

TAURUS Workshop

14-15 March 2023

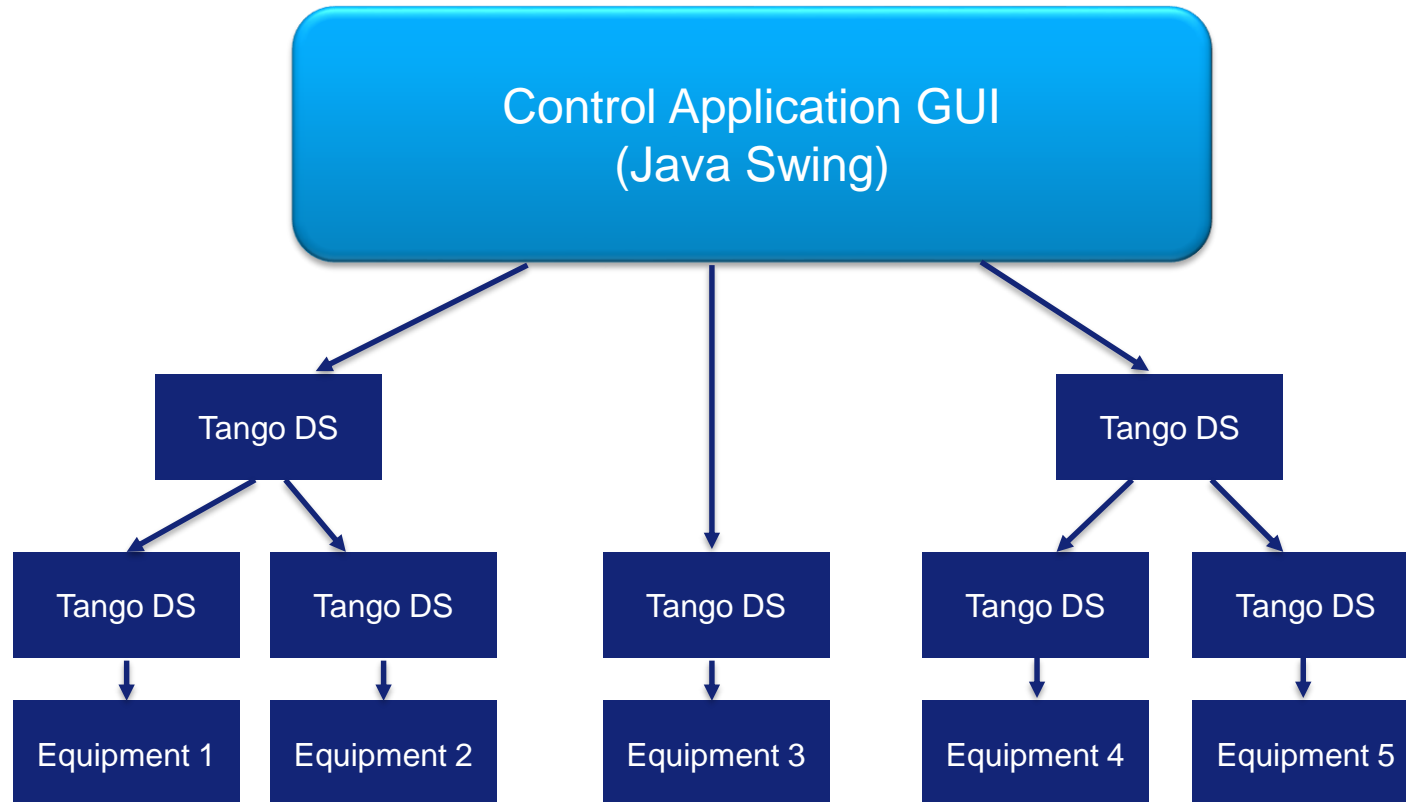
Accelerator Control GUIs at ESRF

F. Poncet



| The European Synchrotron

CURRENT STATUS : ARCHITECTURE



ACCELERATOR CONTROL SYSTEM FIGURES

- **371 Controlled hosts (control PC and VMs)**
- **2 820 Tango servers running**
- **5 159 Tango classes**
- **23 227 Tango devices**
- **417 678 Device properties**
- **153 489 Attribute properties**

