

UA9 Crystal Experiment Controls and Acquisition Software Overview

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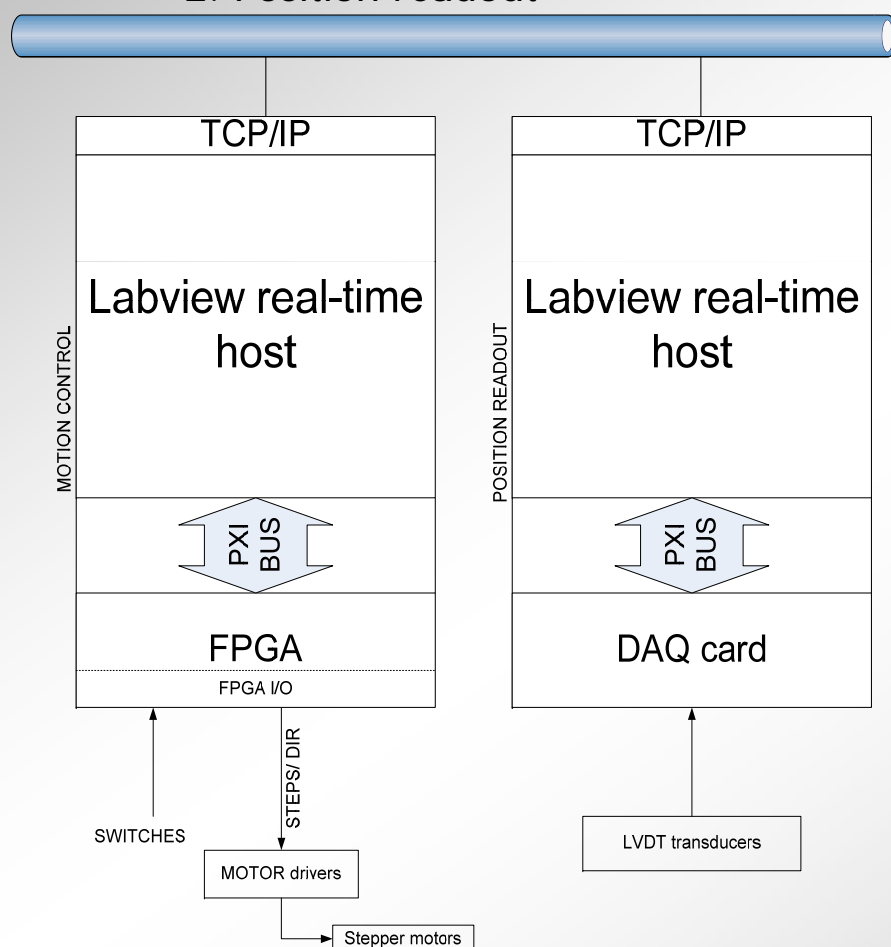


The UA9 (SPS) experiment is composed of:

- 16 scintillators
- 14 stepper axes (stepper motor and LVDT)
- 1 DC axis (DC motor and potentiometer)
- 4 Medipix
- 2 GEM
- 4 SPS collimators (stepper motors)
- 1 LHC phase 2 collimator (stepper motors)

Motorization low-level control

- Based on Labview real-time PXI chassis
- Two PXI : 1. Motion control
2. Position readout



Various software platforms :

1. Labview software for scintillators acquisition (Windows XP)
2. Labview software for GEM acquisition (Windows XP)
3. Pixelman software for Medipix readout (Windows XP)
4. Labview real-time for stepper axes controls (Pharlap ETS)
5. Linux software for SPS collimator controls (LynxOS)
6. PLC software for TAC controls (Siemens Step 7)

➔ Need to unify and synchronize data publication over the network

FESA (Front End Software Architecture)

