TRT DAQ
Status and plans

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for the DAQ team

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Outline - Getting ready for run 2

After a successful run 1,
the TRT DAQ group is getting
ready for run 2

Covered in this talk:

1. **Manpower**
2. **Hardware maintenance/upgrades**
3. **Firmware upgrades**
4. **Software upgrades**
5. **Studies of radiation damage**

1. Manpower

At CERN:

- Sarah Heim
- Ximo Poveda

Need more CERN-based manpower in the future!

Remote experts:

- Jon Stahlman
- Jamie Saxon
- Paul Keener
- Mitch Newcomer
- Mike Reilly
- Brig Williams
- Colin Gay

Experts in training (not fully at Cern yet):

- Bijan Haney
- Khilesh Mistry
- Jared Vasquez

2. Hardware: Maratons
(power supplies for front-ends/patch panels)

Currently in the process of a rolling upgrade (always have fully functioning system in the pit), sending the maratons to the company (Wiener) in bunches of 4:

- gold plating of connectors for better voltage stability

- wire replacements

- **higher resistance found than expected**
- **assumed cause: corrosion**
- **however most recent tests by CERN electronics group show that the wire replacement probably does not fully fix the issue**

- general tests

- need 4 more shipments (usually ~3 months turn-around)

- 2 maratons that were sent in should be used as spares in the future (as they did not pass 1 of 10 high voltage isolation tests)

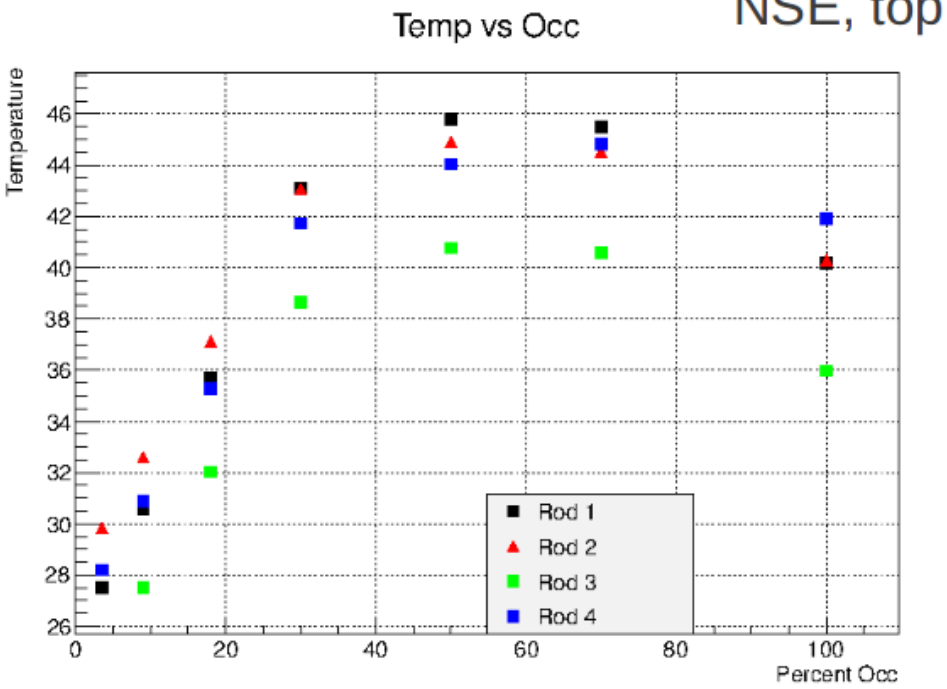
2. Hardware: crates/racks in USA15

- crate power supplies *done*
  - fan upgrade
  - current limit was increased for 5V line for end cap power supplies (possible cause for increase of resyncs in 2012 could be power fluctuations, as the current approached the recommended limit)

- temperature checks on ROD chips
  - showed no critical values in stress tests

- rack turbine update

  will be done next year



Temperature vs detector occupancy measured on the compression chip

Table of spares

	ROD	TTC	ROD PP	TTC PP	LVPP WA	LVPP WB
Number of spares	1 (+3)	9	12	7	>4	>8

- this summer, Mike Reilly and Khilesh Mistry repaired 3 RODs for us (still need to be tested in full readout)

- patch panel repair campaign foreseen (by Cracow)

Current system:

- in a functioning state (did a noise run last Friday)

- two patch panels should be replaced (high current in WA board, one broken patch panel)

- one hardware interlock board is broken

- issues with two RODs (no firmware upload possible)

Tackling Front-end – ROD bandwidth — *implemented/ tested*

- 23 bit reduced readout (chop off last 4 of 27 data bits)

Tackling ROD processing limit (dominated by compression speed)

