PXD Cosmic Test Status at Tabuk

Rachid Ayad, University of Tabuk

1 Introduction and Objectives

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3 Slow Control

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5 EMCM

6 Trigger and Trigger Logic Unit (TLU)

7 Conclusion and Outlook

Introduction and Objectives

1 Determine the pedestals and noise characteristics (individual pixel noise and common mode) of the PXD modules.

2 Study the detection properties of the PXD modules using real tracks such as: efficiency, cluster size and shape, signal height, and gain.

3 Study the uniformity of those properties across the module.

4 Study stability of those properties as function of time.

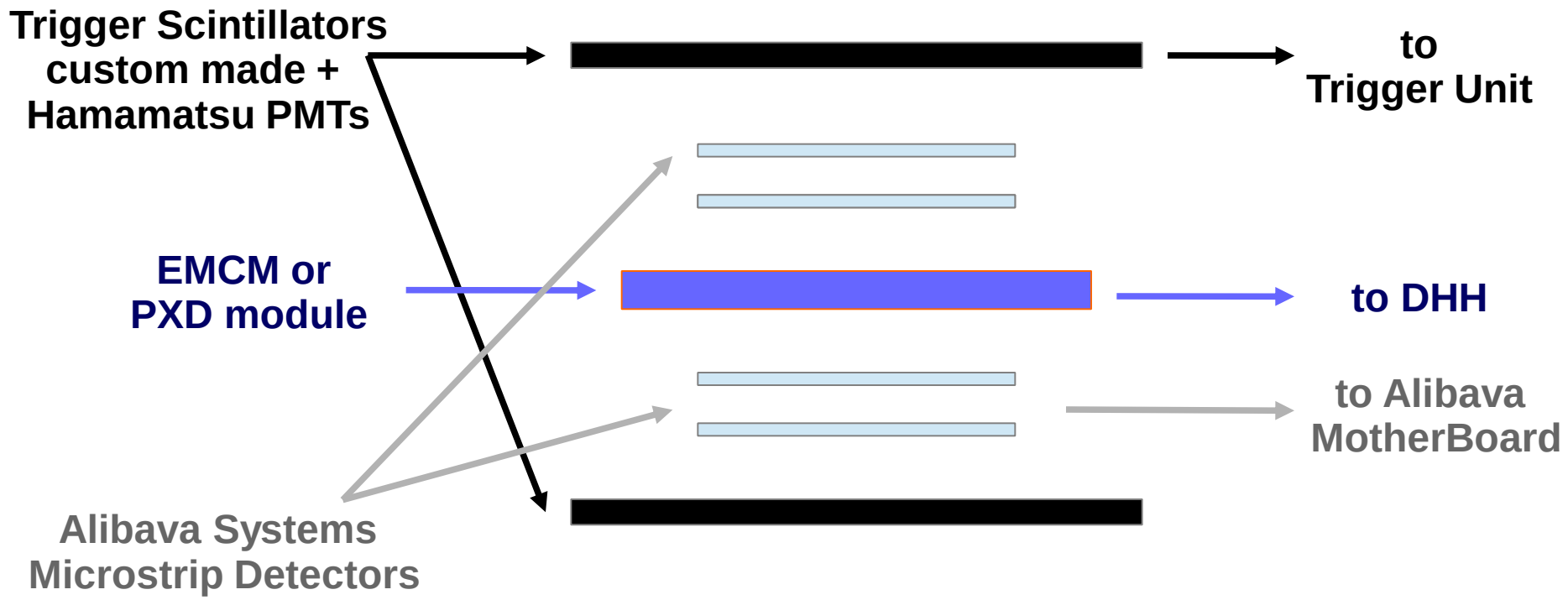
5 Study the dependence on environmental parameter (temperature, humidity).

6 Optimize the operation parameters to obtain the best overall performance.

2 is the main objective:

- 1 is needed by 2 for a good operation
- 3 to 5 need time to achieve them. As planned we will run for a good period of one year before we will be busy with KEK installation and commissioning including KEK cosmic test
- 6 needs all issues 1-5 and it will be to conclude of the cosmic test.

