Tools developed for the SLAC test of the FTOF prototype

L. Burmistrov, N. Arnaud

3nd SuperB Collaboration Meeting @ INFN-LNF

Outlook

→ SLAC test of the FTOF detector (short reminder)

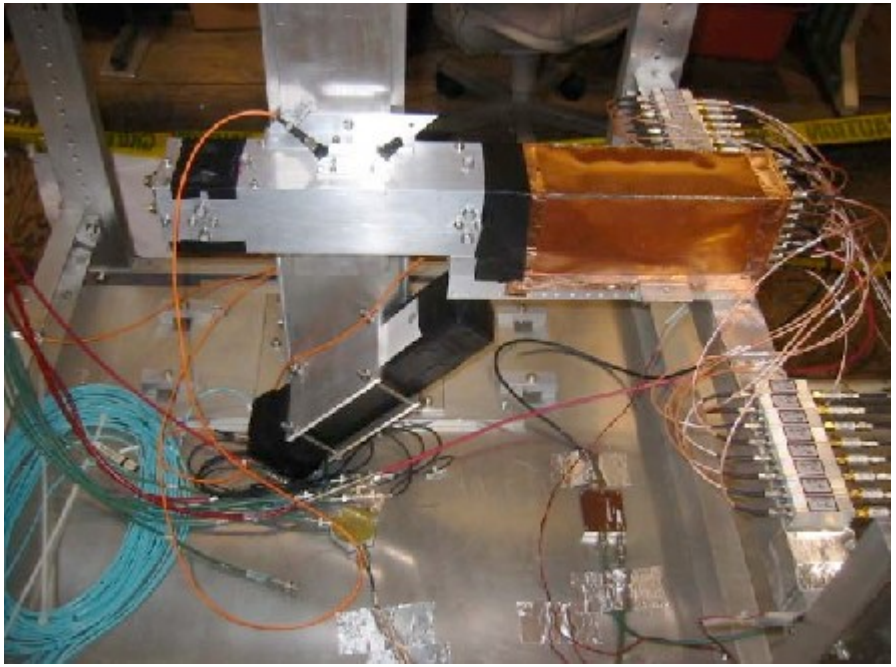
→ DST2 to root converter

“Online” CRT data quality monitor

Cosmic ray generator

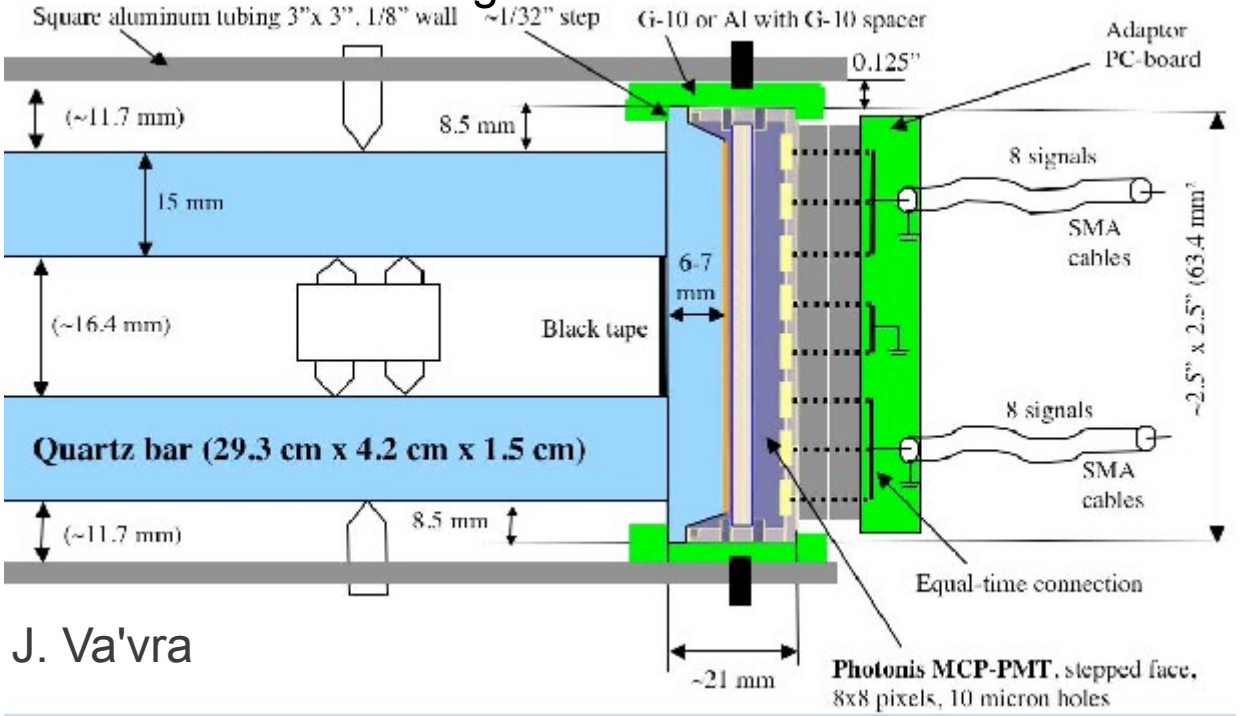
→ Conclusions

SLAC test of the FTOF prototype (short reminder)

