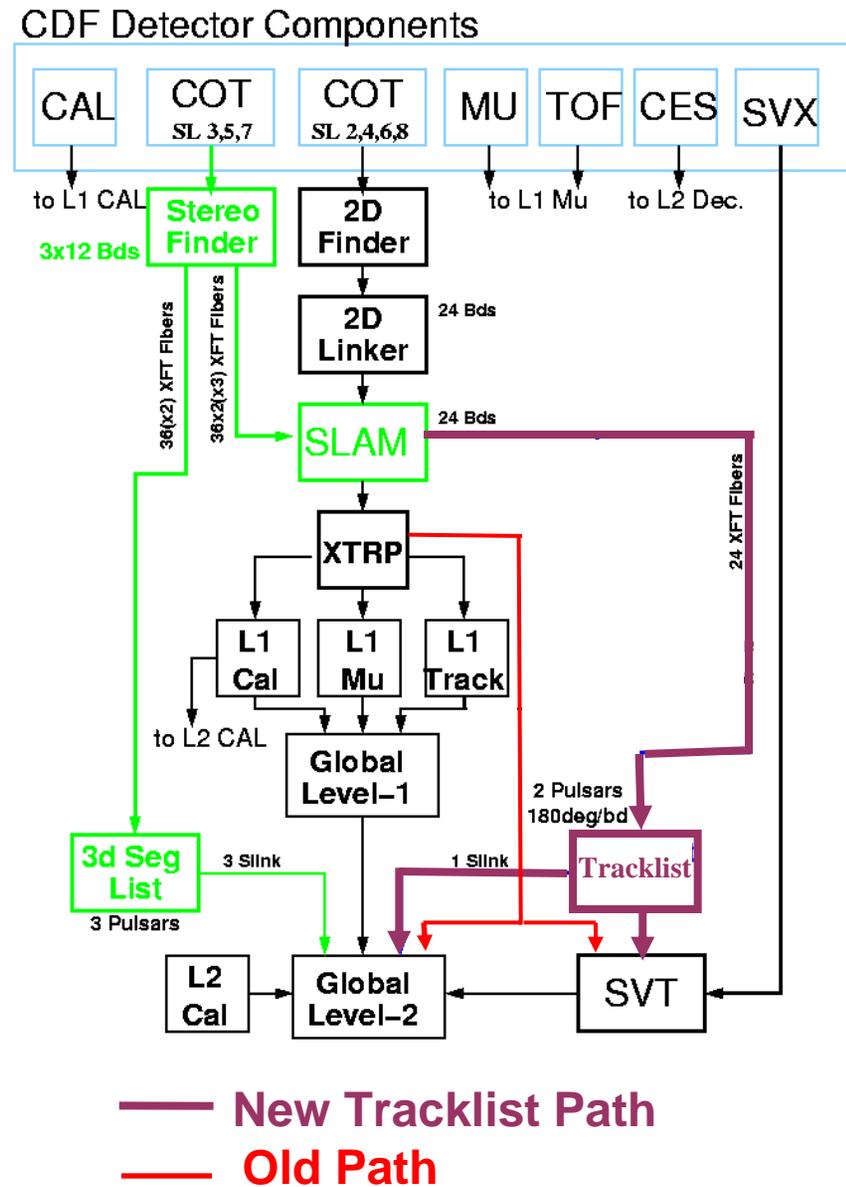




Tracklist Board



- ▶ **Goal:** Replace existing link of tracks via XTRP to L2 and SVT which causes a bottleneck for high occupancy events
- ▶ Tracklist board consists of two pulsars which receive tracks from SLAM boards
 - Boards sparsify and concatenate track data
 - Send tracks to L2 and SVT
 - Filter tracks based on L1 trigger bits and track properties