ACCELERATOR CONTROLS GUI EXAMPLES

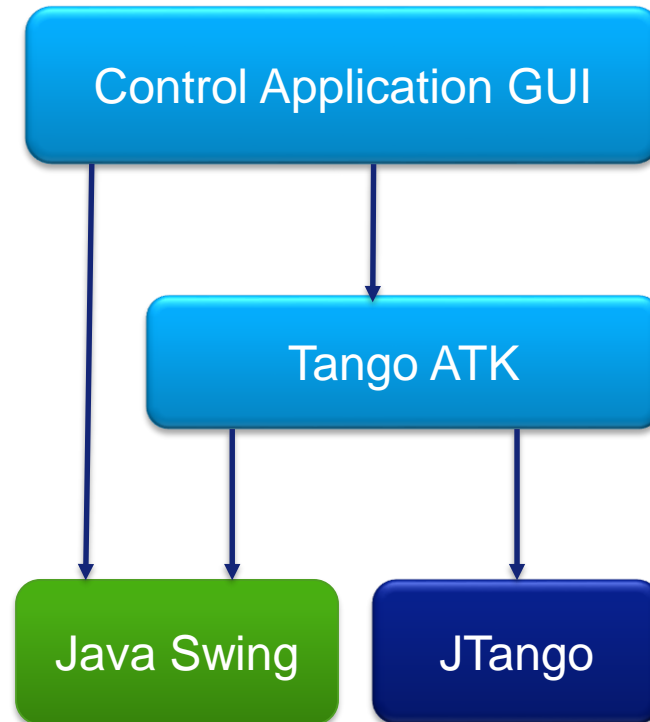
The screenshot displays the EBS SRPs 8.10 control interface, which is a complex dashboard for managing the synchrotron's operations. Key components include:

- Magnet Power Supplies:** A schematic diagram showing the electrical connections for various magnets, with voltage and current readings for different sections.
- Cell 30 and Cell 5:** Panels for monitoring and controlling specific cells, showing parameters like accelerating voltage (5.534 MV) and current (69.241 mA).
- Machine Status 6.7:** A central status panel displaying the current (69.25 mA), lifetime (05h 23mn), and bunch count (16 bunch). It also shows a refilling schedule for the USM.
- Machine Status 6.7 - Bends:** A table showing the status of various bending magnets across different IP stations.
- Machine Status 6.7 - Parameters:** A table of key machine parameters such as SB (c15) current (4.53), Orbit (rms), Orbit (peak), and Energy Spread.
- Machine Status 6.7 - System:** A grid of buttons for controlling various systems like LINAC, SY-INJ, SY-INTLK, SY-RF, SY-PS, SY-EXT, SY-VAC, SY-DIAG, TL2-PS, TL2-DIAG, 352MHZ, SR-INJ, INJ-PERM, PSS-INJ, RF-TRA, SR-ACORR, SR-PS, SR-PS, RF-CAV, SR-BPM, SR-ORBIT, SR-VAC, SR-INTLK, SCRAPER, SR-DIAG, PSS-VAC, ID, FEEDB, PSS-BEAM, COLLIMAI, SR-TH, ALGE, FLUIDS, CS-ROOM, HVAC, BEAML, CRYO-TZ, INFRA, EL-THD, W-LEAK, HQPS, System, VOICE, HDB, HOSTS, TIMING.
- Emittance Control 5.1:** A panel for controlling the emittance of the beam, showing settings for D09, D27, ID07, and ID25.
- Triggers:** A panel for managing triggers, showing the status of srdiag/ccd/c07-1.
- Beam Stop:** A panel for controlling the beam stop, showing the status of CT device and PCT.
- Modulators:** A panel for controlling the modulators, showing the status of modulator 1 and modulator 2.
- Plots:** Several diagnostic plots are visible, including a current plot (SR current (mA)) and a lifetime plot (Lifetime).

