# CSS – Control System Studio

## Synoptic Display Studio (SDS) and Archive Display (Data Browser)

*CSS – Control System Studio*

Summary Presentation @ GSI February 11th 2009

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Presented by: Matthias Clausen

# Overview

## Synoptic Display Studio (SDS)

- Overview
- Converter

## Data Browser

- Basic Functionality
- Post Analyzer
- Waveform Support
- Integrating data from Scopes

# Synoptic Display Studio

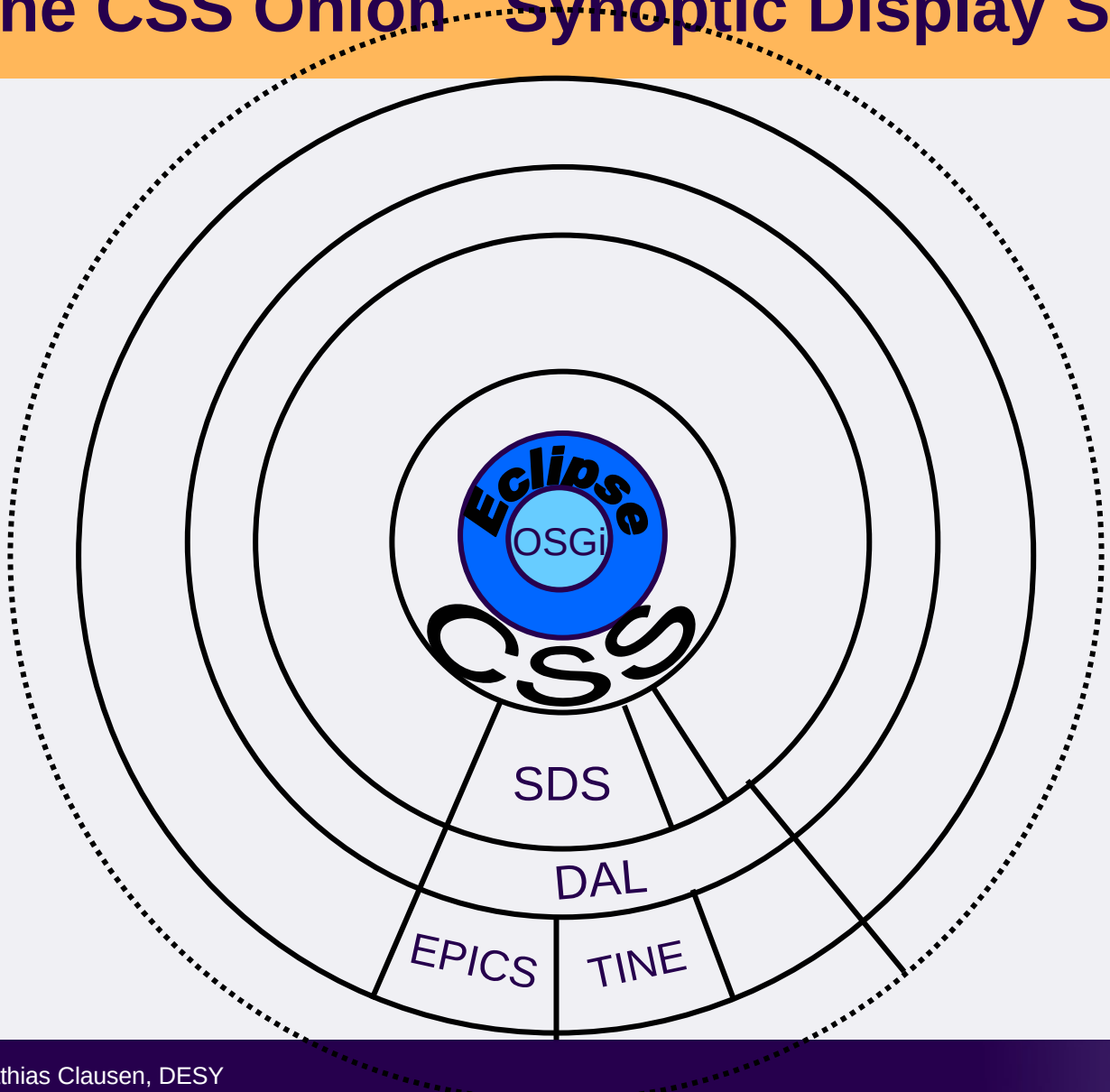
Synoptic Displays are the key (killer) application for process control systems

The current implementation provides a rich functionality

- Any property of any widget can be dynamic
- Any value from the control system may be converted by an individual (Java) script
- Any widget or graphic may change dynamically
- A local namespace can be configured dynamically (on the fly) and provides in addition a fixed set of parameters

Let's see how it works…

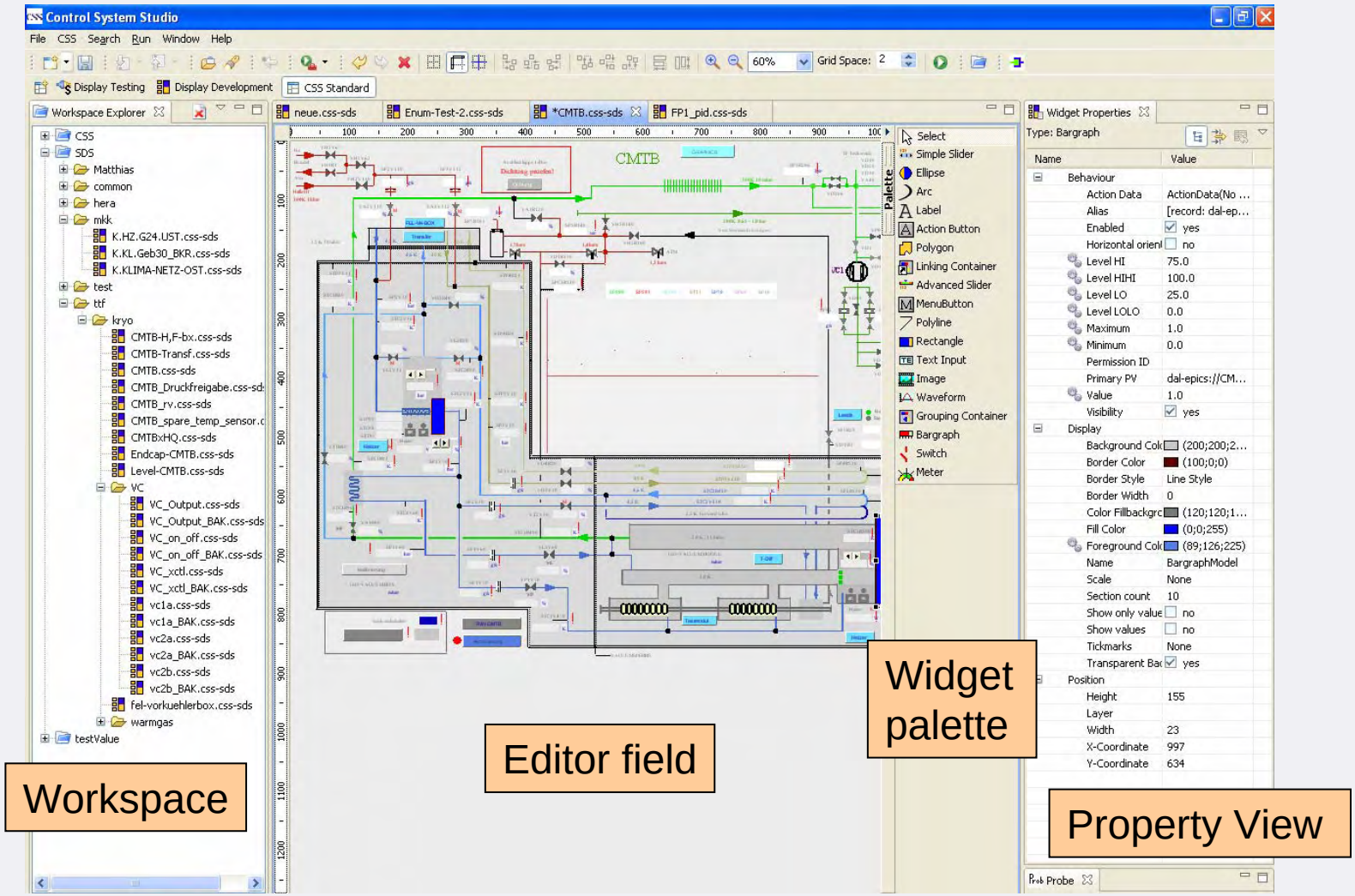
# The CSS Onion – Synoptic Display Studio (SDS)



