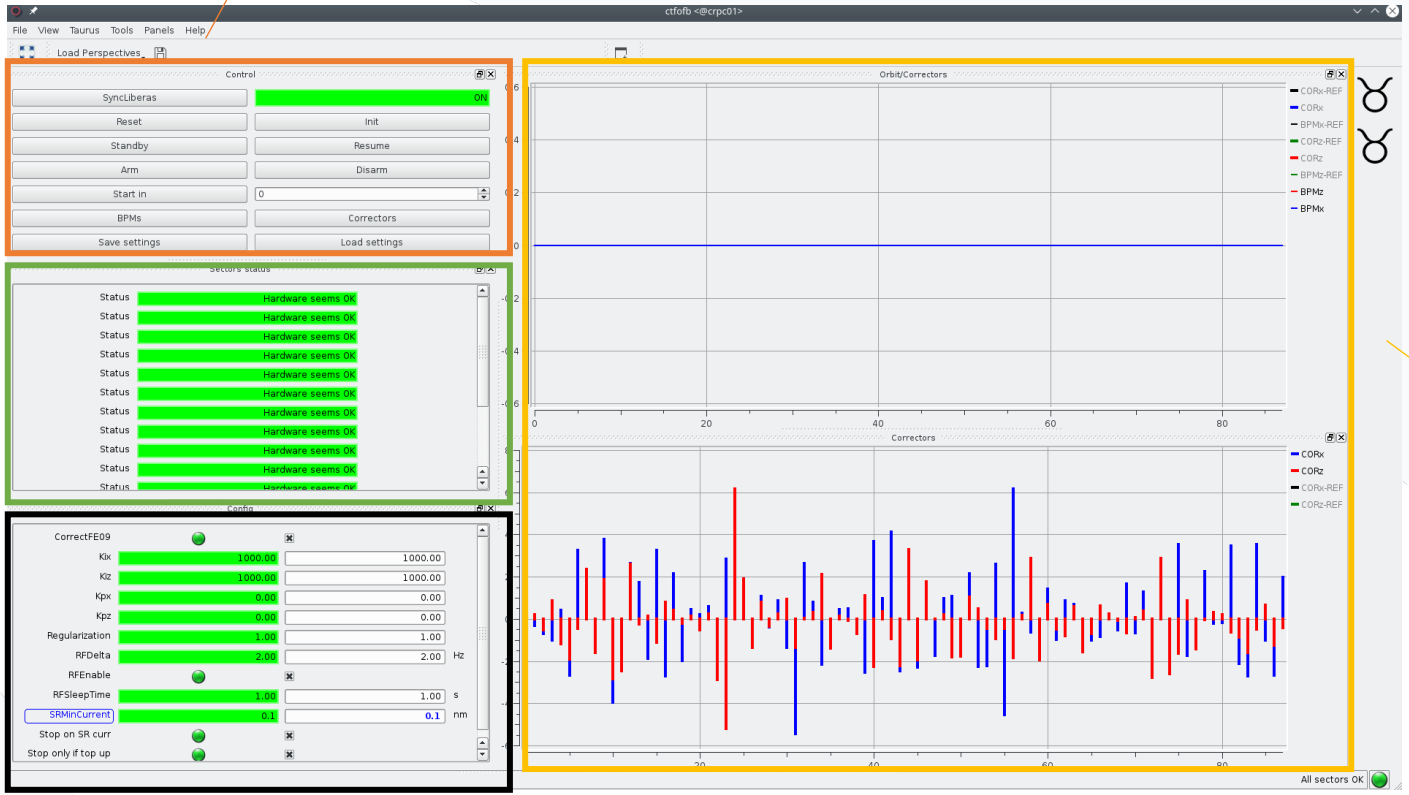
Accelerators Control Group
Taurus GUI



Accelerators Control Group
Taurus GUI

Device control

Devices Status



Plot Area

Device configuration

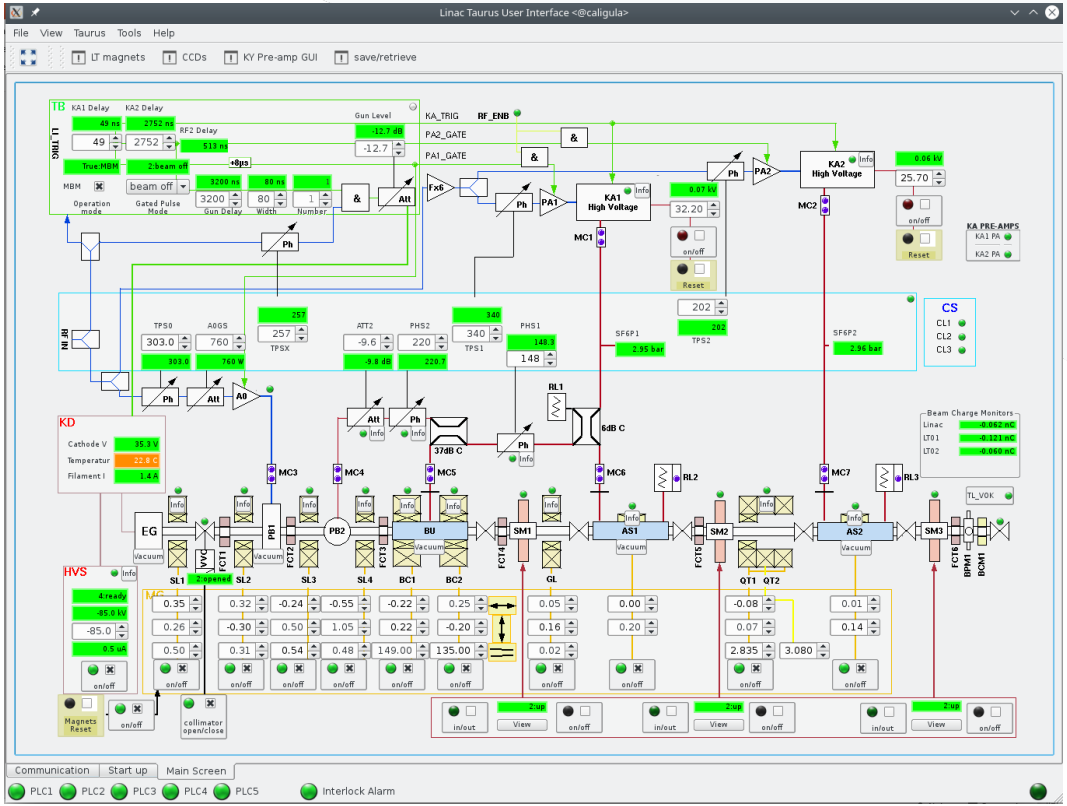
Control System GUI

- Accelerators Control Group
  - Taurus GUI
  - Taurus as a library + Qt.
    - **Synoptics**
    - Multiwindow

- GUIs developed using Taurus as another Python library
- Variety of Qt based Taurus widgets to implement your development
- Qt standard libraries available from Taurus
- Use of Taurus tools like Taurus Designer to help your development
- Easy to "*Taurify*" widgets to adapt your development constrains

