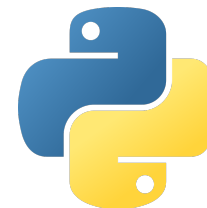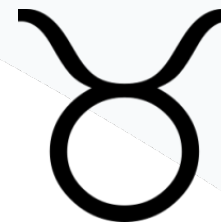# Operations made GUIs.

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Contents.

- ALBA control room.
- Accessing the machine.
  - PyTango
  - taurus.core
- Operations made GUIs.
  - Taurus.
    - taurusform, taurusplot.
    - taurusgui.
    - taurusdesigner + python
  - PyQt5 + python.
- Questions

Taurus SIG – ESRF 2023.

ALBA Control Room

- 2x Workstations for operations.
- 5x Workstations for accelerators.
- 1x Workstation to display data in the wall monitors.

Taurus SIG – ESRF 2023.

PyTango and taurus.core
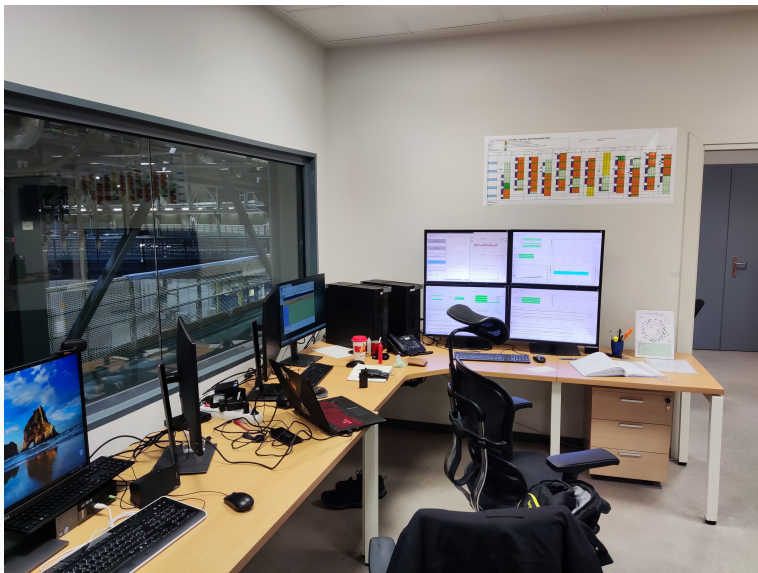
There are two ways to access device server at ALBA:

- PyTango:
    - The standard way of accessing tango device servers.

- Taurus:
    - From the user point of view taurus has the same functionalities than PyTango but adds another layer of security on top of it.

Example: A member of the accelerators group made a python script that try to read an attribute without any wait time between readings, with PyTango, the device hang, and a lot of secondary device servers depending on it fail, so we lost the beam.

Just changing to taurus module instead of pytango solve the problem… with a quirk.

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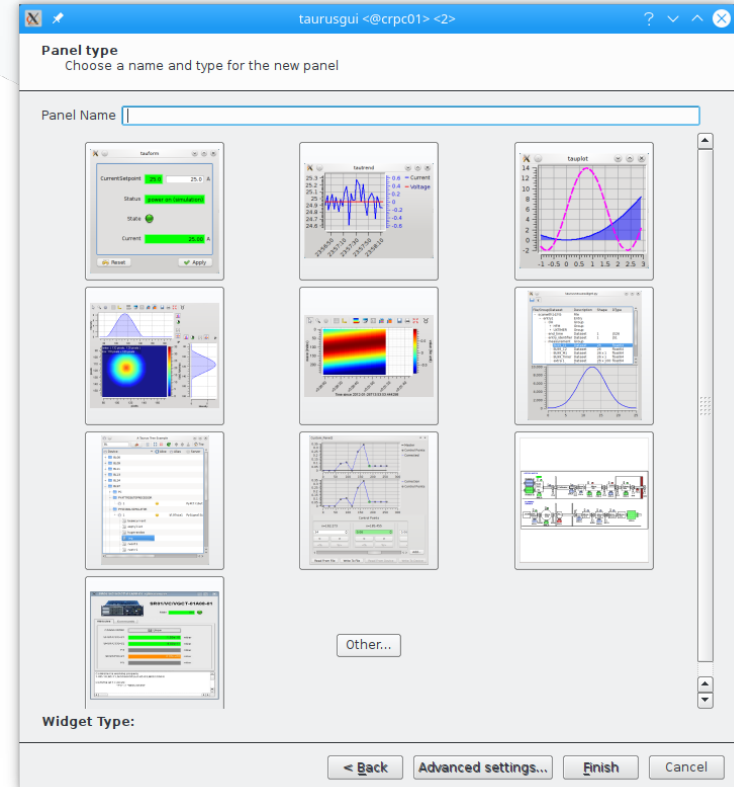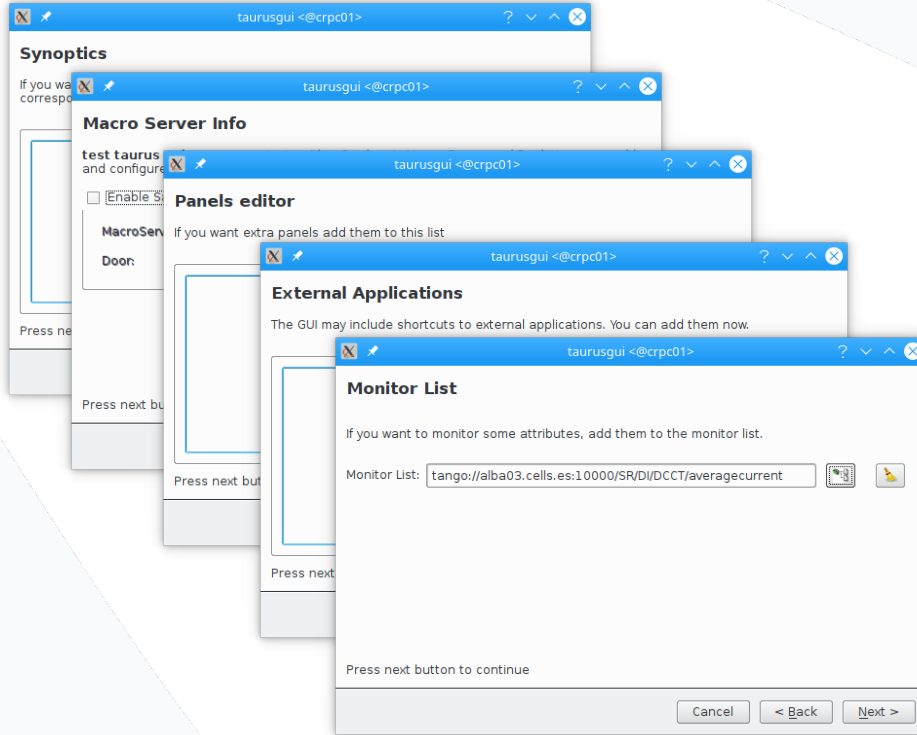# Taurusform and Taurustrend

