

MIDAS: DAQ & Monitoring

HARDWARE
FADC, Master Board, GPS



READOUT
Low level interface with the hardware. Register maps, decoding, etc.

Channel: Trace (t), Trigger (t), threshold, rate, sum



x16

Board: SLT Rate, pattern code



x4

Event: GPS Time stamp, pattern list

DAQ

Main loop → waiting for events

Timers → 1s for background readout; 15min for antenna trigger..

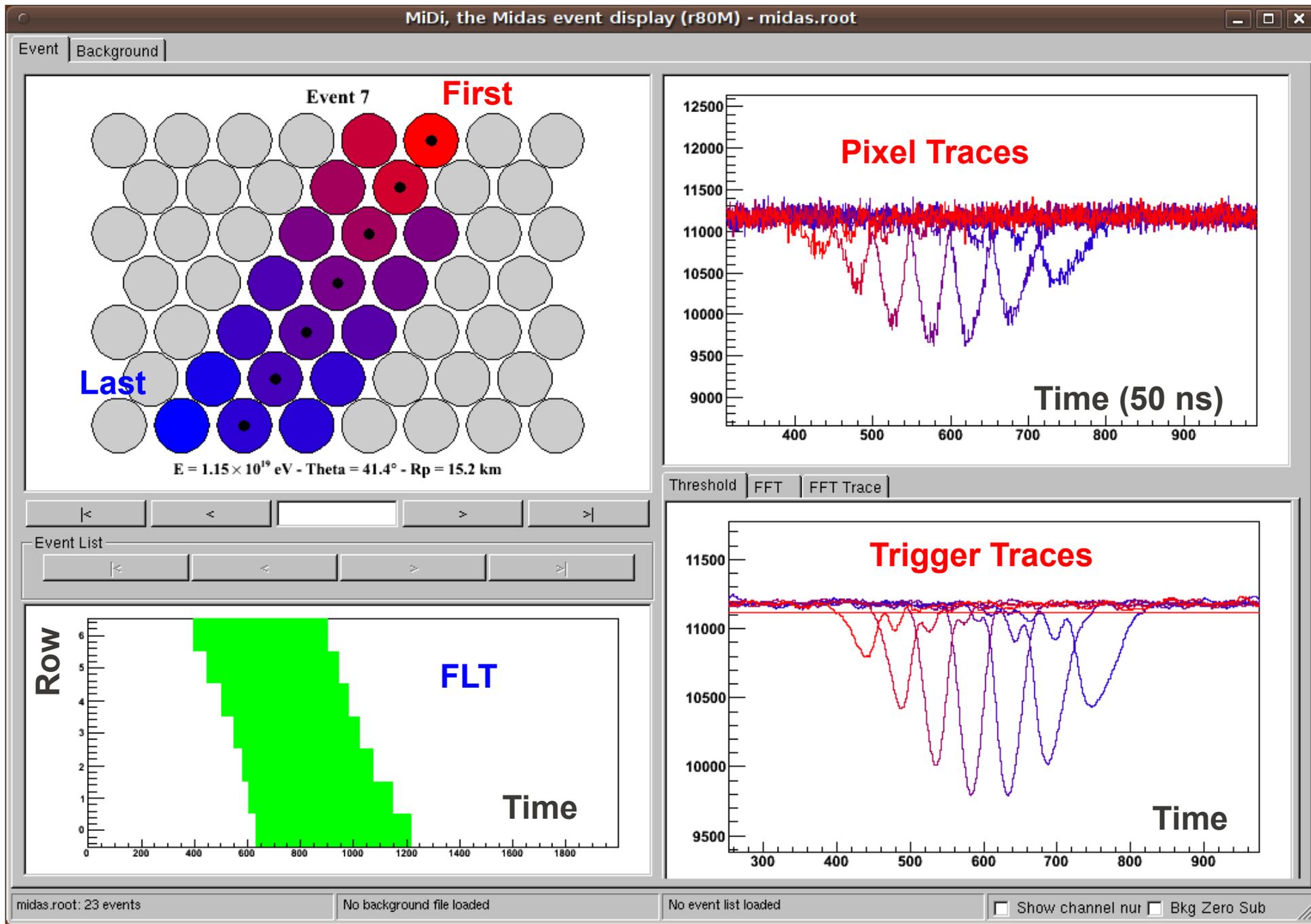
Three data streams (+log file): events, background, calibration events

RUN control

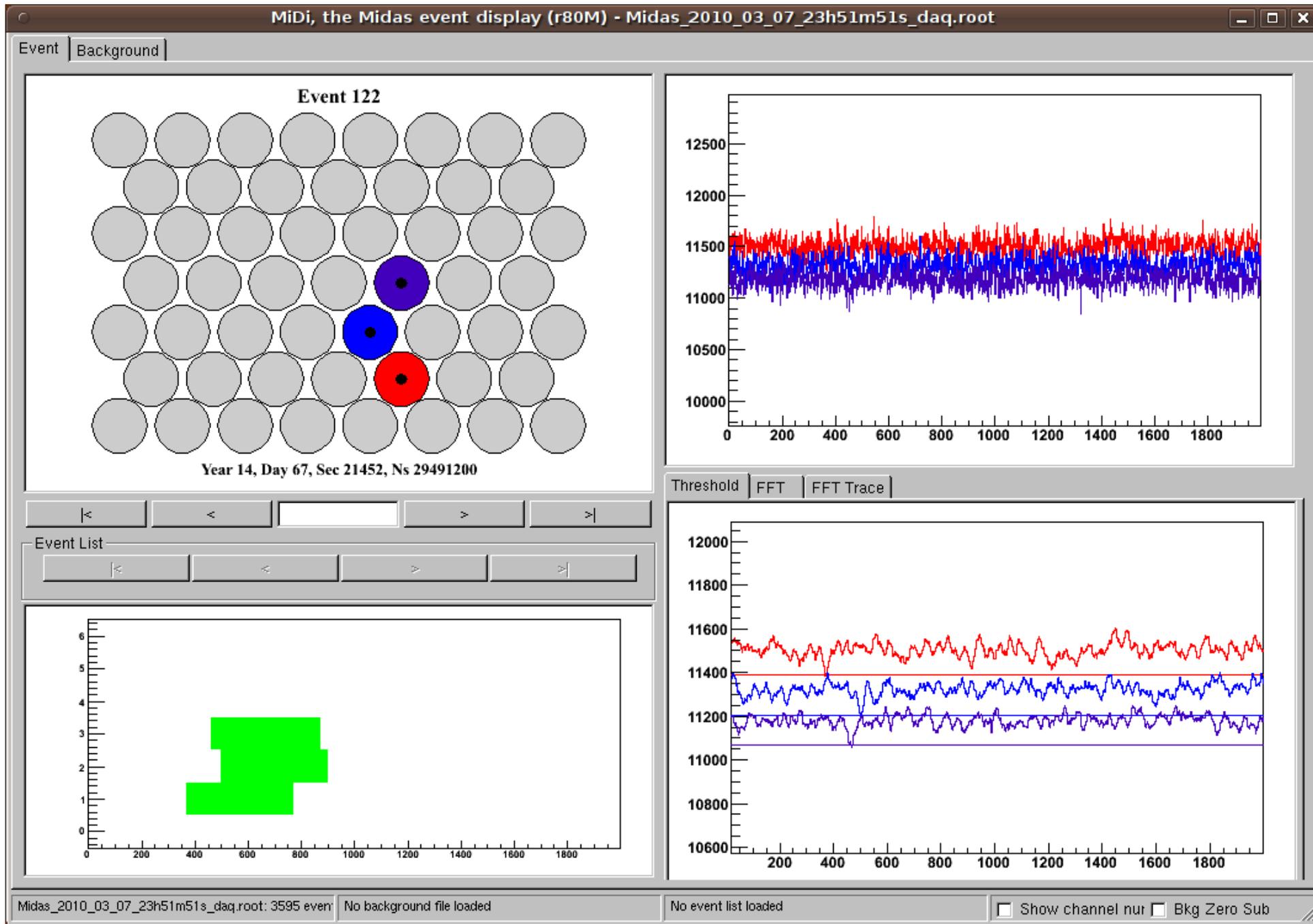
Small program to put start the run in the proper directory, restart the daq every 6 hours, copy the files in a nfs disk.

