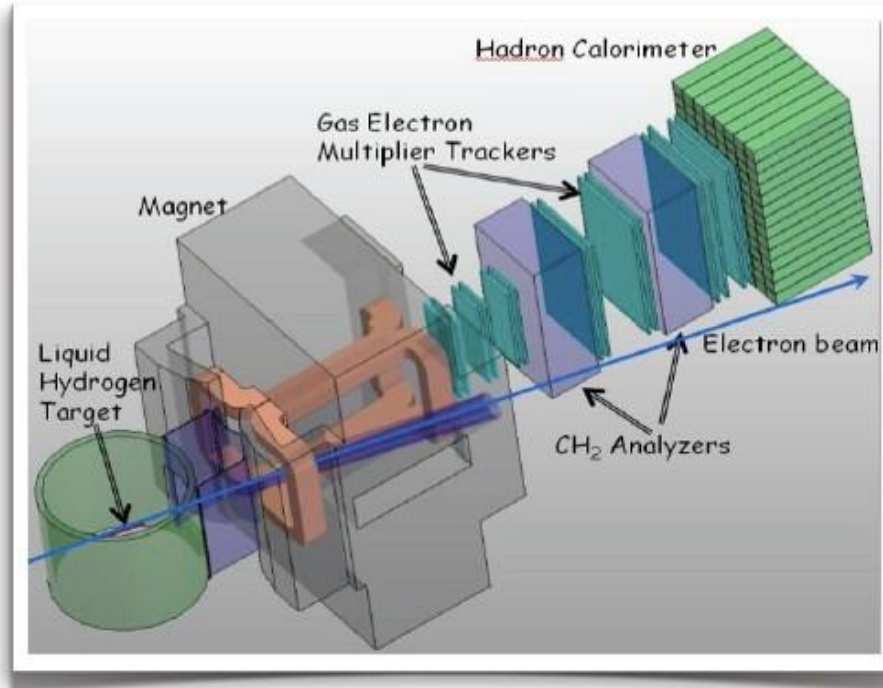


Super-BigBite-Spectrometer
(SBS)

**Monthly Progress
Report**

November 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 second 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 10/1/2012	Expected Date 11/1/2012	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 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 a Jefferson Lab manager, scientist, and magnet engineer.

- Collaboration meeting was held on October 18-19, 2012 at Jefferson Lab. (see [link](#) for the program)

WBS 1.1 Magnet, Power and Construction:

- Through October all work was at the conceptual, pre R&D level to revisit the floor plan layouts of the experiment and prepare for the start of engineering designs. Engineers and designers plan to have final drawings of the magnet steel and coils by February 1, 2013, which will allow 2 months to negotiate a contract with a vendor to take delivery of the steel and perform the required modifications. We anticipate meeting milestone 1.2-01M by March 30, 2013 when the steel arrives at the vendor. The intention of the milestone is for JLab to have full possession of the magnet and sending the steel to the vendor, rather than to JLab first, is more efficient.

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.

WBS 1.3 Beam Line:

- No activity this period.

WBS 1 Costs:

- Budget for this WBS for FY13 is \$838K.
- Budgeted money for WBS 1 is intended for procurements, project oversight, a magnet power engineer (power supply), and installation in the Hall. As such, the expected first expenditure, beyond oversight constant level of effort, will be in the March-April time frame to Brookhaven and the shipping company.
- Costed and obligated to date (as of 11/1/2012): \$1.504K (0.18%) (Project oversight constant level of effort)

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 10/1/2012	Expected date 11/1/2012	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).
- Collaboration meeting was held on October 18-19, 2012 at Jefferson Lab. (see [link](#) for the program)
- Adam Sarty (St. Mary's University, Halifax, Nova Scotia) has joined the collaboration. At this point he plans to contribute, using Canadian funds, an auxiliary coordinate detector that uses scintillators rather than GEM technology which will augment the planned GEM based coordinate detector.

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 October we continued the testing and characterization of SBS prototype GEM module #1. This module continues to work well showing stable behavior. We calibrated the gain of the chamber using two methods; the results agree with each other well.

We finalized the new design for the polarimeter GEM modules and placed the orders for GEM foils and GEM frames. We expect delivery of these items by December. We are currently fabricating GEM chamber assembly equipment to match the dimensions of this new design.

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.

We calibrated the gain and pedestal noise level of our APV-25 readout system (design by our Italian colleagues for the readout of SBS trackers) and compared it to the results from a second APV-25 readout system we purchased from CERN. The Italian collaboration is now making modifications and improvements to the electronics based on the results from our tests.

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 11/1/2012): \$0.967K (1.2%) Project manager constant level of effort.

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	