- Quick access to the device servers.
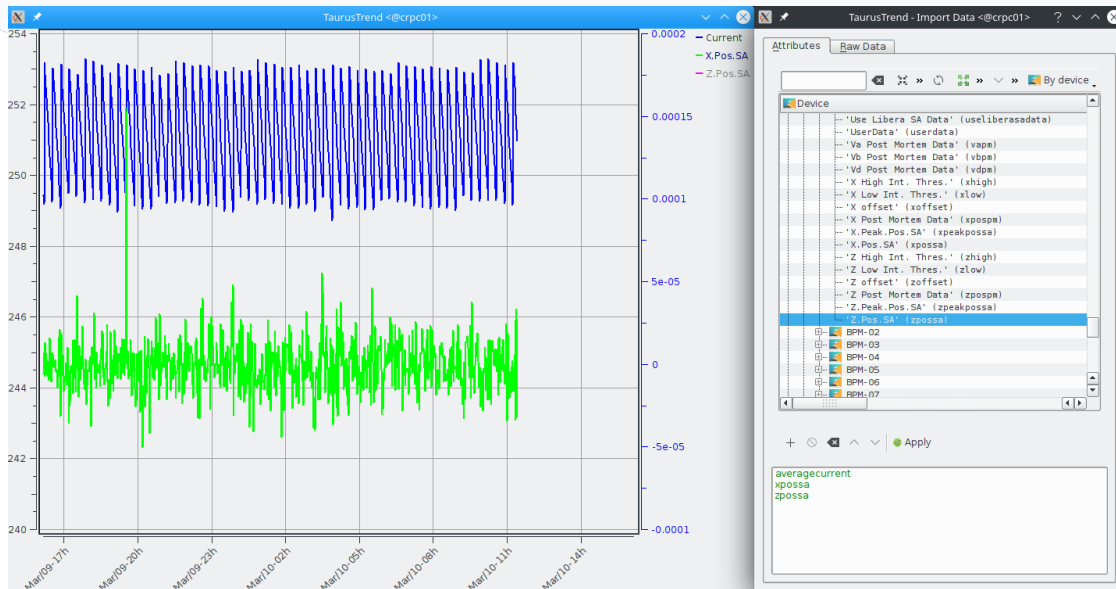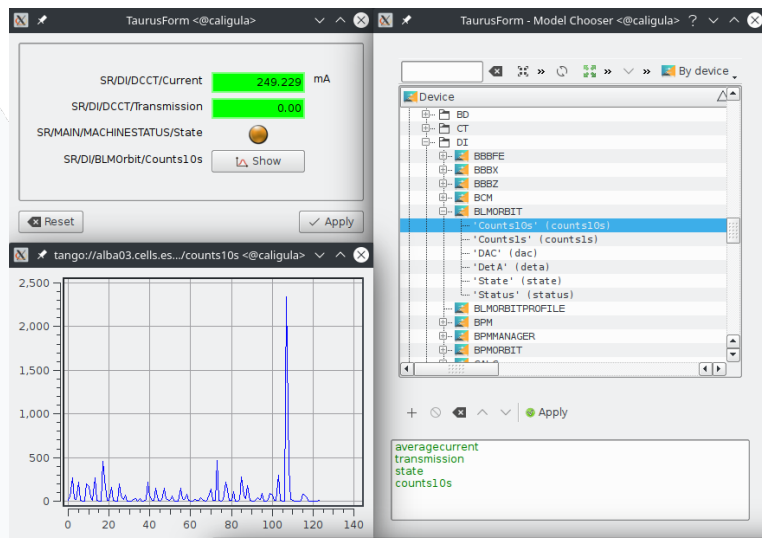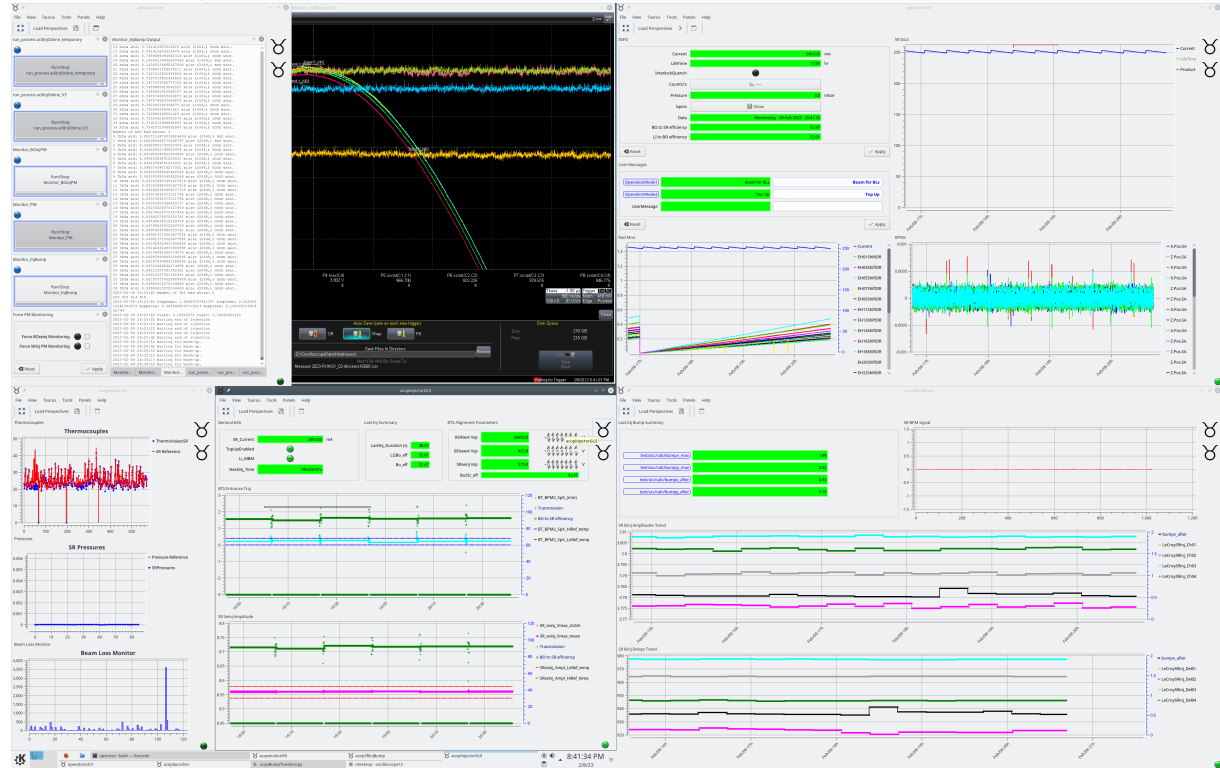
- This two utilities only need a 5 minutes training to use.

Taurus SIG – ESRF 2023.

- Allows the creation of more complex GUIs, combining taurusforms, taurustrends and more widgets.

