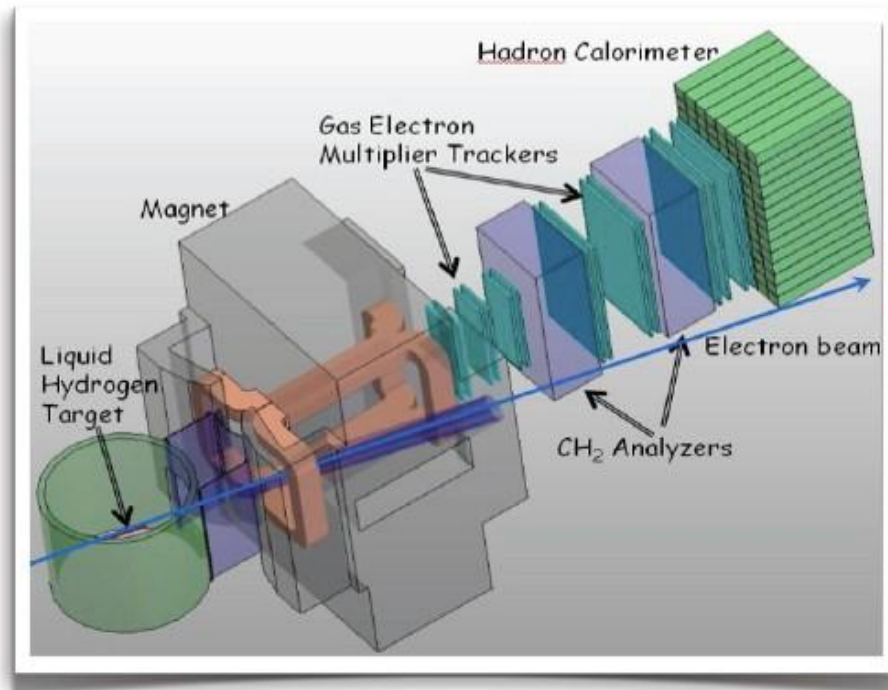


Super-BigBite-Spectrometer (SBS)

Monthly Progress Report

December 15, 2012



Introduction:

The SBS Program consists of three separate, but interrelated Projects.

- The first Project, **SBS Basic (WBS 1)**, involves the acquisition of an existing magnet and the associated work of preparing it for use during the SBS research program. The effort includes modifications to the magnet, including machining a slot in the yoke for beam passage, field clamps, and a solenoid to reduce the transverse magnetic field on the beam line, the design and development of the infrastructure needed to run the magnet, and the construction of the platform on which it will stand.
- The second Project, **Neutron Form Factor (WBS 2)**, involves the construction of twenty-nine GEM detector modules with associated front-end and DAQ modules to meet the requirements of the approved neutron form factor measurements.
- The third and final Project, **Proton Form Factor (WBS 3)**, involves the construction of thirty-five GEM detector modules with associated front-end and DAQ modules and the addition of pole shims for increased magnetic field integral to meet the requirements of the approved proton form factor measurements.

Project Management Highlights:

This is the third Monthly Progress Report for the SBS Program. The collaboration is in place, and the Program Management Plan has been approved by Jefferson Lab management and by the DOE-NP Instrumentation Program Manager.

The first and second Projects within the SBS Program, SBS Basic (WBS 1) and Neutron Form Factor (WBS 2), started at the beginning of FY13. The third Project, Proton Form Factor (WBS 3), isn't scheduled to start until FY14.