Status



- ▶ **Internal tests of all data paths (dataIO, ControlB, ControlA)**
- ▶ **Full readout of both boards in system since March**
- ▶ **Trigmon expert monitoring since beginning of April**
 - SLAM → Tracklist is golden
 - No errors in expected vs observed Control B and Control A output
 - Differences between TP2D (tracklist) and TL2D (XTRP) are understood and due to errors in XTRP
- ▶ **SVT Interface tested**
 - 2 μ s faster than existing path
 - Data better than from XTRP
- ▶ **Slink interface extensively tested in test crate**
- ▶ **Slink → CPU tested for ~ 20 minutes in April**
 - Data looked good
- ▶ **Added functionality to firmware to send L1 trigger bits out via slink interface**
 - Trigger bits need to be tested → does not inhibit incorporating the TL board



Timing

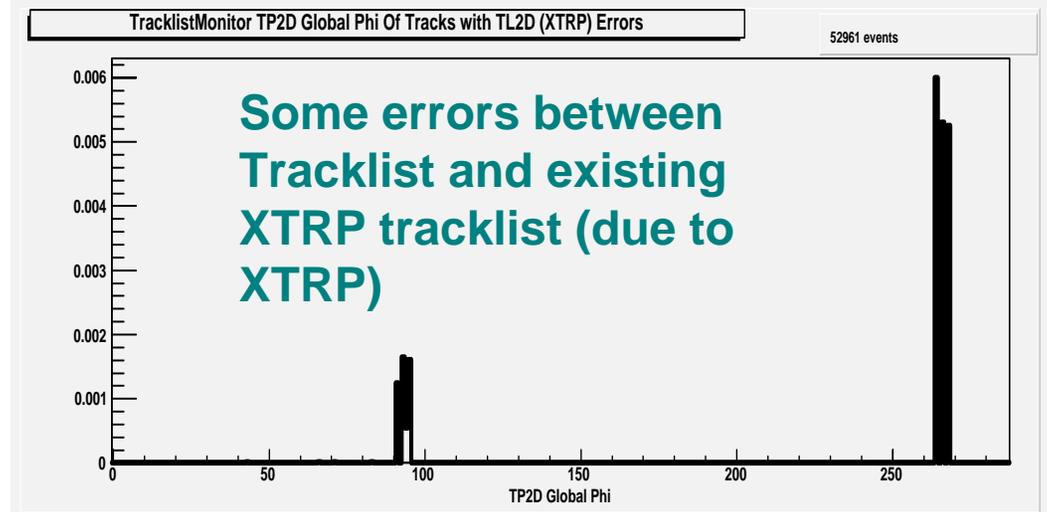
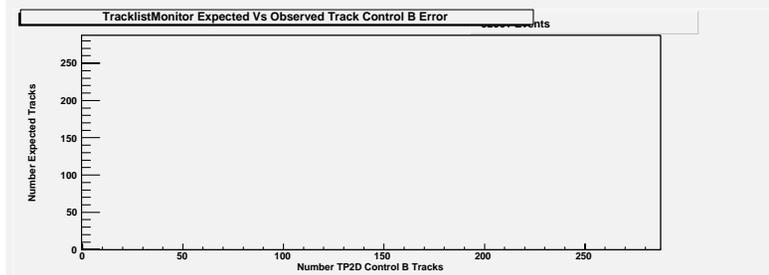
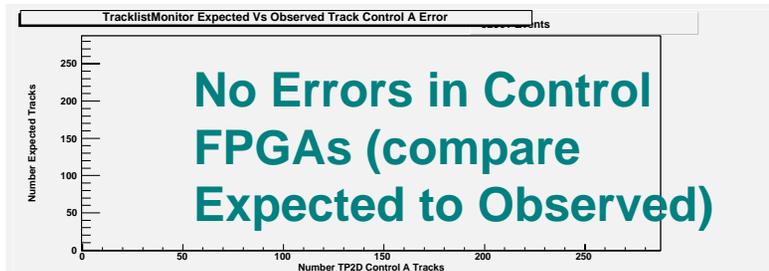
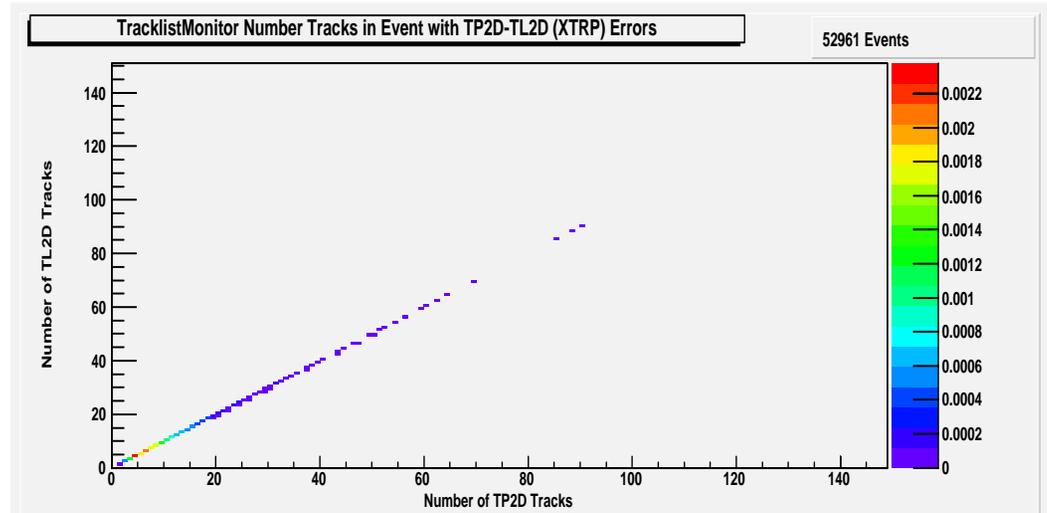
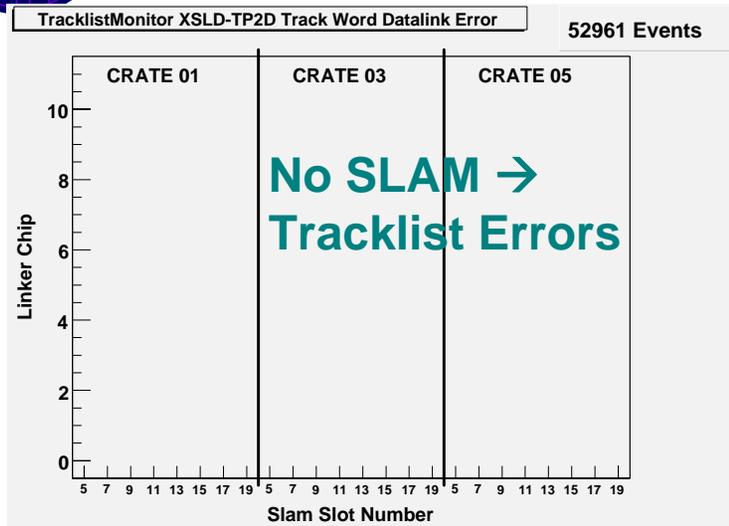


