



STT controls status Update

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IFIN-HH

Work done 1

- EPICS IOCs implemented for hardware available @ IFIN-HH
 - 1 Gas line consisting of:
 - 2 MFCs for Ar and CO₂
 - 1 MFC and 1 PC for mix inlet/outlet
 - 1 MFM and 1PM for monitoring
 - 1 Wiener MPOD with :
 - 64 HV channels
 - 24 LV channels
- CS-Studio (v 4.5) interface implemented for everything mentioned



Main highlights

- Everything done at user level (no modification to EPICS and CS-Studio was necessary).
- IOCs and interface conceived to be extended (e. g. to 24 gas lines).
- All logic implemented in EPICS. CS-Studio used only for interface.
- Everything is “macro”-based. Any modification should be simple.

Final product

CS-Studio

File Edit Search Run CS-Studio Window Help

Alarm Area Panel

GasSystem Mpod

Alarm Tree

STT

- Area: GasSystem (undefined-ack'ed/No Connection)
- Area: Mpod (invalid-ack'ed/UDF_ALARM)
 - System: Crate
 - PV: ca://STT:Mpod:Status:MainInhibit
 - PV: ca://STT:Mpod:Status:LocalOnly
 - PV: ca://STT:Mpod:Status:InputFailure
 - PV: ca://STT:Mpod:Status:OutputFailure
 - PV: ca://STT:Mpod:Status:FantrayFailure
 - PV: ca://STT:Mpod:Status:SensorFailure
 - PV: ca://STT:Mpod:Status:PlugAndPlayIncomp
 - PV: ca://STT:Mpod:Status:BusReset
 - PV: ca://STT:Mpod:Status:SupplyDerating1
 - PV: ca://STT:Mpod:Status:SupplyFailure1
 - PV: ca://STT:Mpod:Status:SupplyDerating2
 - PV: ca://STT:Mpod:Status:SupplyFailure2
 - System: HV (invalid-ack'ed/UDF_ALARM)
 - System: Channel_0 (invalid-ack'ed/UDF_ALARM)
 - System: Status
 - PV: ca://STT:Mpod:HV:Channel_0:Status:O
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:Fa
 - PV: ca://STT:Mpod:HV:Channel_0:Status:O
 - PV: ca://STT:Mpod:HV:Channel_0:Status:O
 - PV: ca://STT:Mpod:HV:Channel_0:Status:O

STT control and monitoring system

GAS

Power Source

General Switch OFF

HV LV

Services

Interlock Status:

Alarm Table

Current Alarms (0)

PV	Description	Alarm Time	Current Seve	Current Stati	Alarm Severi	Alarm Status	Alarm Value
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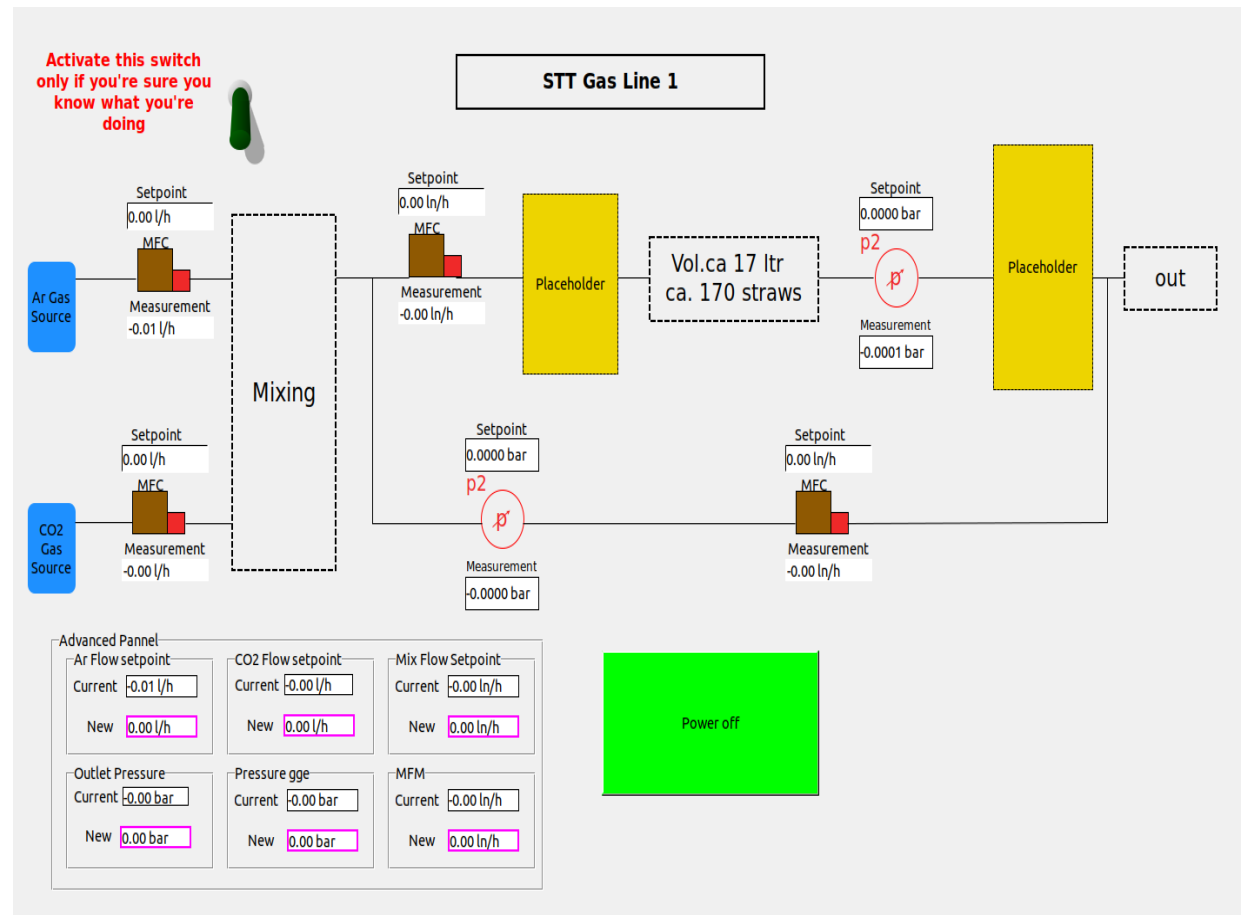
Acknowledged Alarms (103)

