Review of L2STT

Fermilab

February 25, 2000

Introduction/Overview

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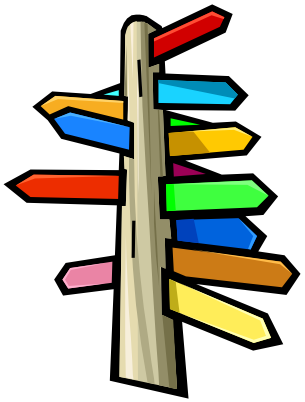
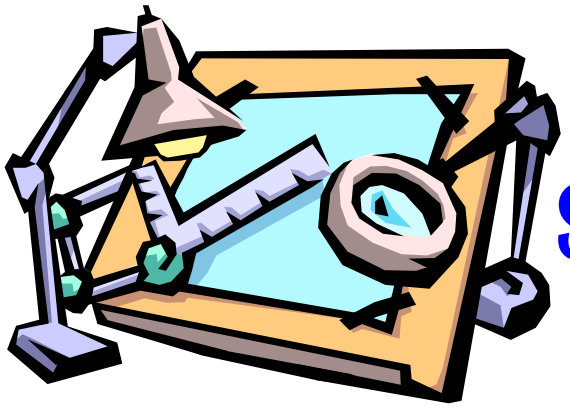
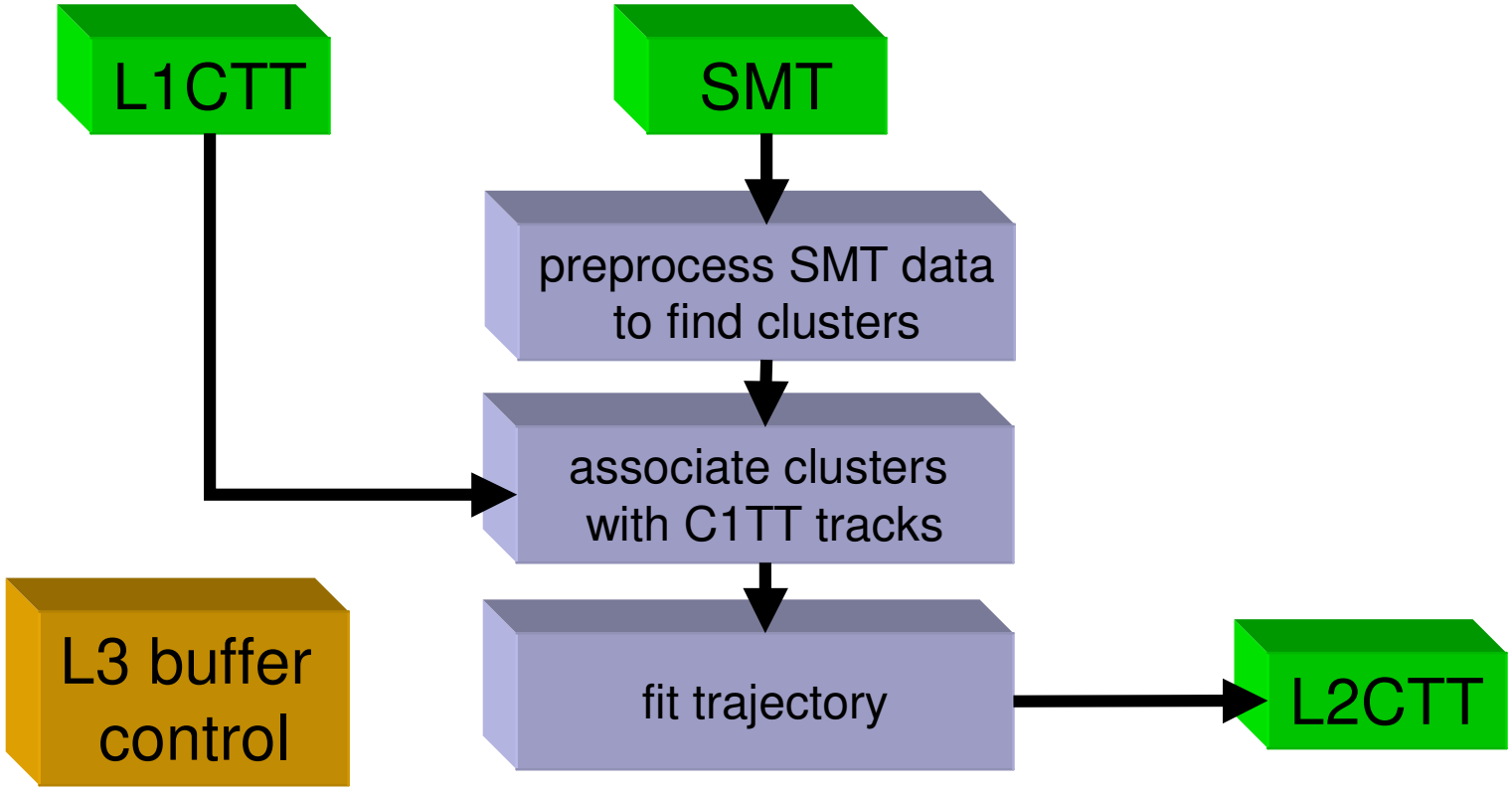