- ▶ At low luminosities tracklist board is faster than the current Muon/XTRP by $\sim 6 \mu\text{s}$
- ▶ At higher luminosities, we gain even more
- ▶ Estimation of time for track data \rightarrow L2 CPU:

# tracks	XTRP/Muon (μs)	Tracklist (μs)
0	10	2.5
10 (1.3E32)	12	3.5
45 ($\sim 3\text{E}32$)	18	4
100	30	6
288	67	11



Monitoring Plots



► Can easily make a canvas for the CO to monitor



Summary



- ▶ **Tracklist board provides a new and improved path for XFT tracks from SLAM boards to L2 and SVT**
- ▶ **All elements of base tracklist design have been thoroughly tested**
- ▶ **Tracklist → SVT test was very successful**
- ▶ **Ready for integration to L2 system**
- ▶ **Soon we will have L1 trigger bits also sent to L2**



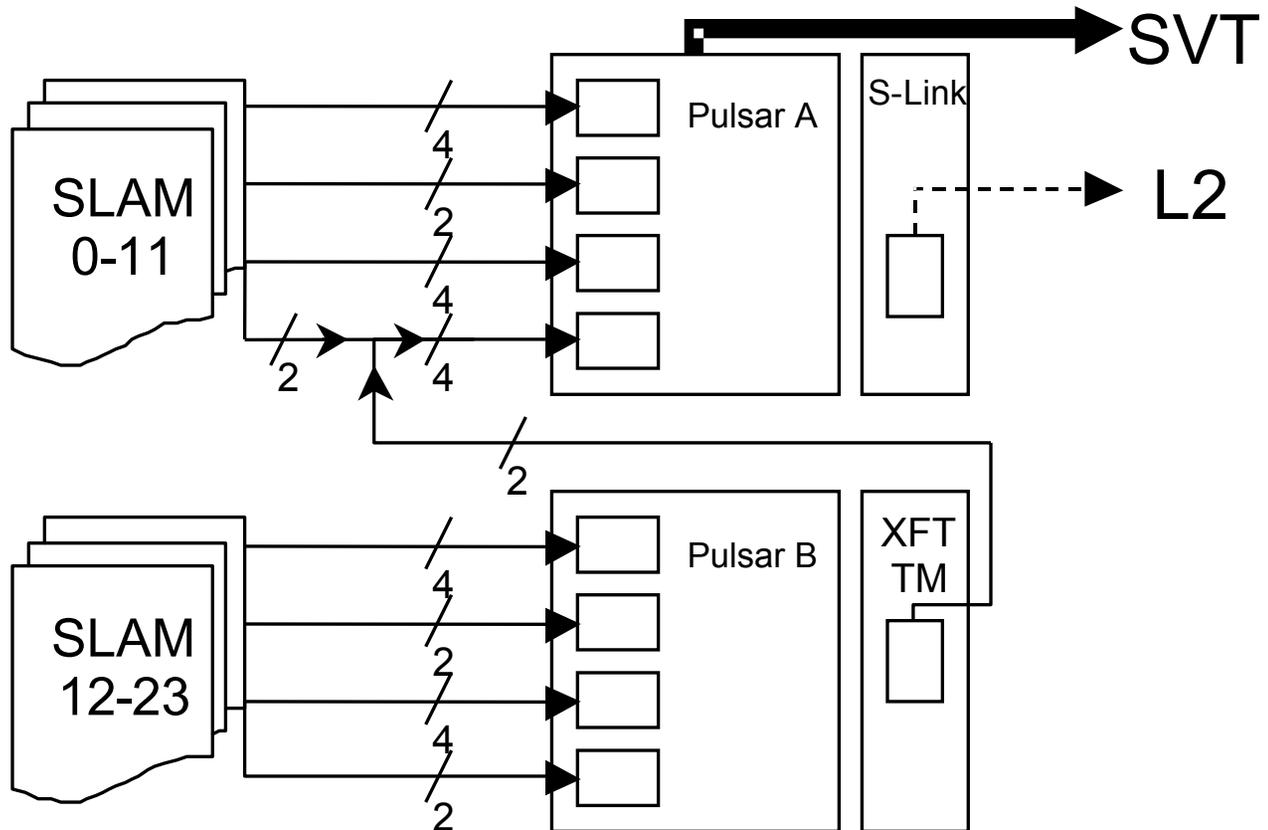
Backup Slides



Tracklist Board

► Firmware Summary

- **DataIO**
 - Receives and sparsifies track data from SLAM boards (also, Pulsar A receives track data from Pulsar B)
- **Control A**
 - Concatenate track data and sends out via SLINK to L2 and SVT
- **Control B**
 - Concatenate tracks and send out via fiber to Pulsar A

