

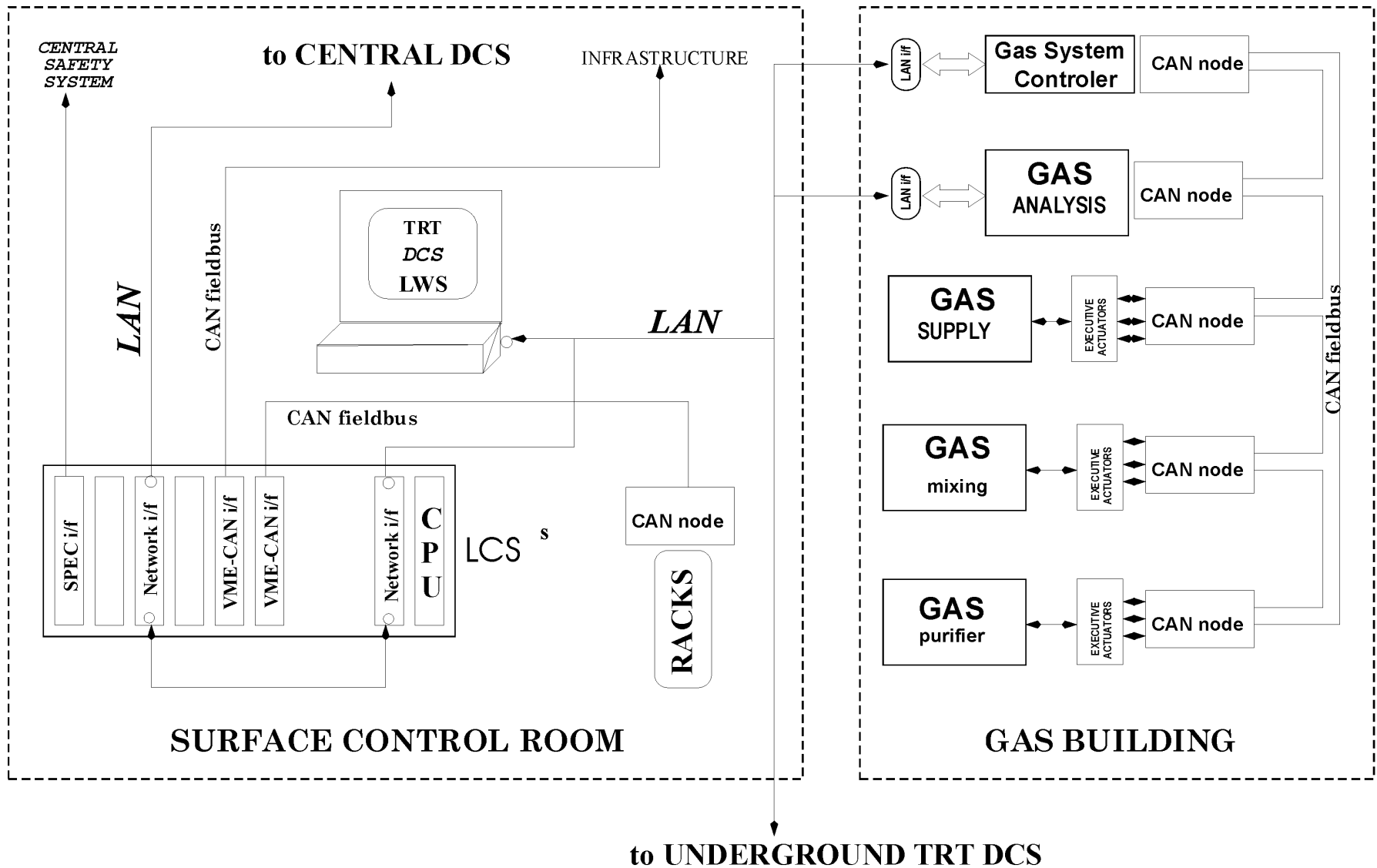
# TRT - subdetector work

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