Liquid Argon Calorimeter Slow Control

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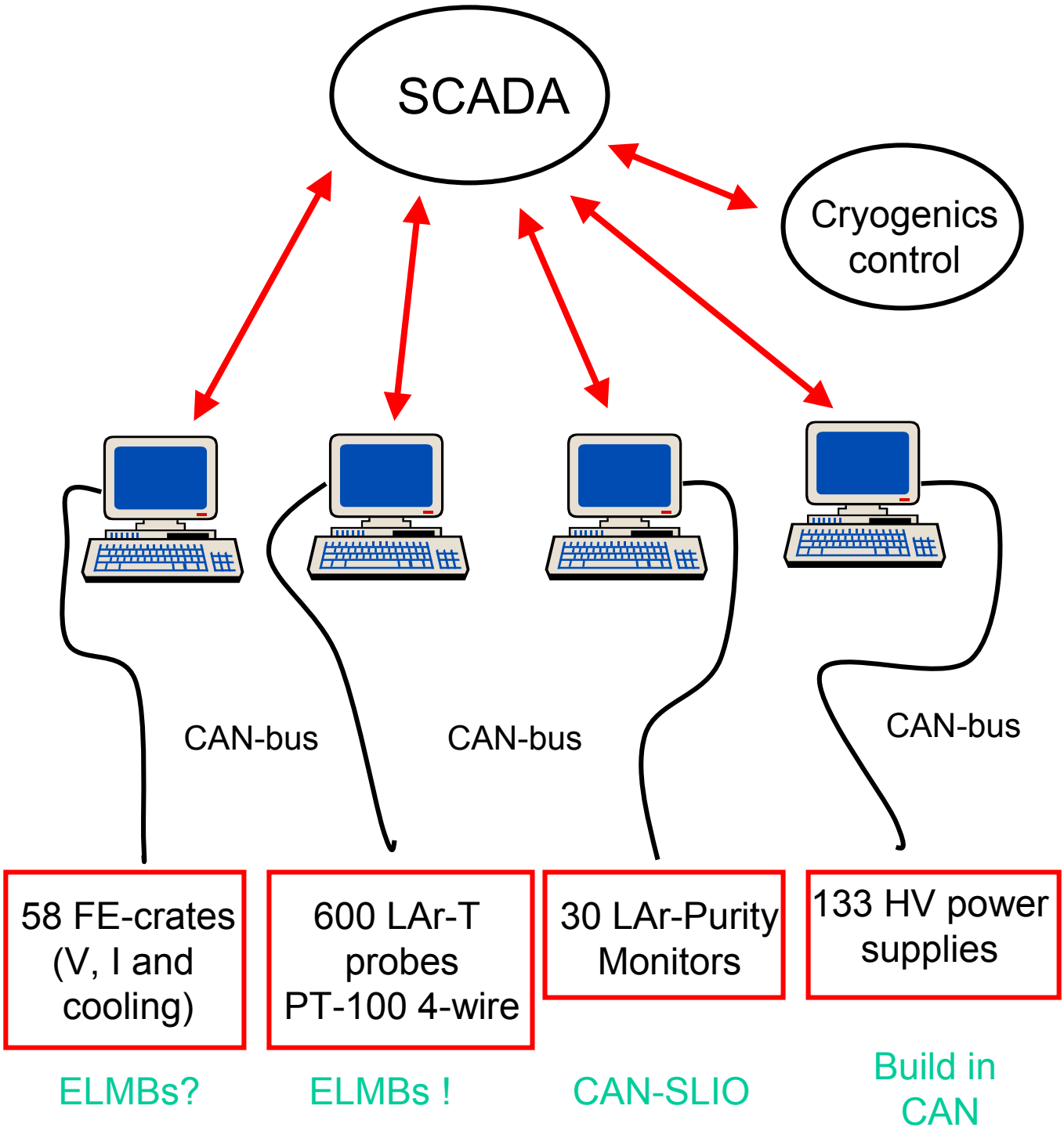
Slow Control Components

- HV-Moduls w/ CAN-Bus interface
- Temperature Probes (ELMB) inside the cryostats:
  ca. 600 PT-100 with 4-wire readout
- LAr Purity Monitors (CAN-BUS)
- Front-End Crate Monitoring (partially w/ ELMB)
- Front-End-Board Control (SPAC)
- Monitoring of other electronics boards?
- Cryostat/Cryogenics Control and Monitoring
  Standalone system not in DCS, but exchange of information needed !