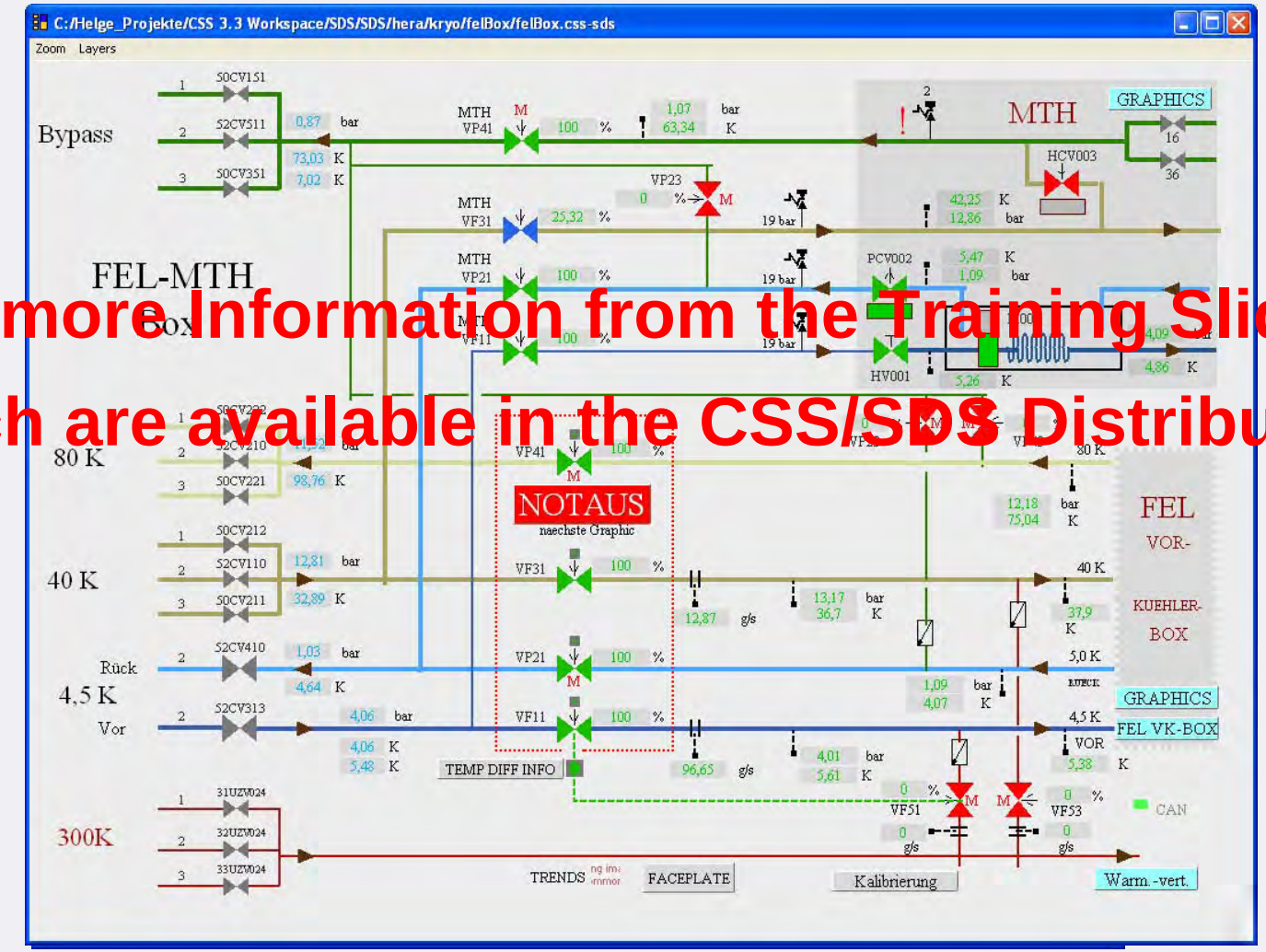
# Synoptic Display Studio

- Synoptic Display Studio (SDS) is a set of CSS plugins
- SDS is based on GEF
- Connection to control system via DAL
  - Support for EPICS and TINE ( more to come)
  - Full asynchronous support for data updates
- Initializer for widgets (depending on local settings)
- CVS support for the management of displays (Eclipse feature)
- ADL converter to reuse dm2k Displays
- Easy to add new widgets (one week for a Cosylab student)
  http://css.desy.de/content/e1576/index_eng.html
- Everything can be dynamic
  - Properties
  - Display call-up (name substitution using alias names)
  - Displays in Displays (depending on the actual value of a channel)

# Synoptic Display Studio UI



# SDS Example

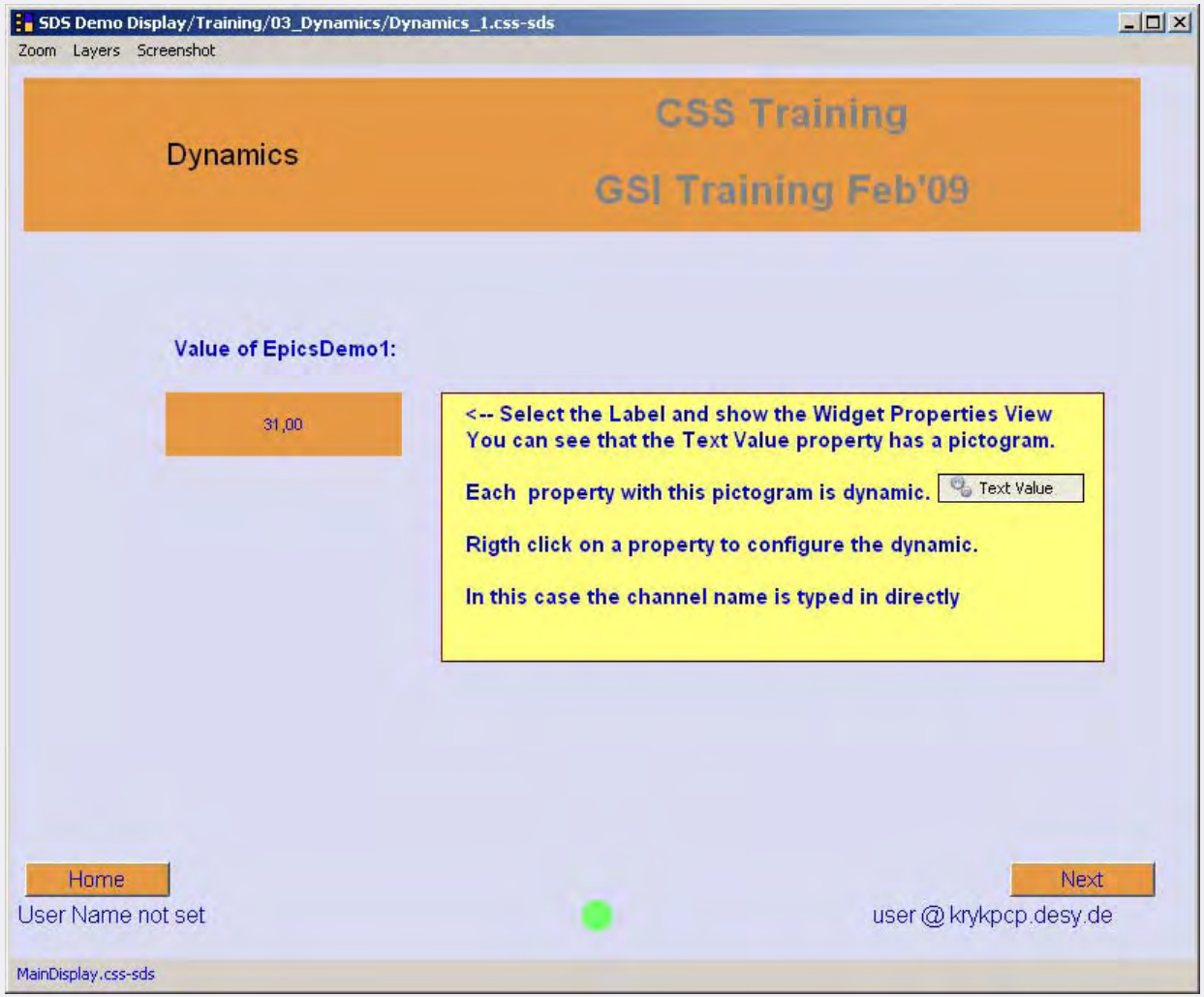



**Get more Information from the Training Slides which are available in the CSS/SDS Distribution**

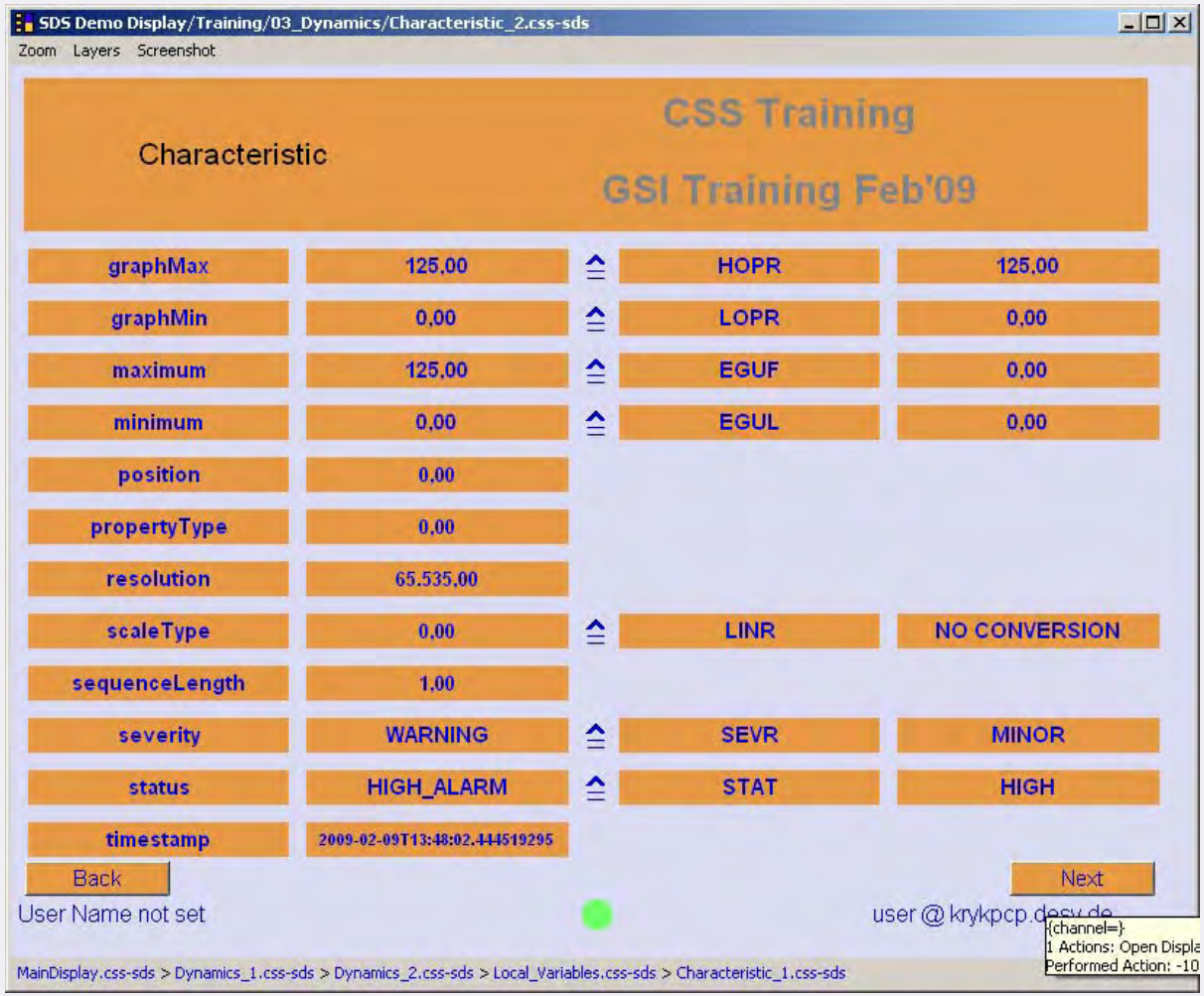
# Overview


SDS Demo Display/Training/00_Main/MainDisplay.css-sds
Zoom Layers Screenshot
Main
CSS Training
GSI Training Feb'09
Chapter
Description
Chapter
Description
00 Initialization
01 Overview
02 Layer Management
03 Dynamics
04 Alias
05 Connection-States
06 Rules
07 Action Data
08 Cursor
09 Preferences
10 Widget Overview
20 Utilities
30 Examples
40 PID Seminar
User Name not set
jhatje @ krykpcp.desy.de

# Dynamics


SDS Demo Display/Training/03_Dynamics/Dynamics_1.css-sds
Zoom Layers Screenshot
Dynamics
CSS Training
GSI Training Feb'09
Value of EpicsDemo1:
31,00
<-- Select the Label and show the Widget Properties View
You can see that the Text Value property has a pictogram.
Each property with this pictogram is dynamic.
Text Value
Rigth click on a property to configure the dynamic.
In this case the channel name is typed in directly
Home
Next
User Name not set
user @ krykpcp.desy.de
MainDisplay.css-sds