WBS 1: SBS Basic

WBS 1	SBS Basic: (Hall A Infrastructure)	WBS 1.01	Milestones
		WBS 1.02	Project Oversight
		WBS 1.1	Magnet, power and construction
		WBS 1.2	Magnet/detector platforms
		WBS 1.3	Beam line

WBS 1.01 Milestones:

Id #	Level	Milestone	Scheduled Date	Expected Date 11/1/2012	Expected Date 12/1/2012	Actual Date
1.1-01M	1	Project start	10/1/2012	10/1/2012	10/1/2012	10/1/2012
1.2-01M	2	Magnet delivered to JLab	4/30/2013	4/30/2013	4/30/2013	
1.2-10M	2	Platform parts received	6/27/2014	6/27/2014	6/27/2014	
1.2-20M	2	Magnet assembled on platform	3/19/2015	3/19/2015	3/19/2015	
1.2-30M	2	Beam-line parts received	9/24/2015	9/24/2015	9/24/2015	
1.1-10M	1	Project completion	1/29/2016	1/29/2016	1/29/2016	

WBS 1.02 Project Oversight:

- SBS weekly meetings are being held via shared file (EVO) and teleconference every Wednesday. During this Report period, meetings were held on Nov 7th, Nov 14th, and Nov 28th. Participants included Jefferson Lab, University of Virginia, Carnegie Mellon University, University of Glasgow, St. Mary's University, William and Mary, University of Massachusetts, and Norfolk State University.
- Project is staffed appropriately for this beginning stage, and includes a Jefferson Lab manager, scientist, and magnet engineer.

WBS 1.1 Magnet, Power and Construction:

- Our engineer, Whit Seay, visited BNL to acquire details of the 48D48 magnet condition, fabrication, and assembly procedure. The photo below shows the 48D48 magnet as it now exists at BNL.



- We are continuing the magnetostatic simulation of the magnet to define the modifications required.
- The cutout was determined for meeting all experiment kinematics.
- New electrical engineer introduced to magnet requirements, so he can write power supply specification.

WBS 1.2 Magnet/Detector Platforms:

- Developing conceptual design for the magnet/detector support structure revisiting the Hall A floor plan layouts, in preparation of the start of the engineering design.
- Incorporated SBS detectors into design model.
- Started structural analysis of counter weight support method.
- Continuing design work on magnet counter weight support to incorporate movement of support to relocate magnet as needed.



WBS 1.3 Beam Line:

- No activity this period.

WBS 1 Costs:

- Budget for this WBS for FY13 is \$838K.
- Costed and obligated to date (as of 12/1/2012): \$6.580K (0.79%)

WBS 2: Neutron Form Factor

WBS 2	Neutron Form Factor	WBS 2.01	Milestones
		WBS 2.02	Project oversight
		WBS 2.1	GEMs (UVa)
		WBS 2.2	GEM Electronics (UVa)
		WBS 2.3	Electronics Hut, Lead Shielding, Lead platform, and Detector Frames
		WBS 2.4	Coordinate Detector

WBS 2.01 Milestones:

ID #	Level	Milestone	Scheduled Date	Expected date 11/1/2012	Expected date 12/1/2012	Actual Date
2.1-01M	1	Project start	10/1/2012	10/1/2012	10/1/2012	10/1/2012
2.2-01M	2	UVa receives GEM parts	2/3/2014	2/3/2014	2/3/2014	
2.2-20M	2	UVa receives electronics parts	8/20/2014	8/20/2014	8/20/2014	
2.2-10M	2	UVa GEM modules assembled and tested	10/17/2014	10/17/2014	10/17/2014	
2.2-40M	2	Coordinate Detector Assembled	11/17/2014	11/17/2014	11/17/2014	
2.2-30M	2	UVa front-end electronics assembled and tested	2/2/2015	2/22/2015	2/22/2015	
2.2-40M10	2	WBS 2.3 completed (Electronics Hut Assembled etc.)	10/5/2015	10/5/2015	10/5/2015	
2.1-10M	1	Project completion	1/29/2016	1/29/2016	1/29/2016	

WBS 2.02 Project Oversight:

- SBS weekly meetings are being held via shared file (EVO) and teleconference every Wednesday. During this Report period, meetings were held on Oct 3rd, Oct 10th, Oct 24th, and Oct 31st. Participants included Jefferson Lab, University of Virginia, Carnegie Mellon University, University of Glasgow, St. Mary's University, William and Mary, University of Massachusetts, and Norfolk State University.
- Project is staffed appropriately for this beginning stage, and includes Jefferson Lab (manager, scientist, and magnet engineer), UVA (two scientists), and W&M (one scientist).