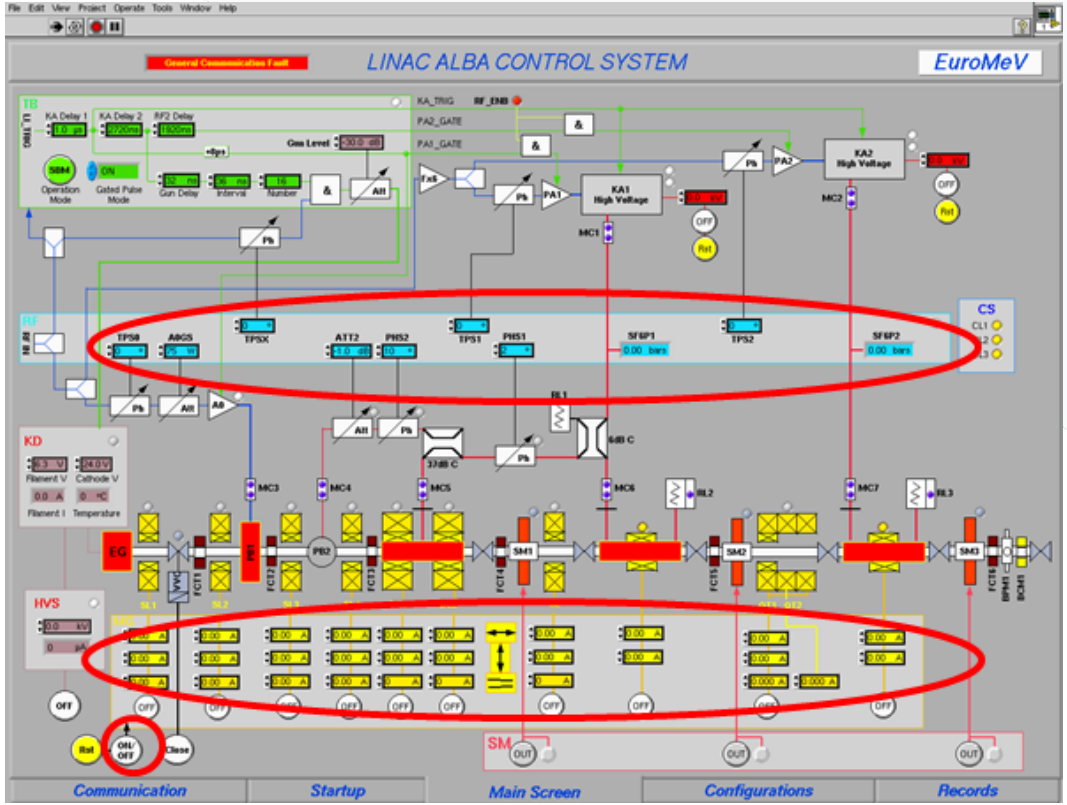
Accelerators Control Group

Taurus as library + Qt. Synoptics



Accelerators Control Group

Taurus as library + Qt. Synoptics



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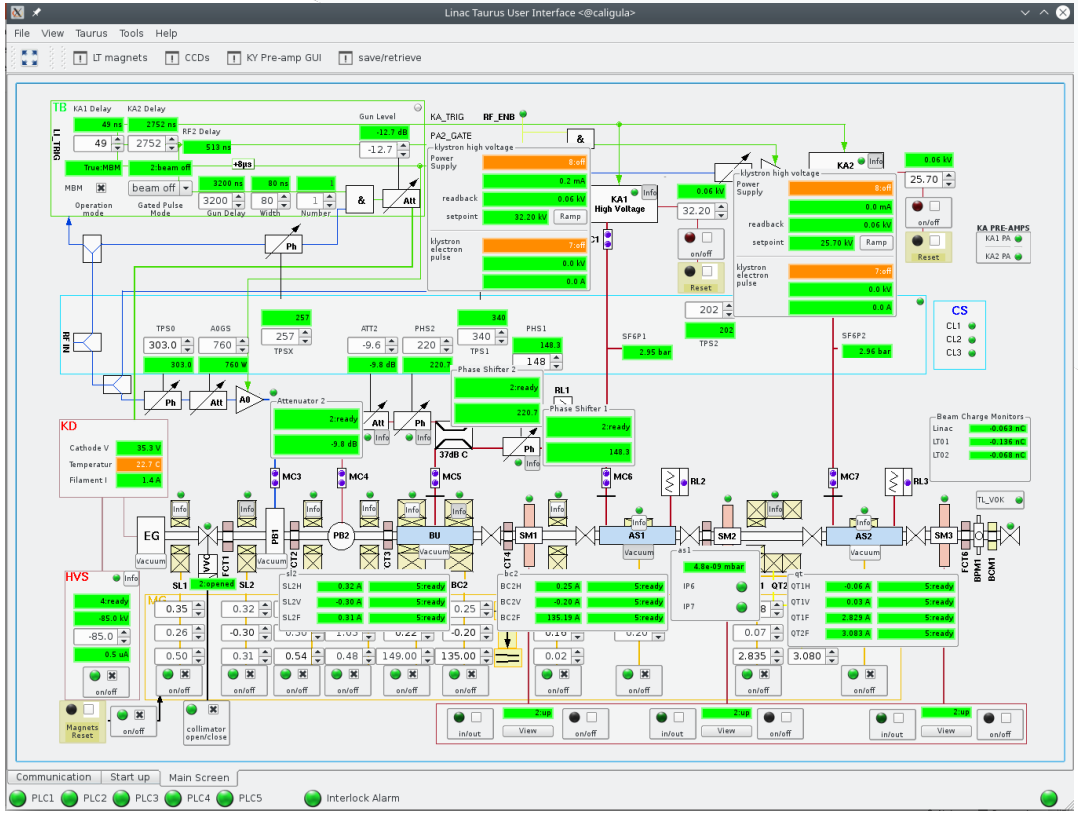
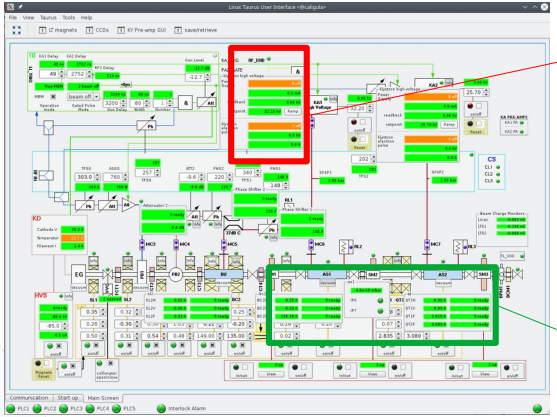
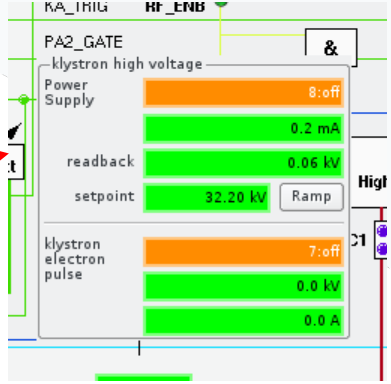
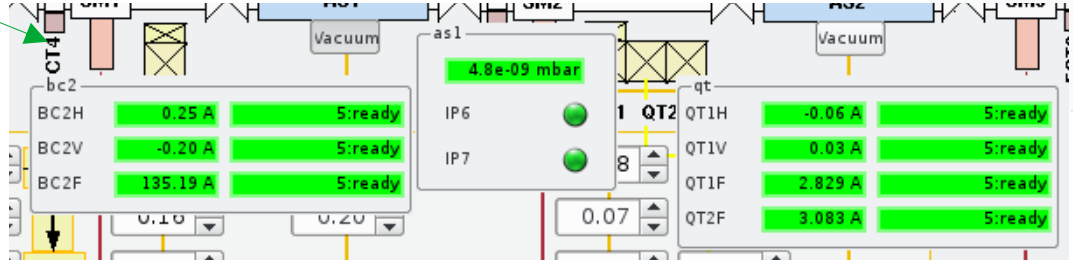


