

Task 2.5: Control System (R. Modic) 20'

7th MYRTE meeting 22-24 Oct 2018, CERN

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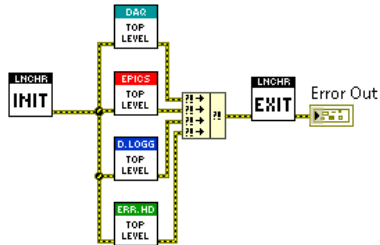
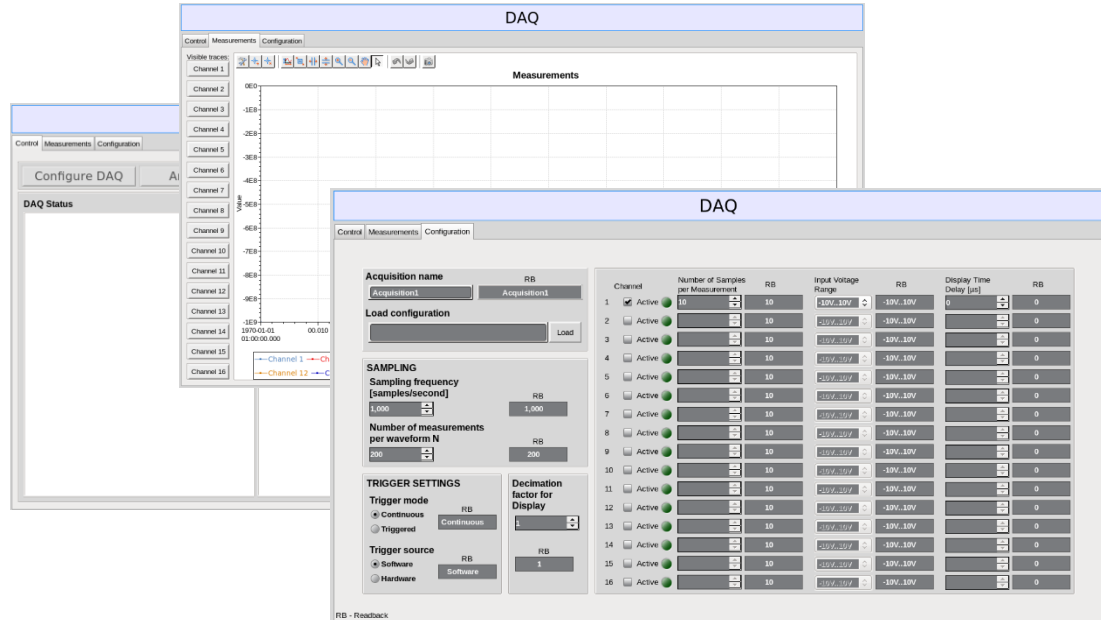
DAQ > motivation



- performance increase ~10x
- signal quality improvement
- arbitrary signal processing
- specific signal display
- data logging in scientific format
- control it from Control Room

DAQ > Design

- ❑ LabVIEW provides Acquisition, Archiving, Error handling
- ❑ EPICS CSS GUI and display data

The screenshot displays the DAQ software interface, which includes several panels for configuration and monitoring:

- DAQ Status:** Shows the status of 16 channels, including acquisition time (1970-01-01 01:00:00.000) and channel selection (Channel 1, Channel 12).
- Measurements:** A grid for displaying data from 16 channels.
- Configuration Panel:**
 - Acquisition name:** RB (Readback) for Acquisition1 and Acquisition3.
 - Load configuration:** A button to load the configuration.
 - SAMPLING:** Sampling frequency (1,000 samples/second) and Number of measurements per waveform N (300).
 - TRIGGER SETTINGS:** Trigger mode (Continuous, Triggered) and Trigger source (Software, Hardware).
 - Decimation factor for Display:** Set to 1.
- Channel Configuration Table:**

Channel	Active	Number of Samples per Measurement	RB	Input Voltage Range	RB	Display Time Delay [s]	RB
1	Active	10	10	0.2V..1.9V	-10V..10V	0	0
2	Active	10	10	0.2V..1.9V	-10V..10V	0	0
3	Active	10	10	0.2V..1.9V	-10V..10V	0	0
4	Active	10	10	0.2V..1.9V	-10V..10V	0	0
5	Active	10	10	0.2V..1.9V	-10V..10V	0	0
6	Active	10	10	0.2V..1.9V	-10V..10V	0	0
7	Active	10	10	0.2V..1.9V	-10V..10V	0	0
8	Active	10	10	0.2V..1.9V	-10V..10V	0	0
9	Active	10	10	0.2V..1.9V	-10V..10V	0	0
10	Active	10	10	0.2V..1.9V	-10V..10V	0	0
11	Active	10	10	0.2V..1.9V	-10V..10V	0	0
12	Active	10	10	0.2V..1.9V	-10V..10V	0	0
13	Active	10	10	0.2V..1.9V	-10V..10V	0	0
14	Active	10	10	0.2V..1.9V	-10V..10V	0	0
15	Active	10	10	0.2V..1.9V	-10V..10V	0	0
16	Active	10	10	0.2V..1.9V	-10V..10V	0	0