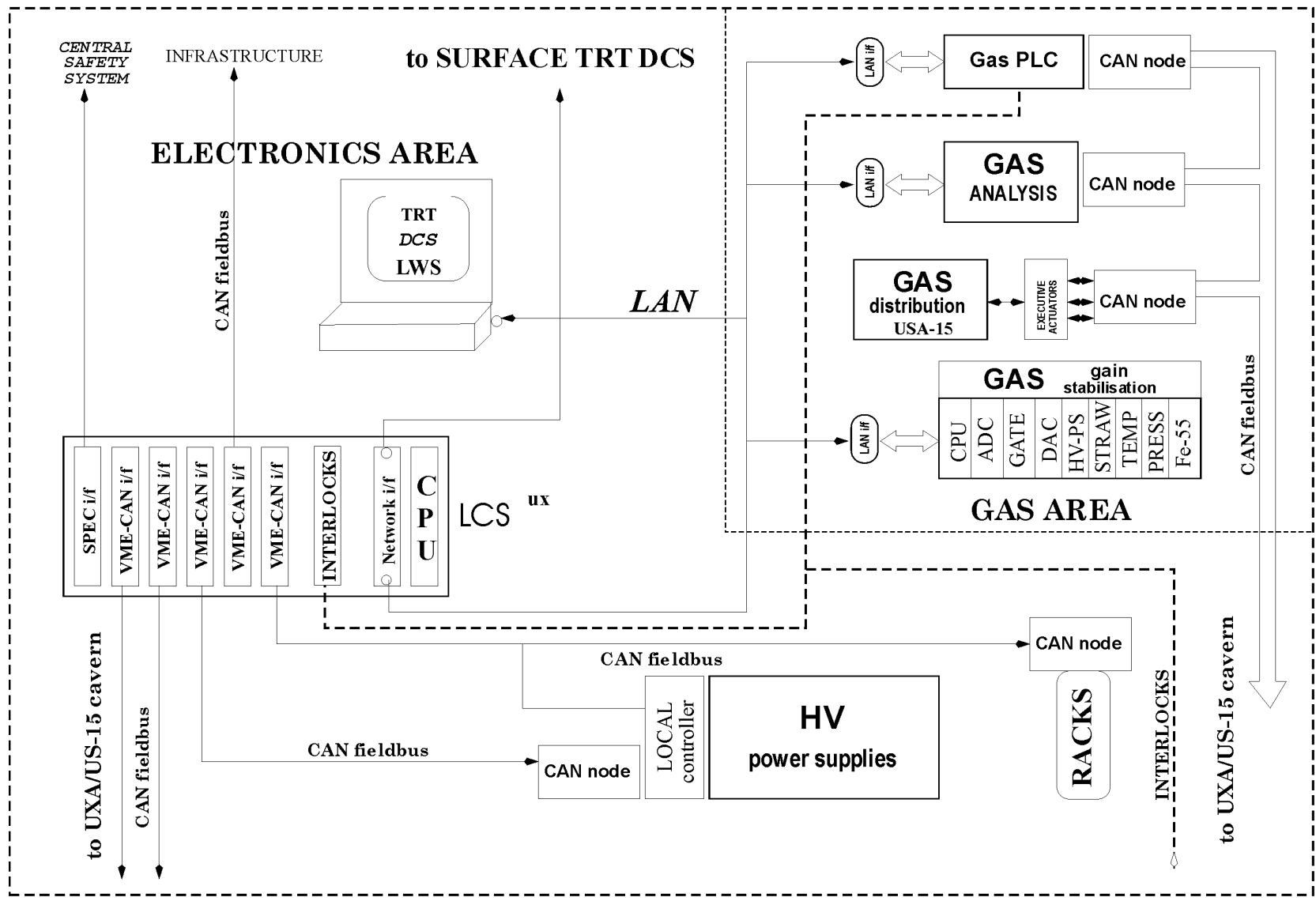
# TRT detector control system (DCS)