PV	Description	Alarm Time	Current Seve	Current Stati	Alarm Severi	Alarm Status	Alarm Value
ca://STT_GasSystem_L	undefined-ack'ed alarm: Pressure Gauge setp	2019/11/04 10:48:50.146	UNDEFINED	No Connecti	undefined-ac	No Connecti	
ca://STT_GasSystem	undefined-ack'ed alarm: Pressure Gauge me	2019/11/04 10:48:50.146	UNDEFINED	No Connecti	undefined-ac	No Connecti	

stefan

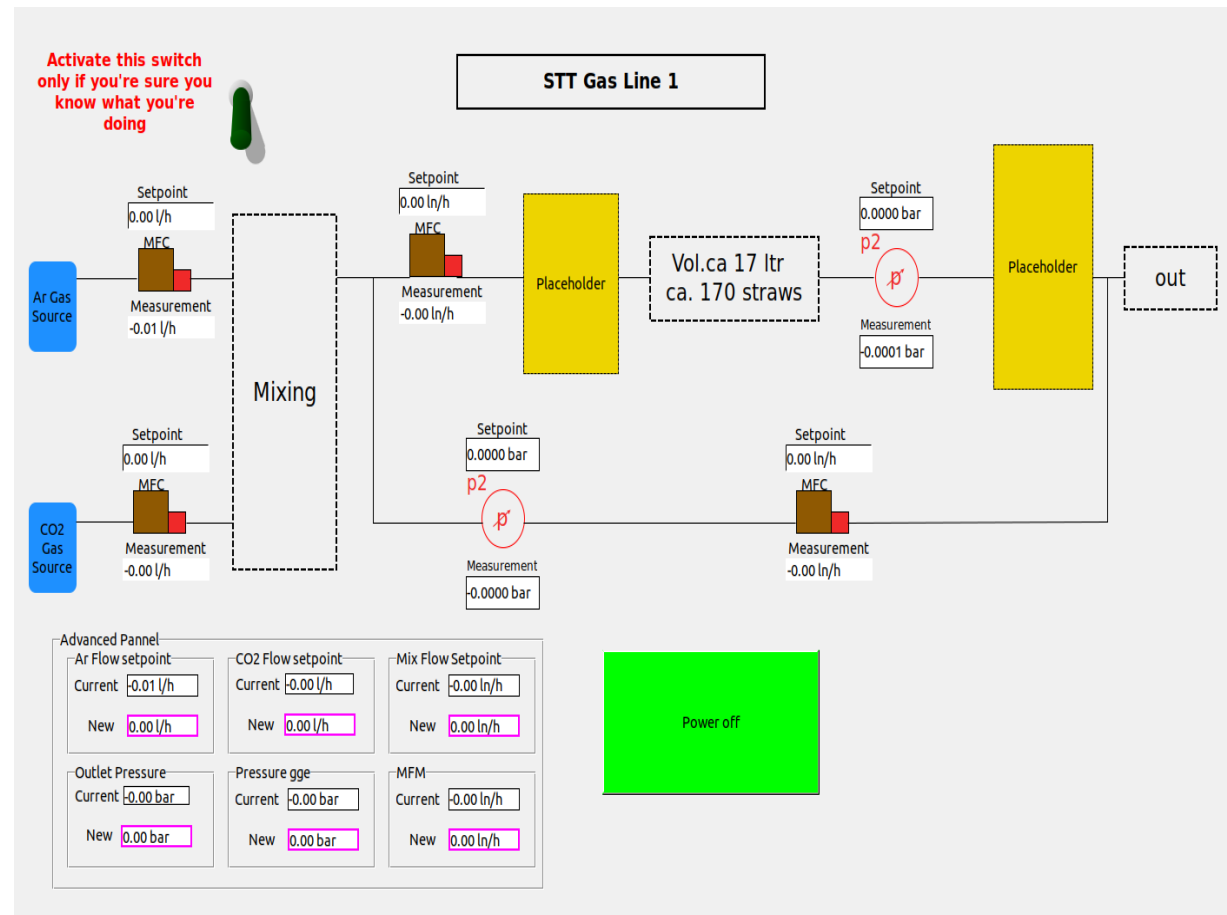
Gas System

- 1 line configured with additional Ar and CO₂ MFCs also present
- RS232 interface used for communication



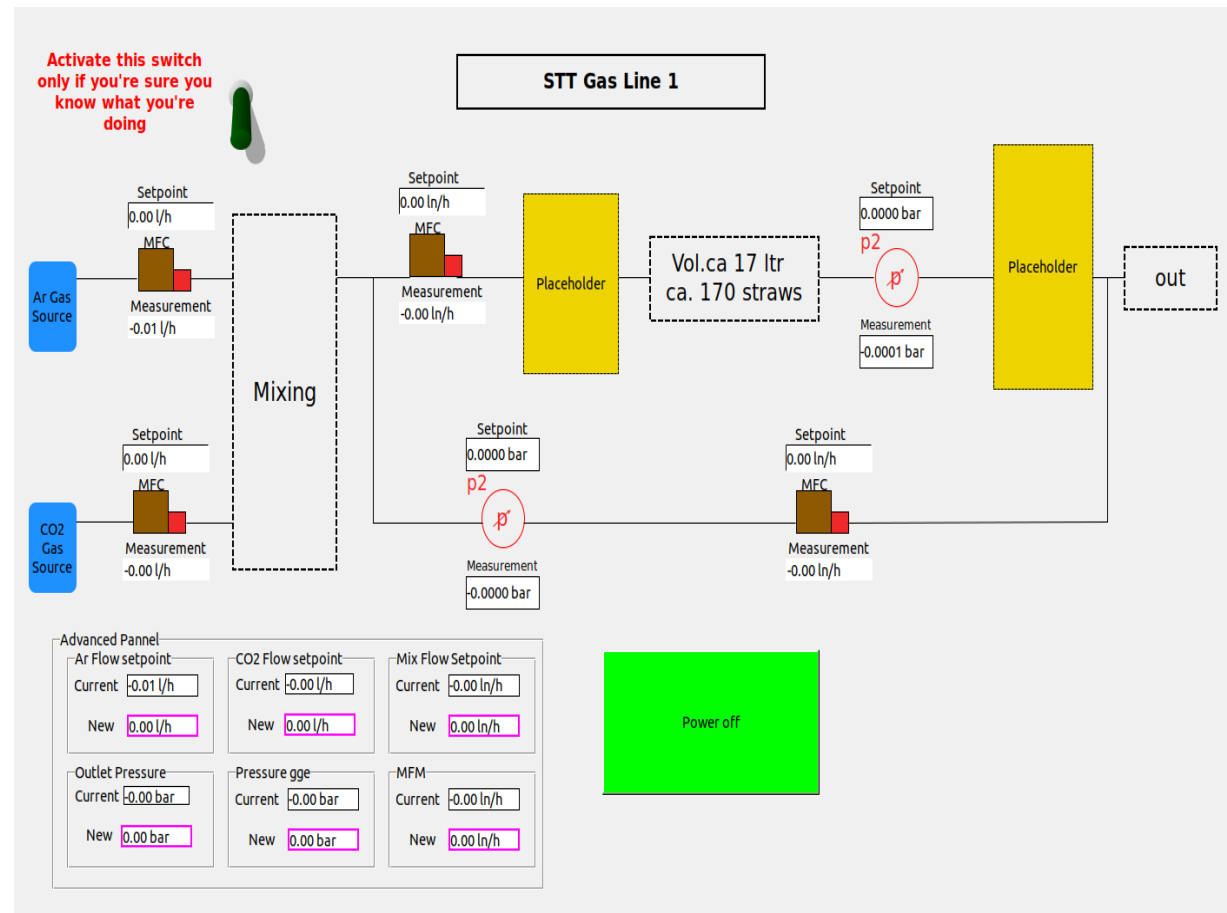
Gas System

- Placeholders with widgets inactive in case of modifications
- Setpoints/Measurements conversion done in IOC
- Operating modes using SNC