DAQ > work done



- ❑ extends Cosylab original MYRTE scope
- ❑ requirements done in Q1 2018
- ❑ **core development finished H1 2018**
- ❑ **test plan & testing done in Q3 2018**
- ❑ **installation @ LLN done Oct 2018**
- ❑ **USER MANUAL and test plan delivered Oct 2018**
- ❑ **exercise in requirement driven engineering**
- ❑ test plan TBD remotely Q4 2018

DAQ > Testing considerations



- Consider some effort needed for fixing bug-features of open tools (e.g. CSS)
- Approve on the test plan advance (how we'll test)
- Have a non-developer execute test plan
- Fix functionality glitches
- make the test plan clear through reviews
- Iterate test plan N-times until **PASS**

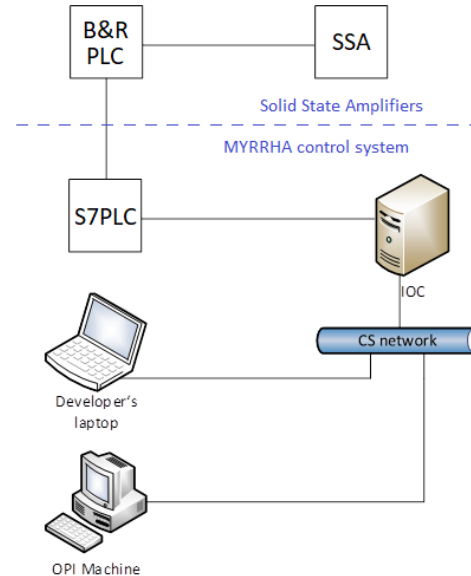
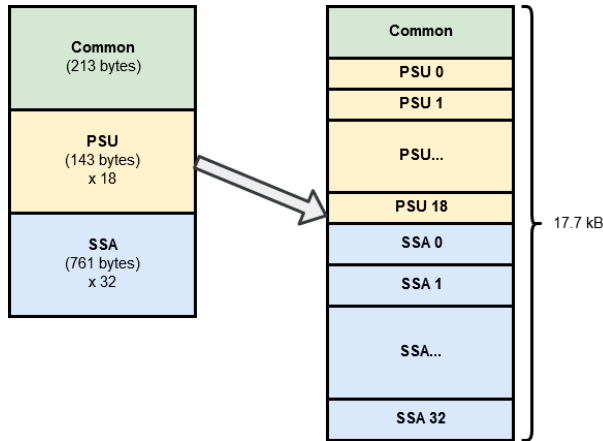
DAQ > Highlights



- ❑ Uses CA Lab for LabVIEW-EPICS communication
- ❑ Carsten Winkler (DESY) provided improvements to CALab based on our feedback
- ❑ **Case study how to integrate NI HW into EPICS**
- ❑ Do you need to control your NI equipment from EPICS?



- ❑ SSA connects via Profinet to SIEMENS PLC which talks to EPICS
- ❑ ~6000 variables exchanged via multiplexing (32 frames)
- ❑ design for redundancy, enable control from CS room



