Control System Studio,

CSS

Overview

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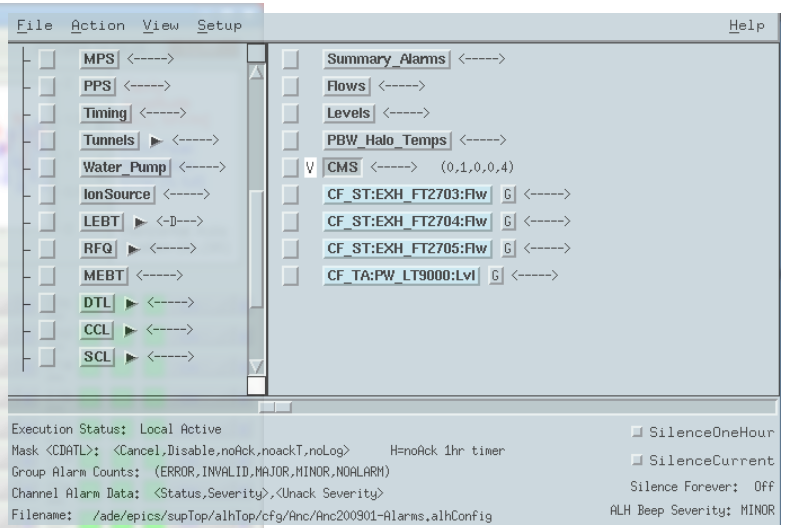
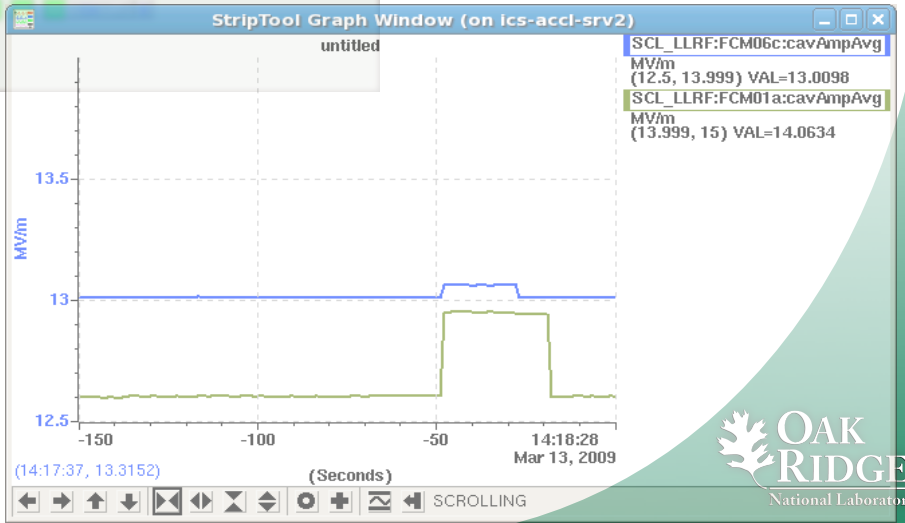
Jan. 2013

Original EPICS Operator Interfaces

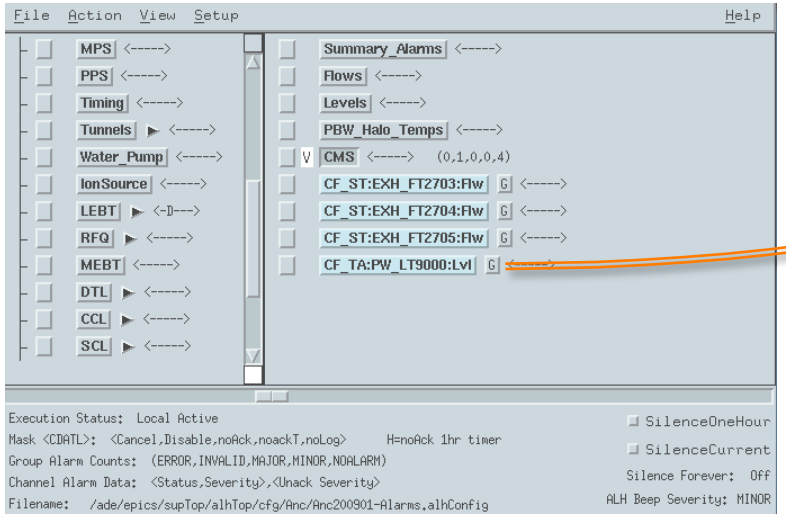
Many disjoint tools

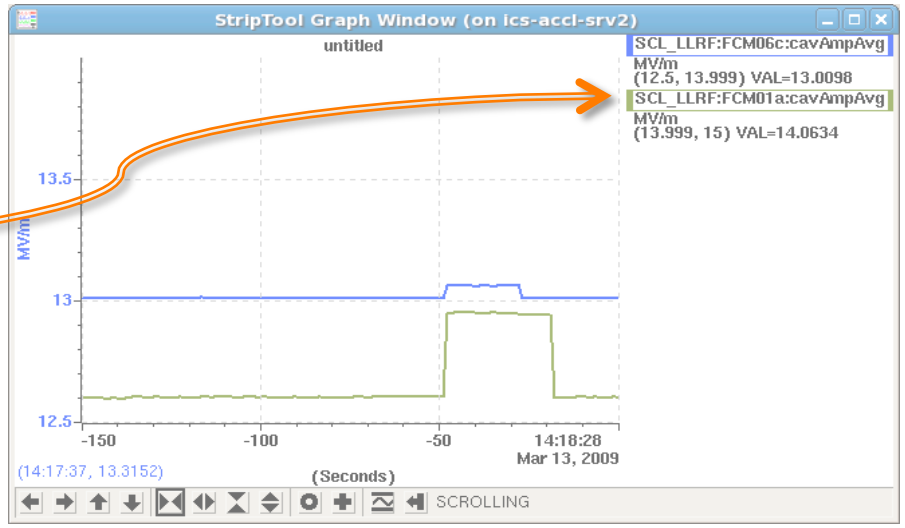
- Static layout
- Inconsistent Look
- Online help?
- primarily for Linux/X11





No Integration between Tools





- Note PV associated with Alarm
- Start StripTool
  - Add PV to StripTool
- Start Archive viewer
  - Add PV ..

CSS: A Collaboration

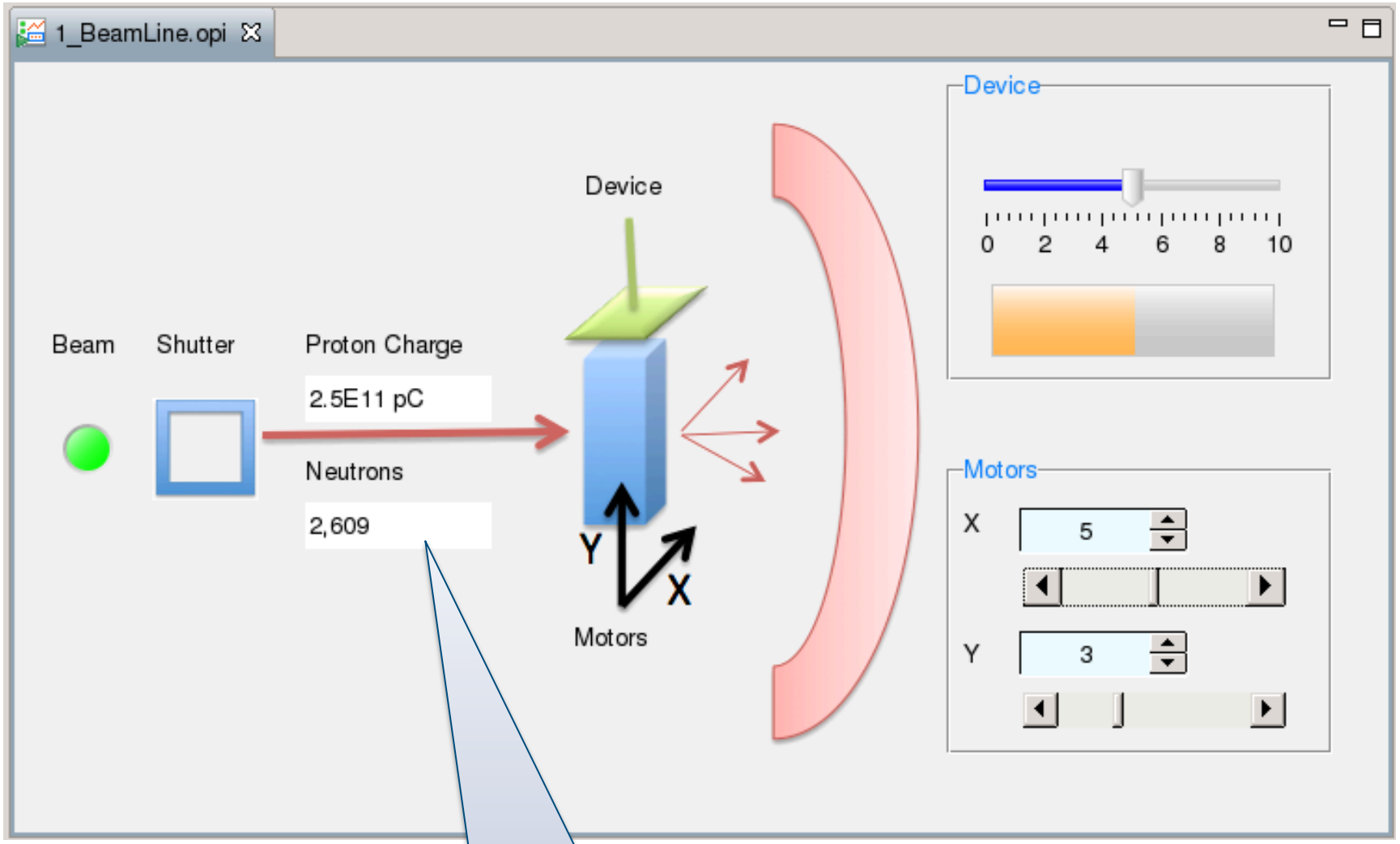
- **Goal:**
  Portable, better integrated control system tools
- **Started 2006 between DESY and SNS**
  - **Joined by CLS, APS, BNL, ITER, KEK/J-PARC, …**
- **http:// sourceforge .net/apps/trac/cs-studio**
  - **Wiki, Mailing lists**
  - **Source code: https://github.com/ControlSystemStudio**

CSS: Control System Architecture

- Portable environment (Windows, Linux, OS X)
- Free development tools

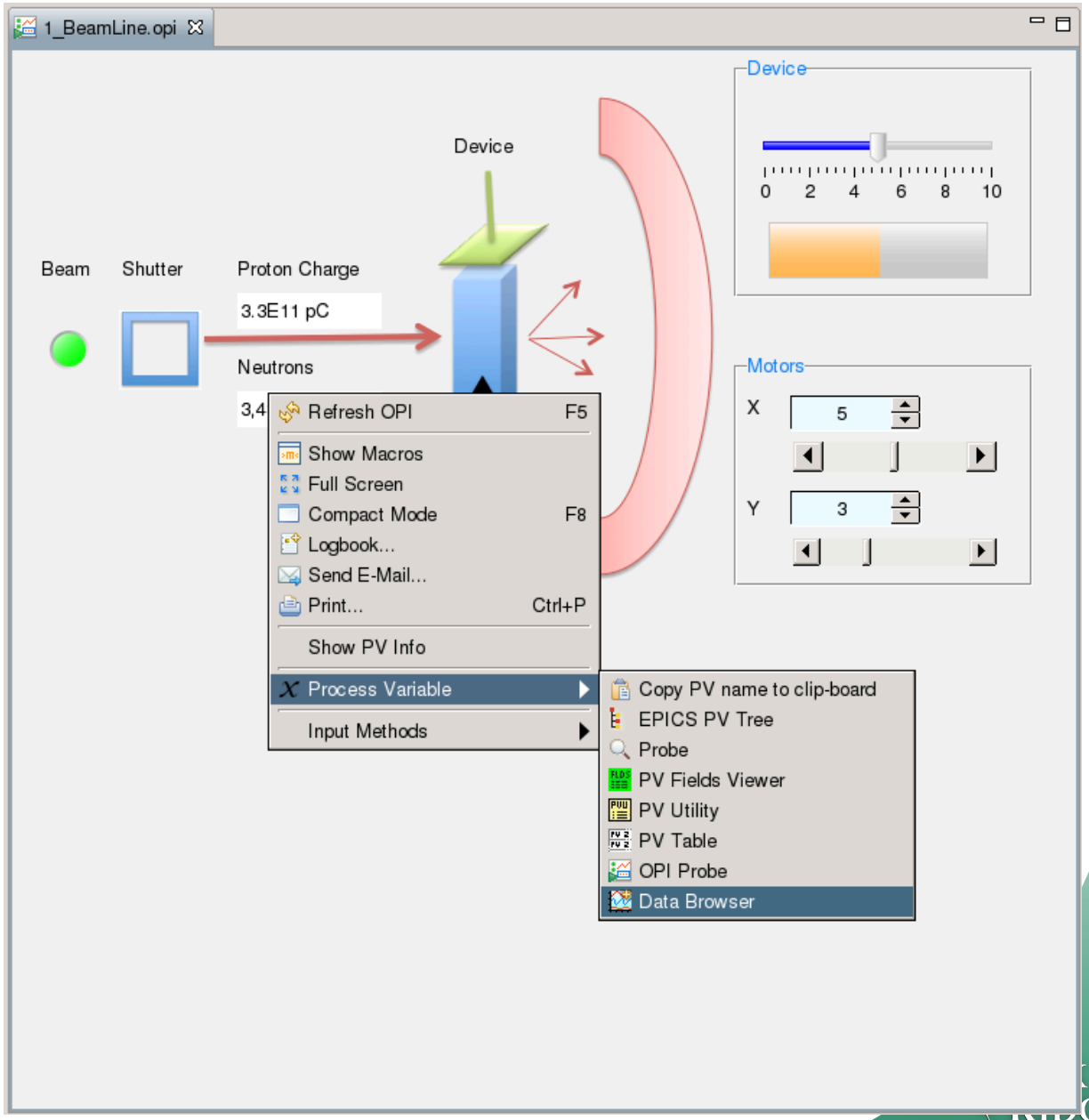
- Plug-Ins, Extension points, Registry
- Rich Client Platform (RCP): Windows, menus, help, preferences, online update, …

Assume this Beam Line GUI



How many neutrons do we receive over time?