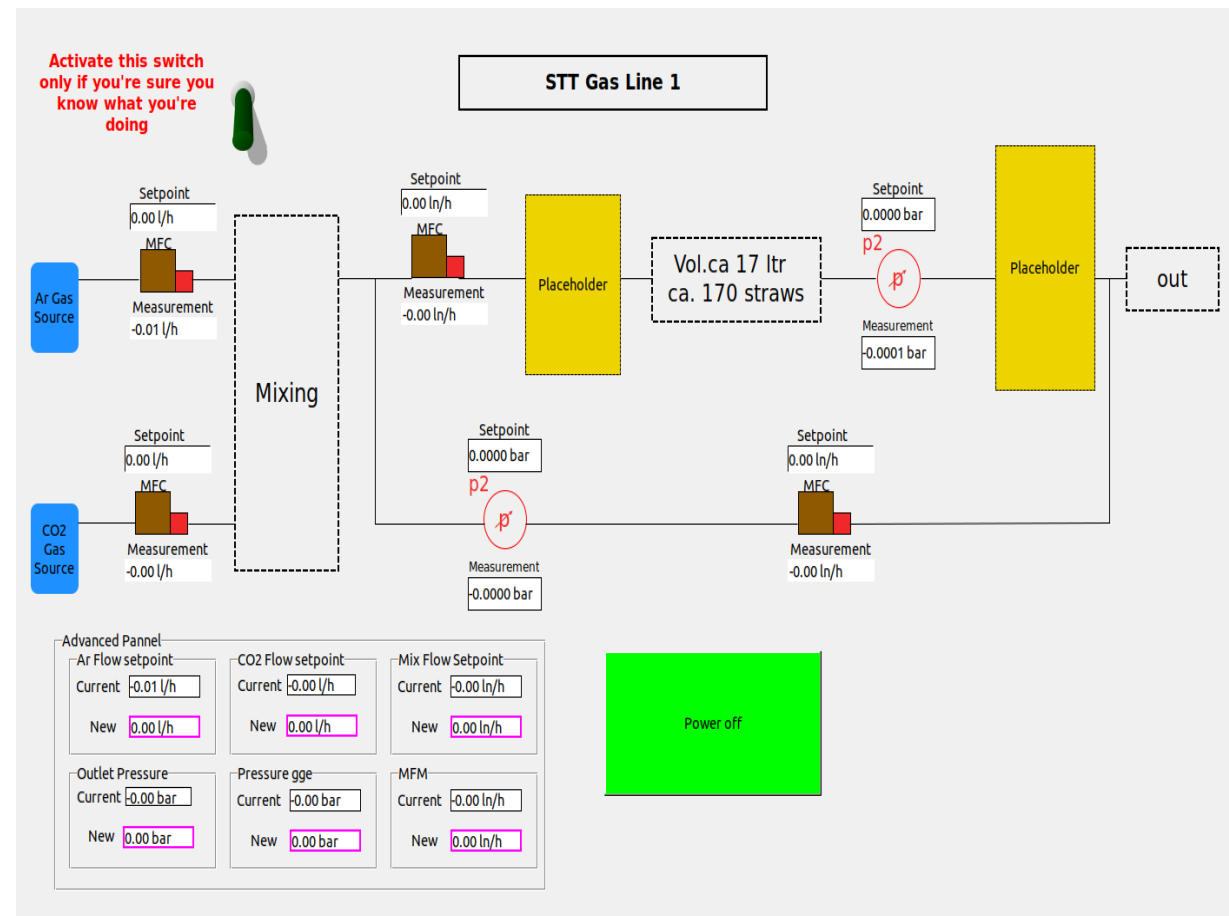
Gas System

- ~100 PVs per Line
- >80% of them are soft. Most of them CALC records used for conversions
- Operating modes using SNC. Maybe use Subroutine (depending on how they scale)