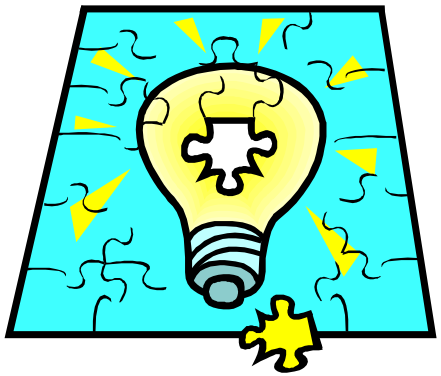
Review Charge

- Charge is 2 weeks old…
  - We concentrated on hardware description
  - Not complete answers to everything
  - Committee advice welcome
  - Past reviews
    - D0 review of physics case in 97 and 98
    - PAC review of physics case in 98 and 99
    - http://www-d0.fnal.gov/~wahl/review.html



System Design





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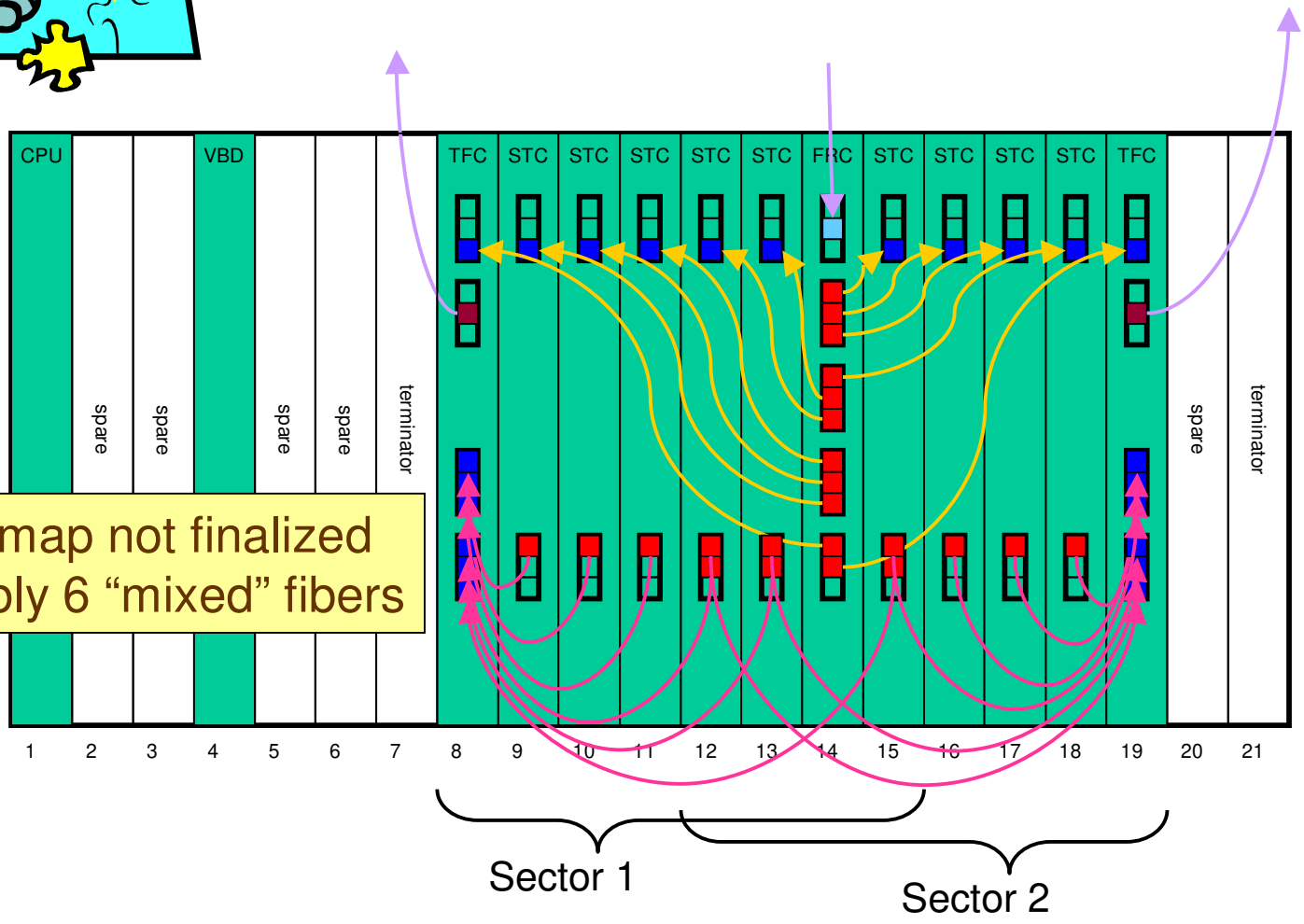
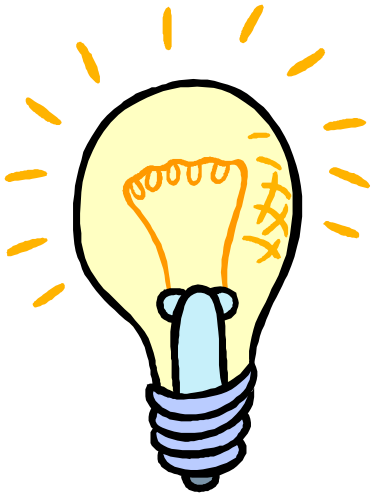