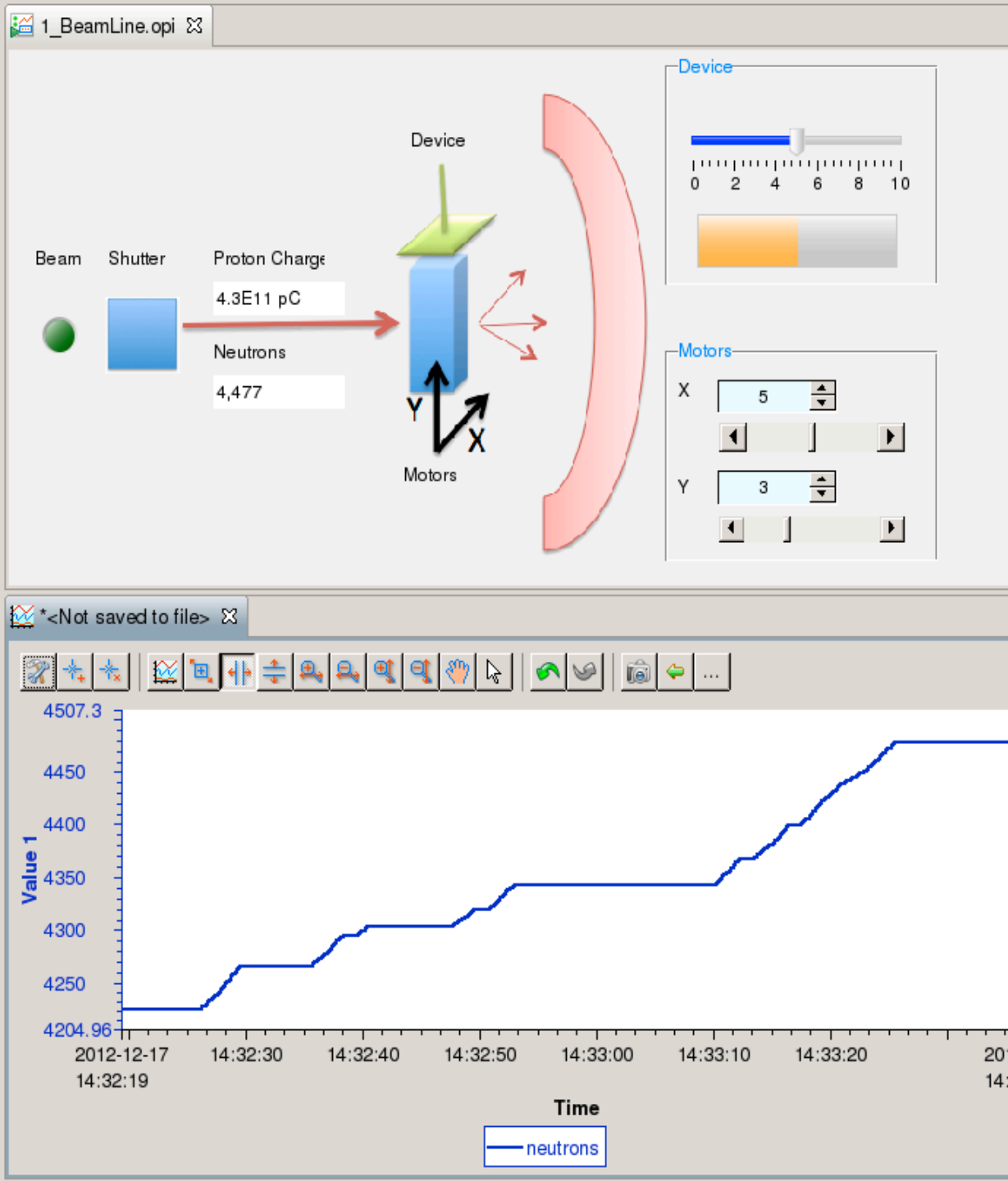
Right click on the neutron count…



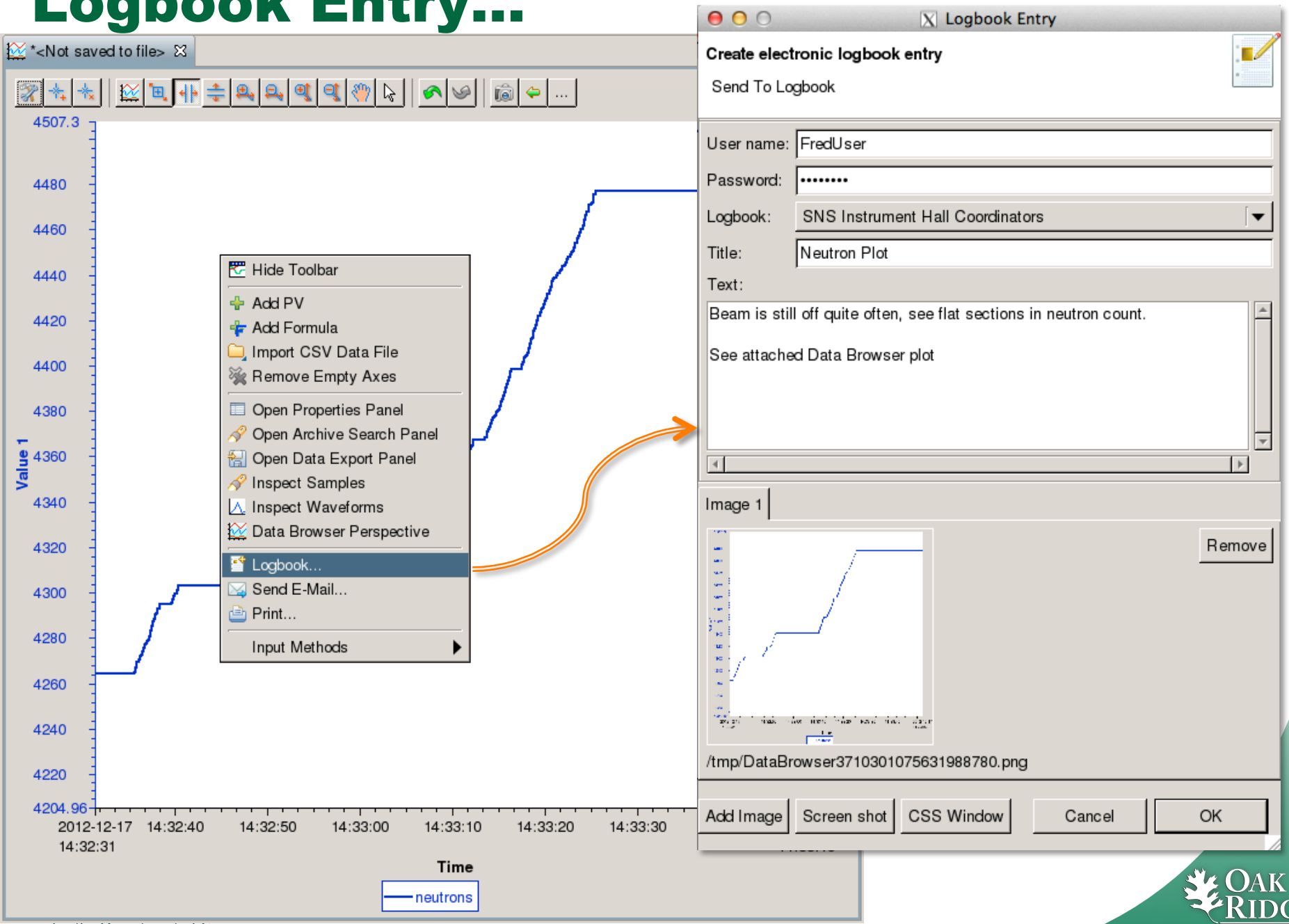
'Data Browser is listed as one of the tools that handle Process Variables…

Plotting...

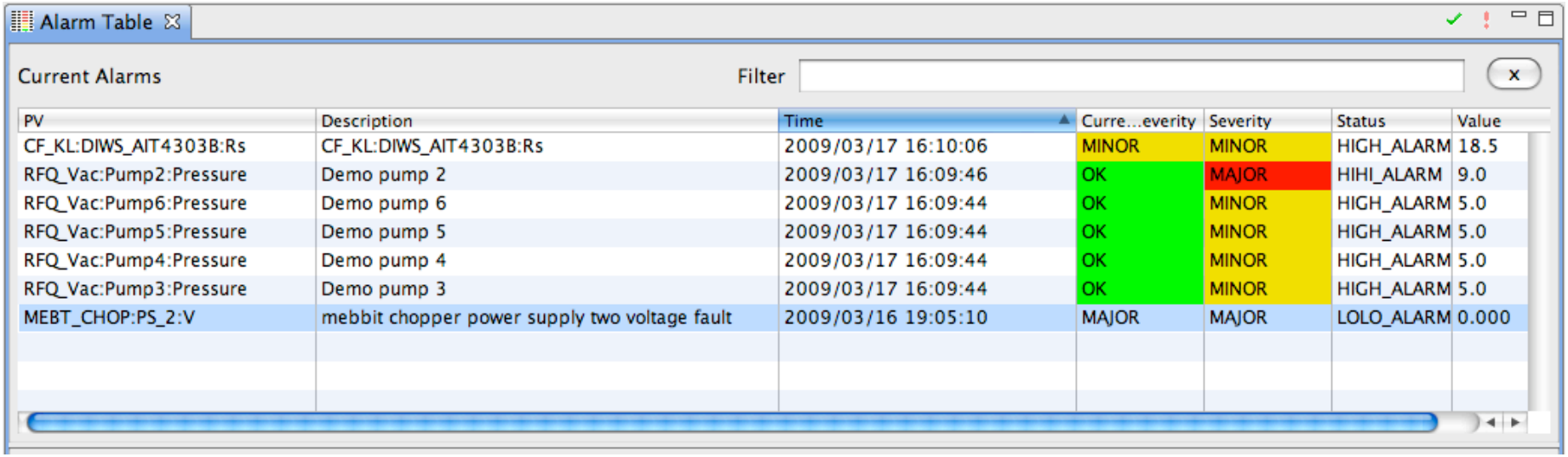
- Data Browser started
- PV added
- Starts showing samples over time
- Can also query historic data, if available



Logbook Entry...



