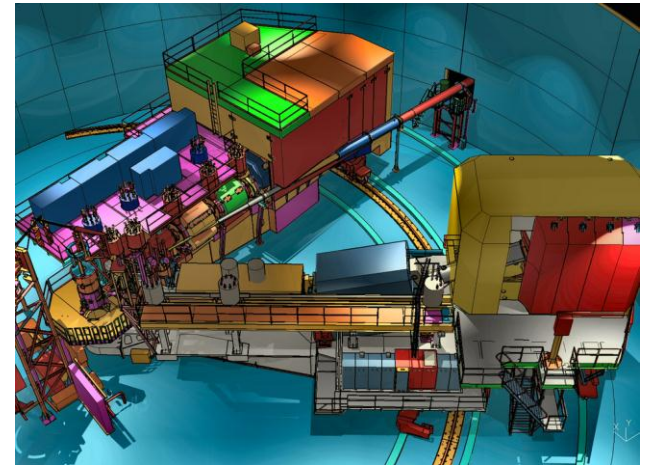
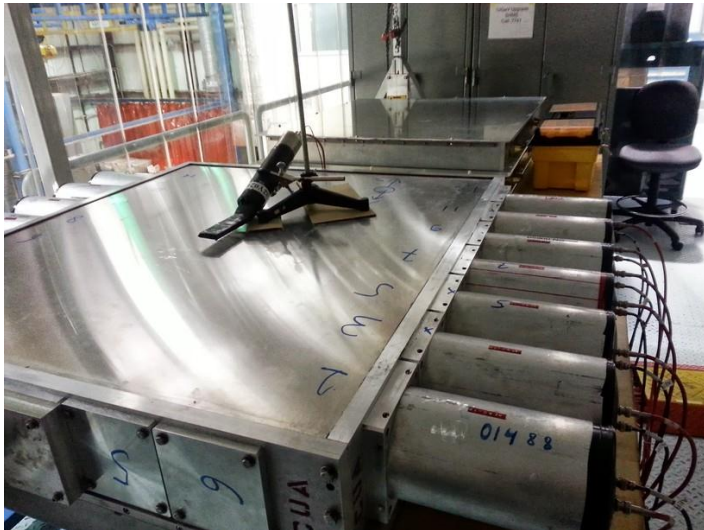
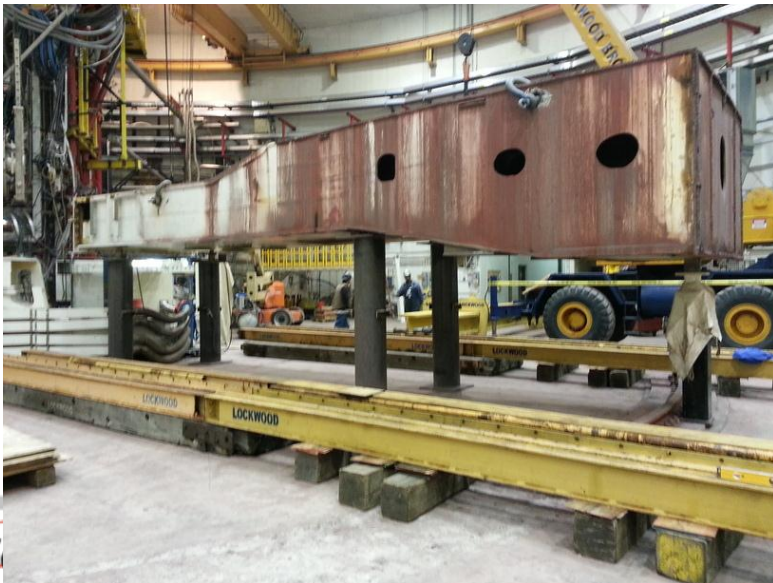




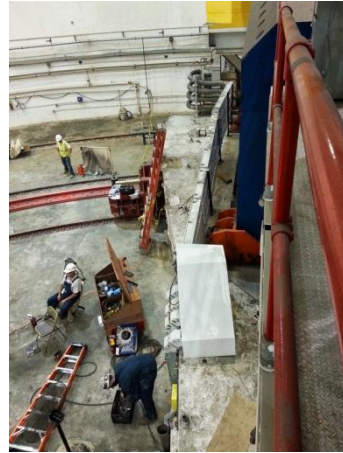
NPS Collaboration
Meeting
November 14, 2013
Stephen Wood



