

Hall C

Mark Jones , Hall C Staff

Overview

- Most experiments will use the existing High Momentum Spectrometer (HMS) and the new Super High Momentum Spectrometer (SHMS).
- HMS and SHMS have similar detector packages: Drift Chambers, Scintillator hodoscopes, gas Cerenkov, Aerogel, Lead-glass calorimeter.
- Several experiments use new apparatus: neutron polarimeter, neutral meson spectrometer, Backward angle hodoscope third arm.

Status and Timeline

- SHMS carriage is on the pivot and detector hut is being constructed.
- Magnets being built. Installed in late 2014 thru 2015.
- Beam commissioning in Feb 2016 (Shift from April 2015)

Goals and Management Structure

Goals of Hall C Software

- Develop a Hall C specific standalone C++ library that utilizes the existing Hall A PODD C++ library. Use the existing well-tested Fortran code (ENGINE) as basis for the C++ library.
- Test new HMS code against original Fortran code (ENGINE) using 6 GeV HMS data
- Test new SHMS code against original Fortran code (ENGINE) using 6 GeV SOS data

Management Structure

Activity	Person	Institute
Software Manager	Mark Jones	Jefferson Lab
C++/ROOT Analyzer	Gabriel Niculescu	James Madison University
Calibrations	John Arrington	Argonne National Lab
Online histogramming	Pete Markowitz	Florida International Univ.
Simulation (SIMC)	David Gaskell	Jefferson Lab

HMS and SHMS comparison

HMS detector	SHMS detector	Comment
Front X-Y scintillator plane Rear X-Y scintillator plane	Front X-Y scintillator plane Rear X scintillator plane Rear Y quartz plane	Same code Same code New code
Drift Chamber	Drift Chamber	Modified code for SHMS Based on Hall C SOS DC design
Gas Cerenkov	Noble Gas Cerenkov Heavy Gas Cerenkov	Same code
Aerogel	Aerogel	Same code
Lead Glass Calorimeter 4 columns oriented perpendicular to central ray	Pre Shower Column “Fly’s Eye” Arrangement of Calorimeter	New code. SHMS is similar to Hall A Calorimeter

Present Status

- HMS Drift Chamber tracking code is working and comparisons to Fortran analyzer have been done. Need to add best track selection and tracking efficiency code.
- Now with tracking done, HMS hodoscope and calorimeter coding and comparisons can be finished.
- HMS gas cerenkov and aerogel comparisons in progress.
- Using git for version control and Github as repository server. Github is easier for offsite users and has tools for communication and tracking issues and milestones.
- Added the ability to use SCONS for building code to eventually replace Make. Makes it easier to build on different platforms.
- Documentation on Hall C wiki to allow users to get involved.
- Integrating Hall C scalars into PODD.
- Adding Hall C report templates.

Progress on Milestones

2012

July : Define reference HMS data for testing code

- Using data from “Jan05” experiment

Sep : Documented non-tracking HMS detectors code in Fortran Analyzer

- Calorimeter done
- Hodoscope partly done
- Aerogel, Gas Cerenkov almost done

Oct : Make DAQ decoding in C++ Analyzer object-oriented

- Has been started by Bob Michaels in Hall A

Oct : Ability to analyze Hall C data at the raw data level in C++ Analyzer

- Done

Dec : Documented the drift chambers and tracking code in Fortran Analyzer

- Not done

Dec : Verify HMS hodoscope analysis in C++ Analyzer

- Done (as far as could be without tracking)

Progress on Milestones (part 2)

2013

Jun : SHMS code added to Fortran Analyzer.

- Not done
- Decide not to do since expecting beam to Hall C in 2016

July : Full analysis of HMS data with C++ Analyzer ready

- Not done
- Drift Chamber tracking code ready.

Sep : C++ Analyzer ready for SHMS calorimeter tests.

- Not needed

Dec : Full analysis of HMS data with C++ Analyzer verified by comparison to Fortran analyzer.

- Will postpone

Updated Milestones

2014

Jan: Hall C specific BPM/Raster code. Hall C report templates
Mar: Implement Hall C scalers.
June: Complete documentation of Fortran code.
July: HMS Calibration codes ready.
Aug: HMS Online histogramming ready
Oct: Test software for SHMS calorimeter with FADC.
Dec : Full analysis of HMS data with C++ Analyzer verified by comparison to Fortran analyzer.
Dec: Nightly builds

2015

June: C++ Analyzer ready for SHMS detector package
June: SHMS Online histogramming ready
Aug: SHMS Calibration codes ready.
Sept : Analyze cosmic ray data in SHMS

Summary

Response to recommendations

- Not developing SHMS Fortran code.
- Plan on nightly builds by Dec 2014
- Investigating use of code evaluation codes such as `cpp_check` and `valgrind`

Afternoon talks:

- “Comparisons between HCANA and ENGINE”,
Gabriel Niculescu, JMU
- "Hall C General Updates and additions to PODD“,
Ed Brash, CNU