Taurus SIG – ESRF 2023.
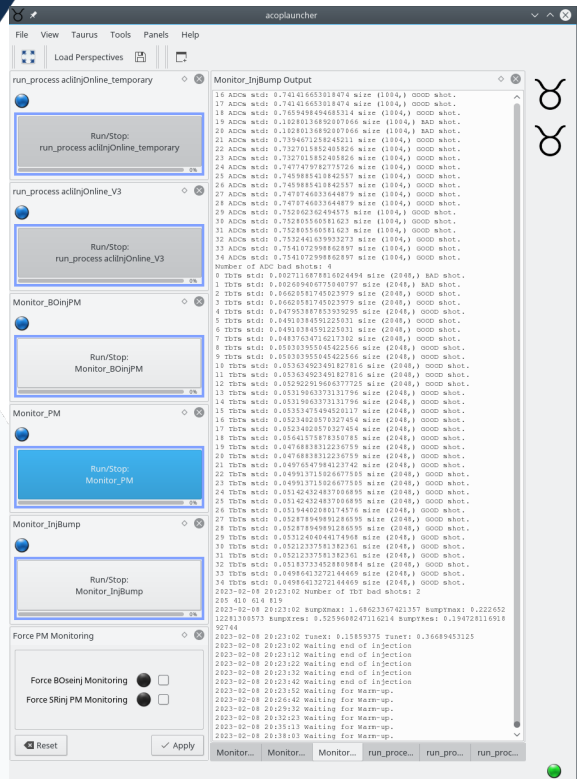
Taurusgui examples.

- Operation Workstation crpc02 uses taurusguis.
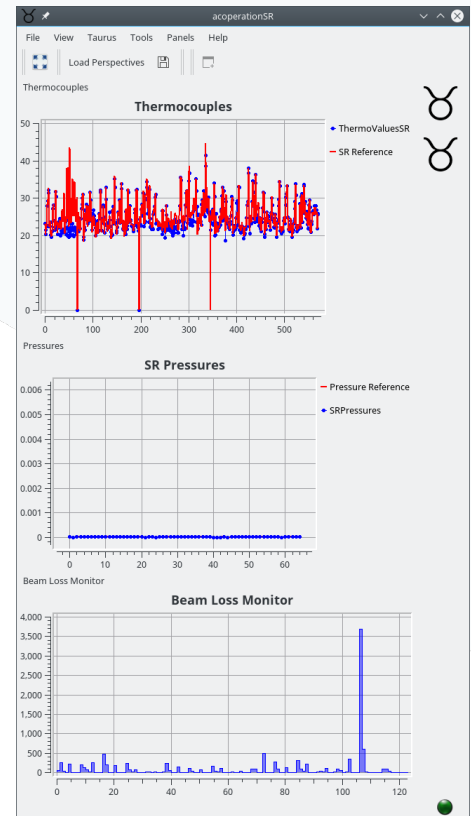

Taurus SIG – ESRF 2023.

Taurusgui examples.

- acoplauncher.
  - This GUI launches scripts that are used during operation.
  - Uses a macro-server to control the scripts execution.
  - This allows to check the status of the scripts instead of having to navigate from terminal tab to tab.

- acoperationSR:
  - Used to check vacuum pressures, SR temperatures and Beam Loss Monitors.

Taurus SIG – ESRF 2023.

Taurusgui acosrinjbump.
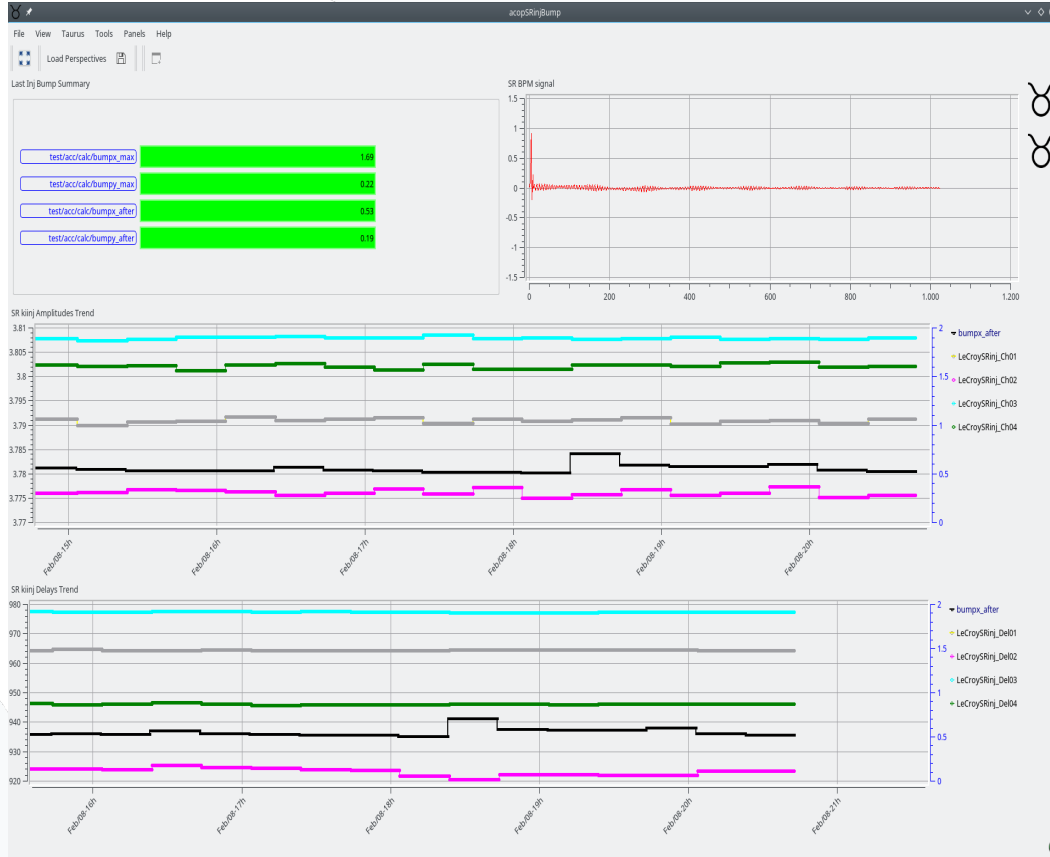
- acopsrinjbump.
  - This GUI is used to check the perturbation on the orbit that the pulsed magnets produce.