SSA > work done



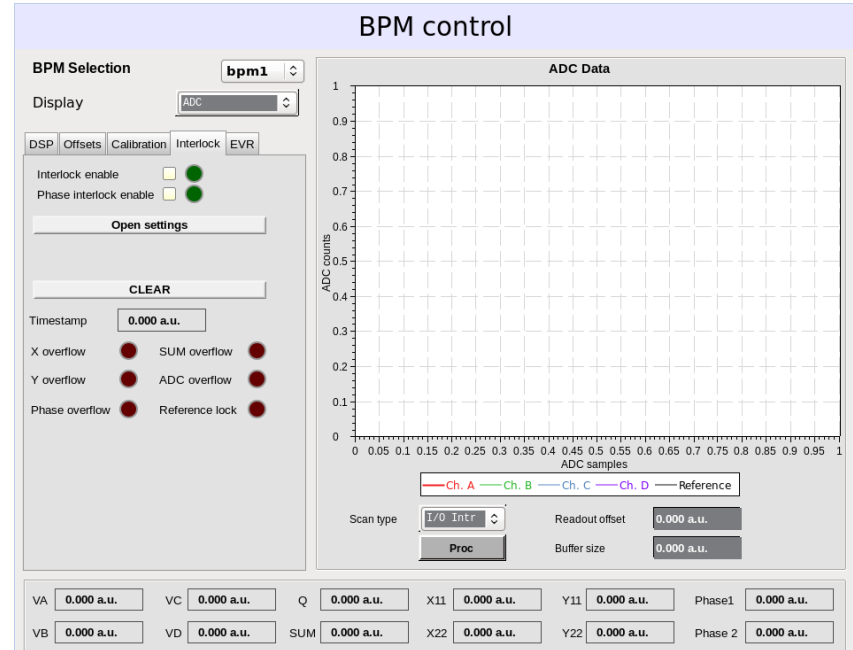
- ❑ PLC code MUX of frames implemented
- ❑ Control and monitoring interface tested on clone equipment at CSL
- ❑ PLC code, EPICS integration and GUI RPMs installed and (performance) tested on-site
- ❑ KUDOS to IBA (Yves Paradis) for good collaboration



BPM GUI > work done

- ❑ GUI designed from the list of PVs, Libera documentation and our past experience
- ❑ Cosylab collaborated with IPNO
- ❑ **GUI in RPM installed on-site**
- ❑ **provide remote control**
- ❑ test on equipment when ready

- ❑ Same approach will be used for the LLRF

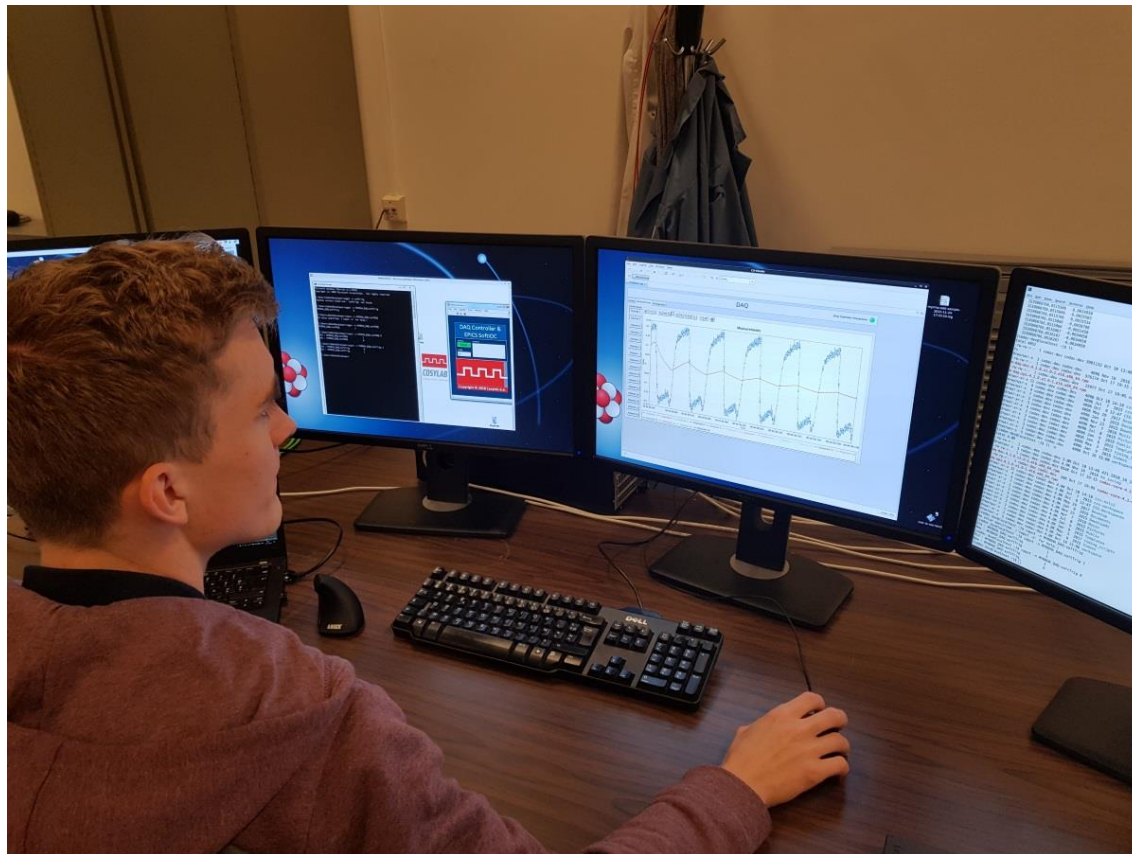


- ❑ Testing and installation of general-purpose DAQ
 - From requirements, LV app, EPICS int. to CSS GUI
 - Design, User Manual and Test plan documents delivered
- ❑ Testing and installation of SSA integration
 - PLC code, EPICS integration, CSS GUI, work with IBA
 - Design and User manual document handed over
- ❑ BPM integration
 - Collaboration with IPNO, installation of BPM GUI
- ❑ On-site visit for installation done (week 15 Oct)
- ❑ Remote control from CS room now possible

