

TANGO control system for electrostatic accelerators



TANGO control system for electrostatic accelerators



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a brief history of accelerator control systems



PAST (knobs)

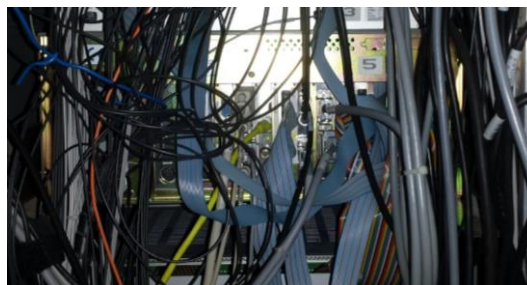
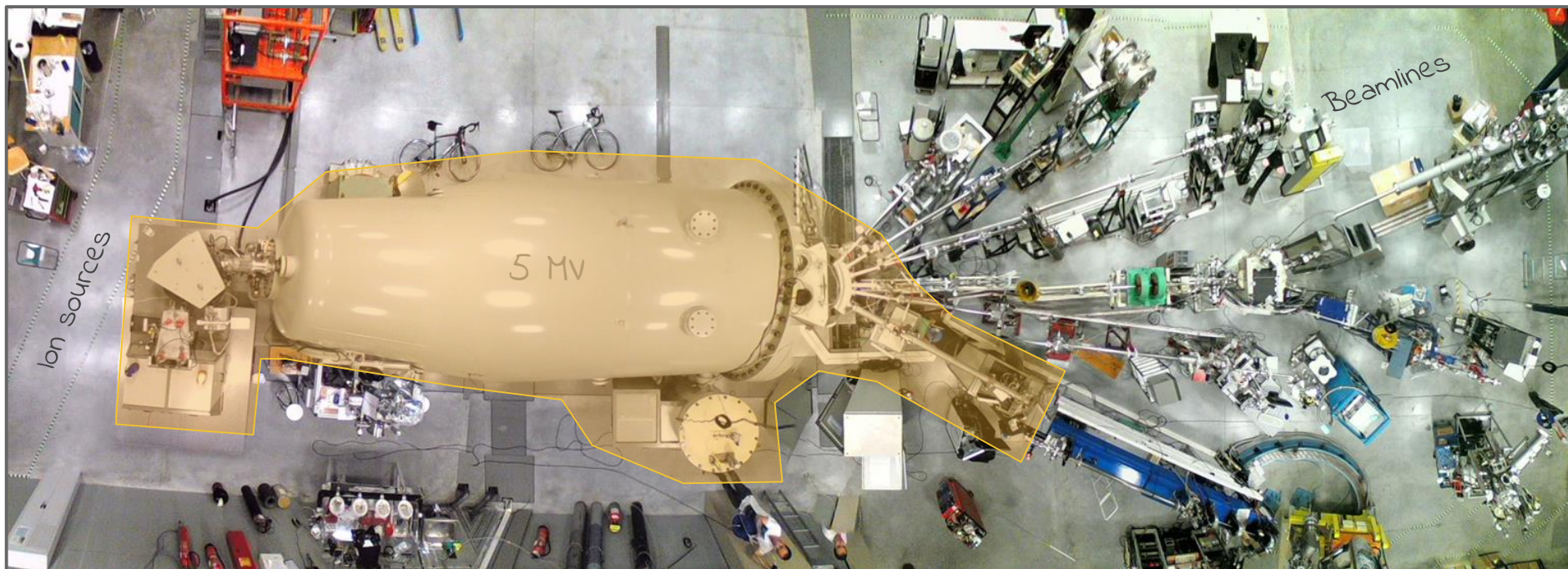


present (1 PC)