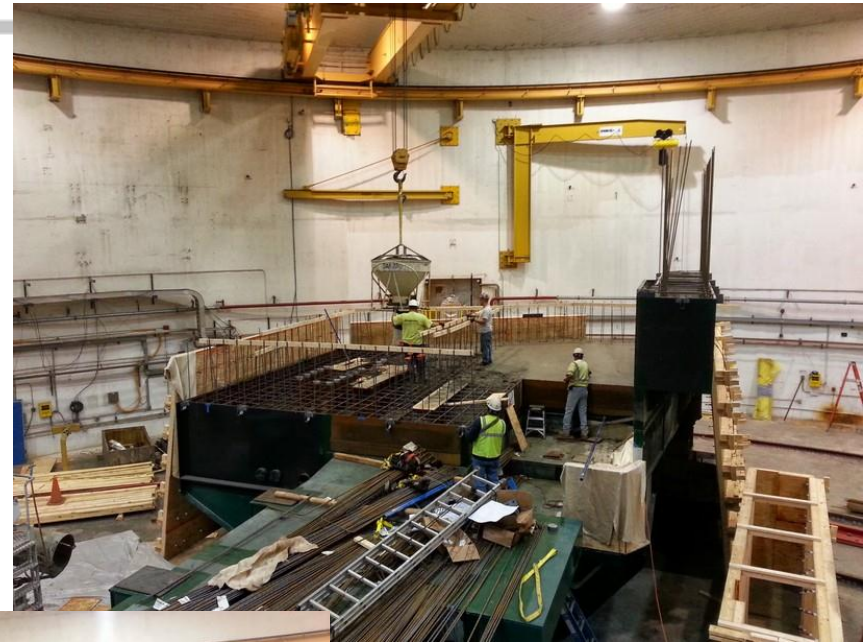
SOS is gone



SHMS Construction



SHMS Construction



SHMS Detectors @ JLab

Aerogel
assembly
and
testing



Preshower
cosmic
tests



Heavy gas
Cerenkov



Shower – waiting for SHMS hut

Hall C Timeline

- Mid 2013 SHMS installation began
- Fall 2013 SHMS Shield house

Magnet	Delivery Date
Q1	May 2014
Dipole	May 2015
Q2, Q3	May/July 2015
3° Horizontal Bender	May 2014

Note: Some
assembly required

Dipole installation
after Q3 install

- 2014 Shower counter and electronics/DAQ
- 2015 Detector installation
- 2016 SHMS commissioning

Commissioning Experiments in Hall C

Early running plans – Year 1

2016: ~25 PAC days – Commissioning “Experiment”

9 days of E12-06-107 [search for color transparency](#)

$A(e,e'p)$ only – “easy” coincidence measurement

E12-10-002 $F_2^{p,d}$ [structure functions at large x](#)

Momentum scans help understand acceptance

2 days E12-10-108 [EMC Effect](#)

Integrate light nuclei with F_2 run,

Point target helps acceptance studies.

3 days of E12-10-003 [d\(e,e'p\)](#)

If time available

Push to lower cross sections

Early running plan – Years 2

2017:

E12-09-017 P_t dependence of basic SIDIS cross sections

Push particle ID capabilities of SHMS

E12-09-002 Precise $\pi^+\pi^-$ ratios in SIDIS – Charge Symmetry

Detector efficiencies

E12-09-011 L/T separated $p(e,e'K^+)$ factorization test

Easiest L/T separation

2018:

E12-06-121 g_2^n measurements at fixed Q^2

First polarized ^3He target experiment in Hall C

Depends on when ^3He runs in Hall A and other factors

A_1^n , F_π , $x>1$, GeN ?

Approved and Conditional 12 GeV Hall C Experiments

Number	Experiment	Grade	Approved Days	Cond. Days	Non-standard Equipment
E12-06-101	Pion Form Factor	A	52		
E12-06-104	SIDIS R	A-	40		
E12-06-105	$x > 1$	A-	32		
E12-06-121	He3 g_2	A-	29		Polarized He3 target
E12-07-105	(e,e' π) Exclusive Factorization	A-	36		
E12-09-011	(e,e'K) Exclusive Factorization	B+	40		
E12-09-017	SIDIS P_t	A-	32		
E12-09-002	Charge Symmetry Violation	A-	22		
E12-10-002	F2 @ large x	B+	13		
E12-10-003	d(e,e'p)	B+	21		
E12-10-008	EMC	A-	23		
E12-06-107	Color Transparency	B+	26		
E12-06-110	He3 A1n	A	36		Polarized He3 target
E12-11-002	He4(e,e'pol(p))	B+	37		FPP in HMS
E12-11-009	Neutron Form Factor	B+	50		Magnet + Neutron polarimeter
E12-11-107	EMC d(e,e' backward p)	B+	40		LAD (Hall B TOF bars)
E12-13-007	SIDIS π^0	A-	26		Neutral Partical Spect.
E12-13-010	DVCS + Exclusive π^0	A	53		Neutral Partical Spect.
C12-13-011	Deuteron Tensor SF b1	A-		30	Polarized ND3
			608	30	
Total Days			638	7.3 Years @ 25 Weeks/year	

Hall C Analysis Software Upgrade

FORTRAN ENGINE analysis code being replaced with
C++/ROOT analyzer

Based on Hall A analysis software

Ease sharing of software and people with Hall A

Easier to reuse code between HMS & SHMS

Likely easier and more natural to add new detectors

Keep Fortran detector algorithms (e.g. tracking) and CTP-like features

Status

Code, “hcana”, managed with “git” on github.com

Supports CTP like parameters and reports. Hall A cut and histogram definition
package similar to CTP