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Taurusgui acopinjectorgui.
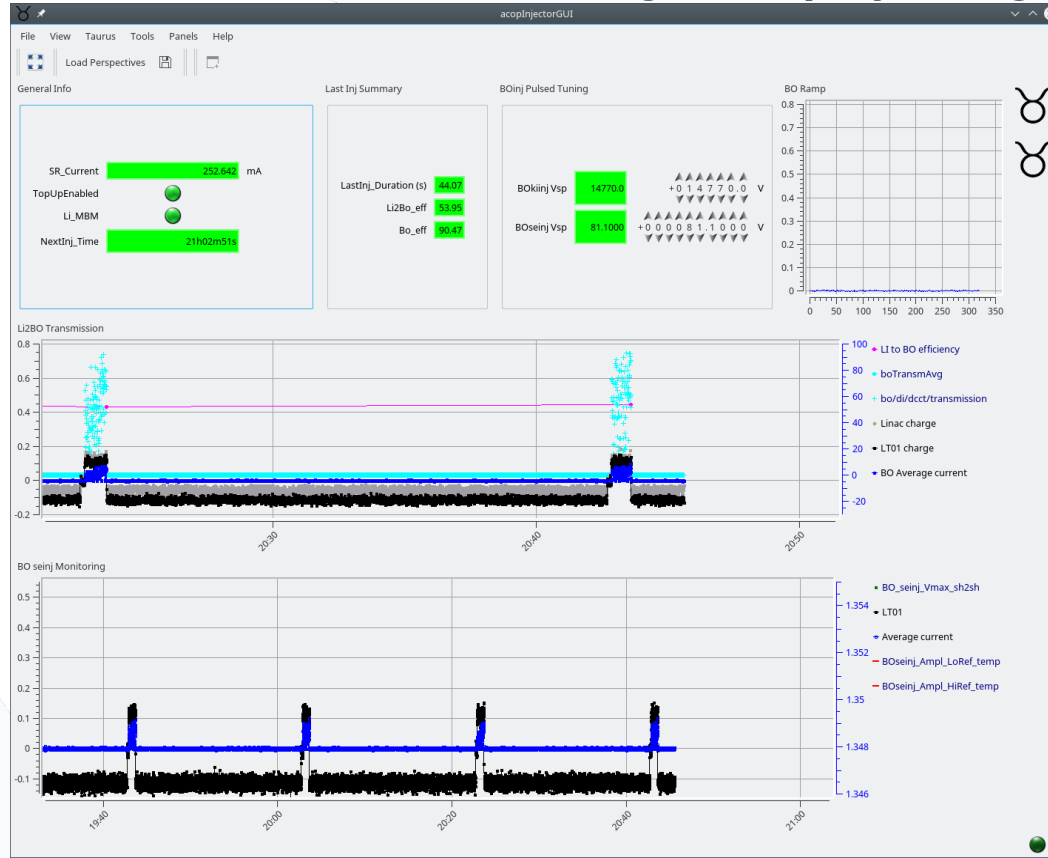
- Taurusgui also have the possibility of pre-save different lay-outs.
- acopinjectorgui has 3 layouts used in different operational situations.
- This layout is used to improve Linac to Booster transmission.

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Taurusgui acopinjectorgui.
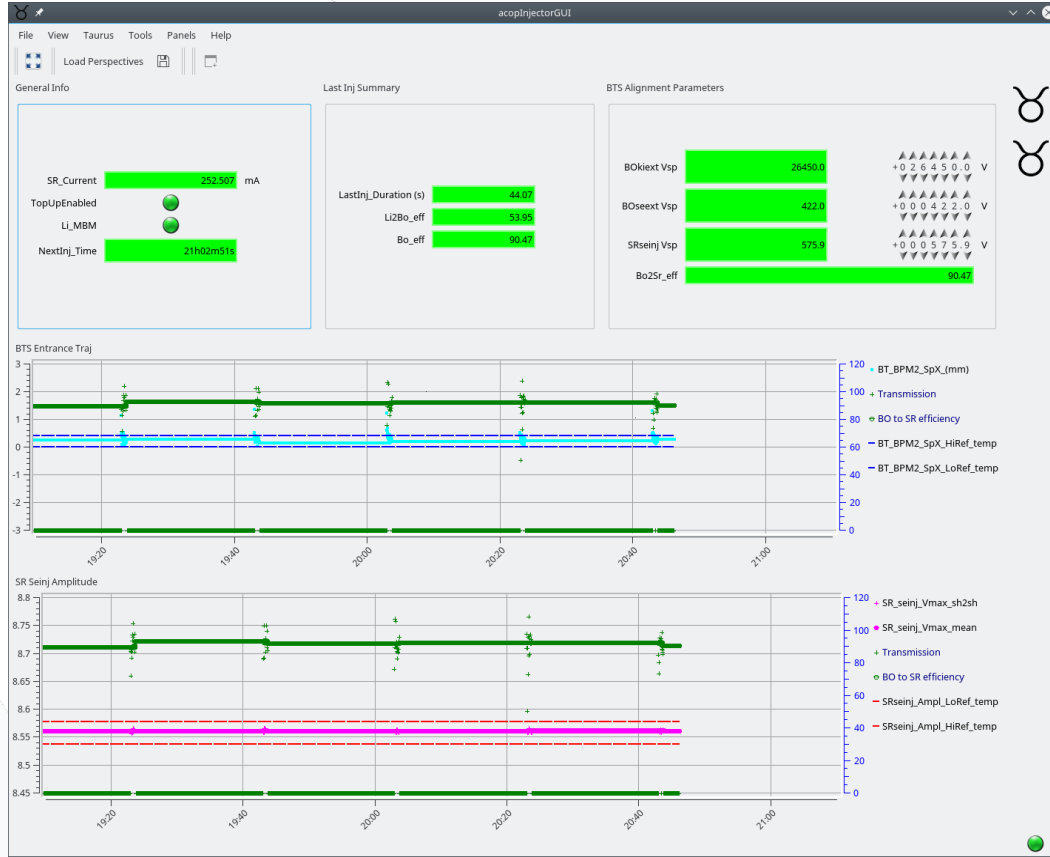
- This layout is used to improve Booster to Storage Ring transmission.

Taurus SIG – ESRF 2023.

Taurusgui acopinjectorgui.
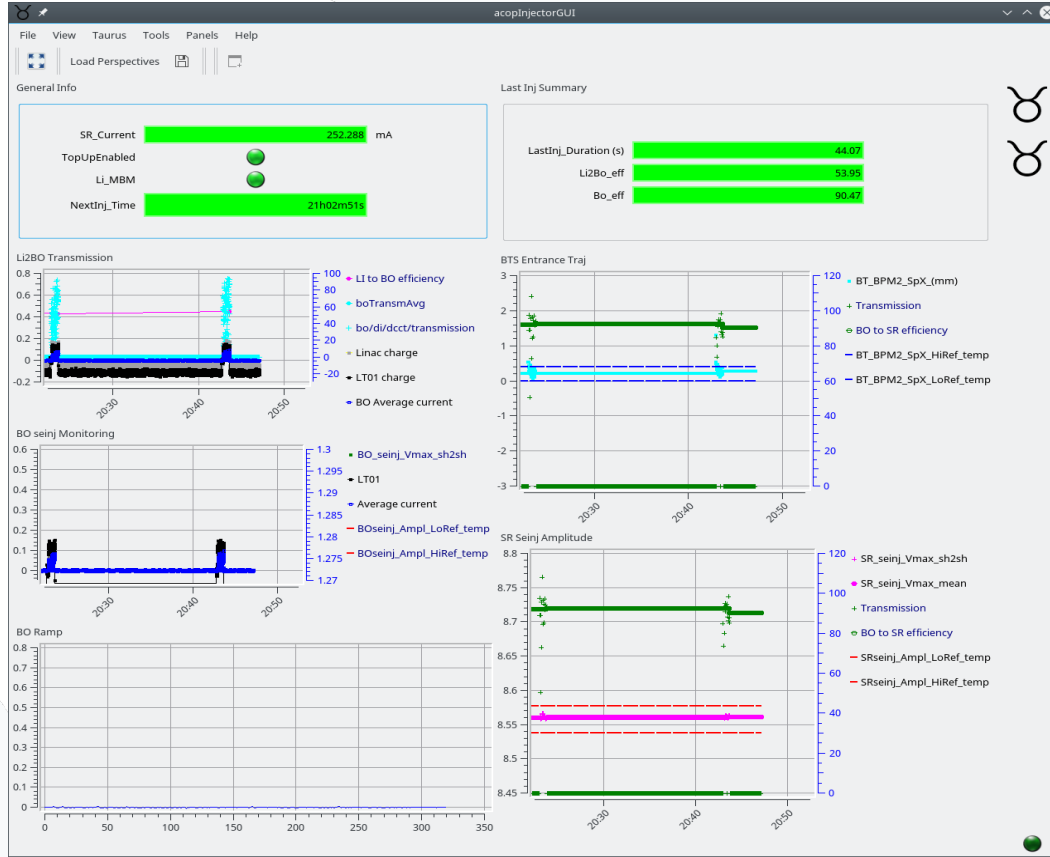
- This layout is used to check the machine during Top-Up mode.
- Taurusgui is ideal for users from basic to no programming experience.