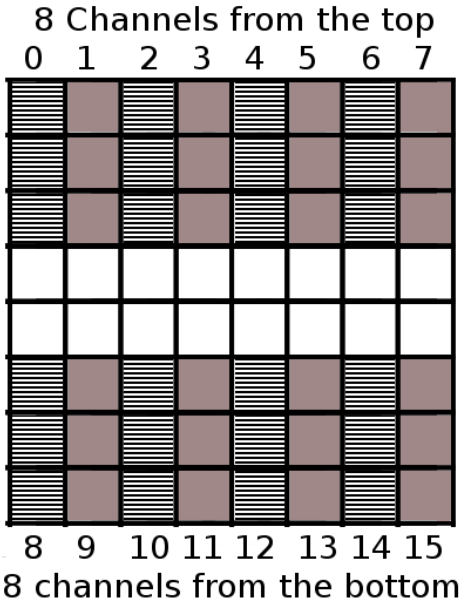


- Two quartz bars connected to one Photonis MCP-PMT (8x8 channels, stepped face, 10 micron holes).
- Tube operate at -2.7kV (gain ~ 7.0×10^5).
- 16 channels connected to the USBWC electronics developed by LAL and CEA/IRFU electronics team.
- Amplifiers (40dB).
- Filters (600MHz bandwidth).
- Installed at SLAC CRT in Fall 2010.