a better present





IN-OUT

problems

HVEE signals

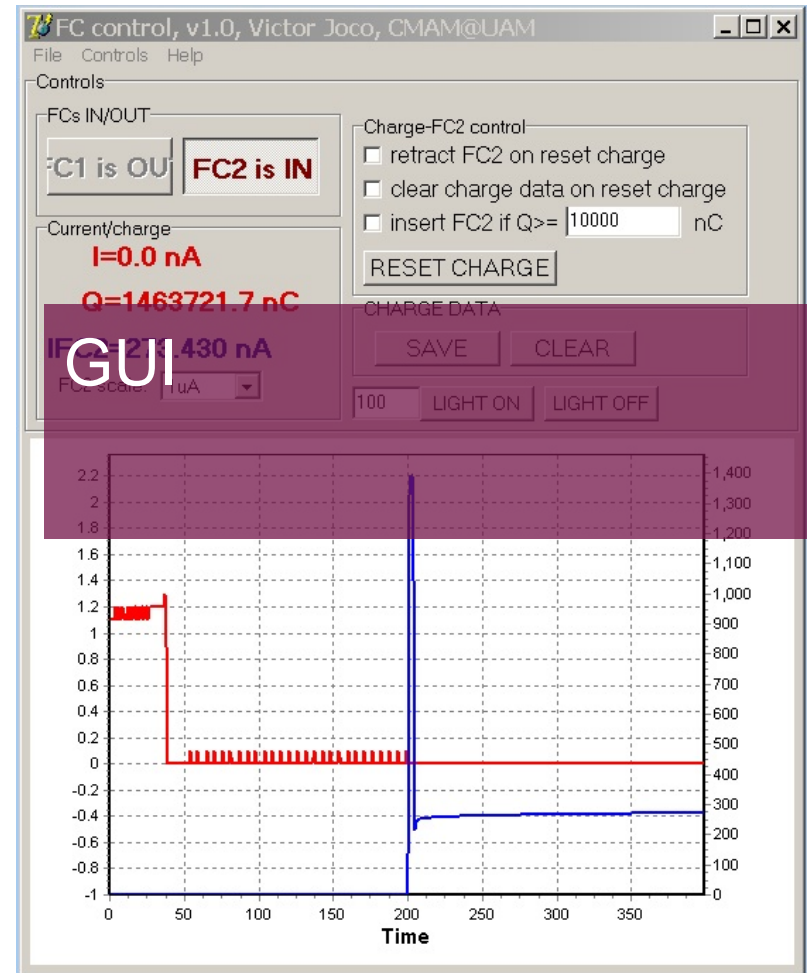
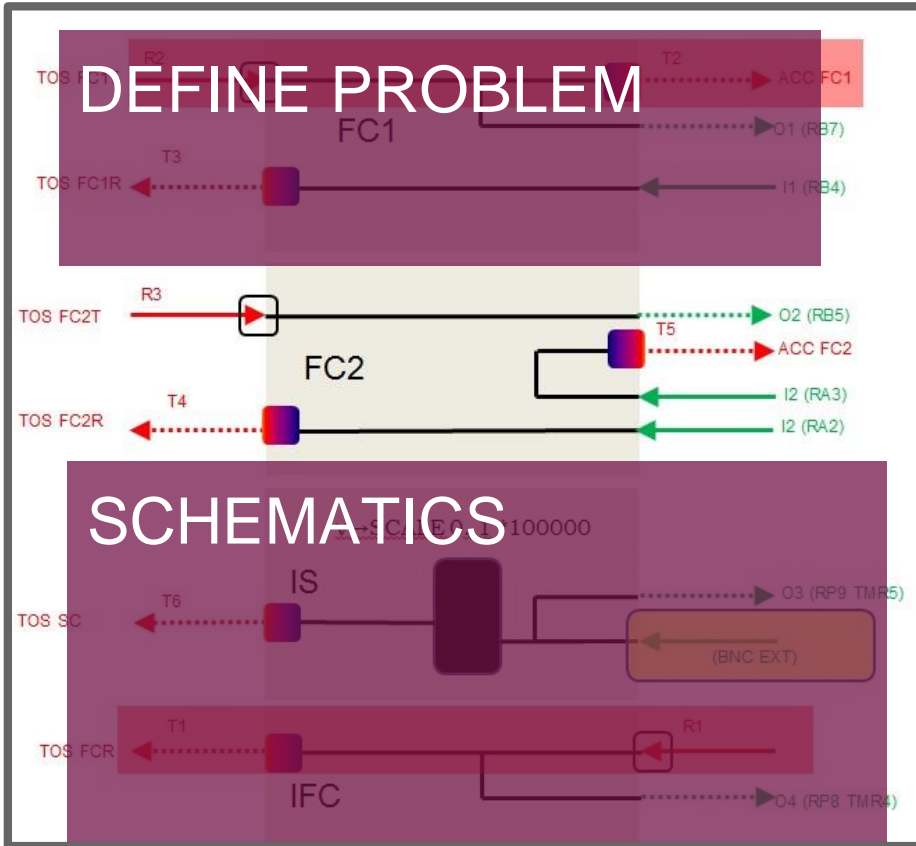
HVEE PC

