

DAQ Commissioning

- In most areas: **successful beyond expectations**
- ➔ About **73M events in 980 runs** under recorded conditions from October 3 to November 7
- ➔ Logged about **14M events during collisions** with most/all components
- ➔ > 12M events in the "List of useful runs"
- **No large downtimes**
- ➔ "Lost" about 400k events once due to "No run number" problem
- **Read out everything possible and impossible:**
 - ➔ All calorimeters (little ShowerMax)
 - ➔ All COT crates (2/3 of TDC's)
 - ➔ All Muon crates (not all TDC's)
 - ➔ CLC, BSC, TOF
 - ➔ All Level 1 trigger: Calorimeter, XFT, Muon trigger, XTRP, PreFred, Fred, Scalers, ...
 - ➔ Some Level 2: Part of SVT, Calorimeter, SVT interface board, L2 Processor, ...
 - ➔ Some Silicon

DAQ Commissioning

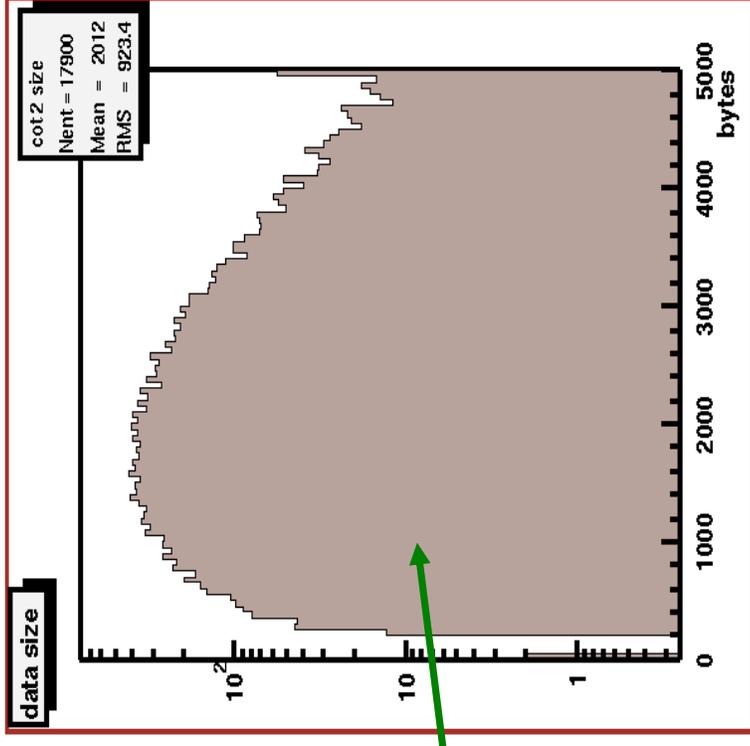
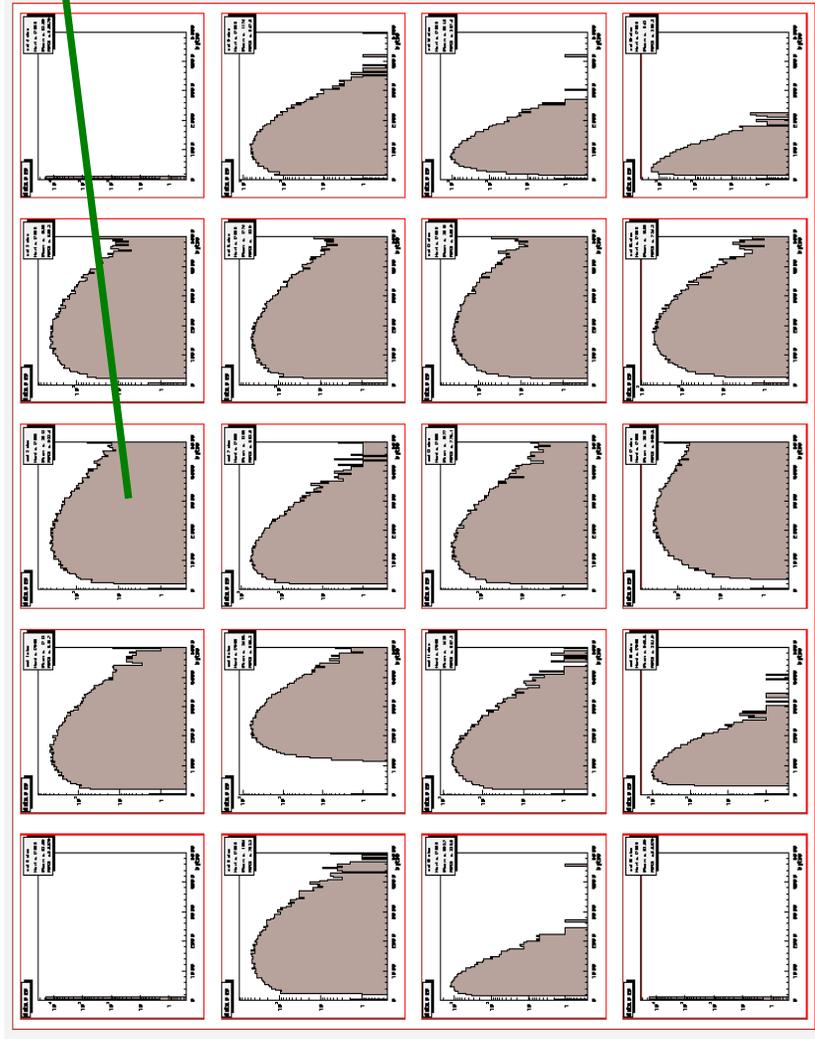
- Typical event size close to 100kB
- In the end, we achieved sustained running with
 - ➔ **Livetime > 95% at about 100Hz L1A/L2A/L3A rate**
 - ➔ Maximum logging rate about 340Hz (no tracking on L3), up to 25MB/sec
 - ➔ Observed 15% dead time at 250Hz
- One run with > 1M events during collisions, operator ended
- Most runs intentionally ended
- Some of the **improvements during the run**
 - ➔ Continuously extended TDC coverage for COT, introduce dead/hot wire lists, understand most robust TDC readout
 - ➔ Include XTRP readout
 - ➔ Add SVT readout through additional VRB
 - ➔ Include L2 processor (tag only)
 - ➔ Glitches in SVX data cured by removing 1/2 ladder
 - ➔ Continuous speed up of readout