Basic layout



Frame(5 shelves: EMCM, Trackers, and Trigger)

Slow Control Rack

Shelves for readout electronics

SETUP

Chiller for EMCM

1 Right: PC monitors on table for Slow Control and PXD DAQ
2 Left: Big screen with wireless Keyboard and mouse

Scintillator (Top)

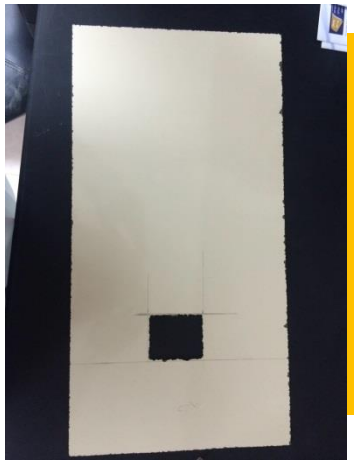
Alibava Tracker 1

EMCM now, PXD module later

Alibava Tracker 2

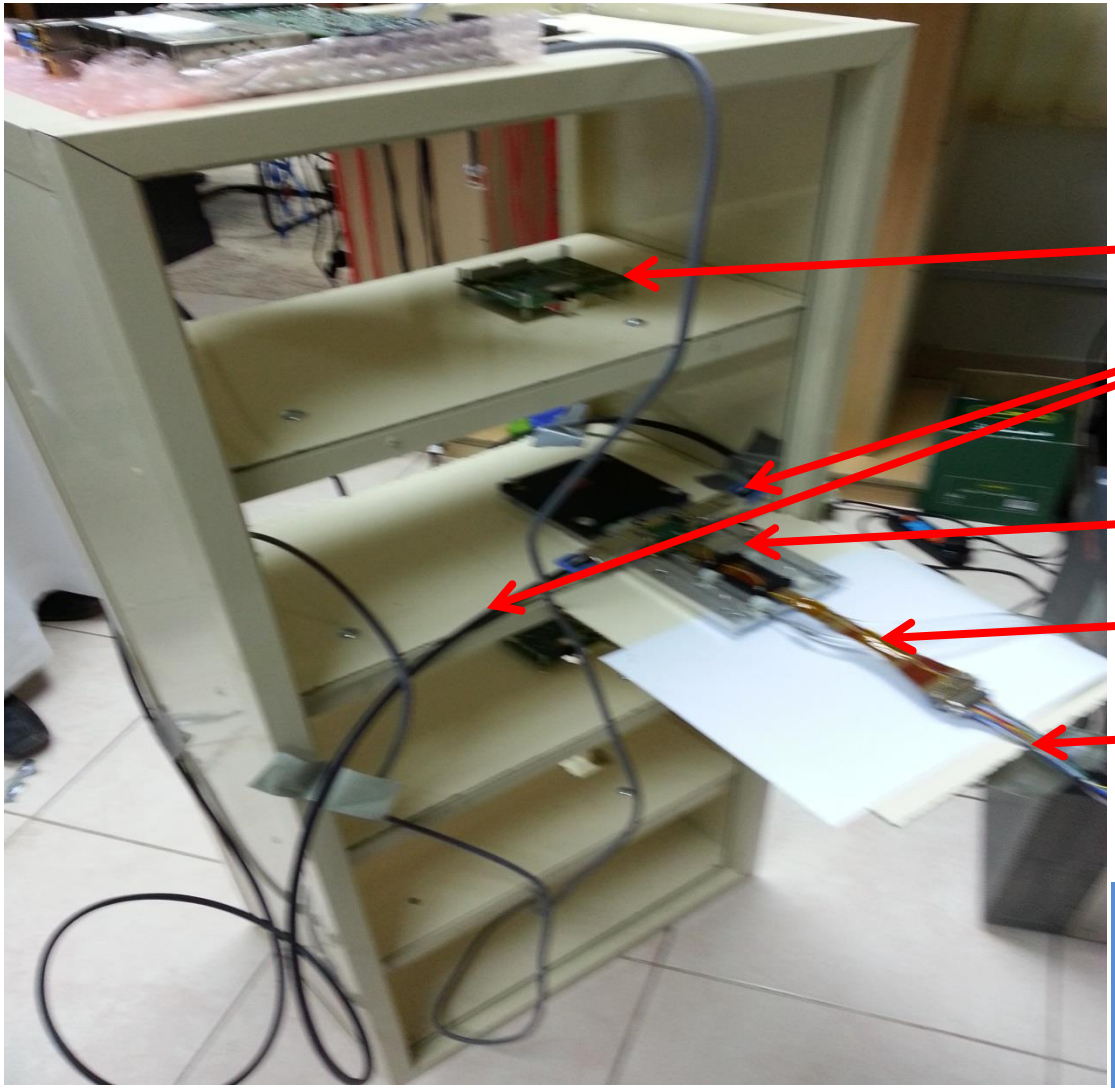
Scintillator (Bottom)