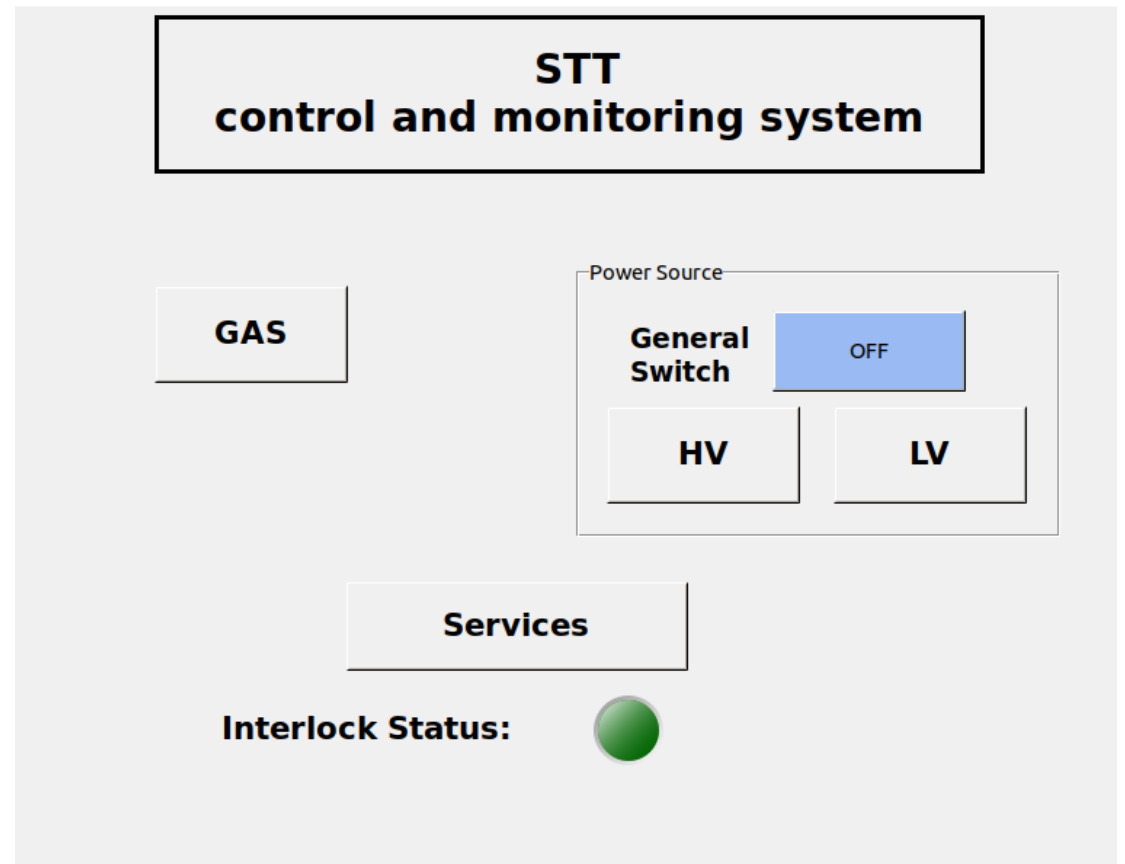
Gas System - drawbacks and work needed

- Huge amount of parameters in RS232 (~250).
- General decoder by brute-force is unrealistic
- Calibration should be done on-site
- Operating modes using SNC. Maybe use Subroutine (depending on how they scale)



Wiener Crate

- Easy navigation
- HV and LV accessible from main window
- Communication through snmp
- Monitoring of Interlock status
- **Services** - will contain useful information



Wiener Crate - HV

- 64 channels implemented
- Adding and removing is trivial
- This OPI contains hundreds of widgets. Filling table by script is very slow
- Text widgets in CSS are very scalable. Use them instead

HV Channels

Group **Control** 0.000 V

Ch 0 OFF	Ch 1 OFF	Ch 2 OFF	Ch 3 OFF
Ch 4 OFF	Ch 5 OFF	Ch 6 OFF	Ch 7 OFF
Ch 8 OFF	Ch 9 OFF	Ch 10 OFF	Ch 11 OFF
Ch 12 OFF	Ch 13 OFF	Ch 14 OFF	Ch 15 OFF
Ch 16 OFF	Ch 17 OFF	Ch 18 OFF	Ch 19 OFF
Ch 20 OFF	Ch 21 OFF	Ch 22 OFF	Ch 23 OFF
Ch 24 OFF	Ch 25 OFF	Ch 26 OFF	Ch 27 OFF
Ch 28 OFF	Ch 29 OFF	Ch 30 OFF	Ch 31 OFF
Ch 32 OFF	Ch 33 OFF	Ch 34 OFF	Ch 35 OFF
Ch 36 OFF	Ch 37 OFF	Ch 38 OFF	Ch 39 OFF
Ch 40 OFF	Ch 41 OFF	Ch 42 OFF	Ch 43 OFF
Ch 44 OFF	Ch 45 OFF	Ch 46 OFF	Ch 47 OFF
Ch 48 OFF	Ch 49 OFF	Ch 50 OFF	Ch 51 OFF
Ch 52 OFF	Ch 53 OFF	Ch 54 OFF	Ch 55 OFF
Ch 56 OFF	Ch 57 OFF	Ch 58 OFF	Ch 59 OFF
Ch 60 OFF	Ch 61 OFF	Ch 62 OFF	Ch 63 OFF