Accelerators Control Group

Taurus as library + Qt. Synoptics

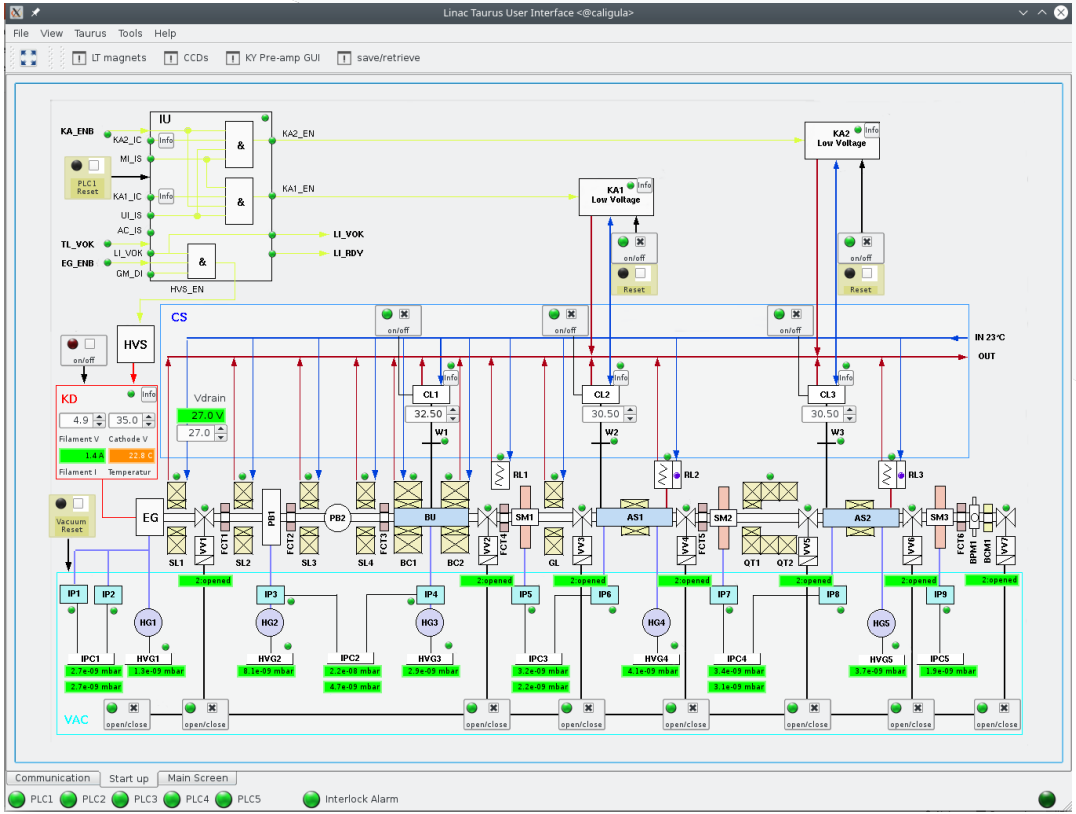






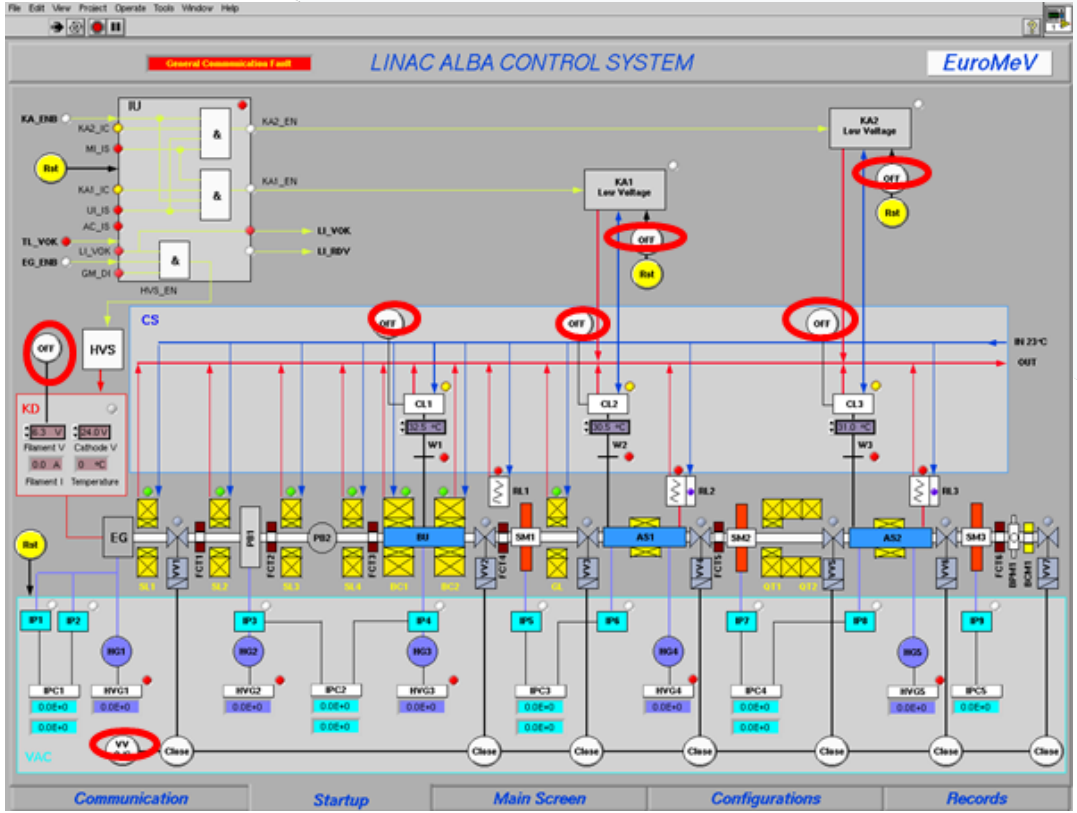
Accelerators Control Group

Taurus as library + Qt. Synoptics



Accelerators Control Group

Taurus as library + Qt. Synoptics



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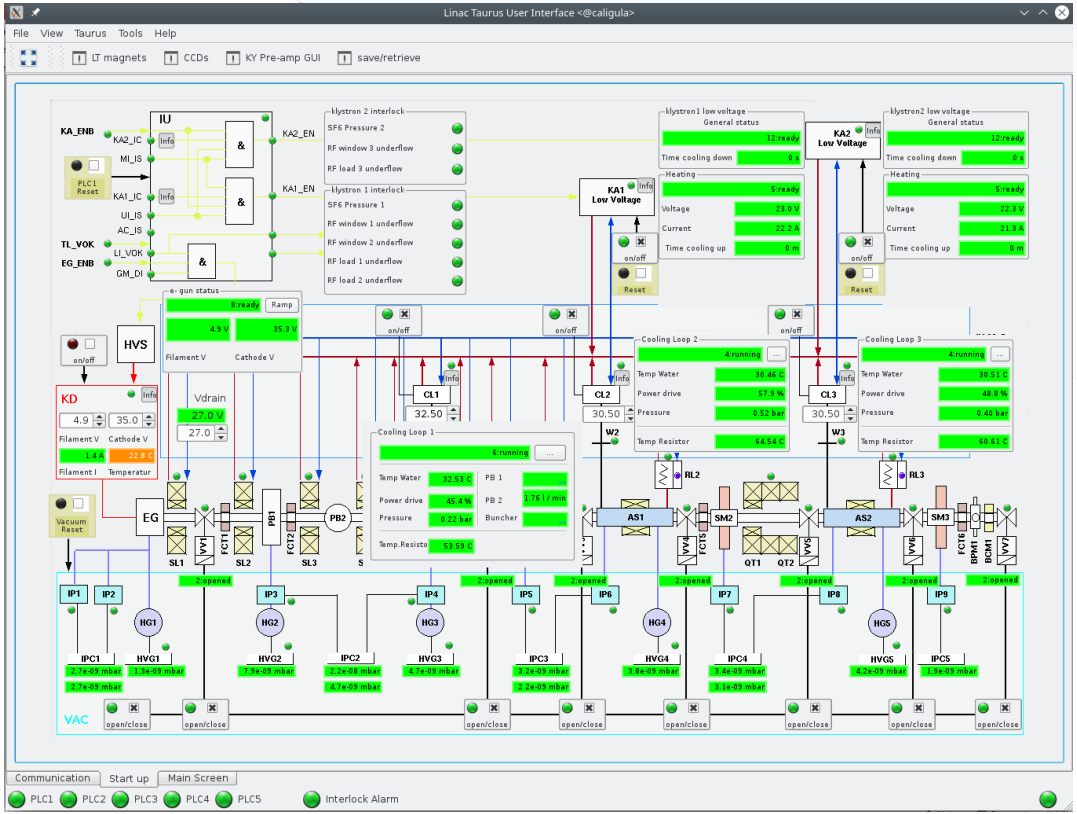

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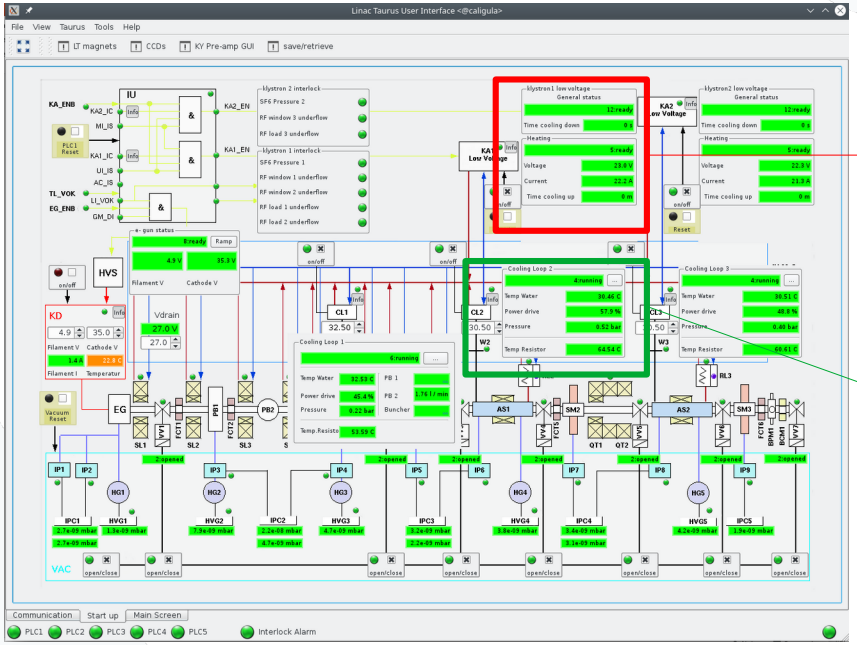
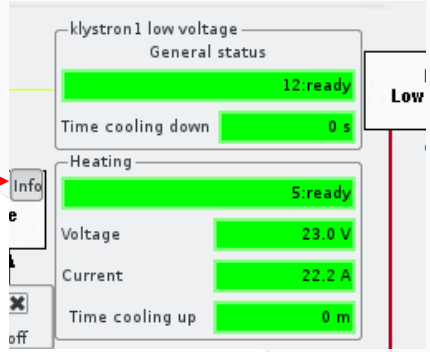
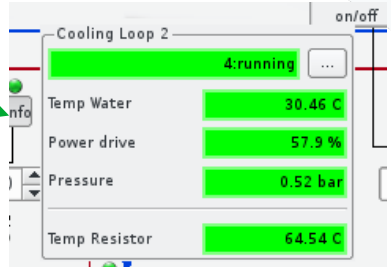






Accelerators Control Group

Taurus as library + Qt. Synoptics

```python
__all__ = ["LinacValueSpinBox", "SaveRetrieveSpinBox"]


Sergi Blanch-Torne
class LinacValueLineEdit(TaurusValueLineEdit):

    _dangerOperation_OkReceived = None
    _dangerOperation_ConfirmationRequested = None
    _dangerMessage = None
    _dangerAbove = None
    _dangerBelow = None

    Sergi Blanch-Torne
    def __init__(self, *args, **kwargs):
        TaurusValueLineEdit.__init__(self, *args, **kwargs)
        self._dangerOperation_ConfirmationRequested = False
```

```python
Sergi Blanch-Torne
def setDangerMessage(self, dangerMessage=""):
    """Sets the danger message when applying an operation.
       In this widget, setting a danger message is not enough to define
       a dangerous operation, because it must be defined the thresholds
       where the danger operation applies.
       If dangerMessage is None, the apply operation is considered safe

    :param dangerMessage: (str or None) the danger message.
                          If None is given (default) the apply operation
                          is considered safe.
    """
    self._dangerMessage = dangerMessage
    self.info("setting a danger message %r" % (self._dangerMessage))
    self._reviewIsDangerous()

DangerMessage = Qt.pyqtProperty("QString",
                                TaurusBaseWritableWidget.getDangerMessage,
                                setDangerMessage,
                                TaurusBaseWritableWidget.
                                resetDangerMessage)
```

Accelerators Control Group

Taurus as library + Qt. Synoptics

```python
from taurus.qt.qtgui.display import TaurusLed
from taurus.qt.qtgui.display.taurusled import _TaurusLedController
from time import time, sleep
from threading import Thread

BLINK_OFF2ON = 0b01
BLINK_ON2OFF = 0b10
BLINK_BOTH = BLINK_OFF2ON | BLINK_ON2OFF


sblanch +2
class LinacLed(TaurusLed):
    sblanch
    def __init__(self, parent=None, designMode=False):
        super(LinacLed, self).__init__(parent, designMode)
        self._blinking = None
        self._blinkTime = None  # seconds
        self._blinkPeriod = None  # seconds
        self._blinkThread = None
        self._blinkStart = None
        self._evtvalue_value = None
```

```python
sblanch
def handleEvent(self, evt_src, evt_type, evt_value):
    if self._blinking and hasattr(evt_value, 'value'):
        self.info("Received event %s (%s) = %s"
                  % (evt_src, evt_type, evt_value.value))
        self._evtvalue_value = evt_value.value
        if self.hasToBlink() and not self._blinkThread:
            self._blinkThread = Thread(target=self.doBlink,
                                       args=([evt_value.value]))
            self.info("Created a blinking thread")
            self._blinkThread.start()
            self.info("Started the blinking thread")
    TaurusLed.handleEvent(self, evt_src, evt_type, evt_value)

sblanch
def hasToBlink(self):
    if bool(self._blinking & BLINK_OFF2ON) and self._evtvalue_value:
        return True
    if bool(self._blinking & BLINK_ON2OFF) and not self._evtvalue_value:
        return True
    return False
```