- Cable map not finalized
- Probably 6 “mixed” fibers

High Luminosity

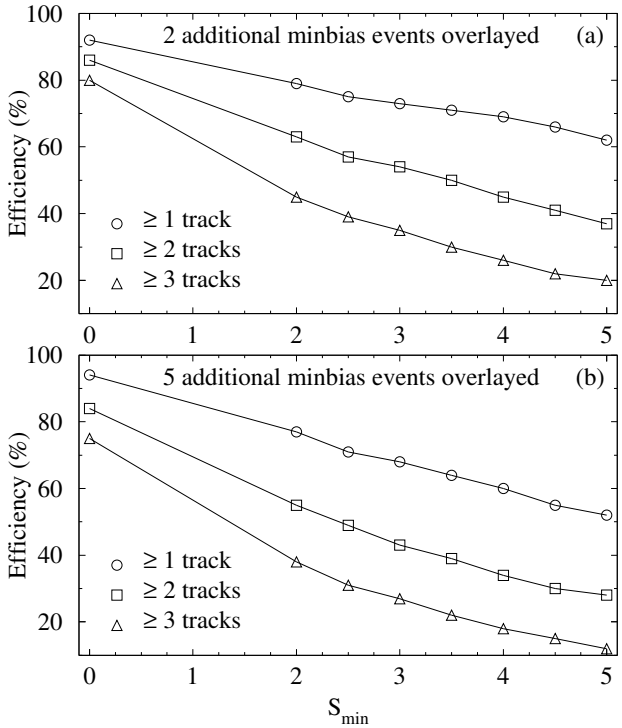


Triggering on $Z \rightarrow b\bar{b}$ Events in Run II 12

Imp... ...with Silicon Trigger

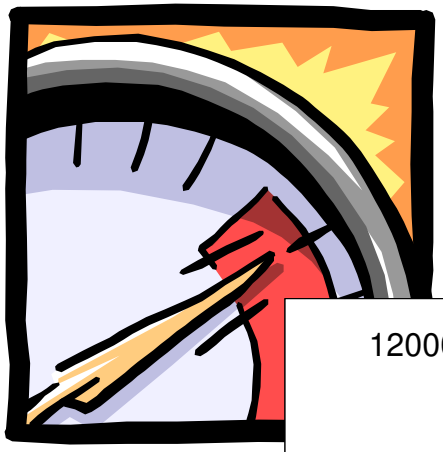
- E... ...ne S_{min} STT trigger configuration for ...events with 2 and 5 additional interactions. ...are relative to JET_2_MED trigger term)