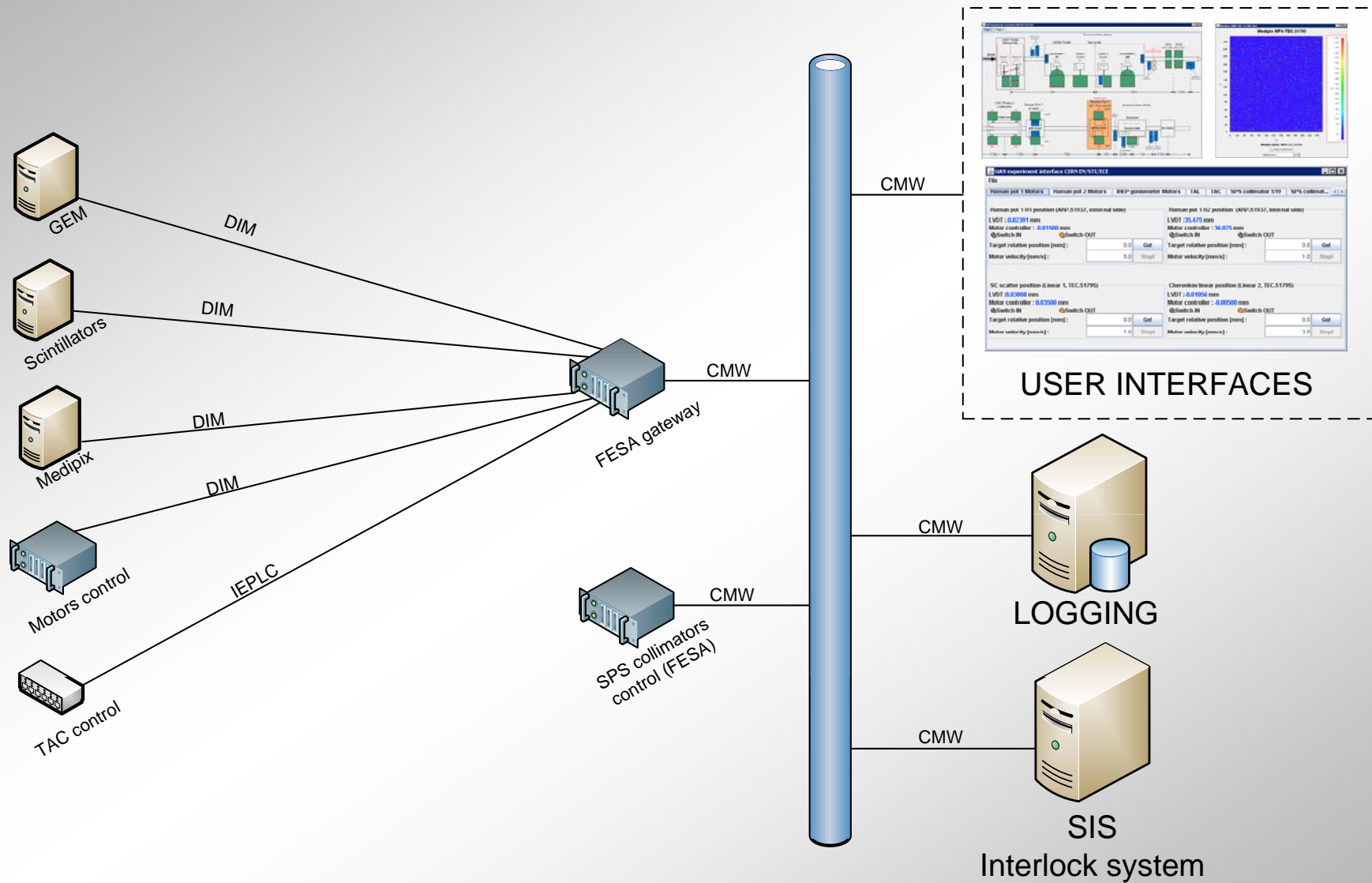
- CERN standard for devices acquisition and controls
- Provides uniform devices communication (CMW)
- Only compatible with Linux

DIM (Distributed Information Management System)

- Used by LHC experiments (DIP)
- Light footprint
- Multi-platforms (Linux, Windows, HP-UX...)

