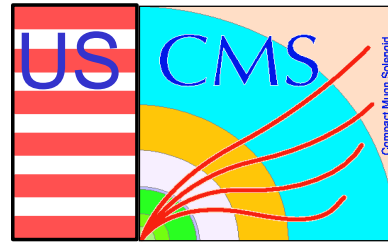# Status of the Anode Front - End Electronics

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EMU Meeting

CMU

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Outline

- **AFEB status from tests at FAST sites and ISR**

- **AFEB - ALCT Cables**

- **AFEB Test Stand status**

- **Use of ROOT for the test data analysis**

AFEB status

- **FAST sites (UF, UCLA, IHEP, PNPI, Sep. 2003) (http://www.phys.ufl.edu/cms/emu/fast/failure-stats.html)**
    - **175 tested CSCs (ME234/2,ME2/1, ME1/2)**
    - **4650 tested AFEBs**
    - **~27 AFEBs with problems (0.6%), not counting misuse of Cint**
    - **~27 AFEBs replaced (0.6%)**
    - **Problems**
        - **55% - crosstalk**
        - **19% - threshold, noise out of limits**
        - **22% - mechanical (latches, connectors)**
        - **4%   - others**

- **ISR site (Oct. 2003)**
  (http://isr-site.web.cern.ch/ISR-site/images/ProblemsRep.htm)
  - **105 tested CSCs (ME234/2, ME2/1)**
  - **2844 tested AFEBs**
  - **~18 AFEBs with problem (0.6%)**
  - **problems:**
    - **60% - mechanical (loose screws, connectors – fixed)**
    - **35% - out of limits parameters**
    - **5% - dead channel (1 AFEB)**

AFEB - ALCT Cables

- **All 10,596 cables, including spares (221), are finished**
  - **total of 412 + 1 (for UF test stand) sets**
  - **includes ME4/1 upscope (38 sets) for PNPI**
  - **all cable sets delivered to FAST sites (sets balance for ME4/1 awaiting shipment to PNPI)**
  - **All spare cables delivered to FAST sites (81 cables will be sent to ISR)**

- **Problems**
  - **14 cables (0.3%) from 4650 tested on chambers at FAST sites**
  - **No connection or inverted connectors on AFEB side**

- **Shipped in April, 2003 to CERN, installed at ISR**
  - **for future test of repaired AFEBs**
  - **includes PC, CAMAC, digital scope, adapter etc.**

- **Tests stand software upgraded, documentation about completed, available from the CSC Web page at CERN** (http://cmsdoc.cern.ch/cms/MUON/csc/doc/afeb_doc/afebdoc.html)
  - **hardware and software manuals**
  - **instructions for operator**

Use of ROOT for the test data analysis

- **ROOT, An Object-Oriented Data Analysis Framework (http://root.cern.ch)**

- **Making and using a ROOT tree with CSC/Trigger objects in TClonesArray(s), a ROOT collection class**
  - **start of project in May, 2003**
  - **CSC objects (hits, tracks, trigger)**
  - **EmuDAQ/Analysis package for offline analysis of the test beam data (with J. Mumford, A. Tumanov, S. Valouev and R. Wilkinson), see US-CMS Slice Test Software Repository, http://www.phys.ufl.edu/~tfcvs**
    - **packing all CSC + LCT + Trigger info into a tree for any # of CSC**
    - **using ORCA classes**
  - **planning to use the same approach for:**
    - **global view of the FAST sites + ISR test results**
    - **making trees from data and results coming from the CSC tests on disks**

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- **Good examples of quick ROOT implementation for the CERN test beam 2003 data analysis (US-CMS Slice test Software Repository, http://www.phys.ufl.edu/~tfcvs)**

  - **EmuDAQ/DataFormat/analysis package (J. Mumford, S. Valouev, A. Tumanov, R. Wilkinson et al.)**

    - packing LCT and Trigger info for two CSC into ROOT Ntuples (Trees)
    - makes use of ORCA classes

  - **UCLA Event Display (B. Mohr)**