GUIS CHARACTERISTICS AND FIGURES

- **130 Java GUI applications deployed and used in operation. Many of them also include expert sub-panels**
- **All of them are desktop standalone applications**
- **100% of these applications are developed by our team (ACU)**
- **Among them lots of medium complexity applications and a few very complex applications**
- **The number of tango devices connected to one application : up to 2 000**
- **Pure clients talking to Tango devices. The control logics are coded inside the device servers not in GUI applications**
- **In addition to the above applications, more than 60 dashboards based on Jdraw Synoptic made by non programmers : equipment responsables or operators**

Java applications based on Tango ATK framework



HOMOGENOUS LOOK & FEEL

- **Color code, ToolTips, conventions**
- **Same tools for chart, plots**
- **Error handling and windows : popup and history**
- **Synoptic drawings**

HOMOGENOUS LOOK & FEEL

Device States

ON OPEN EXTRACT

OFF CLOSE INSERT

INIT FAULT MOVING

ALARM STANDBY DISABLE

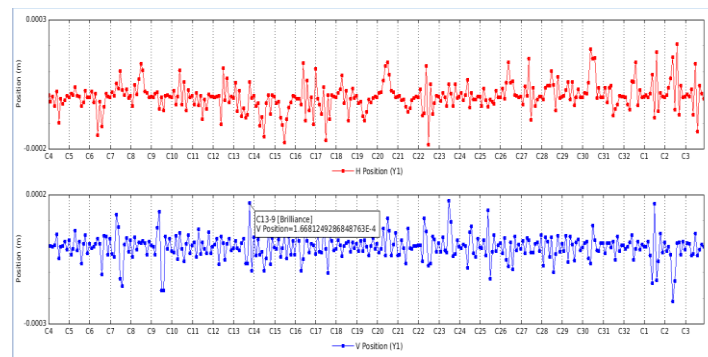
RUNNING UNKNOWN

Att Quality Factors

VALID INVALID

ALARM WARNING

CHANGING



Tango error manager

Time	Severity	Source	Description
09Feb 18:25:37	WARNING	ip/test/L/Att_float	Reading on hardware failed...
09Feb 18:25:59	ERROR	ip/test/L/Att_float	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:30:17	WARNING	ip/test/L/Att_float	Reading on hardware failed...
09Feb 11:39:03	ERROR	MySetState	java.lang.NumberFormatException: For input...
09Feb 11:39:03	ERROR	MySetState	Incompatible command argument type, expe...
09Feb 18:25:50	ERROR	ip/test/L/State	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:44	ERROR	ip/test/L/att_trois	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:45	ERROR	ip/test/L/att_...	Not able to acquire serialization (dev, class o...
09Feb 18:26:01	ERROR	ip/test/L/att	The polling thread is late and discard this ob...
09Feb 18:25:45	ERROR	ip/test/L/att	Not able to acquire serialization (dev, class o...
09Feb 18:26:01	ERROR	ip/test/L/att	The polling thread is late and discard this ob...
09Feb 18:25:54	ERROR	ip/test/L/att	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:47	ERROR	ip/test/L/att	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:47	ERROR	ip/test/L/att	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:50	ERROR	ip/test/L/att_cmg	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:53	ERROR	ip/test/L/att_ga	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:50	ERROR	ip/test/L/Att_boolean	Device (ip/test/1) timed out (>3000 ms)!
09Feb 18:25:44	ERROR	Timeout	Device (ip/test/1) timed out (>3000 ms)!