Accelerator Example: React to Alarm

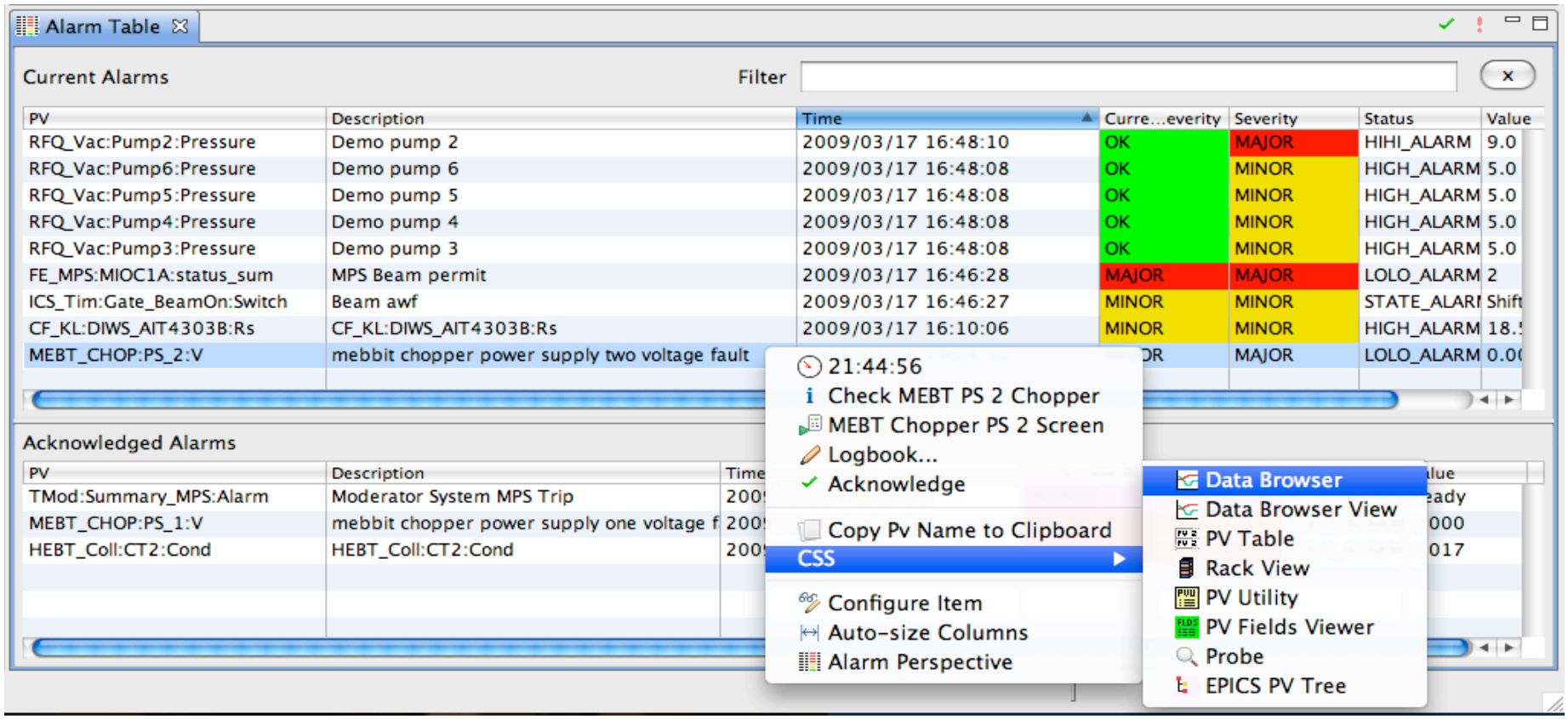


PV	Description	Time	Curre...everity	Severity	Status	Value
CF_KL:DIWS_AIT4303B:Rs	CF_KL:DIWS_AIT4303B:Rs	2009/03/17 16:10:06	MINOR	MINOR	HIGH_ALARM	18.5
RFQ_Vac:Pump2:Pressure	Demo pump 2	2009/03/17 16:09:46	OK	MAJOR	HIHI_ALARM	9.0
RFQ_Vac:Pump6:Pressure	Demo pump 6	2009/03/17 16:09:44	OK	MINOR	HIGH_ALARM	5.0
RFQ_Vac:Pump5:Pressure	Demo pump 5	2009/03/17 16:09:44	OK	MINOR	HIGH_ALARM	5.0
RFQ_Vac:Pump4:Pressure	Demo pump 4	2009/03/17 16:09:44	OK	MINOR	HIGH_ALARM	5.0
RFQ_Vac:Pump3:Pressure	Demo pump 3	2009/03/17 16:09:44	OK	MINOR	HIGH_ALARM	5.0
MEBT_CHOP:PS_2:V	mebbit chopper power supply two voltage fault	2009/03/16 19:05:10	MAJOR	MAJOR	LOLO_ALARM	0.000

CSS includes an alarm system.

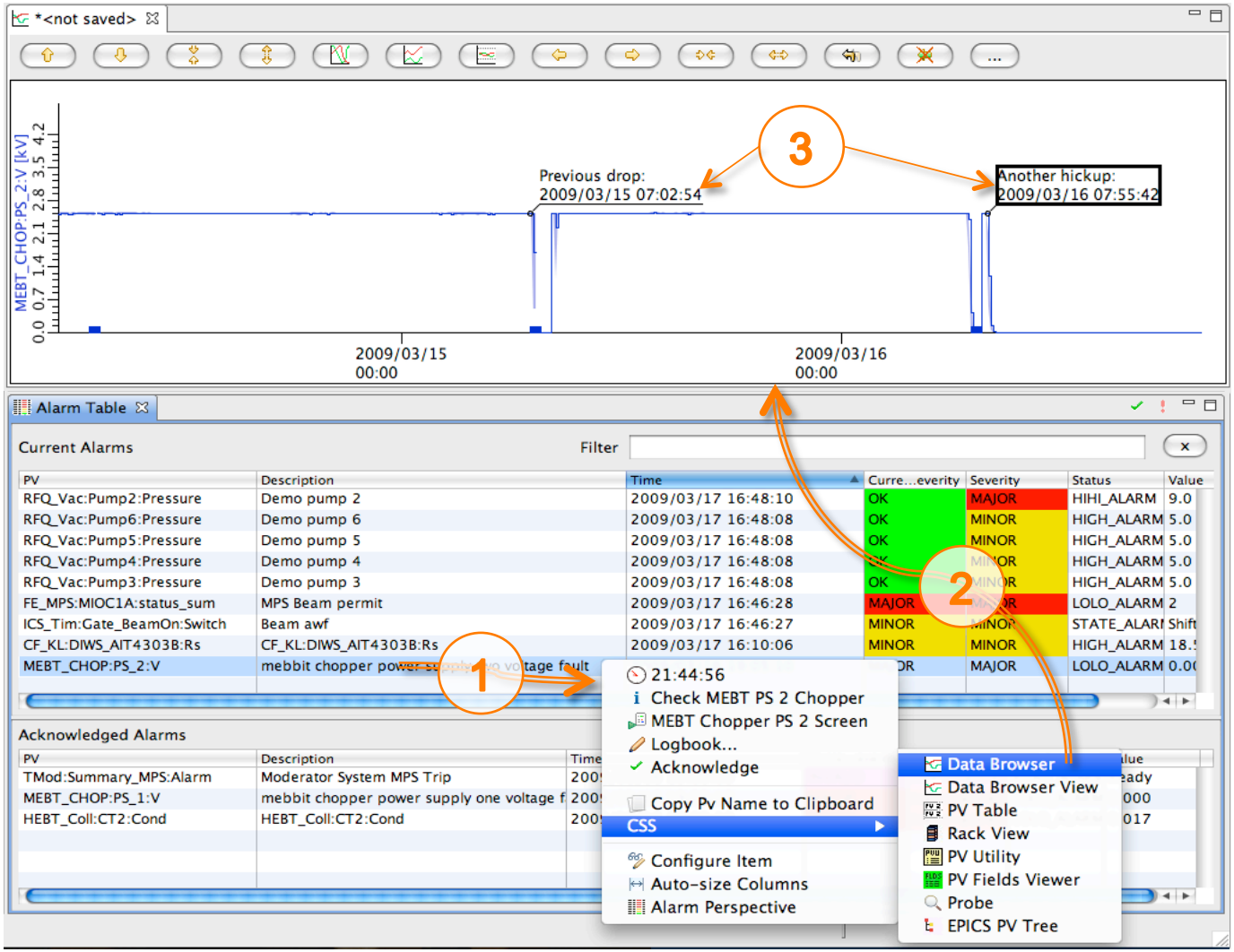
Operator notices an alarm…

Example Work Flow: React to Alarm.



Context menu of alarm… (“right click”)

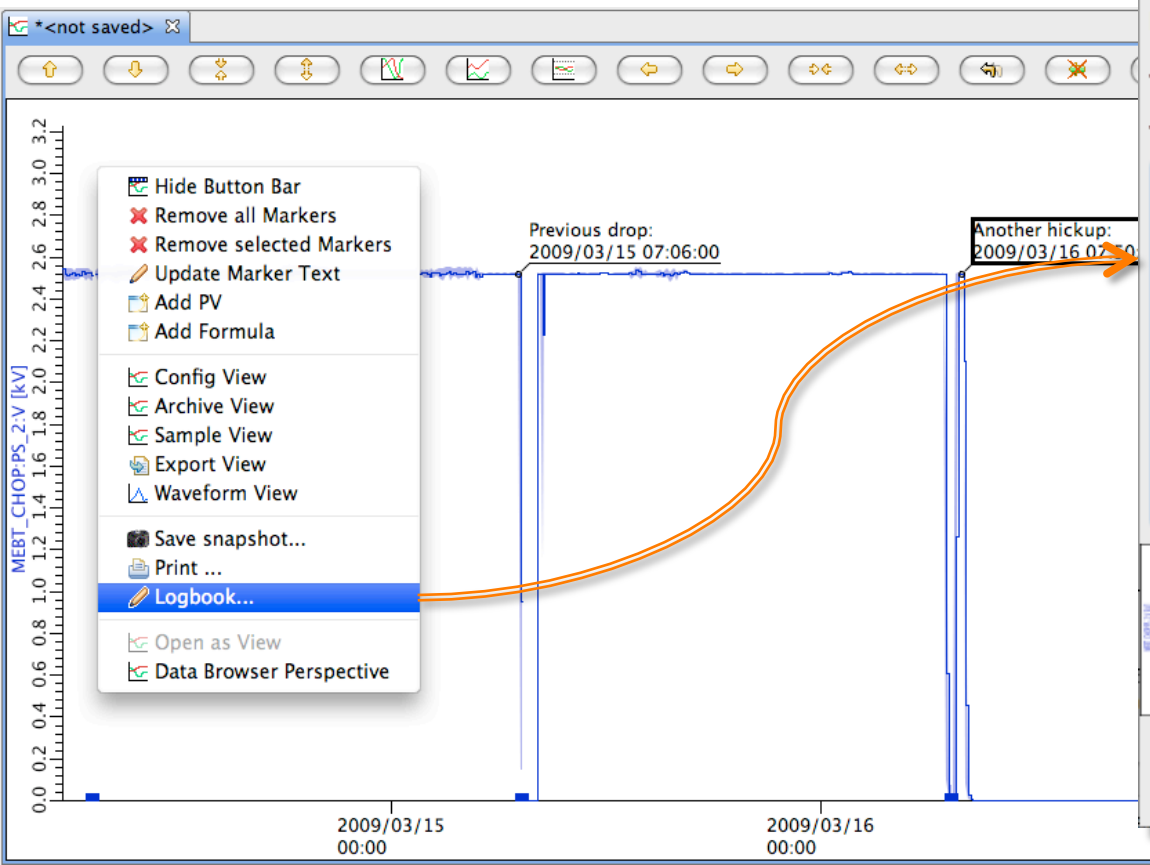
Example Work Flow: React to Alarm...

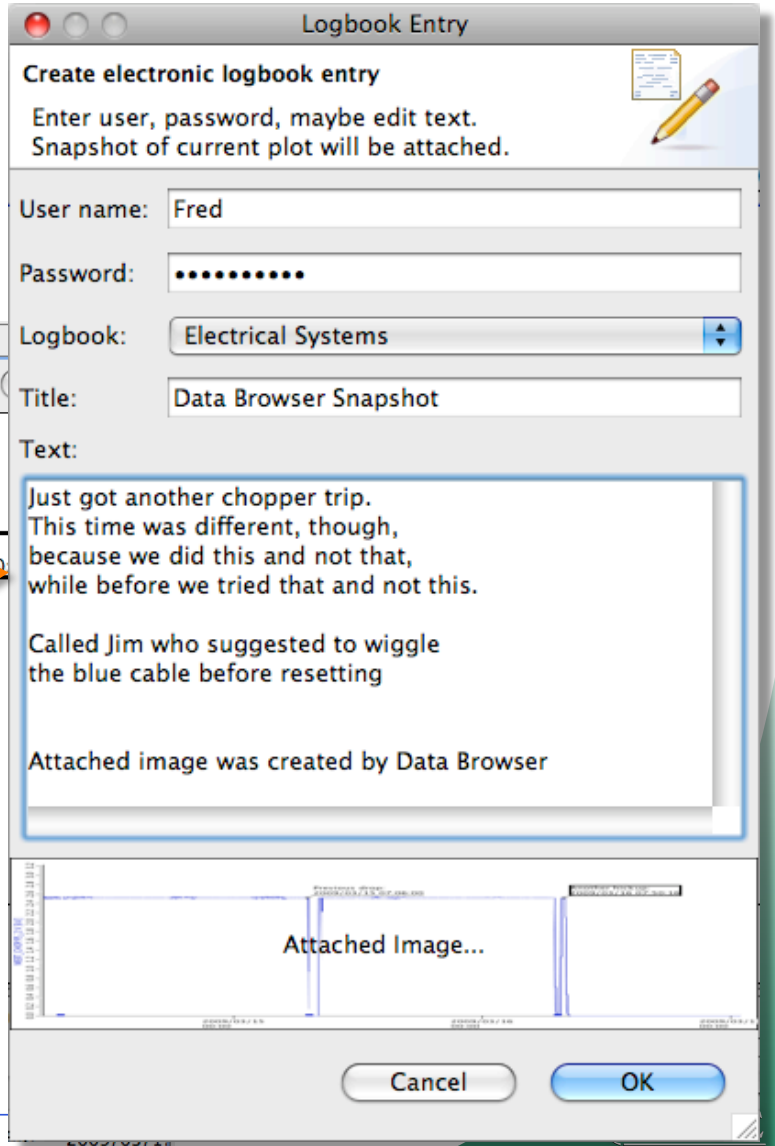


Inspect history of PV, annotate, …

Finally: Make Logbook Entry

**After inspecting alarm PV history,
post commented plot
to E-Log!**





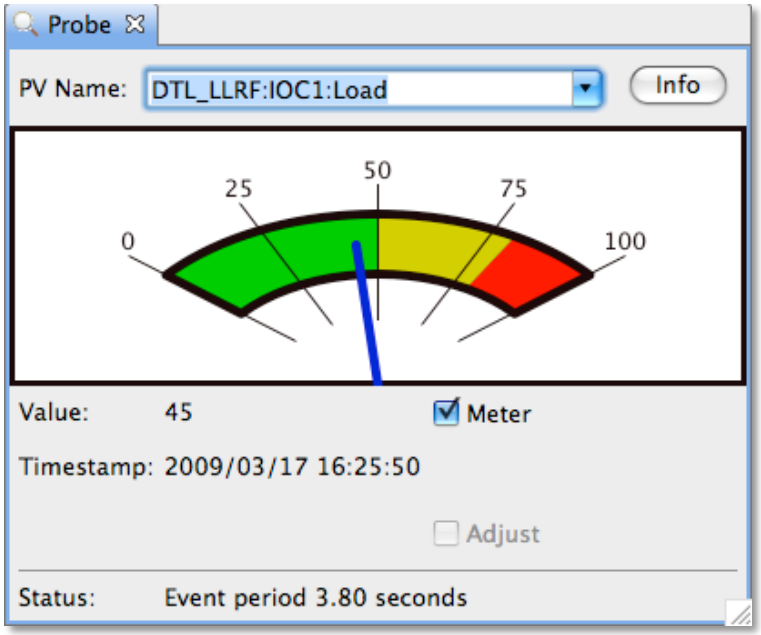
CSS: Toolkit

- **Application Plug-Ins**
  - **Strip-Chart: Data Browser** 
  - **OPI: BOY** 
  - **Alarms: BEAST** 
  - **Automation: Scan System**
  - **Utilities: Probe, Clock**  **, PV Tree**  **, Psychiatrist** 
- **Library Plug-Ins**
  - **Control system data types (PV, Sample, …), Life data access, Historic Data Access, Logbook**  **, E-Mail, Authentication, Authorization, …**
  - **Extension Points**
    - **Life data: Channel Access, Simulated, Local PVs**
    - **Historic Data: XML-RPC, RDB, …**
    - **Authentication: Kerberos, LDAP, …**