Plus, routines for hardware initialization (only when crate is restarted): threshold regulation, data transfer (*alignment*) between ADC's and master board

MC Simulated event

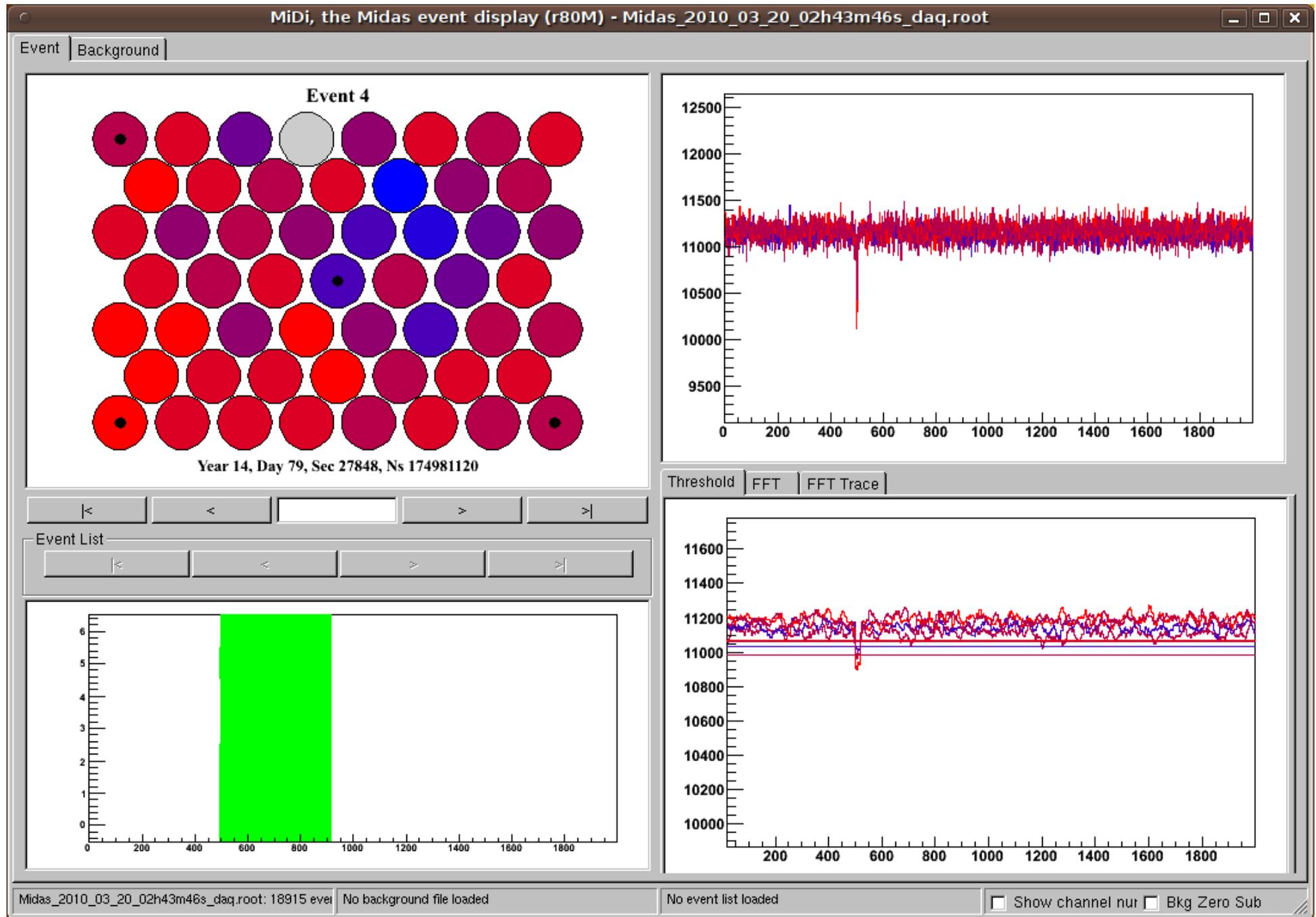


Event (Accidental)

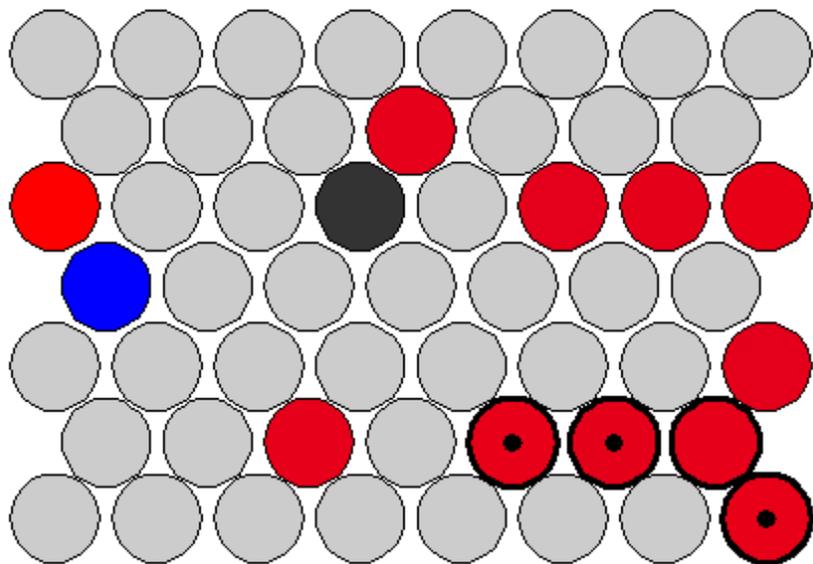


Event / Noise

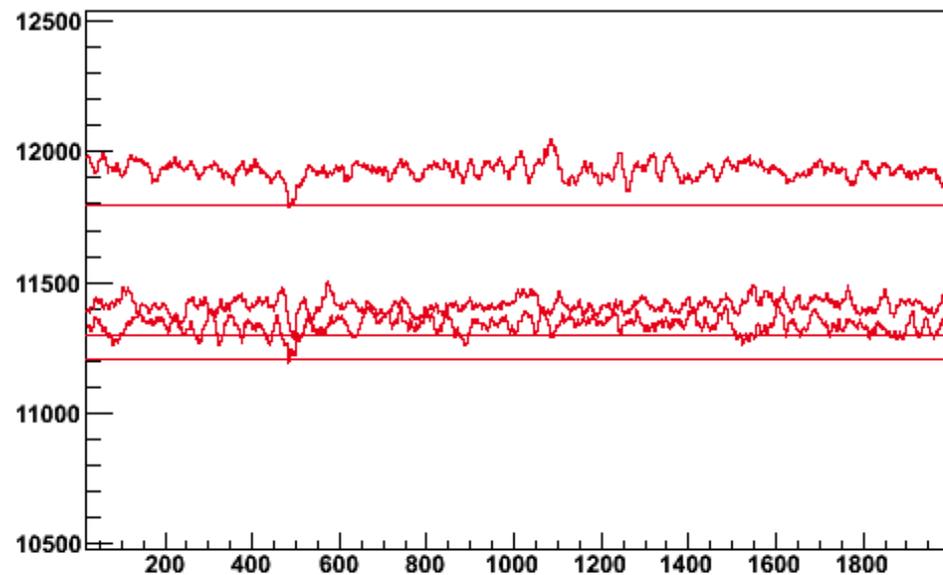
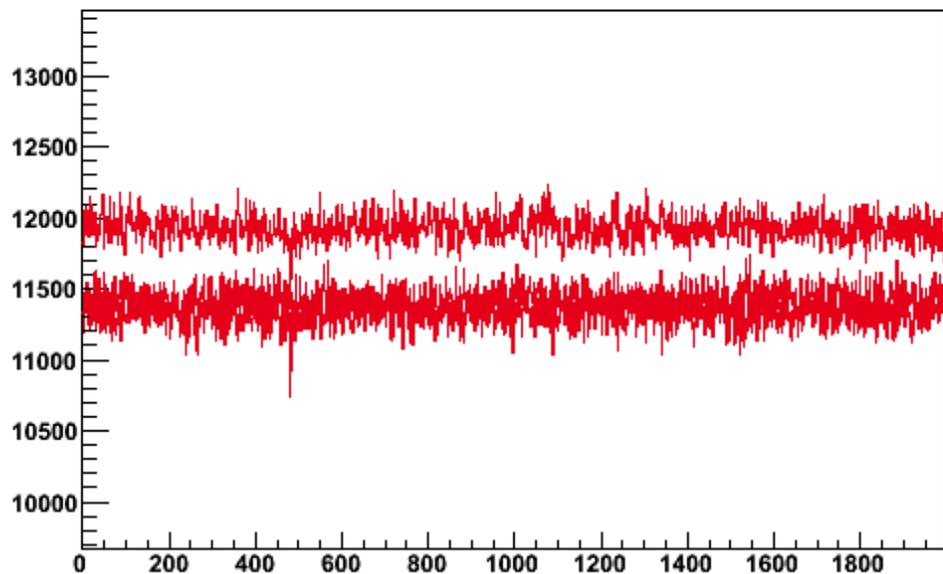
Clear signature, all pulses at the same time.



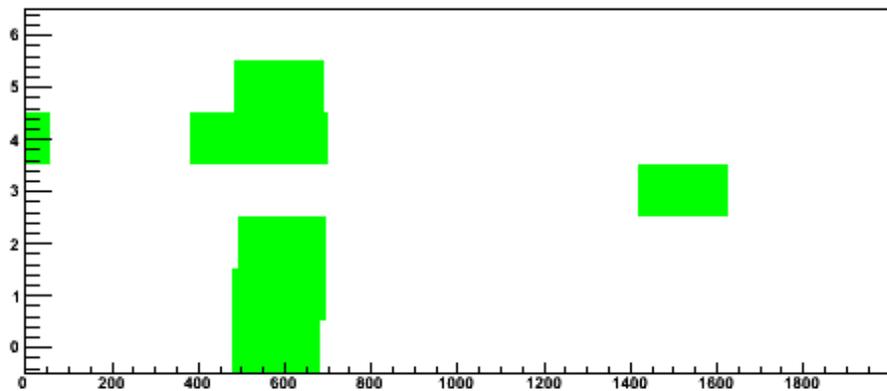
Event 10



Year 14, Day 279, Sec 13262, Ns 479024820



Event List



How to run MIDAS?

Log into daq master

[0. Run a couple of initialization routines, check antenna pointing]

1. Start 'midasrun'

It will take 60 runs of 6 hours i.e. 15 days

2. Log out. Check data in server.

3. After 15 days, GOTO 1.

What can go wrong?

- When running using 'midasrun' daq software is extremely stable.
- We used to have problems with the crate, due to the two extra power supplies (temperature); SOLVED
- Every now and then, specially during thunderstorms, the power supplies for the feeds and the power detectors trip.