## SURFACE



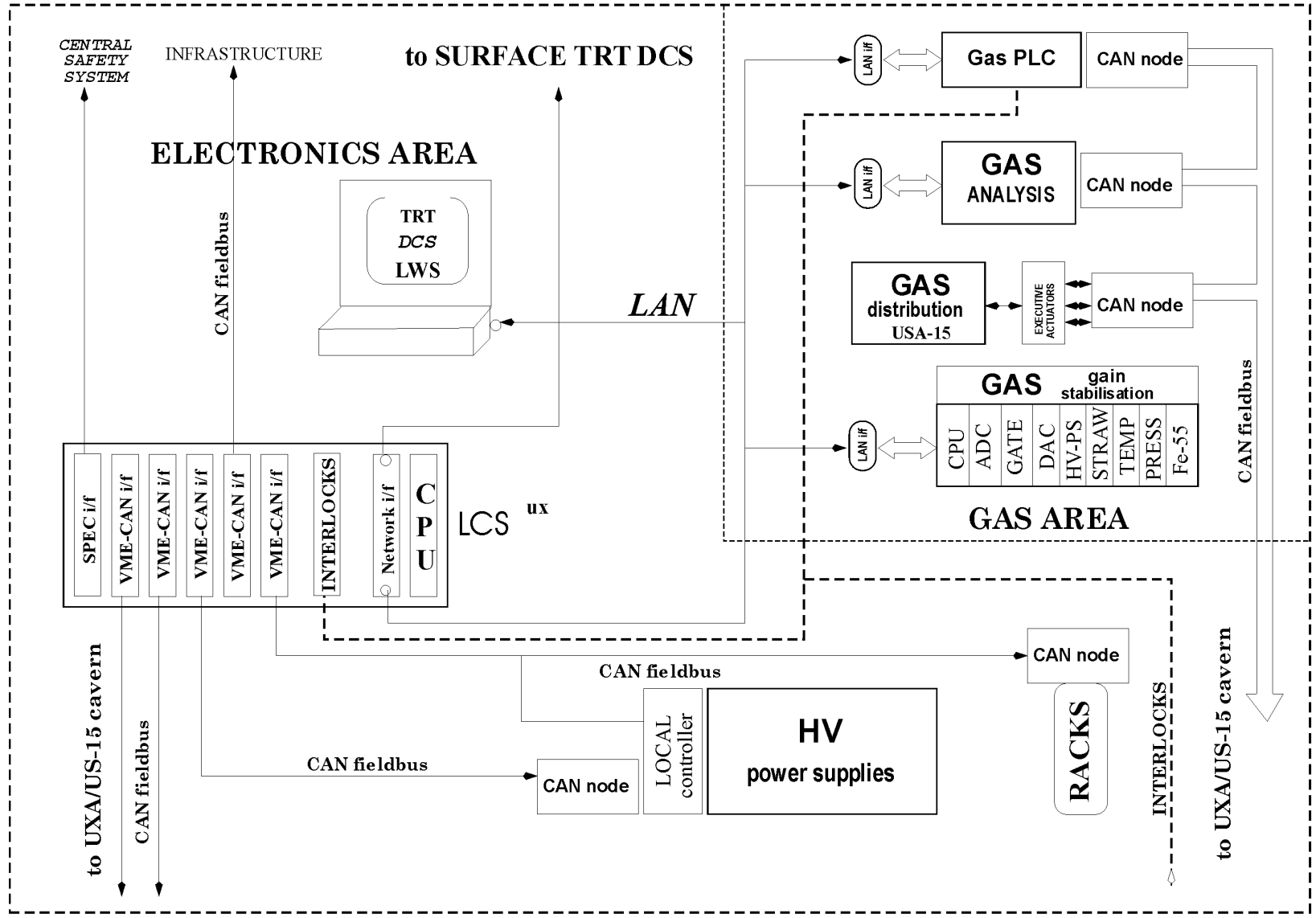
# TRT detector control system (DCS)

## UNDERGROUND CONTROL ROOM



# TRT detector control system (DCS)

## UNDERGROUND CONTROL ROOM



# TRT - projects in progress

- ✓ OPC Server for W-IE-NE-R (previous presentation)
- ✓ Protection of detector electronics
- ✓ Naming convention and parameters definition
- ✓ ELMB for bulk HV Power Supplies
- ✓ Gas Gain Stabilisation System

# Electronics protection



against thermal hazards

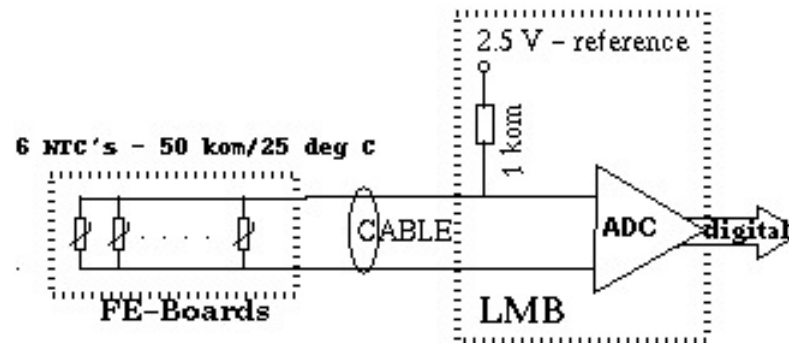
**USING NTC's**

# Electronics protection against thermal hazards

- Note Sep 99 (see EDMS)
  - ATL-IT-EN-0016 v.0 Temperature monitoring of the FE-boards
- Main issues
  - sensitivity
  - delay of sensor's reaction
  - in parallel test simple temperature measuring system with LMB

