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# Status of TOB Module Testing and Repair Center at UC Riverside

**Gail Hanson, Geng-yuan Jeng, Asish Satpathy,  
Robert Stringer**

**University of California, Riverside**

**Tracker Week Module Test Meeting July 2005**



# Outline



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- **UCR CMS Tracker Group**
- **The Clean Room**
- **Test Setup**
  - **ARC Testing**
  - **Long Term (LT) Testing**
  - **Visual Inspection**
- **Current Status**
- **Outlook**



# *UCR CMS Silicon Tracker Group*



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- **Faculty**
  - Gail Hanson
- **Post Docs**
  - Gabriella Pásztor
  - Asish Satpathy \*
- **Graduate Students**
  - Geng-yuan Jeng \*
  - Hongliang Liu
  - Robert Stringer (NEW) \*
- **A technician to be hired**



# *The Clean Room*



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- About 100 m<sup>2</sup>
- Class 10000 certified
- Temperature ~20 °C
- Humidity Control  
RH < 50%





# Storage



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# Module Testing Setup



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- **ARC teststand**
  - **Software : ARCS 8.1**
  - **Test on**  
**30200020005063**
    - → with all kinds of faulty channels added deliberately
  - **Able to reproduce and identify expected problems**
    - CMN, shorts, pinholes, etc.

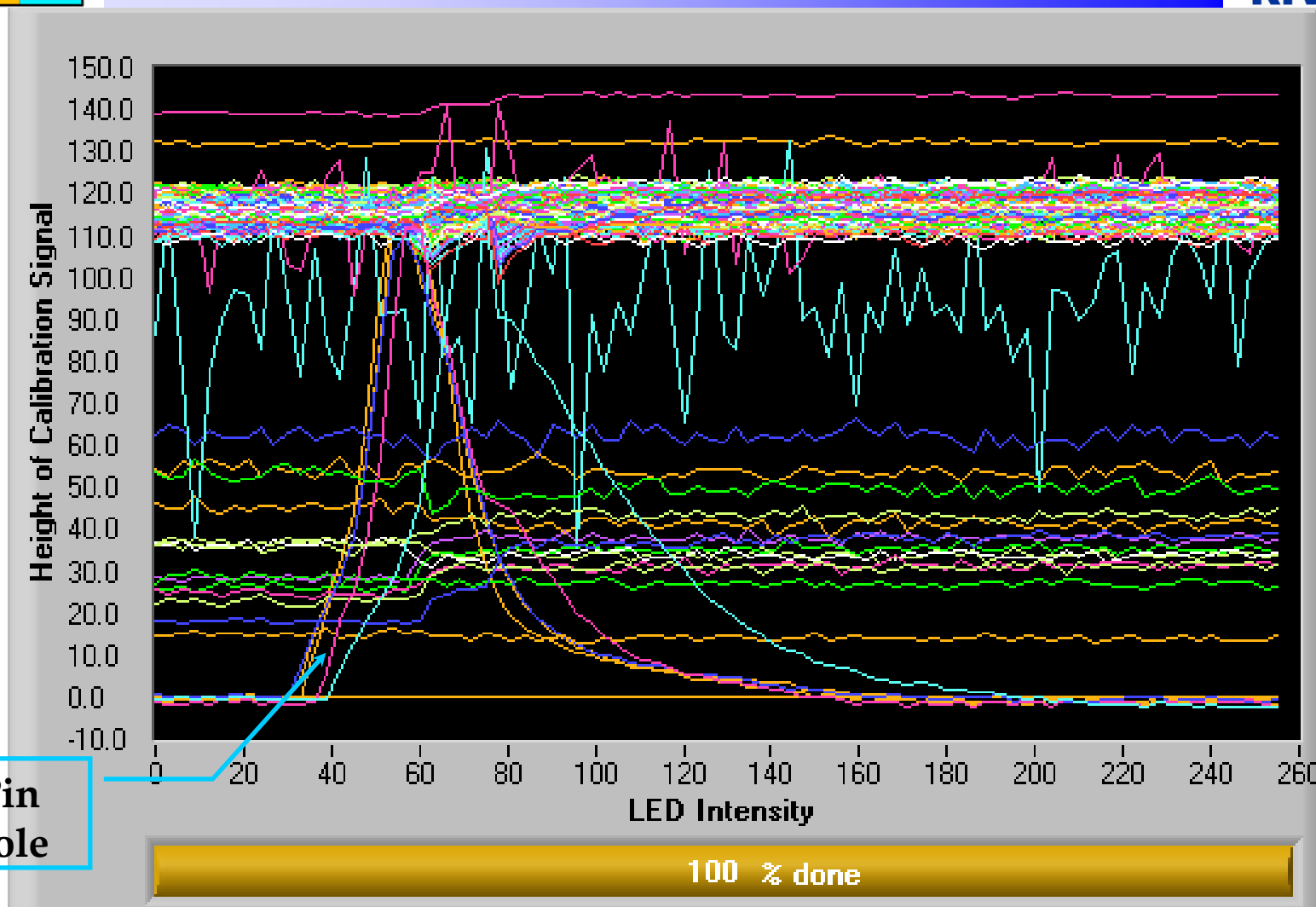




# Results (30200020005063)



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# Module Testing Setup



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## •LT teststand

### • Hardware

- CAENnet A1303 and A128HS ctrl card
- TSC, FED
- VTH Interlock Box and Supply
- Missing Part → TPO + related hardware