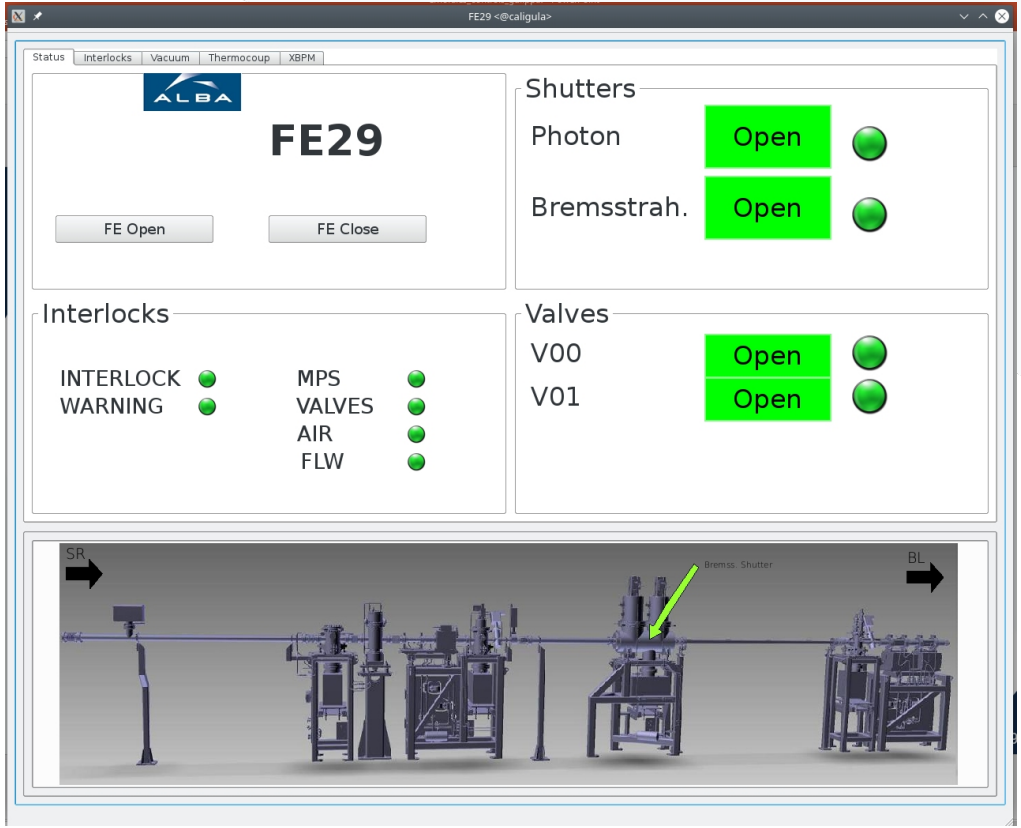
Accelerators Control Group

Taurus as library + Qt. Synoptics

```
Jose A. Ramos +1
class UpdateHandler(QtCore.QObject, TaurusBaseComponent):
    update_digitals = QtCore.pyqtSignal(np.ndarray, name="updateDigitals")
    update_analogs = QtCore.pyqtSignal(np.ndarray, name="updateAnalogs")
    update_analog_floats = QtCore.pyqtSignal(np.ndarray,
                                             name="updateAnalogFloats")
    update_analog_delta_write = QtCore.pyqtSignal(np.ndarray,
                                                  name="updateAnalogDeltasWrite")
    update_analog_delta_read = QtCore.pyqtSignal(np.ndarray,
                                                 name="updateAnalogDeltasRead")

    Jose A. Ramos +1
    def __init__(self, name="", parent=None, designMode=False,
                 **kwargs):
        QtCore.QObject.__init__(self)
        TaurusBaseComponent.__init__(self, name, parent, designMode, **kwargs)

    Jose A. Ramos
    def setModel(self, model, key=None):
        TaurusBaseComponent.setModel(self, model)

    Jose A. Ramos +1
    def handleEvent(self, evt_src, evt_type, evt_value):
        TaurusBaseComponent.handleEvent(self, evt_src, evt_type, evt_value)
        if not isinstance(evt_value, tango.DevFailed):
            if evt_src.name == "DigitalsREAD":
                self.update_digitals.emit(evt_value.rvalue.magnitude)
            elif evt_src.name == "AnalogIntsREAD":
                self.update_analogs.emit(evt_value.rvalue.magnitude)
            elif evt_src.name == "AnalogRealsREAD":
                self.update_analog_floats.emit(evt_value.rvalue.magnitude)
            elif evt_src.name == "AnalogIntsDeltaWrite":
                self.update_analog_delta_write.emit(evt_value.rvalue.magnitude)
            elif evt_src.name == "AnalogIntsDeltaRead":
                self.update_analog_delta_read.emit(evt_value.rvalue.magnitude)
```

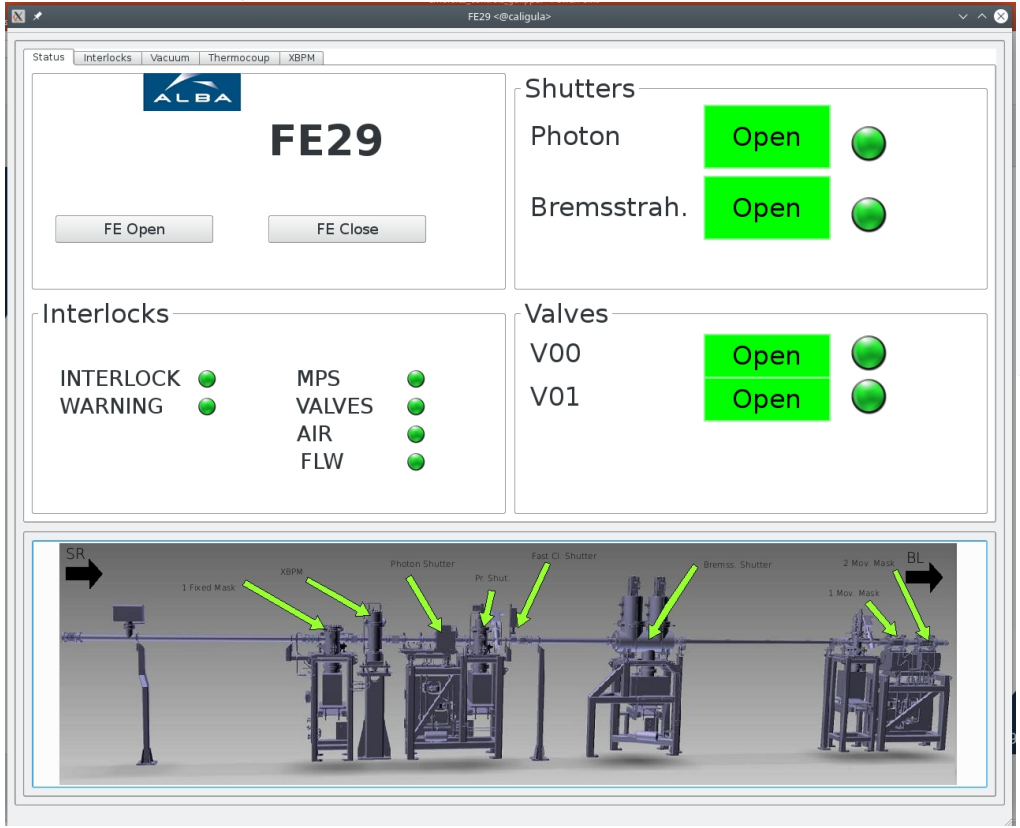
Accelerators Control Group

Taurus as library + Qt. Synoptics



Accelerators Control Group

Taurus as library + Qt. Synoptics



Control System GUI

- Accelerators Control Group
  - Taurus GUI
  - Taurus as a library + Qt. Synoptics
  - **Taurus as a library + Qt. Multiwindow**