Basic CSS Tools

Probe

- Current value of a PV

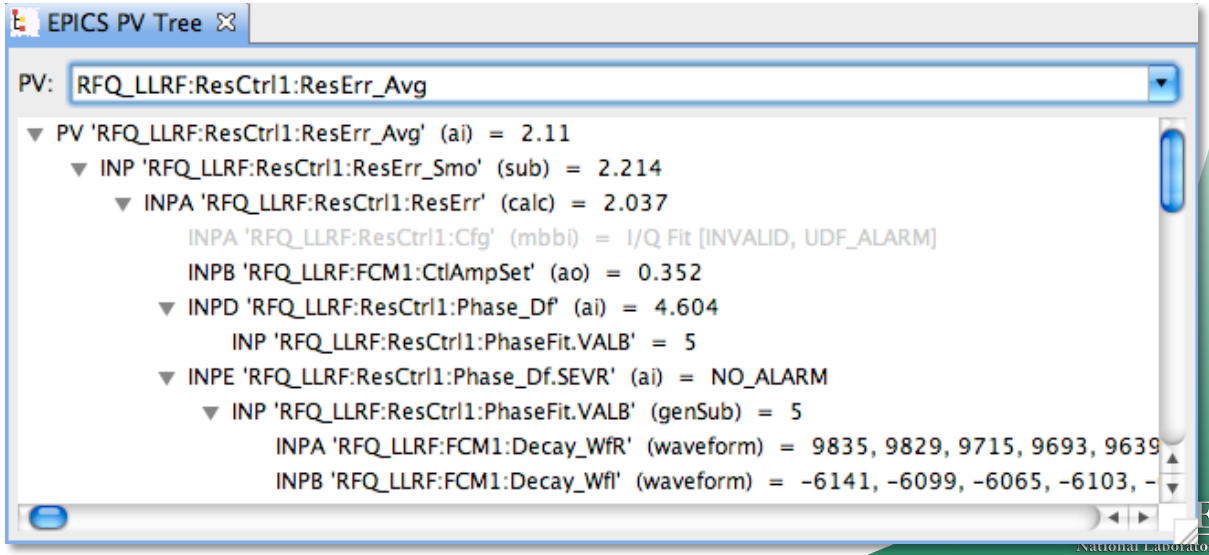


EPICS PV Tree

- Trace PV links

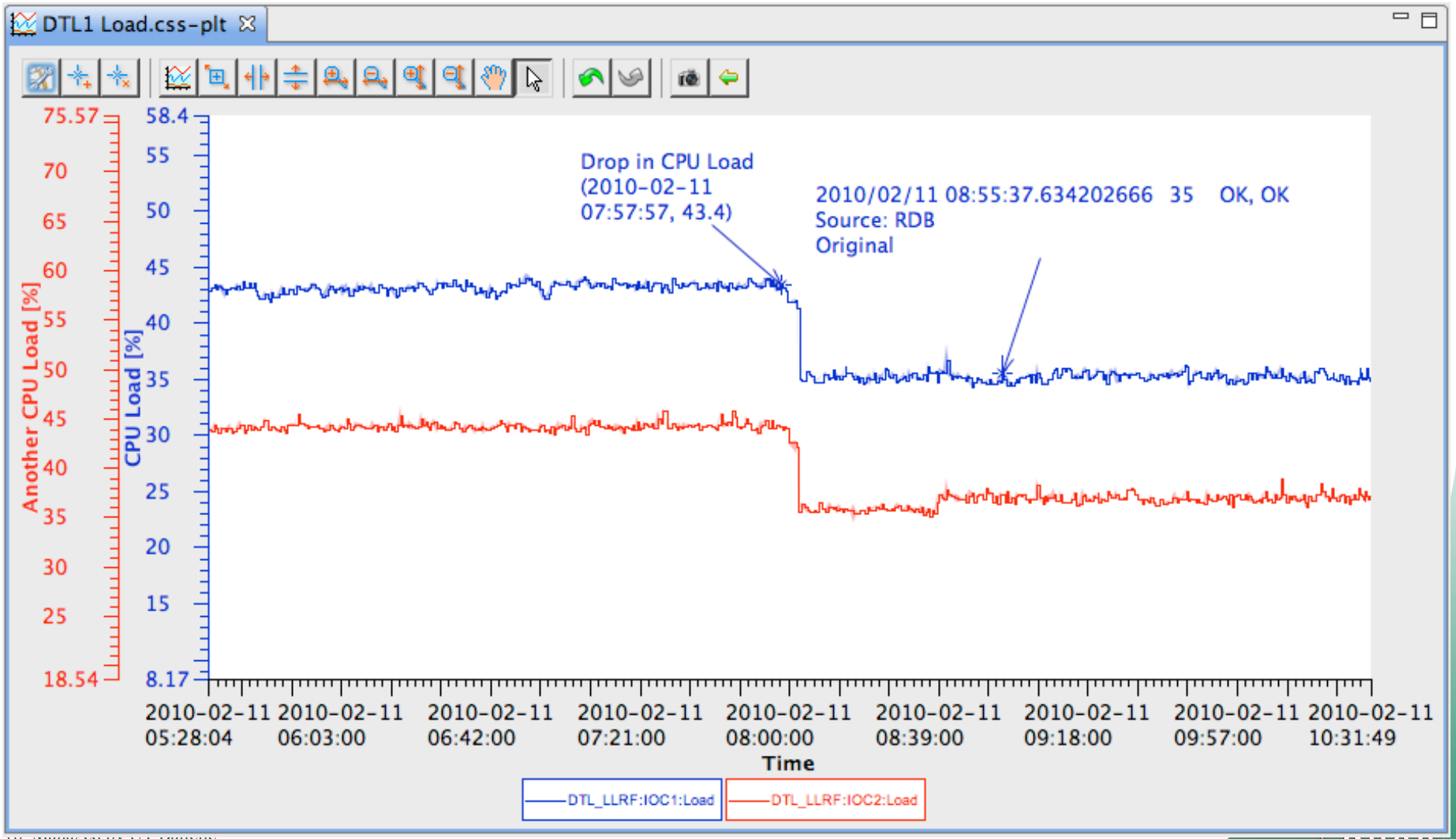
Both:

- ✓ Resize
- ✓ PV Name Drop-down history

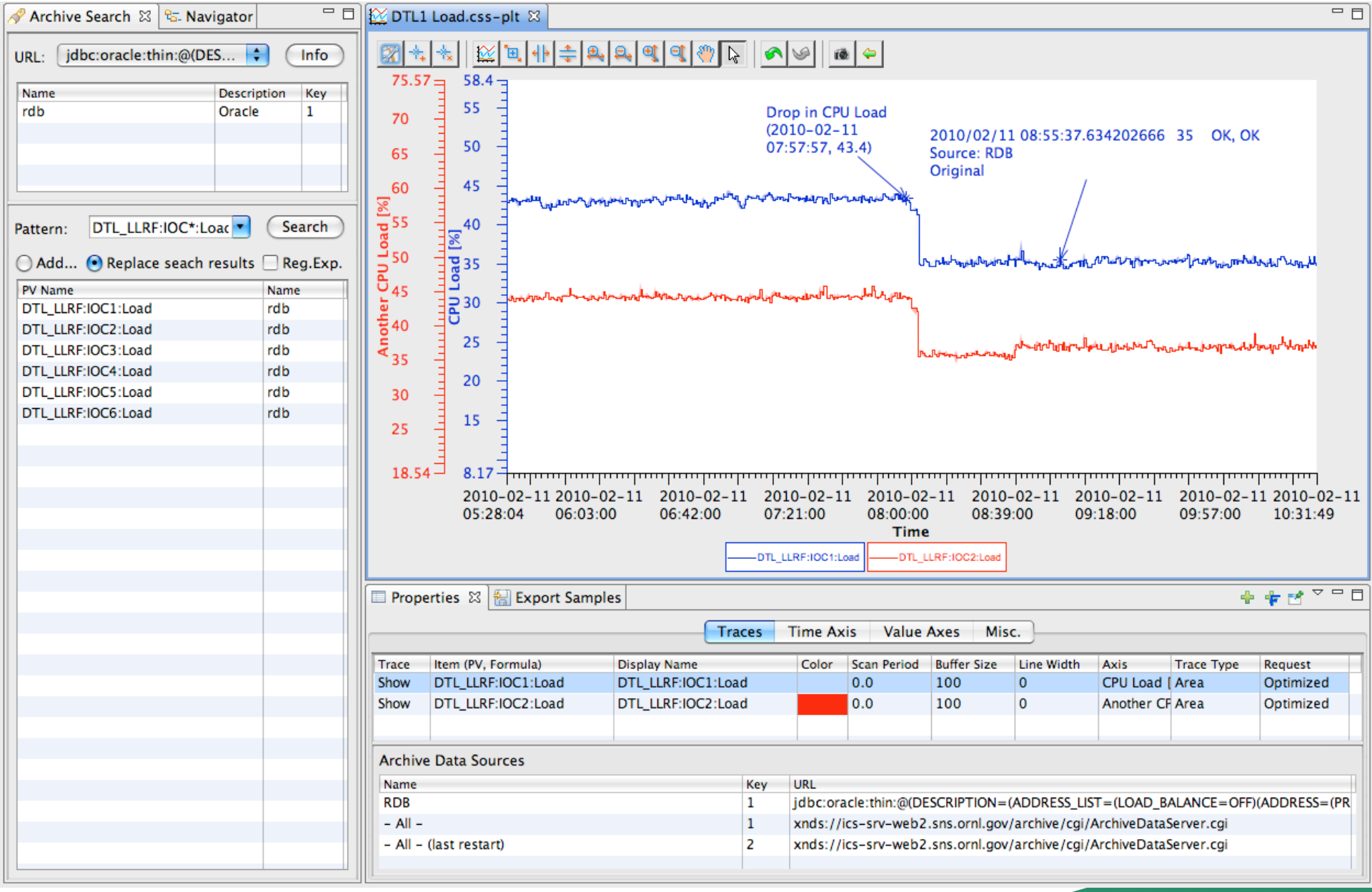


Data Browser

Plot ‘live’ and ‘archived’ data over time

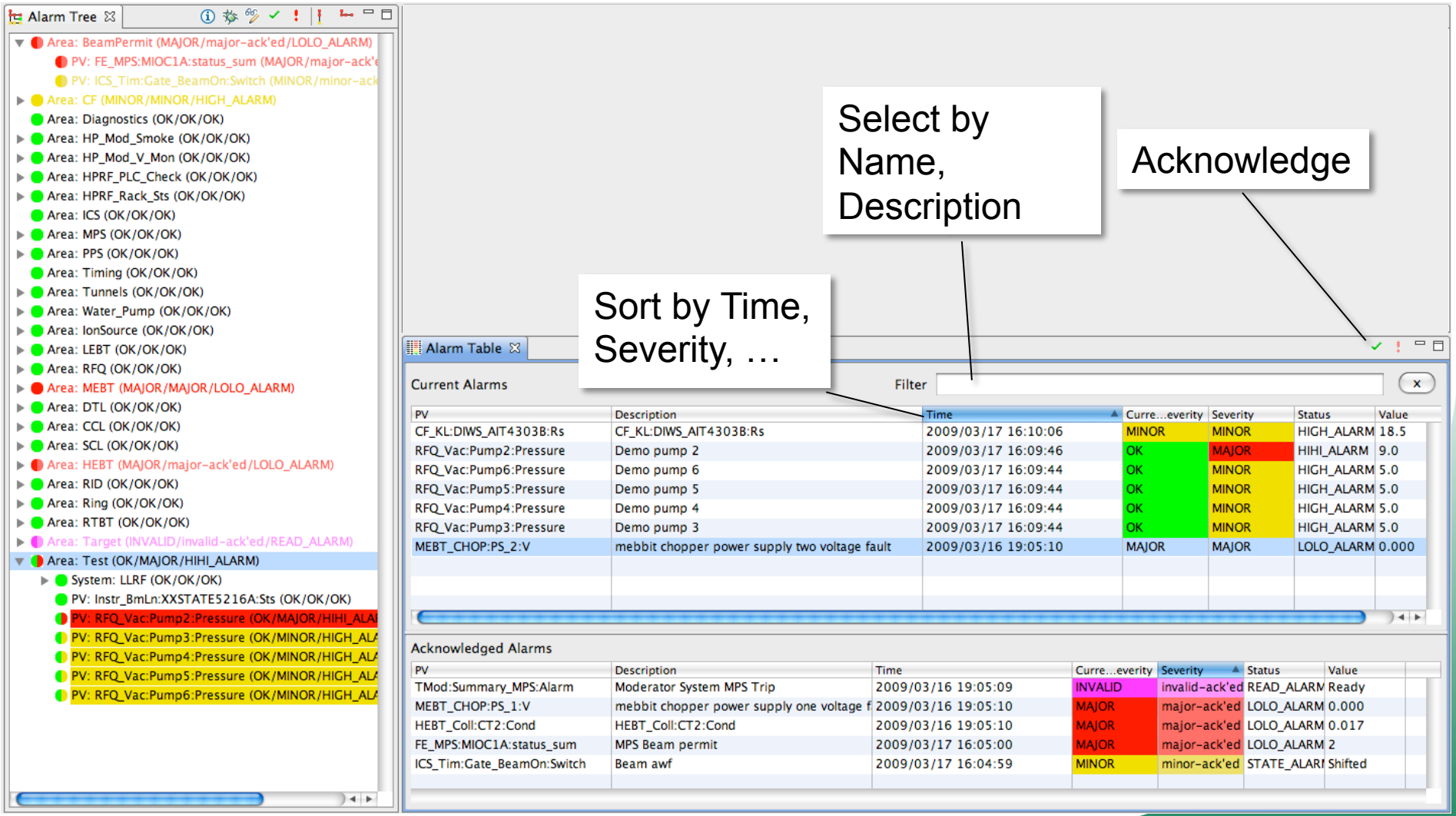


Support for Historic Data Sources



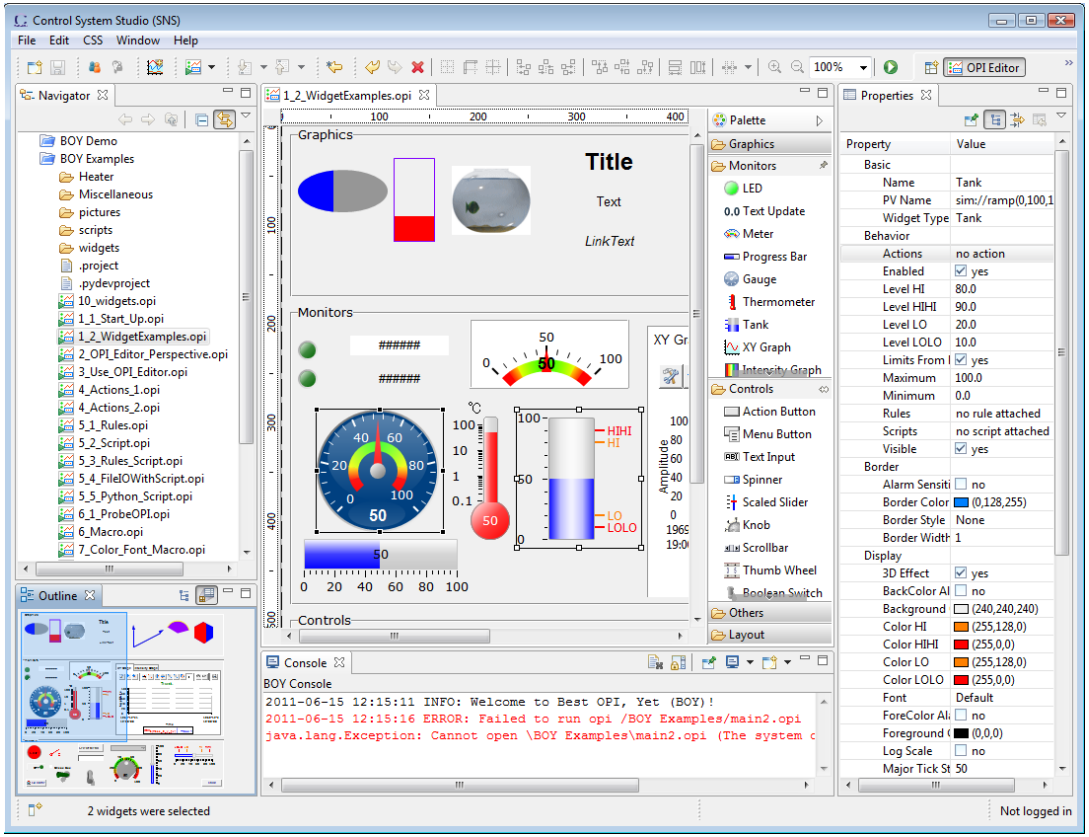
Alarm System (BEAST)

