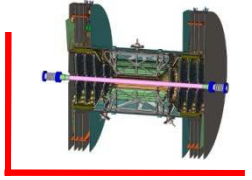
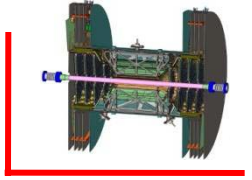


FVTX Commissioning Plan 1.71

Jon S Kapustinsky



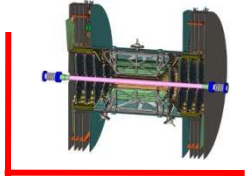
Installation and Commissioning Overview

- 4 half-cages assembled and tested in the FVTX lab in the Physics Building (metrology and survey complete).

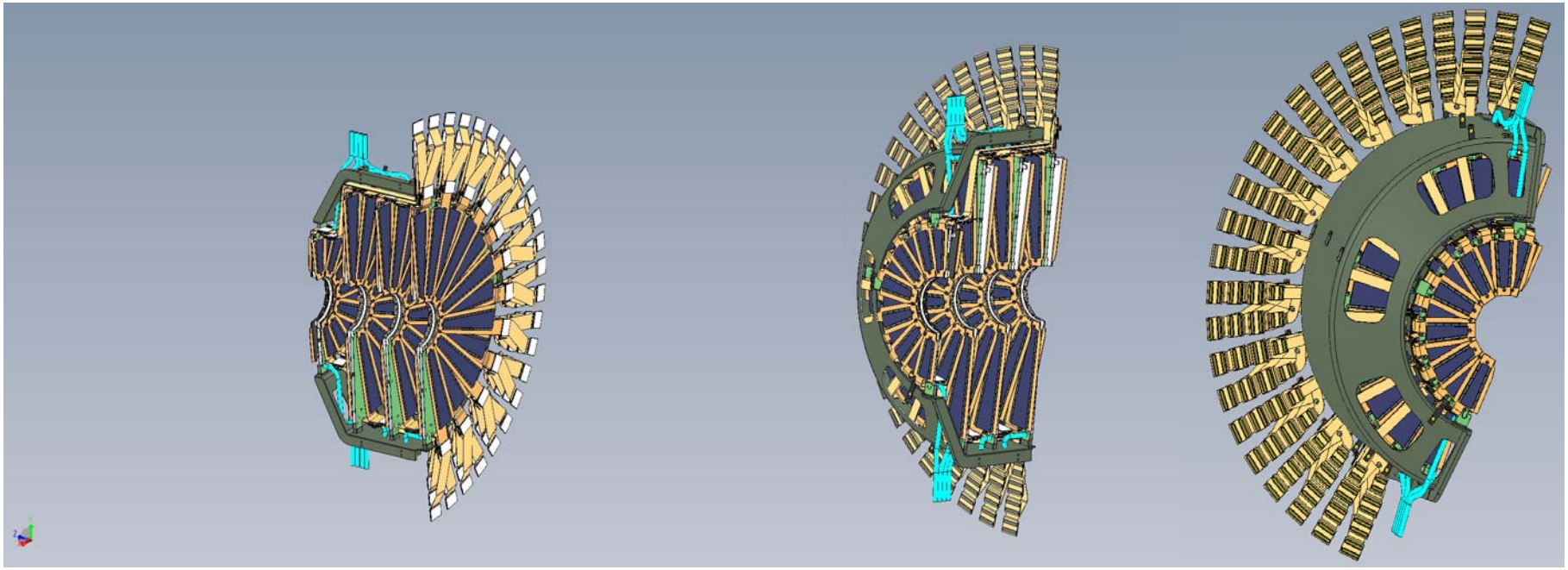
- Full data acquisition system chain tests and cosmic runs on the bench and with bias and low voltage and cooling system, and in the IR.

- Integrate the FVTX into the VTX support structure outside the IR.

- Install the VTX/FVTX into the IR with PHENIX techs and engineers (Coordination with the PHENIX Integration Group led by Don Lynch).