2- Control and acquisition architecture

Architecture



1. Logging system

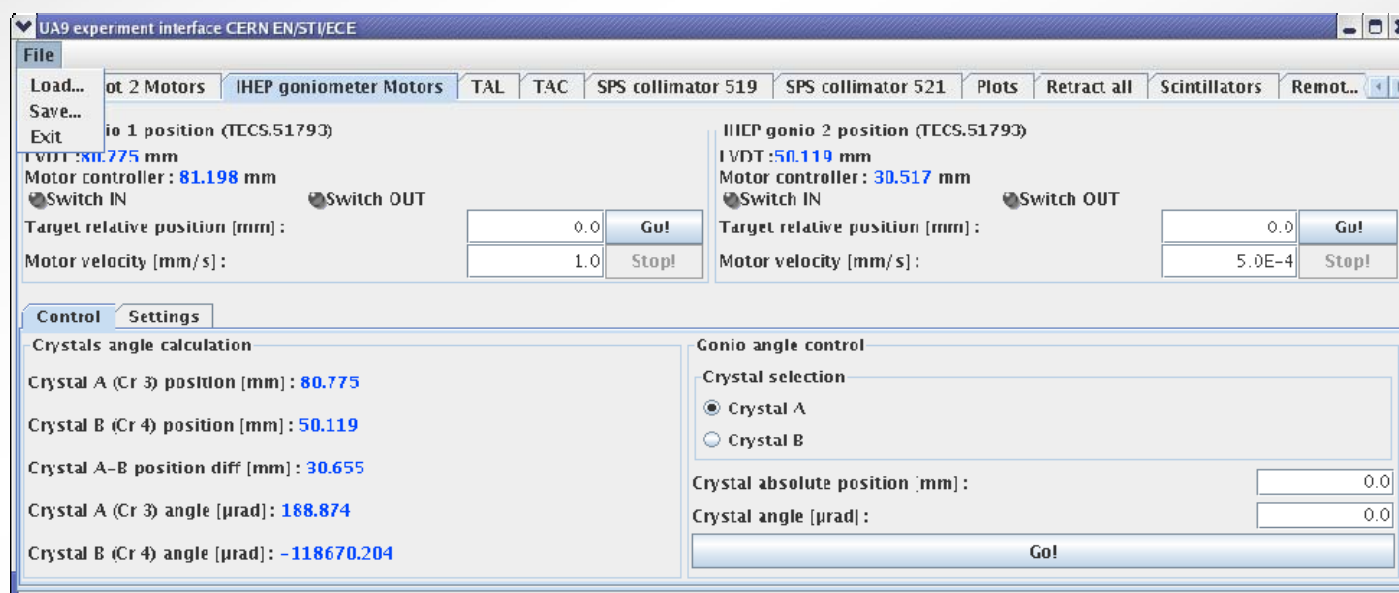
- ⇒ JAVA application
- ⇒ Connects to devices using CMW
- ⇒ Save CSV (text) files every minute
- ⇒ Notification system in case of failure (via e-mail and SMS)



Status	Device name	Property name	Last write	Notification	Size (kB)	File path
Active	UA9Gem1	Acquisition	22/10/10 09:30:31	22/10/10 09:30:38	14645	...ber2010\Detectors Data\Gem1.csv_0.csv
Active	UA9Gem2	Acquisition	22/10/10 09:30:31	22/10/10 09:30:38	19526	...ber2010\Detectors Data\Gem2.csv_0.csv
Active	UA9Scintillators	Acquisition	22/10/10 09:30:31	22/10/10 09:30:39	8357	...10\Detectors Data\Scintillators.csv_2.csv
Active	TAC.LSS5	Acquisition	22/10/10 09:30:31	22/10/10 09:30:39	3987	...Detectors Data\TAC_position.csv_0.csv
Active	Medi.XRP.51937-H1	Acquisition	22/10/10 09:30:31	22/10/10 09:30:36	26759	...Data\Medipix.XRP.51973-H1.csv_25.csv
Active	Medi.XRP.51937-H2	Acquisition	22/10/10 09:30:32	22/10/10 09:30:39	5763	...Data\Medipix.XRP.51973-H2.csv_25.csv
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Active	TCSM.51934	MeasuredCornerPo...	22/10/10 09:30:31	22/10/10 09:30:39	19920	...ctors Data\Phase2_Collimator.csv_0.csv
Active	TEC.51795.CERNLIN1	Acquisition	22/10/10 09:30:32	22/10/10 09:30:39	4652	...s Data\TEC.51795.CERNLIN1.csv_0.csv
Active	TEC.51795.CERNANG...	Acquisition	22/10/10 09:30:32	22/10/10 09:30:39	4912	...Data\TEC.51795.CERNANGL1.csv_0.csv
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Active	TEC.51795.SCATTER	Acquisition	22/10/10 09:30:32	22/10/10 09:30:39	4484	...rs Data\TEC.51795.SCATTER.csv_0.csv
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2. Motorization devices control