Filters: Stop Clear View panic View error View warning View source All Sort by No sort

Apply Cancel Close

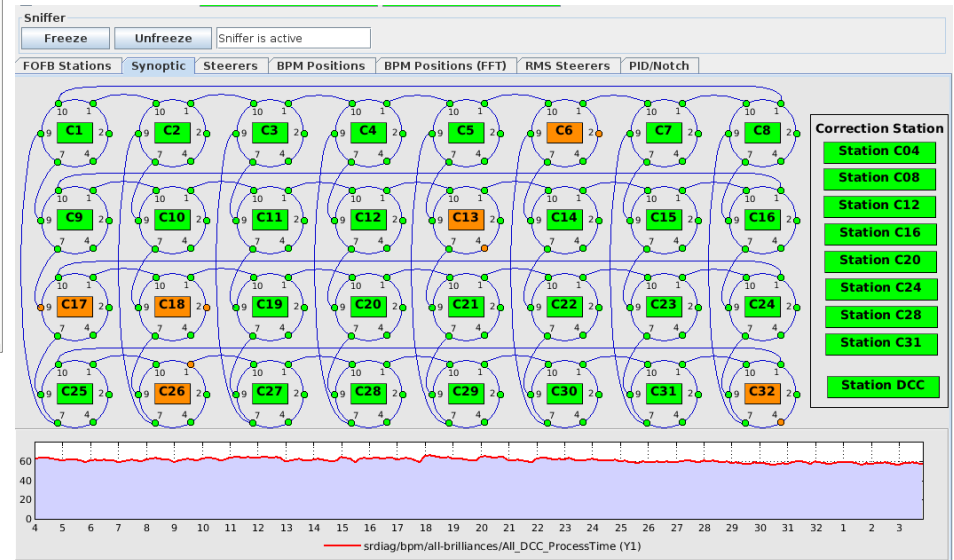
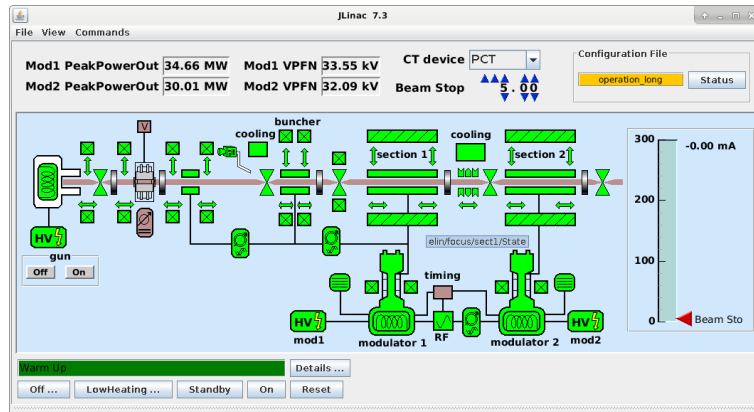


HOMOGENOUS LOOK & FEEL

Synoptic drawings

The unique tool at ESRF which allows to build a simple GUI with zero programming. The equipment experts and/or the operators can build a GUI in autonomy.

This tool is included in Tango ATK.



- **Oracle Support for Java**

- ✓ Oracle Supports Java : see the oracle document “Java Client Roadmap Update” last updated May 11, 2020
- ✓ Latest LTS release Java 17 and the next LTS release Java 21 is planned for September 2023
- ✓ A non LTS release every 6 months and one LTS release every 2 years according to the Oracle Java SE Support Roadmap

- **Oracle Support for AWT and Swing**

- ✓ In Oracle document “Java Client Roadmap Update” last page : *Oracle will continue developing Swing and AWT across all supported releases as a core Java SE technology*

- **JACORB**

- ✓ There is no update or apparent activity on this project since 2017
- ✓ Are the JACORB source codes included inside the Jtango project so that they are compiled / recompiled with Jtango ?
- ✓ What will be the future of Tango Java clients : AtkPanel, Jive, Astor, HDB++ tools and clients?

- **JEROMQ**

- ✓ It is still updated. The last release jeromq-0.5.3 December 2022

- **Jtango**

- ✓ ESRF : for the moment no contributor (Since Pascal's retirement)
- ✓ SOLEIL : Main contributor
- ✓ S2 Innovation
- ✓ Are we going to actively maintain Jtango? Resources? What about JACORB and JEROMQ?

FUTURE OF JAVA GUIS AT ESRF

- **JAVA and Swing support** ✓
- **JEROMQ** ✓
- **JACORB** 🖱️
- **JTANGO** ?

MANY THANKS FOR YOUR ATTENTION