Accelerators Control Group

Taurus as library + Qt. Multiwindow

Accelerators Control Group

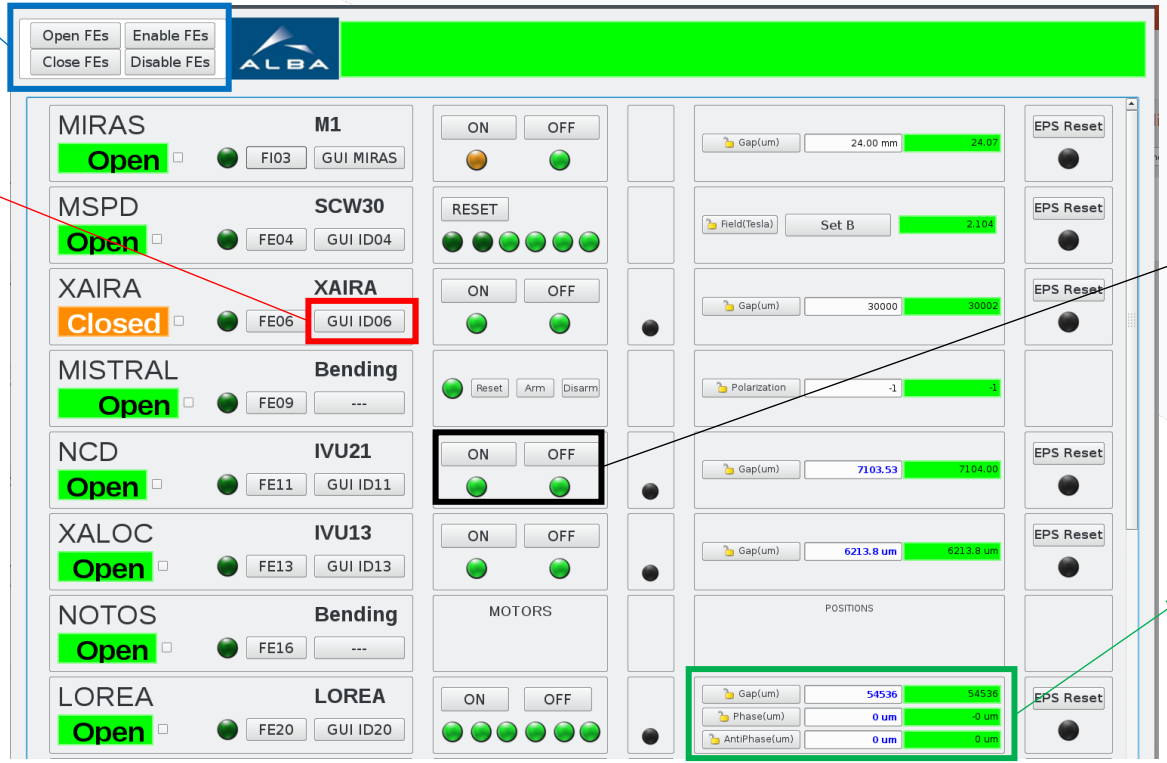
Taurus as library + Qt. Multiwindow

Global actions

GUI Launcher

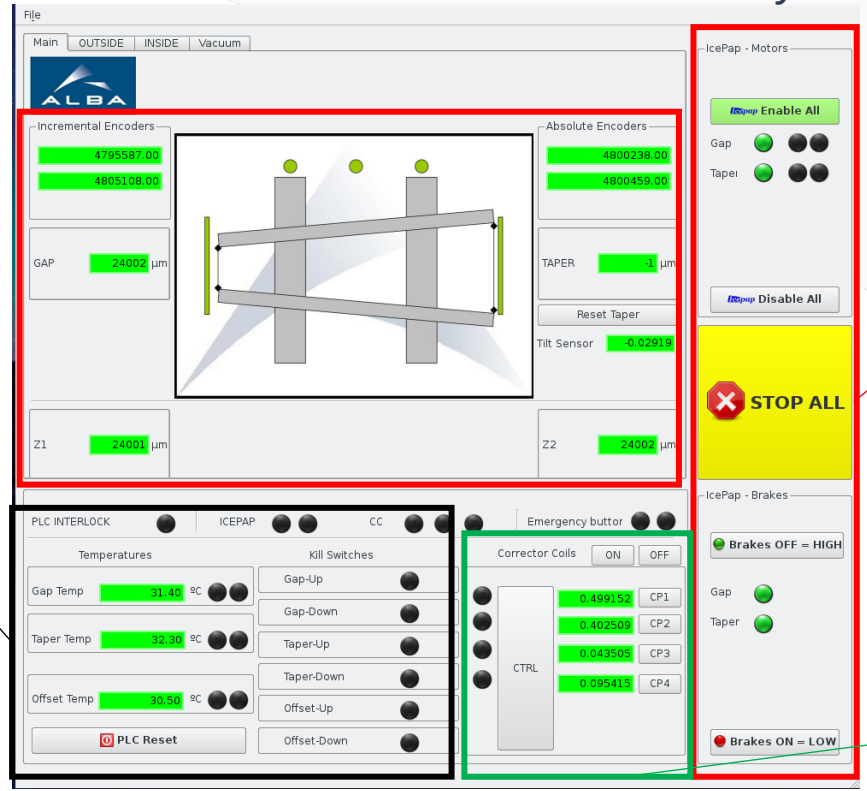
Motor Enable

Motor movement



Accelerators Control Group

Taurus as library + Qt. Multiwindow



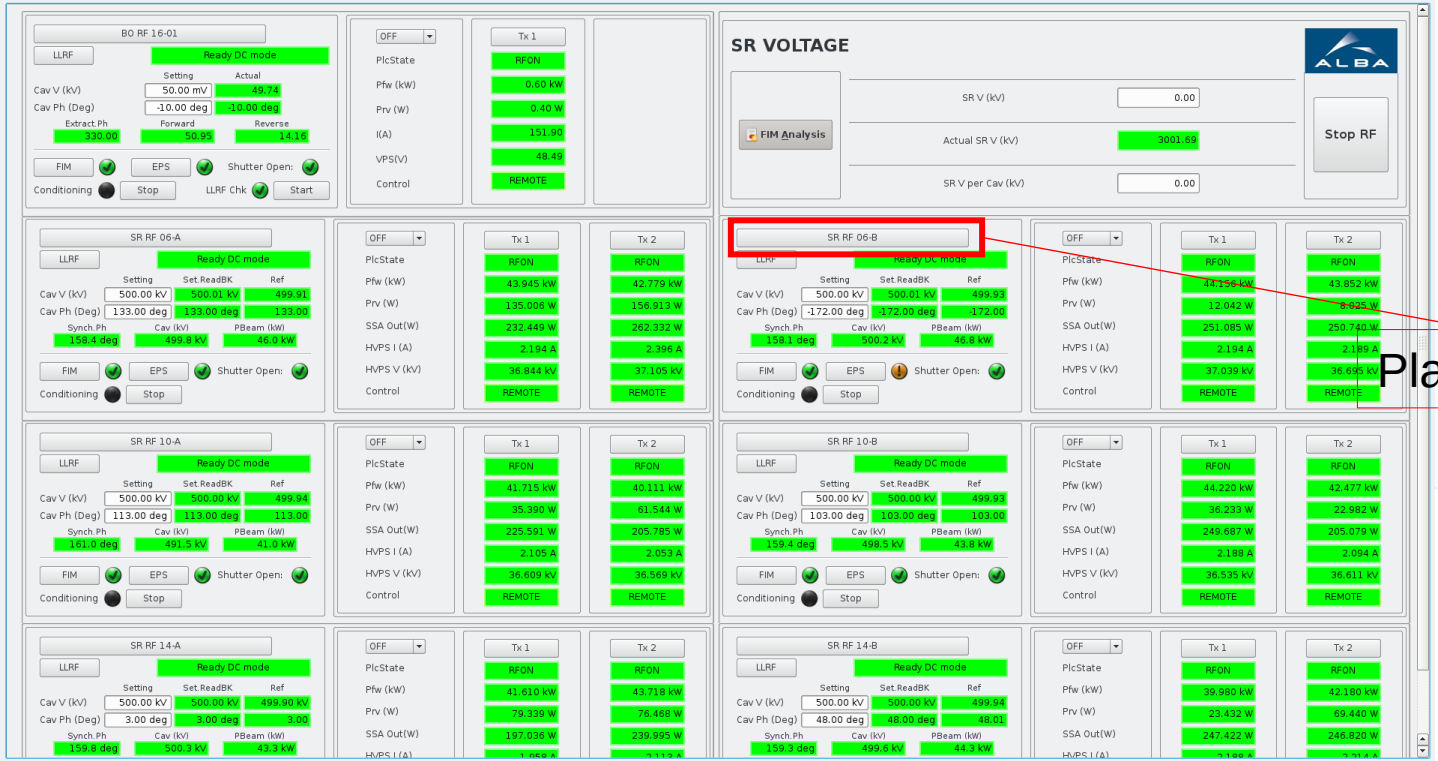
EPS Signals

Motor control (Sardana Widgets)