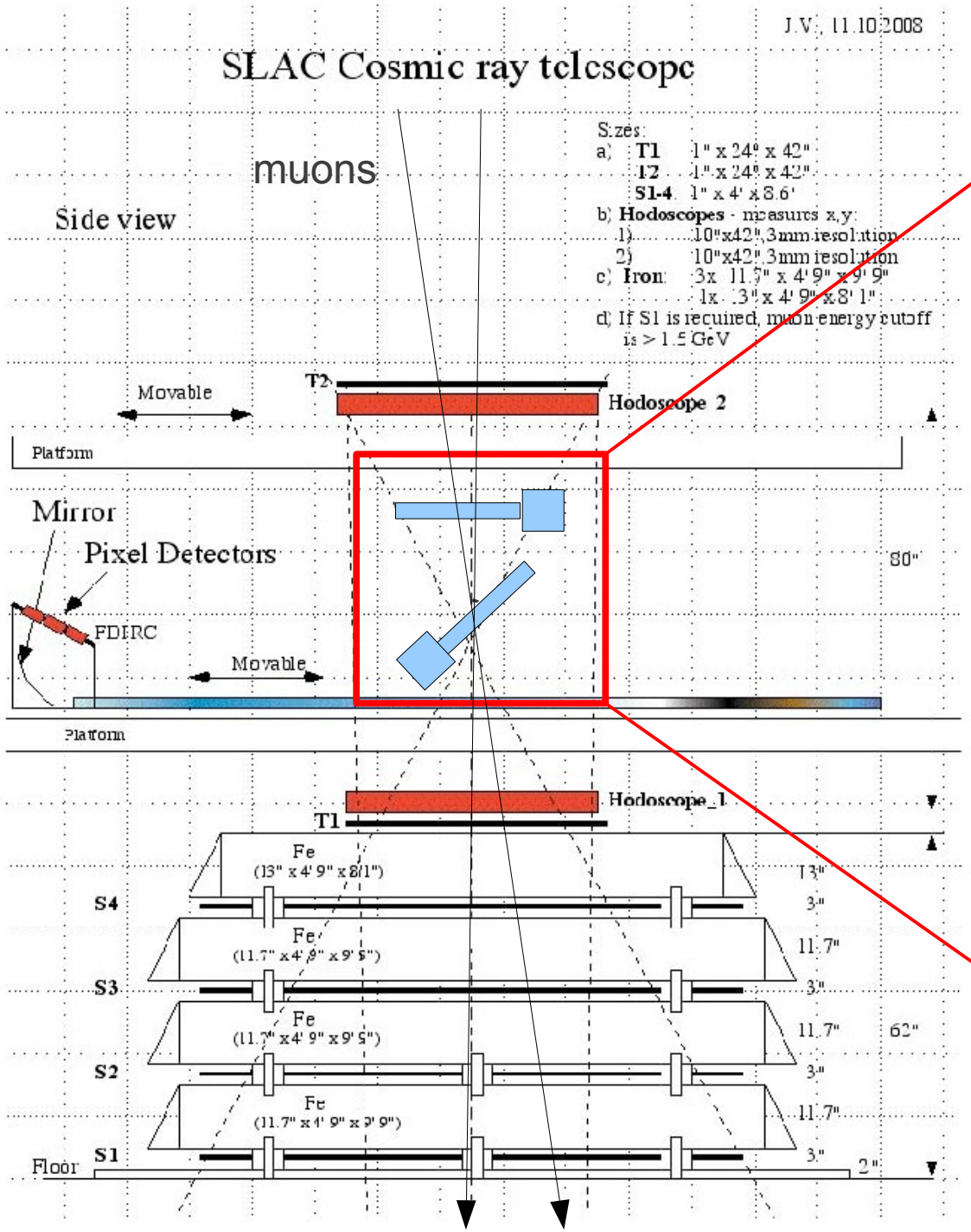
Schematic drawing of the FTOF

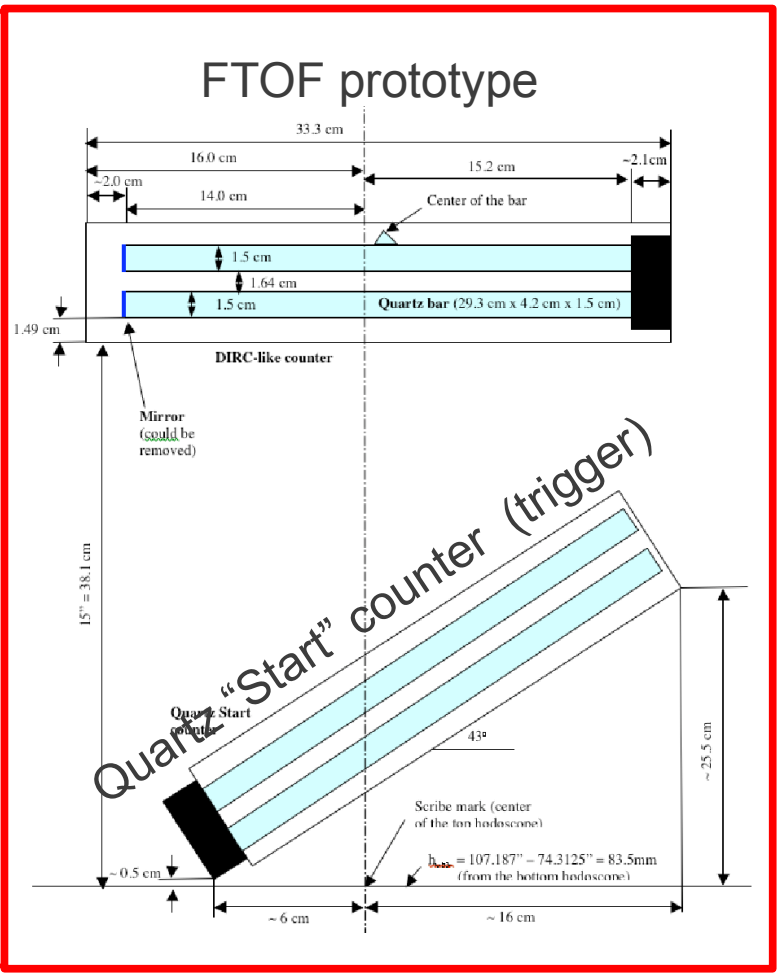