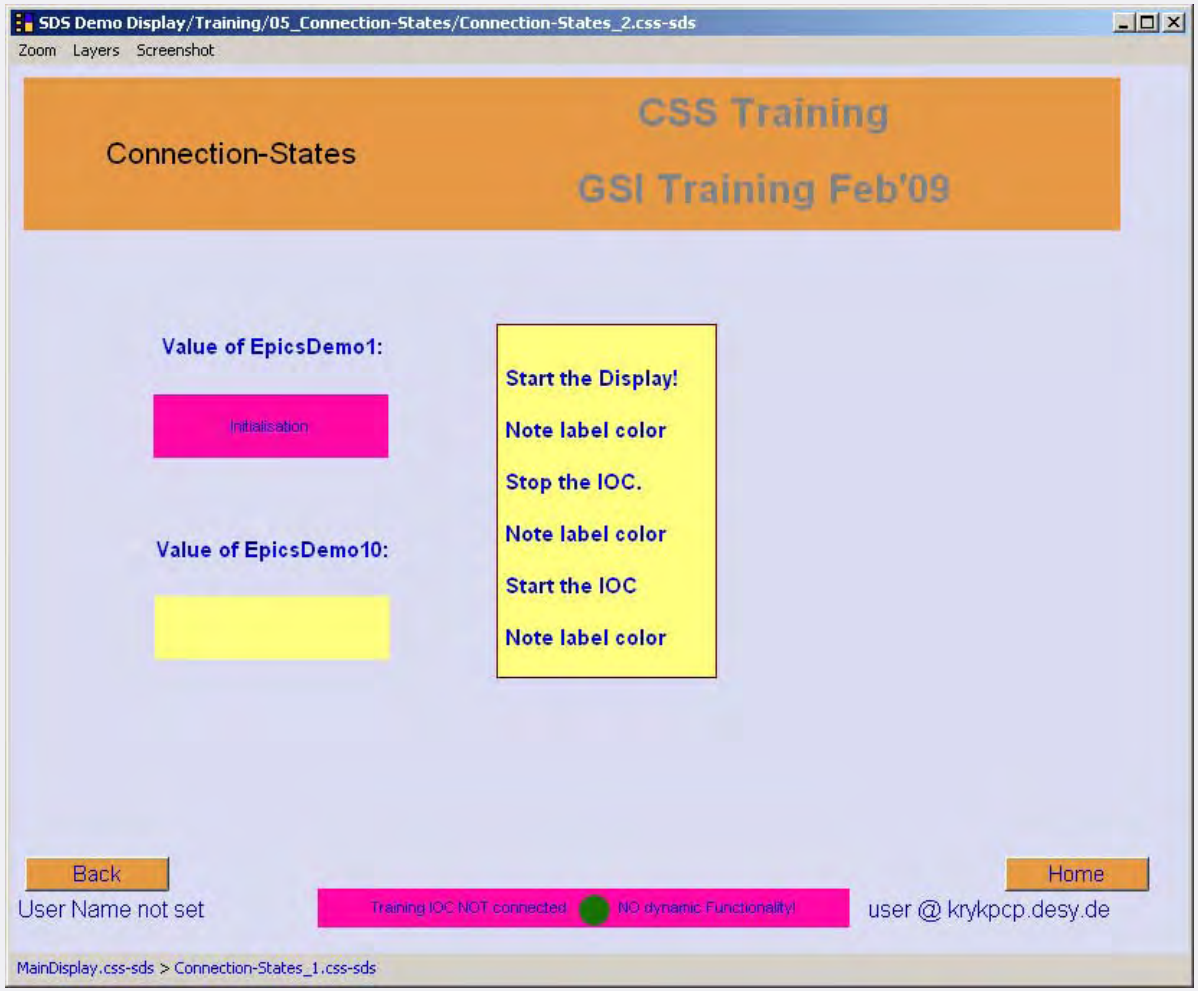
# Characteristics



# Alias


SDS Demo Display/Training/04_Alias/Alias_2.css-sds
Zoom Layers Screenshot
Alias
CSS Training
GSI Training Feb'09
Value of EpicsDemo1:
4,00
A dynamic Value with a simple Alias
$channel$ (default Alias)
Value of EpicsDemo4:
40,00
A dynamic Value with a parent Alias
$channelDisp$ (Display Alias)
Value of EpicsDemo1:
4,00
A dynamic Value with an overwritten parent Alias
$channelDisp$
Back
Next
MainDisplay.css-sds > Alias_1.css-sds

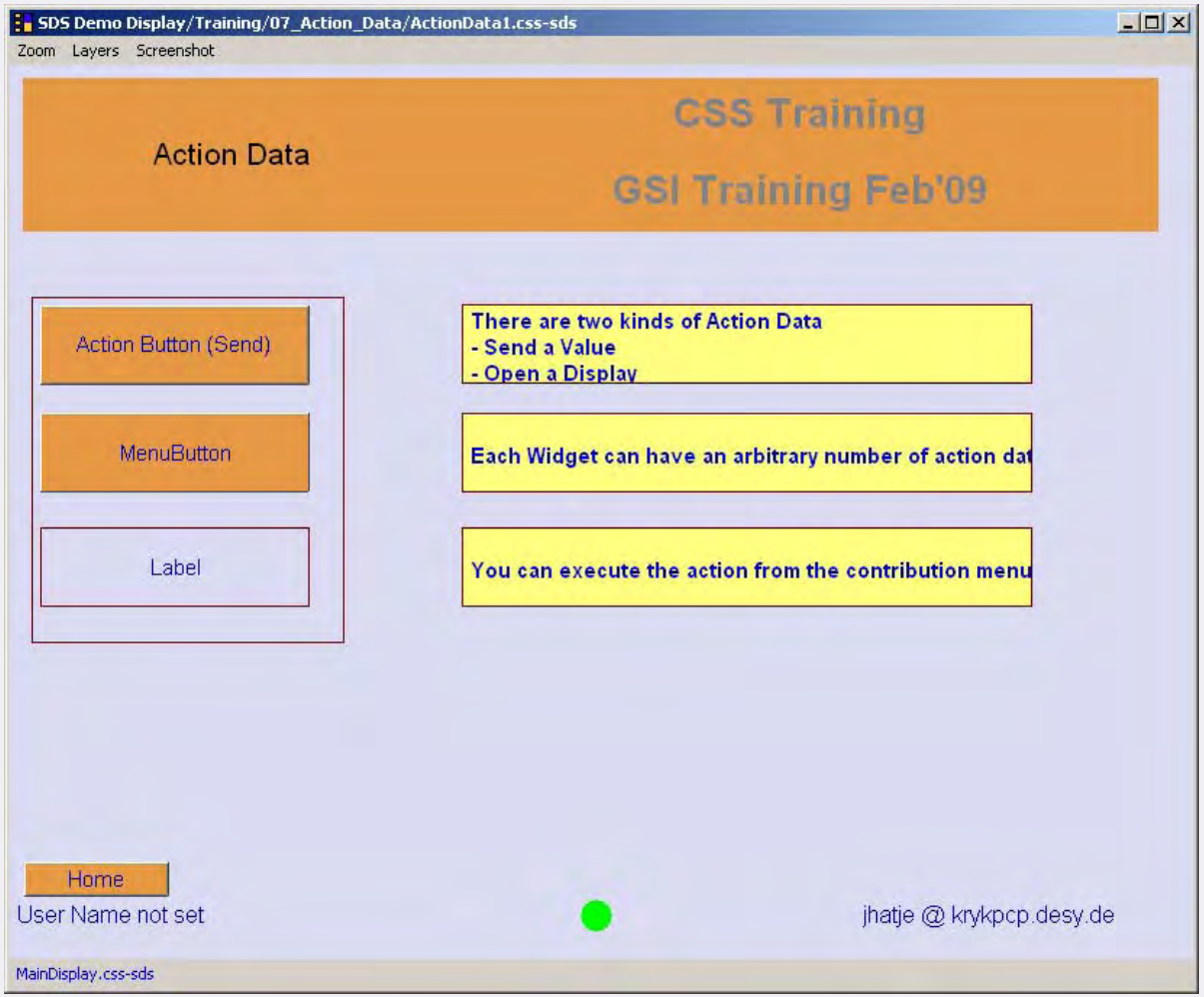
# Connection States



# Rules


SDS Demo Display/Training/06_Rules/Rules_1.css-sds
Zoom Layers Screenshot
Rules
CSS Training
GSI Training Feb'09
Value of EpicsDemo1:
(Alarm Color Rule)
84,00
Value of EpicsDemo10:
(Simple Color Rule)
84,00
There are two rule types:
Java Rules
Script Rules
Simple Color Rule (Java)
Simple Color Rule (ECMA Script)
Example
Linking Container
Home
User Name not set
user @ krykpcp.desy.de
MainDisplay.css-sds

# Action Data

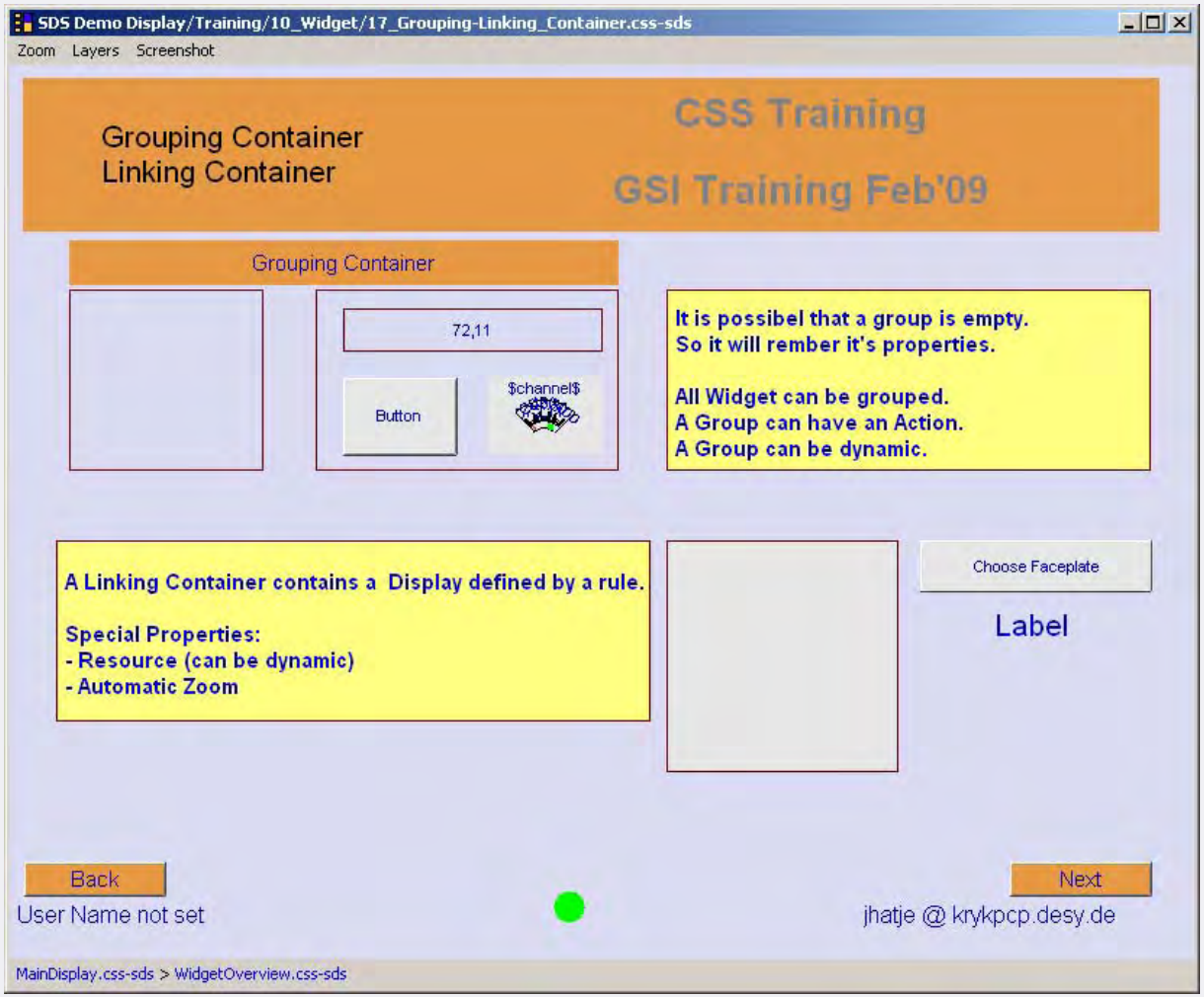

SDS Demo Display/Training/07_Action_Data/ActionData1.css-sds
Zoom Layers Screenshot
Action Data
CSS Training
GSI Training Feb'09
Action Button (Send)
MenuButton
Label
There are two kinds of Action Data
- Send a Value
- Open a Display
Each Widget can have an arbitrary number of action dat
You can execute the action from the contribution menu
Home
User Name not set
jhatje @ krykpcp.desy.de
MainDisplay.css-sds

# Bargraph and Meter


The Initializer is setting the properties according to your needs.