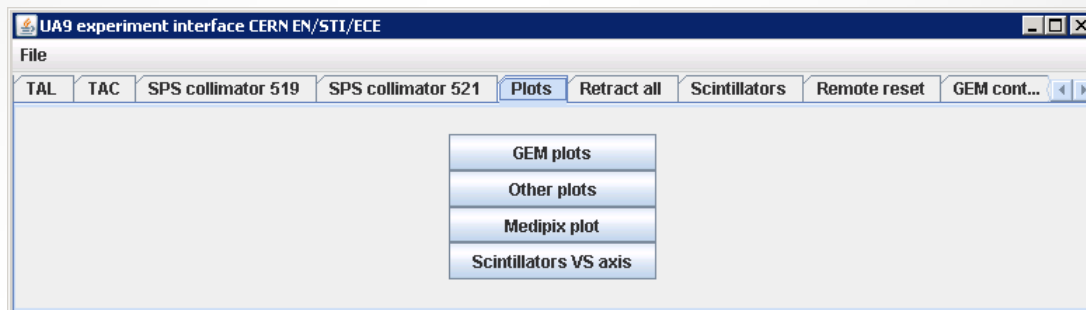
- ⇒ JAVA application
- ⇒ Connects to devices using CMW and PLC communication
- ⇒ Controls and acquisition of all UA9 devices : UA9 motors, SPS collimators reset, GEM gas
- ⇒ Detectors plot integrated into the application
- ⇒ Possibility to save and restore motors positions settings
- ⇒ Calculation of IHEP crystals angle



3. Detectors acquisition and plotting

⇒ Plots available :

- ⇒ GEM
- ⇒ Scintillators versus time
- ⇒ Motors position versus time
- ⇒ Medipix plots
- ⇒ Scintillators versus motor position

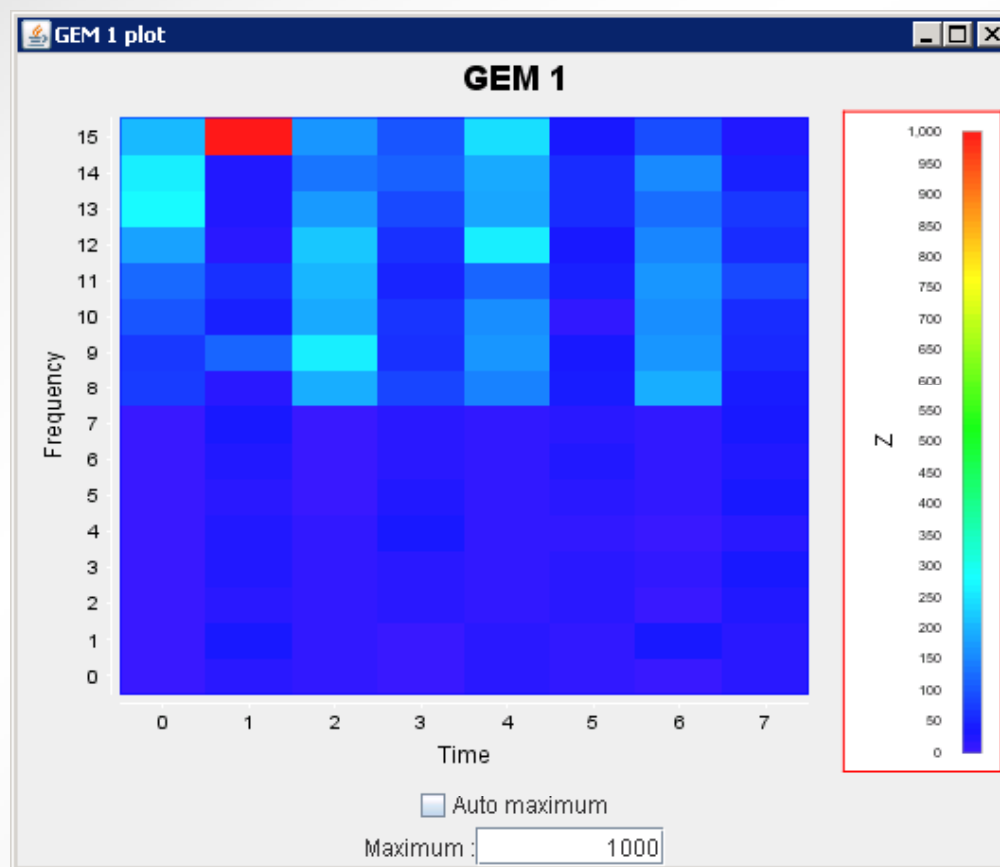


3. Detectors acquisition and plotting

⇒ GEM plot

⇒ XYZ chart (Y : frequency, X : Time)

