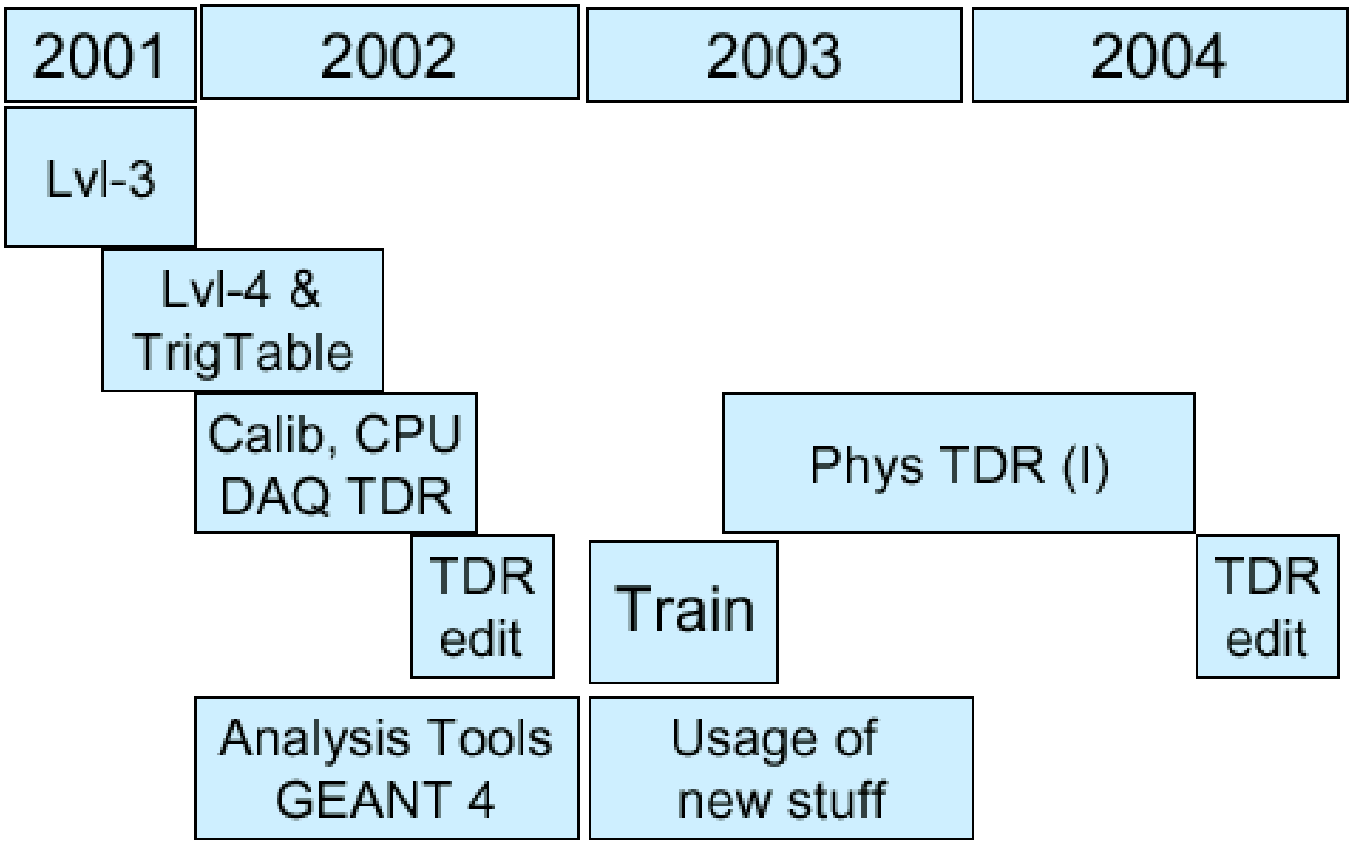
Towards the DAQ TDR

Schedule

As presented by Paris in last PRS coordinators meeting:



1) Need to have fully developed algorithms for L2 & L3 jets, taus, and MET by mid 2002. 2) At the same time, we develop physics analyses on channels with these objects to understand what we want to write to tape (including background samples, calibration samples, etc). 3) We also have to get GEANT4 going and verified. Its not that long (especially given our current manpower situation.)

DAQ TDR

I've started a little draft of our contribution to the DAQ TDR, and attached it to the HCAL/jet/met web page.

Here is the outline, along with my thoughts on the current status of each part.

I think we should keep track of our status on this document at each CMS week/ CPT week.

Outline: Highest Level

- Overview
- List of samples we want written to tape
- Brief review of the level 1 and update since L1 TDR
- Level 2.0 (Calorimeter only)
- Level 2.1 (add Pixels)
- Level 3 (all information)
- Samples for evaluating trigger efficiencies, backgrounds
- Final Trigger Table with Rates and Summary

Outline: Samples

Need list of "offline cuts" for each sample we want to trigger on. These people will also be responsible for designing each layer of the trigger table for "their" samples, and calculate the efficiency for signal for their sample.

- **Calibration Samples**

  Olga will provide. (when???)

- **QCD physics samples**

  Greg Snow, Albert DeRoeck will provide??? (when???) but, who will be in charge of the rest of the things needed for the DAQ TDR for QCD physics???

- **Higgs physics samples**

  Higgs to tau's and invisible Higgs. Sasha/Ritva will provide.