TDC operation?

- Gained a lot of experience with TDC operations
 - ➔ Remember: after roll-in, could for some time not take any runs > 100k events with many TDC's...
- TDC failure rate significantly improved (although each access was a fight against time)
 - ➔ Once a TDC is installed, it rarely fails
 - ➔ So far no blown buffer chips with the latest mods
- Still, TDC's are probably the **most important bottleneck**
 - ➔ Cannot access TDC while the onboard DSP is processing (corrupt data) ⇒ **2ms (!!) delay**
 - ➔ Cannot use "Early early Done mode" (allow next L2A before TDC FIFO is being read out), which could be the most efficient readout mode
 - ➔ No chance to exercise "Spy mode" readout
- As an emergency action, we had to **truncate COT data at 5kB/crate** (< 1 hit/channel)
 - ➔ COT group: are 8 hits/channel max needed??
- **Confident that all the above problems will be solved by March 1st**

COT data volume

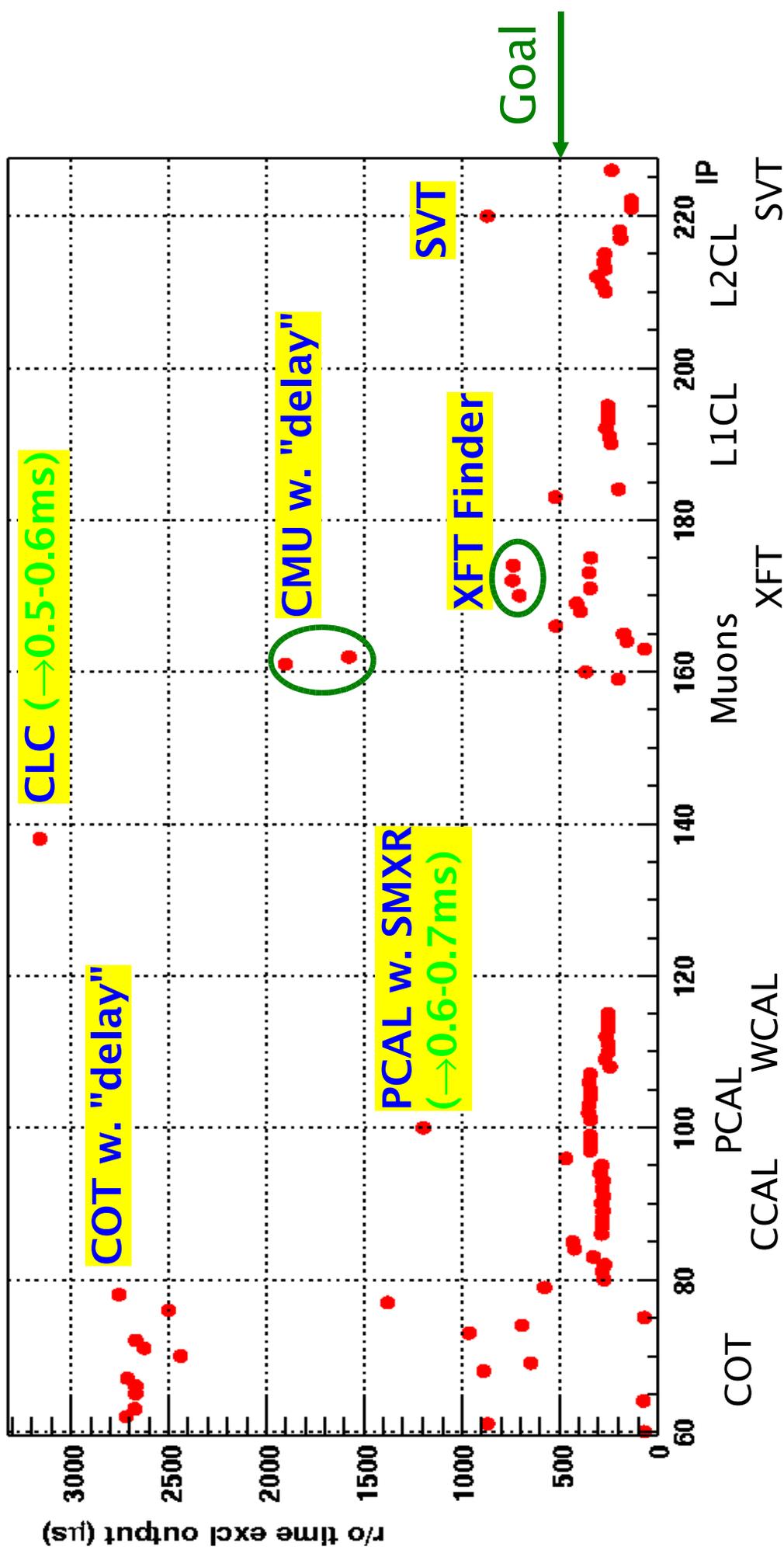
- Run 103604 (last store, low thr. in SL8)
- Extrapolate to full instrumentation:
already **~40kB/event** at low luminosity