ACC status out of the
vendor PC

User experiment control



- messing around with DIY solutions



HARDWARE



too many boxes

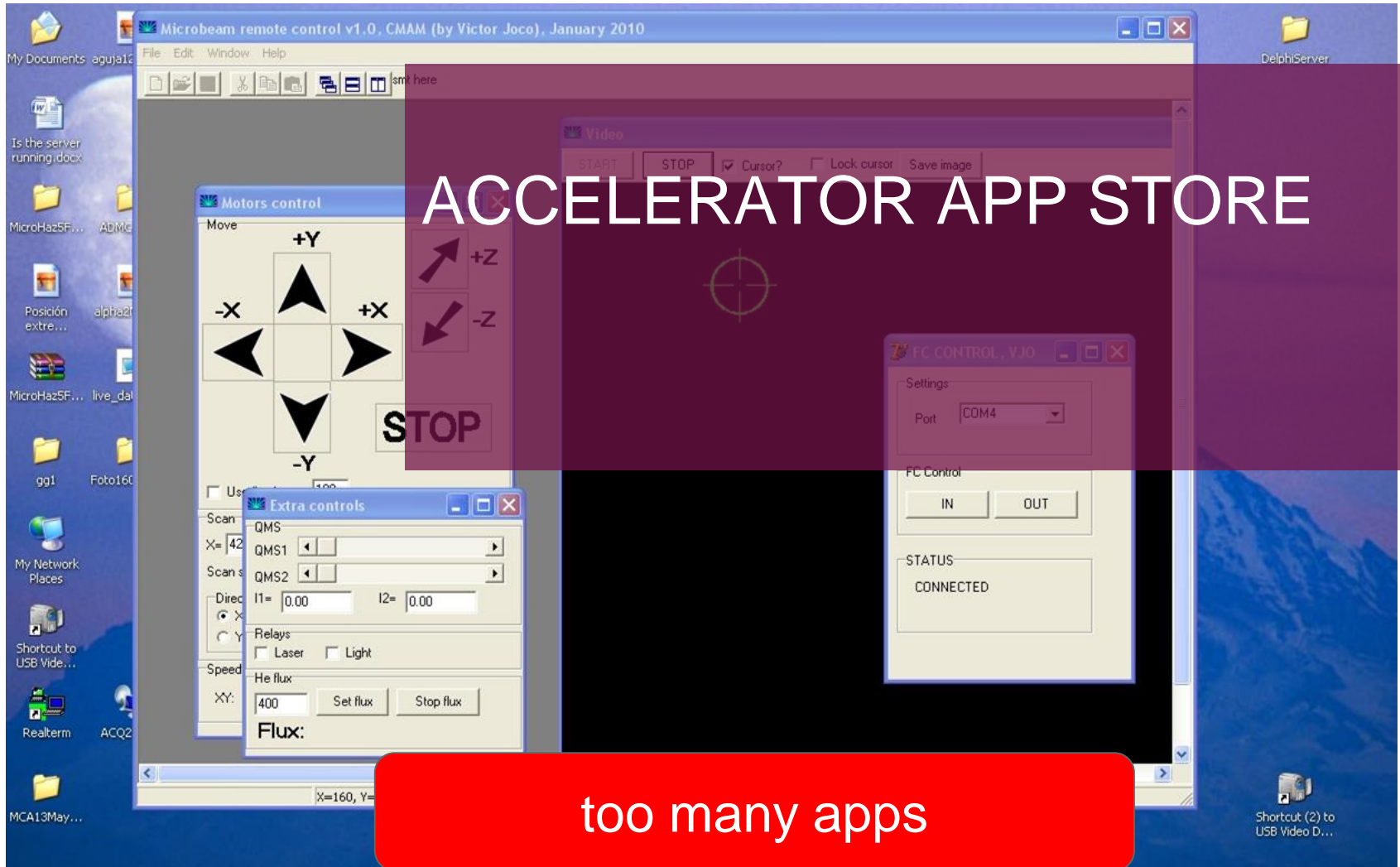
OUT-IN problems

auxiliary signals

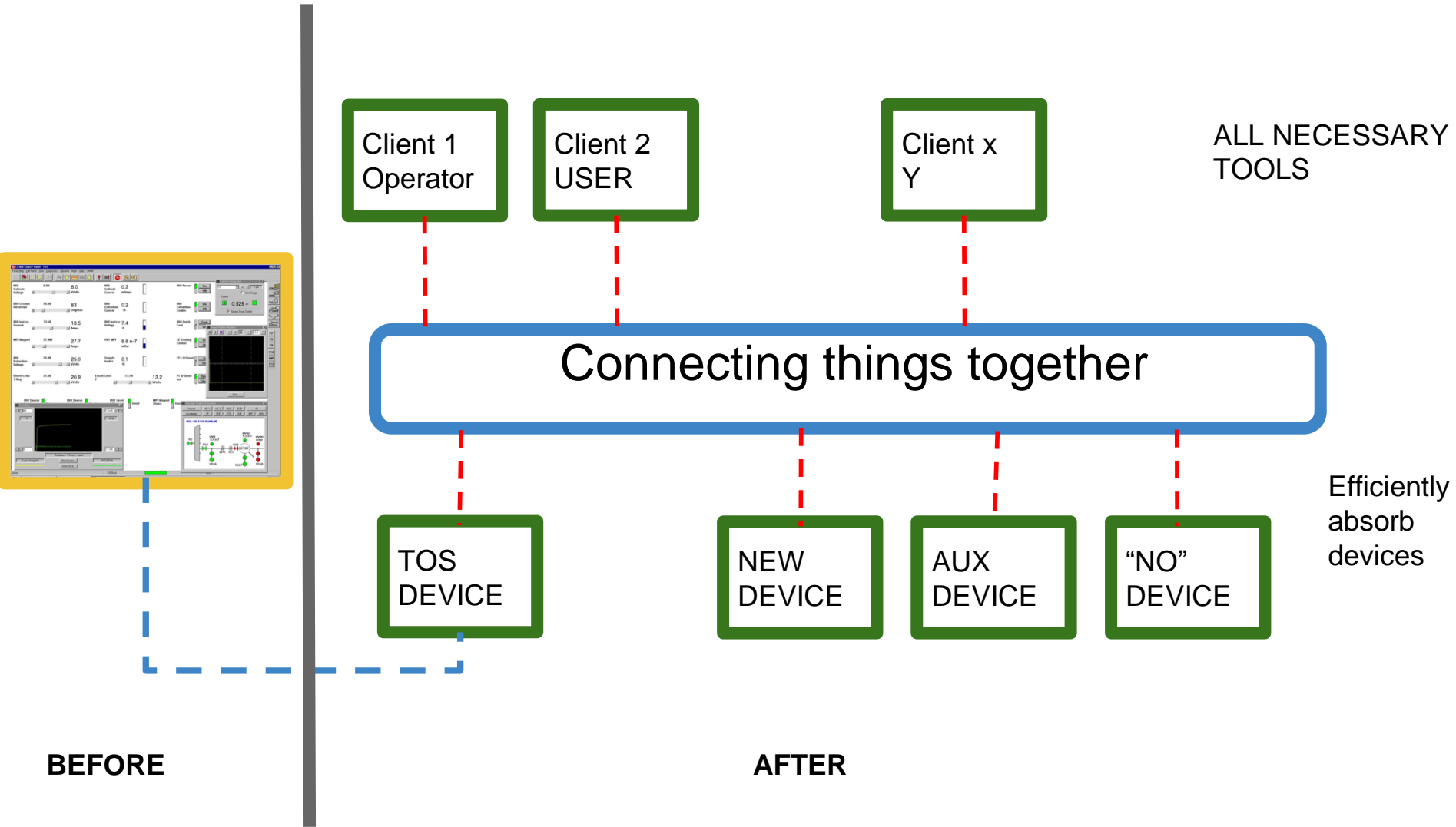
beamline
PC

ACCELERATOR APP STORE

too many apps



OLD VS. NEW CONCEPT!



Simple, open source + community

Connecting things **together**

What is **TANGO Controls ?**

A free open source device-oriented controls toolkit for controlling any kind of hardware or software and building **SCADA** systems...

[READ MORE](#)

Why choose **TANGO Controls ?**

Because it is easy to use, flexible, and highly scalable. It provides a complete set of features for controlling equipment and lot of services for managing systems.