M. Narain, 11/20/97



- Efficiencies/Rates
  - 1997/98 reviews
  - Lum = $2*10^{32}/cm^2/s$
  - Linearized fit
  - ±1 mm roads

http://www-d0.fnal.gov/~wahl/review.html



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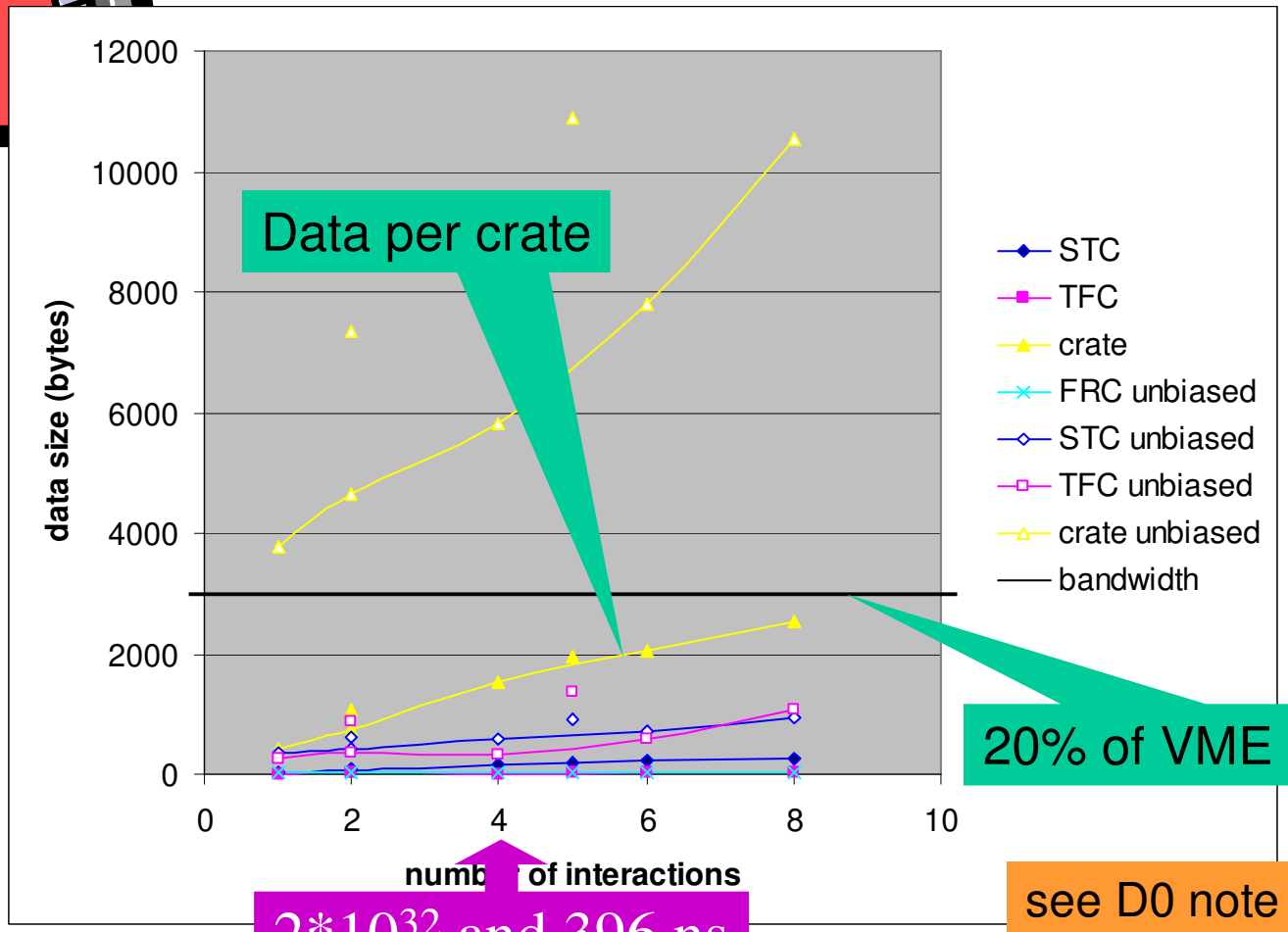
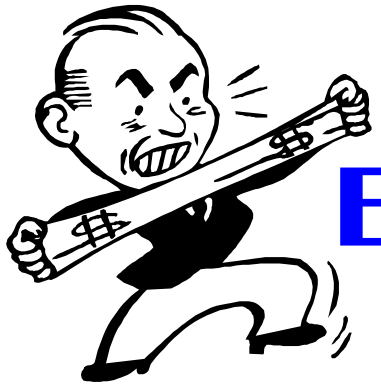