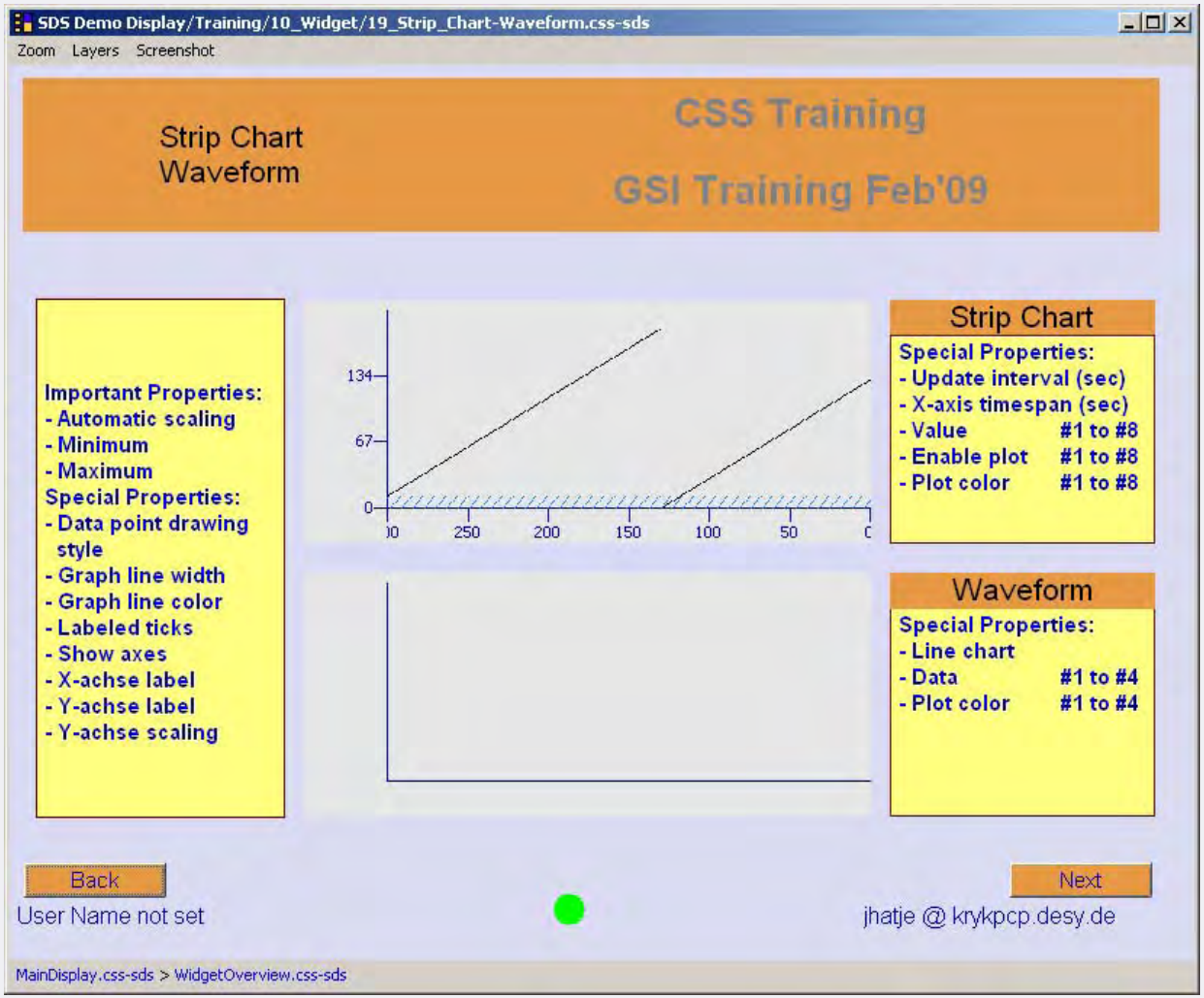
(Or your control system)

# Grouping- and Linking Container



# Sixteen Binary Bar and Thumb Wheel

# Strip Chart and Waveform



# And there's more …

Widgets:

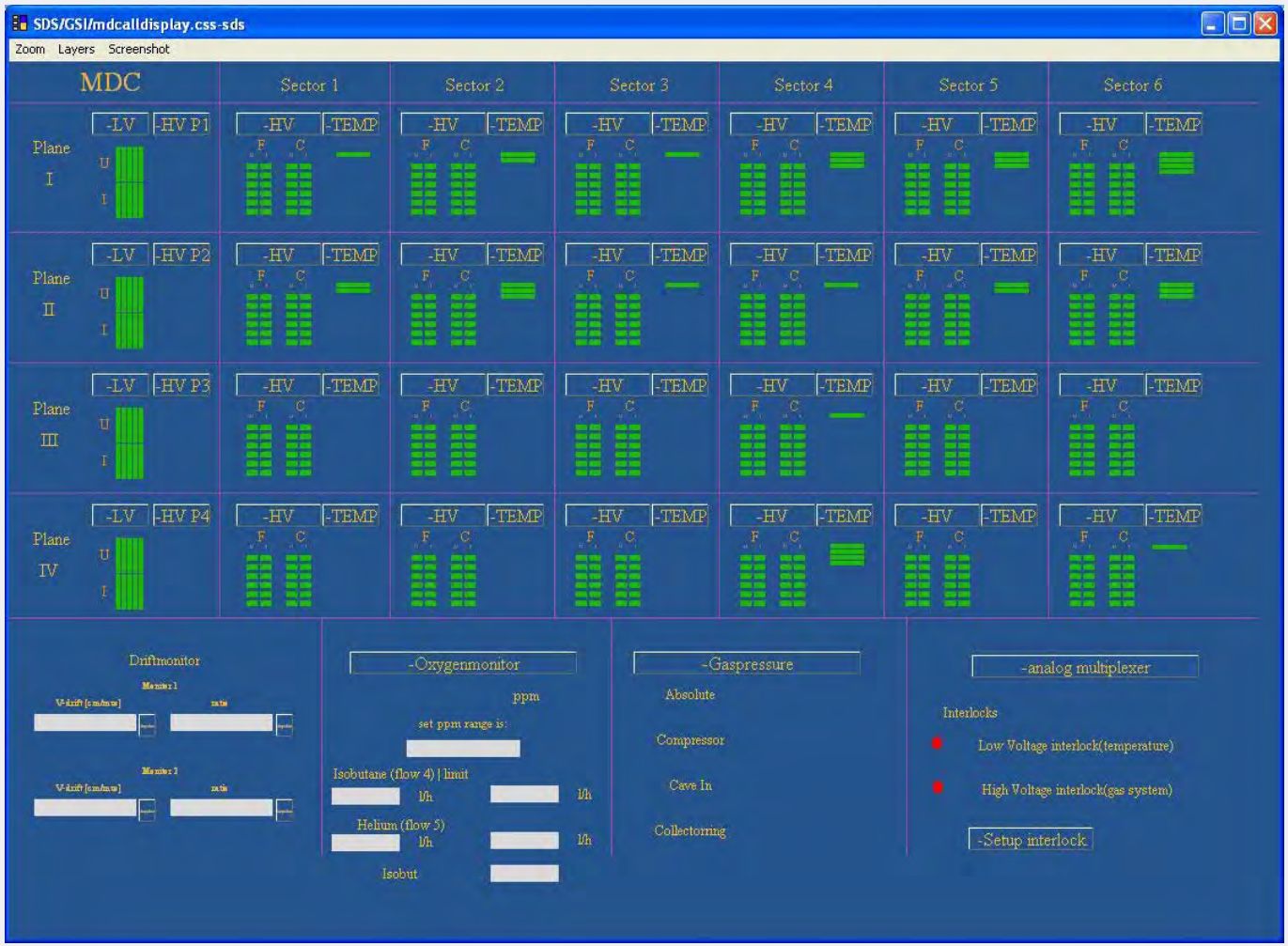
- Timer
- Plyline/ Polygon
- Rectangle/ Ellipse/ Arc
- Slider
- Switch ('programmed' symbols)
- Image (picture)

Layer management

…

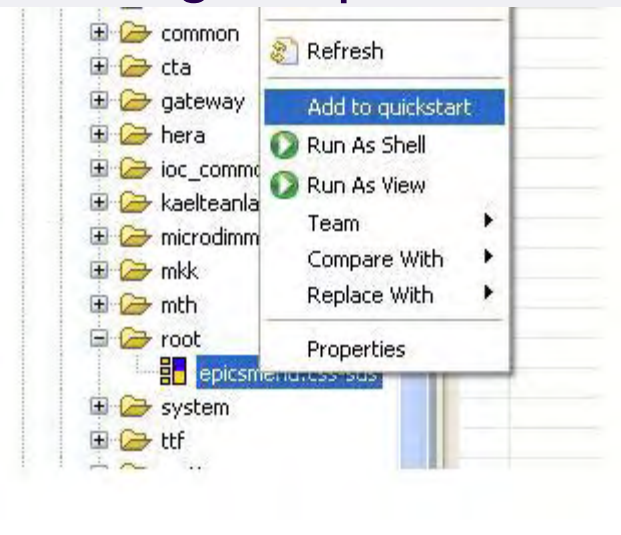
# ADL Converter

# MEDM → SDS


SDS/GSI/mdcalldisplay.css-sds
Zoom
Layers
Screenshot
MDC
Sector 1
Sector 2
Sector 3
Sector 4
Sector 5
Sector 6
Plane I
Plane II
Plane III
Plane IV
-LV
-HV P1
-HV P2
-HV P3
-HV P4
-HV
-TEMP
F
C
U
I
Driftmonitor
-Oxygenmonitor
ppm
set ppm range is:
Isobutane (flow 4) | limit
l/h
Helium (flow 5)
Isobut
-Gaspressure
Absolute
Compressor
Cave In
Collectorring
-analog multiplexer
Interlocks
Low Voltage interlock(temperature)
High Voltage interlock(gas system)
-Setup interlock