[READ MORE](#)

How to use **TANGO Controls ?**

Just download it and install it. Then reuse or write a device server, deploy and marvel at how it works!

[READ MORE](#)

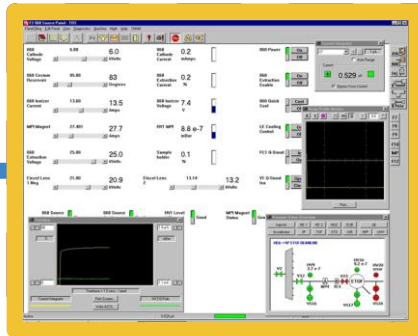
The community

Open Source
SCADA and **DCS**

OLD CS - TOS - DONE, CONNECTED

TANGO SOFTWARE BUS

TOS
DEVICE



Source code?

A screenshot of the AtkPanel 4.8 software interface. The window title is "AtkPanel 4.8 : tosserver/tos/1". The main display area shows the device name "tosservers/tos/1" and the status "The device is in UNKNOWN state." Below this is a list of attributes with their values and units. The "c860CathodeVoltage" attribute is highlighted in green.

Current	20.75 No unit
c860CathodeVoltage	6.00 kV
strcCl	0.06 uA
range	4.00 No unit
cClrange	aaa
phe3	1.35e-06 No unit
phe2	1.01e-06 No unit
phe1	8.31e-07 No unit
cCl	0.00 No unit
c860IonizerCurrent	12.87 No unit

A screenshot of the "Attribute property editor" dialog box. It shows the device name "tosservers/tos/1" and the attribute "c860CathodeVoltage". The current value "6.00 kV" is displayed in a large green box. Below this are various configuration options for the attribute, such as label, minimum/maximum values, and units.

Identification

Device: tosservers/tos/1

Attribute: c860CathodeVoltage

6.00 kV

Properties

Label: c860CathodeVoltage

Minimum value: Not specified | Maximum value: Not specified

Minimum alarm: Not specified | Maximum alarm: Not specified

Format: %6.2f | Unit: kV

Min. warning: Not specified | Max. warning: Not specified

Delta t(ms): Not specified | Delta Val: Not specified

None

Apply cha... Information Dismiss

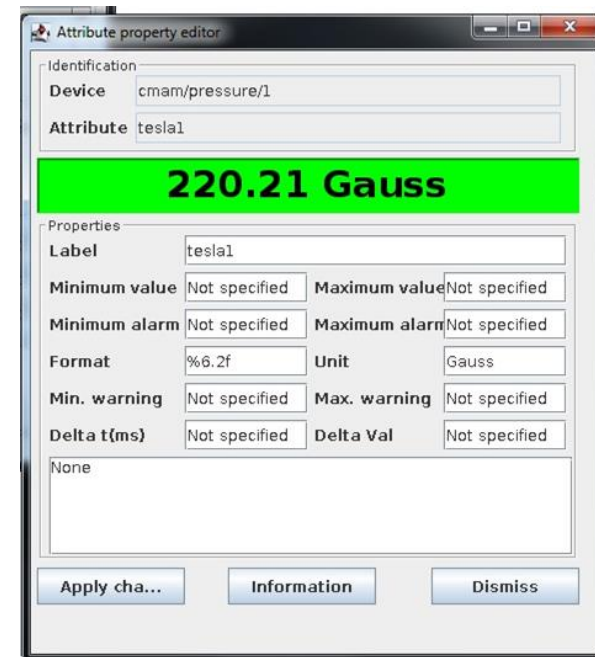
Connecting things together



PC, serial port

DS pytango server:

```
ser2 = serial.Serial(port='/dev/ttyAMA0,...')  
@attribute(dtype=float)  
def tesla1(self): return float(ser2.readline()[::-2])
```



The clients

The image shows a Qt Designer interface for a particle accelerator simulation. The main window displays a schematic of the accelerator components, including an ION SOURCE, INJECTION MAGNET, 5 MV ACCELERATOR, BENDING MAGNET, NUCLEAR PHYSICS, EXTERNAL MICROBEAM, IMPLANTATION, STANDARD, TIME OF FLIGHT, INTERNAL MICROBEAM, and ULTRAHIGH VACUUM. A graph below the schematic shows a plot of values from 0 to 1,000. A dialog box titled "Dialog" is open, showing a StringList with the text "tosserver/tos/1/phase1" and the word "model" displayed prominently in the center. The dialog also includes "New" and "Delete" buttons, a "Value:" input field, and "Aceptar" and "Cancelar" buttons.