ID	Status	V. set	C. set	V. sense	V. term	C. meas
Ch 0	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 1	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 2	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 3	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 4	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 5	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 6	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 7	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 8	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 9	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 10	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 11	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 12	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 13	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 14	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 15	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 16	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 17	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 18	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 19	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 20	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 21	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 22	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 23	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 24	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 25	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 26	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 27	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 28	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 29	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 30	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 31	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 32	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 33	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 34	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 35	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 36	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 37	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 38	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 39	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 40	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 41	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 42	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 43	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 44	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 45	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 46	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 47	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 48	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 49	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 50	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 51	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 52	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 53	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 54	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 55	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 56	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 57	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 58	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 59	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 60	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 61	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 62	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 63	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A

Wiener Crate - HV

- Possibility to control each channel (ON/OFF/Reset/Set voltage)
- Colors reflect state. Very easy to spot errors
- Global control also implemented
- 13-16 states possible. Decoder already implemented (see next slide)

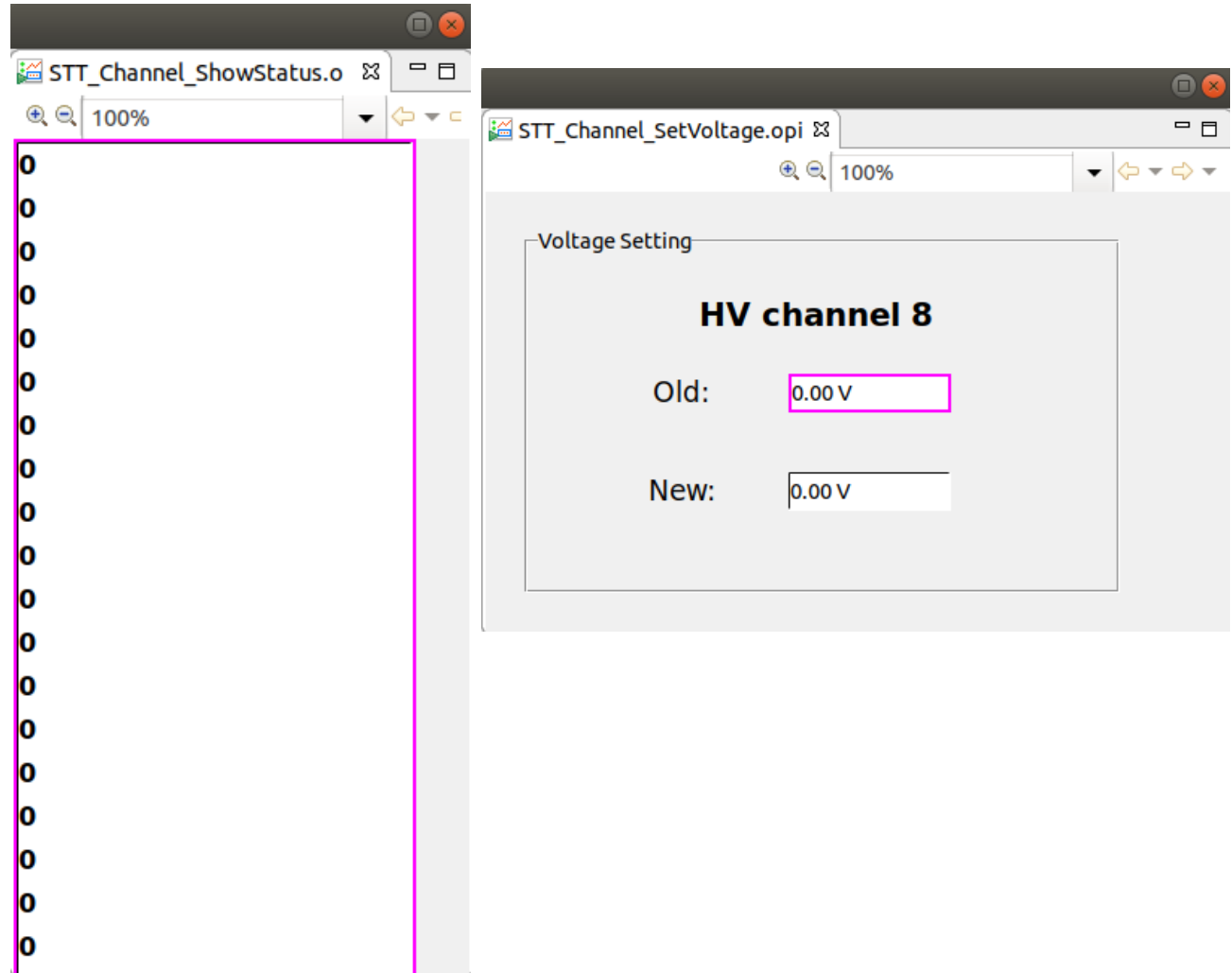
HV Channels

Group	Control	0.000 V	
Ch 0 OFF	Ch 1 OFF	Ch 2 OFF	Ch 3 OFF
Ch 4 OFF	Ch 5 OFF	Ch 6 OFF	Ch 7 OFF
Ch 8 OFF	Ch 9 OFF	Ch 10 OFF	Ch 11 OFF
Ch 12 OFF	Ch 13 OFF	Ch 14 OFF	Ch 15 OFF
Ch 16 OFF	Ch 17 OFF	Ch 18 OFF	Ch 19 OFF
Ch 20 OFF	Ch 21 OFF	Ch 22 OFF	Ch 23 OFF
Ch 24 OFF	Ch 25 OFF	Ch 26 OFF	Ch 27 OFF
Ch 28 OFF	Ch 29 OFF	Ch 30 OFF	Ch 31 OFF
Ch 32 OFF	Ch 33 OFF	Ch 34 OFF	Ch 35 OFF
Ch 36 OFF	Ch 37 OFF	Ch 38 OFF	Ch 39 OFF
Ch 40 OFF	Ch 41 OFF	Ch 42 OFF	Ch 43 OFF
Ch 44 OFF	Ch 45 OFF	Ch 46 OFF	Ch 47 OFF
Ch 48 OFF	Ch 49 OFF	Ch 50 OFF	Ch 51 OFF
Ch 52 OFF	Ch 53 OFF	Ch 54 OFF	Ch 55 OFF
Ch 56 OFF	Ch 57 OFF	Ch 58 OFF	Ch 59 OFF
Ch 60 OFF	Ch 61 OFF	Ch 62 OFF	Ch 63 OFF

ID	Status	V. set	C. set	V. sense	V. term	C. meas
Ch 0	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 1	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 2	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 3	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 4	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 5	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 6	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 7	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 8	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 9	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 10	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 11	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 12	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 13	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 14	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 15	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 16	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 17	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 18	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 