

jddd

Editor for Control System Panels
& Runtime Engine

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Content

- Motivation for jddd development
- The jddd editor:
 - Components / widgets
 - Functionality
- Special features:
 - Layers, Thumbnail preview, SVNBrowser, Plugin Interface, Export for high level applications
- Screenshots of Petra vacuum controls
- Experience & Outlook

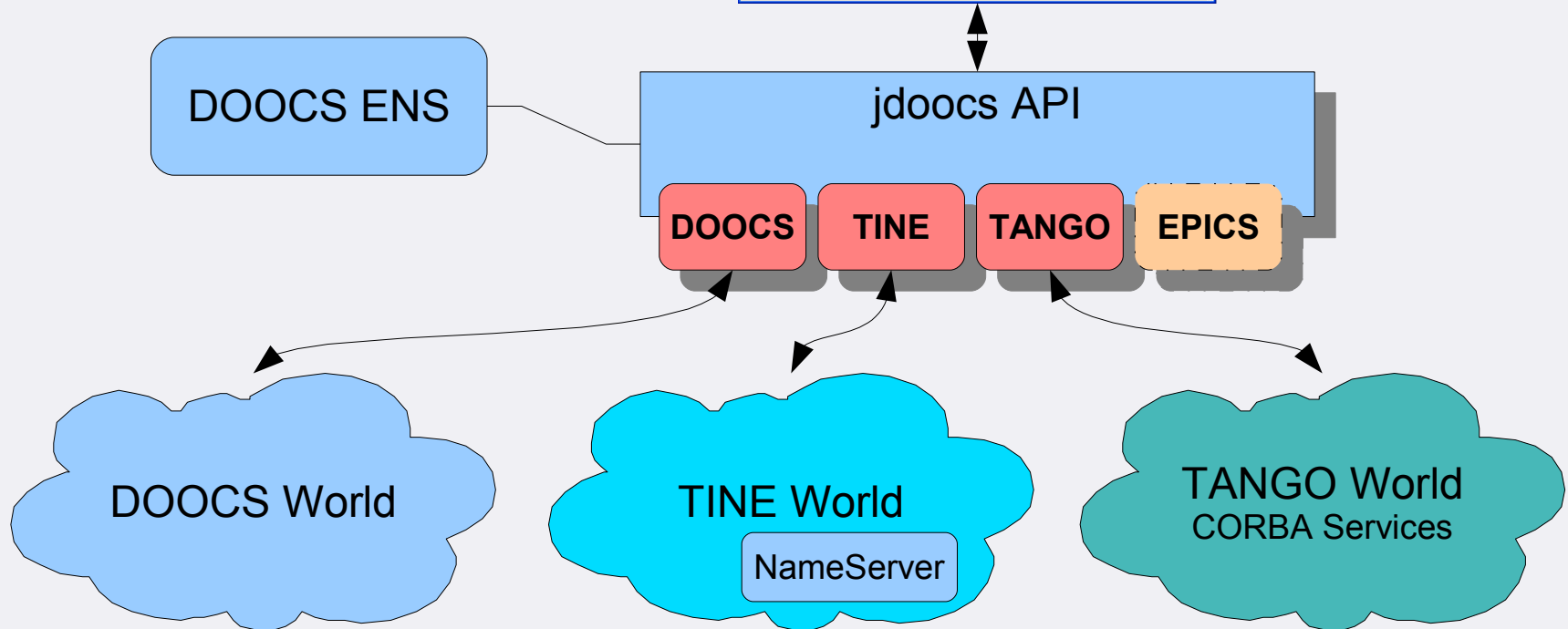
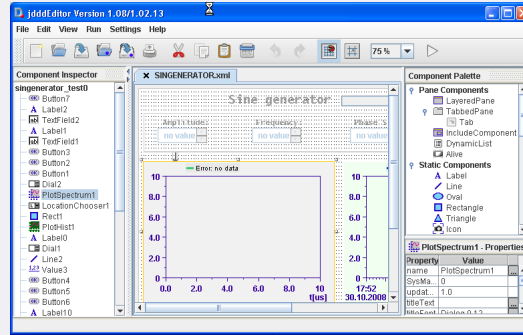
Motivation

- **We don't want to design all panels in the controls group (Flash: ~ 1300 control panels)**
- Non-programmers / subsystem experts should develop graphical control panels
- Synoptical display editor: simple creation of control panels with a set of standard components: text, buttons, graphical components, values, dials, plots, “If”, animated components
- Replace old ddd (DOOCS data display, C++)
→ **jddd (Java DOOCS data display)**

Jddd Implementation

- Use JAVA for platform independence
- Standard JAVA technology (Swing, Java Beans)
- Save panels in xml file format
- Central storage of jddd and designed panels
- We decided to write a **completely new editor** because:
 - Independence of external libraries
 - Highest flexibility
- Demands on the editor:
 - Stability, extendability, standard functionality, ergonomic and intuitive machine interface

jddd Architecture



jddd Editor

Component Inspector

EditorPanel

- TabbedPane1
 - Tab0
 - IncludeComponent
 - If7
 - If6
 - Icon1
 - CheckBox1
 - Label1
 - IncludeComponent
 - IncludeComponent
 - IncludeComponent
 - IncludeComponent
 - If5
 - If4
 - Button6
 - IncludeComponent
 - Button1
 - Button5
 - Button4
 - IncludeComponent
 - IncludeComponent
 - IncludeComponent
 - IncludeComponent
 - Line5
 - Button3
 - Button2
 - Button1
 - IncludeComponent
 - Line2
 - If3

Editor Window

GunSection.xml

Gun Section | Diag

☑ Laser On

Sol Mover

Laser

Value

Temp

Water

else

else

else

Klystron 3

else

else

Klystron 2

ACC1

Component Palette

- Pane Components
- Static Components
- Dynamic Components
- Logic Components
- Plot Components

Component Properties

IncludeComponent7 - Properties

Property	Value
name	IncludeComponent7
adr	
xmlFile	/home/elkes/bpm_co...
borderType	No Border
toolTipText	
layer	NONE
scale	<input checked="" type="checkbox"/>
bounds	[188,114,13,68]

33 jddd components

Pane Components:

- LayeredPane
- **TabbedPane**
- IncludeComponent
- **DynamicList**
- **Alive**

Static Components:

- Label
- Line
- Oval
- Rectangle
- Triangle
- Icon

Dynamic Components:

- Button
- **ToggleButton**
- Value
- Dial
- **TextField**
- **ComboBox**
- **CheckBox**
- **ProgressBar**
- **Slider**
- StatusRegister
- **Audio**
- **ColouredIndicator**
- **LocationChooser**
- CameraImage
- **TextArea**
- **DeviceTree**

Logic Components:

- If
- **Switch**

Plot Component:

- PlotSpectrum
- PlotHist
- PlotLocation
- PlotXY

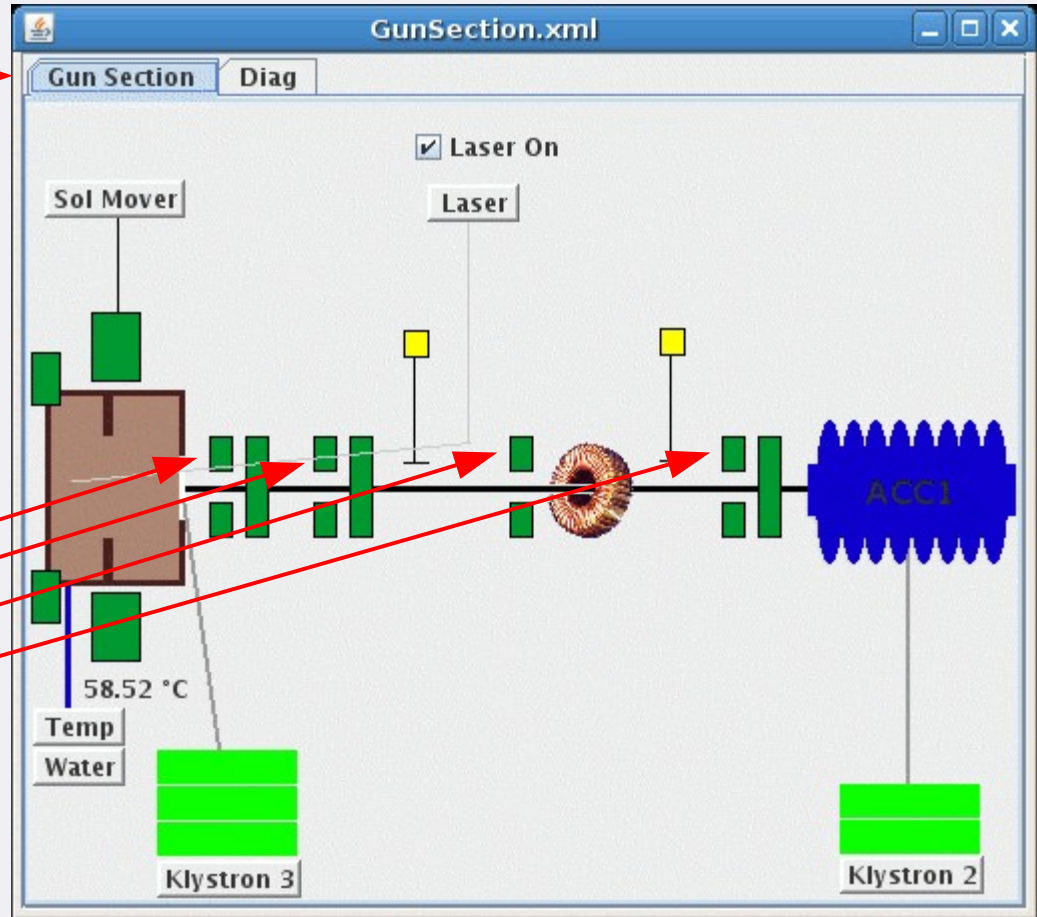
New Components

Pane Components

TabbedPane

IncludeComponent

Library component which can be used in multiple panels
steerer.xml



Pane Components

Dynamic List

in edit mode:

DynamicList of pump stations

Name	Rotation Speed	current	Status
Value	Value	no value	<input type="checkbox"/>

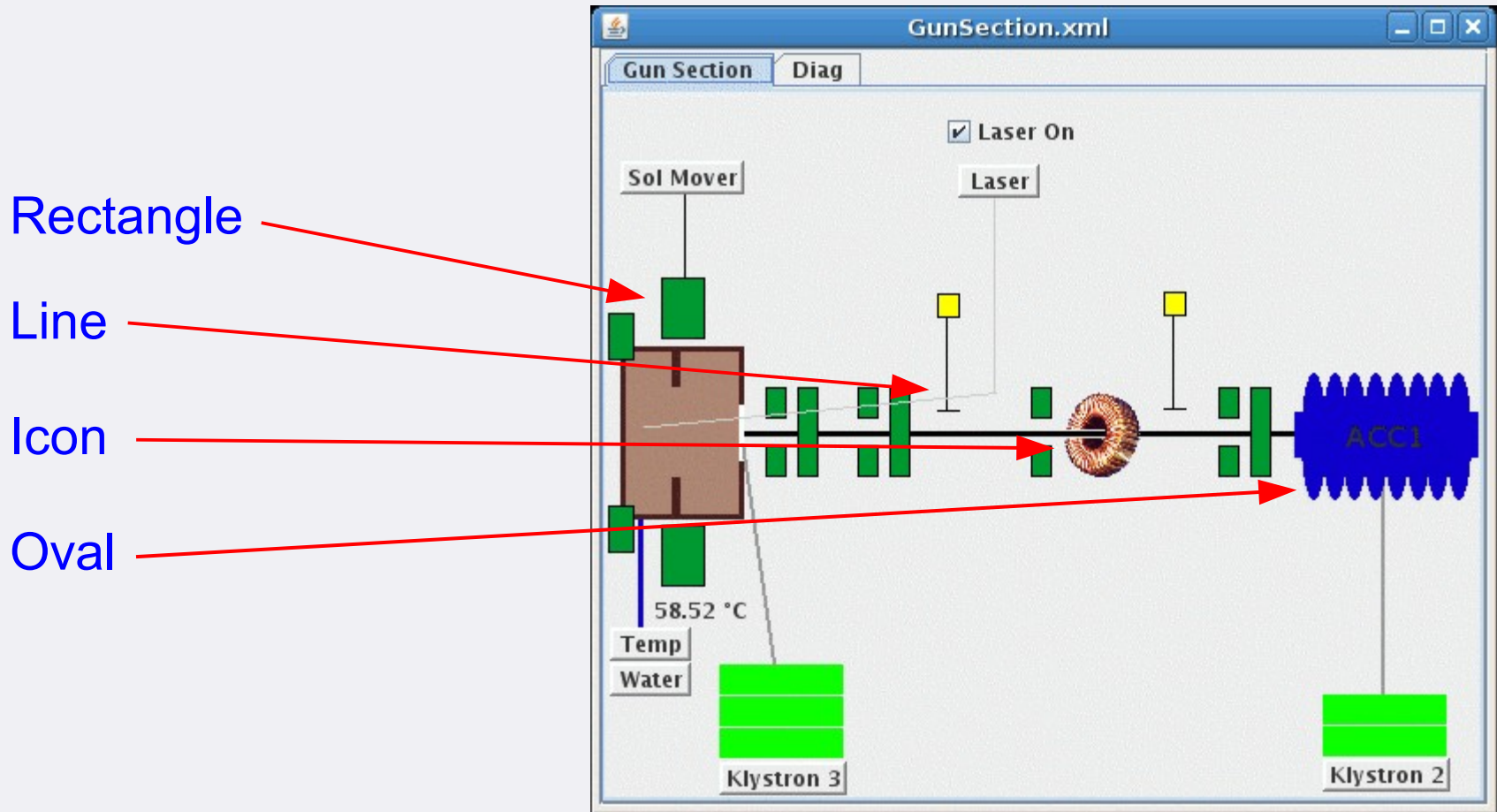
in run mode:

dynamicList.xml

DynamicList of pump stations

Name	Rotation Speed	current	Status
7ACC6.1.PS	734.496	0.70	<input checked="" type="checkbox"/>
PS.86	0.000	0.00	<input type="checkbox"/>
PS.85	0.000	0.00	<input type="checkbox"/>
PS.115	0.000	0.00	<input type="checkbox"/>
PS.111	0.000	0.77	<input type="checkbox"/>
PS.119	0.000	0.00	<input type="checkbox"/>
PS.117	0.000	0.00	<input type="checkbox"/>
PS.120	0.000	0.00	<input type="checkbox"/>
PS.45	565.470	0.00	<input type="checkbox"/>
PS.112	0.000	0.00	<input type="checkbox"/>
PS.113	0.000	1.08	<input type="checkbox"/>
PS.116	779.880	0.00	<input type="checkbox"/>
PS.43	0.000	0.00	<input type="checkbox"/>
PS.114	0.000	0.00	<input type="checkbox"/>