- 14/18 TDC's read out in b0cot02
- ~1/2% of events truncated

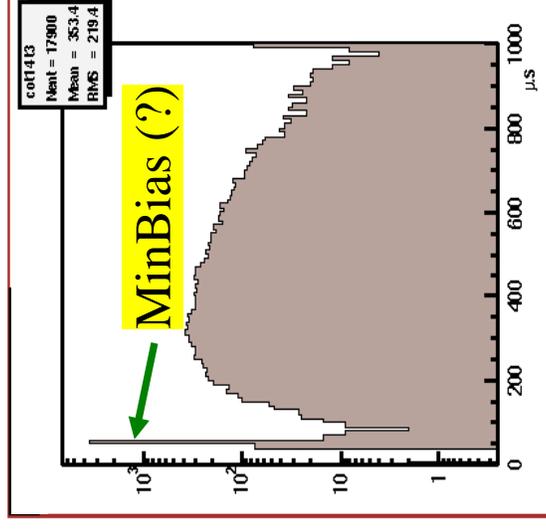
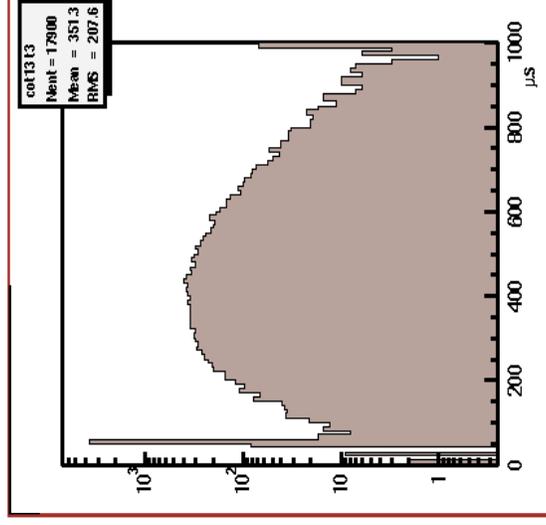
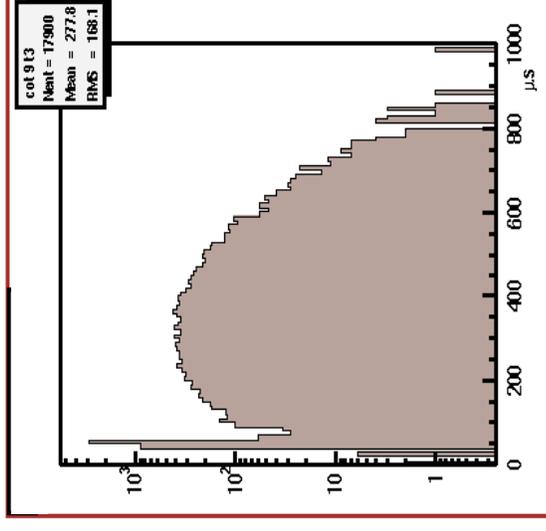
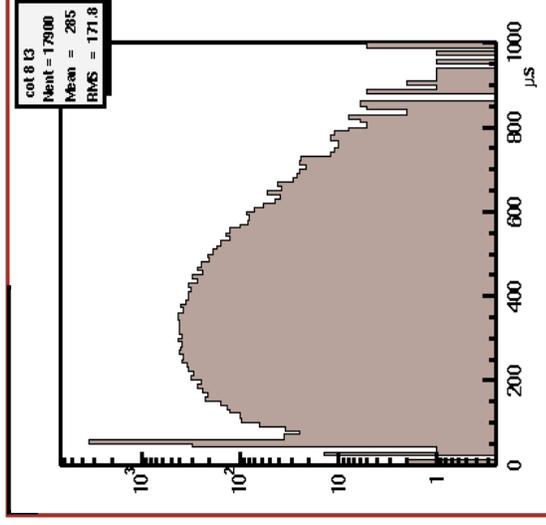
Readout performance