### • Software

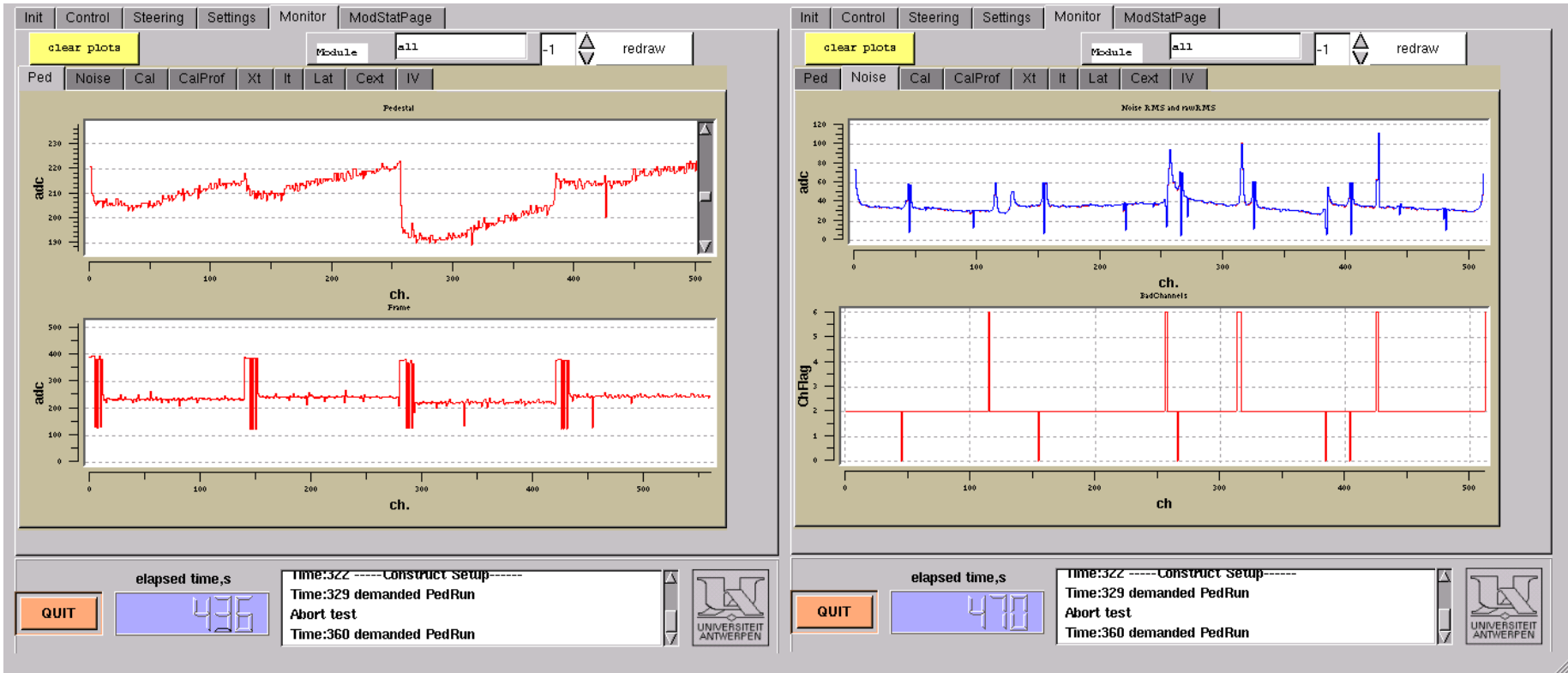
- Many software changes were made during the installation
  - **Install scripts are somewhat out of date**
  - **DAQ stable0703 installed**
  - **Lt\_1\_24**
- Able to run Pedestal data
  - **30200020005063**

