Meeting of 16 October 1997

8:00 in the Ninth Circle

Agenda:

- any progress in studies?
- preparations for trigger workshop:
  scope of STT, needs, questions
- plan, strategy:
  proposal? D0note? review by collaboration?
  timescale, deadlines?
  how to obtain resources and funding?

People present at meeting:
Fred Borcherding,Hugh Montgomery, Meenakshi Narain, Doug Norman, Frédéric Stichelbaut, Horst Wahl, Harry Weerts Andrzej Zieminski,

MINUTES OF MEETING:

1. **Plan, strategy** [Mont]
   During a discussion with John Peoples whose main purpose was to brief him about the French involvemnt in D0, the subject of the STT was also raised by the spokespersons. John suggested that, when ready, DØ go to the PMG (project management group), to define if it is a scope change or whether it can be subsumed under the heading of the already approved upgrade program. In order to be ready for this, we **should generate a full write-up of our present understanding by Christmas**, even if the design is not complete. The write-up should also contain information about manpower needs, cost, schedule, etc.. Open questions which will have to be answered include:
   ◦ who does it (many groups appear now to be interested),
   ◦ what are the engineering needs for a full design (FSU, BU, Fermilab,..). This write-up could then also form the basis of a proposal to get funding, if needed.
2. **STT scope, questions** [Horst]
   Horst presented a slightly updated version of the proposed scope of the STT, as well as some open questions:
   List of tasks of STT (wishlist) :
   (a) cluster (hit) finding in Si detector:
      - r-phi clusters (needed for track finding and fitting)
      - 90 deg. clusters (needed for z_vertex finding)
      - u-v clusters (2 deg. stereo) (not needed at L2, but useful in L3?)
      - disks??

      notes:
      - this requires optical splitting of information coming from SVX2;
      - cluster finding is done during read-out of raw Si detector information;
        => does not need "real time"

(b) ship cluster information to L3, to be used in tracking
(in addition to raw detector information, not instead of it)
(appears feasible, at least in principle)
bandwidth?? time needed?

(c) L2 track finding and fitting:

- get CFT track candidates
  16 tracks per 60 degree wedge, i.e. max 96 tracks (not just 20 highest pt tracks!!)
  note: assume that CFT information is available at L1 accept time
  (or very shortly thereafter – well before end of digitization in SVX2)
- identify r-phi clusters which are in CFT road,
  - map r-phi hits to physical coordinates
  - obtain rough z-information of track (from barrel number)
  - hand on r-phi hits and z-info to DSP for track fitting (via VME-64 bus)
- compute track parameters in DSP
  - fit track using hit coordinates in CFT road,
    get p and impact parameter
  - notes:
    * should not fit just one track in CFT road:
      start with most probable hit (closest to center of road), try next best hit if chisq too big;
      (number of possible iterations depends on number and speed of DSP's)
    * or do some preselection of best hits to use before fitting (CDF's consistency check?)
    * need algorithm which allows for primary vertex not at (x=0,y=0), to allow for beam tilt effects
    * need estimate of transverse beam position for calculation of impact parameter, to correct for beam tilt; (at least barrel information)
- ship pt and impact parameter for all found tracks to global L2

(d) z_vertex finding:

- use z-clusters found by z-clusterfinder to obtain z of vertices, e.g. with scaling and histogramming algorithm;
- ship z_vertex and associated multiplicity to global L2

Questions:

- CFT studies to be done:
  ∘ quantify fake track problem
  ∘ fake tracks due to detector resolution or algorithm?
  (any reasonable hope for improvement?)
  ∘ in the new scheme without double tracks, how often is the high pt track the right one?
- plans for CFT preprocessor:
  ∘ what information will it provide? – when?
  ∘ use uv information?
- how much do we gain at L3 by knowledge of SVX clusters?
- quantify influence of z_vertex knowledge on trigger rates (Et, missing Et) and efficiency turn-on

- how much time needed/available for track fitting in DSP?
- possible to do several fits in parallel?
  (send track candidates with chisq to L2 global?)
- improve STT track fitting algorithm:
  - xy position of primary vertex
  - preselection of hits
- how much information can we send to L2 global?
  how much do we want/need to send?
- what are the limitations on sending information to L3?
  bandwidth? time? number of geographic sectors?

discussion:

- can we get more information from the CFT trigger?
  Fred: not with the presently foreseen amount of hardware; will have to study if the newly proposed scheme fulfils the requirements.
- philosophy question: does one want an independent CFT L2 processor, or should CFT information go to L2GLB via a preprocessor which merges it with SVX information (as CDF does it)?