Some on-site impressions - DAQ



Some on-site impressions - DAQ





SSAmain.opi

MYRTE SSA engineering GUI

PLC Connection: ●

Common | **PSU** | **SSA**

POWER

LEGEND:
 fwd - Forward
 rfi - Refill
 rf - Radio frequency

Load	Value	Over rf:
Load fwd 100 kW	0.06	●
Load rfi 100 kW	0.04	●
Forward 192 kW	2.15	●
Refill 192 kW	2.19	●
Over Drive		●

Enclosure 1	Over rf:	Enclosure 2	Over rf:
Load 50 kW	0.33 W ●	Load 50 kW	0.04 W ●
Forward 96 kW	1.25 W ●	Forward 96 kW	0.16 W ●
Refill 96 kW	0.64 W ●	Refill 96 kW	0.18 W ●

Coupler 1

Load 24 kW	0.00 W ●	Load 25 kW	0.00 W ●
Forward 48 kW	0.15 W ●	Forward 48 kW	0.06 W ●
Refill 48 kW	0.04 W ●	Refill 48 kW	50,800.53 W ●

Coupler 2

Load fwd 25 kW	0.03 W ●	Load fwd 25 kW	0.05 W ●
Forward 48 kW	0.04 W ●	Forward 48 kW	0.04 W ●
Refill 48 kW	0.04 W ●	Refill 48 kW	50,800.53 W ●

ENABLE PSU

Voltage

Slot	Enable	Voltage	Disable
1	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
2	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
3	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
4	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
5	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
6	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
7	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
8	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
9	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
10	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
11	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
12	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
13	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
14	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
15	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
16	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
17	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>
18	<input type="checkbox"/>	50.00 V	<input type="checkbox"/>

RACK STATUS

1	●	17	●
2	●	18	●
3	●	19	●
4	●	20	●
5	●	21	●
6	●	22	●
7	●	23	●
8	●	24	●
9	●	25	●
10	●	26	●
11	●	27	●
12	●	28	●
13	●	29	●
14	●	30	●
15	●	31	●
16	●	32	●

RESET SSA - Main

RESET SSA

1	<input type="button" value="Reset"/>	17	<input type="button" value="Reset"/>
2	<input type="button" value="Reset"/>	18	<input type="button" value="Reset"/>
3	<input type="button" value="Reset"/>	19	<input type="button" value="Reset"/>
4	<input type="button" value="Reset"/>	20	<input type="button" value="Reset"/>
5	<input type="button" value="Reset"/>	21	<input type="button" value="Reset"/>
6	<input type="button" value="Reset"/>	22	<input type="button" value="Reset"/>
7	<input type="button" value="Reset"/>	23	<input type="button" value="Reset"/>
8	<input type="button" value="Reset"/>	24	<input type="button" value="Reset"/>
9	<input type="button" value="Reset"/>	25	<input type="button" value="Reset"/>
10	<input type="button" value="Reset"/>	26	<input type="button" value="Reset"/>
11	<input type="button" value="Reset"/>	27	<input type="button" value="Reset"/>
12	<input type="button" value="Reset"/>	28	<input type="button" value="Reset"/>
13	<input type="button" value="Reset"/>	29	<input type="button" value="Reset"/>
14	<input type="button" value="Reset"/>	30	<input type="button" value="Reset"/>
15	<input type="button" value="Reset"/>	31	<input type="button" value="Reset"/>
16	<input type="button" value="Reset"/>	32	<input type="button" value="Reset"/>

START SSA - Main

TEMPERATURE

	Enclosure 1	Enclosure 2
Coupler 1	0.0 deg C ●	0.0 deg C ●
Warning temp.	●	●
Over temp.	●	●
Coupler 2	0.0 deg C ●	0.0 deg C ●
Warning temp.	●	●
Over temp.	●	●

INFO

Enclosure status	0
Operation Mod	remote
Live Counter	624
Program Version	100
Hardware Version	100
Serial Number	1

Some on-site impressions - COSY



Some on-site impressions - COSY



Thank you

Your **TRUSTED** Control System Partner