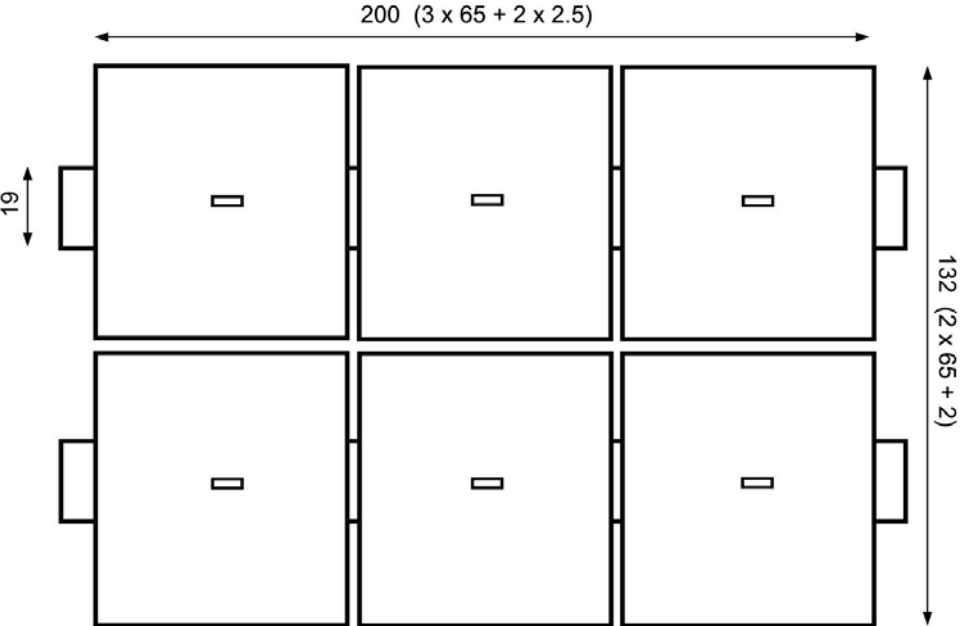
# Basic idea

- Only one cable
  - but stack of 6 boards
- Low sensitivity if PT-1XXX!

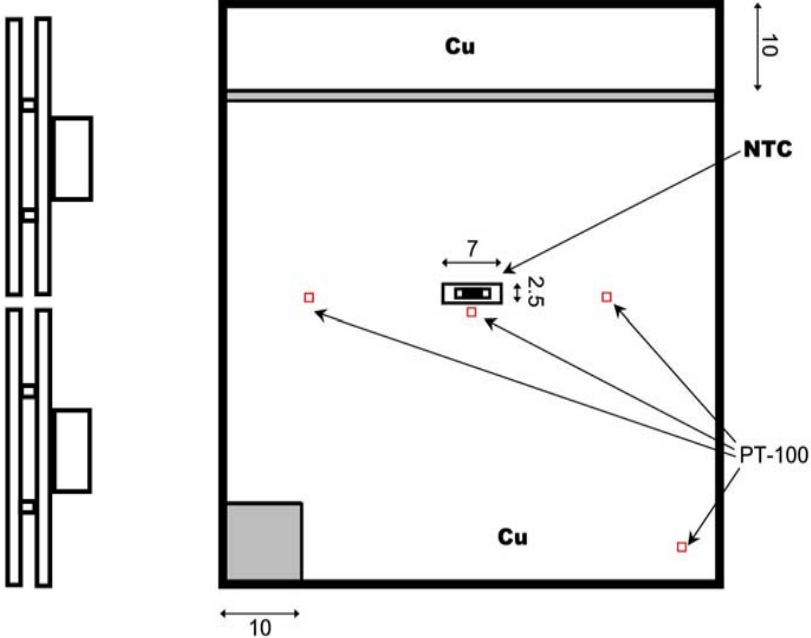




# Mock – up 1



## FE-boards mock-up



# Some conclusions

- Works ! Sensitivity seems quite high
- Delays seems acceptable
  - the thermal dynamics of real boards unknown
- Will try to introduce ambient cancelation
- As for temperature monitoring
  - two wires with correction works reasonably
  - noise level +/- 0.25 deg. C
- Next step: change to PT-1000 to increase signal-to-noise ratio

# TRT DCS parameters

# TRT DCS parameters

## C.Subsystems naming convention

## C.Parameters naming convention (examples)

Subsystem	Naming
detecting element/channel <sup>a</sup>	SR
control signals	TT
electronics - readout	ER
electronics- front end	EF
temperature on the detector	TD
high voltage channel	HC
high voltage bulk	HB
low voltage channel	LC
low voltage bulk	LB
gas cooling	CG
liquid cooling	CL
gas system	AG
barrel ventilation	BV
racks	RA
crates	KR
infrastructure	IN
environment	QN

<sup>a</sup>. individual straw - this position allows to place here straw or electronics parameters.