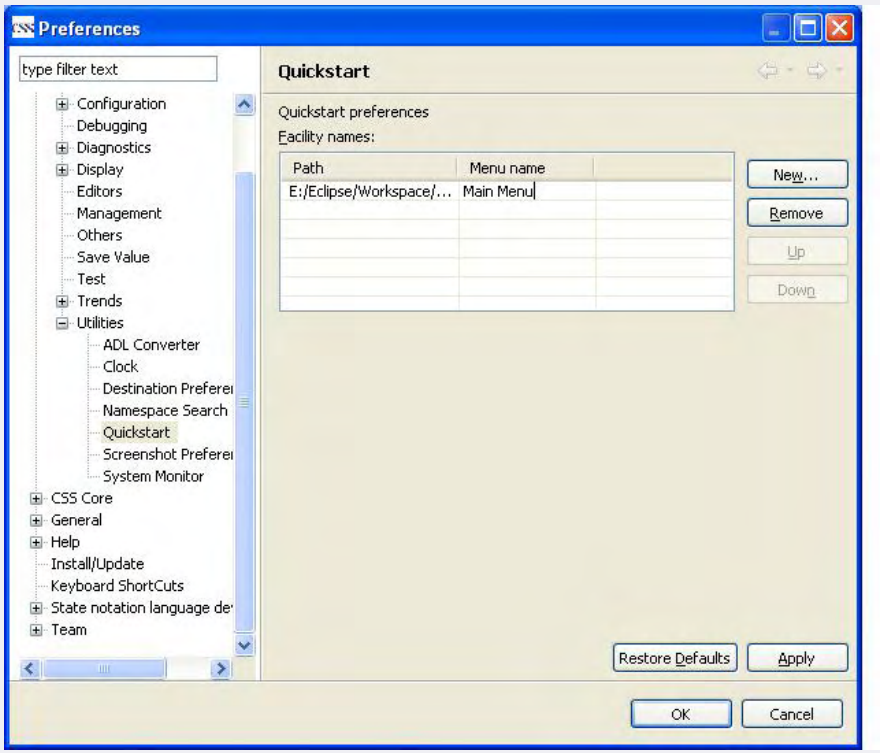
# SDS Quickstart Menu

## Adding Graphic to Menu

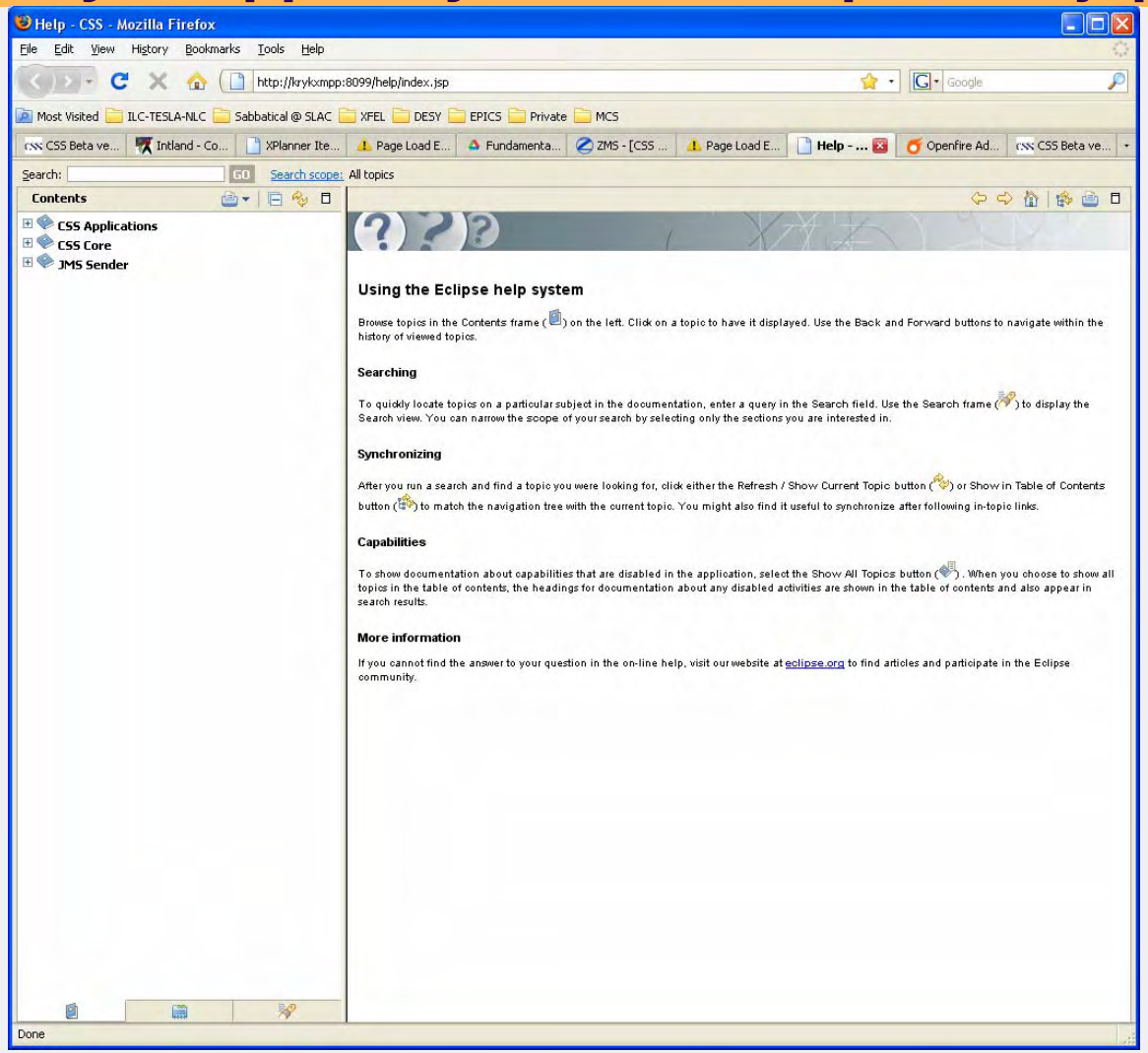



## New Menu Entry


## Changing Menu Entry String



# Online Help @ http://krykxmpp.desy.de:8099/help/index.jsp



# Synoptic Display Studio
# Who is involved?

- Core functionalities specified by DESY
- Initial implementation and design: C1-WPS/ University of Hamburg
- DAL/ simpleDal adapter: C1-WPS
- New widgets and extensions: DESY, students
- Initializer: DESY
- Adl2Sds converter for dm2k(medm) graphics: DESY

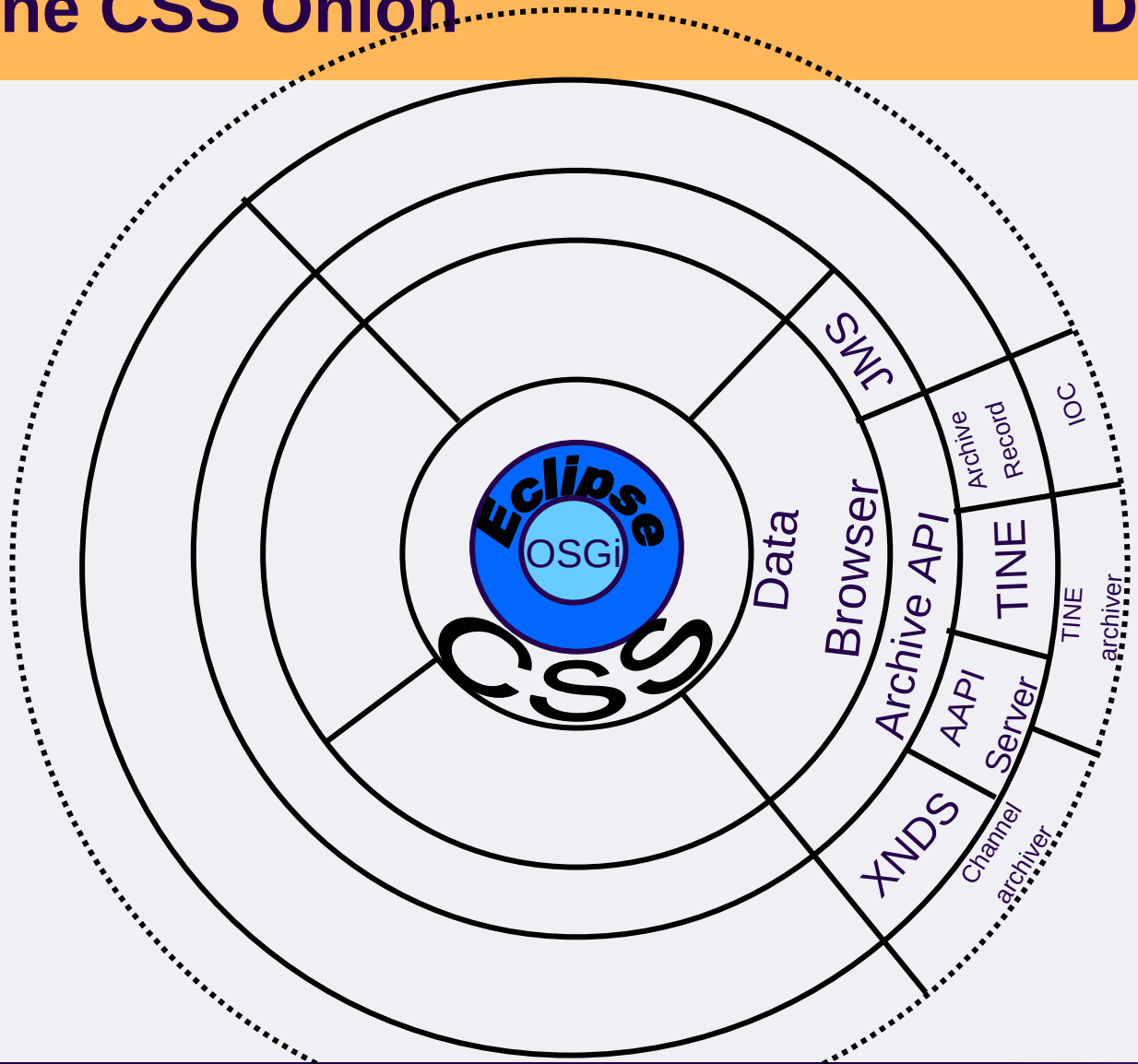
# Synoptic Display Studio
# Relevance for GSI Users:

- Most of the existing medm graphics can be converted into SDS graphics ‘out of the box’
- The existing DAL implementation for GSI (DAL-plug) could be converted into a CSS/DAL plugin
  - This would open the door to use CSS and it’s applications (SDS) also for other GSI applications

# Synoptic Display Studio
# Future Plans:

- Continue to develop new widgets
  - The meter widget needs attention
  - A (3D) image widget is necessary for beam line controls
- Improve SDS by taking the feedback from the DESY operators into account
  - Ease of use
- New project with C1-WPS and HHLA with the focus on using the CSS-SDS tools as a basis for the operator applications in the container terminals (JMS DAL-plug)
- The collaboration with ITER might add new development resources to CSS/SDS

