



Elettra Sincrotrone Trieste

# Executer

## A Tango based tool for experiment control

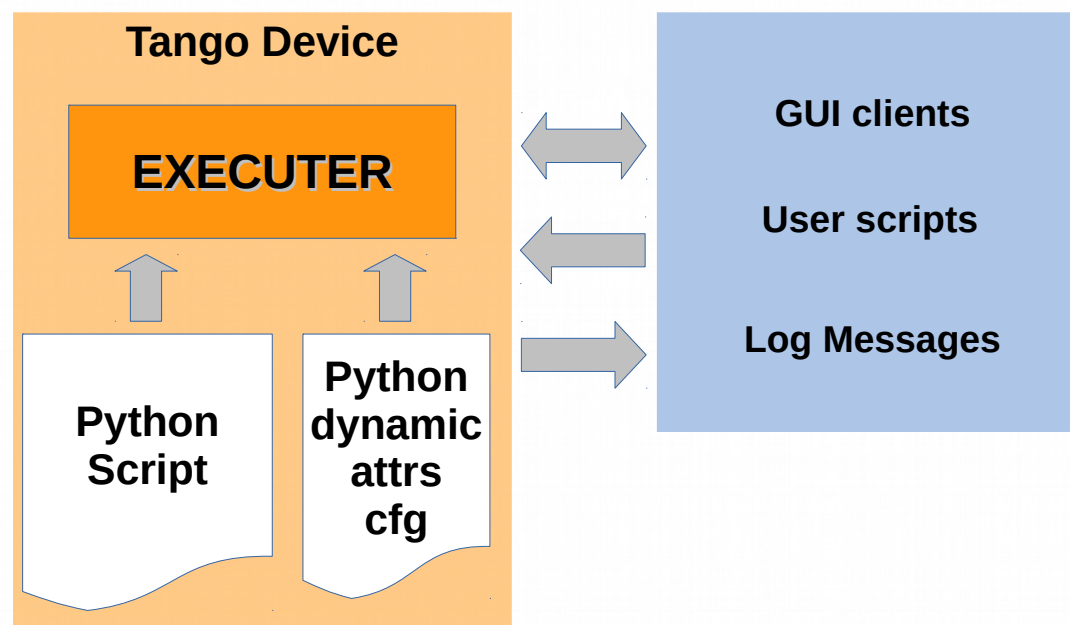
Martin Scarcia  
on behalf of the  
*Software for Experiments Group*  
*Elettra Sincrotrone Trieste*

- ♦ Fermi FEL beamline control systems based on Tango
- ♦ **Experiment control** and data acquisition are therefore based on Tango
- ♦ Manage experiments with an instrument that is:
  - ♦ Versatile
  - ♦ Extensible
  - ♦ Integrated in Tango
  - ♦ Simple

- ♦ An **experiment control** and management tool...
- ♦ ...but also a Python Tango device server
- ♦ A device that **runs** generic **Python scripts**
  - ♦ can interact directly with other Tango objects
  - ♦ can embed non-Python code
- ♦ Takes advantage of **dynamic** Tango **attributes**
  - ♦ configured via a Python cfg file
  - ♦ Including custom read/write functions

- ♦ Each “**experiment**” or “operation” is codified in a Python script that represents the “flow” of actions
- ♦ The main Executer instance will perform
  - ♦ Preparatory functions
  - ♦ Experimental steps
  - ♦ Instrumentation synchronization
  - ♦ Start/stop the data collection
  - ♦ Finalization
- ♦ A separate instance can handle online data post-processing if required

# Interacting with the Executer



# Example (Fermi FEL)

Main experiment  
control panel on  
Timex beamline

**EIS-TIMEX CONTINUOUS DAQ**

Continuous Mode
Pump-Probe Mode
Raster P-P Mode

Project: 20139031    Experiment: CuGeO3    DataSet: 39

Shots/File: 500    Acq. N files: 500

**START**    ●    **STOP**

The device is in OFF state.