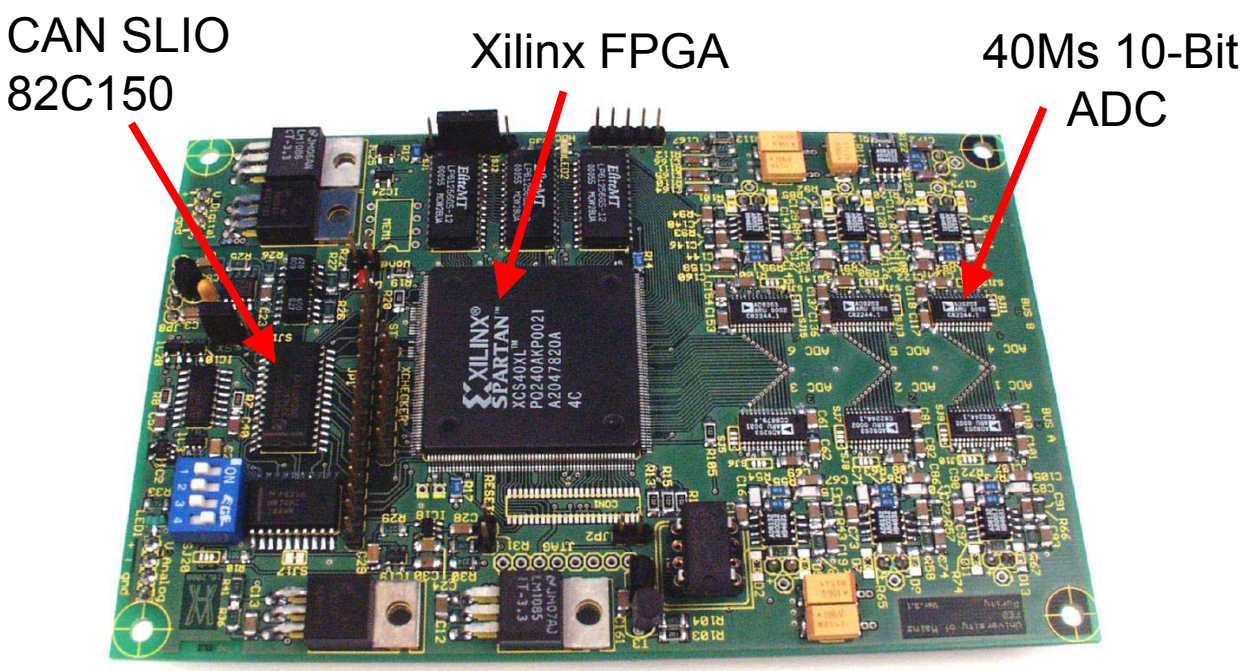
LAr Calorimeter DCS



+ crate/rack monitoring in UX-15 and USA-15

LArg Purity Monitor

- Total 30 Monitors distributed over the the 3 cryostats
- Radioactive Sources ionize LAr (Signal: ca. 4fC)
- Cold Amplifier provides 1mV/fC @ 50Ω
- Signal is driven differentially to DAQ board (ca. 30m)
- Digitization and histograming in Xilinx FPGA
  50 MB/sec data rate
- Histogram transfer to computer via CAN-Bus
- Analysis performed on receiving computer
- Result made available via OPC-server



Front-End Crate Monitoring

Monitoring in each crate of

- 6 Voltages and currents
- Temperature measurement of cooling water (ca. 6 probes)
- Monitoring of cooling system w/ flow meters