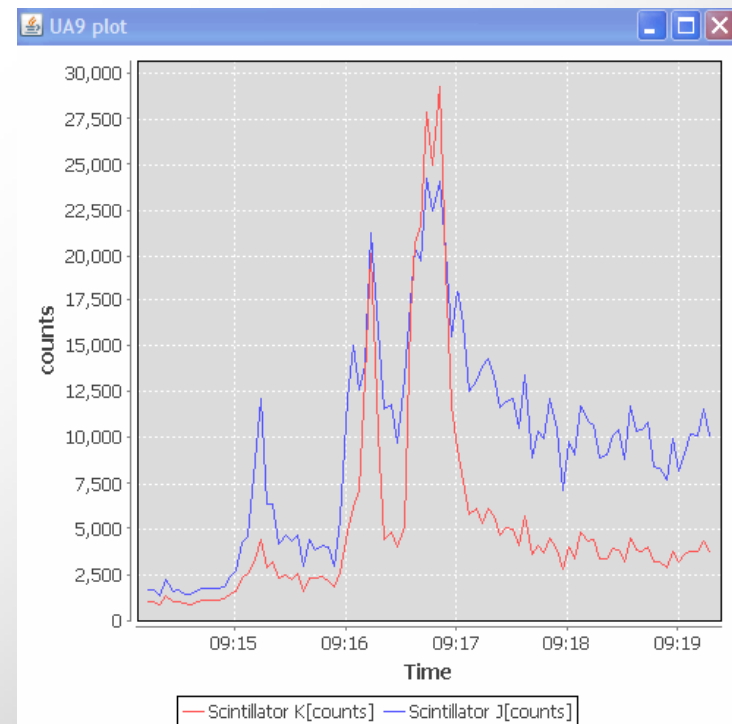
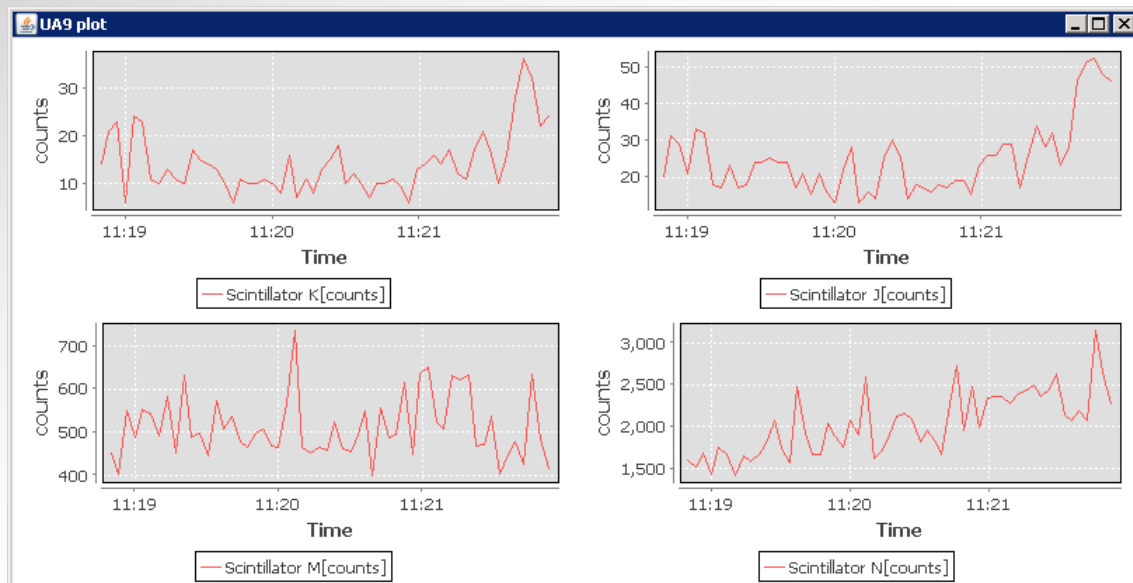
⇒ Possibility to save plot as PNG (image) file



3. Detectors acquisition and plotting

⇒ Scintillators versus time

- ⇒ XY plot (X : Time, Y : scaller rate)
- ⇒ Possibility to plot more than one scintillator at time
- ⇒ Plot can be saved into PNG (picture) or CSV (points)
- ⇒ Zoom-able plot