Tabular or Tree view, voice annunciations, …

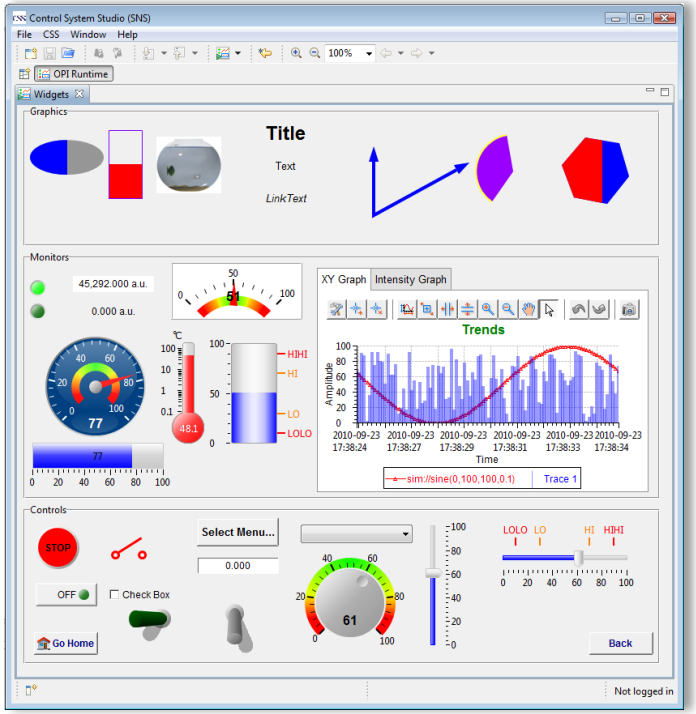


BOY – Best OPI, Yet

Operator Interface Editor



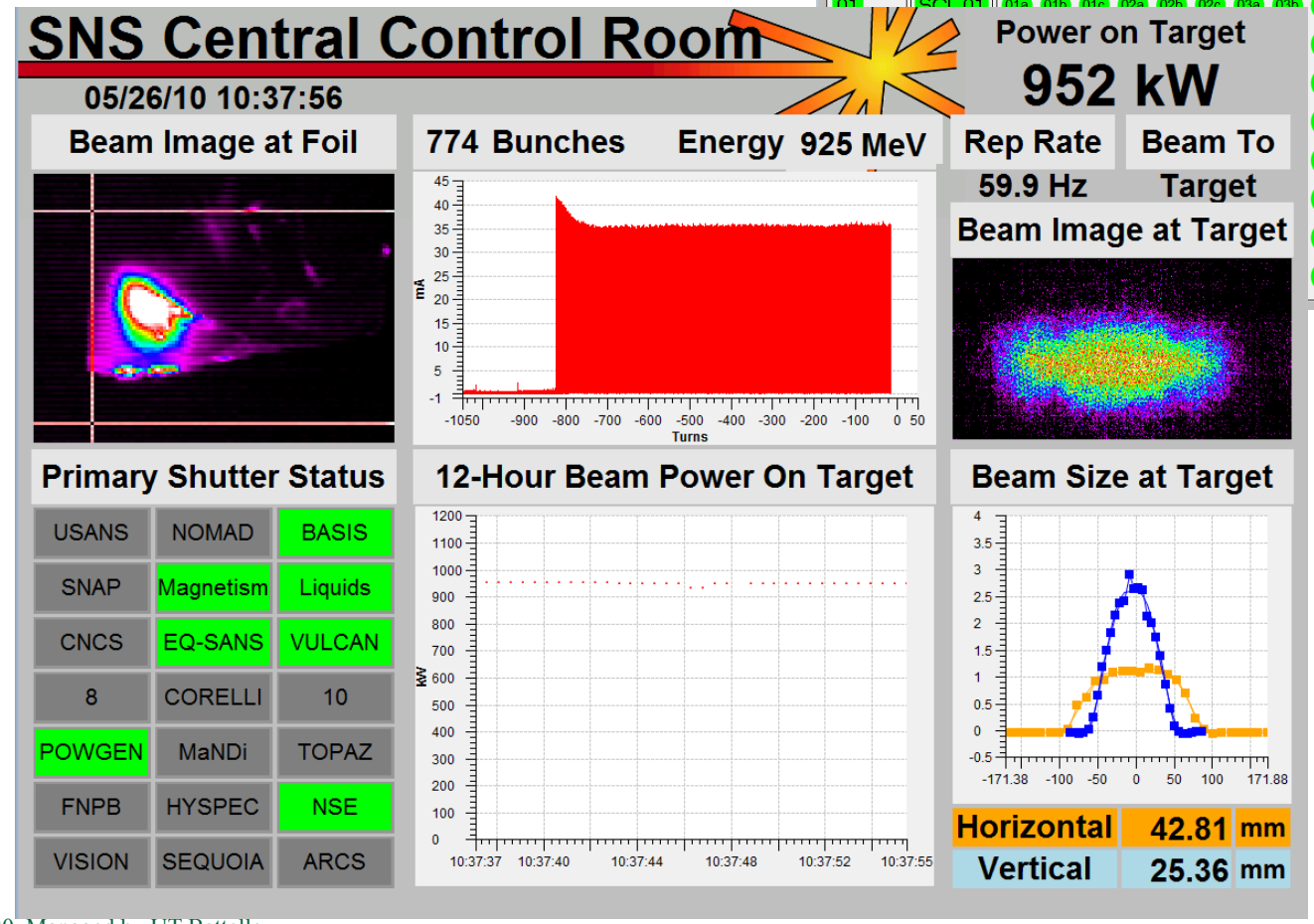
Runtime

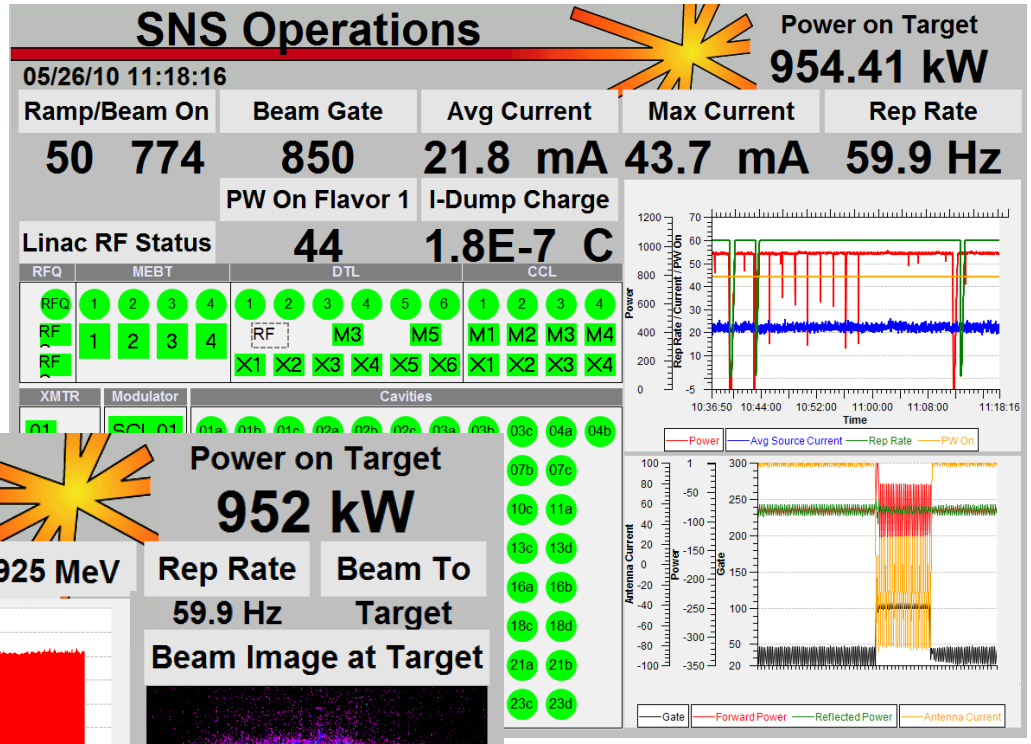


- Select widget, enter PV name, done
- No programming, no compilation, …

SNS Examples

- Top-level displays created by operators



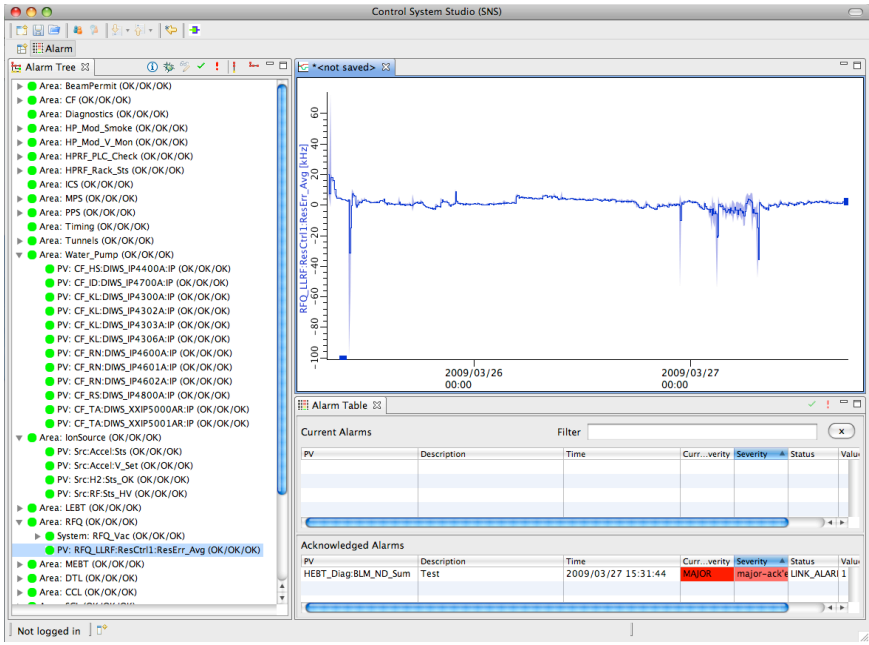


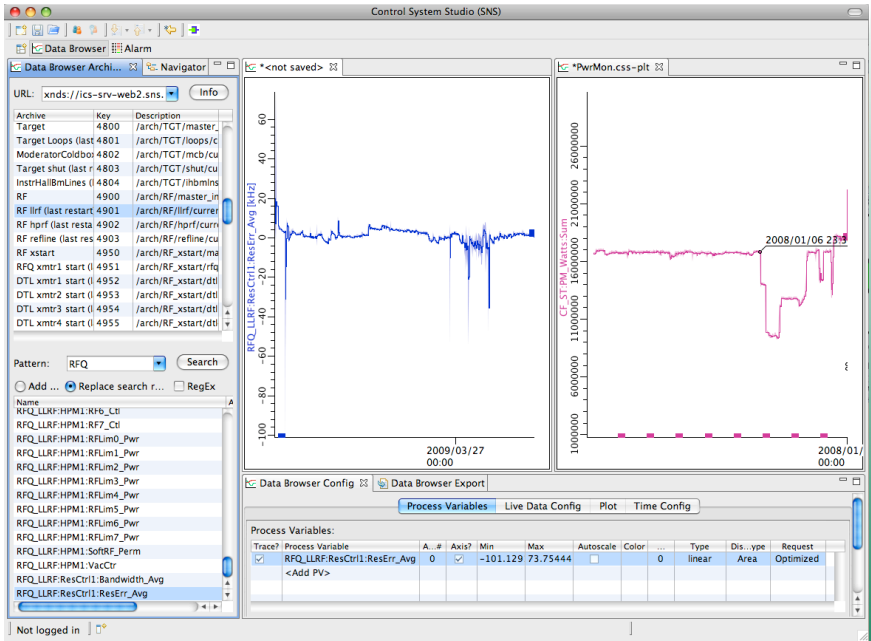
Tim Southern, Nick Luciano

OAK RIDGE National Laboratory

Flexible Layout

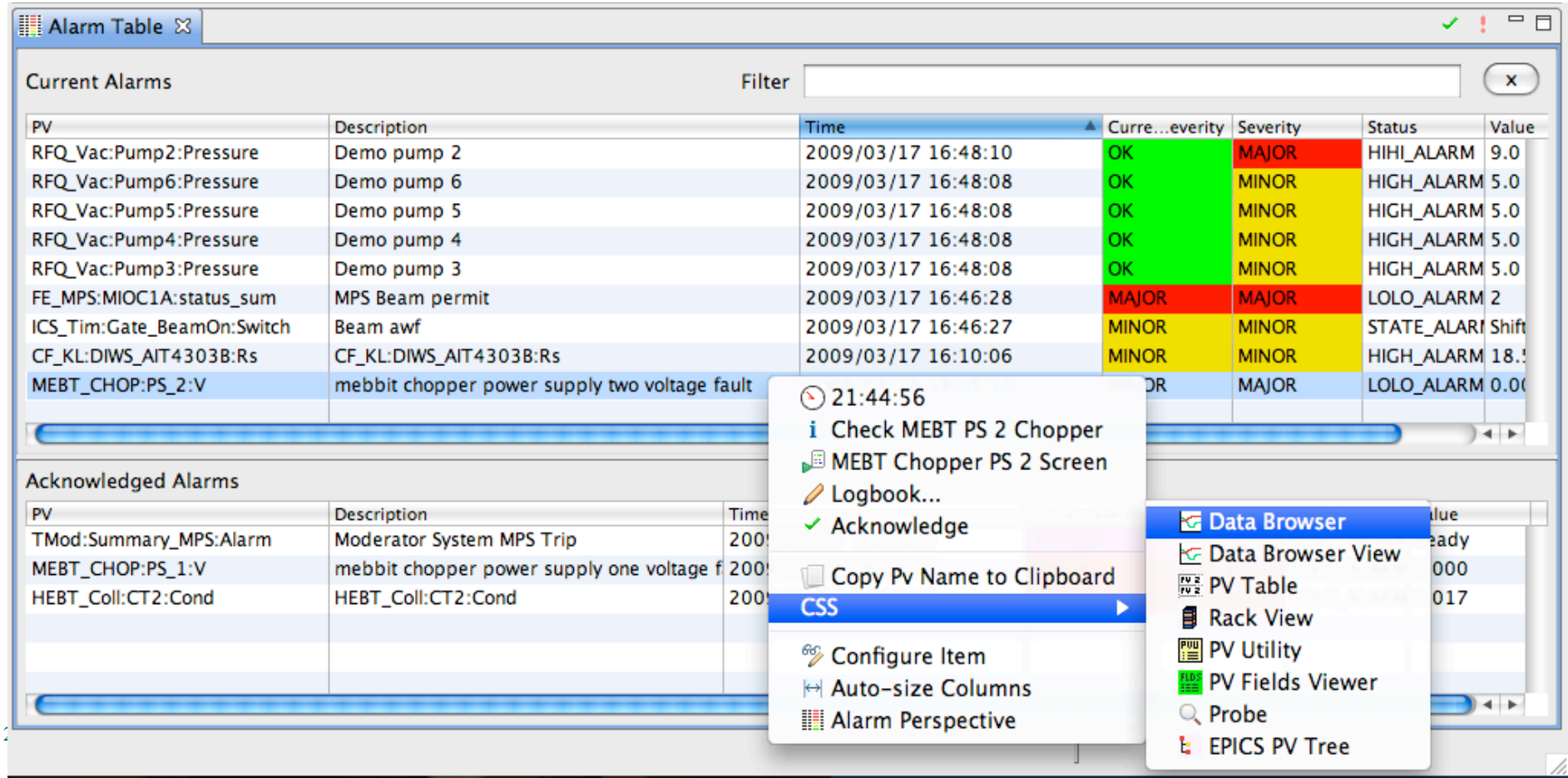
- Panels can be closed, reopened, repositioned
- Multiple Perspectives
  - Name, Save, Restore
- Multiple document instances share same configuration panels





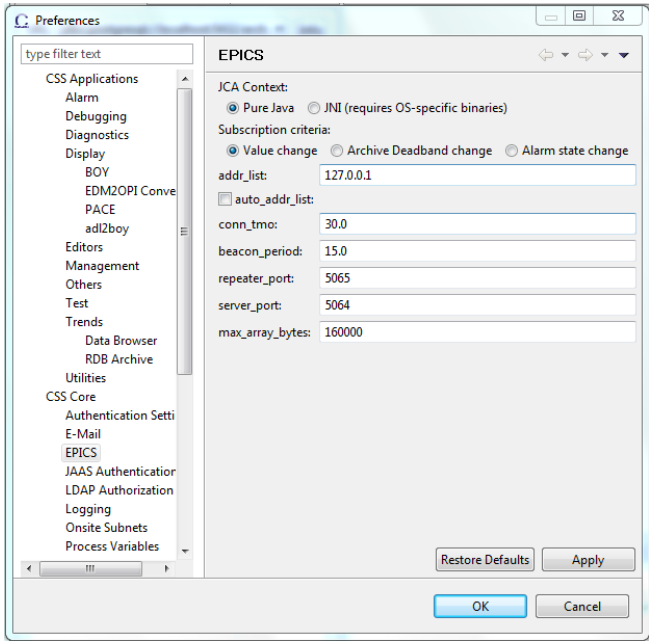
CSS PV Exchange

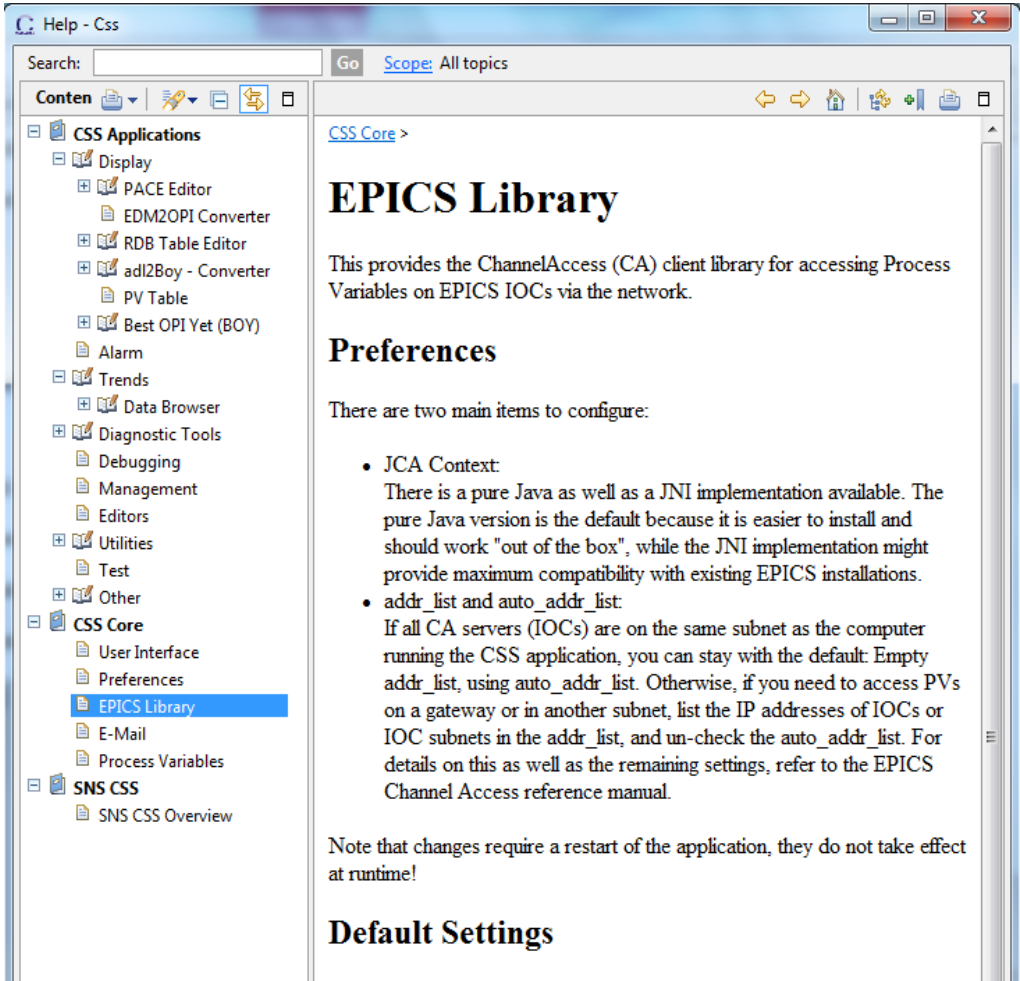
- PV in *any* CSS Tool
  ➔ Context Menu ➔ Select other PV Tools
  - Opens other tool with that PV



