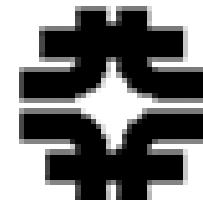


2002 S.I.S.T Program

FermiLab **CDF** SlowControl

Icicle DAQ



“The highrise of CDF SlowControl”

Presented by

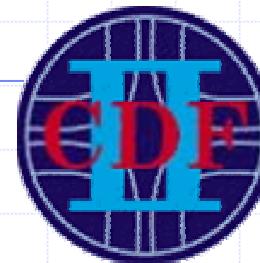
Ravin Ramananjara Pierre.

(Aero Eng / CS)

Supervised by

William F. Badgett Ph.D.

(CDF PP Division)



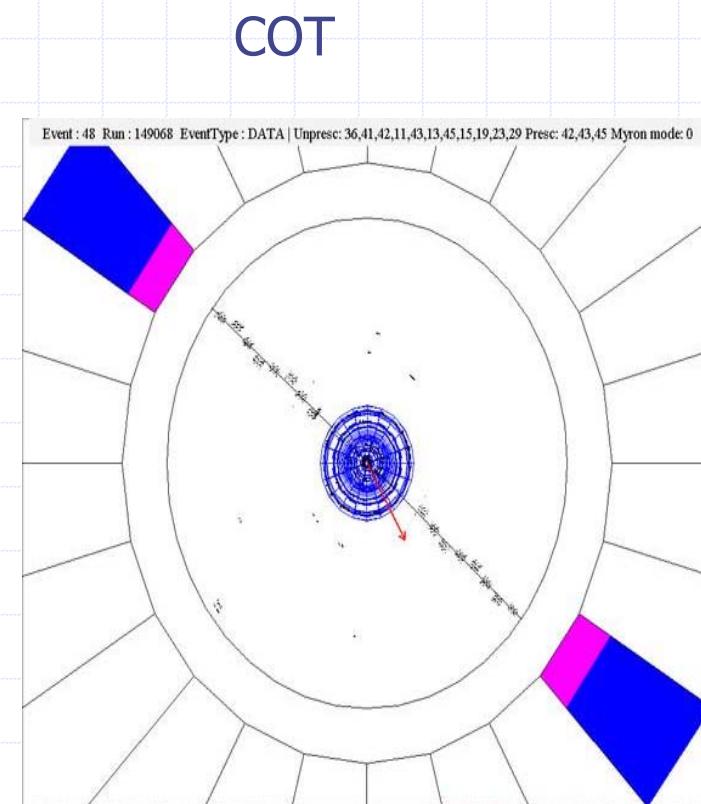
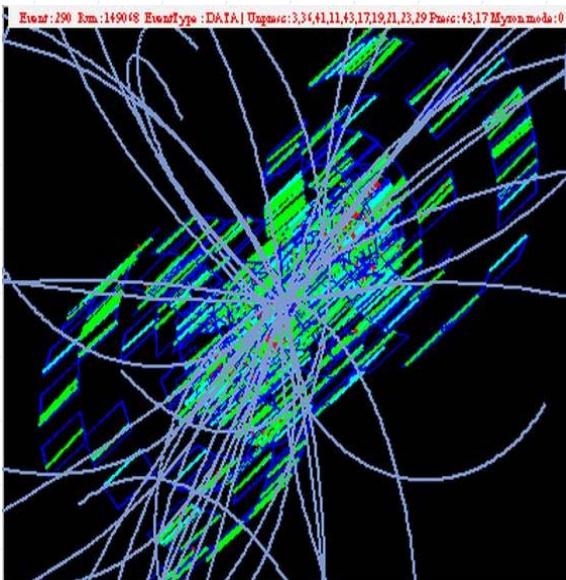
# Overview

- ◆ What are the detectors?
- ◆ What is Online/Offline and DAQ in relation to Detectors?
- ◆ What is Icicle?
- ◆ What is SlowControl and **where** it fits in?