19	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 20	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 21	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 22	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 23	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 24	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 25	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 26	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 27	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 28	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 29	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 30	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 31	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 32	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 33	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 34	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 35	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 36	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 37	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 38	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 39	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 40	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 41	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 42	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 43	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 44	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 45	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 46	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 47	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 48	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 49	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 50	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 51	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 52	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 53	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 54	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 55	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 56	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 57	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 58	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 59	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 60	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 61	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 62	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 63	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A

Wiener Crate - HV

- Channel status in separate OPI.
- When something happens, the status text is displayed
- Voltage setting in different OPI
- Text input configured to be error-proof (e.g. can't set too high voltage)



Wiener Crate - LV

- 24 channels implemented
- All functionality the same as in the case of HV
- Use Rules anytime it is possible as they are faster than scripts.
- Everything is “macro”-based. Major changes take a day at most.

LV Channels

Group **Control** 0.000 V

Ch 0 OFF	Ch 1 OFF	Ch 2 OFF	Ch 3 OFF
Ch 4 OFF	Ch 5 OFF	Ch 6 OFF	Ch 7 OFF
Ch 8 OFF	Ch 9 OFF	Ch 10 OFF	Ch 11 OFF
Ch 12 OFF	Ch 13 OFF	Ch 14 OFF	Ch 15 OFF
Ch 16 OFF	Ch 17 OFF	Ch 18 OFF	Ch 19 OFF
Ch 20 OFF	Ch 21 OFF	Ch 22 OFF	Ch 23 OFF
Ch 24 OFF	Ch 25 OFF	Ch 26 OFF	

ID	Status	V. set	C. set	V. sense	V. term	C. meas
Ch 0	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 1	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 2	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 3	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 4	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 5	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 6	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 7	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 8	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 9	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 10	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 11	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 12	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 13	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 14	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 15	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 16	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 17	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 18	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 19	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
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Ch 22	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 23	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 24	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 25	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A
Ch 26	View Status	0.00 V	0.00 A	0.00 V	0.00 V	0.00 A

Alarm Configuration

- All PVs to be monitored are written to an .xml file by a script. Easy to extend
- Use AlarmConfigTool and AlarmServer as described in CSS documentation

The screenshot displays the Alarm Configuration software interface. The top window, 'Alarm Area Panel', shows two main areas: 'GasSystem' and 'Mpod'. Below it, the 'Alarm Tree' window shows a hierarchical structure of alarm areas and systems, including 'Area: GasSystem', 'Area: Mpod', and various 'System' and 'PV' entries. The main window, 'STT control and monitoring system', features a 'GAS' button, a 'Power Source' section with a 'General Switch' (OFF) and 'HV'/'LV' buttons, a 'Services' button, and an 'Interlock Status' indicator (a green circle). At the bottom, there are two 'Alarm Table' sections: 'Current Alarms (0)' and 'Acknowledged Alarms (103)', both with columns for 'PV', 'Description', and 'Alarm Time'.