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Taurusdesigner + python.
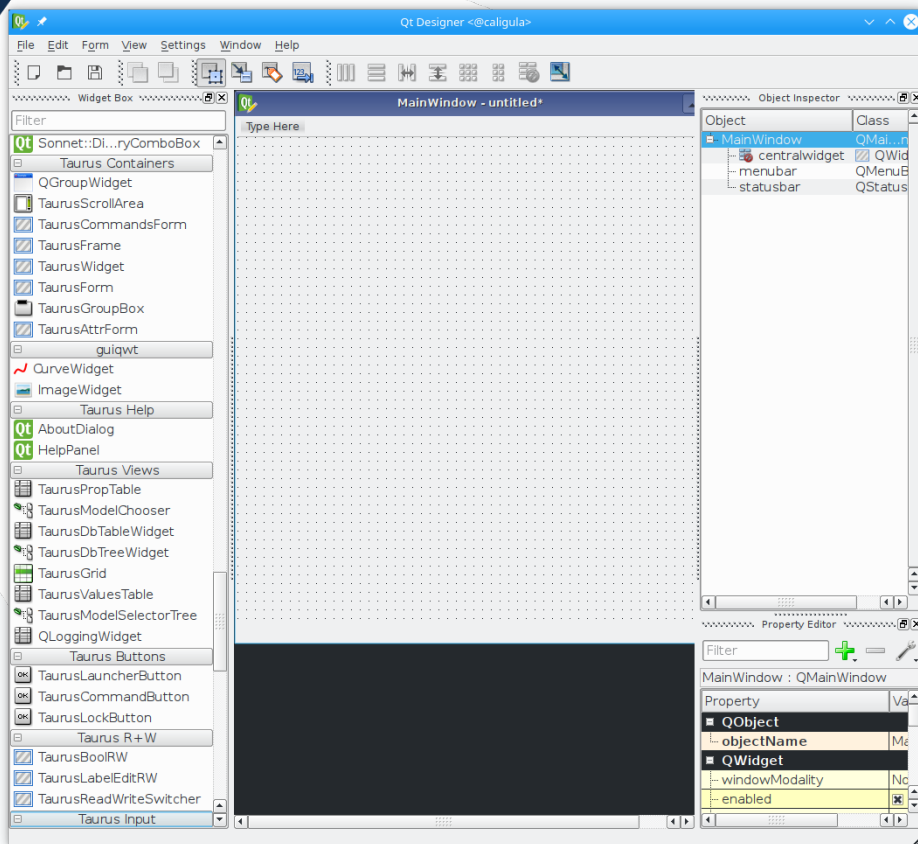
- Taurusdesigner is a qtdesigner tuned to use taurus widgets in an easy way.

- It allows to link the widgets with tango device servers simplifying the GUI design process.

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acopBumpTuneGUI.py
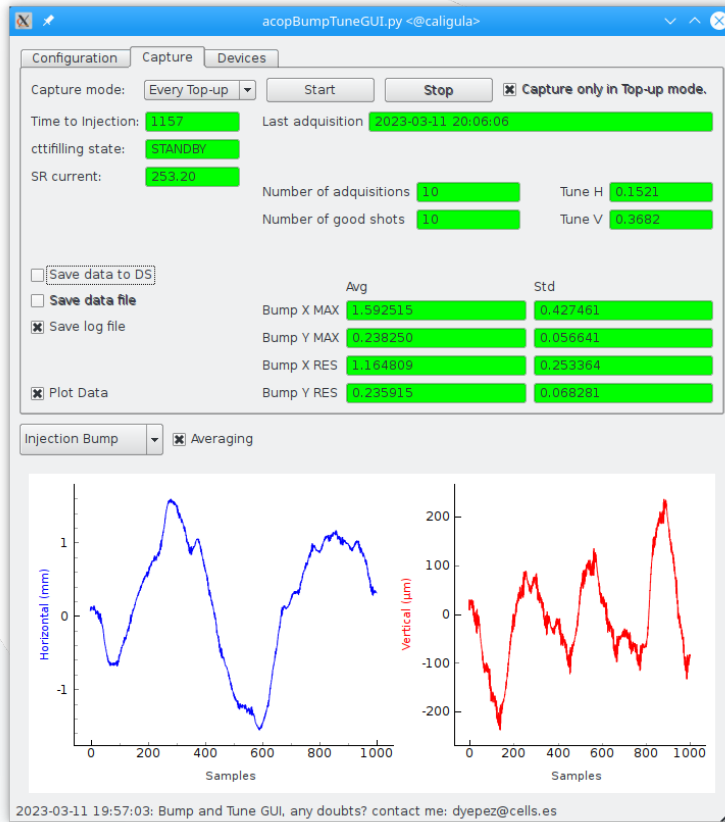
- acopBumpTuneGUI.py it's made with taurusdesigner and python3.

- Used to calculate the storage ring perturbations due to the injection kickers.

Taurus SIG – ESRF 2023.