MCP-PMT pixel map



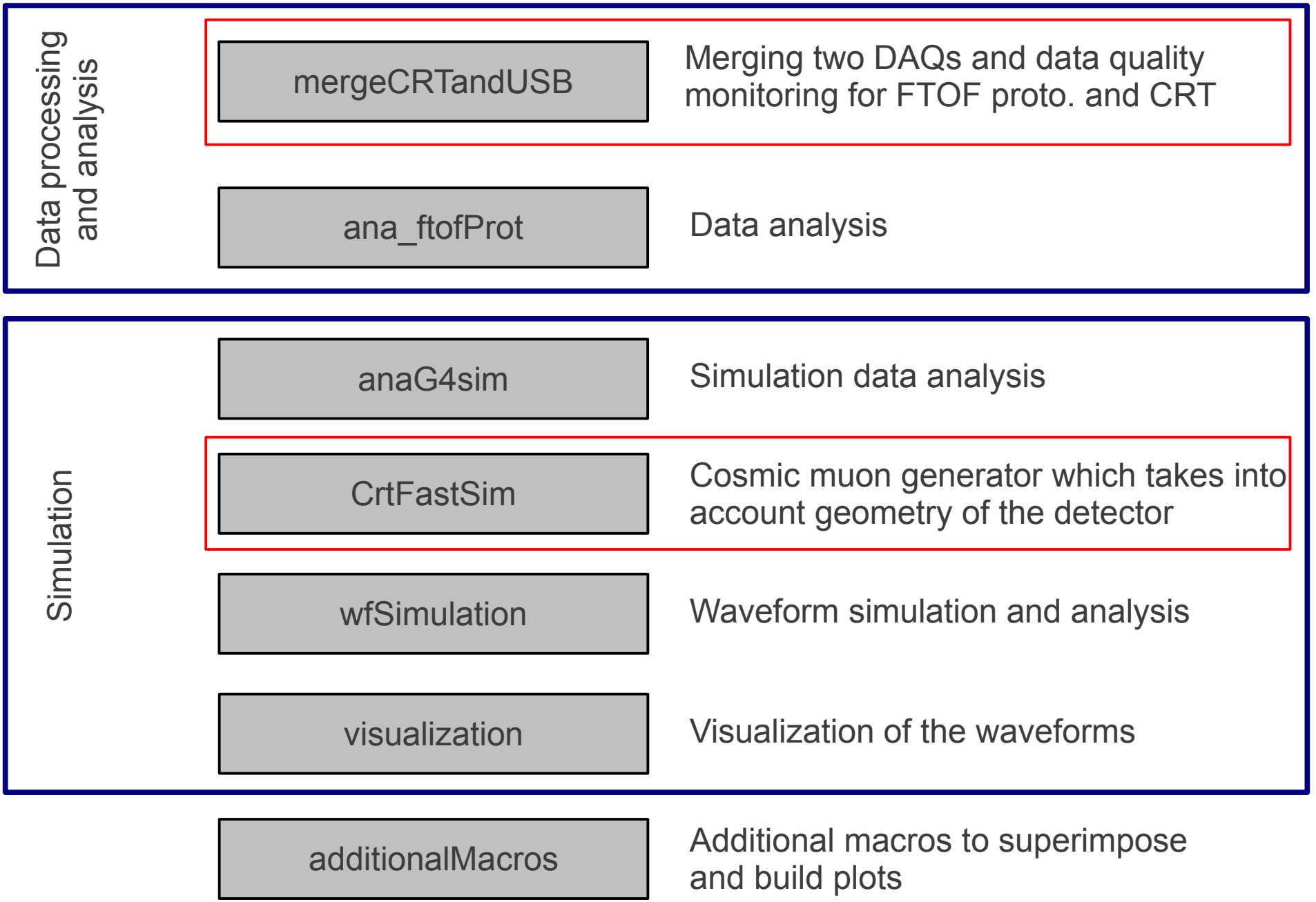
SLAC test of the FTOF prototype (short reminder)