Static Components



Dynamic Components

Checkbox

Dial

Slider

ProgressBar

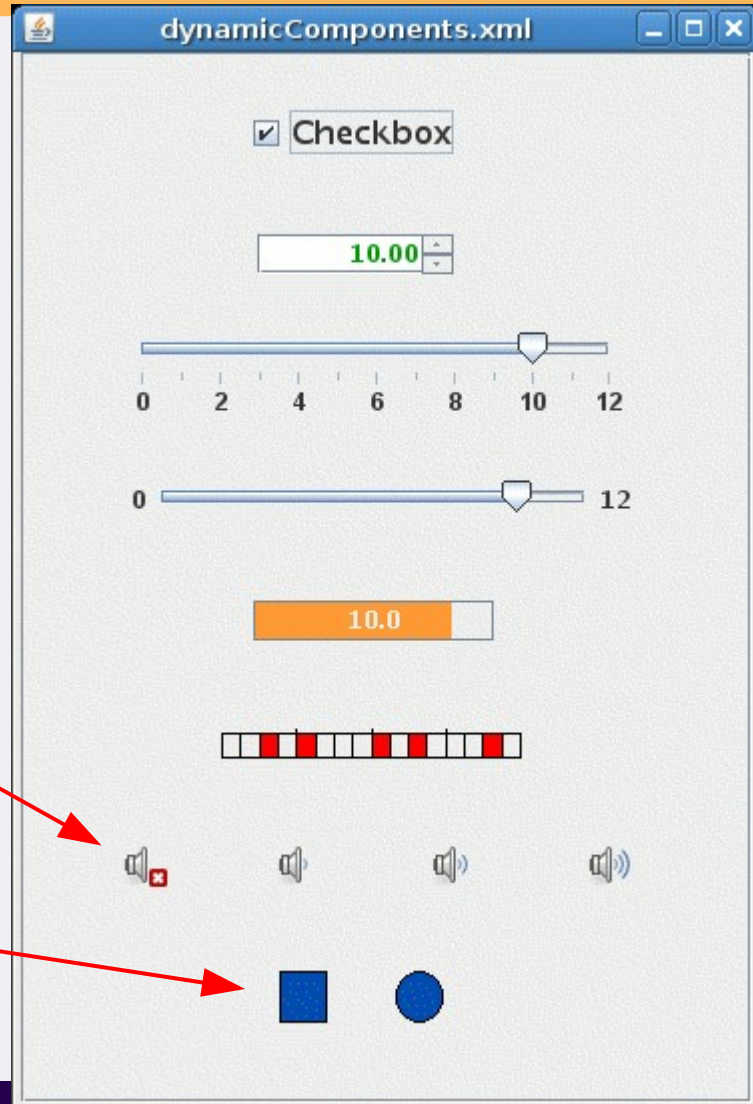
StatusRegister

Audio Component

- plays .wav file
- plays dynamic beep
f(variable in contr. sys)

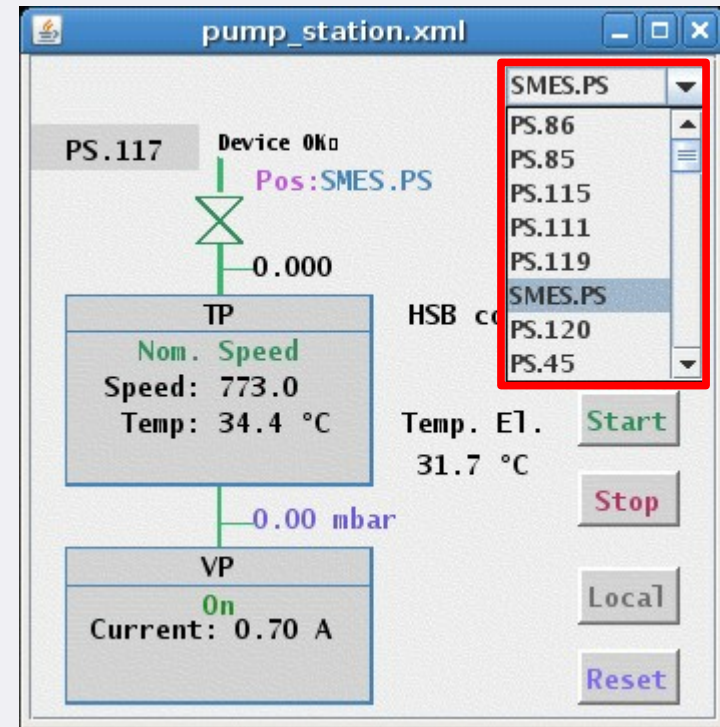
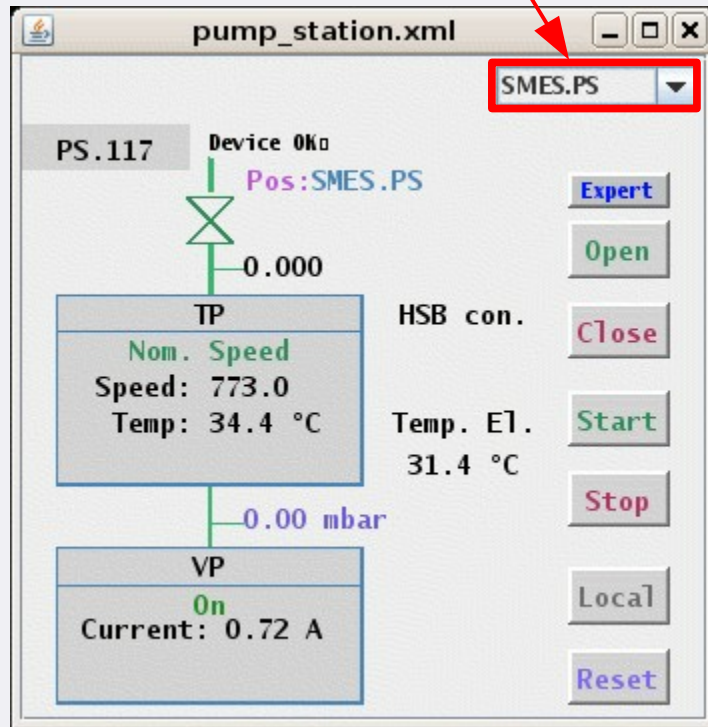
ColouredIndicator

- colour(variable in contr. sys)



Dynamic Components

LocationChooser: changes the base address of the whole panel



Dynamic Components

Buttons with different functions:

- Set one or multiple control system values
- Open new window, replace window, override window
- Execute shell command
- Print panel
- Help (opens a predefined web page in a browser)
- **Set component property** (to set one or multiple property values)



Button

Dynamic Components

Buttons with **Set Component Property** function:

The image displays two screenshots of a software interface titled "button_setComponentProperty.xml".