Data log message:

10:12:56 Data acquired  
 10:13:47 Data acquired  
 10:14:40 Data acquired  
 10:15:32 Data acquired  
 10:16:25 Data acquired  
 10:17:19 Data acquired  
 10:18:14 Data acquired  
 10:18:21 Aborting Script...  
 10:18:21 Aborted

**Background Shots**  
0

☐ Close Shutter On End

File sequence threshold  
5

☐ Enable Fermi Decimation

Fermi Shots: 1

Fermi Blanks: 49

Fermi decimation status: **OFF**

☐ Variable Scan Mode

Wavelength Scan Begin: 21.4000

Wavelength Scan End: 20.7500

Wavelength Scan Step: 0.0700

SYNC SEED
DE-SYNC SEED
SINGLE SHOT FEL
SINGLE SHOT SLU

**Graphical views**

☐ Spectrometer\_hor\_profile

BunchNumber: 725085775

Seed Laser Sync: **False**

☐ UseFelShutter

☐ Simulation

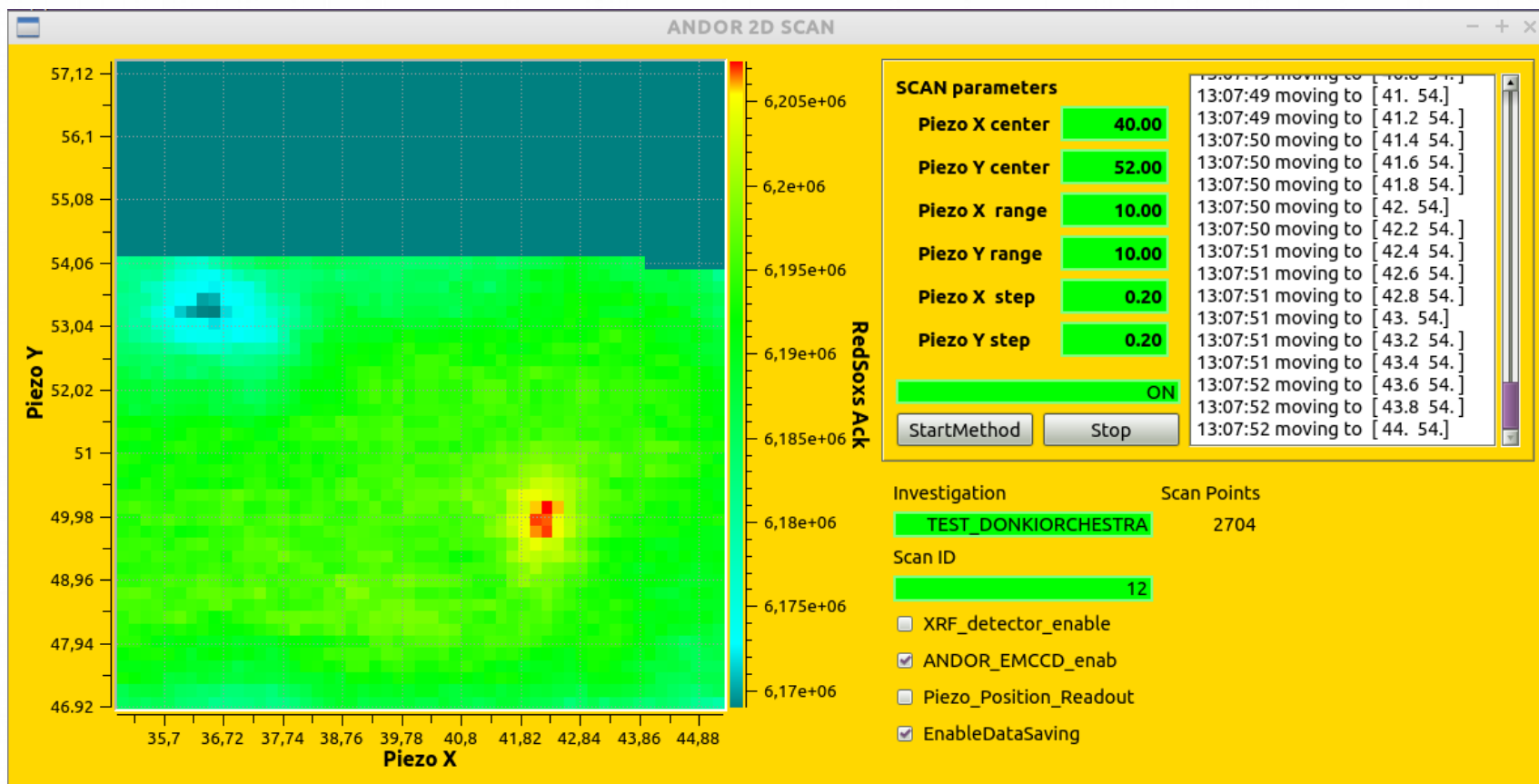
**PADRES\_SHUTTER**  
**OPENED**    OPEN    CLOSE