“SLOW CONTROL”

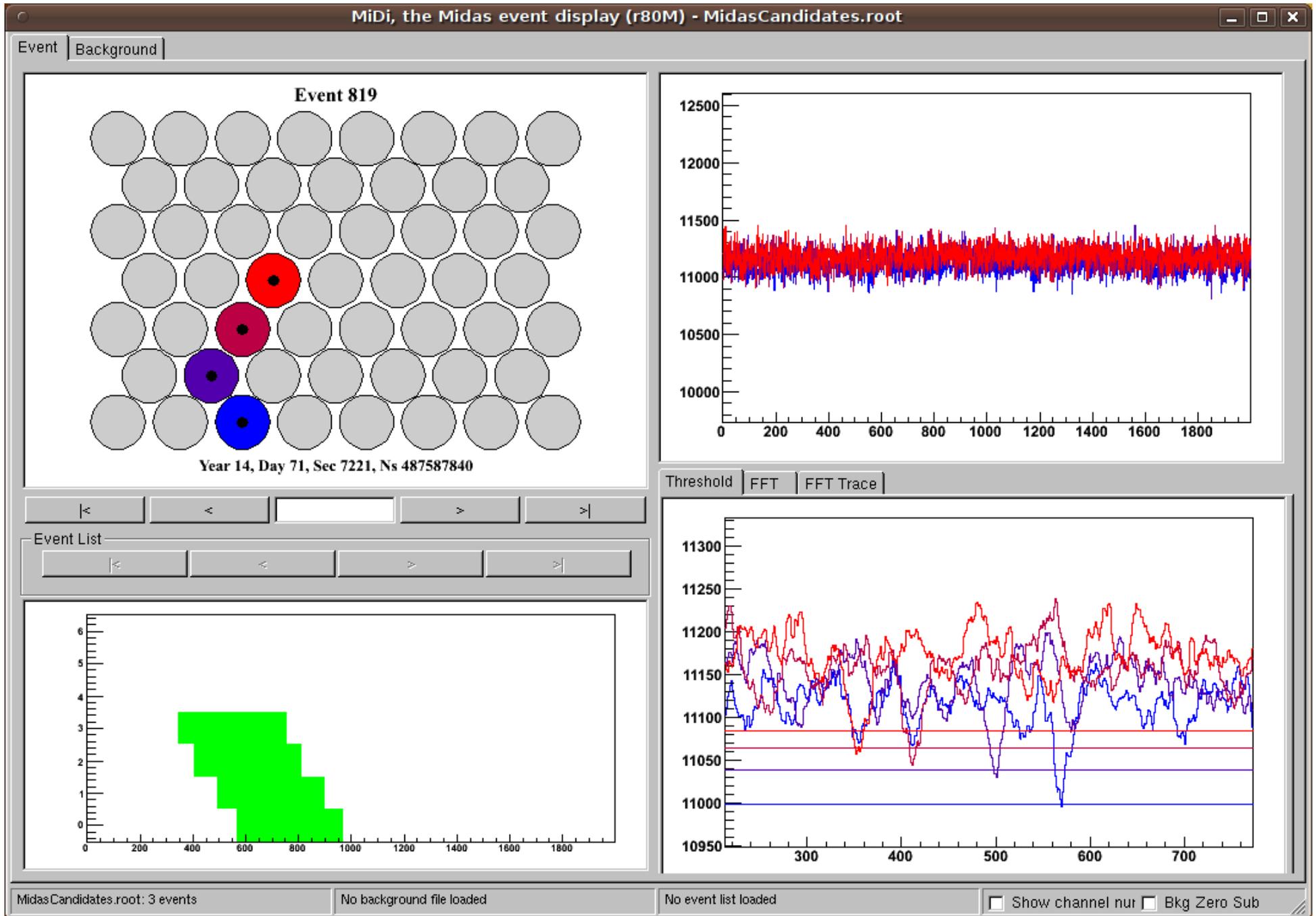
- Power supplies and antenna controller connected to daq master via serial port
- Crate connected via ethernet interface.

Antenna: query position and move.

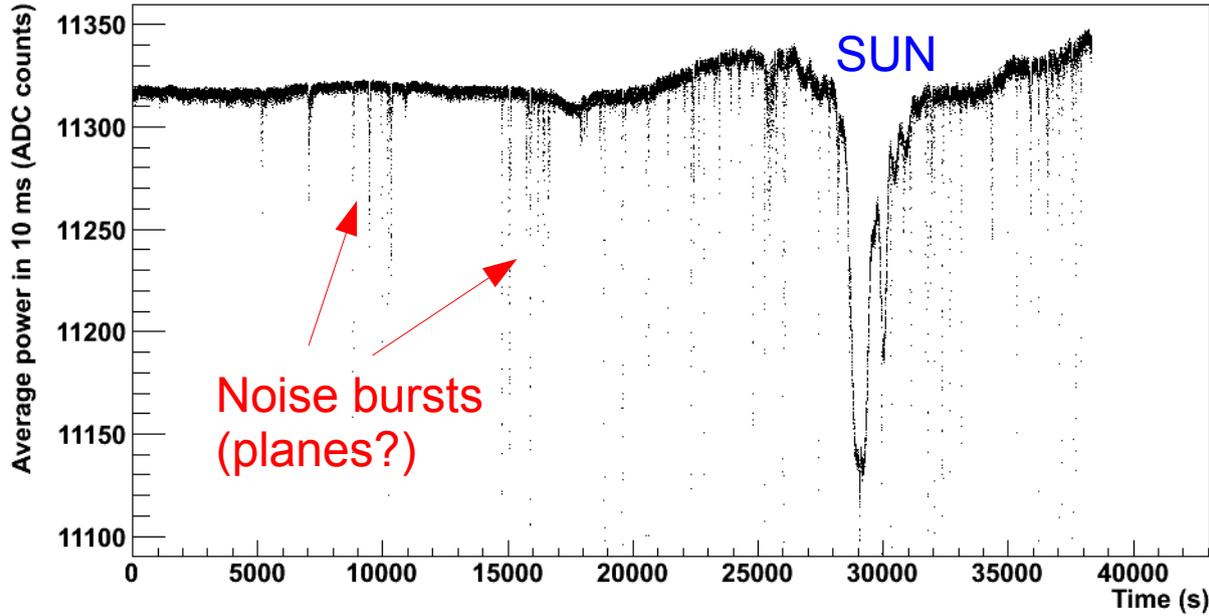
Crate & PS: monitor (voltages, currents, etc.). Power ON/OFF, Reset.

FUTURE: GUI, alarms?, log monitor data?