PyQt5 + Python GUIs
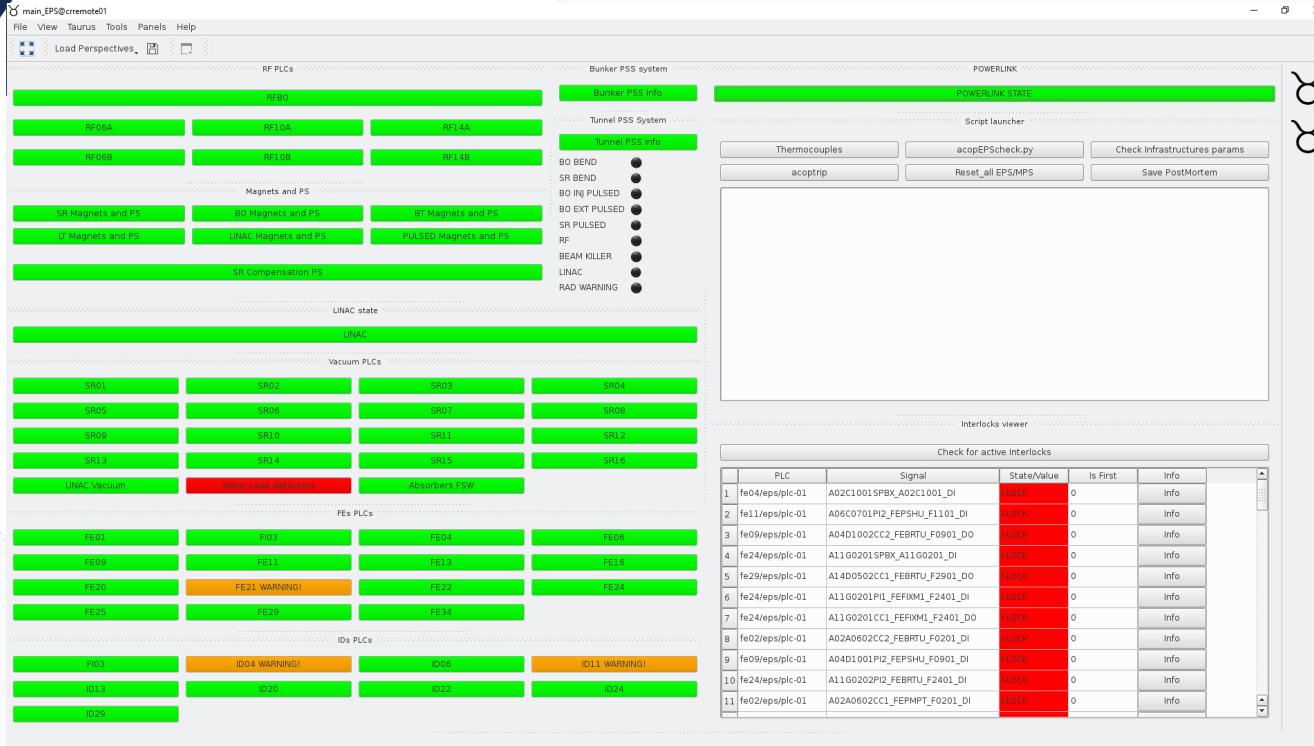
- main_EPS.py:
- This is a huge project, nearly 2 years in development, that simplifies the use of the Equipment Protection System.
- It uses taurusgui as a base gui, with custom made pyqt5 Widgets that work as different layouts.

Taurus SIG – ESRF 2023.

PyQt5 + Python GUIs
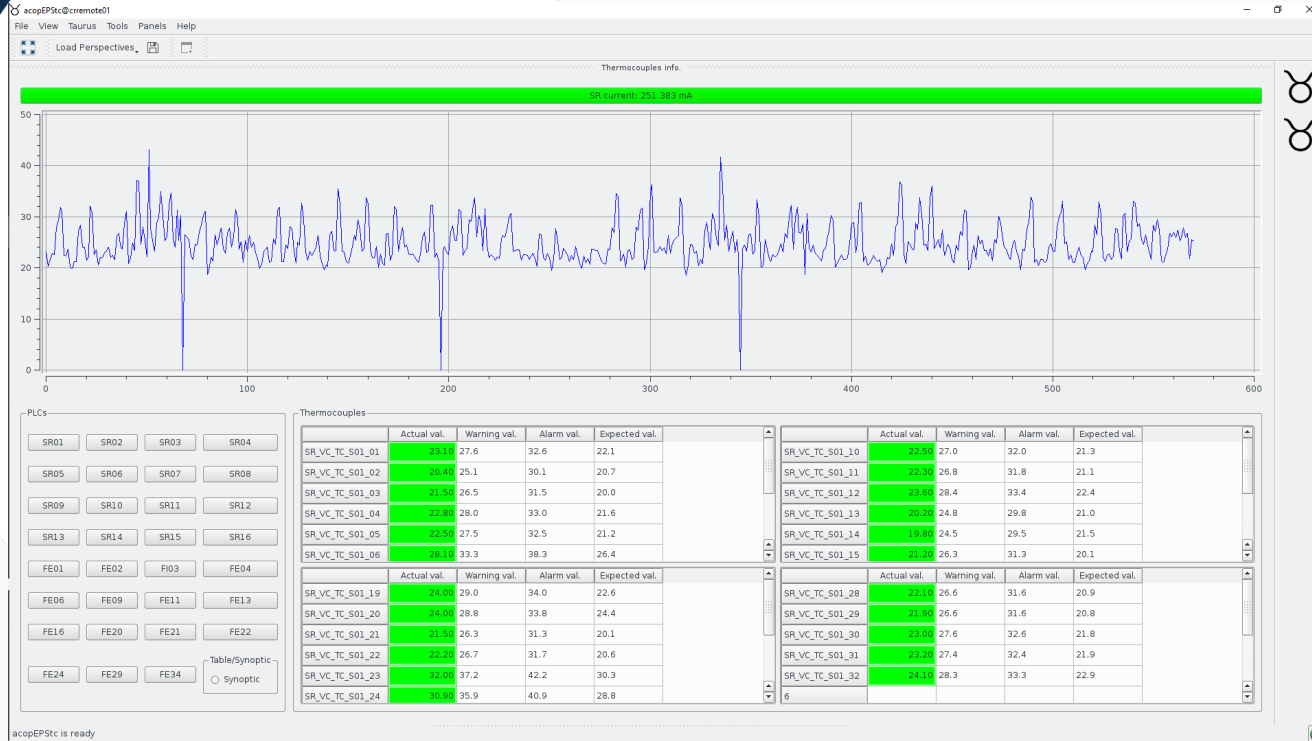
- main_EPS.py:
- This layout shows all thermocouples on the machine.

Taurus SIG – ESRF 2023.

PyQt5 + Python GUIs

- main_EPS.py:
- This layout check all changes on the EPS PLCs.

Taurus SIG – ESRF 2023.
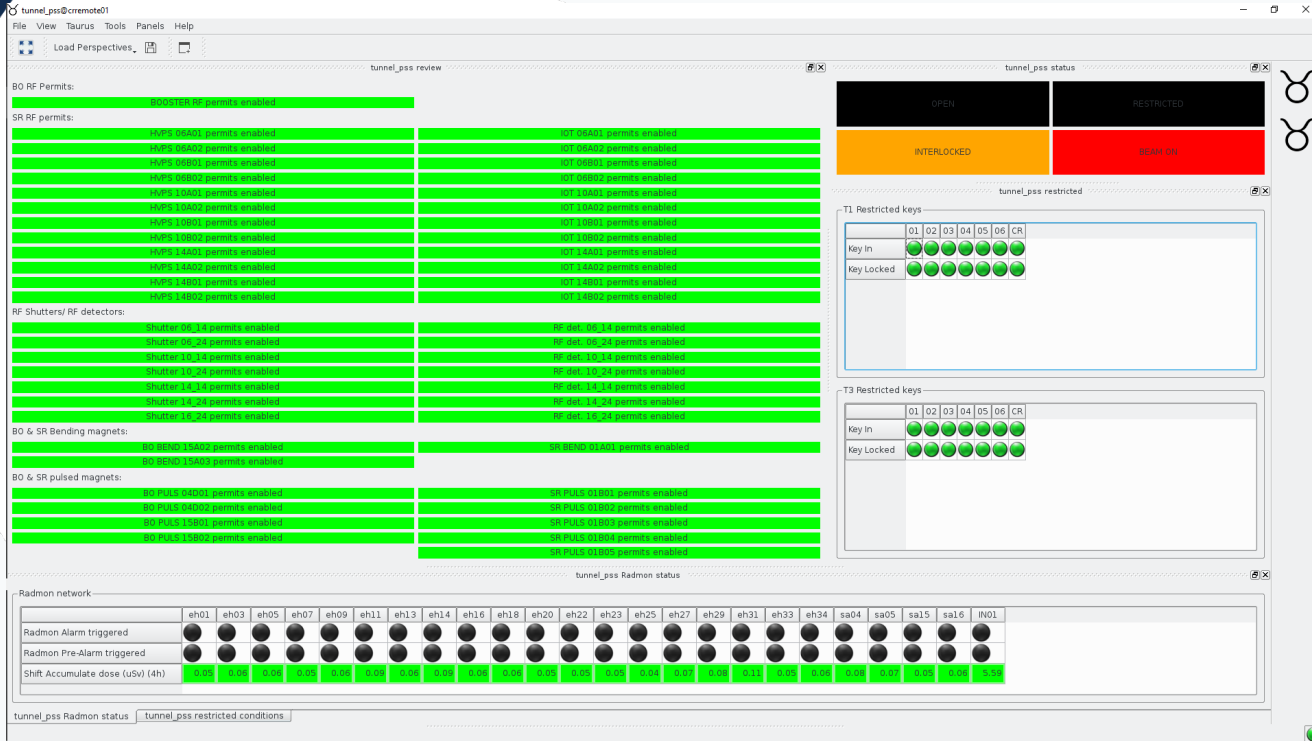
PyQt5 + Python GUIs