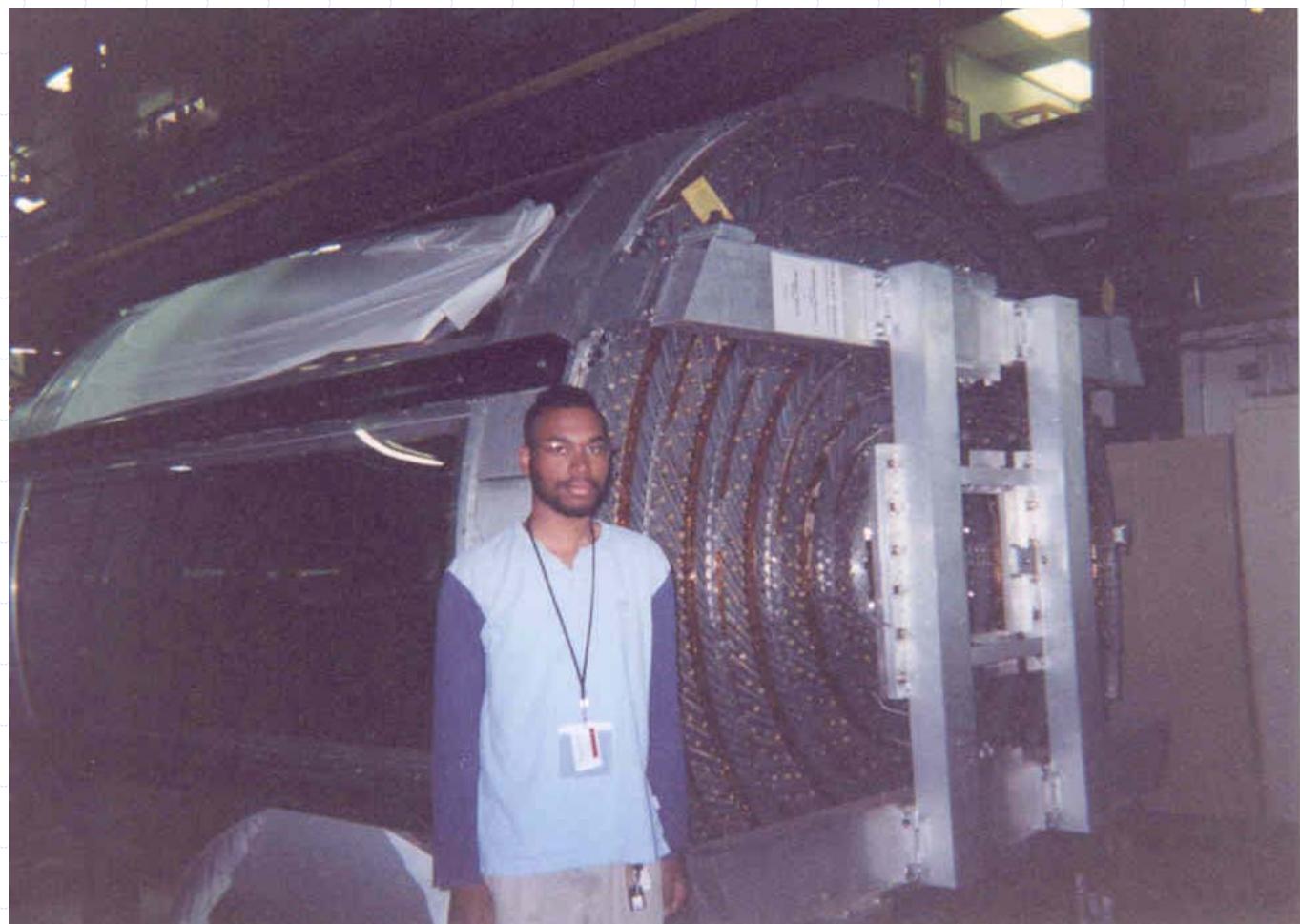
# Detectors

## ◆ Several Detectors of different types

- Tracking (path and momenta)