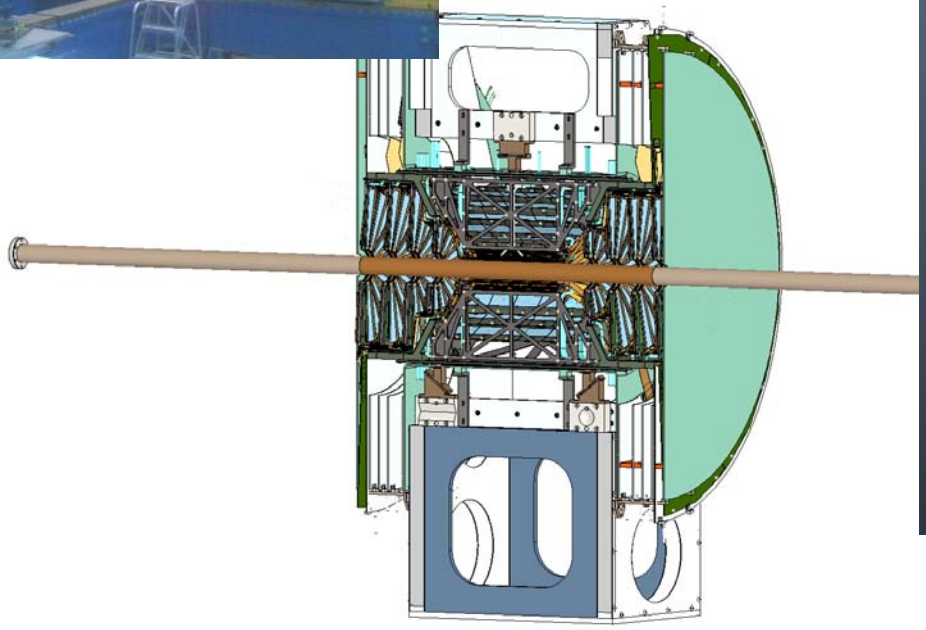


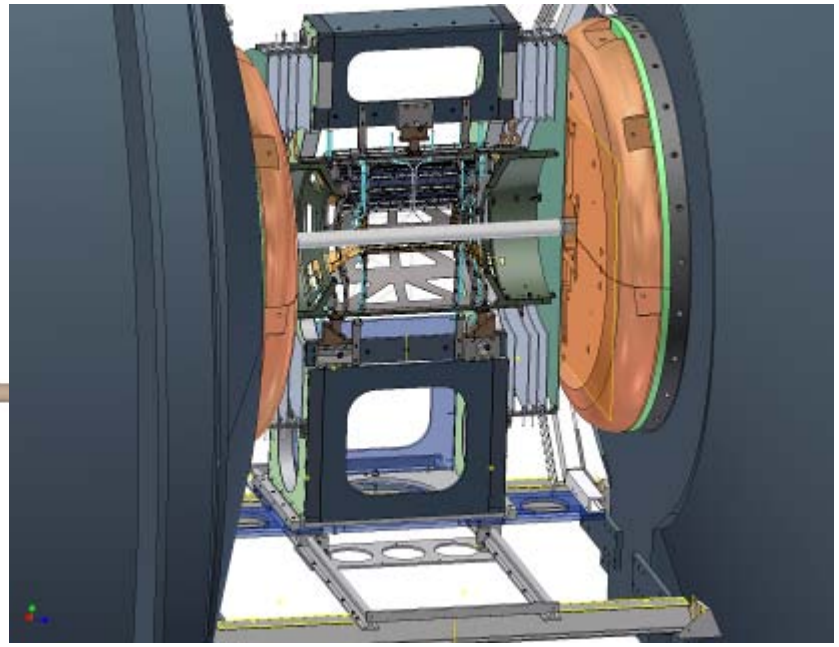
One half-cage of the FVTX – 3 views



- 4 detector stations per FVTX assembly, each off-set in phi.
- Each station has its own cooling circuit.

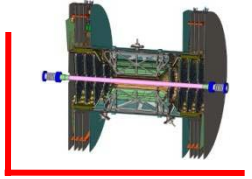
Installation FVTX/VTX in PHENIX IR





- Installation procedure developed by BNL tech staff
- Installation procedure approved by CAD

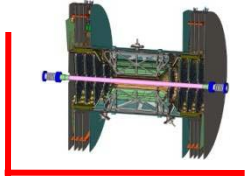
FVTX rack layout in the IR



Chillers will be installed in the assembly hall

Services installed in the IR

Dry gas storage tank outside PHENIX



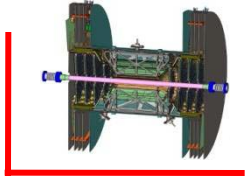
Major tasks and personnel (1)

- Timing calibration, performance optimization, pulser calibration and cosmic runs on the bench
  - ✓ Dave Winter, Doug Fields, Sergey Butsyk, Imran Younas, Melynda Brooks, Pat McGaughey, Hubert van Hecke, Jon Kapustinsky, Steve Pate, students and PD's

- Install and populate electronics racks in the IR with LV/HV power supplies and power distribution cards
  - ✓BNL techs, Eric Mannel, Robert Pak, Walt Sondheim, Don Lynch

- Connect FVTX cooling system and dry gas system and safety interlocks
  - ✓BNL techs, Eric Mannel, Robert Pak, Walt Sondheim, Don Lynch

- Install cabling and optical fibers from the IR to the DAQ in the PHENIX rack room
  - ✓BNL techs, Eric Mannel, Robert Pak, Steve Boose



Major tasks and personnel (2)

