

# DCS

## Introduction

The pixel Detector Control System (DCS) handles all units which are necessary to operate the detector safely and to ensure reliable data taking. This includes hardware devices as well as several software components. The state of the ATLAS pixel detector is continuously recorded by archiving DCS variables. For each data point, it can be specified how much a value has to vary before a new data point is recorded (deadband). In addition, a writing of a new data point may be forced if it has not been written for some time (timeout).

## Current Projects

The volume of data archived is growing rapidly. We can tune the deadband and timeout parameters to reduce data volume while preserving sensitivity to significant changes.

### Timeout versus deadband

In general timeout and deadband are *correlated*, so that changing one of them also changes the effect that changes in the other will have. This can be simulated, as done by this **script**. In practice however, in most cases one of the two is the dominant limiting factor, so that changing the other will have virtually no effect. Thus, the problem decouples and the reduction of archiving rates can be done in two separate steps (see **below**).

### Delta-value distribution

Most characteristics for a given data point type can be deduced by plotting the changes in values over a one day period. Usually the deadband cut on the delta-values is clearly visible. The entries left from it are the timeout events.

### Average writes per day distribution

The average number of writes are calculated over a period of 14 days, where the detector was in stable operation, looping over all data points belonging to the specific data point type. This plot allows for an identification of outlier data point types which are written with extreme frequencies.

### Required accuracies versus measurement precision

The required accuracy was defined by the detector experts for each data point type (see **here**). Obviously, it can not be smaller than the measurement precision given by the usual fluctuation of a variable. The deadband has to be set between these two values.

## Past Projects

We provided a tool to monitor the time dependence of important data points in the form of daily trends. The first step is to query the DCS database and extract the relevant information. This is then plotted as a function of time. Related quantities such as the temperature of all the modules on a stave are plotted on the same plot. And related plots, such as the voltage plots for the entire pixel detector, are collected into one single web page. This hierarchical layout can be specified in a simple text file.