  - ◆ SVX II  
ISL



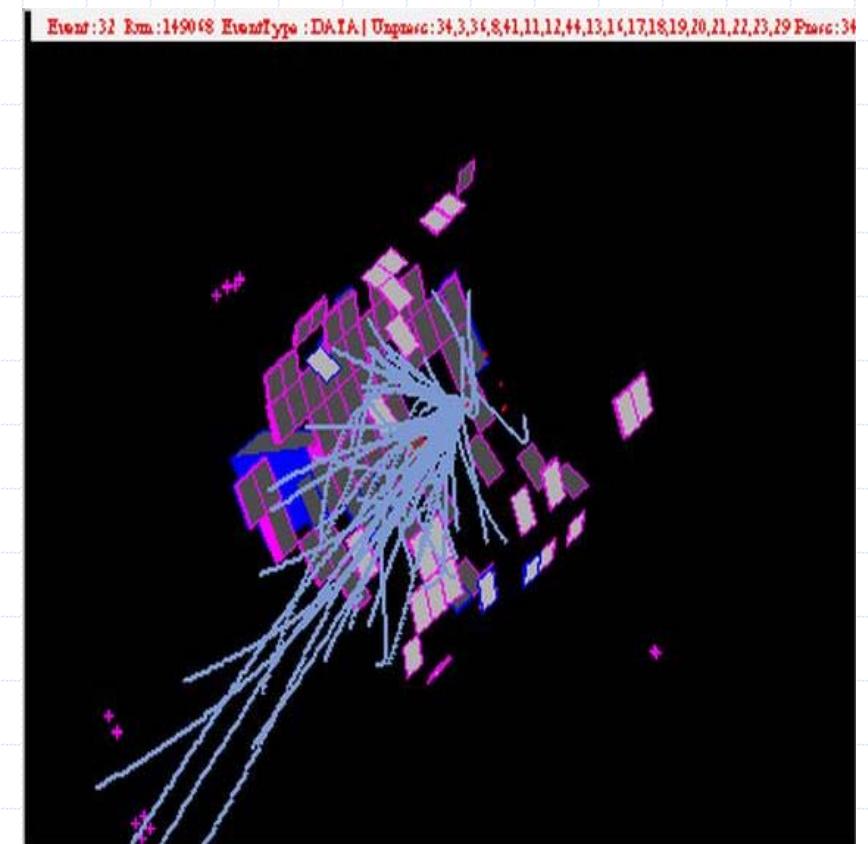
Example of antique detector CDF Run I, the CTC.