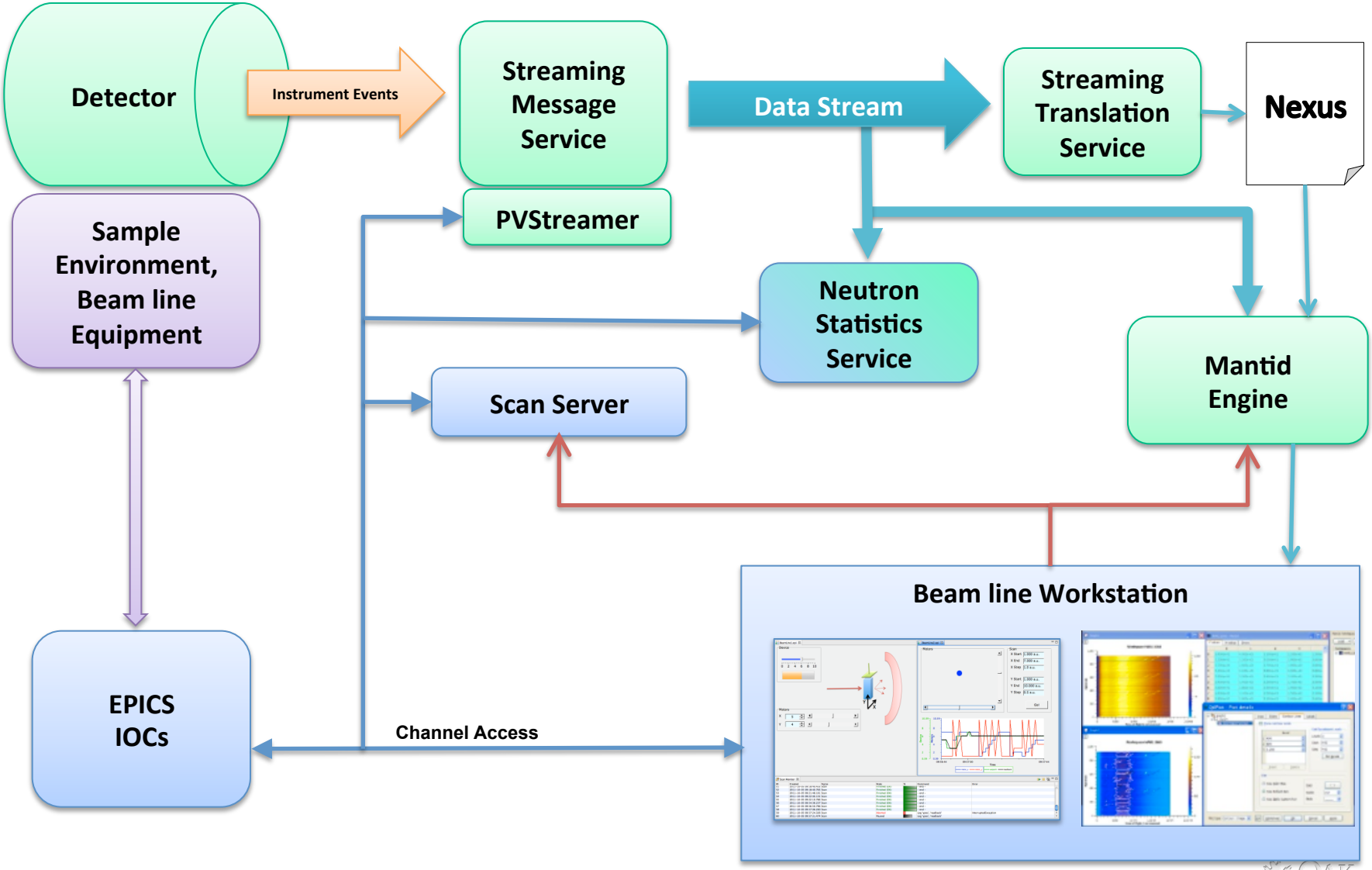
Integrated Help, Preferences

- Uniform access to settings, searchable help
  - Applications
  - Support Libraries
    - Logging
    - Control System access

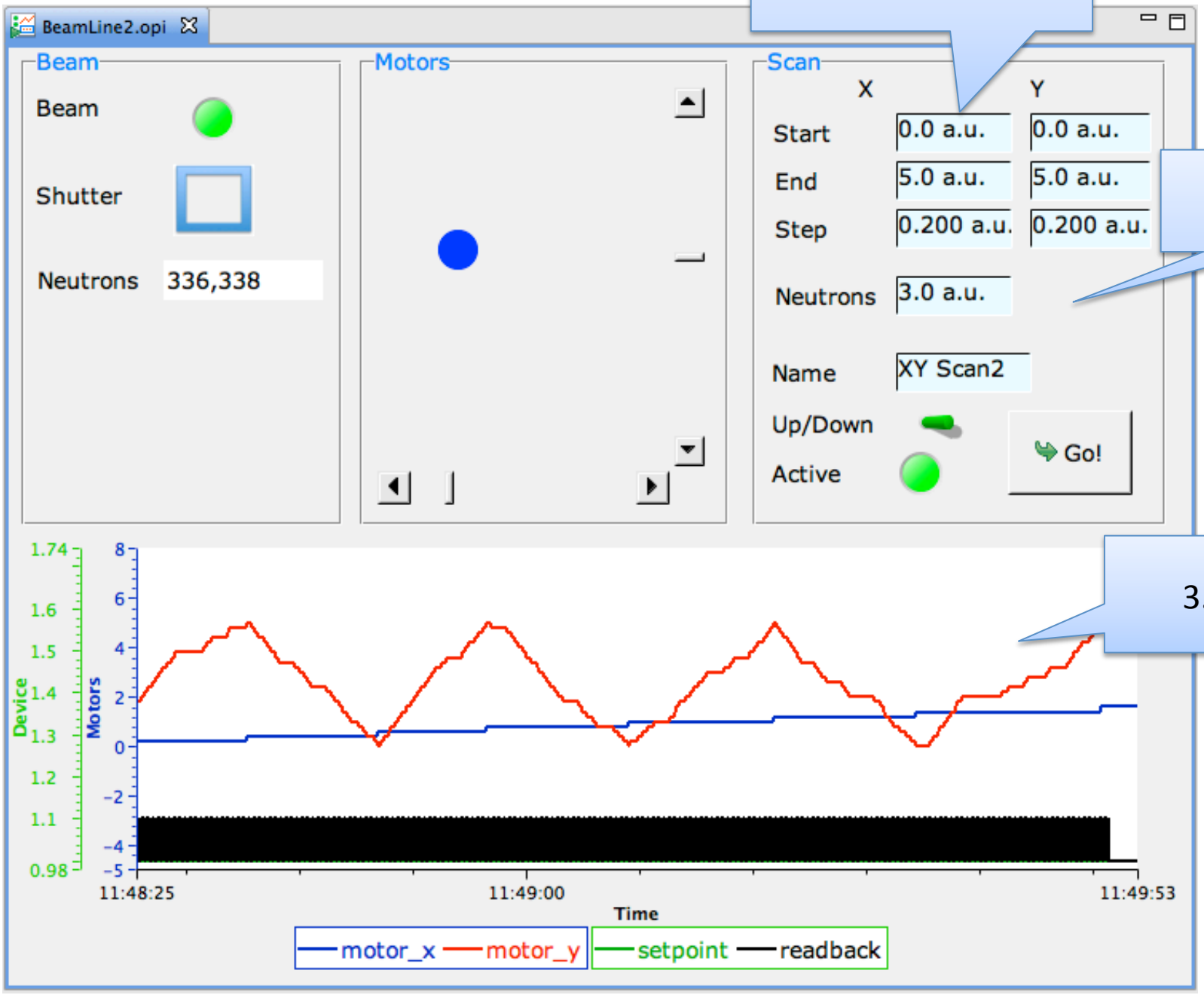




Instrument Automation w/ Scan Server



“Scan” from BOY



1. Configure

2. Start

3. Monitor

TableScan.opi

Submit Scan from Table Example

Point by Point Scan | Nested Scan

Points	xpos	ypos	setpoint
Point 1	0	0	5
Point 2	1	1	10
Point 3	2	2	15
Point 4	3	3	20
Point 6	4	4	15
Point 7	5	5	10
Point 8	6	6	0

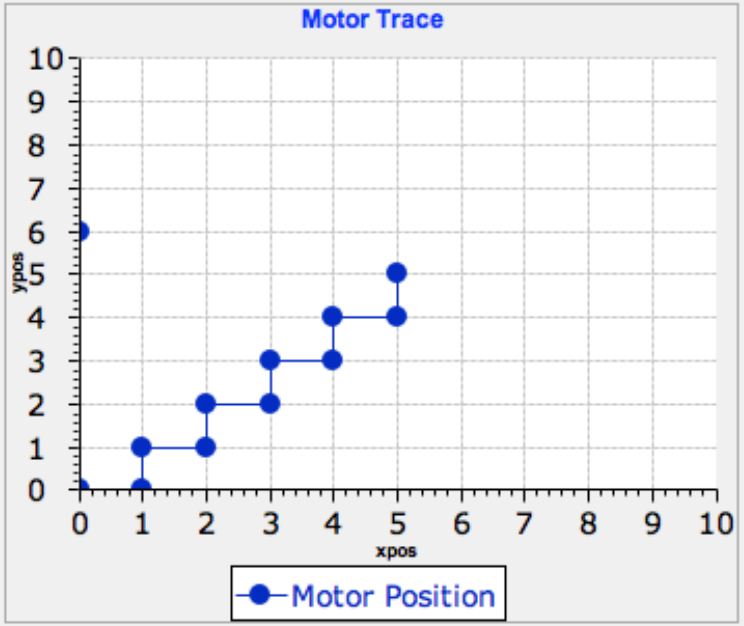
Submit Scan

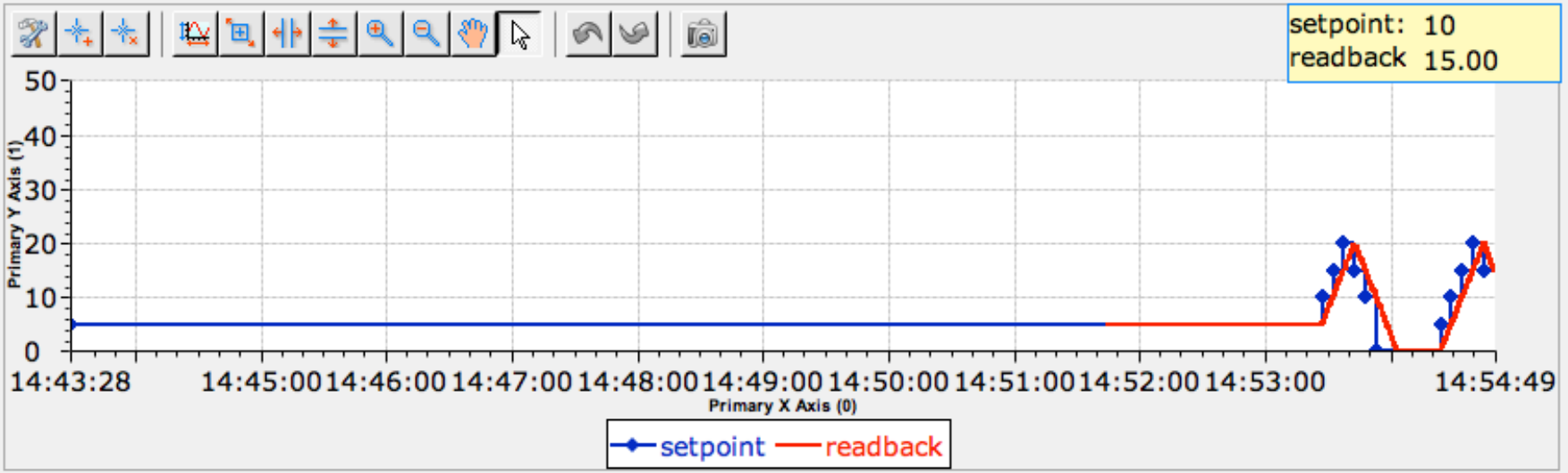
in workspace

Load from .csv ...