Parameter	Codes
high voltage nominal	VN
high voltage measured	VM
current at hv measured	IM
current trip	IT
voltage trip (over voltage)	VT
channel status on/off	VS
hv warning window	VW
hv alarm window	VA
active gas flow	AF
cooling gas flow	GF
cooling liquid temperature	LT
crate status	KS
rack temperature	RT
atmospheric pressure	AP
xenon contents	XP
CO2 contents	CP
xenon flow	XF
status of cooling pump	QPS

# TRT DCS parameters

## A. Naming convention

Let's reserve 14 fields (characters) for names within TRT i.e. all names have IT + 14 characters description.

- First two fields are taken by name of the detector - B for barrel and E for encaps; and for the side of ATLAS: i.e A or C ex. IT-BA which is inner detector, TRT barrel side A. Here we also place a parameters for systems which are external to the detector - code 00.
- Next two fields describe detector type (i.e. M1 or C2) with two 'zero's' reserved for parameters valid for whole detector of given type ex. IT-BA-M1 for ID-BA and module one or IT-EC-00 for whole endcap C. For external system this two fields point to placement of the system (UX-15, USA-15, US-15)
- Fields 5,6 are reserved for a subsystem ex. HV, TE, LV, DA, CR (high voltage, temperature of electronics, low voltage, data,, control etc (ex. IT-EC-C4-HV is addressing HV item on fourth wheel of C side)
- Fields 7 and 8 describe 1/32 of the detector ex. IT-BC-M3-LV-23 points to LV item of 23'rd 1/32-zone in module type 3 on B side A. When filled up with zero's (00) points whole detector ex. IT-BC-M2-GC-00 points to gas cooling of whole module 2 on barrel C side. For external subsystems contains consecutive number of the system subdivision.
- Field 9,10 and 11 contain name of the parameter or serve as number fields
- Rest of the name i.e. 3 fields are reserved for consecutive number of item described previously or are continuation of the number started in fields 9 through 11.

# TRT DCS parameters

## B.Naming - summarized

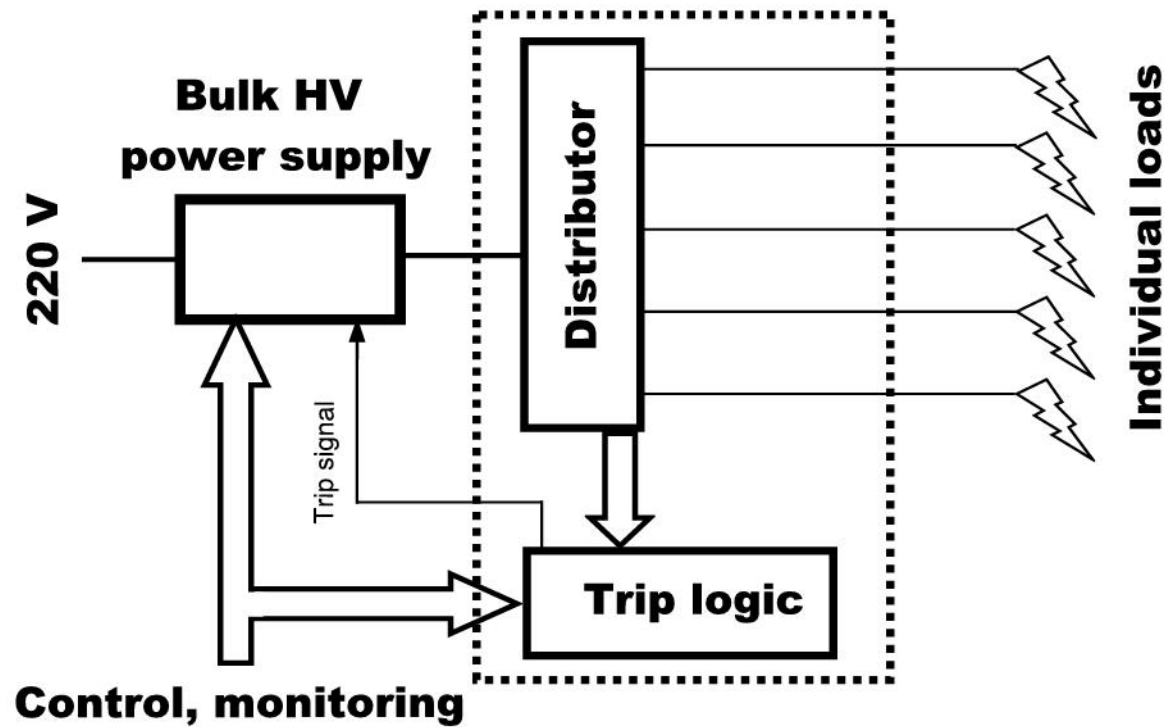
Fields											Field s
1	2	3	4	5	6	7	8	9	10	11	12-14
BARREL											
B	A	M	1-3	subsystem name		1-32		parameter name/nb		nb	
	C			subsystem name				parameter name/nb		nb	
		0	0	subsystem name		0	0	parameter name/nb		nb	
ENDCAP											
E	A	A	1-6	subsystem name		1-32		parameter name/nb		nb	
E	C	B	1-8	subsystem name				parameter name/nb		nb	
		C	1-4	subsystem name				parameter name/nb		nb	
		0	0	subsystem name		0	0	parameter name/nb		nb	
External systems											
0	0	0	X	subsystem name		nb		parameter name/nb		nb	
		S	A	subsystem name		nb		parameter name/nb		nb	
		0	S	subsystem name		nb		parameter name/nb		nb	