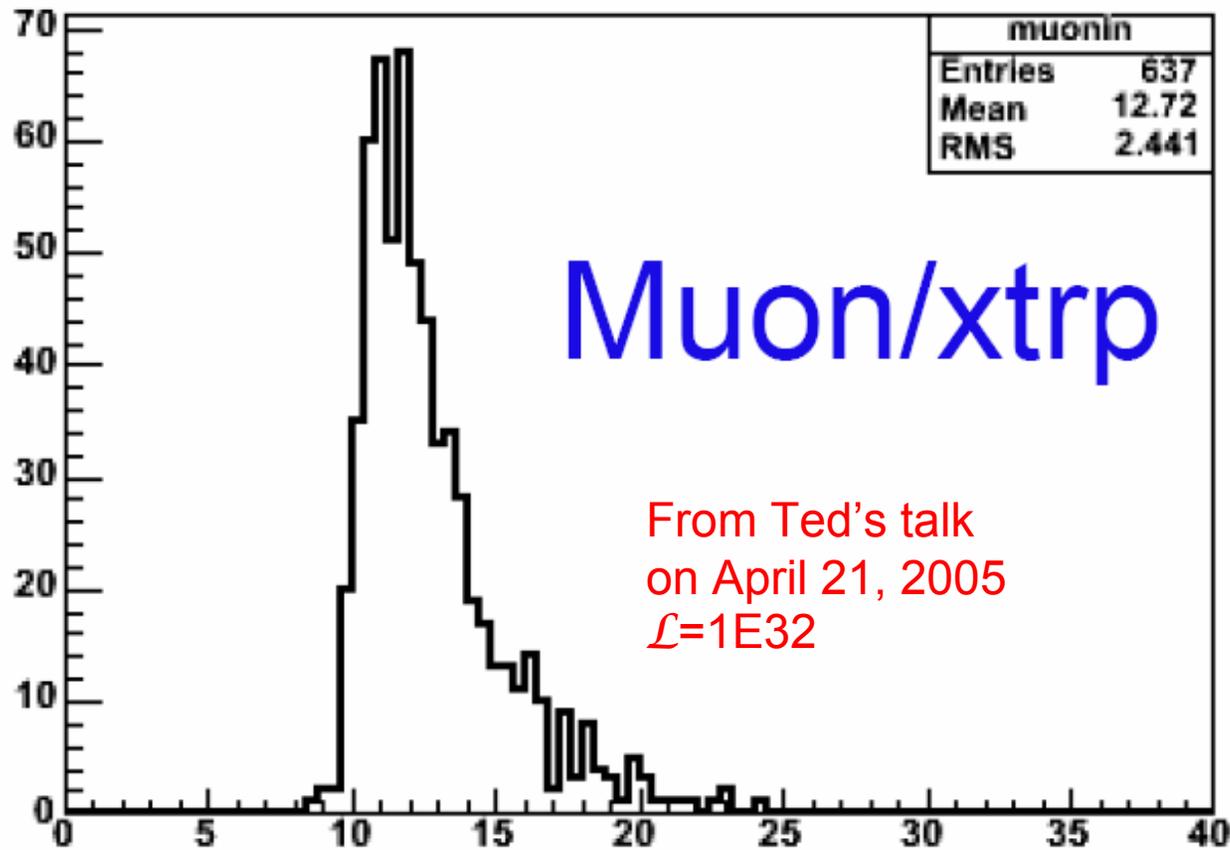




Timing Studies



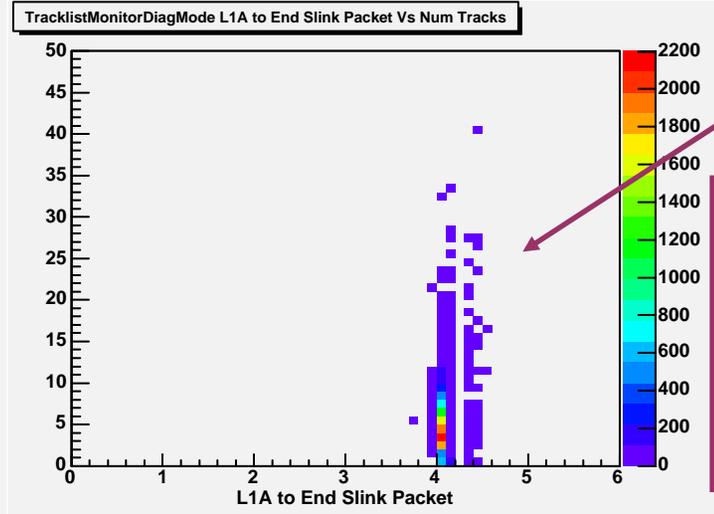
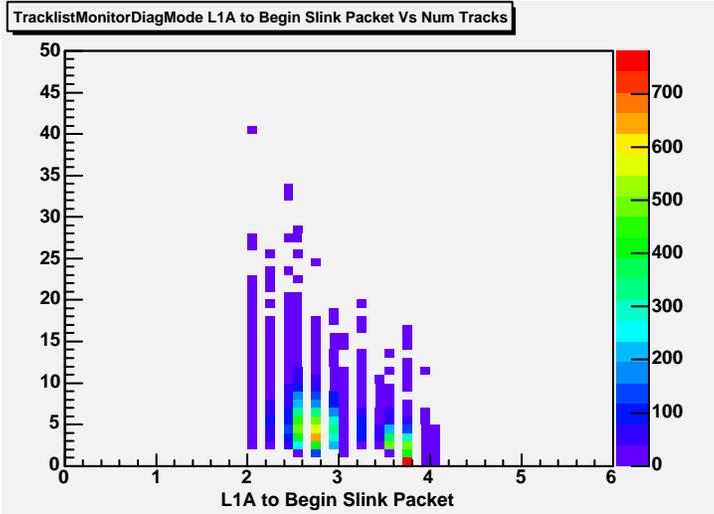
End of Muon package at the Merger Input