Top Screenshot:

- Rectangle:** A white rectangle.
- Include Component:** A yellow circle on a black horizontal line, which is on top of a red triangle with the number "1" inside.
- Dynamic List:**

COUPLER_IN	<input checked="" type="checkbox"/>	ON
COUPLER_OUT	<input checked="" type="checkbox"/>	ON
COUPLER_L	<input type="checkbox"/>	ON
COUPLER_R	<input type="checkbox"/>	ON
COUPLER_COAX	<input checked="" type="checkbox"/>	ON

Bottom Screenshot:

- Rectangle:** A red square.
- Include Component:** A yellow smiley face on a black horizontal line, which is on top of a green triangle with the number "2" inside.
- Dynamic List:**

MTS.17ACC1	<input type="checkbox"/>	ON
MTS.14ACC1	<input type="checkbox"/>	ON
MTS.7ACC1.WG	<input checked="" type="checkbox"/>	ON
MTS.1ACC1	<input type="checkbox"/>	ON

Logic Components

Switch: selects one of multiple layers

Component Inspector

EditorPanel

- Label1
- Switch1
 - X = 8
 - Label1
 - X = 4
 - Line6
 - Rect2
 - Line7
 - Line5
 - Line4
 - Line3
 - Line2
 - Group6
 - Group5
 - Group4
 - Group3
 - Group2
 - Rect1
 - Label1
 - Group1
 - Line1
 - Group7
 - Group8
 - X = 2
 - otherwise

Component Palette

- Dial
- CheckBox
- ProgressBar
- Slider
- StatusRegister
- Audio
- ColouredIndicator
- LocationChooser
- Logic Components**
 - If
 - Switch
 - Case
- Plot Components**
 - PlotSpectrum

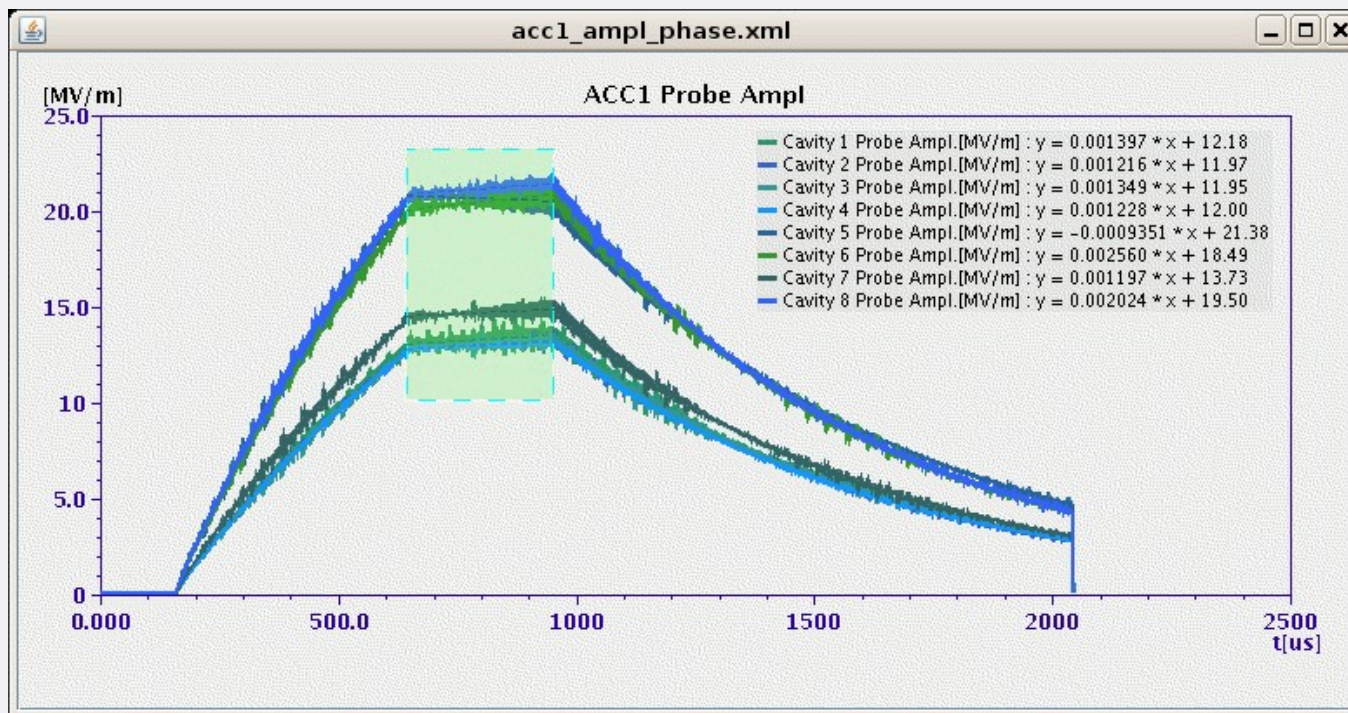
Switch1 - Properties

Property	Value
name	Switch1
adr	TTF2.UTIL/BIS/BEA...
borderTy...	No Border
toolTipText	
layer	NONE
scale	<input checked="" type="checkbox"/>
dataIndex	0
bitMask	15
useBitMask	<input checked="" type="checkbox"/>
updateTi...	1.0