CANDIDATE

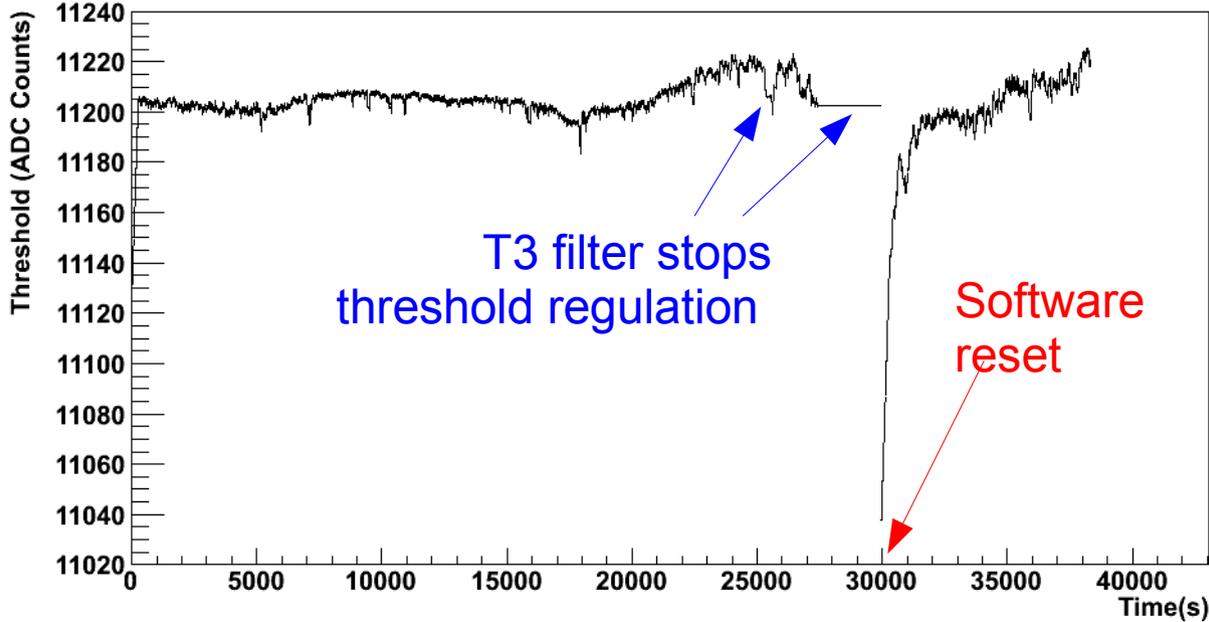


BASELINE

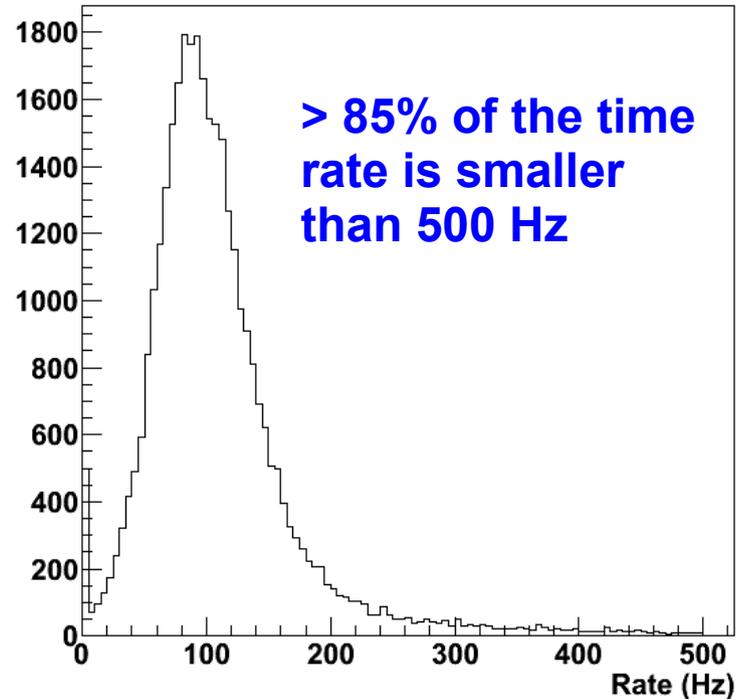


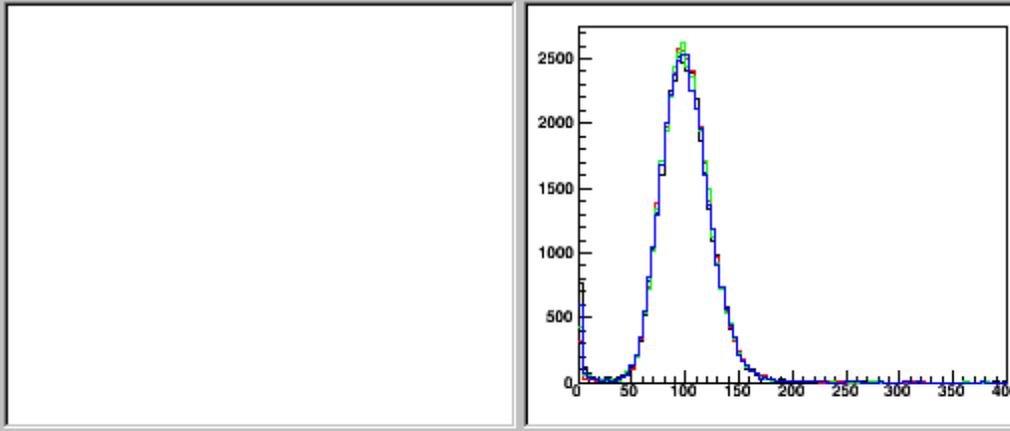
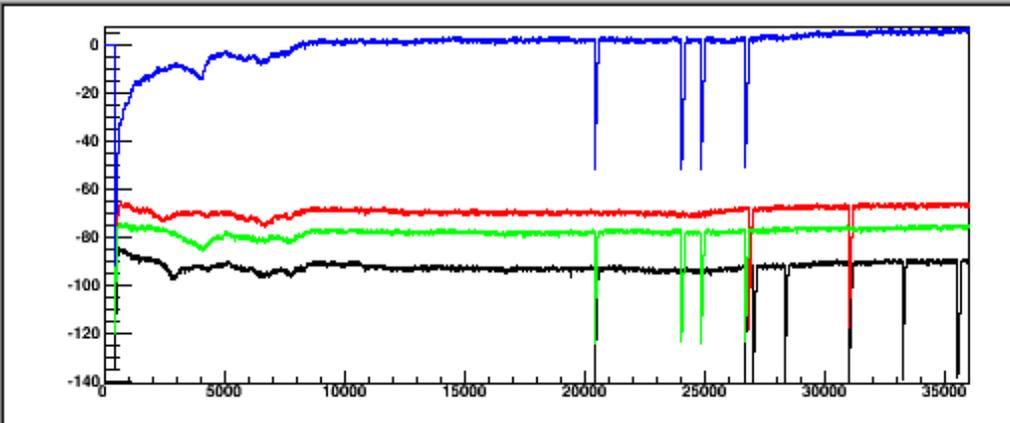
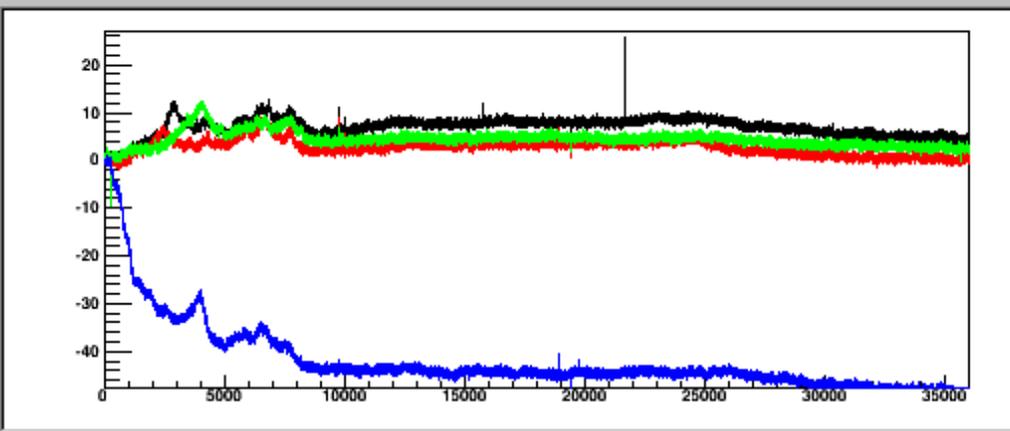
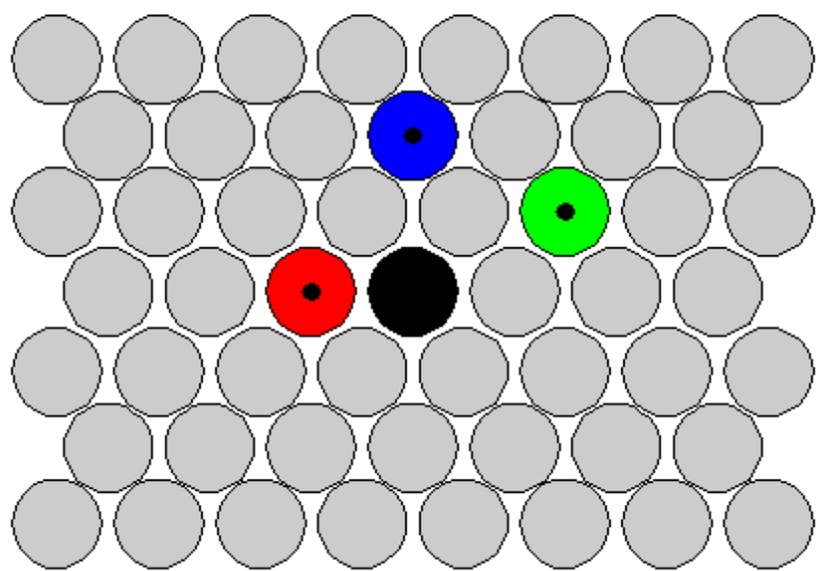
Average baseline (calculated in 10 ms,) threshold and rate recorded every second for detector monitoring.