# The CSS Onion DataBrowser

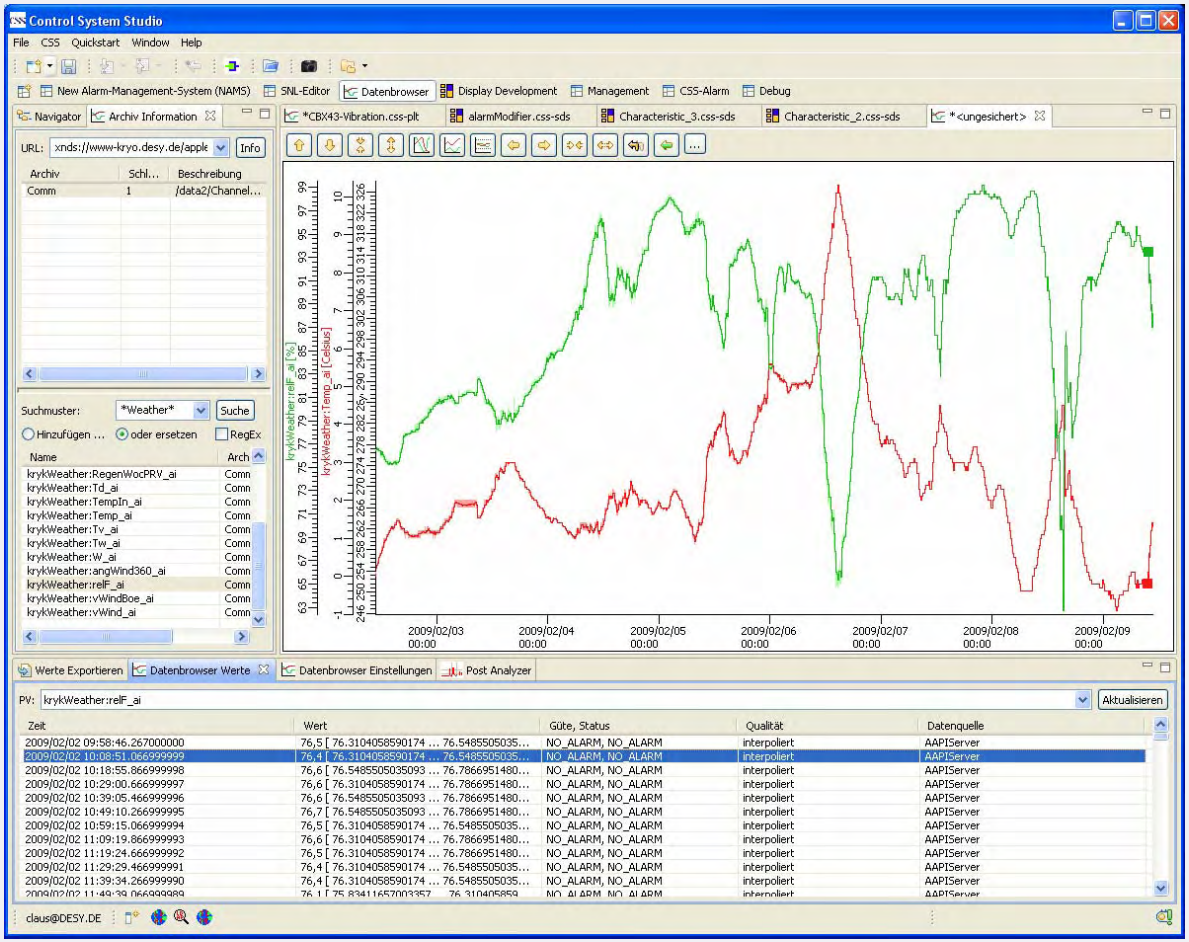


# Data Browser

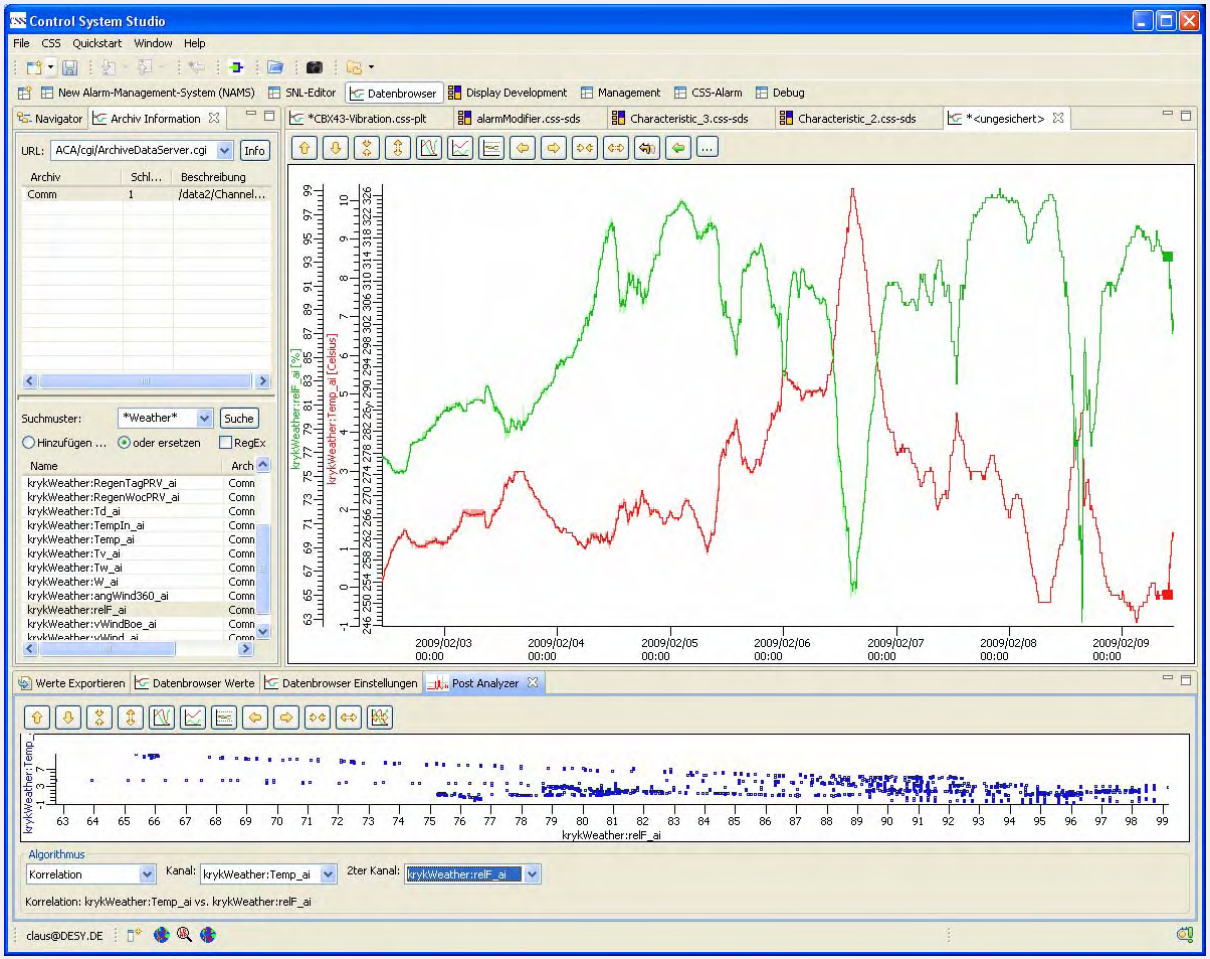
Besides synoptic displays and alarm displays the data browser is the third –important- application for process control.

- The Archive API is the glue code to ‘any’ archive data source
- The dataBrowser was designed and implemented by Kay Kasemir (ORNL)
- ORNL and DESY are constantly working on improvements and extensions