Plot Components

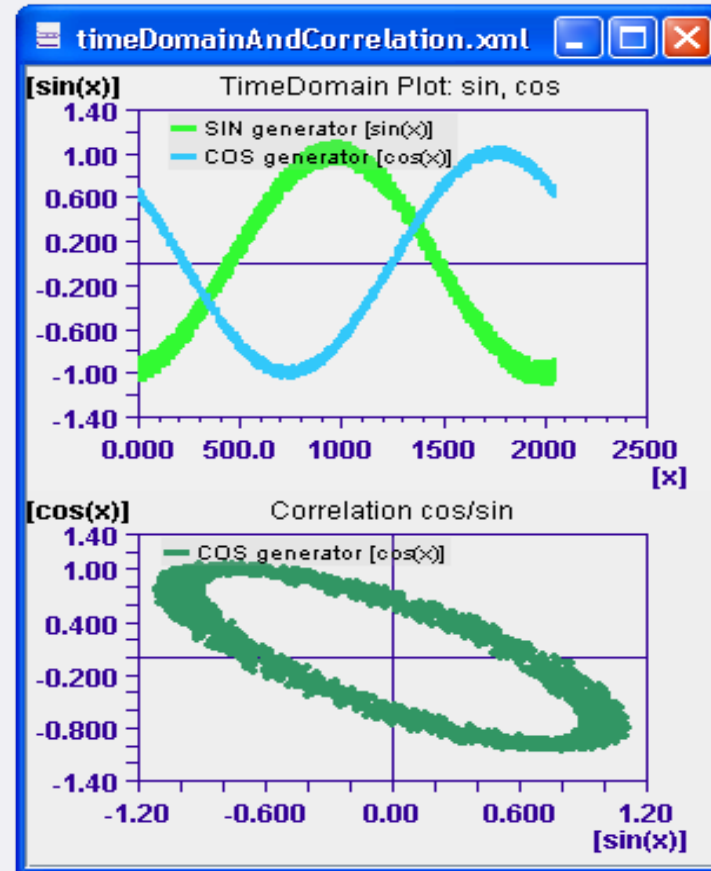
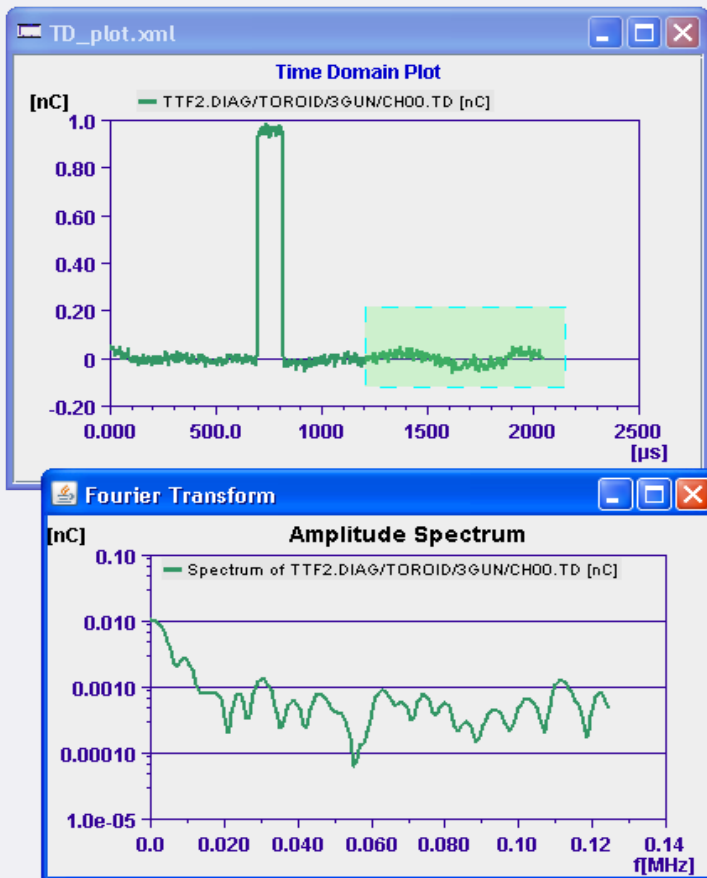
e.g.: time domain plot displaying multiple spectra:

- with * in location field of address
- by drag&drop



Plot Components

Time domain, History, Logic, Location, and XY plots with mathematical functions for online data analysis, autoscale

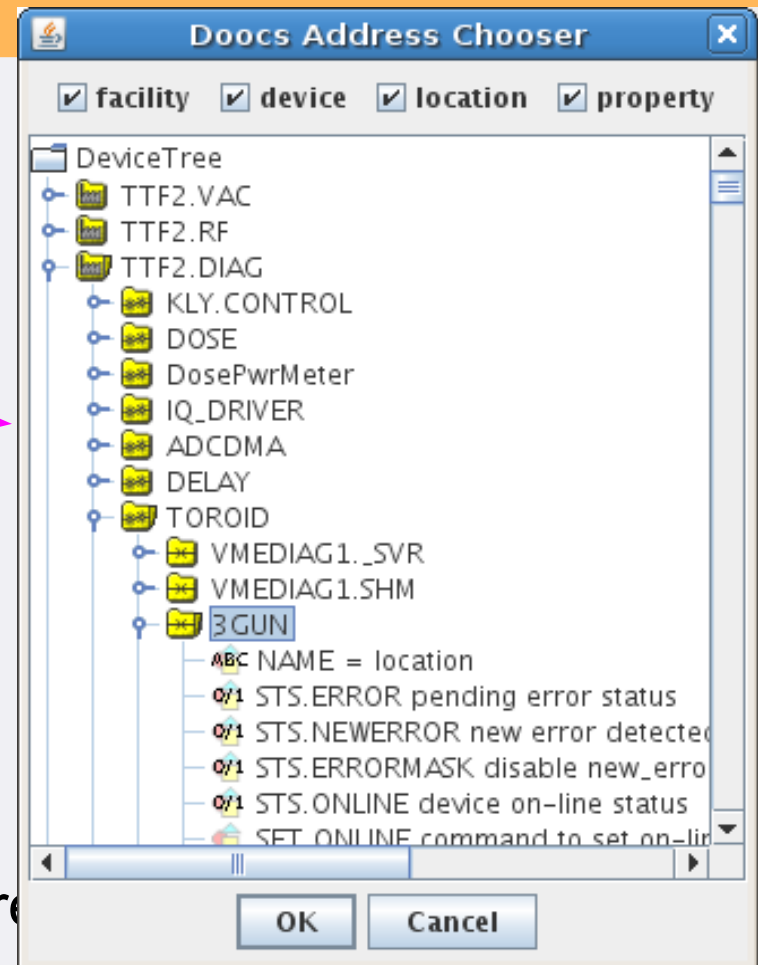


jddd Special Features

- Address Chooser and Inheritance
- Layers
- Thumbnail preview
- Subversion browser
- Plugin interface
- Export for high level applications

jddd Address Chooser

1.23 Value1 - Properties	
Property	Value
name	Value1
adr	DORIS/GLOBALS/keyword/DoDCTau
representation	String



Address Property

- Use the Address Chooser
 - Requires the DOOCS ENS
- Type the address
- One can add a control system name pre