### • Unresolved Problems

- Communication with CAEN HV



# Some Results from Pedestal Run



Biased with 400V

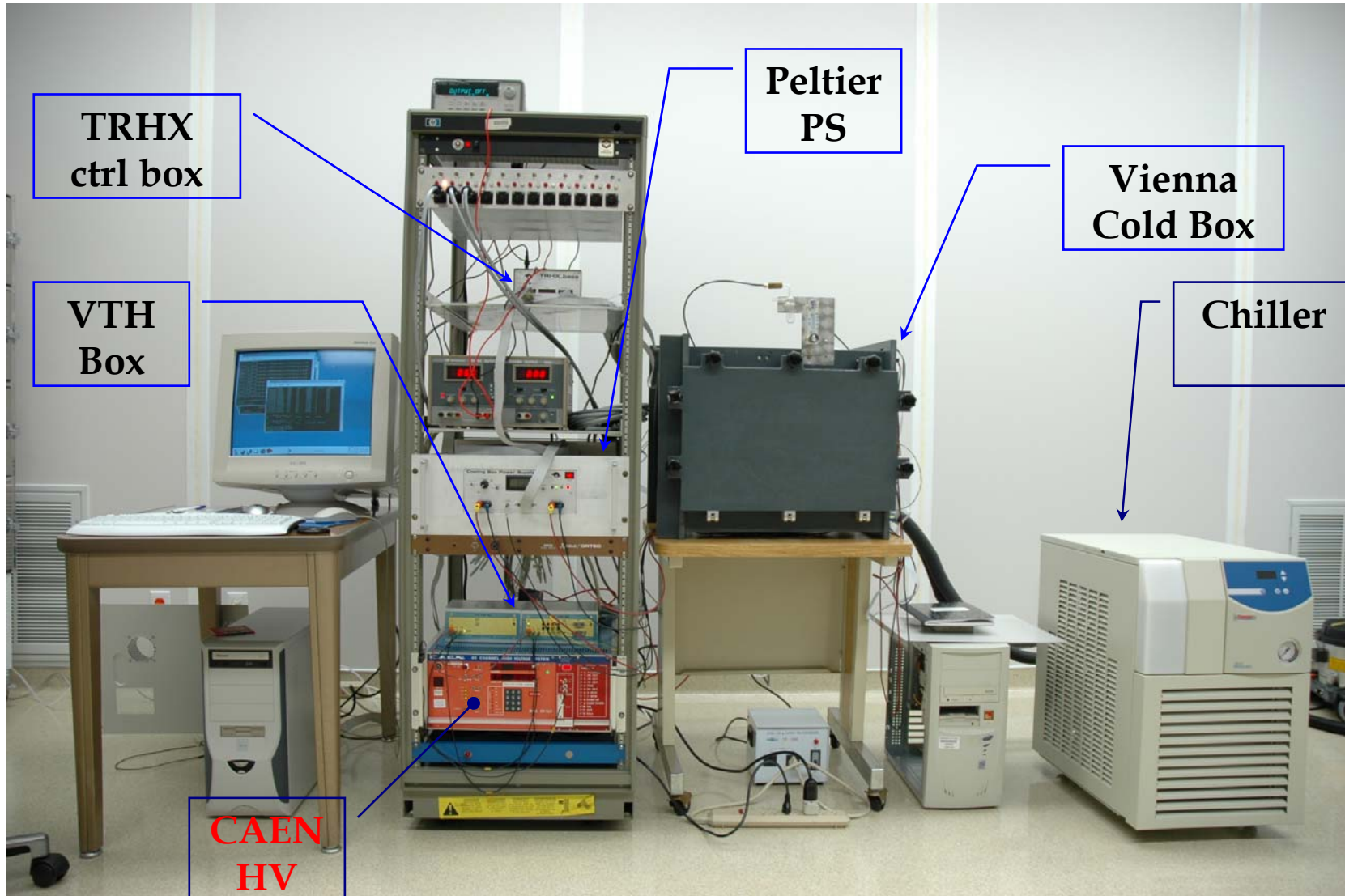




# LT Hardware



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# Visual Inspection



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## • Further Investigation

- **Microscope**
  - Visually inspect bonding problems, scratches, surface contamination and corrosion
  - Mechanical problems
- **Probe Station**  
**ALESSI REL-4500**
- **Digital oscilloscope and logic analyzer**
- **LFHIT**
  - Easy to check electrical connectivity of front-end hybrid





# *Current Status*



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- **With existing equipment we can**
  - Readout module/hybrid with ARCS
  - Readout module with LT teststand
    - Not fully operational yet
  - Visually inspect module/hybrid under microscope
  - Use microprobes to check various clock/data lines using digital oscilloscope and logic analyzer
- **We are almost ready to investigate and certify problematic modules/hybrids and provide feedback on potential failure mode**



# Outlook



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- **Things need to be done:**
  - **Test detail functionality of the LT teststand**
  - **Modify existing storage cabinets with supplied dry air**
  - **Start to receive faulty TOB modules/hybrids with error reports from the production sites**
    - Verify faulty modes of problem modules/hybrids
    - Categorizing and documenting problem modules/hybrids
  - **Collect statistics on failure modes**
    - Study very long term test
  - **Collaborate with TEC and TIB Repair Centers**



# What Modules



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- **All faulty TOB Modules should be sent to Riverside**
  - **Grade C modules (>2% bad channels)**
    - These could be recertified if they had channel flagged incorrectly
  - **Modules with CMN problem**
    - The high noise channels could be removed from readout
  - **Modules with problematic APV's**
    - Groups of 128 channels fail
  - **Modules with “weird” readout problems**
    - Compressed frames → broken hybrid tails
    - I<sup>2</sup>C errors when the module is cold
    - DCU failure
    - ...