THRESHOLD

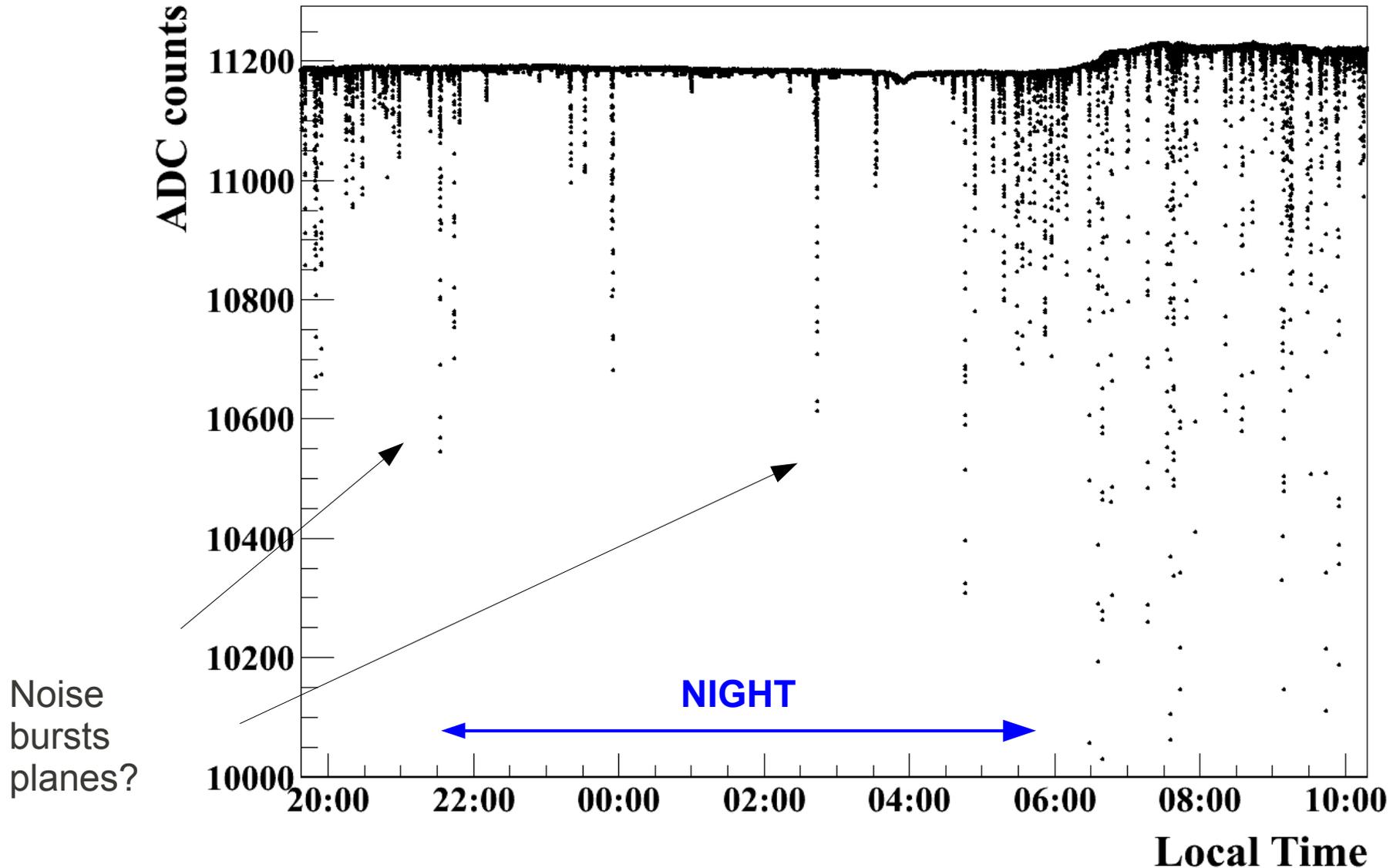


TRIGGER RATE





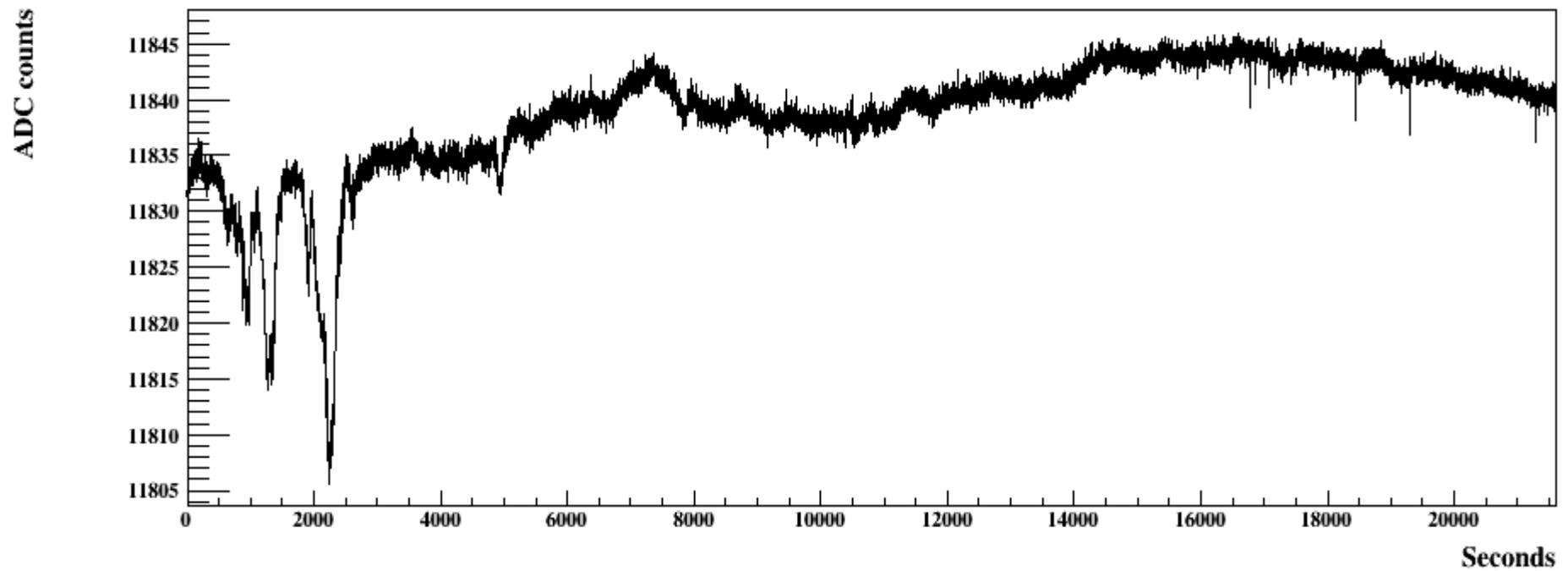
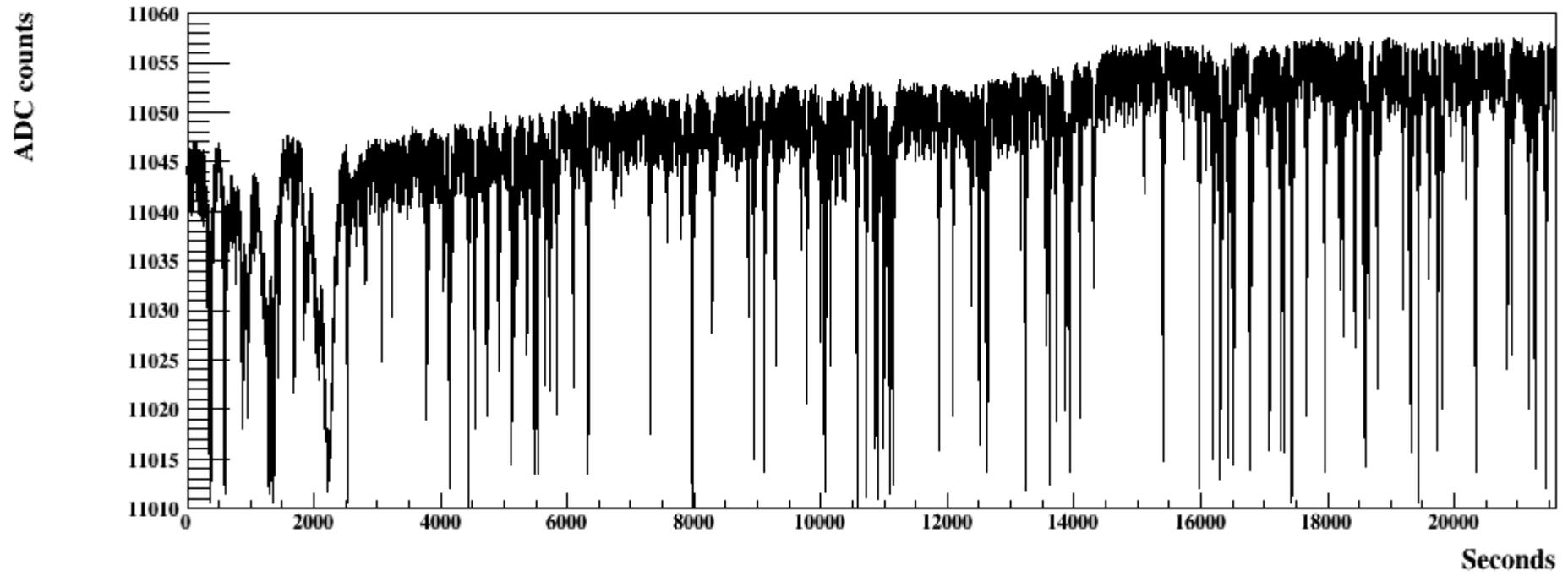
Data taking conditions (one day)



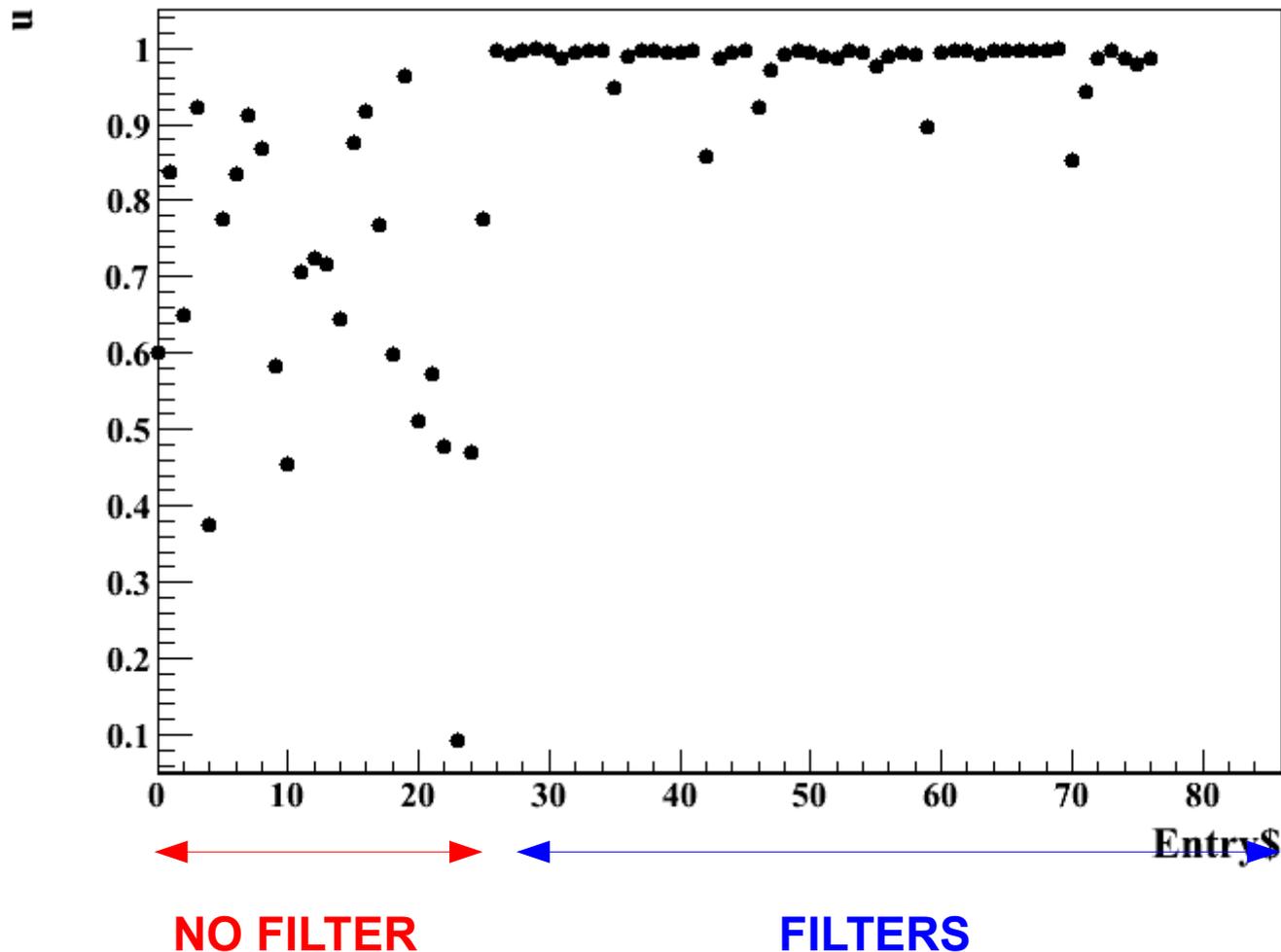
Clean periods (1s latency) between 95% and 50% of the total DAQ time (typical, we had days below 10%)