time:DORIS/GLOBALS/keyword/DoDCCur

doocs://mcsgeg:610490821/TEST.DOOCS/WATCHDOG/DISK/READ

tango://host.desy.de:123/test/tg_test/1/float_spectrum

Address Inheritance

Start new Panel

Overwrites base address of panel

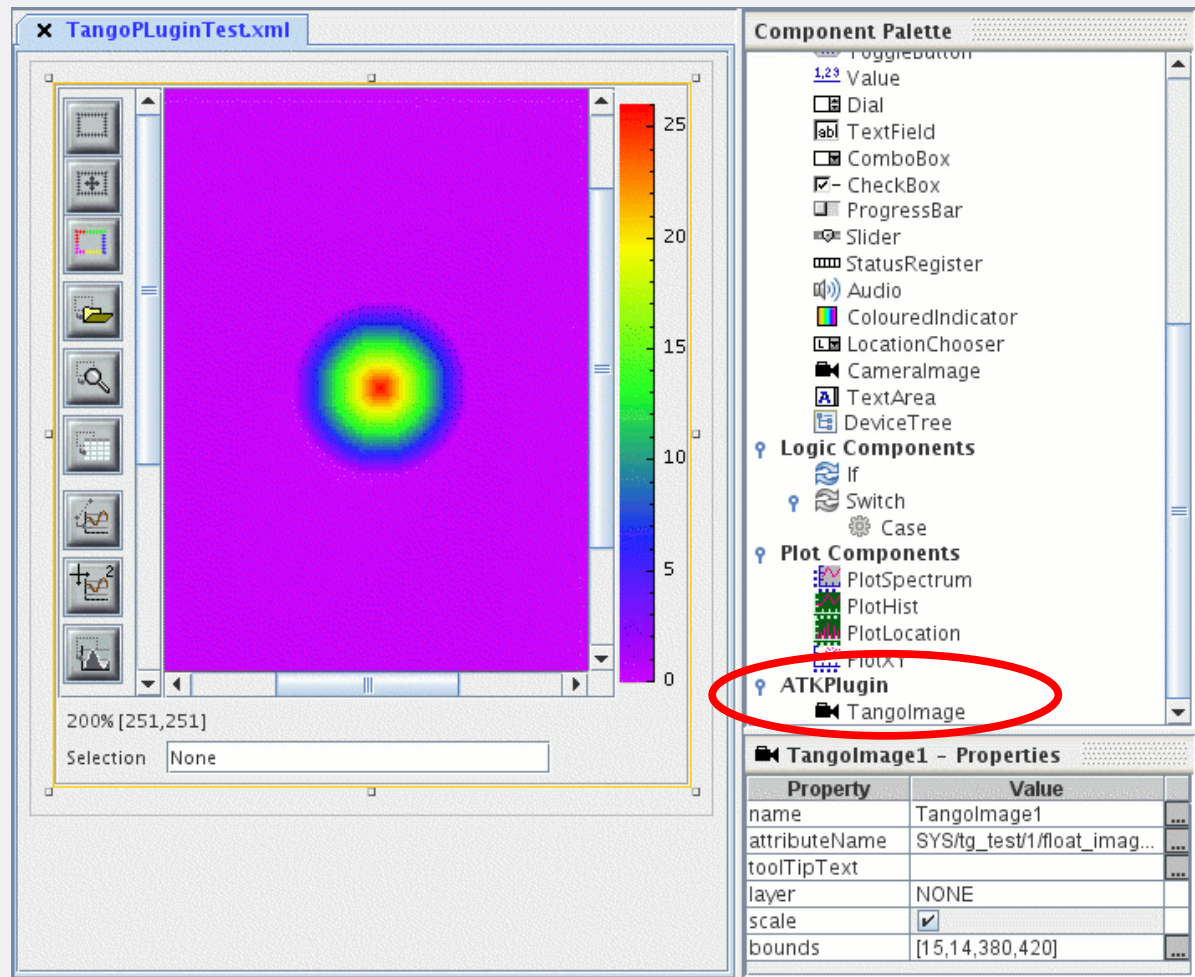
The screenshot shows a window titled 'address_inheritance.xml' with the following content:

- Editor Panel: adr=tine:///
- DORIS LifeTime: adr=DORIS/GLOBALS/keyword/DoDCTau
- 1.0 ← tine:DORIS/GLOBALS/keyword/DoDCTau
- Layered Pane: adr=DORIS///
- DORIS Current: adr=/GLOBALS/keyword/DoDCCur
- 0.48524746 ← tine:DORIS/GLOBALS/keyword/DoDCCur
- The resulting address inherits from EditorPanel + LayeredPane + Value

Plugin Interface

ACOP and Tango widgets can be included

A plugin.jar is needed containing wrapper classes for all Java beans. The wrapper defines the list of properties. The beans keep their direct connection to the control system.



jddd for High Level Applications

1) Export jddd panels as Java source code:

- export as JFrame or JPanel
- Disadvantage: Panels can't be revised with the jddd editor after the export.

2) Use jddd panels as Java Beans:

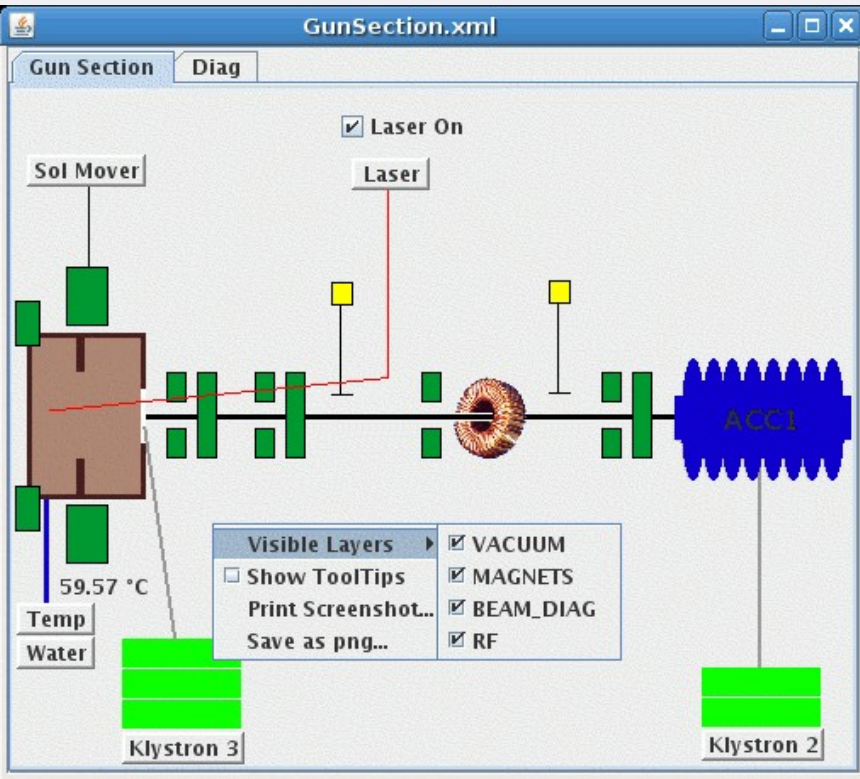
- Create a java application and add the following lines to insert a jddd panel as Java Bean:

```
jdddPanel panel = new jdddpanel();  
panel.setXmlFile(new java.io.File("/home/ttflinac/jdddFileName.xml"));
```
- To access components of the jddd panel:

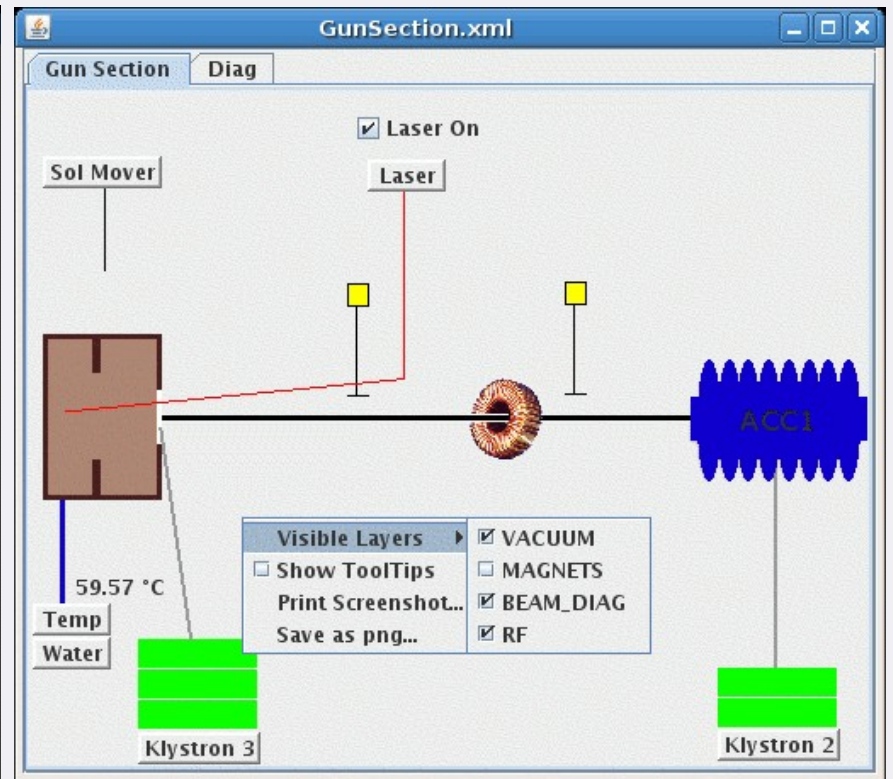
```
DOOCSOval oval1 = (DOOCSOval)panel.getDoocsComponent("LayeredPane1/Oval1");  
oval1.setDoocsFillColor(Color.orange);
```


jddd Layers

All layers on






“Magnets” layers off



Thumbnail Preview on Web-Browser

- screenshot of the panel shrunk to 10% of its original size
- included in the XML file to get a quick panel preview

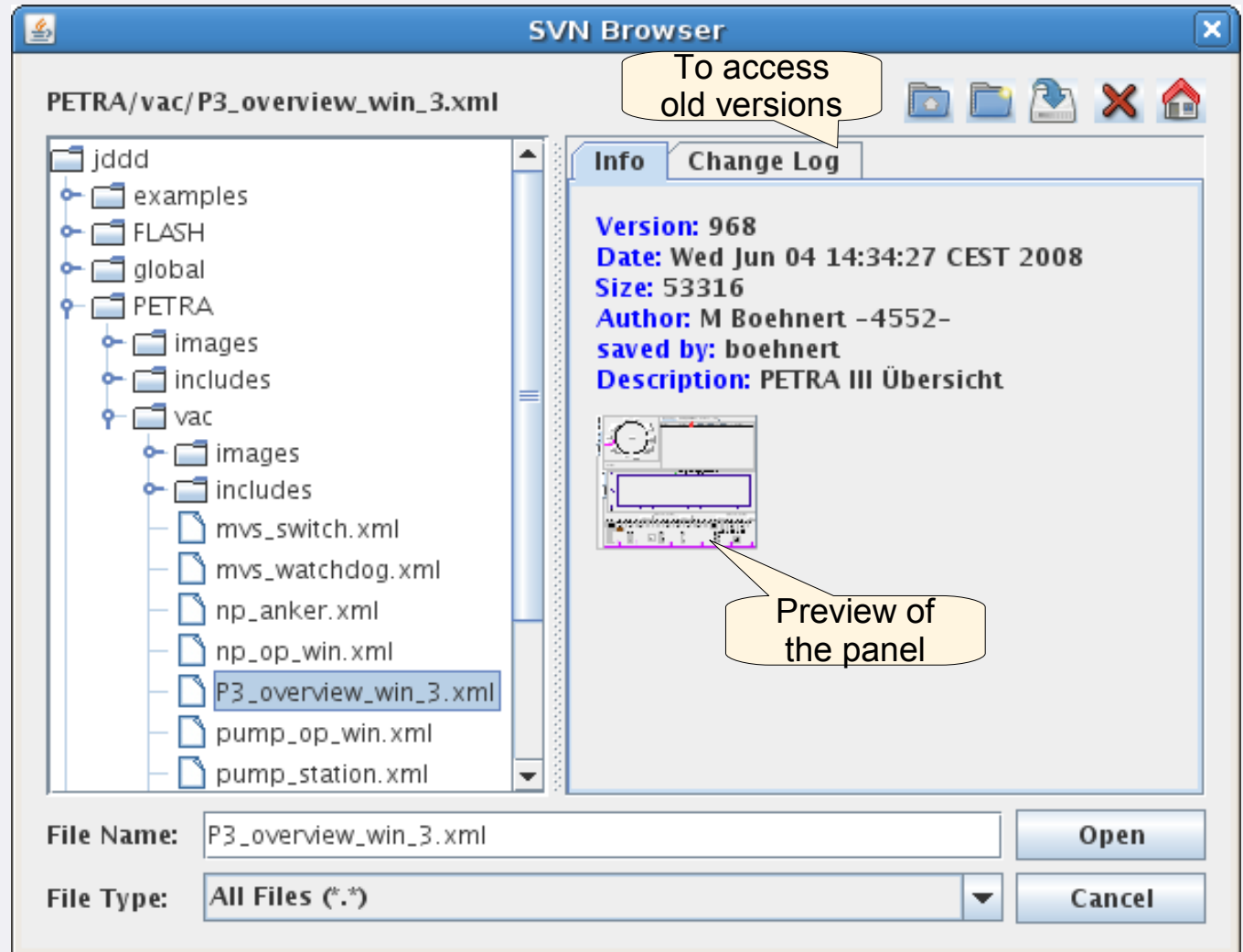
The following table is created dynamically from jddd XML files using an XSL transformation. The XSL transformation extracts the component name, author, description and thumbnail from the XML files.

Component name	Author	Description	Thumbnail
GunSection.xml	E. Sombrowski	jddd test panel of the gun section.	
TTF2_injector.xml	K.Rehlich	TTF2 injector panel converted from ddd.	
p3_overview_win.xml	M. Boehnert	Petra 3 vacuum overview.	