FRAME



The frame is made of Aluminum and hold inside a wood box with door against dust. A removable fiberglass Plate (here left) can be machined to hold detectors. An opening is drilled for muon track or other sources tests.

Zoom on the frame



ALIBAVA Tracker

Two infiniband cables

EMCM piece

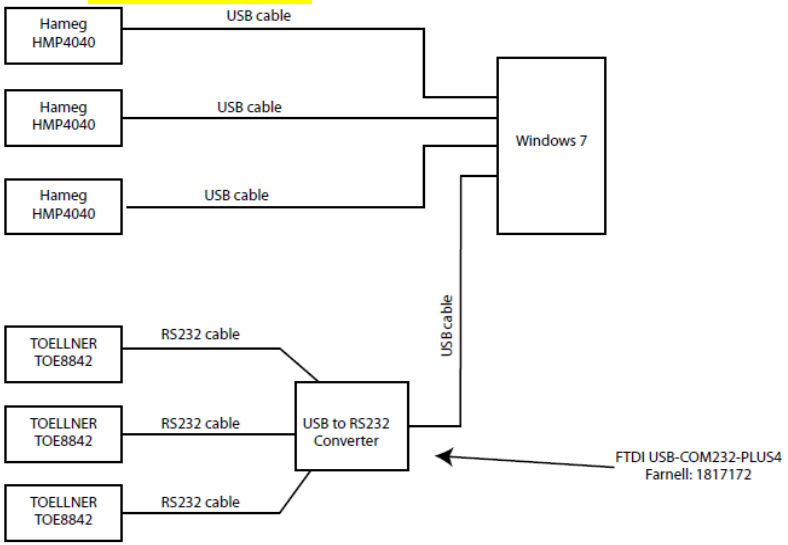
Patch Panel Cable

Cable from breakout board (Slow Control)

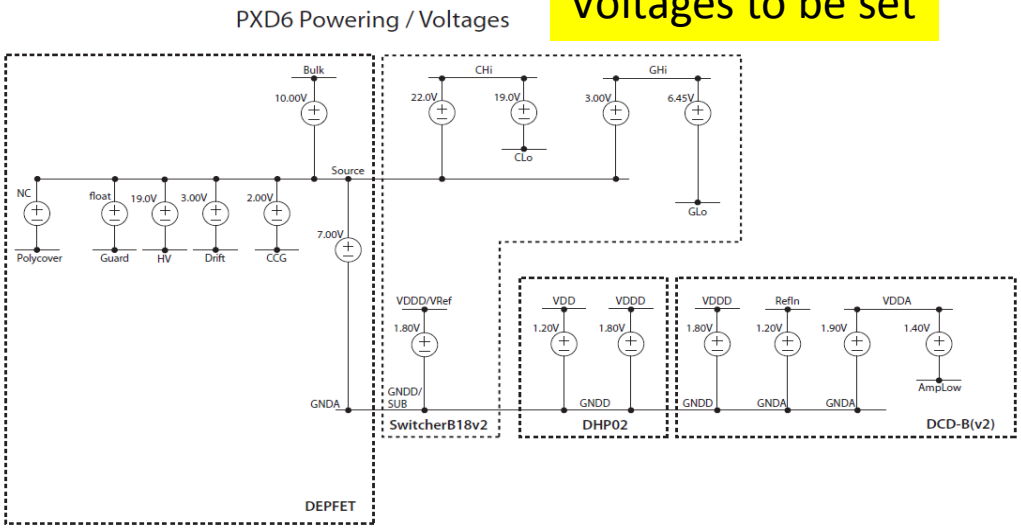
The EMCM removable plate had been extended with and additional Removable plate to hold patch panel and breakout board cable