# TRT DCS parameters

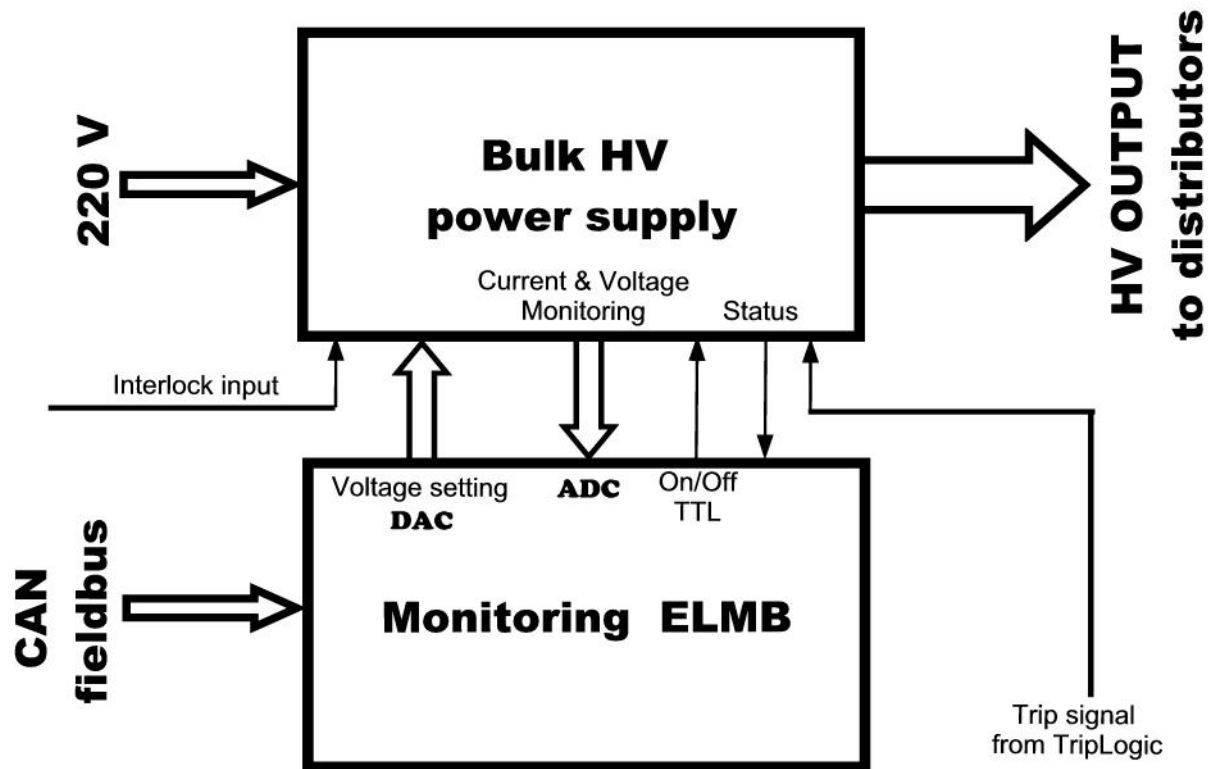
parameter name	Subs yste m	Para meter type	RW, R, W or P	Nomi nal value	Nomi nal band	Warni ng band	Alar m band	Monit oring frequ ency	Num ber of insta nces	Remarks
temperatures of electron- ics	TD	A	R	$T_0$	+/- 2%	+ 5 %	+ 8 %	1/min	1536	
temperature of cooling liquid	TD	A	R	$T_0$						
temperature of cooling gas	TD	A	R	$T_0$						
temperature of cooling water	TD	A	R	$T_0$						
temperature of detector	TD	A	R	$T_0$						Mechanical structure
temperature of active gas	TD	A	R	$T_0$						
temperature of gain stabi- lization system	AG	A	R	$T_0$						
high voltage nominal	HB	A	RW	$V_n$						
high voltage measured	HB	A	R	$V_m$						
current measured	HB	A	R	$I_m$						
overcurrent	HB	A	P	$I_o$						
trip value	HC	A	R/W	$I_t$						
trip status	HC	L	R	$T_s$						