- L2A received by crate controller \Rightarrow Minibanks formed



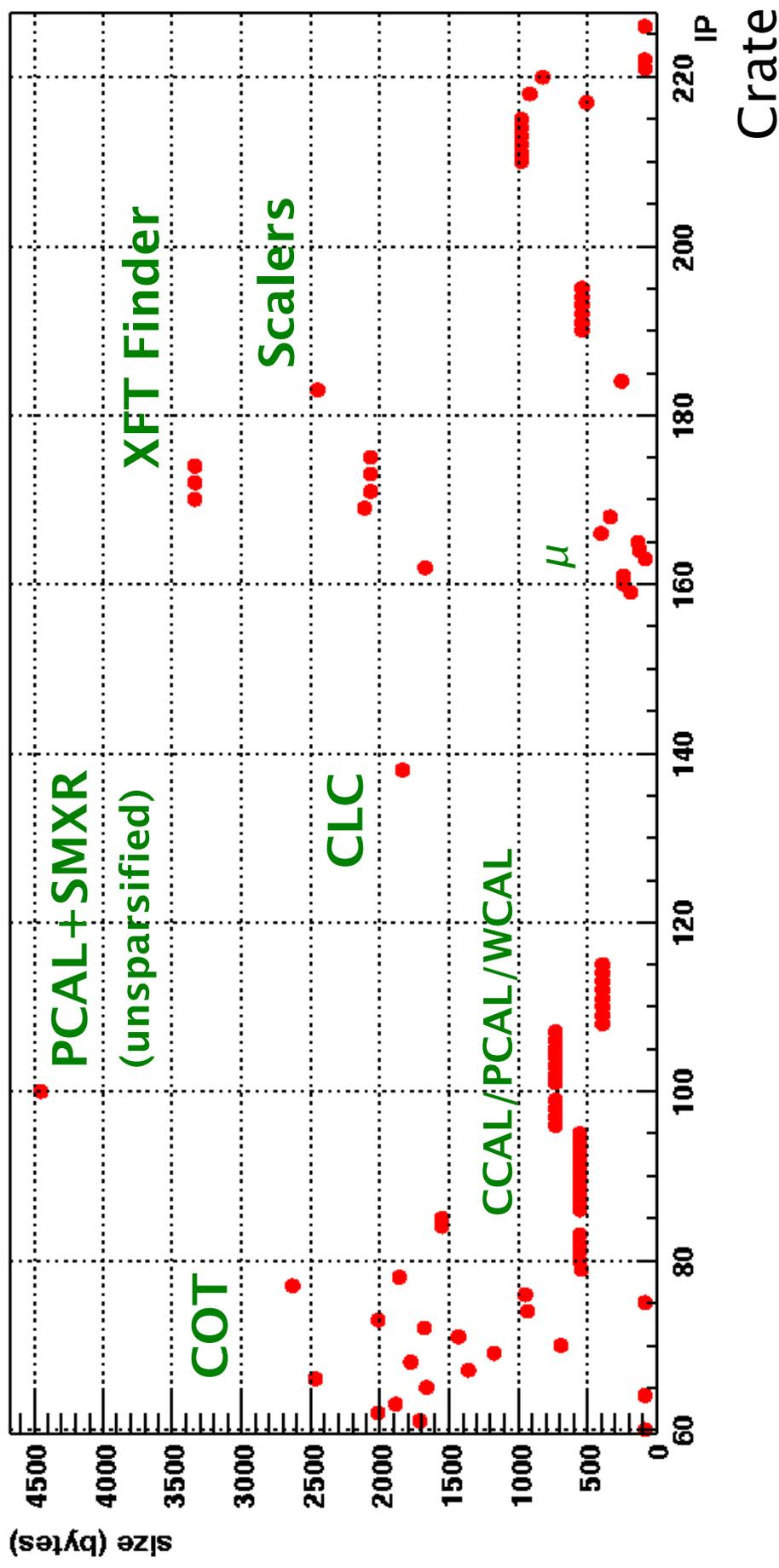
COT readout

- Time until all TDC's in a crate have processed all hits
- Optimum we can hope to achieve for deadtime incurring readout time
- Will need to work on finding the optimal "readout mode" during final commissioning