# Detectors

## ◆ Several Detectors of different types

- Calorimetry (energy)
  - ◆ CEM
  - ◆ CHA
  - ◆ PEM



## Example of active calorimeter detector.



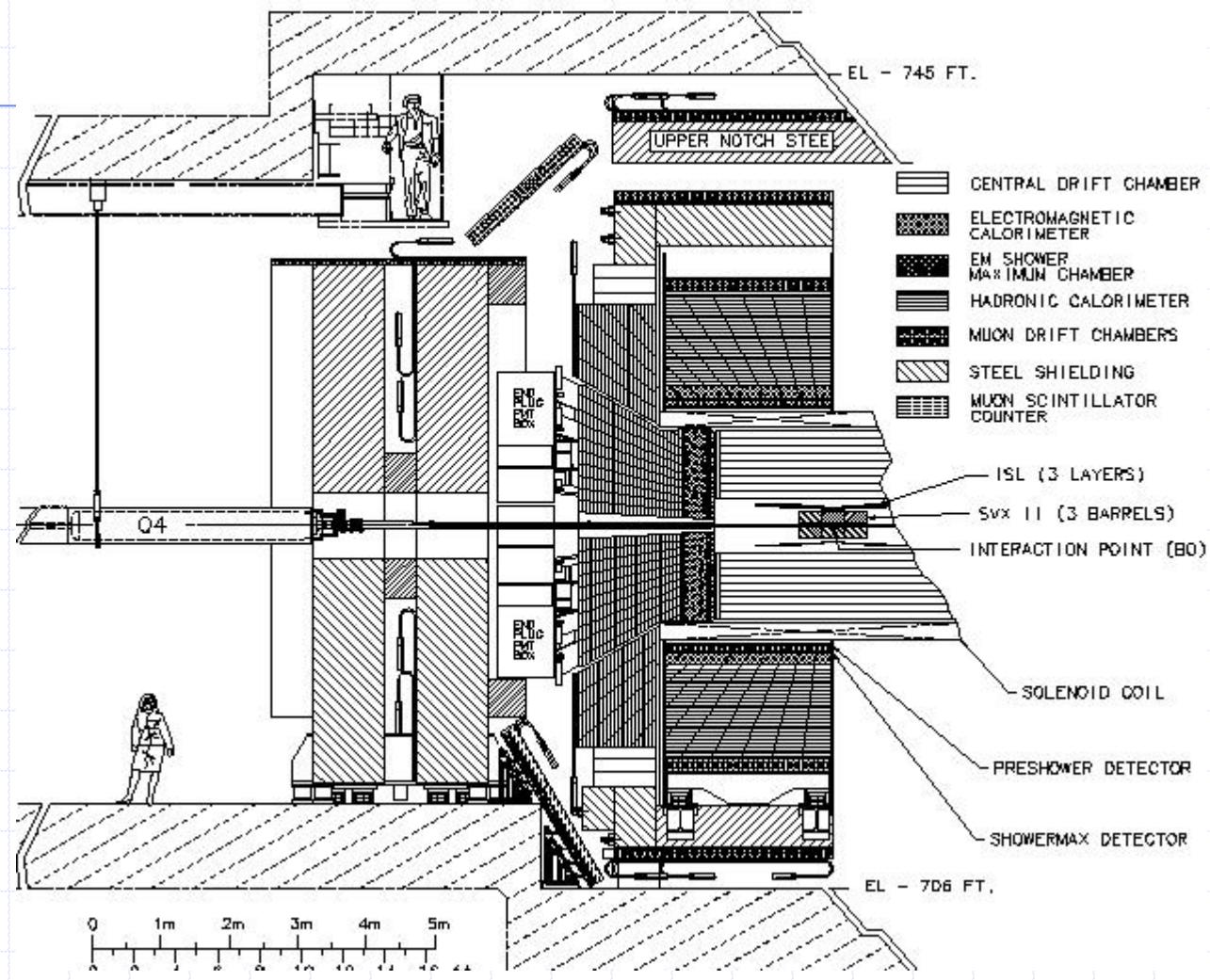
# Detectors

## ◆ Several Detectors of different types

- Muon (just muons)
  - ◆ CMU
  - ◆ CMP