# ELMB for bulk HV Power Supplies

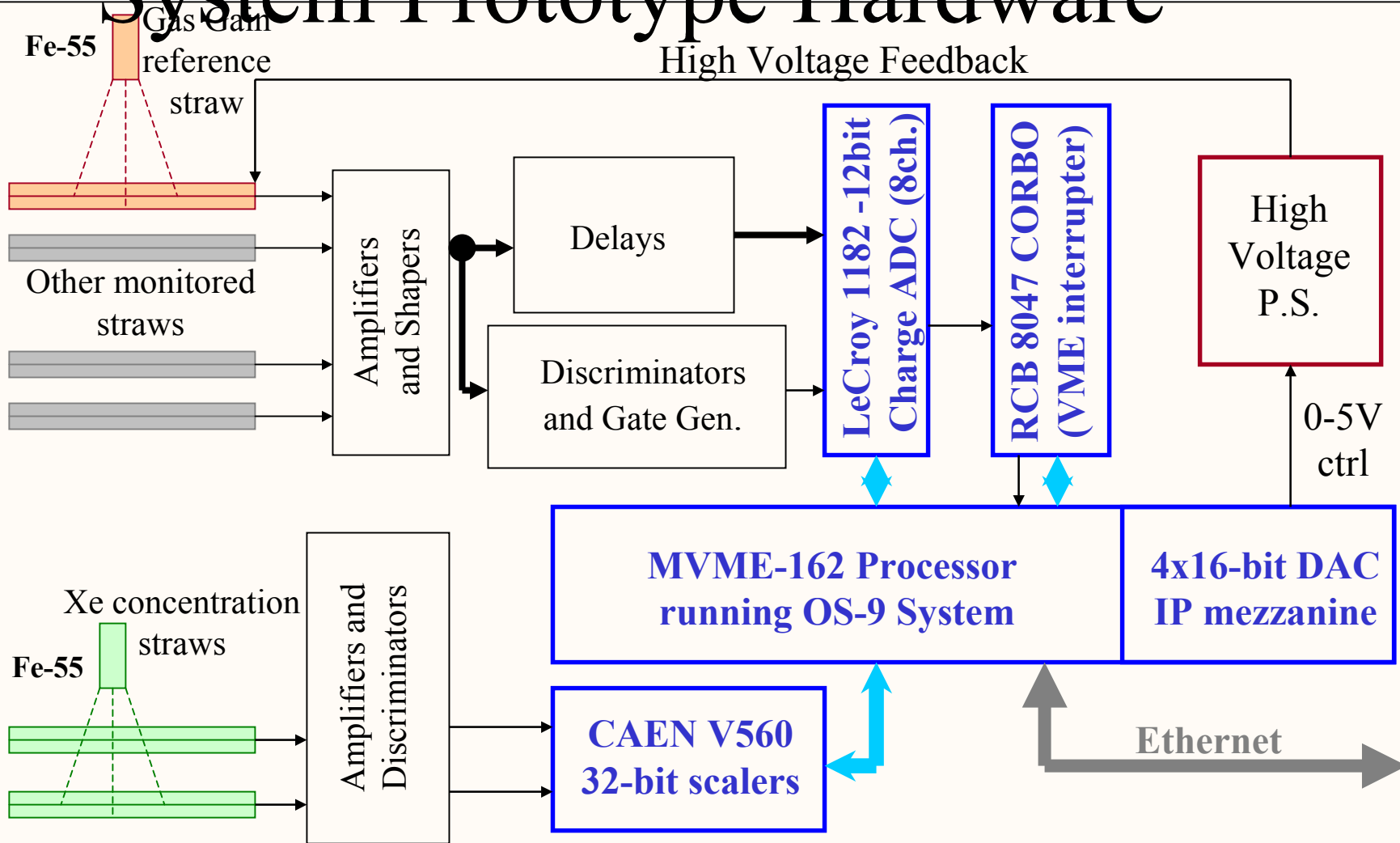
## Basic idea



# ELMB for bulk HV Power Supplies Control