Raw data size

- Size of event fragments from various subdetectors

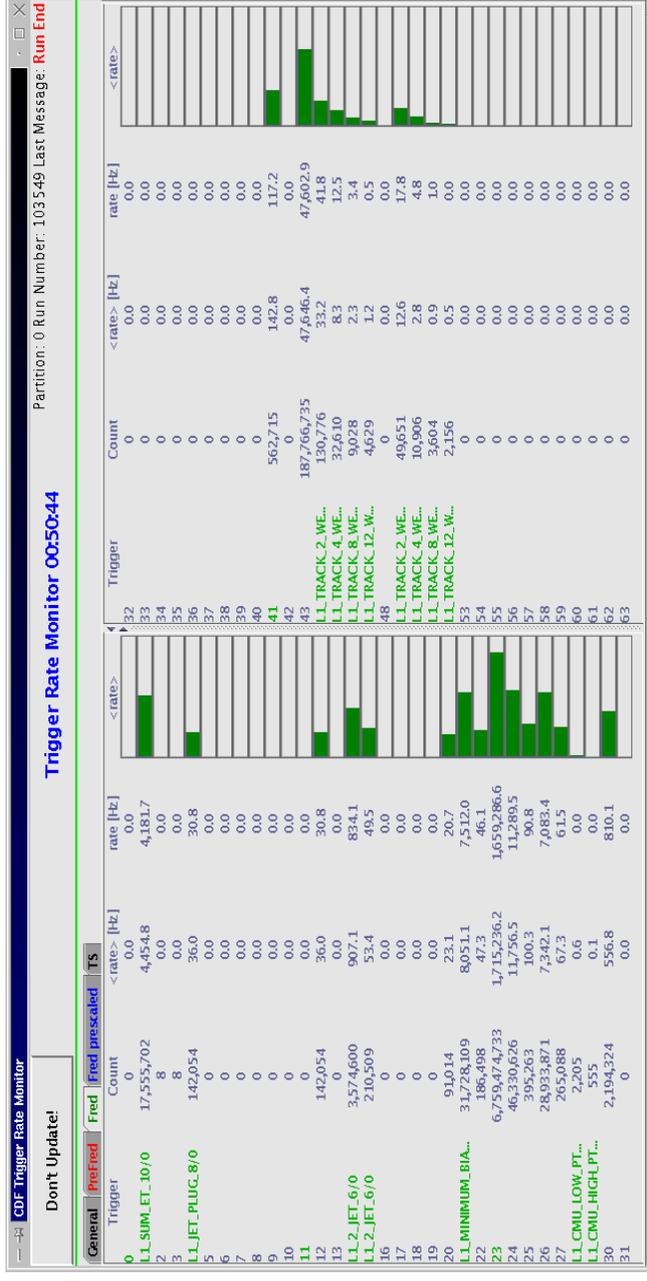


Run control

- Overall, the Aces successfully mastered the difficulties of operating an incomplete/buggy/undocumented run control ... few complaints!
- **Run control crashes** et al.
 - ➔ Segmentation Violation, out of memory, ...
 - ➔ Failure to access the resource manager, cannot get run number, ...
 - ➔ Error handler hangs
- **Error messages need to be more explicit**
 - ➔ "Busy timeout from b0pca104" - No, you should NOT reboot b0pca104
 - ➔ Limited **automated recovery** procedures
 - ➔ Need to send event fragment in case of error (Done)
- **Not all run control clients agree on which state transitions are allowed**
- **Need to reduce the time necessary to set up a new run (5-6 min now)**
 - ➔ Re-introduce "Warmstart" if nothing "relevant" changed in the run settings. This had been disabled due to too many runs where things were not set up properly
 - ➔ Starting a run is only about 50% successful - no single source
- **Successfully used error **crosspoint** (in some special runs)**
 - ➔ Some crates report CDF_ERROR all the time

Some more observations

- In addition to (by now) "standard" consumers (Event Display, YMon, TrigMon, XMon, ...), **online trigger rate monitor** turned out to be extremely useful



- Would have needed **more time for L2**. L2 decision crate unstable
 - ➔ See occasional bus errors, no more L2 decisions from Alpha,... - Already replaced Tracer
- No more problematic Tracer - VRB data links since roll-in
- Many **bunch counter problems/glitches** fixed; still observed (confirmed) in
 - ➔ XTRP, CLC, XFT Finder (<1/1000)
 - ➔ b0imu01 wrong in ~20% of events