  - ◆ CMX

## Example of active muon detector.



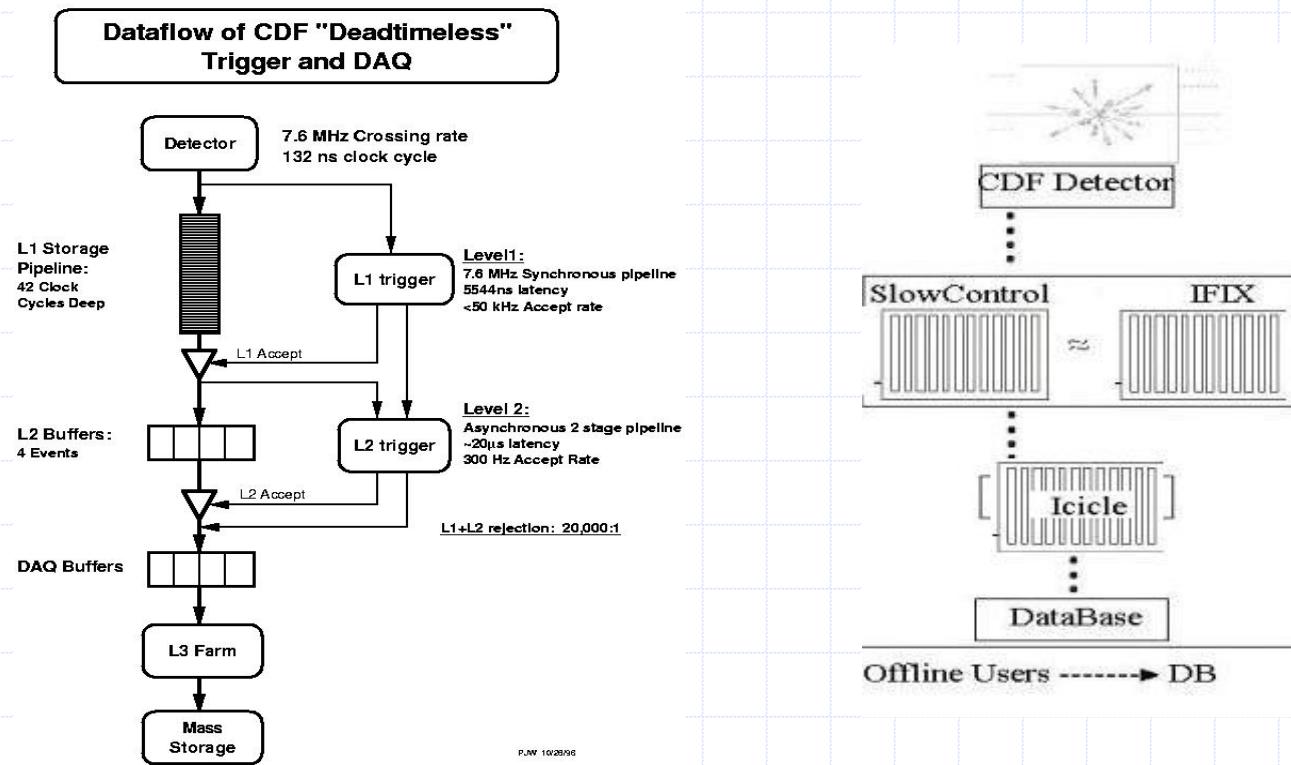


# DAQ

## ◆ Data Acquisition. (DAQ)

### ■ Detector to Storage

■ Approximately 600 Mbytes/sec



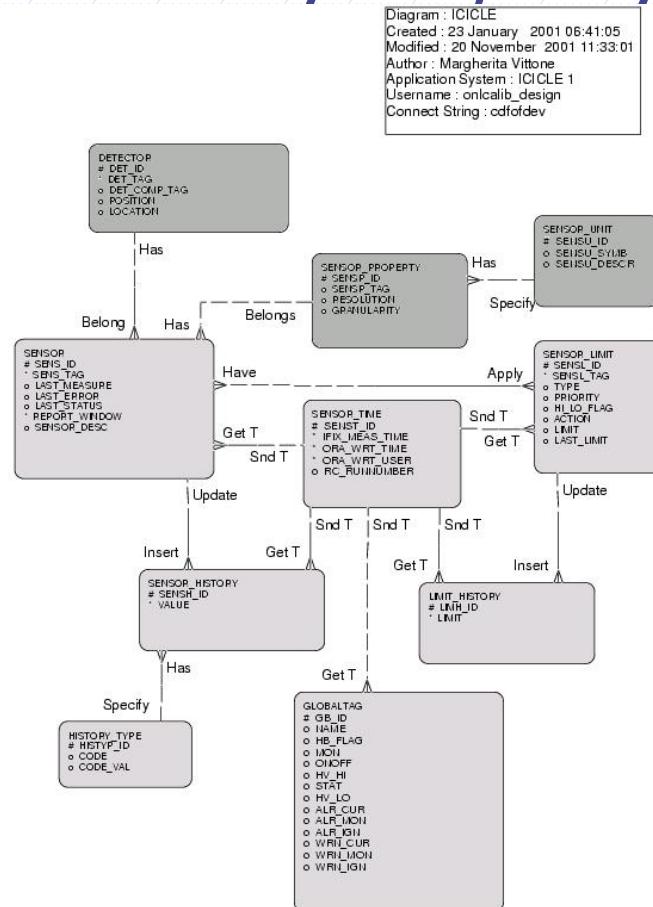
# Offline and Online @ CDF

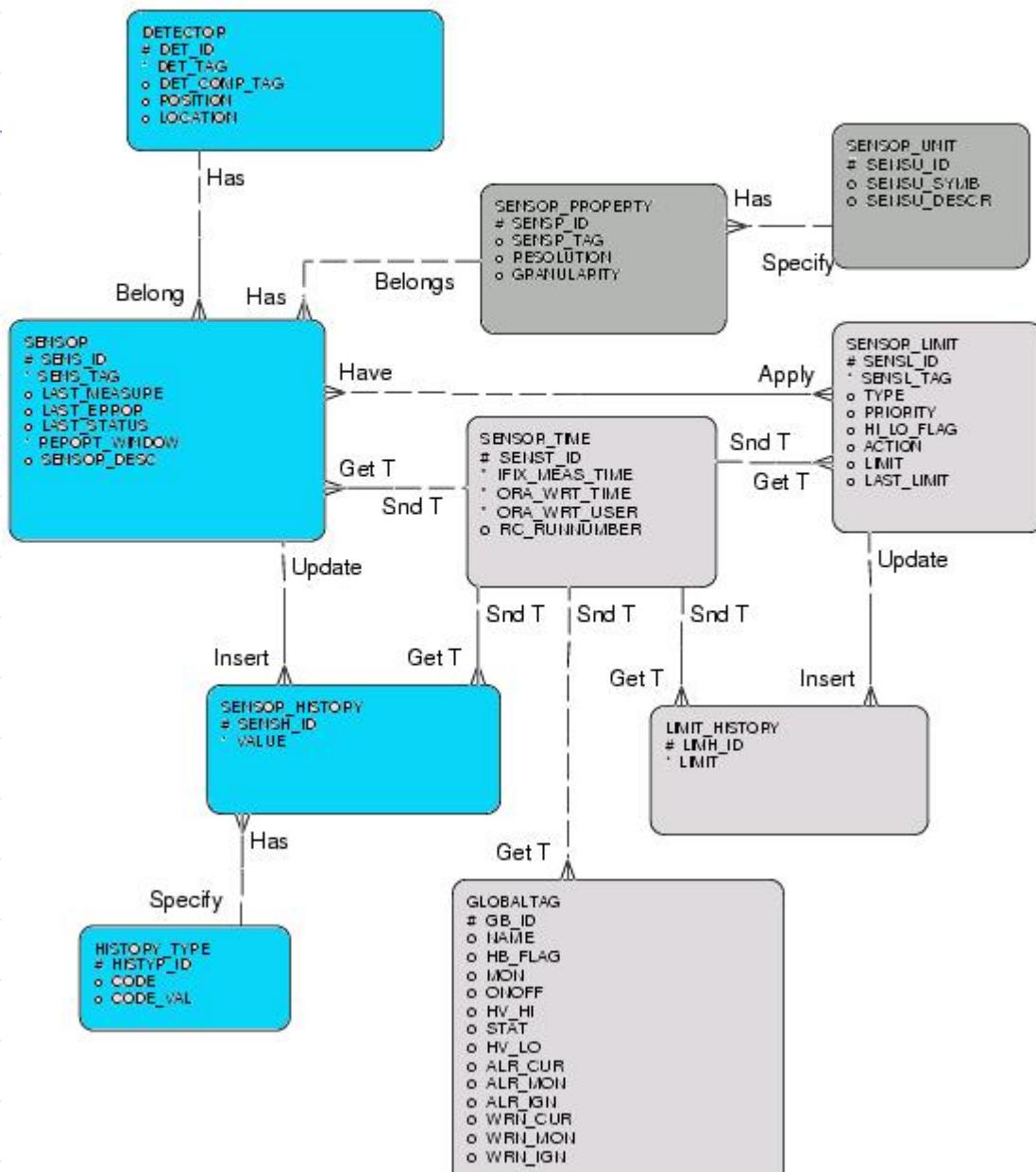
## ◆ Oracle™ DB

- ◆ Runs on System Query Language (SQL)
- ◆ Different Existing DB
  - RunDB
  - HdwDB
  - Calib DB
  - Trigger DB
  - FileCatalog DB
  - and SlowControl DB

# SlowControl DB /Icicle Procedure Analysis

Monitors at significantly lower rates,  
about a few Mbytes / day.