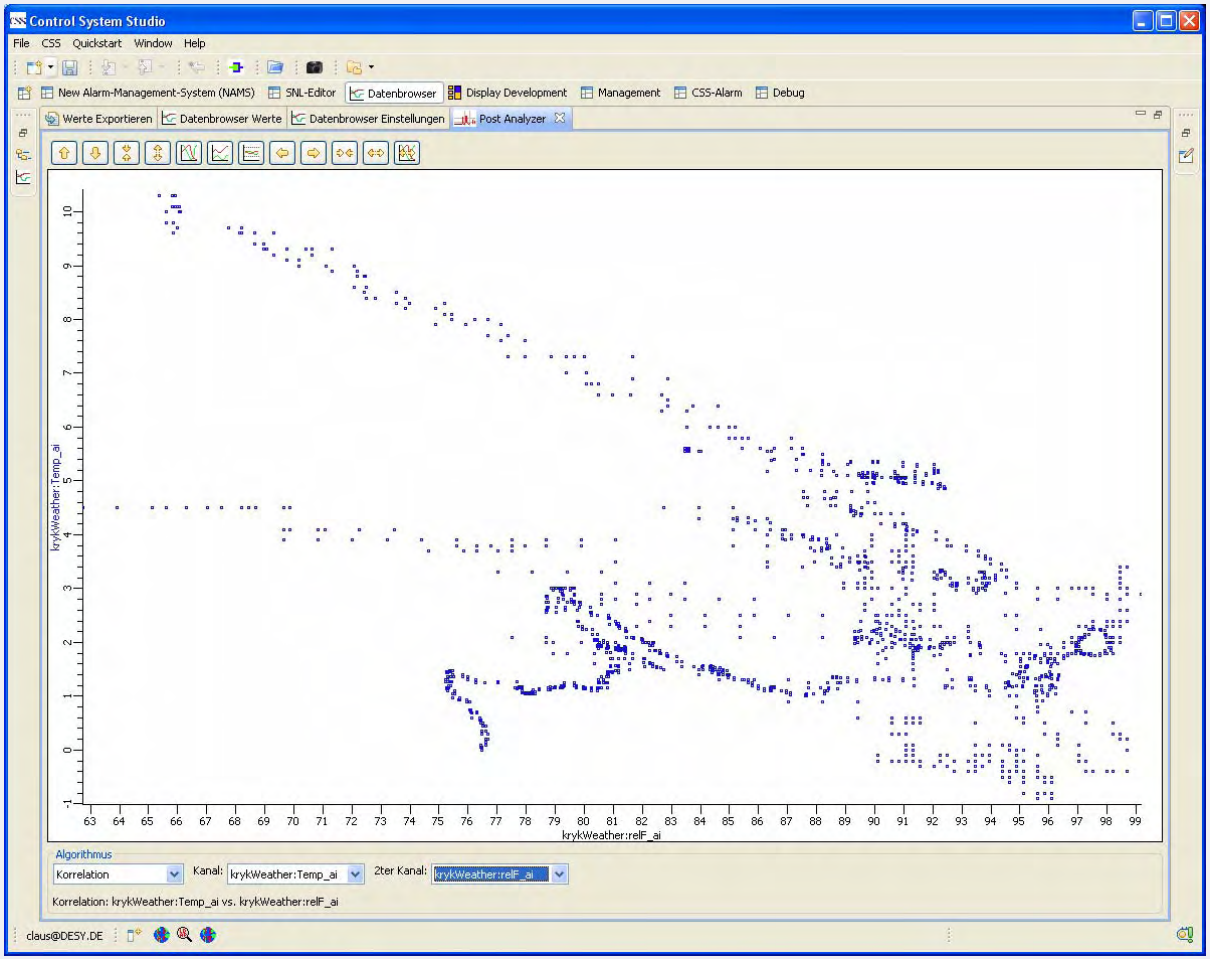
# Data Browser in CSS



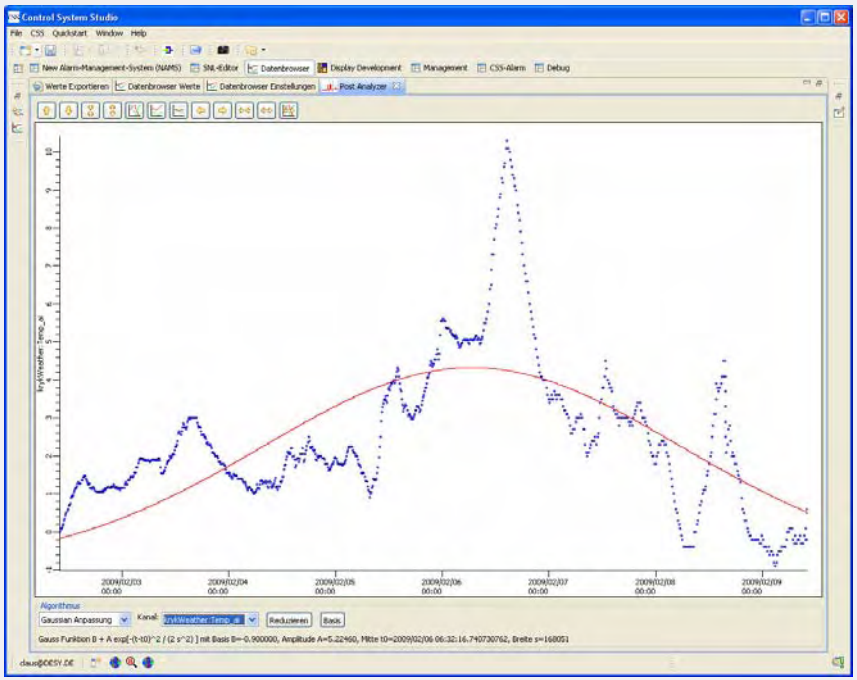
# Data Browser and Correlation Plot

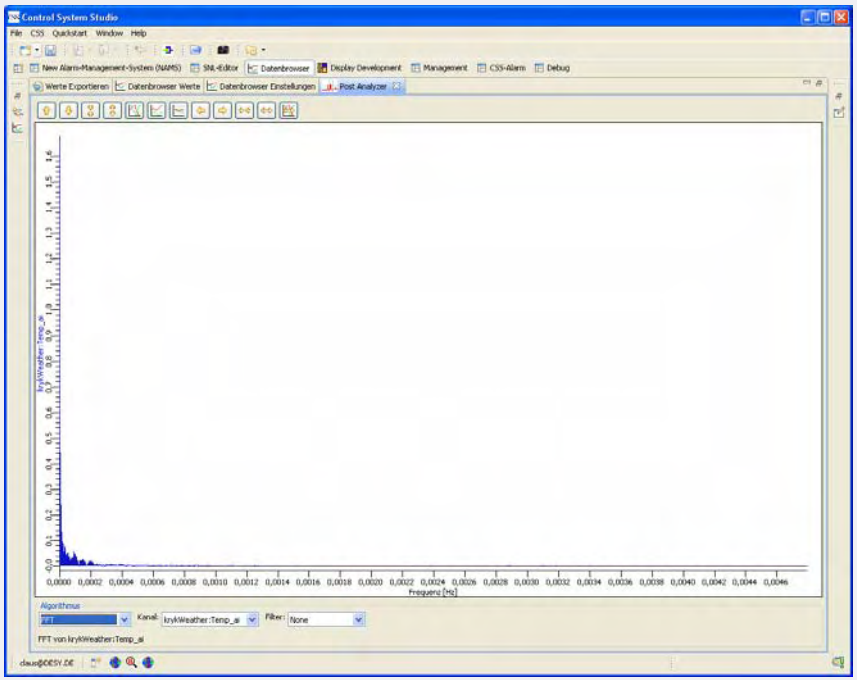


# Correlation Plot



# Gaussian Plot and FFT



# Scope Data - Settings

**Record Cooser**

Choose the records to display

| | Name | Date from | Date to | Sample used | Sample total | Unit | Formula |
|---|---|---|---|---|---|---|---|
| ☑ | SP1V76A(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| ☐ | SP1V76M(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| ☐ | TRIGGER(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | V | Variable must be x |
| ☑ | SP7V100(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| ☐ | SP7V101(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| ☑ | SP7V102(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| ☐ | SP7V103(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | mbar | Variable must be x |
| ☑ | Abs-Druc(Z1) | 2008-04-18 14:09:30.450 | 2008-04-18 14:10:20.500 | 5005 | 5005 | bar | Variable must be x |
| | | | Sum: | 20020 | | | |

Time range for Graph

Start 2008-04-18 14:09:30.450

End 2008-04-18 14:10:20.500

Time | from Graph | from File

Factor

Factor for Sample

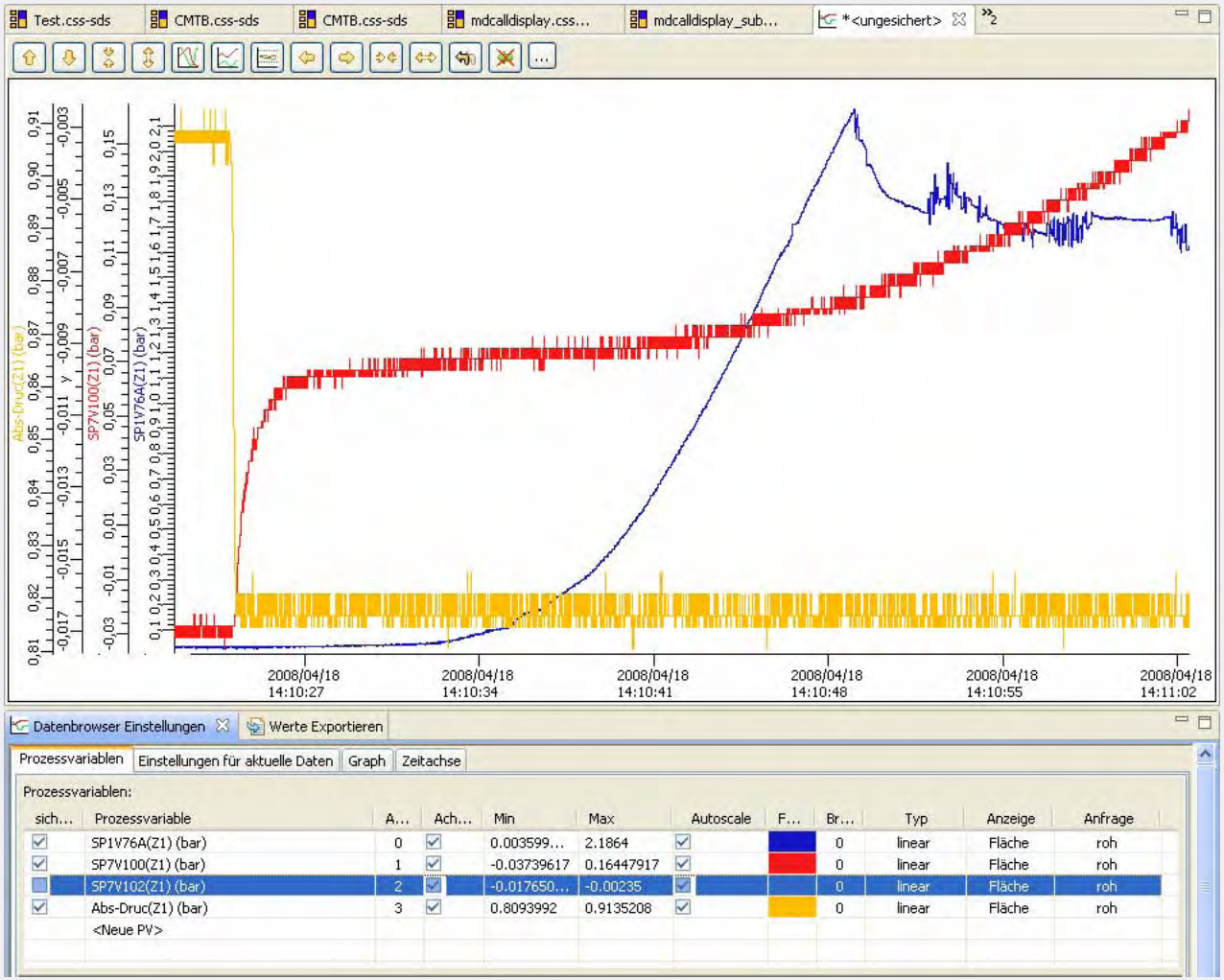
Time offset

Absolute | Relative

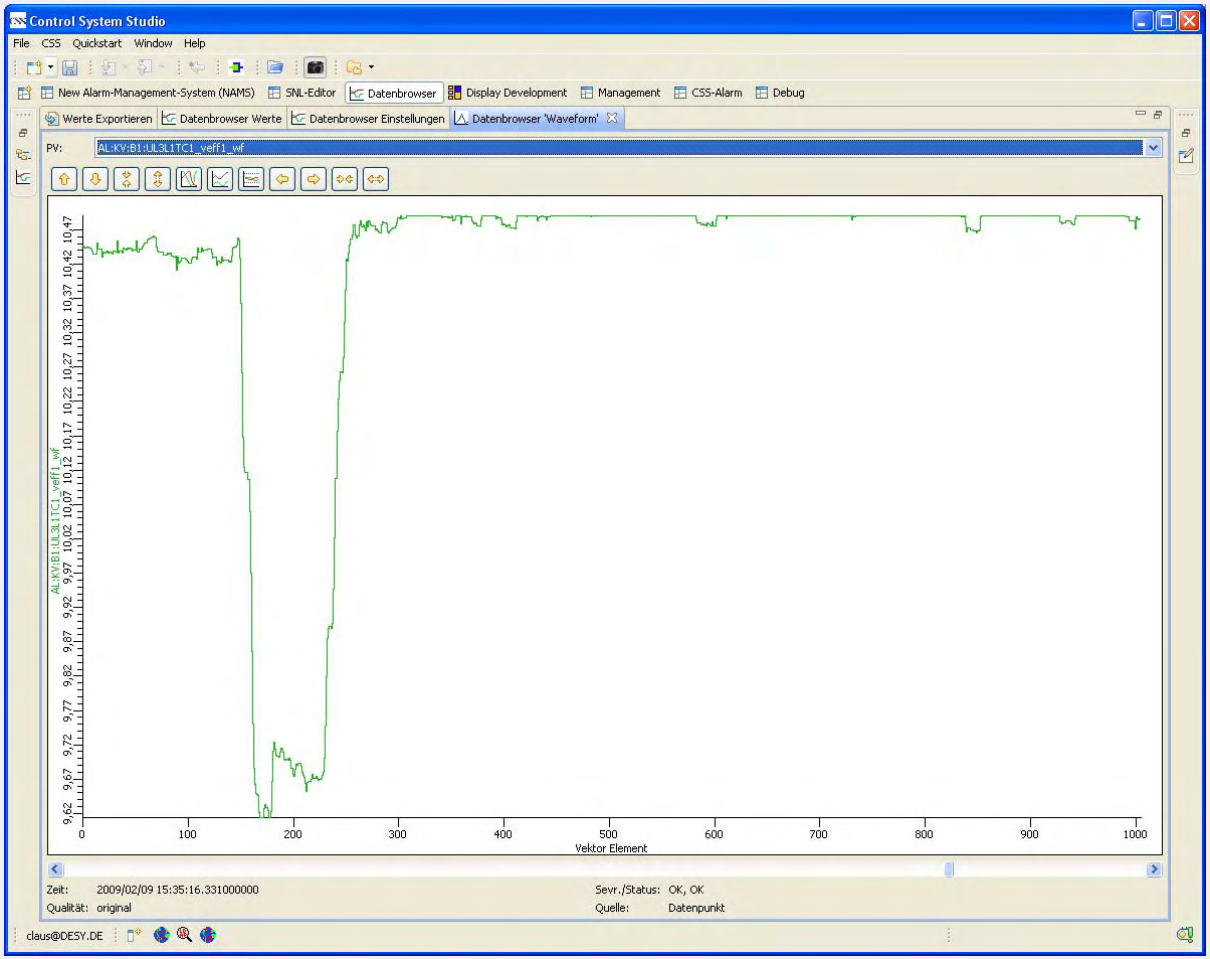
| Date | Time | Milisec |
|---|---|---|
| 18.04.2008 | 14:10:20 | 500 |

