Part VI

Off-Line Software

Chapter 37

Detector Simulation

37.1 GEANT SVT Implementation

Requirement:
statement of requirement

Justification:
justification of requirement

37.2 SDD Response Simulator

Requirement:
statement of requirement

Justification:
justification of requirement

37.3 Calibration Simulaor

Requirement:
statement of requirement; ability to reconstruct drift veolcity profile

Justification:
justification of requirement

37.4 Alignment Simulator

Requirement:
statement of requirement; ability to find actual positions

Justification:
justification of requirement

Chapter 38

Calibration/Alignment

38.1 Pedestal Averages and Width Determination

Requirement:

The calibration system software includes code, to be ran on the I960, to calculate the pedestal averages and widths.

Justification:

The pedestal averages are required for the on-line zero suppression of the data. The calculation of the averages and widths within the I960 avoids the (hardware) read out of un-zero-suppressed or full events. It also allows a short calculation time as the calculation is distributed among many processors operating in parallel.

Requirement:

The pedestal averages and widths are stored to the data base and passed to the monitoring system.

Justification:

The tasks of calibration and monitoring are kept separate.

Requirement:

The pedestal averages are loaded into the ASICs memories.

Justification:

The very reason to calculate them.

38.2 Gain Determination

Requirement:
The calibration system software includes code, to be run on some on-line host, to calculate gain averages and widths for every anodes based on charge injection on all wafer at precise location.

Justification:
The gains are an essential component of the analysis. They should in principle be constant. Variations of the gain might result from electronics gain variation in particular and must therefore be kept track of.

Requirement:
The calibration system software includes code to translate the gain averages measured by charge injection into gain look-up tables to be down-loaded into the ASICs memories.

Justification:
Gain corrections are performed in a distributed fashion by the ASICs so that the data sent to the trigger have a straightforward interpretation. The mechanism for gain correction is based on fast lookup tables. These tables are obtained from a desired gain function taking into account the known non-linearities of the electronics, the bit reduction/compression (10 bits to 8 bits mapping) and the gain measured by charge injection.

38.3 Dead and Hot Channels

Requirement:
The calibration system software includes code, to be run on some on-line host, to identify dead and hot or noisy channels. The identication proceeds among other method on the basis of the width of the pedestals and gains. It also uses the occupency of the pads.

Justification:
The location of dead channels has to be accounted for when reconstructing hits positions in order to reach the optimal position resolution.

Requirement:
The list of dead and noisy/hot channels is stored to the data-base.

Justification:

Information stored by the data-base becomes available both off-line and on-line. In particular, it can be used by the monitoring systems to raise alarms if for instance the number of bad channels has become exceedingly large.

38.4 Zero Suppression Parameters

Requirement:
The calibration system software includes code to estimate the optimal threshold values to be used in the zero suppression on board the ASICs.

Justification:
The optimal thresholds are a function of the signal to noise ratio and should be revised periodically.

Status:
This requirement requires further study by monte carlo simulations. It is unlikely that one would let the calibration software set the threshold automatically. However, software could be used to "suggest" the optimal values to be set by the SVT operator.

38.5 Time Offset

Requirement:
Short statement of requirement

Justification: Justification of requirement

38.6 Average Drift Velocity

Requirement:
Short statement of requirement
Justification:
Justification of requirement

38.7 Differential Nonlinearities

Requirement:
Short statement of requirement
Justification:
Justification of requirement

38.8 Detector Alignment and Positions

Requirement:
Short statement of requirement

Justification:
Justification of the requirement.

38.9 Alignment

Requirement:
Short statement of requirement.

Justification:
Justification of the requirement.
Requirement:
statement of requirement

Justification:
justification of requirement

Chapter 39

Monitoring of Performance

Requirement:
statement of requirement

Justification:
justification of requirement

Chapter 40

Event Reconstruction Software

Requirement:
calibration, cluster finder, space point extraction, track finding, track matching, PID, dE/dx, particle reconstruction

Justification:
justification of requirement

Chapter 41

Event Display

Requirement:
statement of requirement

Justification:
justification of requirement

Chapter 42

Physics Analysis

Requirement:
statement of requirement

Justification:
justification of requirement