Slow Control

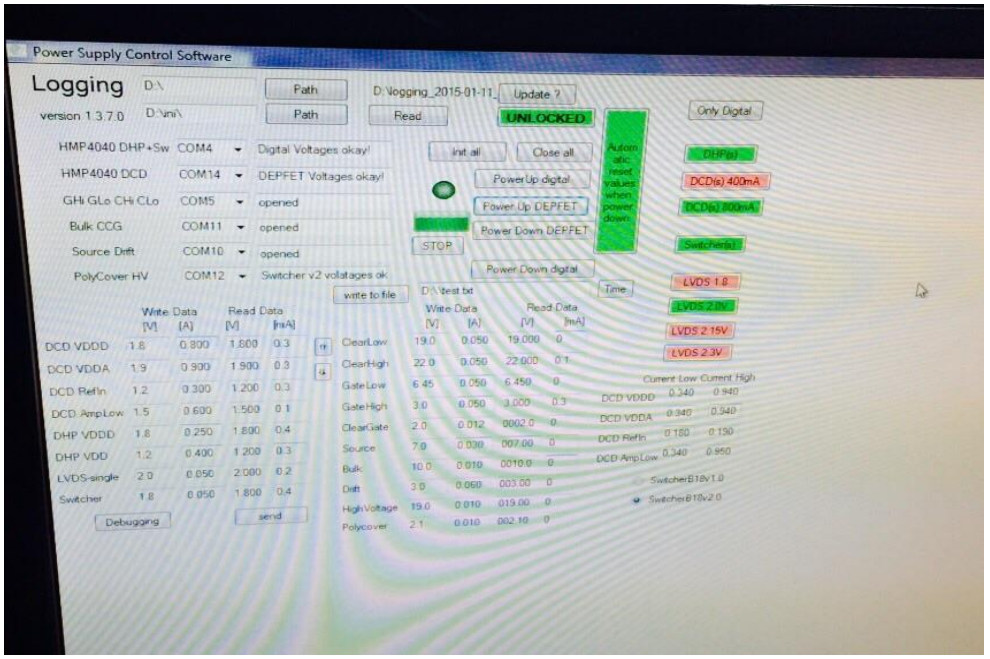
SC SETUP



Voltages to be set



All items in the Rack including the PC



SC program works fine and stable

Alibava Tracker

Two Alibava Detectors (2D 1x1cm^2) Upstream
And downstream the EMCM

Scintillator (Top)