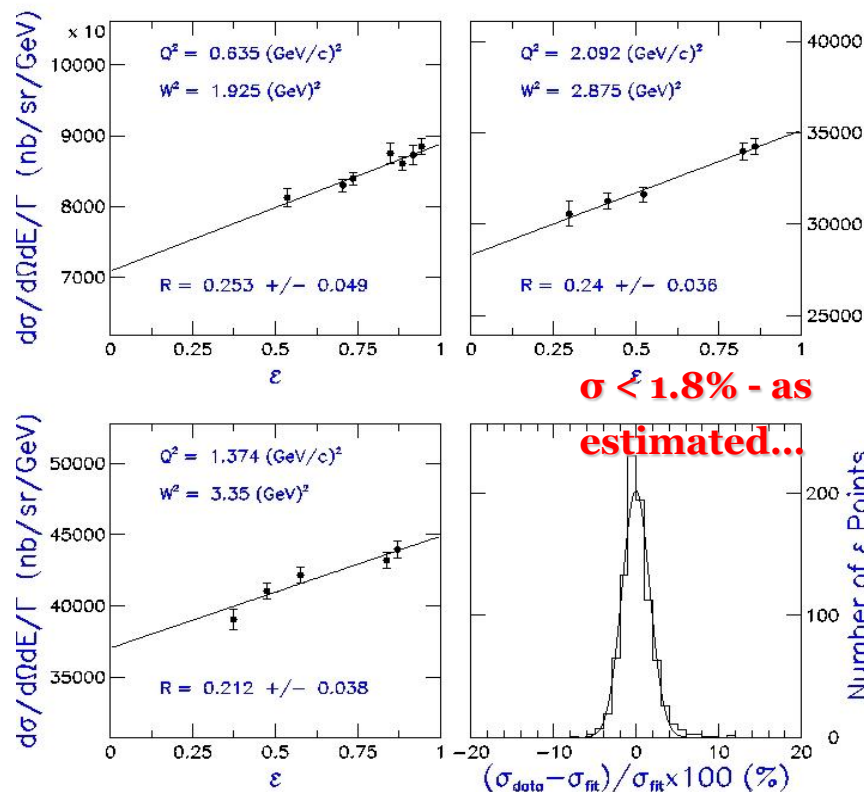
HMS DC Tracking code ported, Shower counter, hodoscopes, Cerenkov code
advancing

Hall C L/T Separations

- Typical and unique Hall C use: $\sigma_L - \sigma_T$ separation
 - Measure σ at several ε with fixed Q^2
 - Control point to point errors to $< 2\%$
 - \rightarrow Control tracking/PID uncertainty to $< 1\%$ over wide range of rates

$$\frac{d^2\sigma}{dQdE'} = \Gamma(\sigma_T + \varepsilon\sigma_L)$$

Quantity	Uncertainty	$\delta_\sigma(\%)$
Beam energy	$\sim 5 \times 10^{-4}$	0.30
Scattered e^- energy	$\sim 5 \times 10^{-4}$	0.25
Scattering e^- angle	~ 0.2 mrad	0.26
Target density (relative)	0.05%	0.05
Beam charge (relative)	0.1%	0.1
Dead Time Correction	0.2%	0.2
Detector Efficiency	0.55%	0.55
e^+ / e^- background	0.2%	0.2
Acceptance	0.7%	0.7
Model Dependence	0.6%	0.6
Radiative Correction (ε)	1.05%	1.05
Total point-to-point		1.6



12 GeV L/T separation

Experiments with L/T Separation

E12-06-101 – Pion Form Factor

E12-06-104 – R in semi-inclusive DIS

E12-07-105 – Scaling in exclusive (charged) Pion production

E12-09-011 – Scaling in exclusive Kaon production

E12-10-002 – Nucleon structure functions

~1/3 of approved beam time

Unique capability in the 12 GeV Era

Natural to augment L/T capability with neutral π/γ detector.

A photon/ π^0 detector fits with Hall C hardware strengths and physics program. “could” be used starting 2020.

Low cost facility addition to assure healthy program to 2030.

Modest resources can be applied to support detector development, electronics, test runs in Hall

Upcoming PACs

PAC42: July 28 – August 1, 2014

Normal PAC accepting new proposals

PAC41: May 19-23, 2014

Re-prioritization PAC – not scheduling, but suggesting what expt. are high impact. Will focus on what can start before 2020.

Hall Leaders will prepare tables of information about each approved experiment and work with experiment contacts to finalize.

Title, Spokespeople, Days, Rating, Readiness Stage, “Run Group” information

Experiment and Beam Requirements

Concerns or Equipment conflicts

Specific Experiment Requirements

Experiments **may** have opportunity to submit a few slides

(under discussion between lab and user group)