- validity gate — *implemented/ tested*
  - straw considered empty if no signal in certain time window
  - Goal: reduce occupancy

  (at 100 kHz, ROD must process 192M straw words/sec, meaning ROD can handle occupancies up to ~50%)
  - looser than offline, exact gate to be determined
- increasing clock speed on compression chip — *to be done*
- hard-coding most common words for compression table — *to be done*

ROD-ROS bandwidth

- not limiting factor thanks to compression

New features

- switch to reduced readout
- validity gate
- switch between Ar/Xe shaping

---> all done, should add reduced readout switch to oks

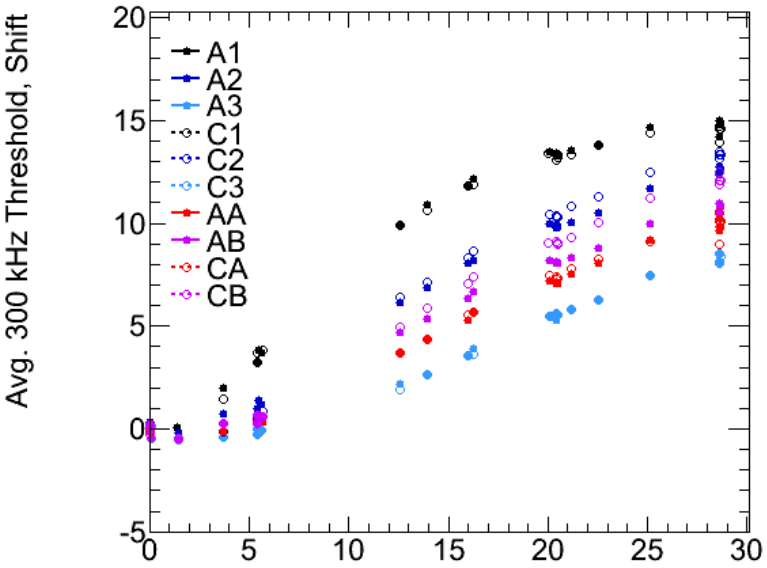
Upgrades

- update to new TDAQ release when available (scheduled for January)
- upgrade to SLC6
- possible change from CMT to HWAF

(no definite plans/documentation yet)

---> not done yet, following TDAQ schedule

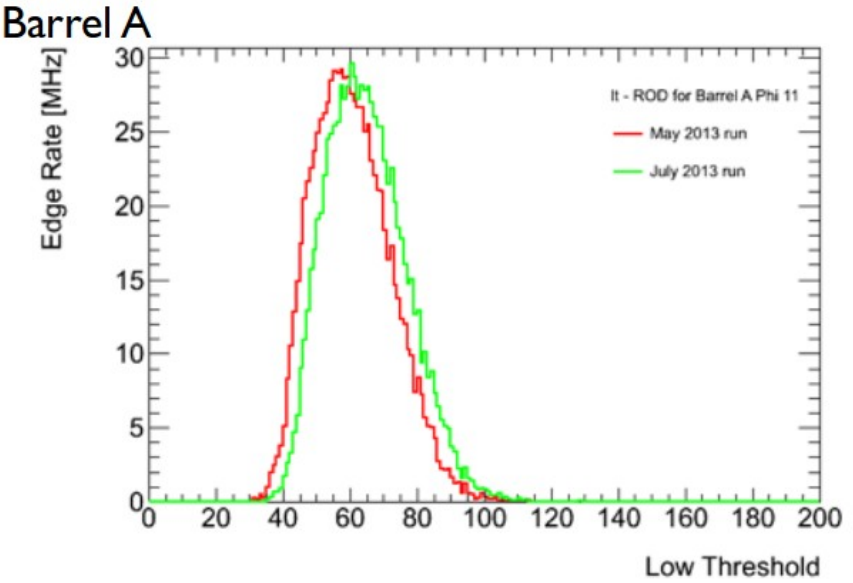
- radiation effects visible at lower total ionizing doses than expected
- can be seen in calibration scans and high threshold ration efficiencies
- flattening out



Did we miss initial radiation effects?

- new radiation tests of ASDBLR board
  in progress: lower rates, lower doses

- additional, abrupt threshold shift
  for noise/test pulse rates seen
  in calibration scans between May and July
  - not due to reduced readout
  - changed detector conditions?
  - not understood yet



Conclusions

- work well underway:
  - system maintenance
  - system upgrades
  - investigations of radiation damage

- ROD 100 kHz processing rate highest priority
  - Colin (our ROD firmware expert) will probably come to CERN in November
  - Ideally we will be able to run at 100 kHz for the second milestone run (end of March)

- documentation in the process of being migrated to central TRT documentation svn area, need to look for undocumented areas (but fairly complete and up-to-date twiki)

- need more manpower at CERN