Test run until Spring 2011

Software organization for SLAC test of the FTOF



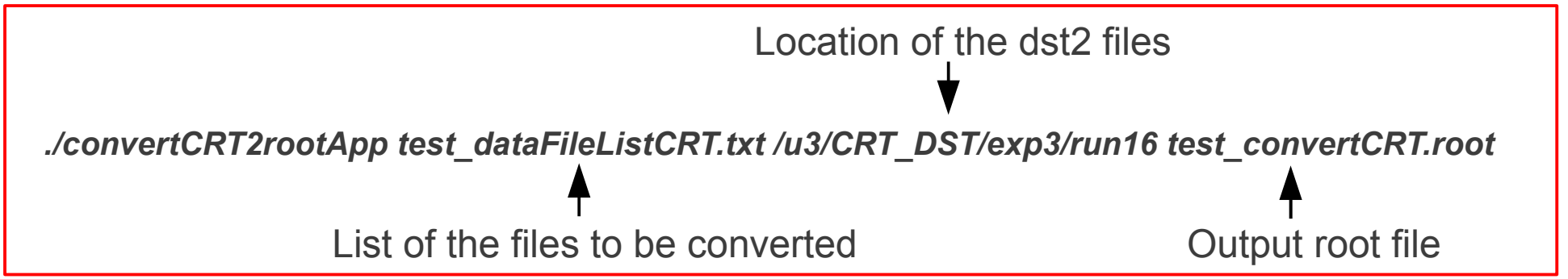
DST2 to root converter

- All the TDCs and ADCs which readout the information from the CRT subsystems are stored in ASCII format in files with extension .dst2.
- Each file contains 1000 triggers.
- Twice every day (the frequency at which the dst2 files were updated by Kurtis) we converted all new dst2 files in ROOT format.
  - This format is needed for the data analysis framework which is ROOT-based as well.
  - It reduce the size of the files by factor of 7-10.

---

convertCRT2root.cc

Example of use



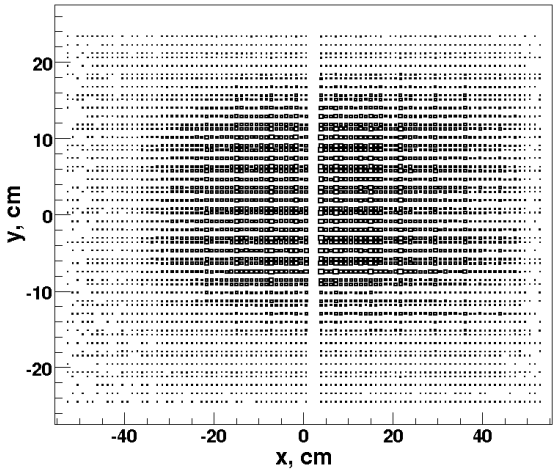
“Online” CRT data quality monitor

From README file (written by Nicolas):

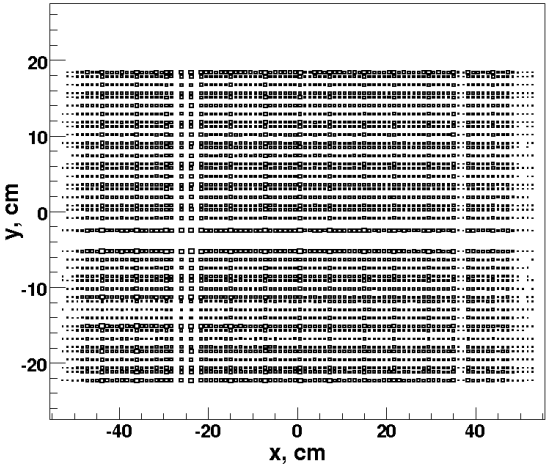
Cron job run automatically on the klong machine twice a day to process automatically the new DST2 CRT ASCII files.