File Browser: Central File Store with Subversion

Subversion (SVN) repository to handle versioning of panels

New development using the Svnkit library
<http://svnkit.com>



PETRA Vacuum Controls: Sector SL

P3_overview_win_3.xml

Overview

Section

Plots

Tue Oct 14 13:14:17 CEST 2008

IonPumps	PumpStations	Valves	TSP
SL153_148	1.44E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5045.0
SL146_141	1.08E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5213.0
SL139_134	1.81E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	4932.0
SL132_126	5.39E-9	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	4902.0
SL124_119	1.18E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5101.0
SL117_112	1.59E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5269.0
SL110_105	1.53E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5161.0
SL103_098	8.26E-9	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5084.0
SL096_090	1.00E-8	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5174.0
SL088_083	7.92E-9	<input checked="" type="checkbox"/> Permit <input type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON	5208.0

Location

History

P mean: 1.07E-8

All OFF

P mean: 1.00E-4

All OFF

PETRA Vacuum Controls: Sector SWL

P3_overview_win_3.xml

Overview

Section

Plots

Tue Oct 14 13:14:52 CEST 2008

IonPumps	PumpStations	Valves	TSP
SWL132_127	7.55E-7	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 5139.0
SWL125_119	8.73E-11	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 0.0
SWL117_112	8.73E-11	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 0.0
SWL110_105	8.73E-11	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 0.0
SWL103_098	8.73E-11	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 0.0
SWL096_091	5.63E-7	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 4942.0
SWL089_083	5.96E-7	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 4901.0
SWL082_076	8.73E-10	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 0.0
SWL074_069	5.05E-7	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 5041.0
SWL067_062	3.15E-7	■	<input checked="" type="checkbox"/> Permit <input checked="" type="checkbox"/> Auto on <input checked="" type="checkbox"/> HV_ON 4562.0

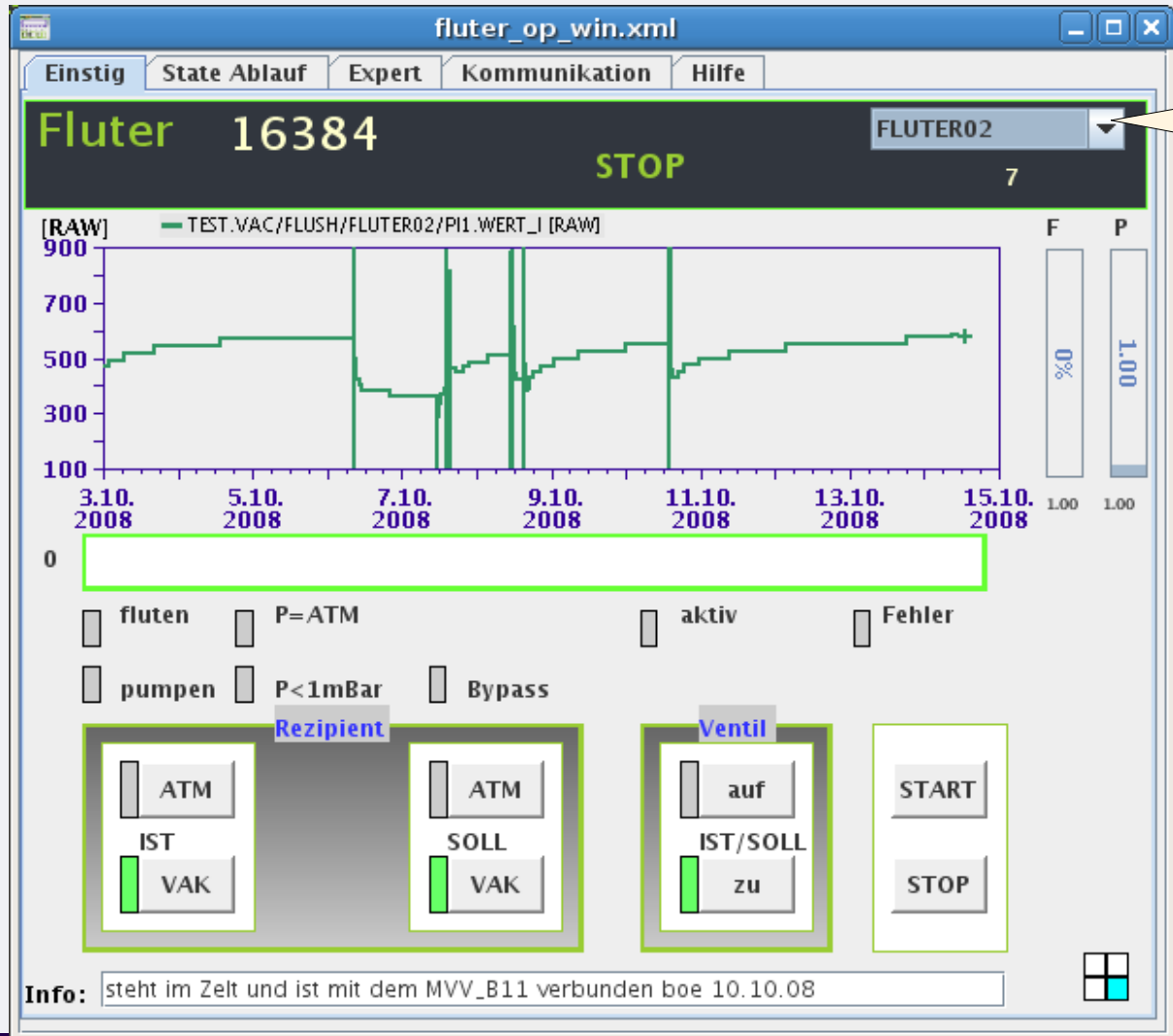
Location

History

P mean: 1.46E-8 P mean: 1.00E-4

All OFF All ON All OFF All ON

PETRA vacuum controls



Address
chooser

Experience

- A Java editor as powerful as the editor of Netbeans or Eclipse, but less resource hungry.
- Quick start with a single mouse click in a web browser.
- Simple creation of complex control panels for non-programmers.
- Rich set of ready-made components/widgets, including:
 - Clever logic components to animate graphics.
 - Plot components with online data analysis.
- External Java beans can be used as jddd plugin.
- Files are kept in a centrally hosted subversion repository for proper bookkeeping and history tracking.
- Access to multiple control systems: currently DOOCS and TINE.
- The implementation of TANGO is under development.

Outlook

API improvements:

- Read history data from the data acquisition system (DAQ)
- Improved interface to TANGO and new interface to EPICS control systems

List of Priorities:

- List will be available on our jddd homepage

How to start jddd

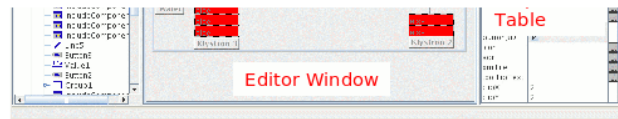
Java Webstart links on <http://jddd.desy.de/>

jddd: A Java DOOCS Data Display

jddd is an editor for control system panels with innovative concepts for control panel design. The main benefits of this software are:

- A Java editor as powerful as the editor of Netbeans or Eclipse, but less resource hungry.
- Quick start with a single mouse click in a web browser.
- Simple creation of complex control panels for non-programmers.
- Rich set of ready-made components/widgets, including:
 - Clever logic components to animate graphics.
 - Plot components with online data analysis.
- External java beans can be used as jddd plugin.
- Files are kept in a centrally hosted subversion repository for proper bookkeeping and history tracking.
- Access to multiple control systems: currently **DOOCS** and **TINE**. The implementation of **TANGO** is under development.

Thank you for your attention !



[Screenshot of the jddd editor. Click screenshot for jddd Web Start.](#)

Done