Automatic feed-back to crate control needed

→ switch off crate if cooling fails or voltage/current out of range

Not clear yet how this will be done, but ELMB is a candidate

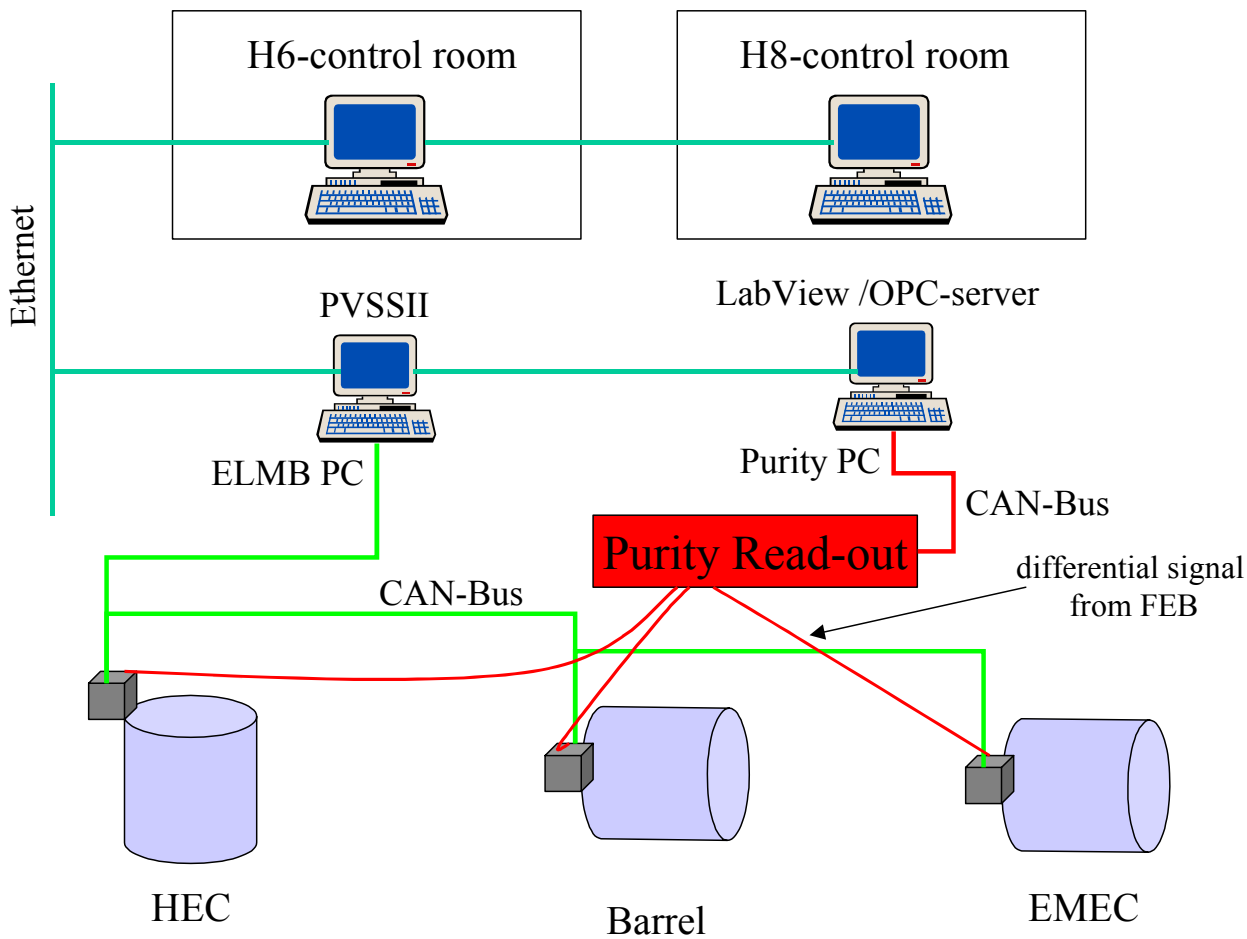
Testbeam Status

Testbeam area consists of three cryostats with

- one FE-crate and one purity monitor per cryostat
- one PC to read-out three ELMBs (FE-crate (V, cooling) and PT-100 4-wire T-probes inside of cryostats)
- one PC to run LAr Purity Monitors

Software

- PVSSII implementation nearly done (will be tested during october testbeam run of barrel calorimeter)
- Full implementation for all three cryostats by next spring



Experience with Hard- and Software

ELMB

- Up to now no problem with the operation
- No experience with performance and stability yet (october testbeam)
- Functionality seems to be ok for our needs

PVSSII

Two russian colleagues (Elena and Iouri Sedykh) are working on the testbeam implementation. Their experience:

- Functionality seems to be ok
- Relatively slow (especially the data base)
- Programming language is a bit limited (not C++)

More to come after October testbeam ...

What we would need !

Hardware: ELMB

- Happy with functionality of ELMB!

Software: ELMB & PVSS II

- General concept how to organize a lot of channels in PVSS II in order to have a flexible and easy maintainable system (e.g. how to add new channels w/o having to re-write a lot of code, like calibration of PT-100 sensors). External configuration files? Scripts to generate code?
- Data-base needed to store history to be displayed and which can be used to export and analyze data easily. Is the PVSS data-base suitable for this?
  First quick look by I.Sedykh was not very positve!

Plans for 2002

- Get all three testbeam cryostats into current PVSS II implementation. Export appropriate data to the different counting houses (distribute system over 3 or 4 PCs)
- Add more channels (will possibly need a few more ELMBs)
- Integrate LAr Purity Monitors into SCADA system

ELMB needs in ATLAS

- 58 ELMBs for FE-crates
- 12 ELMBs for high precision temperature probes inside the cryotats