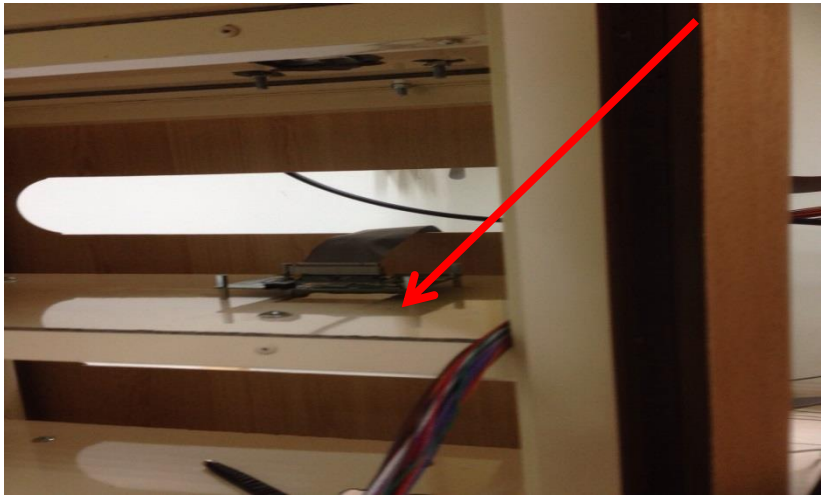
Alibava Tracker 1

EMCM now, PXD module later

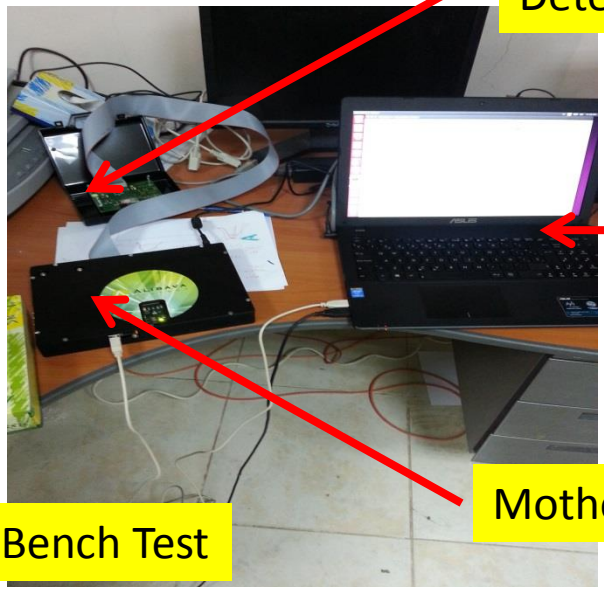
Alibava Tracker 2

Scintillator (Bottom)

Zoom: An Alibava detector plane
On its shelf



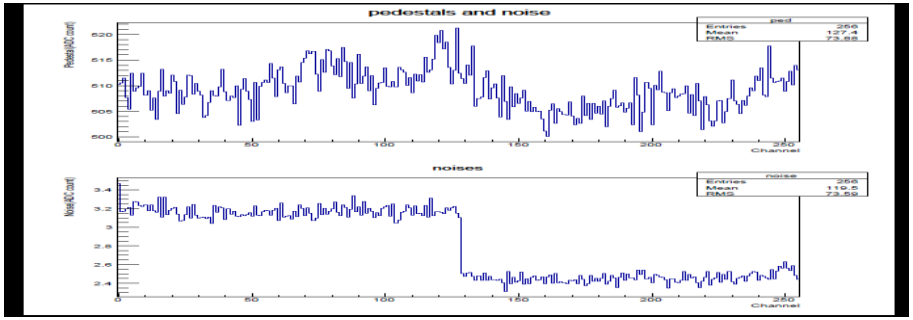
Detector PCB plane



PC

Mother Board

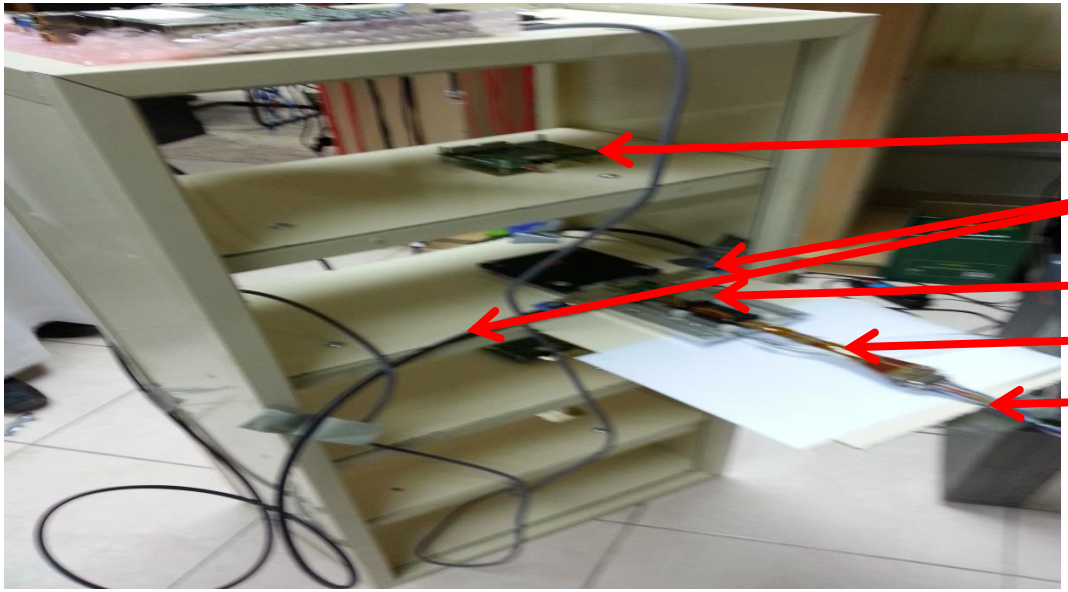
Bench Test



We can download pedestals and noise for 256 Channels (two (128 ch) chips)

Good job by ALIBAVA. All is available with a complete software with GUI. Now they are on a readout program for multiple boards.