Ok | Cancel

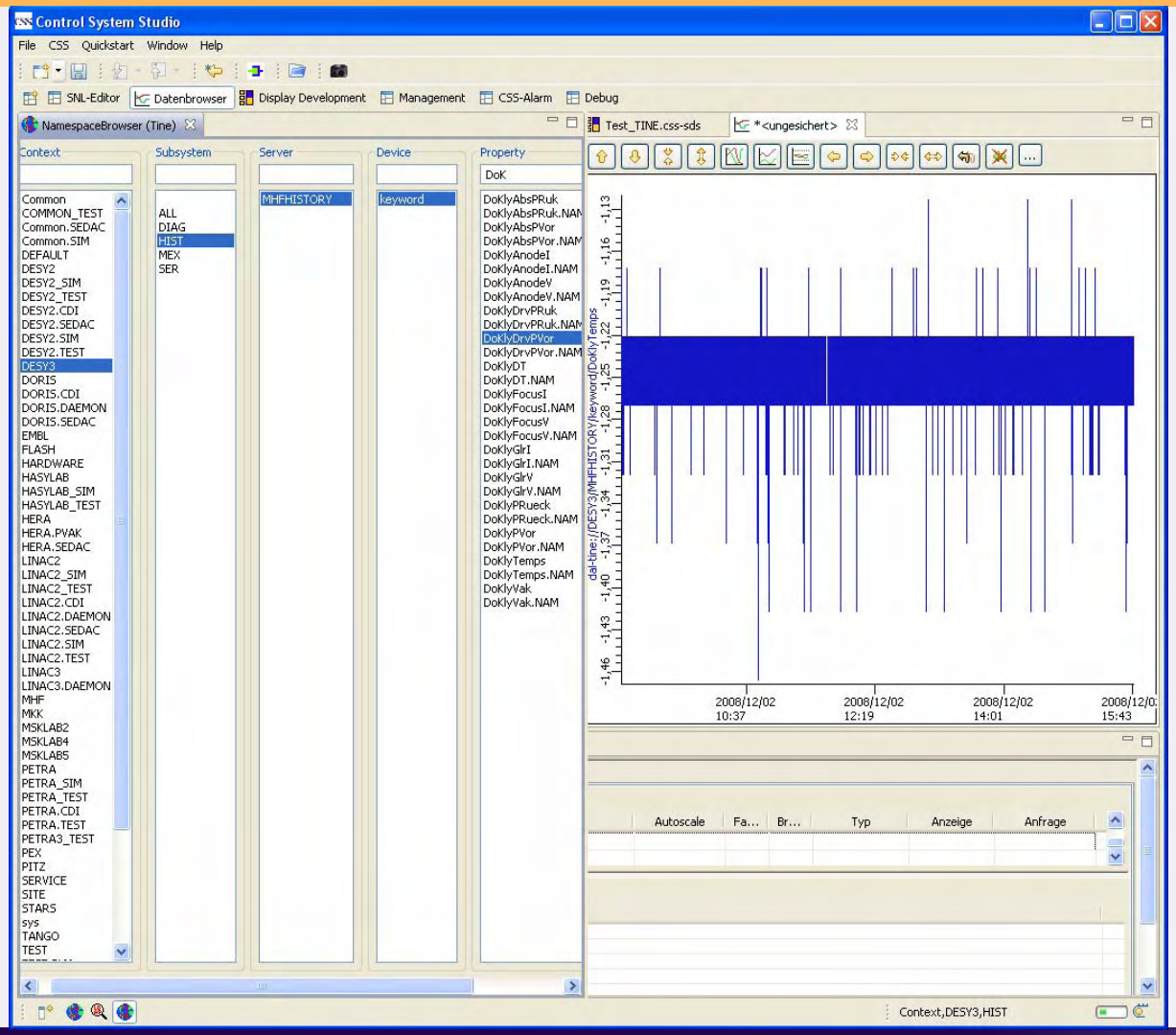
# Scope Data - Plot



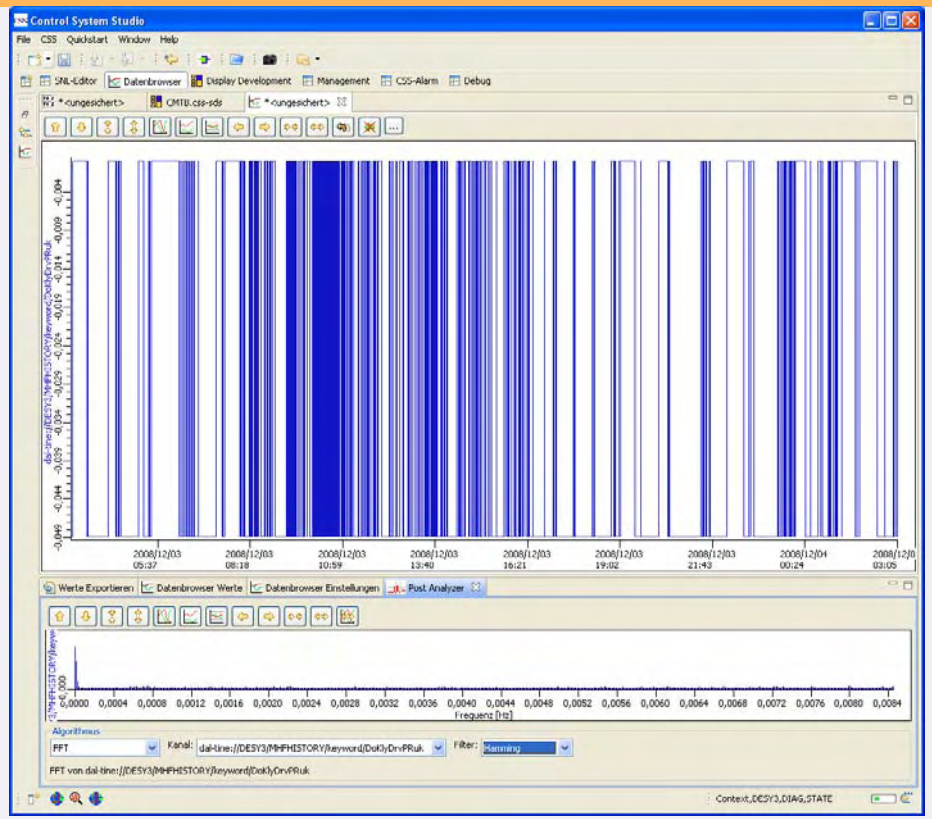
# Waveform Display



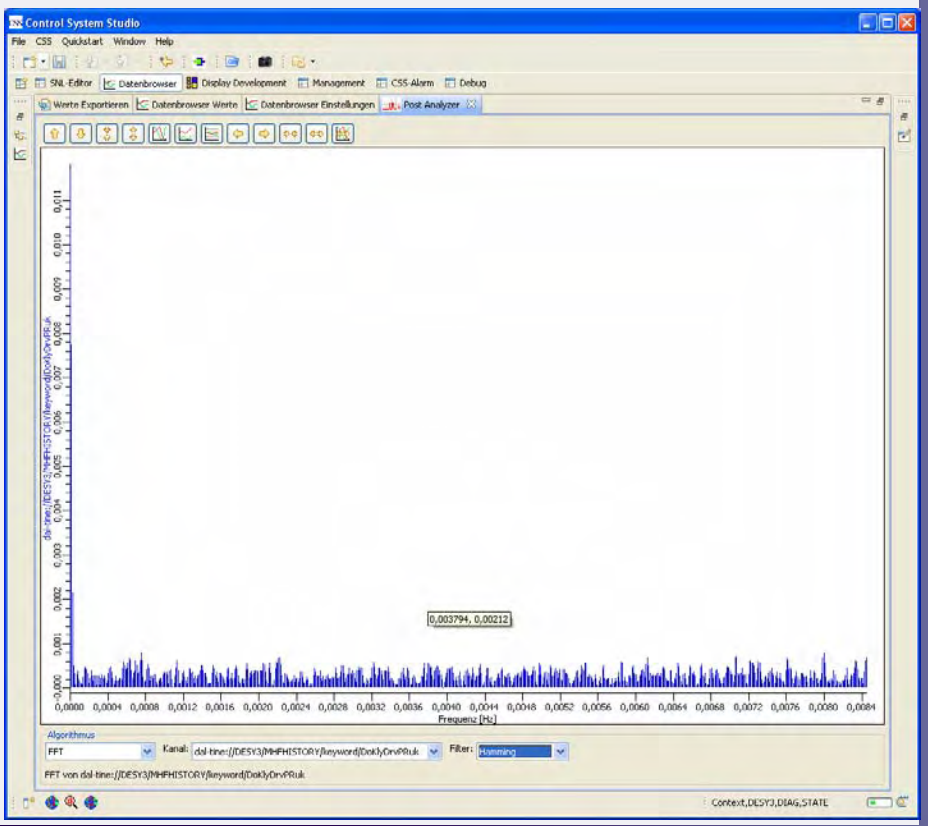
# Namespace-Browser (TINE) and DataBrowser



# dal-tine://DESY3/MHFHISTORY/keyword/DoKlyDrvPRuk




Data




FFT in Post Analyzer

# Data Browser
# Who is involved?

- Archive API specified by DESY and ORNL
- Implementation by ORNL (Kay Kasemir)
- Post Analyzer added by DESY
- Waveform Support modified by DESY

# Data Browser
# Relevance for GSI Users:

- The CSS Data Browser can be used for EPICS archived data as well as for other archive sources.
- Access to legacy systems will open the door for smooth transition plans (if any exist).

# Data Browser
# Future Plans:

- Add support for event displays (ORNL and DESY)
  - Display archived data
  - Display waveform data
  - Display alarms
  - Display message based data

# Synoptic Display and Data Browser

Questions ?