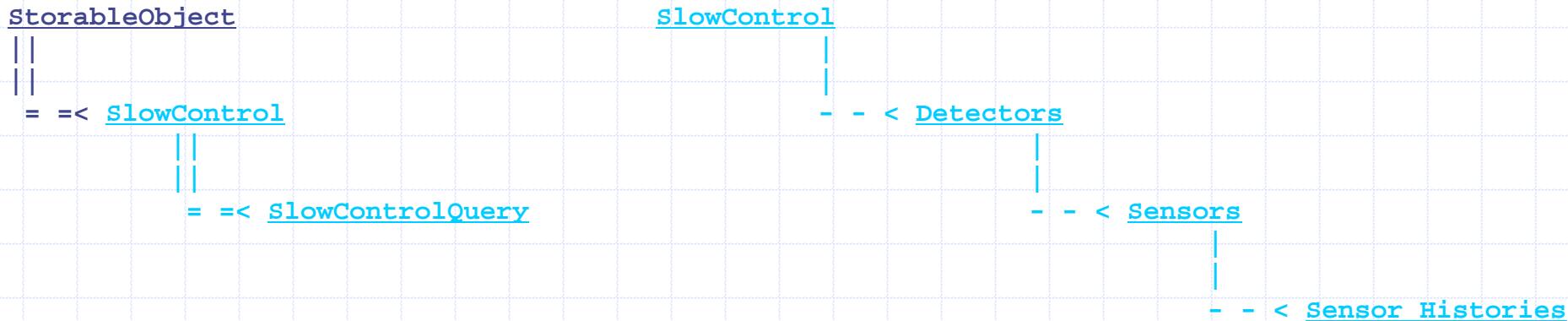
# What is Icicle?

- ◆ AC++ modules interprets raw data into useful output.
  - ie. HeaderObjects module
- ◆ Icicle allows easier access to SlowControl DB for data interpretation.
- ◆ SlowControl (object) bridges AC++ to the SlowControl DB.
  - Therefore, to request the data, SlowControlQuery objects are created.

# AC++ Framework

◆ From Containers like StorableObjects to SlowControl.

- -fill the container member variables from the data fields.
- with string requests from SlowControlQuery the data called upon



```
//From SlowControl.hh

#include "Edm/StorableObject.hh"

class SlowControl
{
    bool      fetchSuccess;           //retrieval flag
    int       fetchTime;             //time when retrieved
    string    dbName;                //name of database
    int       dbTime;                //timing of database

    int beginTime;                  // Time range to be used when
    int endTime;                   // querying the database

    int nDetectors;                 //Detector Counter
    std::map<int,Detectors> DetectorsMap; //recursive subclass objects
                                         //Dynamic number of detectors.

}
```

The diagram illustrates the inheritance structure of the `SlowControl` class. It is shown as a blue-bordered box containing the code. Above the box, a UML class diagram is overlaid, showing the following relationships:

- `SlowControl` inherits from `Detectors` (indicated by a dashed line).
- `Detectors` inherits from `Sensors` (indicated by a dashed line).
- `Sensors` inherits from `Sensor Histories` (indicated by a dashed line).

Each class name in the code is color-coded to match its corresponding UML class in the diagram.

```

SlowControl
|-----< Detectors
|-----< Sensors
|-----< Sensor Histories

//From Detectors.cc //From Sensors.cc

class Detectors
{
    //Data Fields within
    //the Detectors Table
    int det_Id;
    string det_Tag;
    string det_Comp_Tag;
    string position;
    int location;

    int nSensors;
    int nSamples;

    //recursive subclass objects

    std :: map<int,Sensors> DetSensor;
    SensHist;

}

//From SensorHistories.cc

class SensorHistories
{
    int sensh_Id;           //Data Fields within the
    int value;              //the Sensor History Table
}

```

# In the Long Run...

- ◆ SlowControl and SlowControlQuery, the code extracts and retrieves data through AC++.
- ◆ Root, from CERN
- ◆ Communication code interface package
  - Graphical Example
    - ◆ <http://cdf-fs2.fnal.gov:3000/plug/javachart/icicle.htm>

# Recapitulate:

- ◆ What are the detectors?
- ◆ What is Online/Offline and DAQ in relation to Detectors?
- ◆ What is Icicle?
- ◆ What is SlowControl and **where** it fits in?

{//Insert Audience Questions or Comments here...}