EMCM piece



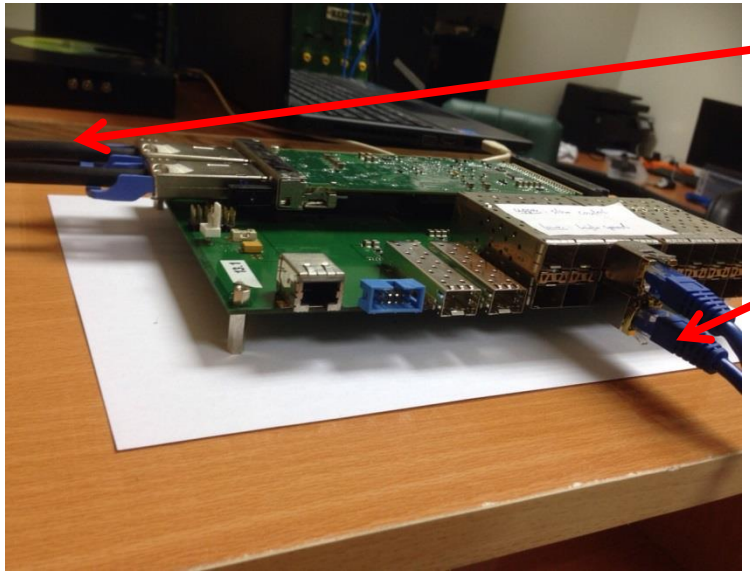
ALIBAVA Tracker

Two infiniband cables

EMCM piece

Patch Panel Cable

Cable from breakout board (Slow Control)



Infiniband cables from EMCM piece

Ethernet Cables to the DAQ PC

DHH board

PC with full installed DAQ is shipped from MPP. Two GUI tasks:

- Slow Control and trigger
- BONN-DAQ

All working well.

Trigger

Scintillator (Top)

Alibava Tracker 1

EMCM now, PXD module later

Alibava Tracker 2

Scintillator (Bottom)

A pair of scintillators made at MPP 1cmx10cmx0.4cm. Window entry Diameter 8mm

PMTs fromHAMAMATSU ordered with 8mm diameter window.

TLU: Many contacted but No success. Now looking To have one from testing Groups in Europe.

Conclusion and Outlook

1 Setup fully installed except PMTs and TLU

2 All software run well

3 To operate the EMCM Hans would like that someone from Tabuk should visit MPP to be trained as powering the EMCM should be done in special sequential way and optimizing the operational parameters is not by the book yet.
This should be done next week?

3 Once TLU and PMTs are at Tabuk we will run a good period to reach goals.

4 We really thank: Hans, Christian, Ben, Felix, Dima, Carlos Lacasta, and Igor who really helped on this issue.

5 Once the setup is finalized (by next month), we will start working on the PXD KEK cosmic test before installing VXD within Belle II. There, we need only trigger scintillator and PXD will be tracked with VXD. But need considerable effort to introduce the test in basf2.

Backing Slides

Tabuk PXD Cosmic Test

Bench Setup at Tabuk consisting of Slow Control, full tracking system: Scintillators trigger, ALIBAVA tracker (silicon planes), and an EMCM from MPP with cooling system.

Status: What is available now at Tabuk Here:

Slow Control: Need 6 power supplies, three received and 3 coming soon. PSs are fully controlled by the installed SL program. Banana Cables from PSs go to a breakout board, then to the EMCM piece via a hand made cable.

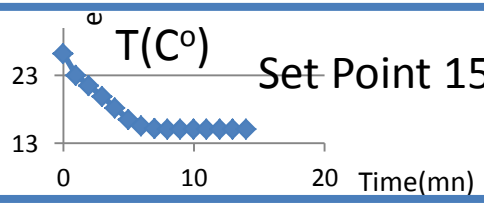
EMCM and DHH also received from MPP and A PC with full installed DAQ.

DHH Board

EMCM

ALIBAVA Tracker: 3 Detector planes (2D 1x1cm) and 3 mother boards, with tested software.