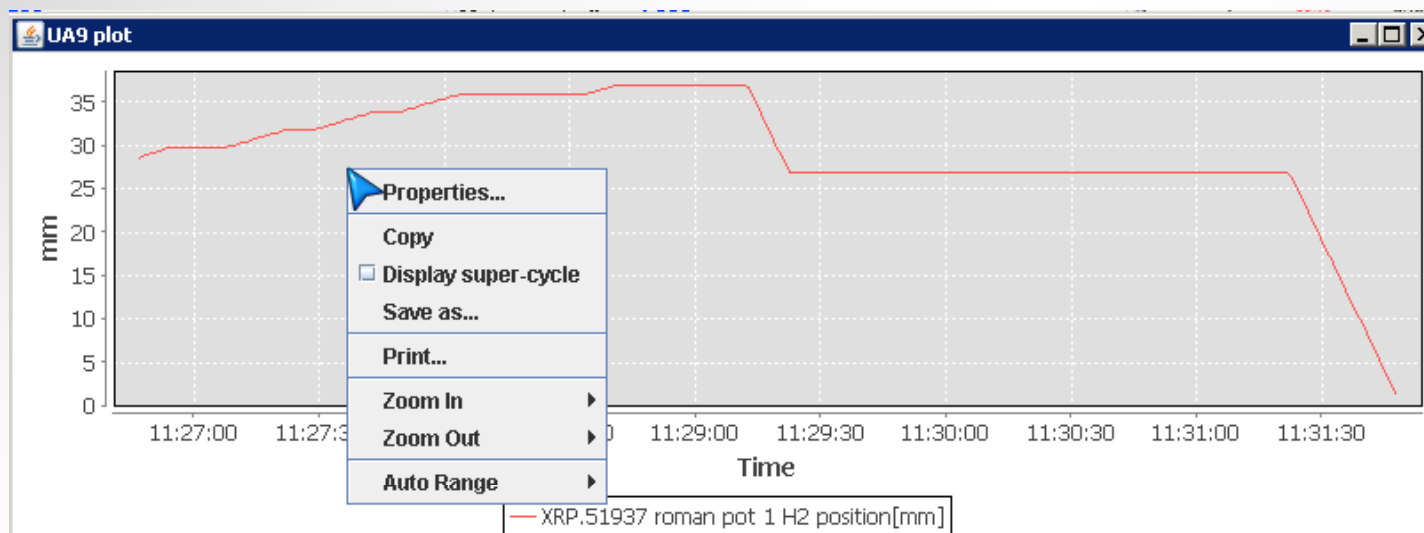


3. Detectors acquisition and plotting

⇒ Motors position versus time

⇒ XY plot (X : Time, Y : absolute position)

⇒ Same features as scintillators plot

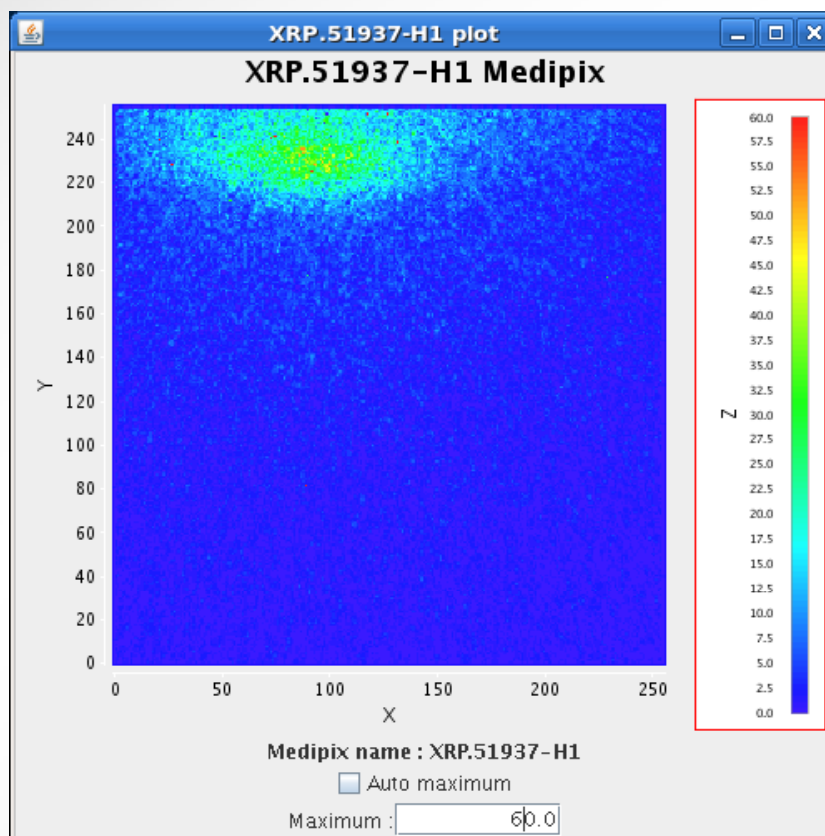


3. Detectors acquisition and plotting

⇒ Medipix plot

⇒ ZXY plot (full Medipix frame)