- main_EPS.py:
- This layout shows all data from the Personnel Safe System.

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PyQt5 + Python GUIs
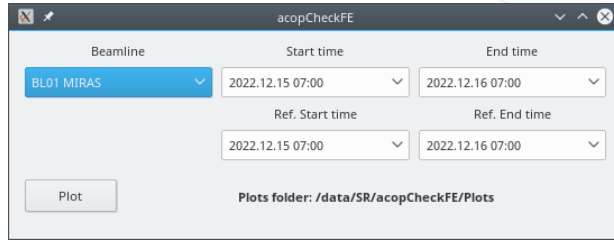
acopCheckFE.py:

To compare the state of the FE diagnostics between two timespans.

acopScopes.py:

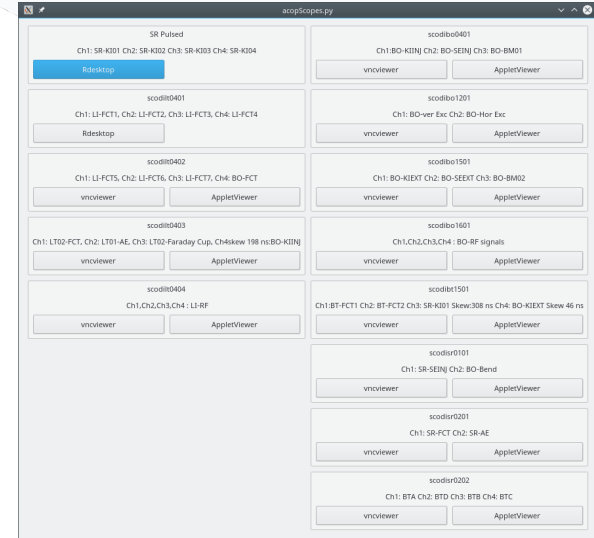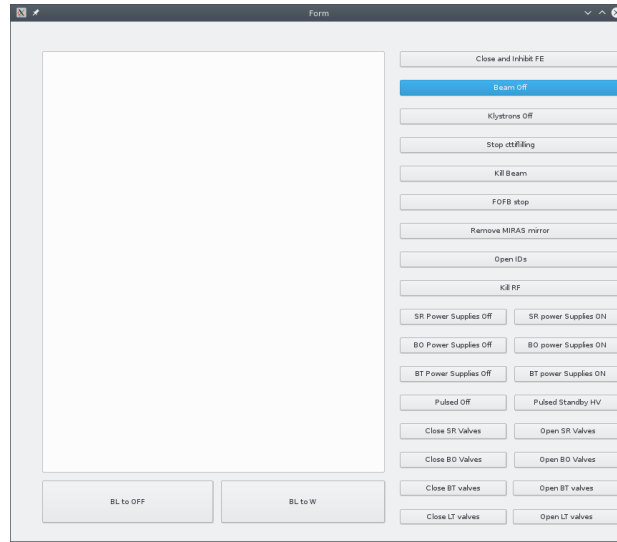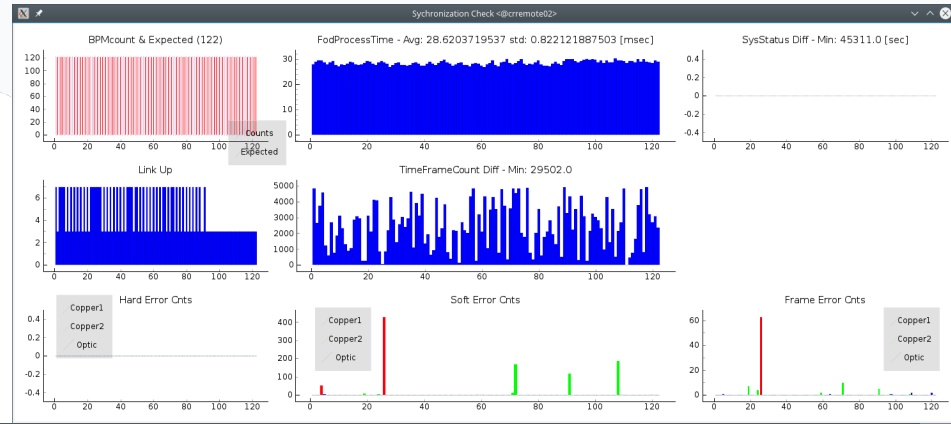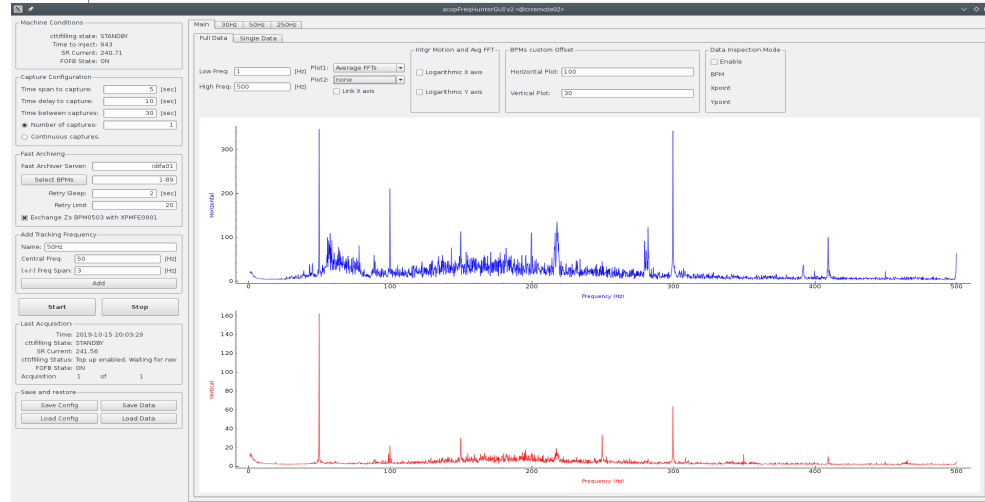Used to launch the different scopes in the machine.