In a second step (automated as well), a program: mergeCRTandUSB/crtDataTest.cpp is run to produce data quality plots which are stored in an area visible from the web. E-mails are finally sent to let users know that new QA plots are available

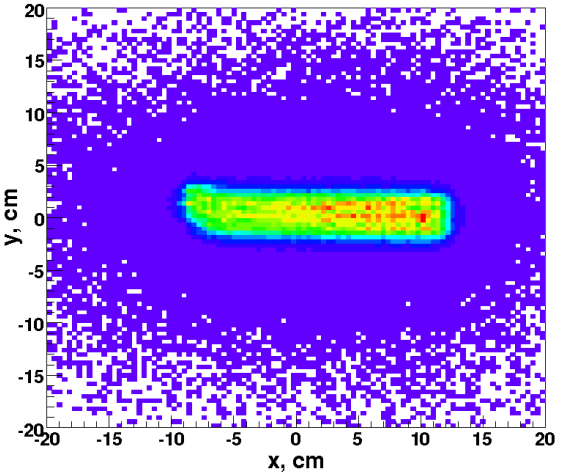
→ Bottom hodoscope



Top hodoscope



Start quartz counter

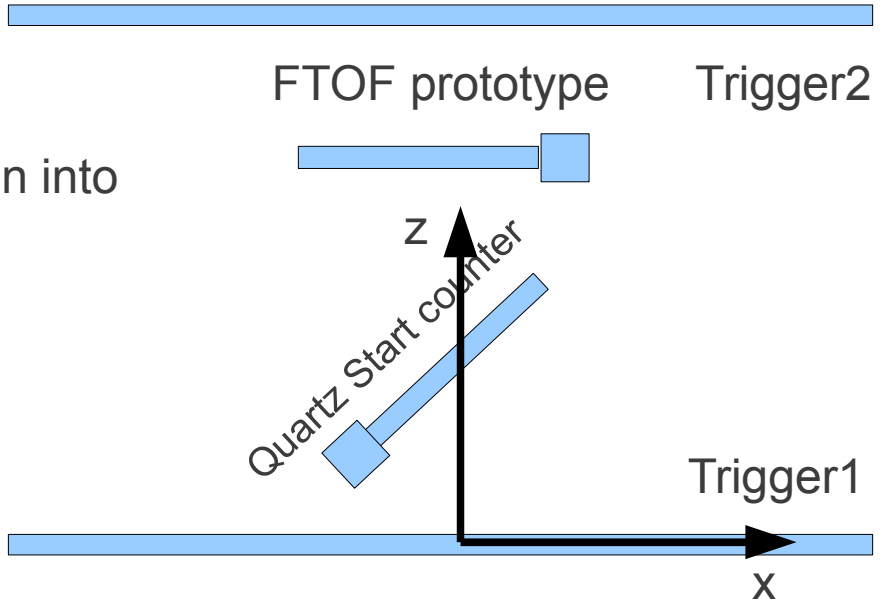


→ Efficiency of the muon reconstruction

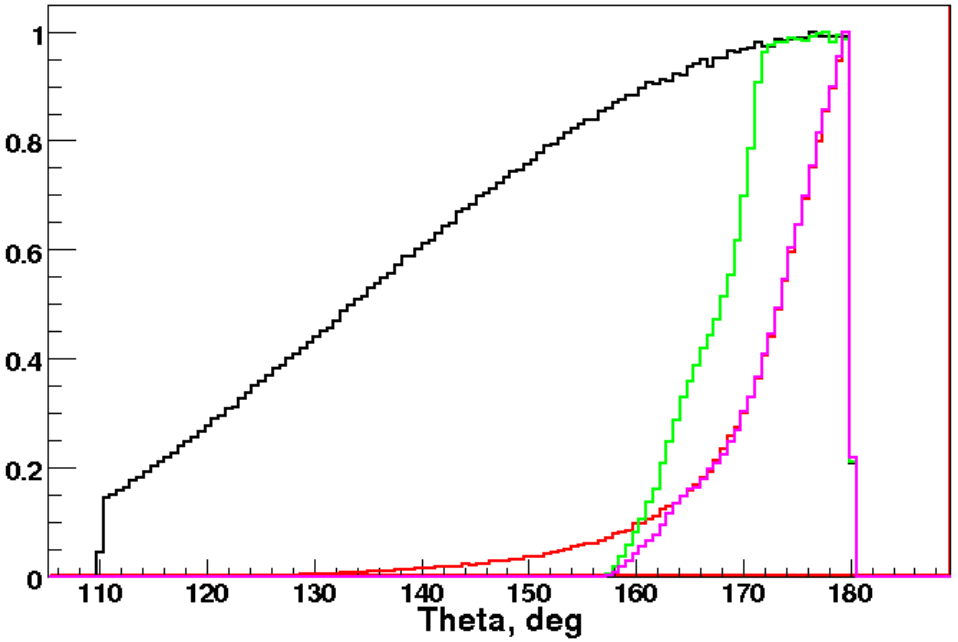
This tool was very efficient to catch hardware problems in the CRT during the data taking period.

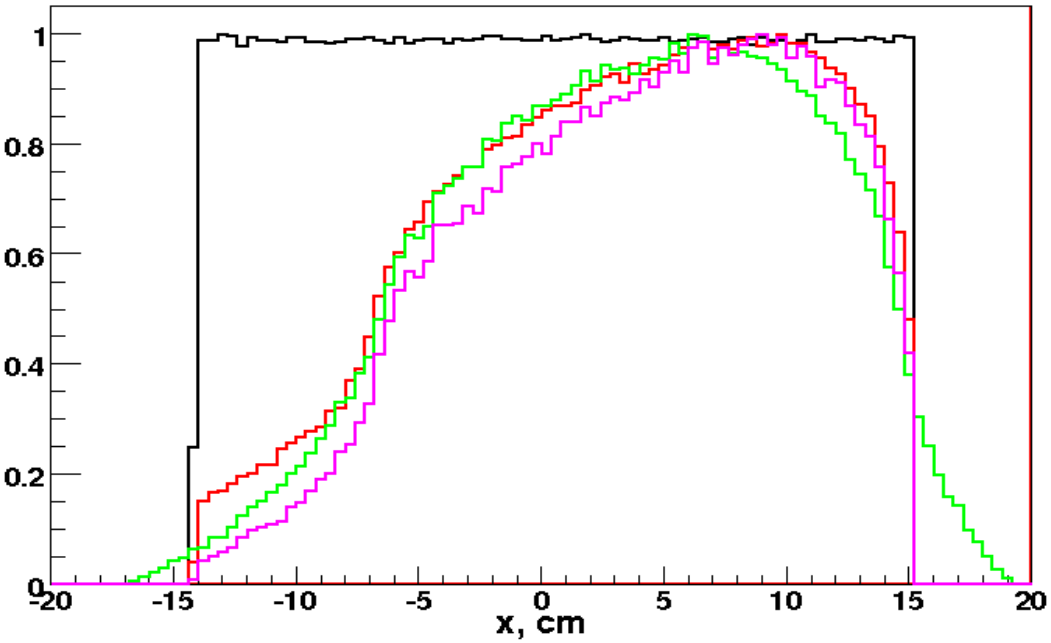
Cosmic ray generator

- $dN/d\theta \sim \cos(\theta)^{1.85}$
- ϕ, x, y of the muon have flat distribution
- Position and sizes of detectors were taken into account
- Momentum 1.5 GeV/c



- FTOF proto. only
- Trigger1, Trigger2, Quartz srt.
- Quartz srt. , fTOF
- Trigger1, Trigger2, Quartz srt. , fTOF





Theta and x distribution of the muons entering FTOF prototype

Conclusions

Tools:

- Converter from .DST2 to root
- CRT data quality monitor
- Cosmic muon generator

can be reused for the FDIRC test at SLAC CRT. However changes of the code will need to be done.