**PADRES\_VALVE2**  
**OPENED**    OPEN    CLOSE

**TIMEX FEL SHUTTER**  
**UNKNOWN**    OPEN    CLOSE

**TIMEX SLU SHUTTER**  
**OPENED**    OPEN    CLOSE

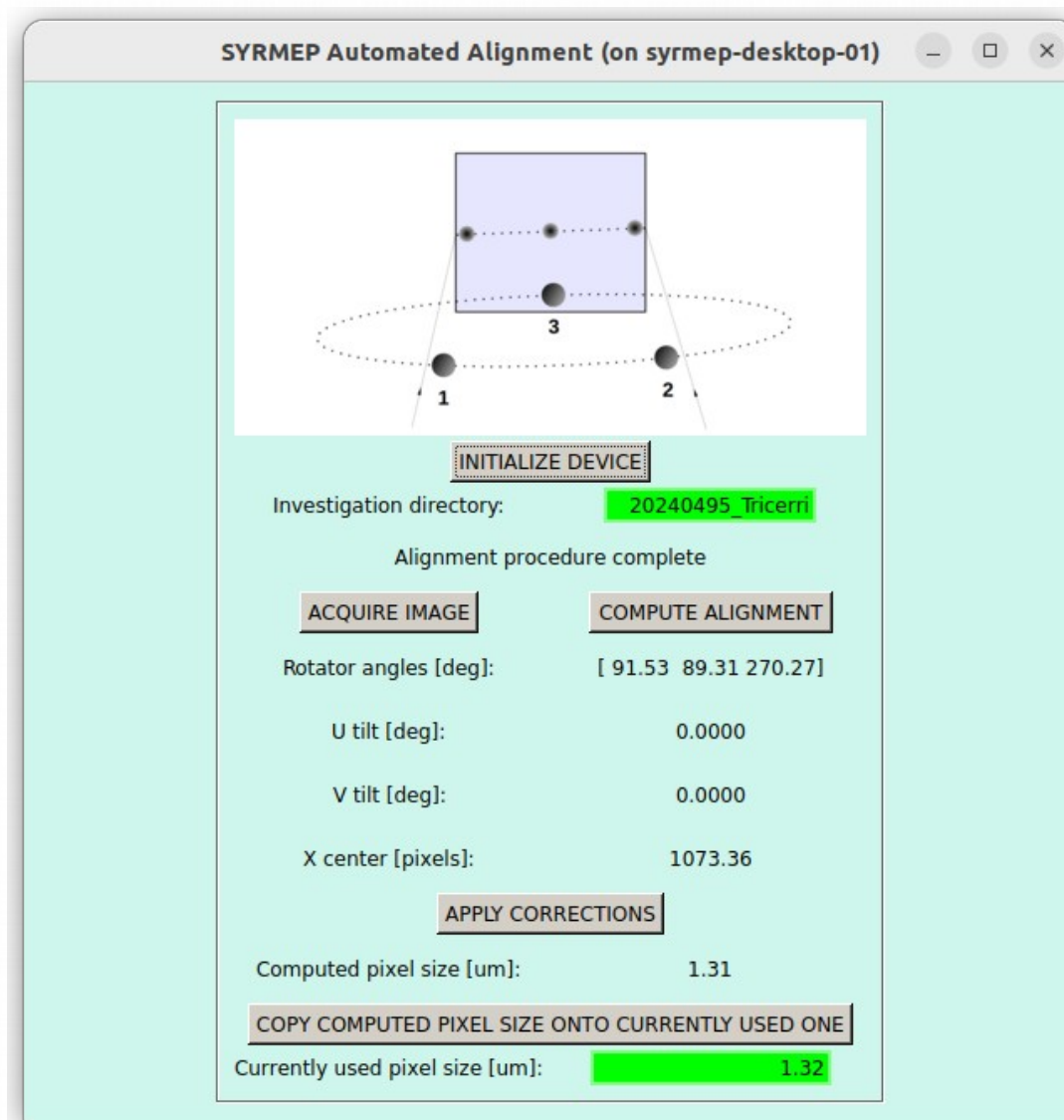
# Example (Elettra synchrotron)



GUI panel for a Executer controlled 2D scan,  
TwinMic beamline

# Example (Elettra synchrotron)

GUI panel for sample  
stage automatic  
alignment,  
Syrmep beamline



- ♦ **CoLibry**: a collection of “internal” Python methods and classes
  - ♦ Build executer scripts
  - ♦ Help write user scripts
  - ♦ e.g.: methods to handle instrument synchronization with FEL pulse
- ♦ **Dynamic**: simplified version of the Executer
  - ♦ **dynamic attributes** only
  - ♦ specific tasks via read/write functions
  - ♦ e.g.: I/O with a non-Tango compliant “guest” source

- ♦ Successfully used during the past years of Fermi operation
- ♦ Used also on Elettra Tango-based beamlines
- ♦ Proved to be **effective** and **versatile**
- ♦ Integrated with other Tango based tools (data acquisition)



# Thank You!