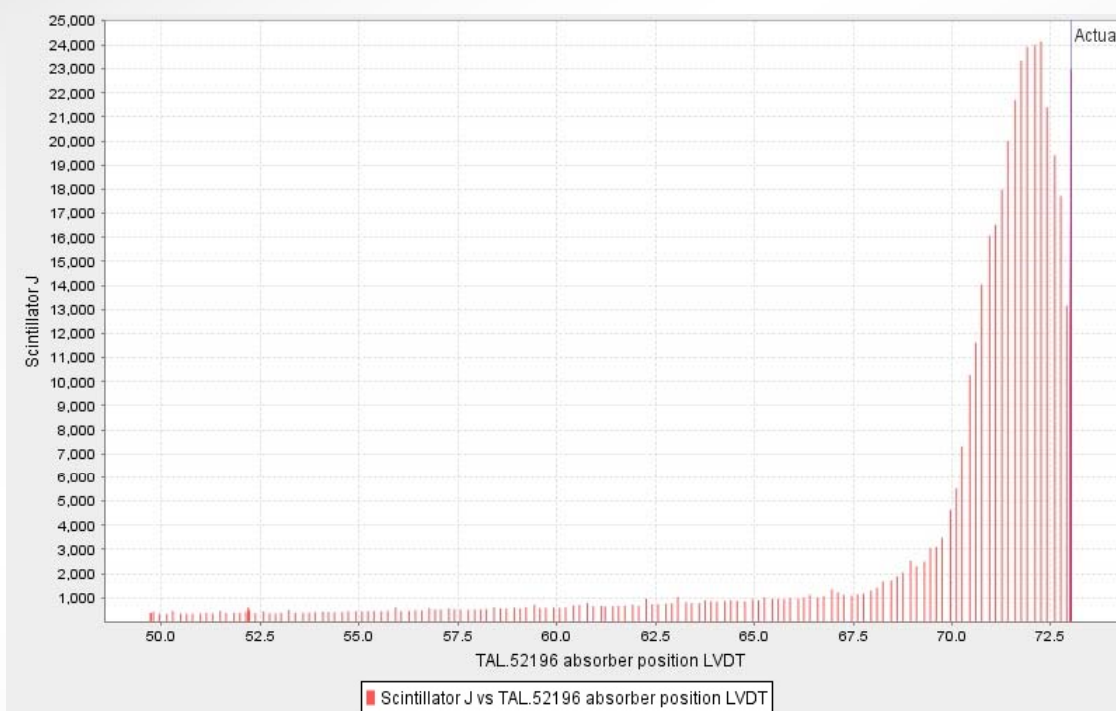
⇒ Export to PNG (image)



3. Detectors acquisition and plotting

⇒ Scintillator versus axis plot

- ⇒ XY bar plot (Y: scintillator rate, X: Axis position)
- ⇒ Export to PNG (image), JPG or CSV file
- ⇒ Very useful for scans