acopShutdown.py:

The shutdown of the machine automatizated, step by step, with this GUI.
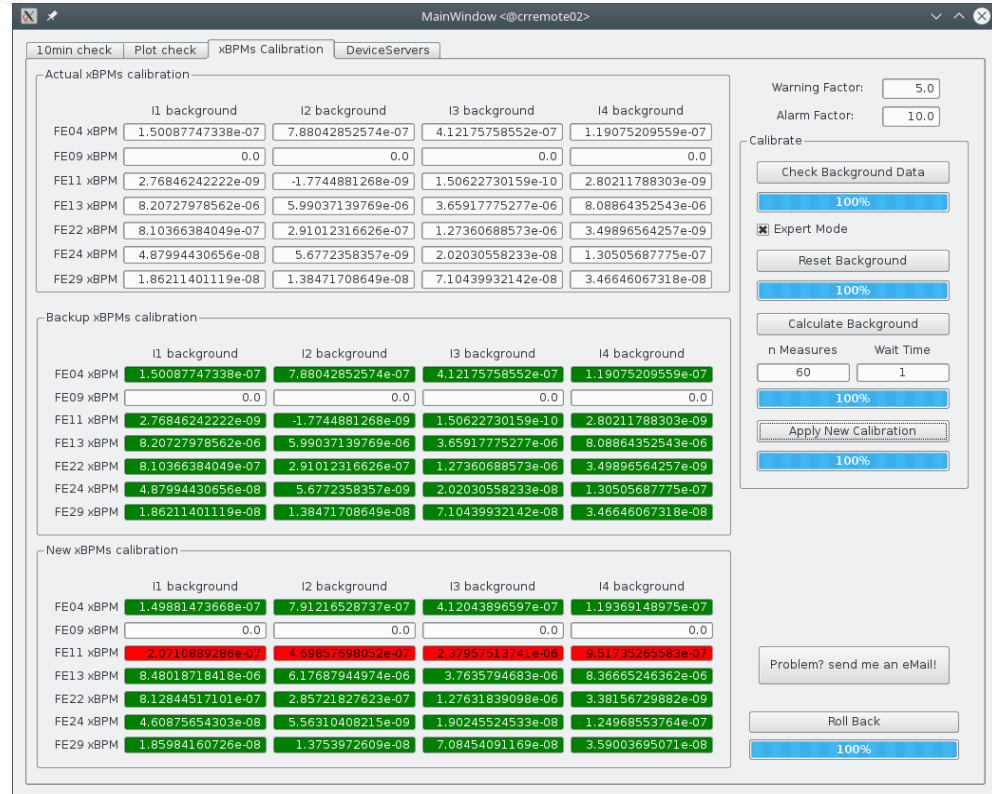
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PyQt5 + Python GUIs

- acopBPMsStatus.py:
  - check and synchronize the BPMs

- acopFrequencyHunter.py:
  - uses the Fast Archiving data to look for instabilities of the beam

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PyQt5 + Python GUIs

- acopxbpmscheck.py:
  - Check beam position at xBPMs and calibrates backgrounds currents from upstream bending magnets.

Taurus SIG – ESRF 2023.

PyQt5 + Python GUIs

- acdiBBBFE.py:
  - Bunch By Bunch Feedback control.

Taurus SIG – ESRF 2023.
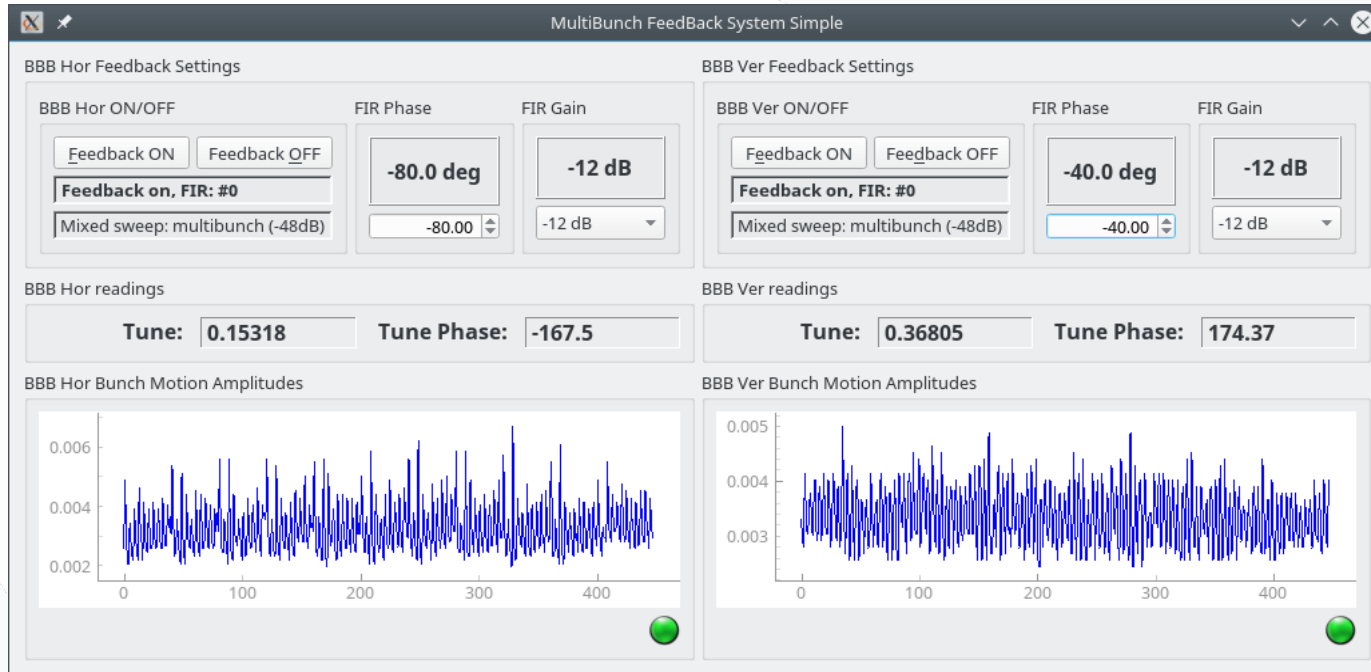
Conclusions.

- Taurus has tools like taurusform, taurustrend and taurusgui that allow scientist and operations to make quick simple GUIs, leaving the controls group to work on more important projects.

- Taurusdesigner, for more advanced users, saves a lot of code, linking device server attributes and commands to taurus-widgets in an easy way.

- Qt is the ideal framework to create GUIs, as it is easy to use and has full integration with python, the programming language of choice at ALBA.

- Using Taurus maintains consistency between GUIs, all GUIs have the same look, feel, and behave in the same way.
    - For example the color coding for attributes:
        - Green: Stable.
        - Blue: Moving.
        - Yellow: Warning.
        - Red: Alarm.
        - Grey: Communication problem.

- Taurus as a way to access the device servers, on top of pytango, adds an additional safety layer to the code for advanced user.

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Questions?

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