Event rate ≤ 0.5 Hz [0.2 expected random in the odf trigger configuration]

New band-pass filter

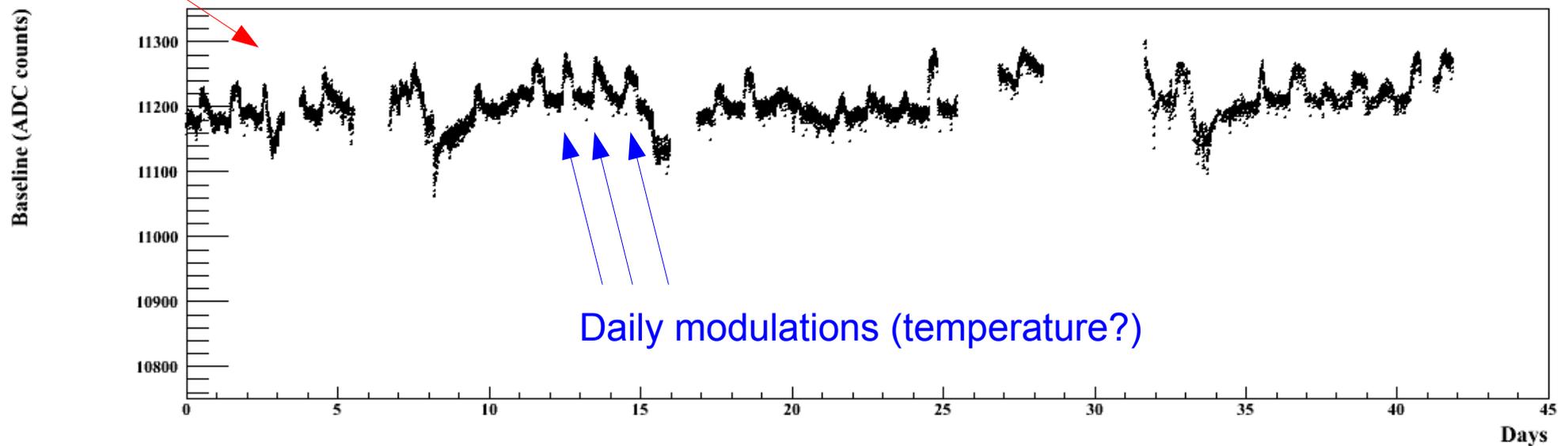
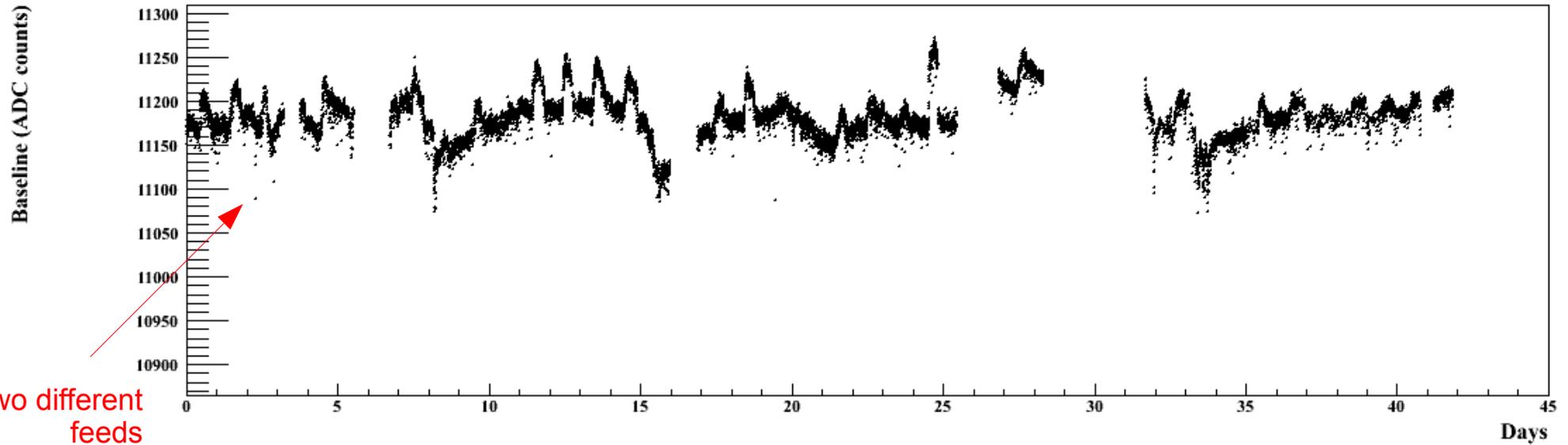


“UPTIME:” fraction of the total DAQ time when can take data (i.e. no veto), calculate from SLT rate in background files



But number of events recorded during run varies between 200 – 20000 (i.e. between 0.01 and 1 Hz). These are not bursts, but pulsed events.
What changes?

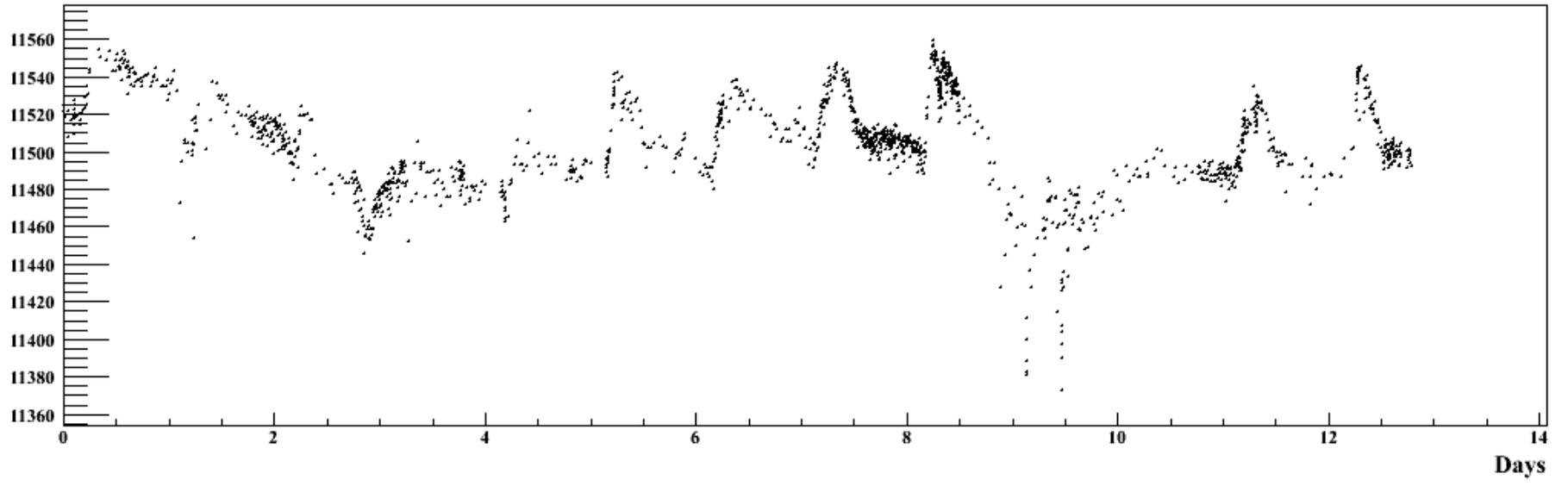
Long term stability (40 days)