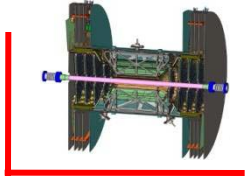
- Test cooling system, thermocouples and interlocks
  - ✓BNL techs, Eric Mannel, Robert Pak, Walt Sondheim, Don Lynch

- Test power distribution systems, bias and low voltage and interlocks
  - ✓Eric Mannel, Paul Giannotti, Pat McGaughey, Steve Boose

- Test fiber optics and signal integrity for all channels
  - ✓BNL techs, Eric Mannel

- Slow controls and integration into the PHENIX DAQ
  - ✓ Eric Mannel, Martin Purschke, John Haggerty, Ed Desmond

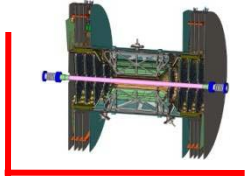
- Timing calibration, performance optimization, pulser calibration and cosmic runs in the IR
  - ✓ Dave Winter, Doug Fields, Sergey Butsyk, Imran Younas, Melynda Brooks, Pat McGaughey, Hubert van Hecke, Jon Kapustinsky, Steve Pate, students and PD's



FVTX Functional Requirements

*Requirement	Metric	Method
Mini strips active	>80% (expect ~99%)	calibration/cosmics
Hit efficiency	>85% (expect~99%)	cosmics
Radiation length per wedge	< 2.4 %	by design
Detector hit resolution	< 25 μm	cosmics
Random noise hits/chip	<0.1%	calibration (threshold:noise~5:1)
Level-1 latency	4 μs	
Level-1 Multi-Event buffer depth	4 events	
Read-out time	< 40 μs	
Read-out rate	> 10 kHz	

***Primary bench test requirements from the Management Plan. The last four have been validated by extensive tests of the FPGA code.**

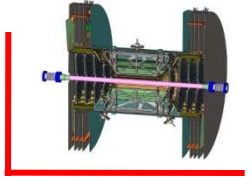


Additional goals to complete commissioning

- FVTX fully integrated into PHENIX DAQ.
- ~99% channels operational, timed in and calibrated.
- Fully operational on-line monitoring.
- Expert shift procedures developed for beam runs, detector operations and data acquisition.

✓ The FVTX collaboration

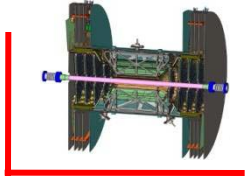
FVTX Installation and Commissioning Schedule



Task	Start-Finish	Comments
Mechanical support structure and installation hardware	Done for VTX	
Cable trays in IR	Done for VTX	
Chiller in Assembly Hall	Done for VTX	
Dry gas system	Done for VTX	
Install cables and plumbing and racks (pre-populated)	07/01/11-08/01/11*	will start asap after the shutdown
Cages fully bench tested First cage complete Last cage complete	 04/08/11-04/22/11 06/09/11-06/16/11	Bench system tests with cooling and power distribution
All FVTX detector, support, installation, alignment and survey parts and assemblies complete, ready for installation	06/16/11-07/1/2011	
Install FVTX into the VTX support structure	08/01/11-08/10/11	Assembly will be done outside the IR
Install and align FVTX/VTX assembly in the IR	08/10/11-08/24/11	Installation nearly identical to VTX in 2010
Connect cables and plumbing	08/24/11-08/31/11	
Test and commission	08/31/11-09/27/11	FVTX manpower

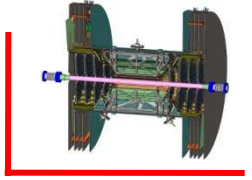
***Shutdown is a month later than even recently expected**

Assumption is that IR will close 10/01/11

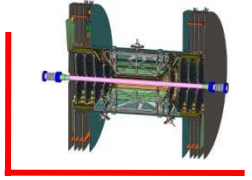


Summary

- Before installation into the IR – FVTX personnel
  - Assembled, pre-surveyed, bench-tested FVTX installed into the VTX support.
- Before Installation into the IR BNL techs and integration personnel
  - Cooling and dry gas system, HV/LV racks, cables and fibers , FVTX/VTX installation hardware installed in the IR.
- After installation of the FVTX/VTX in the IR – FVTX and BNL techs and integration personnel
  - Services hookup and testing, cabling and testing, timing, calibration and integration into the PHENIX DAQ.



Backup Slides



On-line monitoring commissioning tasks

- Histogram sensor hits
  - hot channels
  - dead channels
  - thresholds vs noise
  - update chip registers as needed
- Pulser timing
  - adjust clock to readout (~20 ns window)
- Cosmics tracking
  - refine alignment constants
- Charge sharing/ clusters
  - tracking software

Much of this was already developed for the FVTX cosmic ray tests at LANL