PC Control

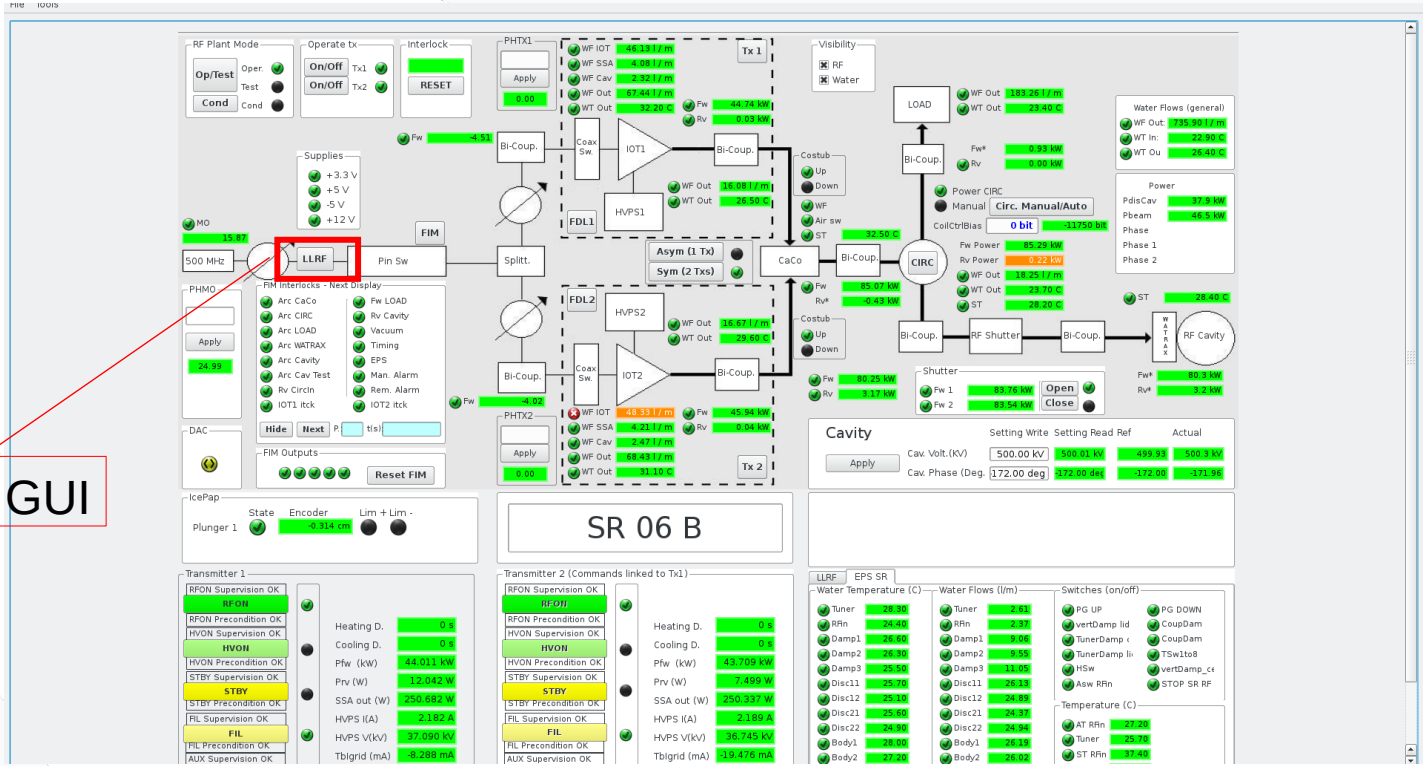
Accelerators Control Group

Taurus as library + Qt. Multiwindow



Accelerators Control Group

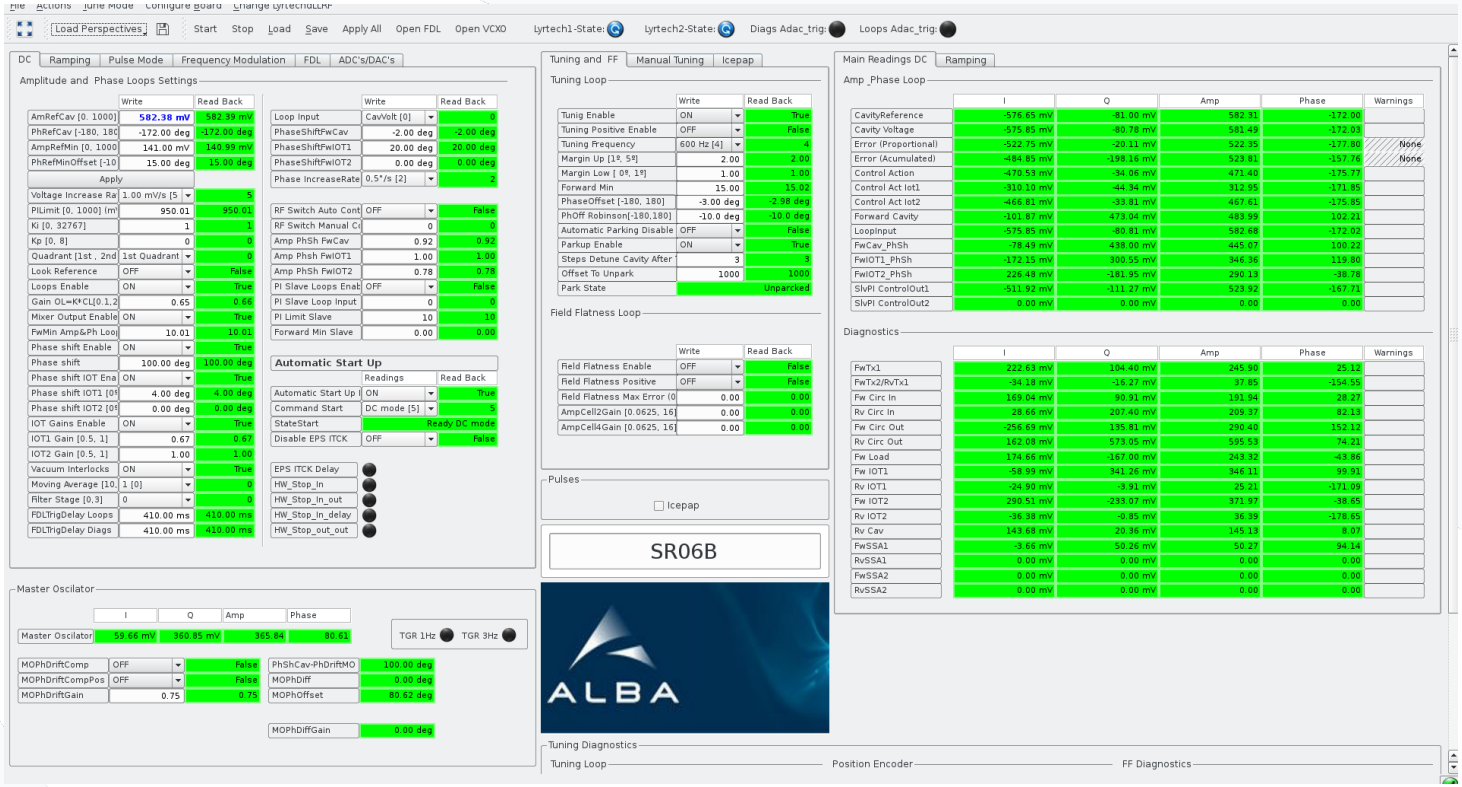
Taurus as library + Qt. Multiwindow



LLRF GUI

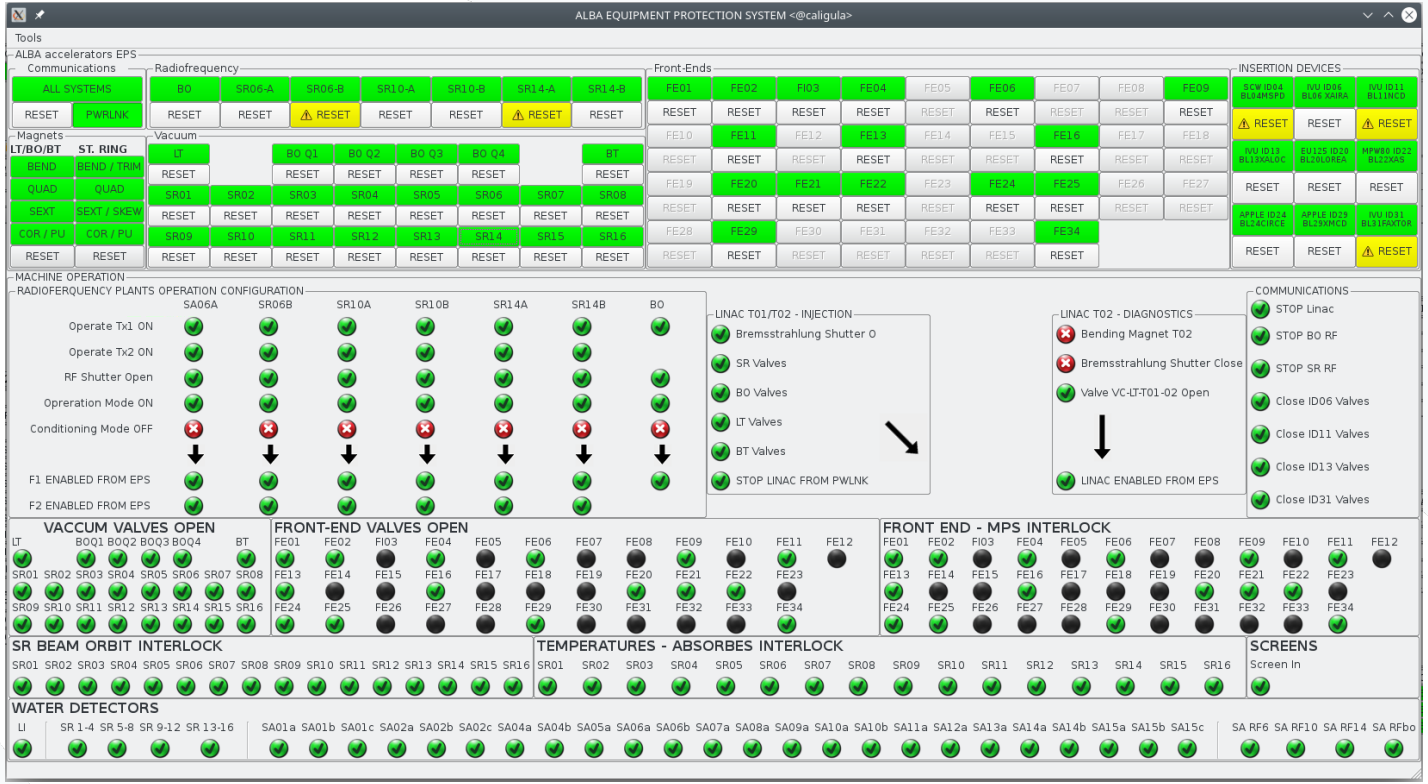
Accelerators Control Group

Taurus as library + Qt. Multiwindow



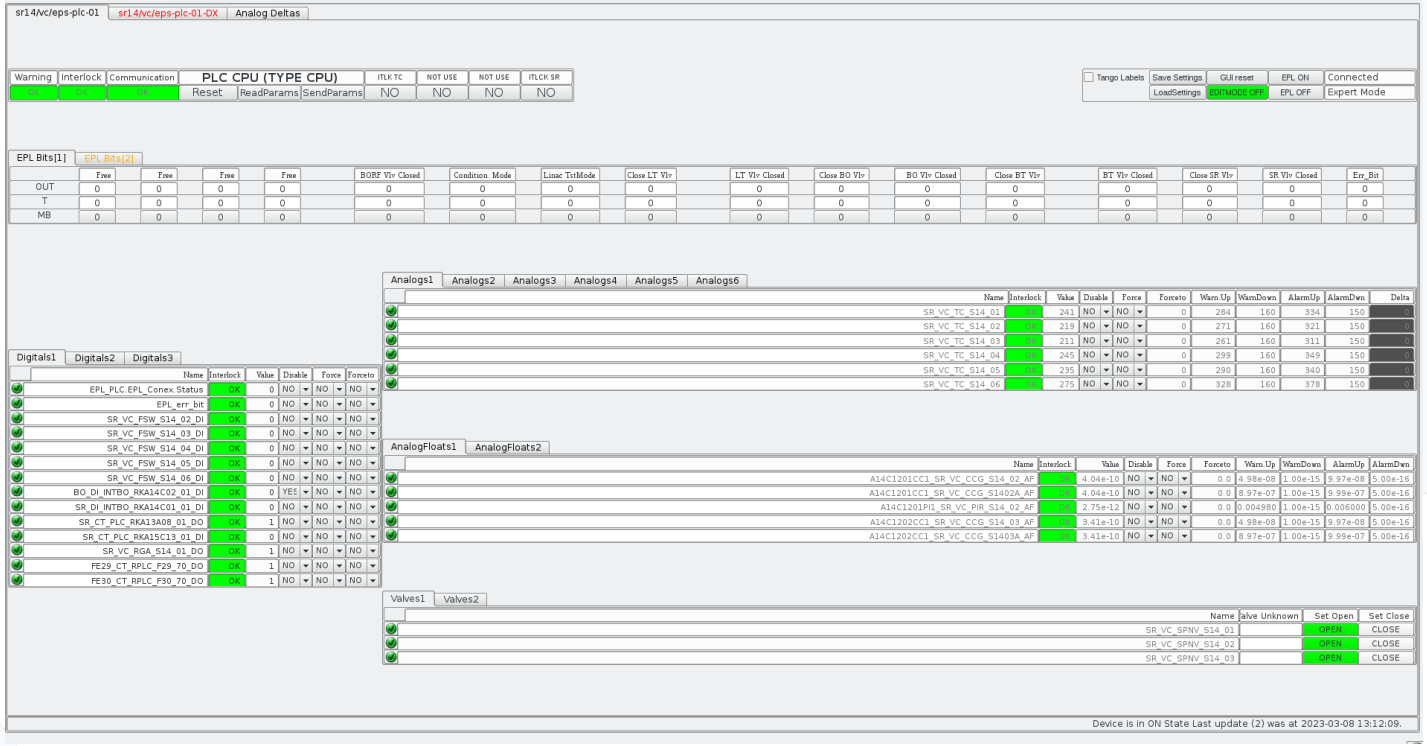
Accelerators Control Group

Taurus as library + Qt. Multiwindow