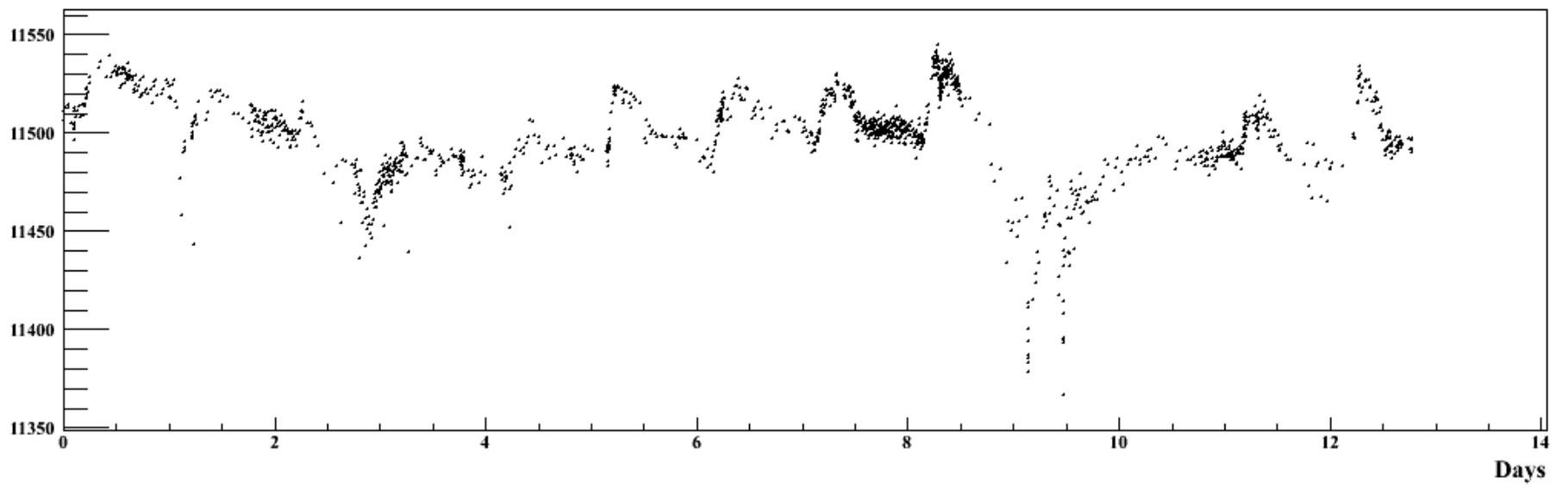
Baseline varies less than 1 dB over the period

New antenna: disentangle between gain drifts and background variations

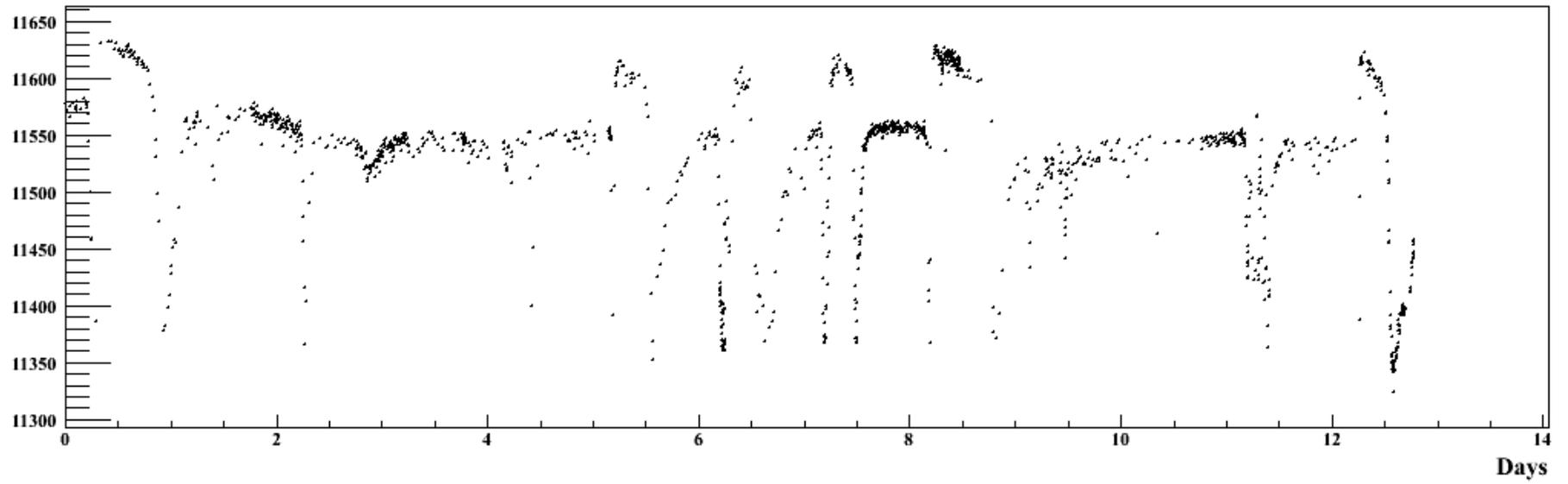
Baseline (ADC counts)



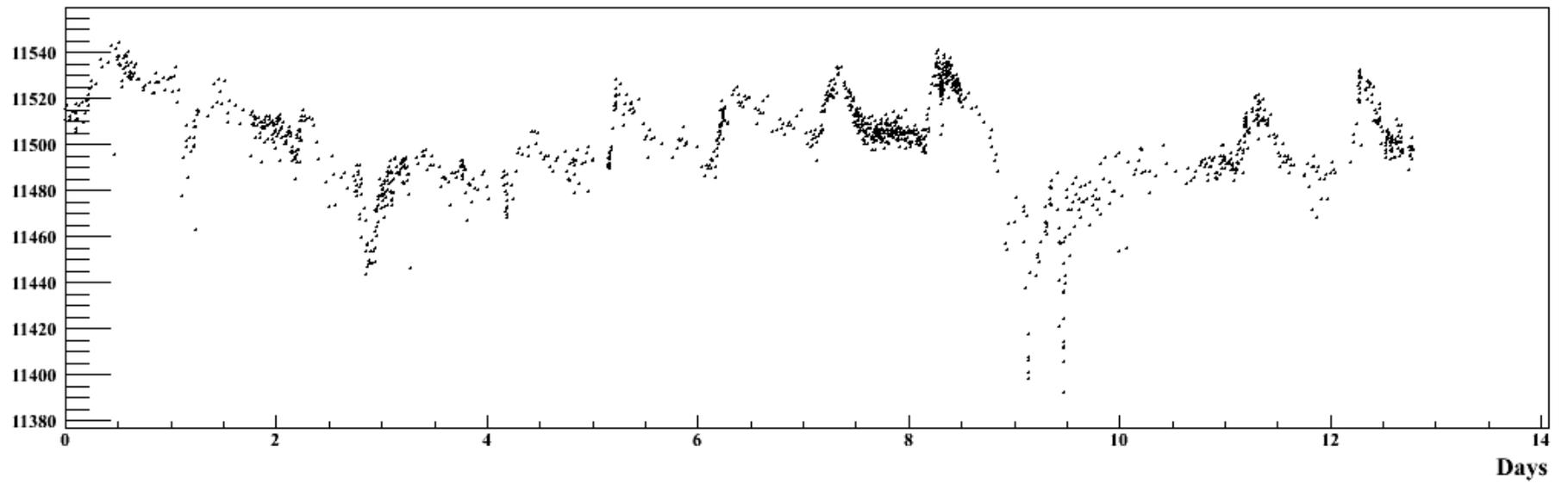
Baseline (ADC counts)



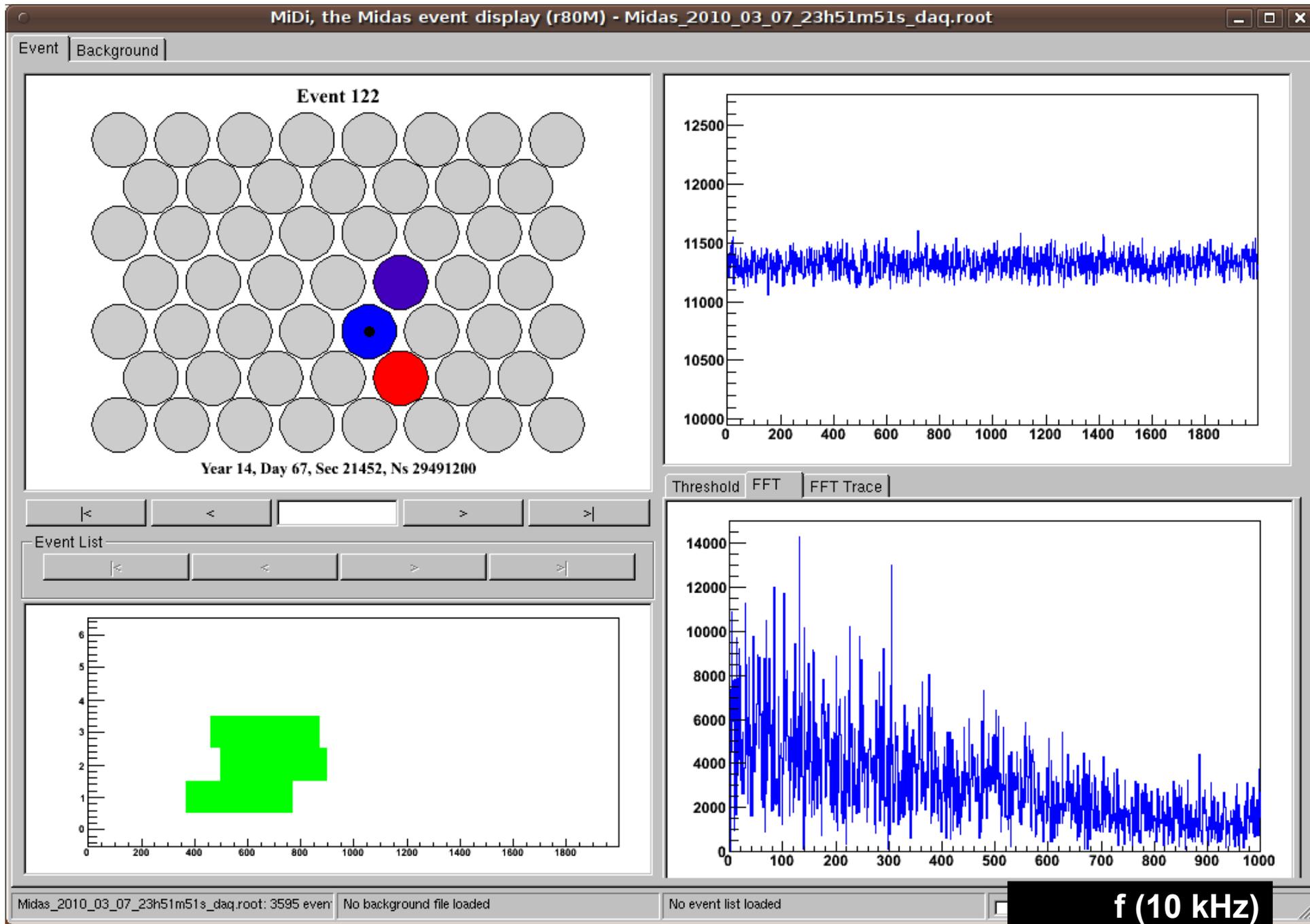
Baseline (ADC counts)