WBS 2.1 GEMs (UVA):

Pre R&D work on the production of GEM modules for WBS 2.1, aimed at starting production work, has continued. Below is a report on how that pre R&D work is progressing.

- In November we continued the characterization of SBS prototype #1; a report with the results from the test is being prepared.
- A new clean room was ordered to expand the existing clean room at UVA in preparation for SBS GEM module production.
- The equipment needed to construct the newly designed SBS backtracker GEM modules is being fabricated.
- The plan for completion of the FY13 SBS pre-R&D was discussed between UVA and JLab, and the final procurement for this phase has been submitted to JLab procurement. According to this agreement, a detailed report on GEM module development will be delivered to JLab in May 2013.

WBS 2.2 GEM Electronics (UVA):

As with WBS 2.1, pre R&D continues on the GEM electronics. Below is a report on that work.

- Our tests of the CERN RD-51 SRS APV-25 GEM readout system has shown that the pedestal noise level for the SBS GEM module readout under lab-bench conditions could be as low as 1800 e⁻ ENC (Equivalent Noise Charge). The pedestal noise level of the present version of the INFN APV-25 readout system is higher than this. Several important features of the CERN system are being incorporated into the INFN system to reduce its noise level.

- We have worked with our INFN colleagues to finalize the design of APV-25 electronics readout cards and associated components for the SBS backtracker chambers.
- The work on incorporating the INFN GEM readout system into Jefferson lab CODA data acquisition system is continuing.

WBS 2.3 Electronics Hut, Lead Shielding, Lead platform, and Detector

Frames:

- No activity this period.

WBS 2.4 Coordinate Detector:

- No activity this period

WBS 2 Costs:

- Budget for this WBS for FY13 is \$81K.
- Costed and obligated to date (as of 12/1/2012): \$3.065K (3.78%)

WBS 3: Proton Form Factor

This Project is not scheduled to start until FY14: October 1, 2013. The WBS structure and milestone table are included below for completeness.

WBS 3	Proton Form Factor	WBS 3.01	Milestones
		WBS 3.02	Project Oversight
		WBS 3.1	Magnet Pole shims and exit field clamp
		WBS 3.2	GEM's (UVa)
		WBS 3.3	GEM electronics (UVa)
		WBS 3.4	Trigger (RU)

WBS 3.01 Milestones:

ID #	Level	Milestone	Scheduled Date	Expected date 10/1/2012	Expected date 11/1/2012	Actual Date
3.1-01M	1	Project start	10/1/2013	10/1/2013	10/1/2013	
3.2-01M	2	UVa receives parts for GEM modules	8/20/2014	8/20/2014	8/20/2014	
3.2-10M	2	UVa begins assembly of electronics	1/5/2015	1/5/2015	1/5/2015	
3.2-50M	2	RU begins trigger design	1/6/2016	1/6/2016	1/6/2016	
3.2-20M	2	UVa electronics assembly and tests completed	7/20/2016	7/20/2016	7/20/2016	
3.2-30M	2	JLab receives pole shims	8/22/2016	8/22/2016	8/22/2016	
3.2-40M	2	JLab receives exit field clamp	8/22/2016	8/22/2016	8/22/2016	
3.2-70M	2	RU completes trigger	12/1/2016	12/1/2016	12/1/2016	
3.2-60M	2	UVa GEM modules assembled (and tested)	2/2/2017	2/2/2017	2/2/2017	
3.1-10M	1	Project completion	7/31/2017	7/31/2017	7/31/2017	