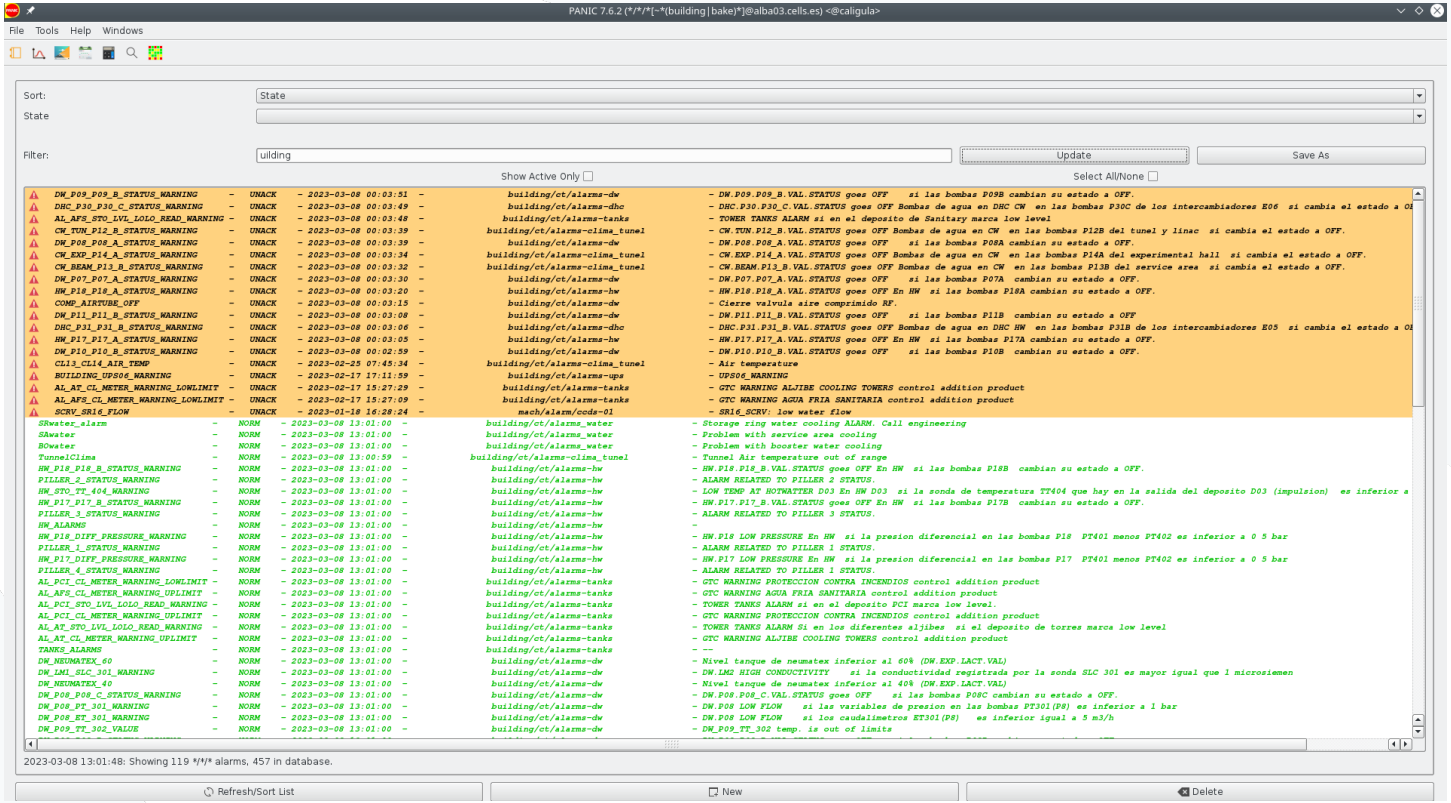
Accelerators Control Group

Taurus as library + Qt. Multiwindow



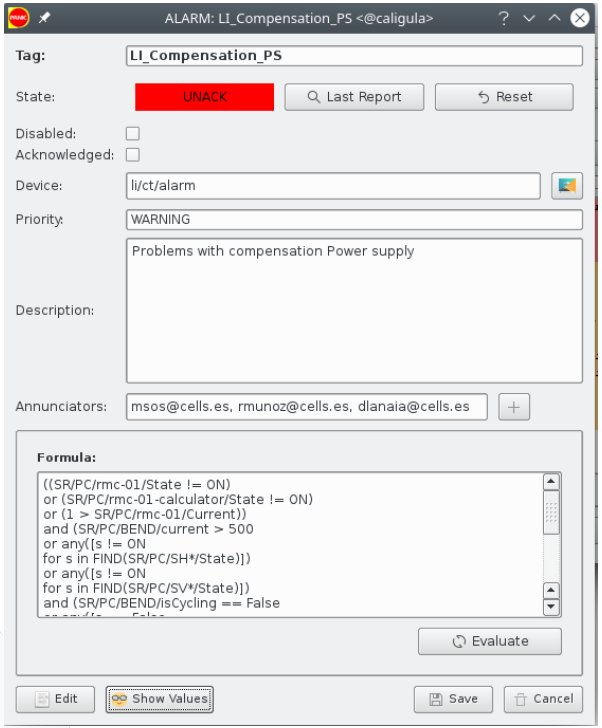
Accelerators Control Group

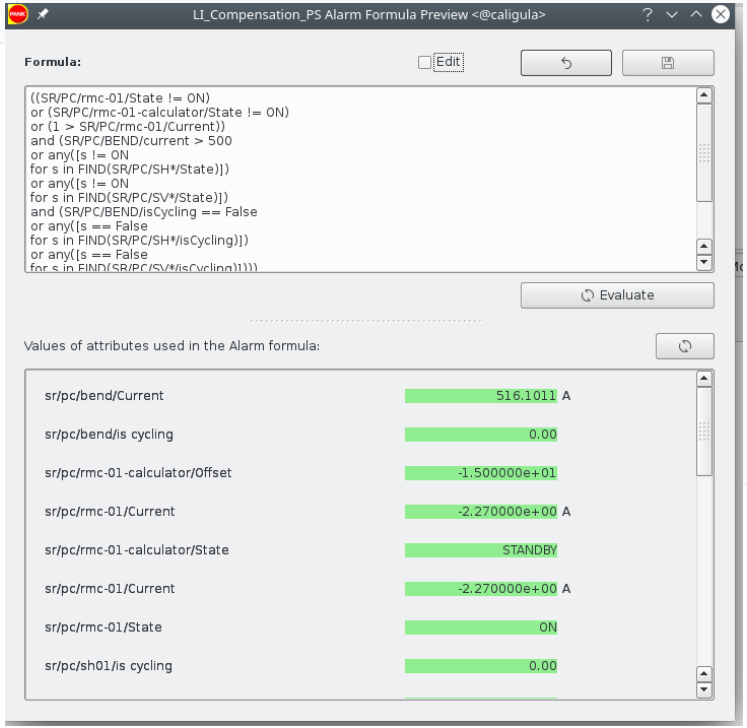
Taurus as library + Qt. Multiwindow



Accelerators Control Group

Taurus as library + Qt. Multiwindow



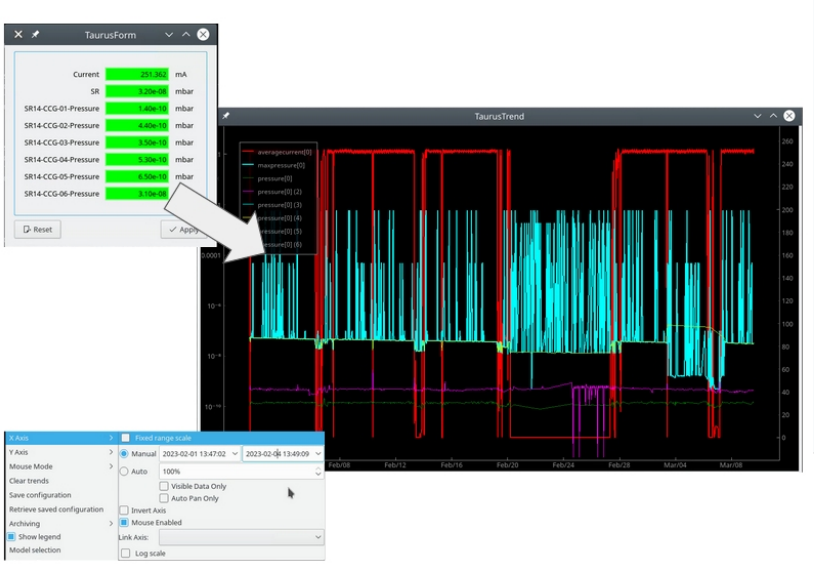


Summary

- ALBA control room
- Control System GUI
- **Control Section widgets**
- Questions