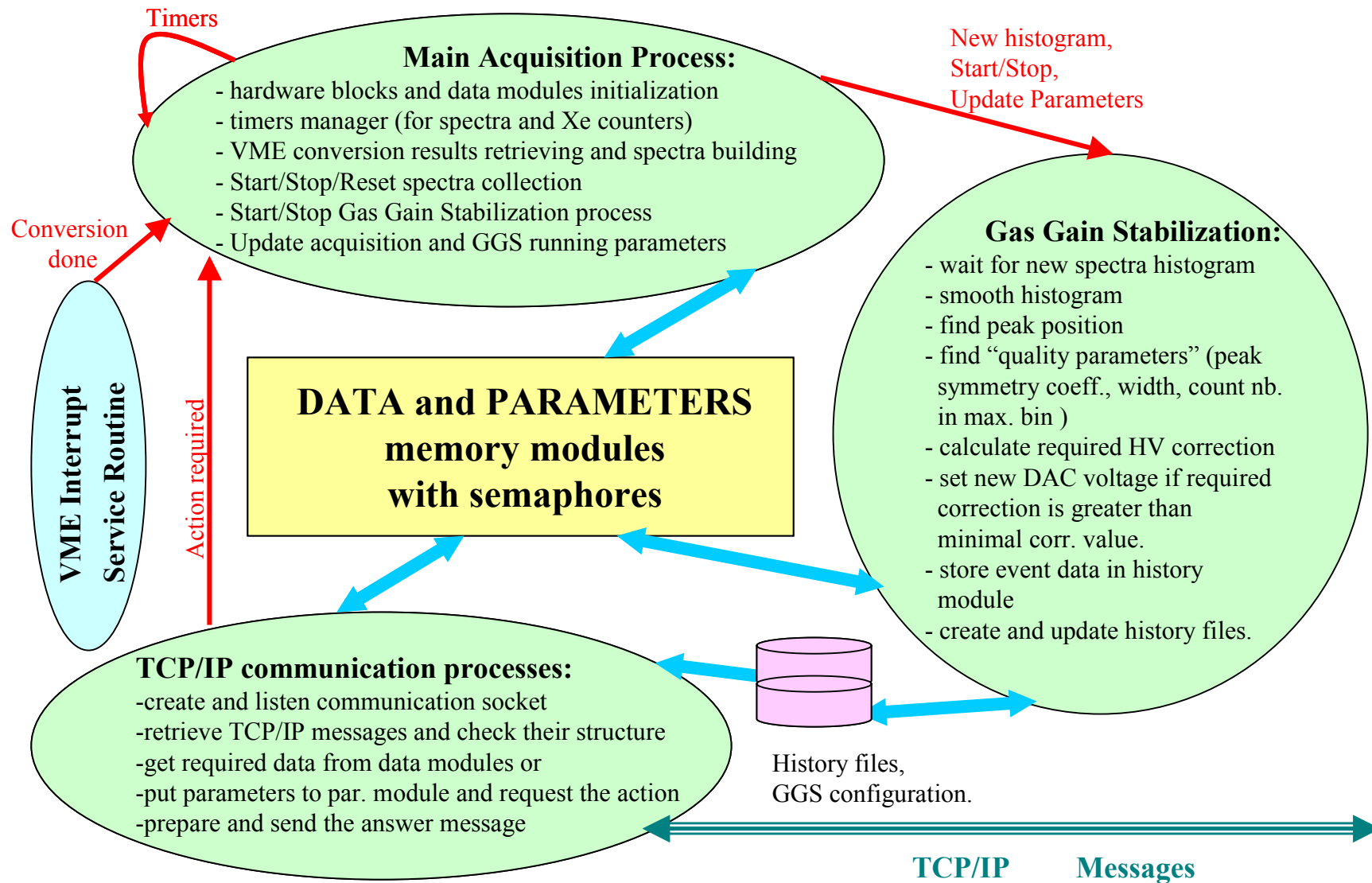


# Gas Analysis and Gain Stabilisation System Prototype Hardware





# ... and Software



# GGG System – hardware architecture