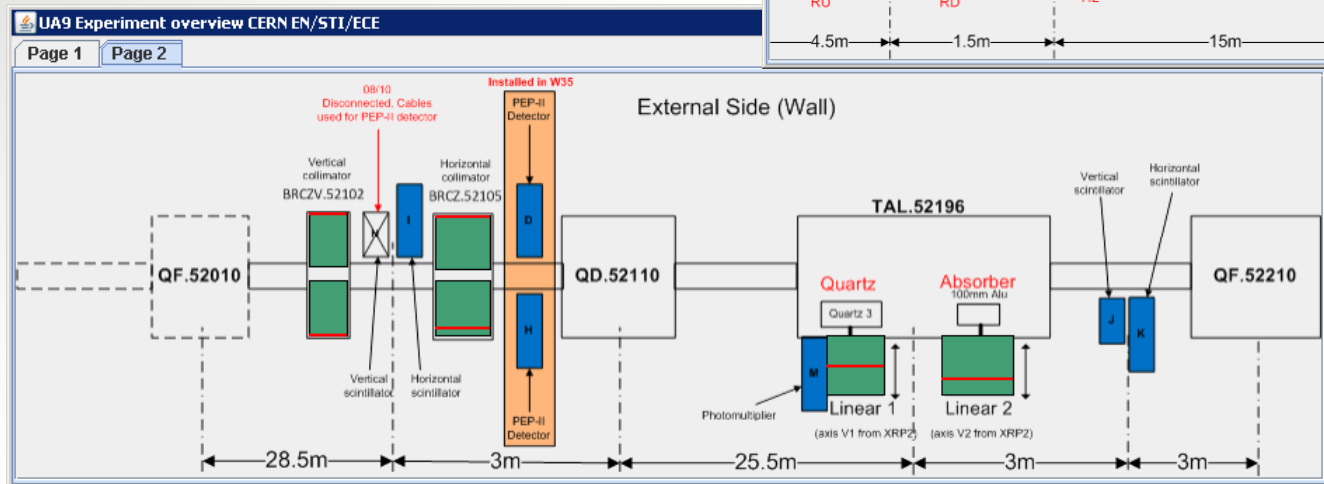
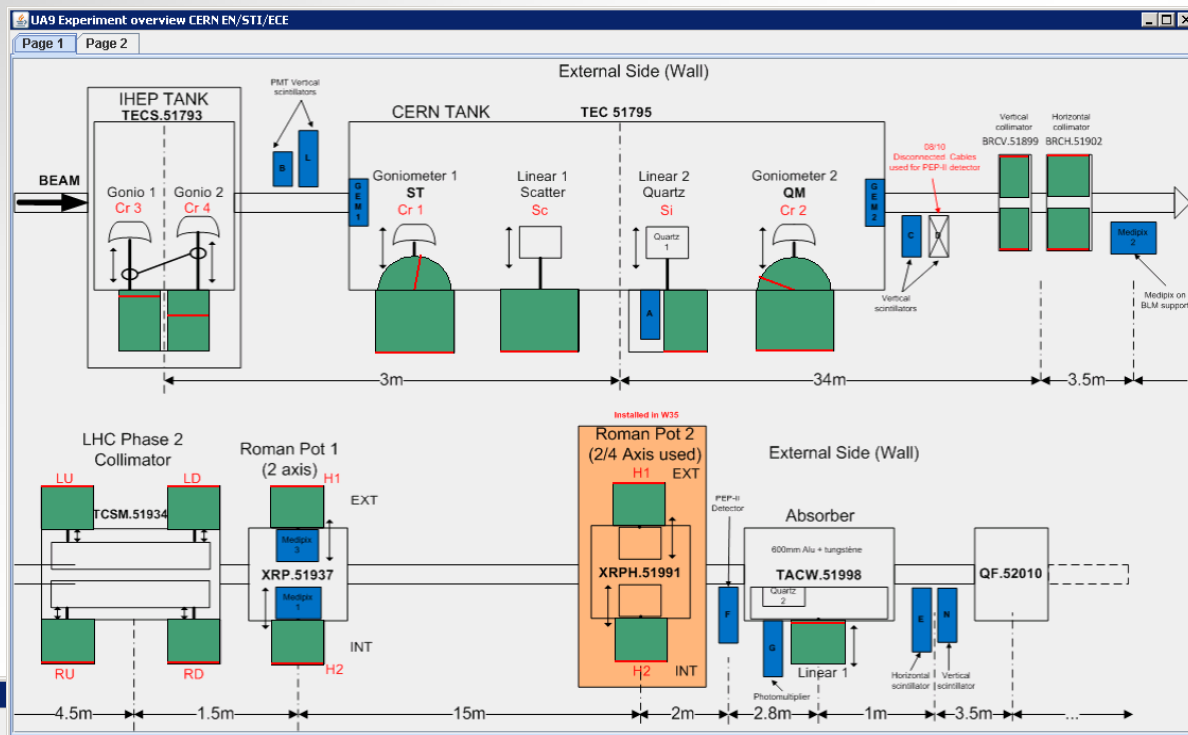
4. UA9 fixed display

- ⇒ Provides an overview of motorizations position used by experiment :
 - ⇒ Crystals position
 - ⇒ Crystals angle
 - ⇒ Absorbers position
 - ⇒ SPS collimators position
 - ⇒ LHC phase 2 collimator position
 - ⇒ Roman pots position
 - ⇒ Quartz position

- ⇒ Positions displayed according to layout and minimum/maximum allowed range

4. UA9 fixed display

⇒ Screenshot



Thank you!