Qt Designer

File Edit Form View Settings Window Help

Widget Box

Filter

- TaurusModelChooser
- TaurusDbTableWidget
- TaurusDbTreeWidget
- TaurusGrid
- TaurusDevTree
- TaurusValuesTable
- TaurusModelSelectorTree
- QLoggingWidget
- Taurus Buttons
 - TaurusLauncherButton
 - TaurusCommandButton
 - TaurusLockButton
- Taurus Input
 - TaurusValueSpinBox
 - TaurusWheelEdit
 - TaurusModelList
 - TaurusValueLineEdit
 - TaurusConfigLineEdit
 - GraphicalChoiceWidget
 - TaurusValueComboBox
 - TaurusValueCheckBox
 - TaurusAttrListComboBox
 - TaurusArrayEditor
- Taurus Display
 - QManoMeter
 - TaurusMonitorTiny
 - TaurusLabel
 - TaurusGraphicsView
 - TaurusPlot
 - TaurusLCD
 - TaurusTrend
 - TaurusLed
 - QLed
 - QPixmapWidget
 - TaurusDrawSynopticsView
 - Taurus R+W
 - TaurusLabelEditRW
 - TaurusRadialMuteSwitch

MainWindow - acc1.ui*

Type Here:

ION SOURCE

INJECTION MAGNET

5 MV ACCELERATOR

BENDING MAGNET

NUCLEAR PHYSICS

EXTERNAL MICROBEAM

IMPLANTATION

STANDARD

TIME OF FLIGHT

INTERNAL MICROBEAM

ULTRAHIGH VACUUM

CMAM

Dialog

StringList

tosserver/tos/1/phase1

model

+ New - Delete

Value:

Aceptar Cancelar

Object Inspector

Object	Class
MainWindow	QMainWindow
centralwidget	QWidget
label	QLabel
qPixmapWidget	QPixmapWidget
taurusLabel_2	TaurusLabel
taurusLabel_3	TaurusLabel
taurusLabel_4	TaurusLabel
taurusLabel_5	TaurusLabel
menubar	QMenuBar
statusbar	QStatusBar