Export to .csv file

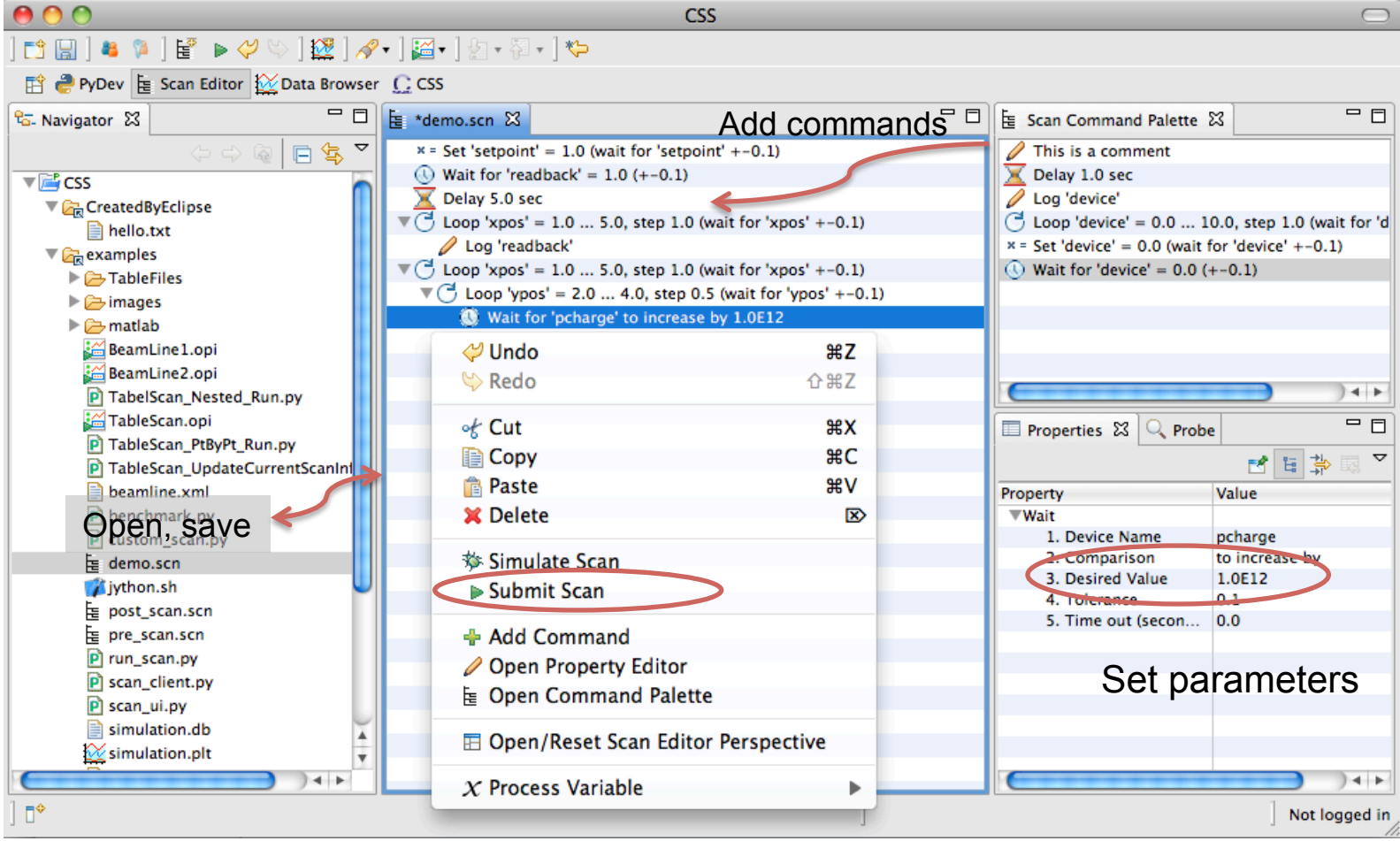
Scan Running





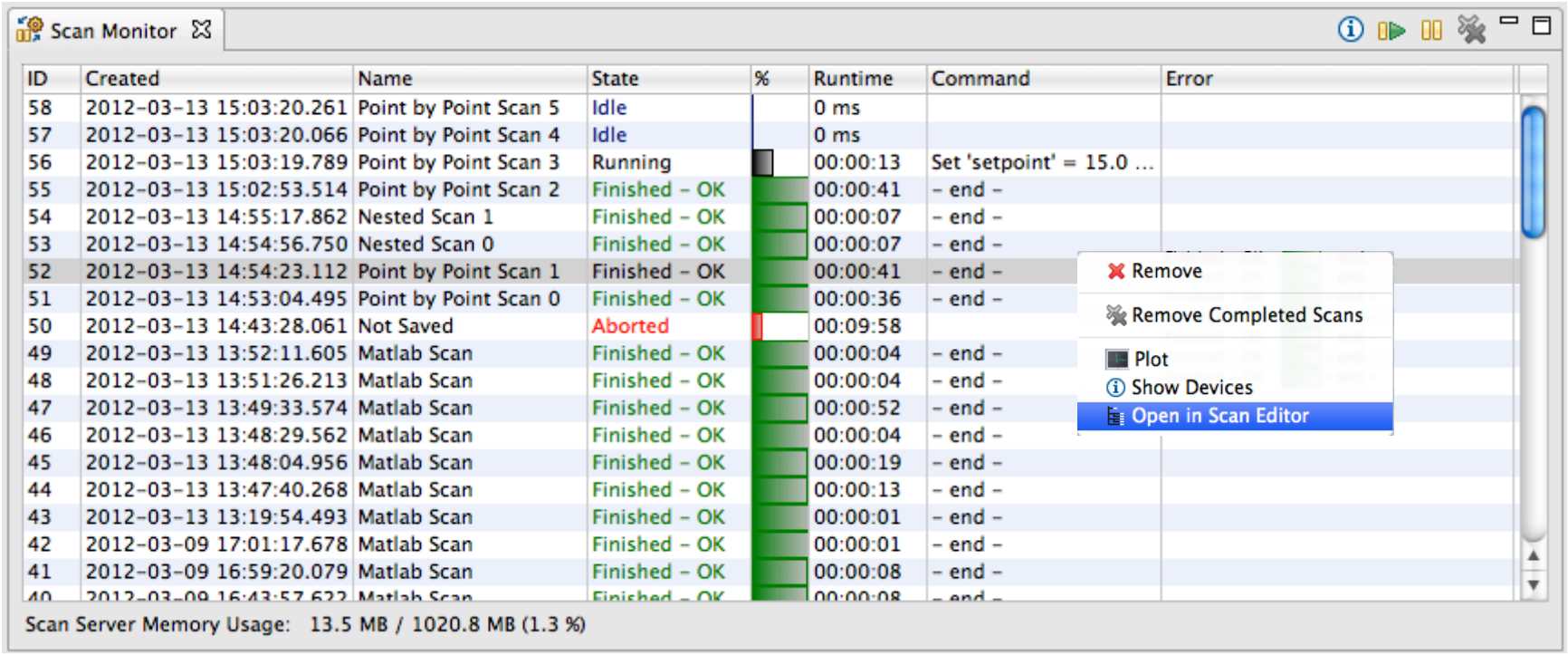
Current Running | Point by Point Scan | Current | Set 'ypos' = 5.0 (wait for | 79%

Scan Editor



- "Undo"
- Drag/drop commands or PV names (also as XML text)
- Device PVs (or alias) can be picked from beamline-specific configuration

Scan Monitor



List Scans on Server

- Idle: To be executed next
- Running: With progress report
- Finished, Failed: Past runs

Thick Client vs. Web

✓CSS: Integrated, rich, portable

Still: Needs to be installed on each user's computer..

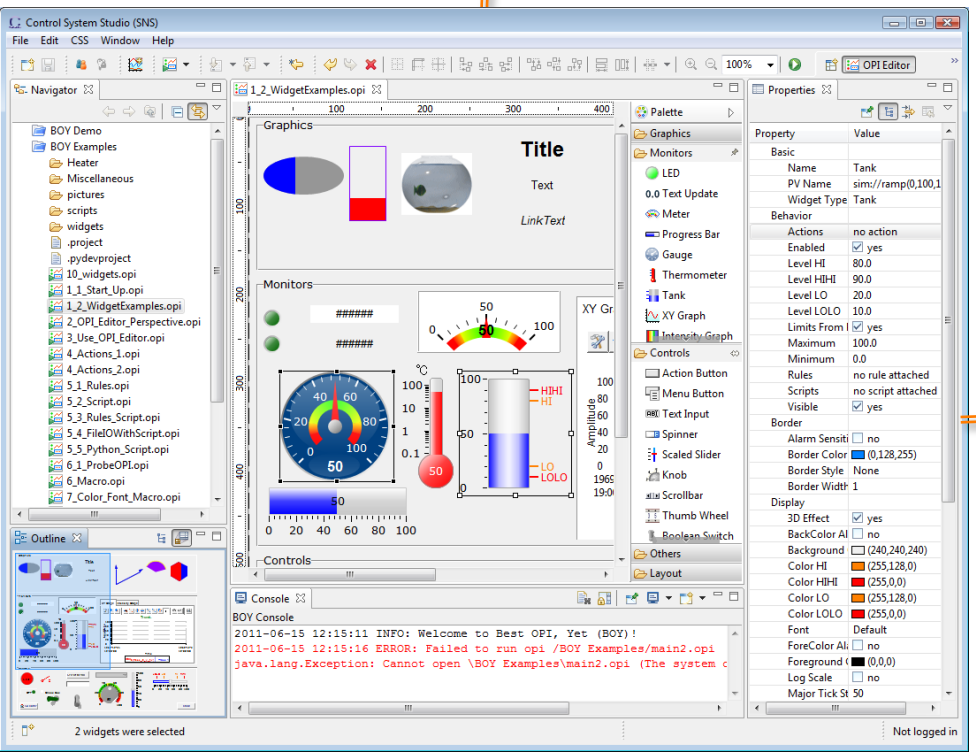
Accessible from phones, tablets, toasters?

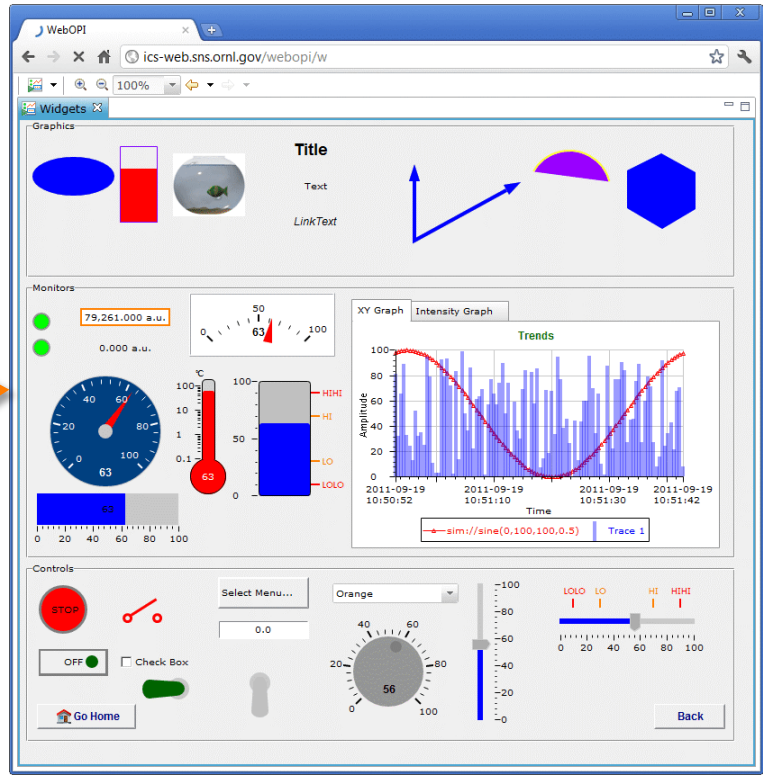
OK, nobody asked about the toaster, yet. But it's getting there, see www.theonion.com

Web OPI

CSS is Desktop app, will probably remain so, but

***.opi files can be viewed online!**

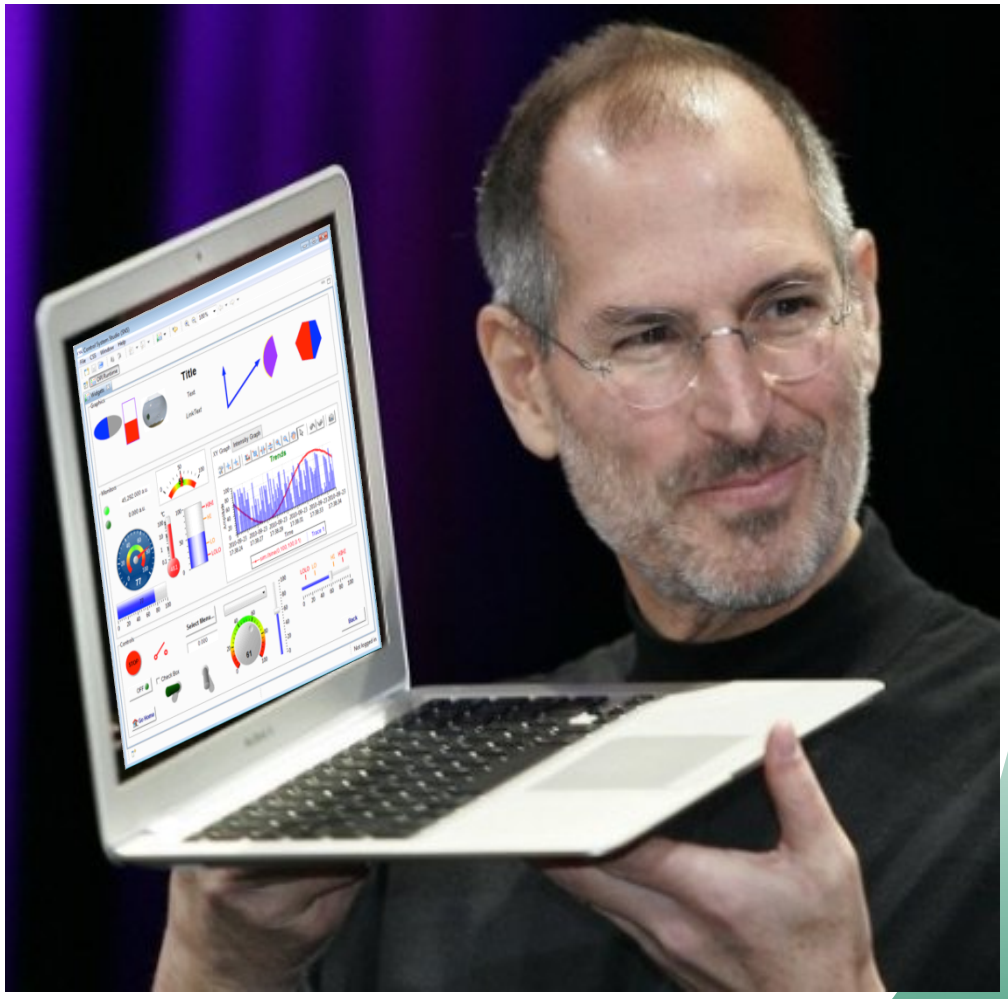




What is CSS?

Integration of various control-system tools into a consistent product

Excellent for end-users!



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