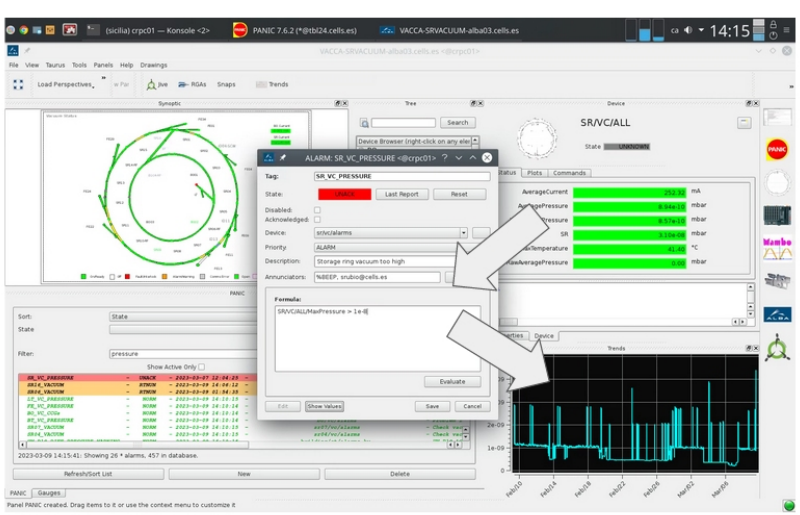
Control Section widgets
Archiving Widgets

- **pyhdbpp** library supports both **MySQL** and **TimeScaleDB**, easy to extend for other backends
- Widget displays either archived data or current data, just moving on the time axis
- Attributes are just drag & drop from other widgets or applications into the plot



Control Section widgets

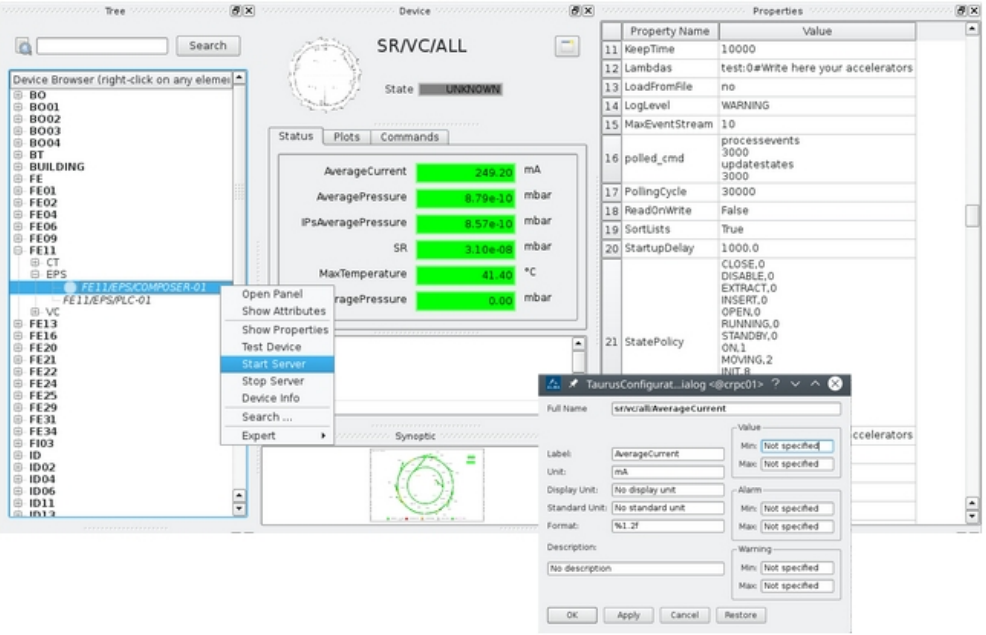
- Attribute models are **draggable** from one application to another
- This allows to directly drag attributes from forms into **archiving** plots or alarm editors, and viceversa
- Specific applications, like **panic**, can be embedded as widgets into other applications



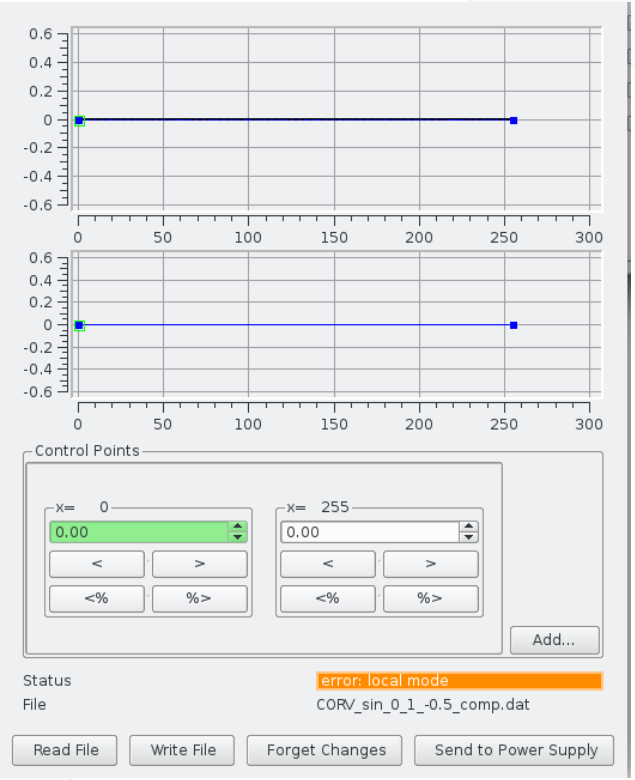
Control Section widgets

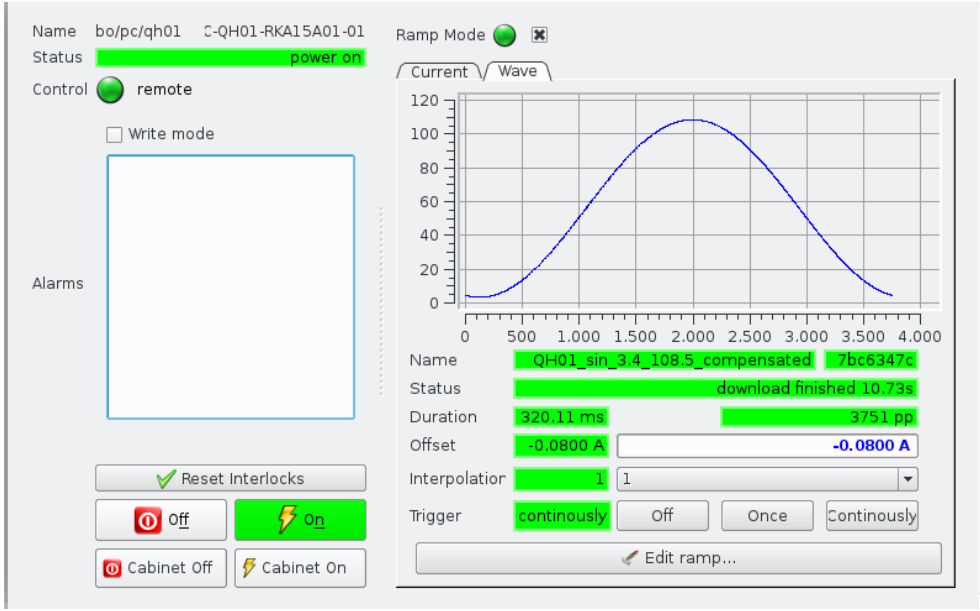
Some applications implement **Jive/Astor** functions like:

- Device creation
- Device Start/Stop/Restart
- Properties editing
- Display device info
- Attribute configuration

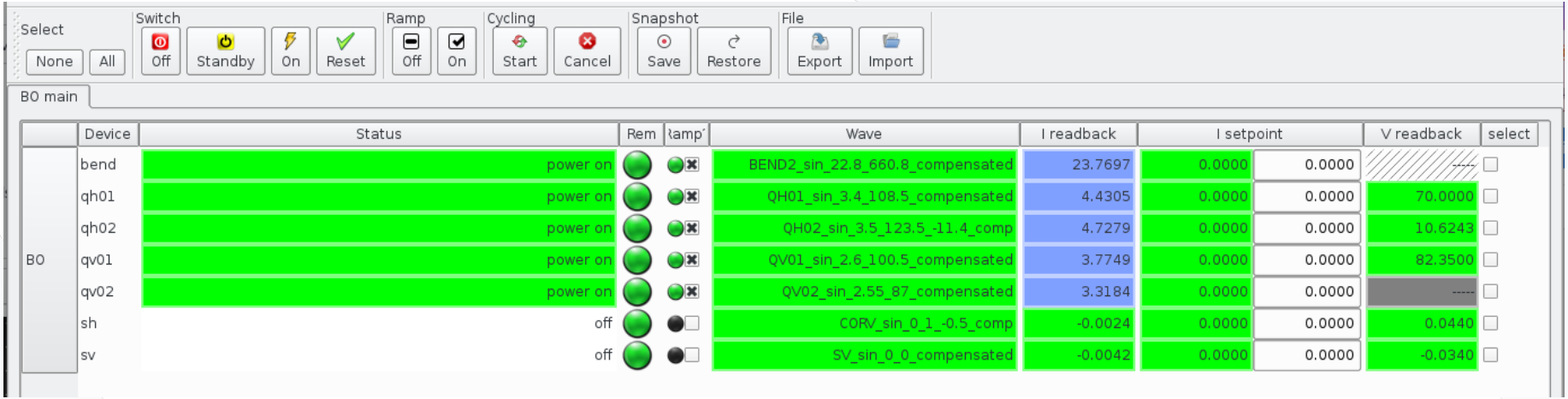


Control Section widgets





Control Section widgets



Accelerators control Group

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Thank you!

Questions?