Property Editor

model

taurusPlot : TaurusPlot

Property	Value
model	Change String List
parentModel	

Resource Browser

Filter

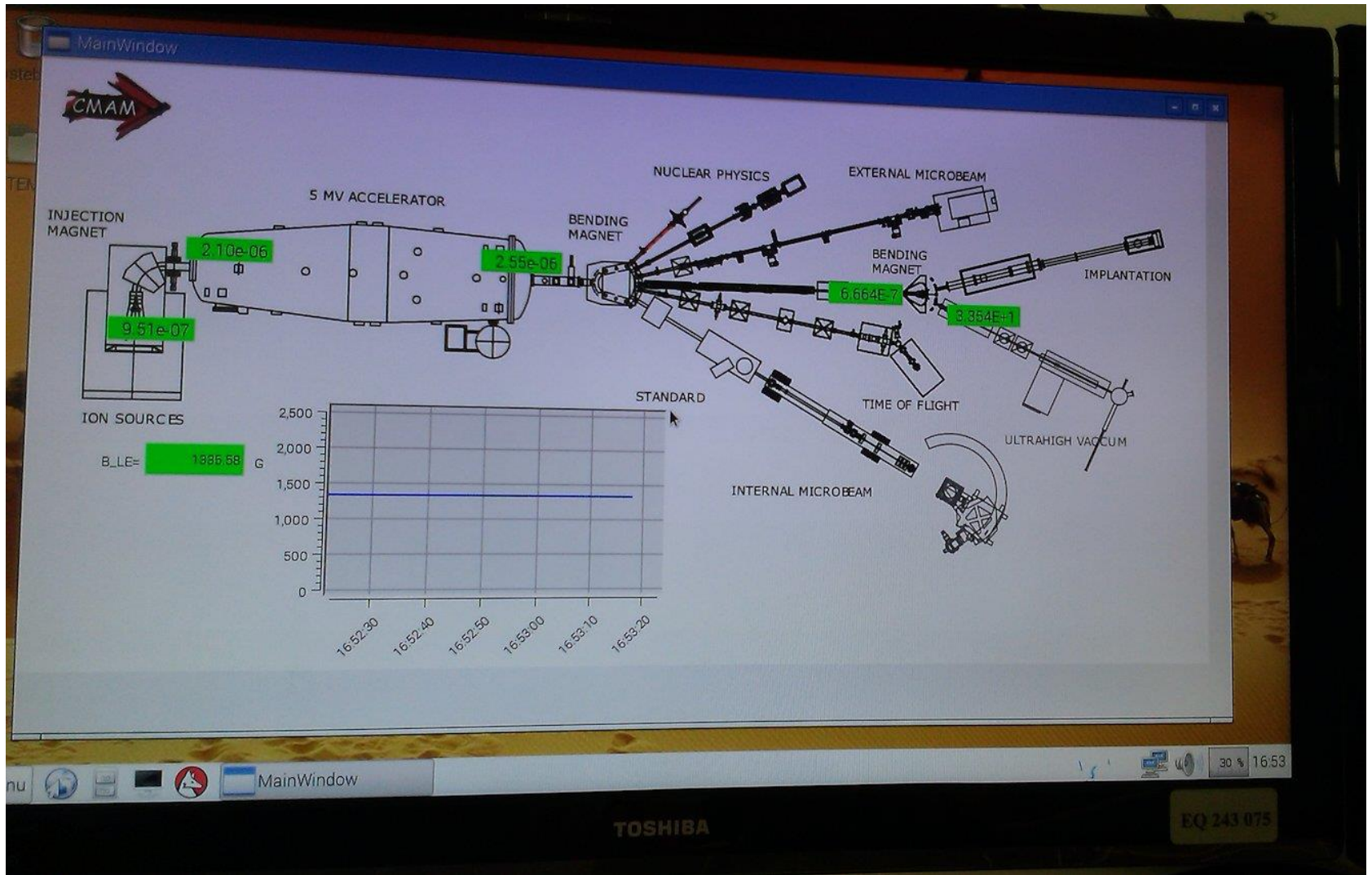
<resource ro...

Signal/Si... Actio... Resource ...