Tracklist Performance

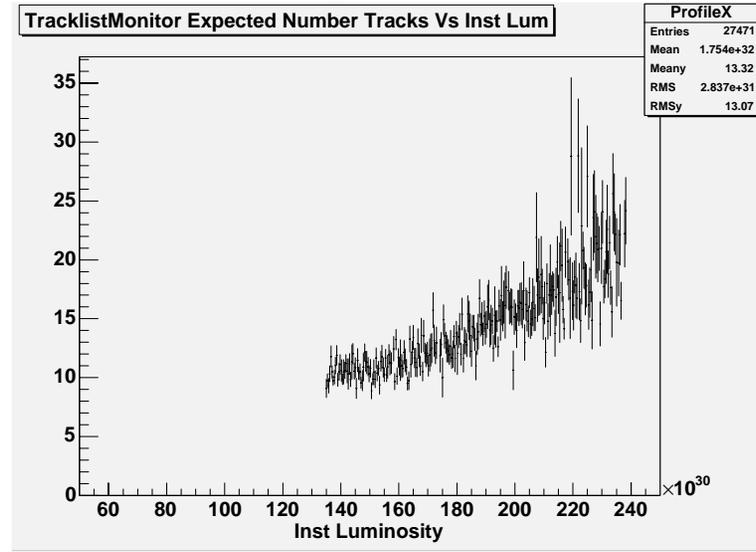
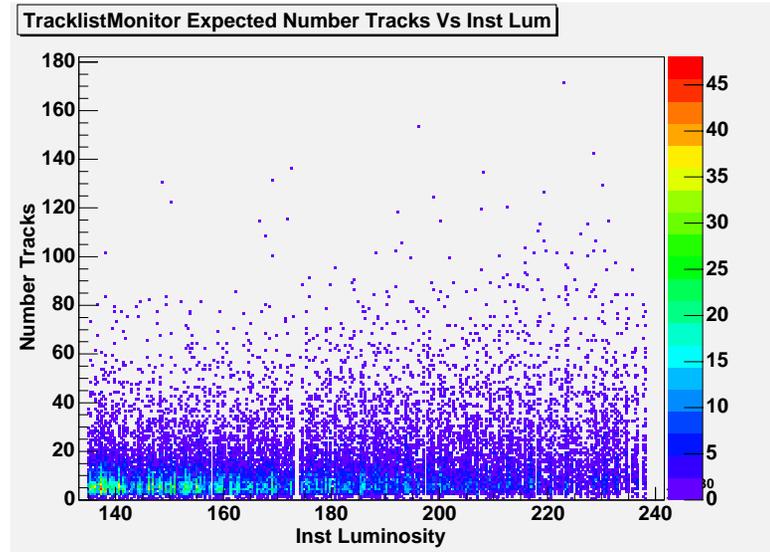
Timing tests from mid-March



Most tracks EOP near 4.5 μ s

Expected estimated (more realistic):
 $EOP = BOP + 25ns \cdot (7 + \#tracks)$,
 where BOP is 2-3 μ s

Number of Tracks as Function of Luminosity



In this run, the maximum number of tracks in an event was 171



Timing Studies