Alarm Configuration

- No way (as far as I know) to monitor global status of a system
- Hence, no single LED to announce errors
- Solution: Alarms and OPI in same window

The screenshot displays a control system interface with several components:

- Alarm Area Panel:** Two large pink rectangular areas labeled "GasSystem" and "Mpod".
- Alarm Tree:** A tree view showing the hierarchy of alarms. The "Area: Mpod (invalid-ack'ed/UDF_ALARM)" is highlighted in orange. Below it, a list of systems is shown, including "System: Crate" with various PVs (e.g., "ca://STT:Mpod:Status:MainInhibit") and "System: HV (invalid-ack'ed/UDF_ALARM)", "System: LV (invalid-ack'ed/UDF_ALARM)".
- STT control and monitoring system:** A central panel with a "GAS" button, a "Power Source" section with a "General Switch" (set to "OFF") and "HV" and "LV" buttons, and a "Services" button.
- Interlock Status:** A green circular indicator.
- Alarm Table:** A table with two sections: "Current Alarms (0)" and "Acknowledged Alarms (103)". Both tables have columns for "PV", "Description", and "Alarm Time".

Alarm Configuration

- Gas System and Wiener crate: 2 separate subsystems.
- Gas System:
 - One subsystem for admission
 - One subsystem for each line
- MPOD:
 - One subsystem for global crate status
 - One subsystem for HV and one for LV
 - For HV and LV:
 - One subsystem for each channel

The screenshot displays the CS-Studio environment. On the left, the 'Alarm Area Panel' shows two subsystems: 'GasSystem' and 'Mpod'. Below it, the 'Alarm Tree' and 'Navigator' show a hierarchical view of the alarm configuration, including 'Area: GasSystem', 'Area: Mpod', and various 'System' and 'PV' entries.

On the right, the 'STT control and monitoring system' interface is shown. It features a 'GAS' button, a 'Power Source' section with a 'General Switch' (set to OFF) and 'HV'/'LV' buttons, and a 'Services' button. Below these is an 'Interlock Status' indicator, which is a green circle. At the bottom, there are two 'Alarm Table' sections: 'Current Alarms (0)' and 'Acknowledged Alarms (103)', both with columns for 'PV', 'Description', and 'Alarm Time'.

Alarm Configuration

- Gas System:
 - One subsystem for admission
 - One subsystem for each line
 - Parameters for alarms: Measurement and Setpoint Display values (converted from integers)
 - Status to be implemented: huge number of parameters, don't know where to begin

The screenshot displays a software interface for alarm configuration. At the top, there is a window titled "Alarm Area Panel" containing two large pink rectangular areas labeled "GasSystem" and "Mpod". Below this, there is a section titled "Alarm Tree" and "Navigator". The "Alarm Tree" shows a hierarchical structure of alarm areas and systems. The "Area: GasSystem" is expanded, showing several "System" entries, each with multiple "PV" (Process Variable) entries. The "System: Line1" entry is highlighted in orange, and its "PV" entries are listed below it. The "PV" entries include measurement and setpoint display values for various parameters such as "MixFlow", "MixPressure", "PressGge", and "MFM".

Alarm Configuration

- MPOD:
 - Crate status decoded. Each state has a PV.
 - Channel status decoded. Each state has a PV
 - Additionally: measurements are also used for alarms

The screenshot displays the 'Alarm Area Panel' software interface. At the top, there are two large pink rectangular panels labeled 'GasSystem' and 'Mpod'. Below these panels is a navigation bar with 'Alarm Tree' and 'Navigator' tabs. The 'Alarm Tree' tab is active, showing a hierarchical tree structure of alarm configurations. The tree is expanded to show the 'Mpod' area, which is currently in an 'invalid-ack'ed/UDF_ALARM' state. Under 'Mpod', there are three system entries: 'Crate', 'HV', and 'Channel_0'. Each system entry lists its associated Process Variable (PV) addresses. The 'Crate' system lists 13 PVs, 'HV' lists 1, and 'Channel_0' lists 11 PVs. The 'Channel_0' system is further expanded to show its 'Status' sub-system, which lists 11 PVs. The interface also includes a toolbar with various icons for alarm management and a status indicator showing 'STT'.

Final remarks

- EPICS IOCs fully functional
- Final Product includes ~2000 Pvs. Most of them soft (not very heavy on the machine)
- CSS interface prepared for available hardware. Will need extensions, but it will be easy
- Few things could be improved: e.g. Global state button
- Takes ~ 1 hour to build from scratch.
- Tools provided to extend alarm configuration and IOC databases.