ALBA

CONFIGURE, DON'T PROGRAMM

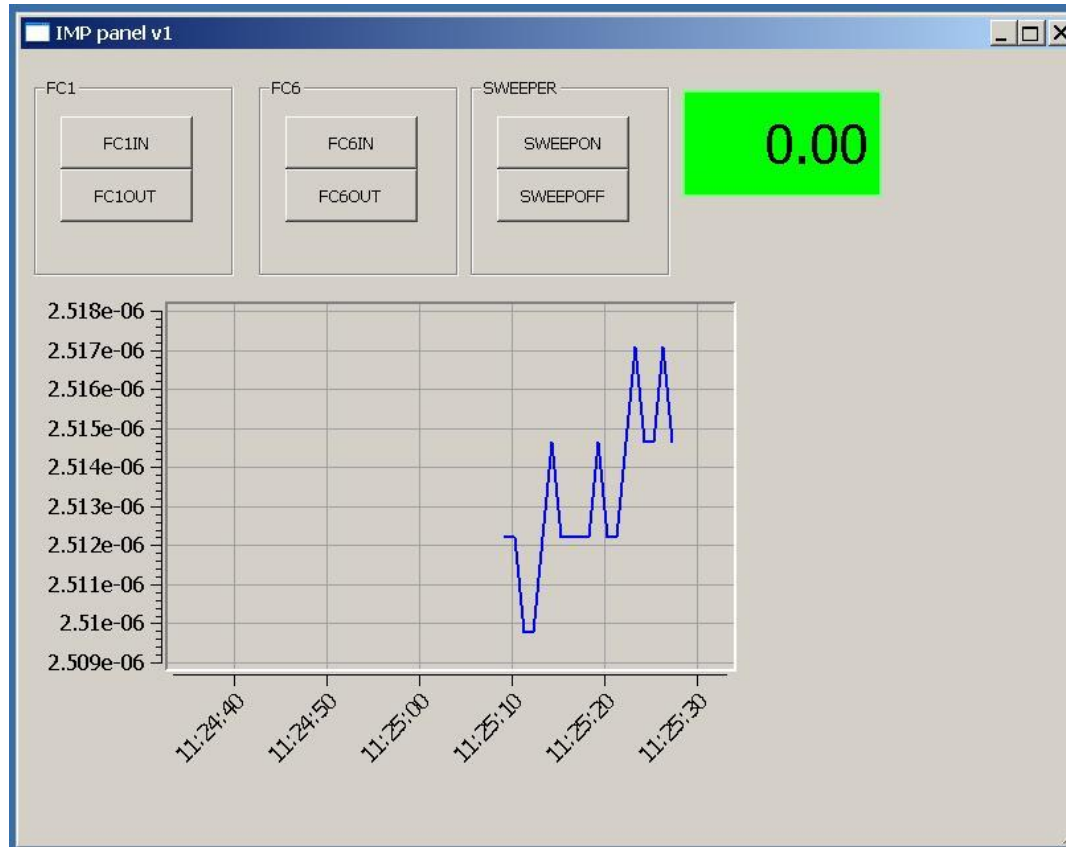
IN PRACTICE



GUI(s)



passing the flag (beamline panels)



just another reason why is better

The screenshot displays a software interface with a tree view on the left and a graph on the right. The tree view shows a hierarchy of folders and nodes, including 'dserver', 'piserver', 'sys', 'tango', 'tofserver', 'tosservers', and 'tos'. The graph shows a line plot with a red line and a green area, representing data over time. The graph title is 'Begin: 2015-09-21 15:54:39.712, End: 2015-09-21 19:35:39.712'. The y-axis ranges from 21.6 to 22.0, and the x-axis shows time from 16:24 to 19:24. The graph shows a fluctuating signal with a red line and a green area, representing data over time.

ARCHIVING
a database not a file
and the tool

HDB & MAMBO

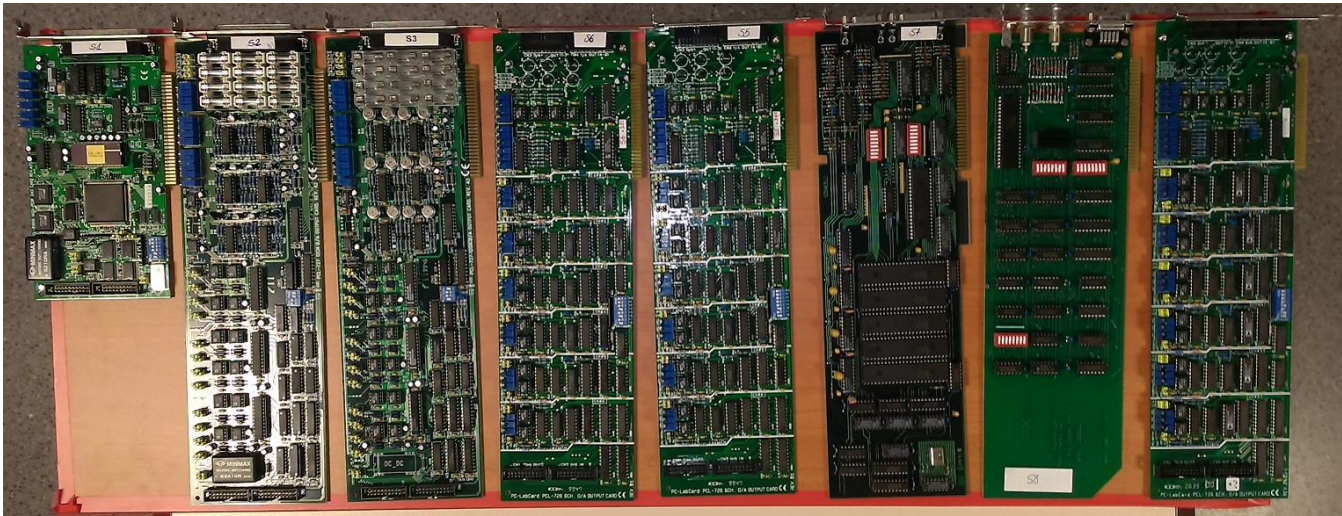
Conclusion

A change in concept
and an open source control system

WORKS



Obsolete hardware





" New ideas pass through three periods:
1) It can't be done
2) It probably can be done but it's not worth doing
3) I knew it was a good idea all along "

Arthur C. Clarke