Chiller Working well and tested with a permanent Heat source



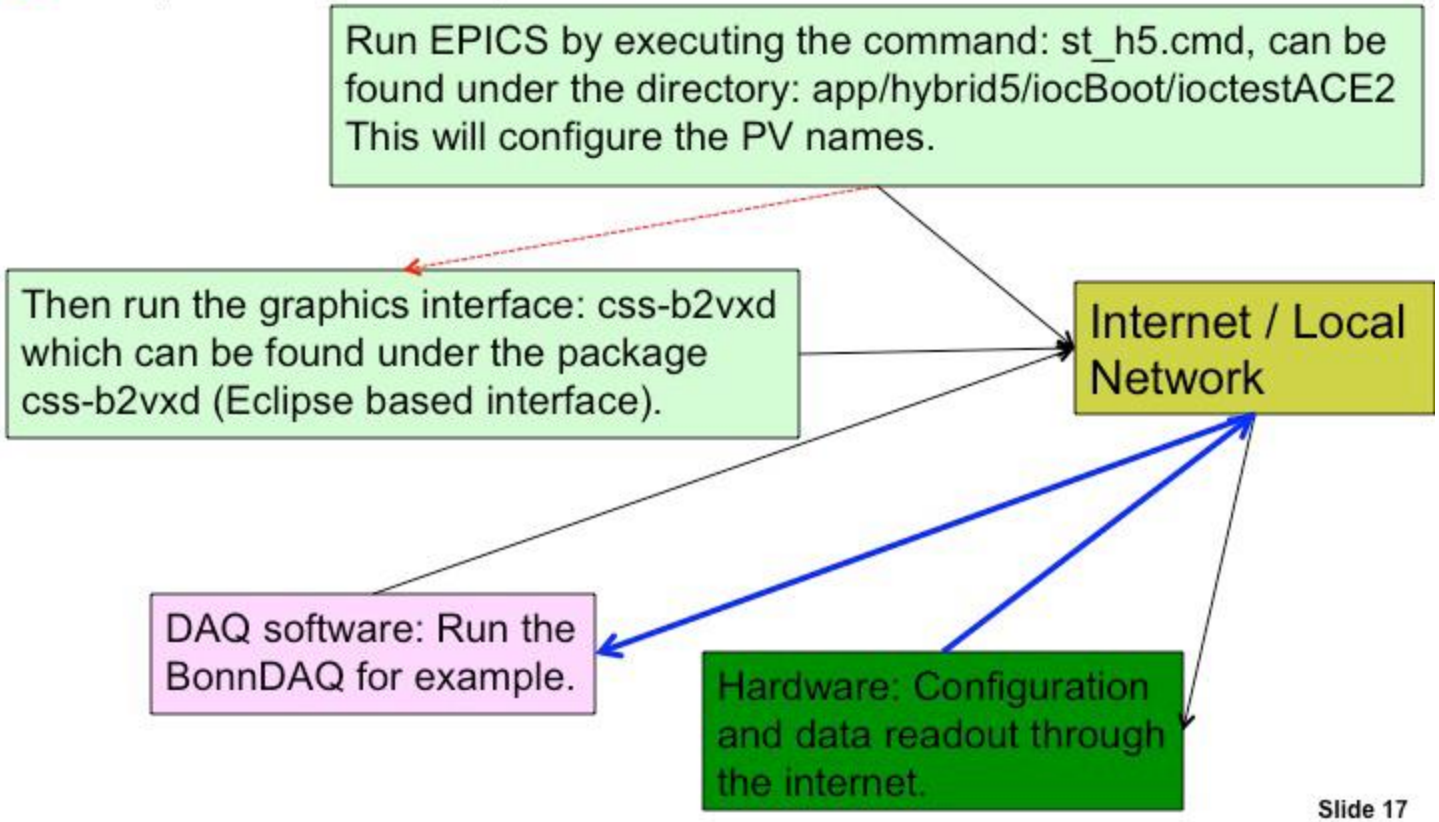
Trigger: Two scintillators with light guide build at MPP and now at Tabuk. HAMAMATSU with 8mm diameter window will arrive soon.

Now we are building a frame to hold Trigger, Trackers, and EMCM piece: Now is waiting its turn in the machineshop.

Overall: All equipment available just missing two ethernet adapters On the DHH board and two PMTs from HAMAMATSU.

How to run the software…

- Different communication components: EPICS needs to be run in order to configure the right processes with the right PV names. This is done by running st_h5.cmd
- Then, comes the data acquisition interface



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