- **SUSY samples**

  SUSY to jets+MET. Need somebody to take charge!!!

- **Exotics**

  Extra-dimensions to monojets, others? Need somebody to take charge!!!

Outline: Level 1

- **Design**
  - time samples to energies, beam crossing id for HCAL at L1

    Salavat will provide by end of summer **(critical path)**
  - discussion of above for ECAL in relation to jets/met/taus

    Need somebody to take responsibility for this**!!!**
  - Segmentation for jets/Met in L1 (get from L1 TDR)
  - Algorithm for jets (get from L1 TDR)
  - Calibration for jets

    Andrei will provide "silvia-type"calibration by Sept 2001**???** Can it be the kind of monte carlo derived scale we have now, or do we also need to develop a scheme for getting this calibration from data**?** If so, who will do this**???**
  - algorithm for taus (get from L1 TDR)

    Does this need re-evaluation because of new much larger HCAL noise? Sasha/Ritva will do
  - algorithm for Met (get from L1 TDR)

Outline: Level 1

Much of the stuff in the next sections are things from the L1 TDR that need to be redone because of the new HCAL noise, need for "branson" weights to get correct rates, and new L1 trigger primitive calculations. Need this stuff by the end of the summer? Redo productions in the fall? Redo rates, etc in the winter? If we can not do it by then, we're doomed?

- **Resolutions**
  - L1 jets

    Needs to be redone for new HCAL noise. Wisconsin group will do???
  - tau jets

    Needs to be redone for new HCAL noise. Sasha/Ritva will do
  - MET

    Needs to be redone for new HCAL noise. Wisconsin/Pal will do???
- **L1 trigger table** (from L1 TDR)

Outline: Level 1

- **Rates, efficiency versus rejection curves for object**
  - Jets. Especially multi-jet rates need to be redone with "branson" weights. Wisconsin group will do???
  - MET. Wisconsin group/ Pal will do???
  - taus. May need to be redone with new HCAL noise? Sasha/Ritva will do
- **Efficiency for signal**
  - People responsible for each signal will evaluate
  - redo L1 TDR efficiencies with new HCAL noise. Maybe add more samples?

Outline L2.0

- **Time samples to energy, Beam crossing id, and zero supression at L2.0 for HCAL**

  Salavat will provide (when? Need for fall production?)

- **study effect of similar things in ECAL on jets/met etc**

  Needs somebody to do this!!!

Outline: L2.0

- **Algorithms**

Unfortunately, we still have lots of work to do in this area.

- **Jets**

1) Should we use cone 0.5, cone 0.7, Kt, a mixture under different circumstances? (need somebody to study!!!).

2) Olga/Alexei's/Irina's work on optimum ECAL/HCAL weights.

3) Need somebody to develop algorithms to suppress fake jets at this level!!!

4) Do we need to develop a more realistic scheme for calibration than "Silvia's" at this time???

5) Should we try to identify individual pions/gammas in jets at L2.0 (without tracking, at this level) ???

6) Need to redo "silvia" calibration with new HCAL noise (big effect) and new weighting scheme. Alexei will do???

7) do we want separate calibrations for b's and tau's at this level??? (remember that b/tau id is not so good at this stage…)

Outline: L2.0

- **Algorithms**
  - **Taus** In good shape?
  - **MET**
    1) Sasha's corrections for unclustered energy
    2) What size jet cone to use???
    3) how to do jet energy corrections to minimize the affect of B field and out-of-cone showering???
    4) What is optimal way to correct unclustered energy???
    5) Is it possible to remove spurious energy from extra interactions, or that got swept to the wrong part of the calorimeter without tracking???
    6) Other ideas to improve met resolution?
    7) Need people to work on these!!! Is anybody working on these now???

Outline: L2.0

- **Resolutions, efficiency versus rejection curves for object**
  - Jets Andrei will do?
  - MET. Pal will do?
  - tau's. Sasha/Ritva will do
- **L2.0 Trigger Table**
  - people responsible for each signal will do
- **Rates**
  - Jets. Need somebody to do
  - taus. Sasha/Rita will do
  - MET. Need to do algorithm development first!
- **Efficiency for signals**
- **Timing Tests**

Outline: L2.1

- **Algorithms**
  - **Jets**

    Use pixels to remove jets from pielup vertices (not started yet)
  - **MET**

    Use pixels to remove jets from pileup vertices (not started yet)
  - **taus**. Done
- **Resolutions**
  - **Jets.** Resolution same as at L2.0
  - **taus**. Resolution same as at L2.0
  - **MET**. Resolution should improve. Need somebody to work on this.
- **trigger table**
- **rates**
- **Efficiency for signal**
- **timing tests**

Outline: L3.0

- **Algorithms**
  - **Jets**
    1) Identify individual hadrons and phtons in jets, use tracks to get better measurement of charged hadrons. (Dan, Olga, Irina? Others would be useful)
    2) Do we want separate calibrations for b's and tau's at this level**???** (if 1) works, might not need separate for tau's (except for neutrinos))
  - **MET**

    Same as for jets (need manpower)
  - **taus.**
- **Resolutions**
- **trigger table**
- **rates**
- **Efficiency for signal**
- **timing tests**

Outline: End

- **Samples for evaluating efficiencies, backgrounds**

  People in charge of each signal will do

- **Final Trigger Table with Rates**