$2*10^{32}$ and 396 ns

see D0 note 3426



Expandibility of System

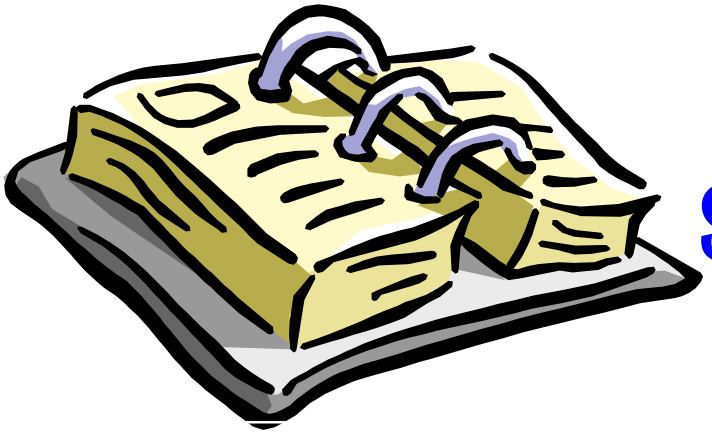
- Increased SMT occupancy… **no change**
  - STCs keep up with readout
  - Selectively reduce level 3 output if needed
- More tracks… **more TFCs**
  - Or… more powerful DSPs
- More layers… **more STCs+VTMs**
  - One spare slot in crate
  - Additional slots require backplane engineering
  - Extension crates require FRC and L1CTT data
  - New detectors must respect 60º sectors

Monitoring

- Basic idea (cf VRB monitoring)
  - Once every ≈5s on *CollectStatus*
    - latch monitor data
    - FRC notifies CPU
    - FRC arbitrates use of VME bus
    - CPU reads data over VME/PCI busses
  - CPU (VxWorks)
    - No communication with TCC
    - Secondary data path to monitoring system
    - Send messages to alarm server
    - Use EPICS to host computer for downloading

Testing and Commissioning

- Preliminary thoughts…
  - Budget $90k for prototypes, test equipment
  - Test 1st prototypes using PC platform
    - Off the shelf, inexpensive, exists…
  - Commissioning at FNAL
    - Inputs from detector
    - Private DAQ via CPU to PC



Schedule

- Prototype design under way
- 1st prototype 100-170 days → Oct 2000
- 2nd prototype 80-100 days → Mar 2001
- System test 60 days → May 2001
- Production 100-120 days → Nov 2001
- Commissioning 60 days → Feb 2002

Cost

- Preliminary cost estimate (MRI)
- Bottoms-up cost estimate next
  - First need design
  - New quote on VTMs 50% higher
  - Extra items… (L1, L2, etc…)

Beam position

- Responsibility of vertex group
  - Vertex package in EXAMINE
    - Store in accelerator control system
    - Input to feedback system
    - Download at beginning of run
      - COOR→EPICS →host computer
      - Same path as other begin-run initializations
  - Determine before first begin-run in store
  - Learn from experience in beginning of Run II

Need:
- <500 μm offset, stable to <30 μm
- <100 μrad tilt

see TDR, D0 note 3444

Do we have enough people?

Coordination	*Heintz, Wahl*
Motherboard	*Hazen, Wu*
LRB/LTB	*Hazen, BU contract engineer, Fatakia*
FRC	*Evans, An, Steinbrück*
STC	*Narain, Earle, Perry+students*
TFC	*Hobbs, Pancake, Taylor*
Crates, power, backplanes	*Hazen, Evans…*
In-crate CPU	*…*
Error messages	*… (waiting for specs…)*
Monitoring/Downloading	*Lee…*
Testing/Commissioning	*Hazen… (long-term plan in fall…)*
Beam position	*Vertex group (Feligioni)*
Accelerator feedback	*… (U Manchester pdoc?)*
CTT broadcaster	*Connolly*
Installation	*Heintz… (long-term plan to be defined in fall…)*
Simulator	*Tentindo-Respond…*

Help needed!

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