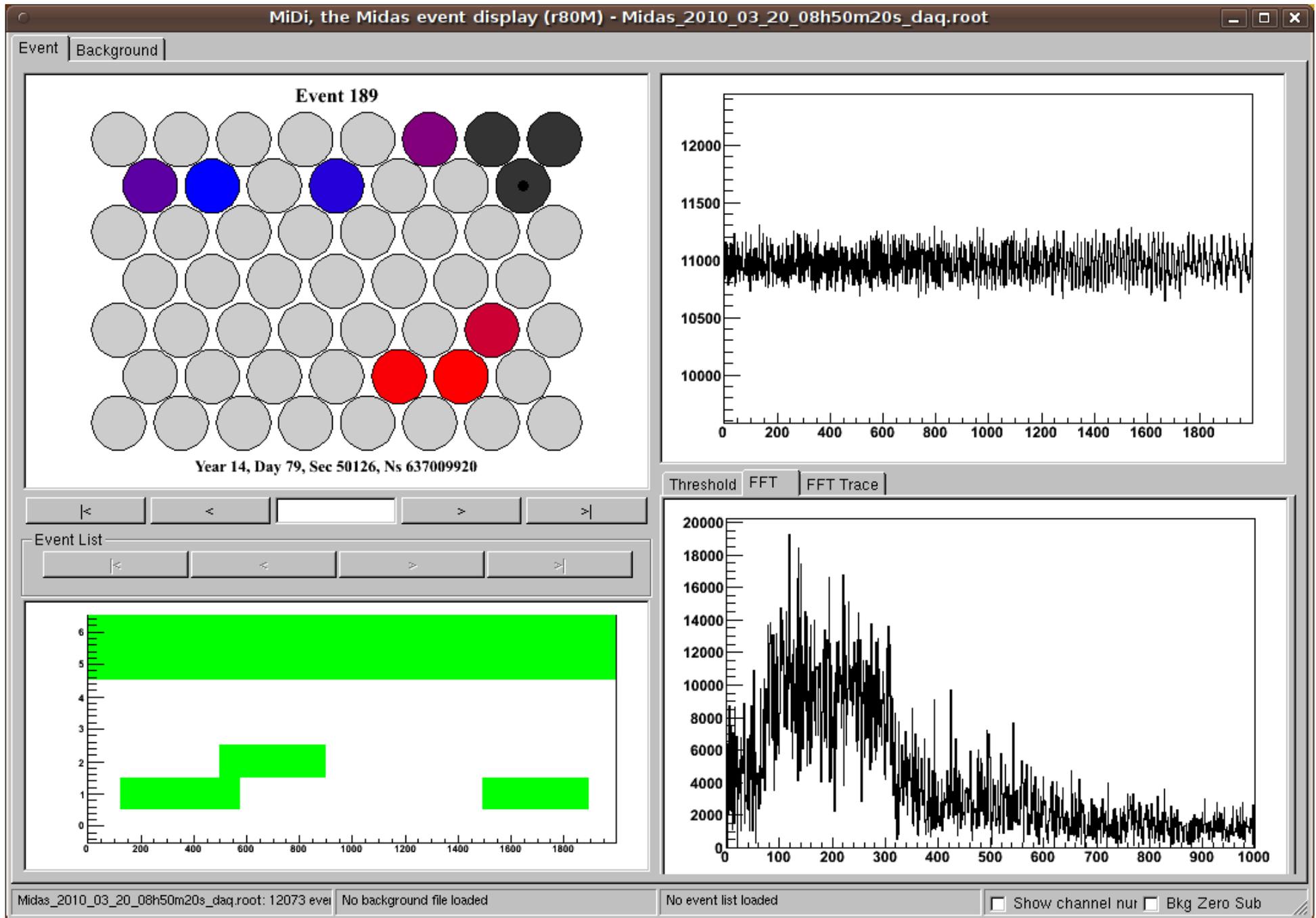
Baseline (ADC counts)



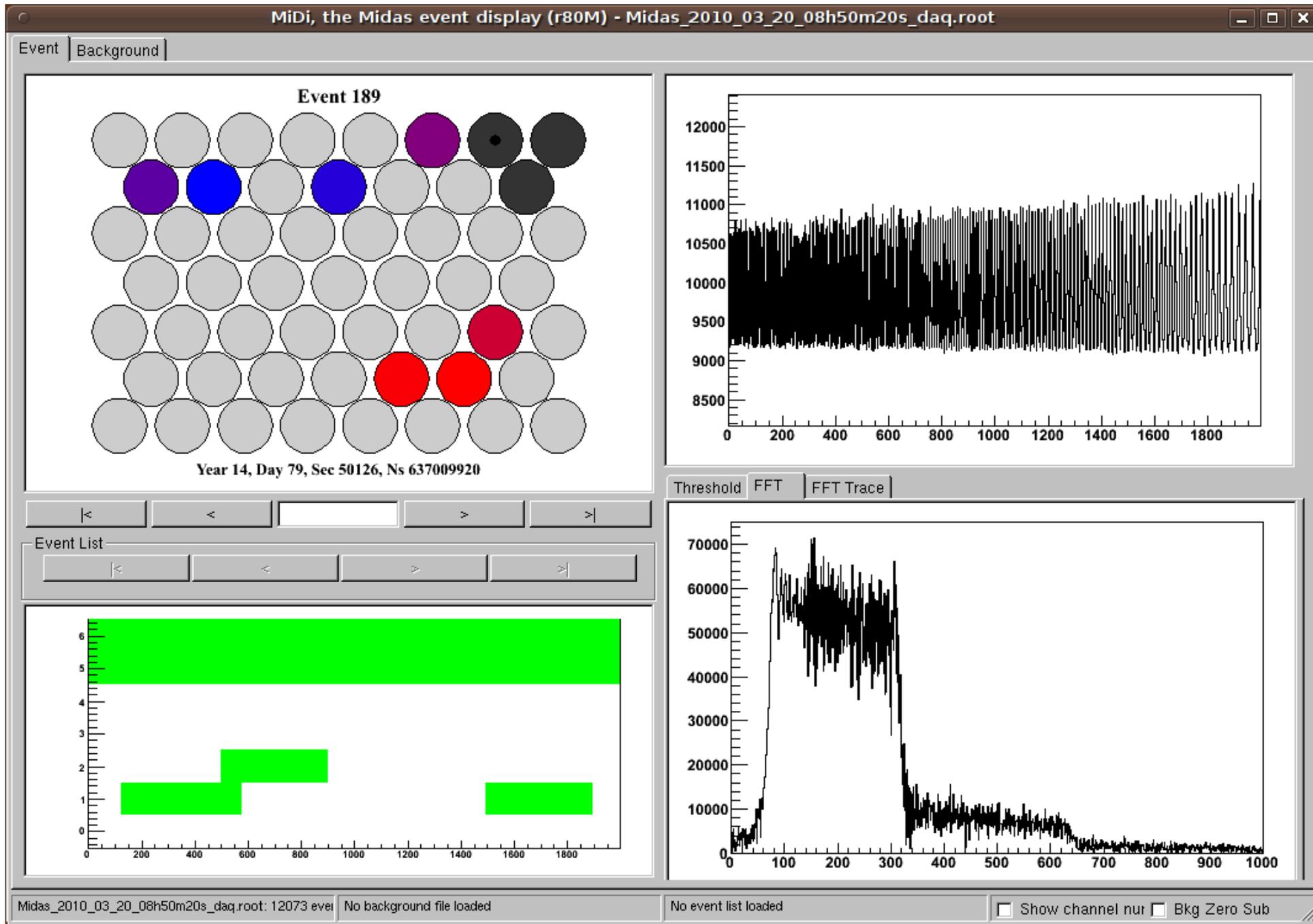
Noise spectral distribution



Noise Zoology (I)



Noise Zoology (II)



Noise Zoology (III)

