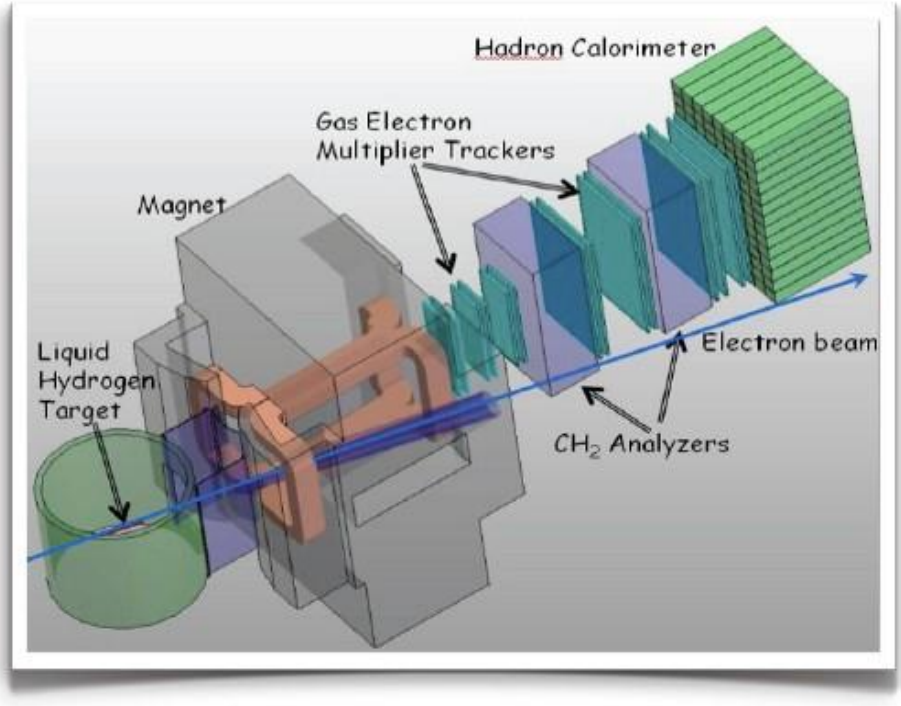
Jefferson Lab
Thomas Jefferson National Accelerator Facility

Super-BigBite-Spectrometer (SBS)

Monthly Progress Report

August 15, 2013



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 eleventh 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.

Level 3 milestones for WBS 1 to allow better tracking on a quarterly basis have been established. Similar milestones are being developed for WBS 2 and WBS 3. When a complete set of level 3 milestones for all three WBS's are ready, the PMP will be updated to include them and it will be submitted for formal approval.

A Pre R&D report has been submitted by UVa and accepted. UVa has reliably achieved the capability needed to construct GEM chambers for SBS. A purchase requisition has been submitted to the JLab procurement department for the construction by UVa of 29 GEM modules.

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 7/1/2013	Expected Date 8/1/2013	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	7/30/2013	8/15/2013	
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, via tele and video conference were held on July 24th and 31st. Participants included Jefferson Lab, University of Virginia, University of Massachusetts, Carnegie-Mellon University, University of Connecticut, William and Mary, Idaho State University.
- Project is staffed appropriately for this beginning stage, and includes a Jefferson Lab manager, scientist, and magnet engineer.

- The magnet and associated extra steel are now officially JLab property and will be shipped from Brookhaven with a current anticipated delivery date between August 12 and 14, thereby achieving milestone 1.2-01M.

WBS 1.1 Magnet, Power and Construction:

- Finalizing yoke modification drawings. (80% completed)
- Continue detail drawings of new coils and procurement specification. (60% completed)
- Power supply specification completed, in procurement for sole source processing. Specification in review by vendor. (90% completed)
- Detail design of field clamps and clamp supports. (20% completed)

WBS 1.2 Magnet/Detector Platforms:

- Continuing design details on magnet counter weight support. Some redesign needed because material from BNL is a different size and weight than planned.(65% completed)
- Completed floor plate design, roller brackets and magnet mounting brackets. (100% completed)
- Designing detector supports. (30% completed)

WBS 1.3 Beam Line:

- Layout and design of shielded beam pipe and vacuum snout. (20% completed)

WBS 1 Costs:

- Budget for this WBS for FY13 is $838K.
- Costed and obligated to date (as of 8/1/2013): $??,??? (?.??%)

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 7/1/2013	Expected date 8/1/2013	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, via tele and video conference were held on July 24th and 31st. Participants included Jefferson Lab, University of Virginia, University of Massachusetts, Carnegie-Mellon University, University of Connecticut, William and Mary, Idaho State University.
- Project is staffed appropriately for this beginning stage, and includes Jefferson Lab (manager, scientist), UVa (two scientists), and Idaho State University (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. Here is a brief summary of the continuing R&D work.

- In July Dr. Kondo Gnavo travelled to CERN to finalize the designs for the last two SBS GEM prototypes. Upon validating the designs with the CERN GEM workshop, the orders were placed for components of these two modules. These components are currently under fabrication.
- The study of the effects in the spacers in GEM chambers was studied; the results show that the dead region caused by the spacers is of the order 3 mm-5 mm wide.

A Pre R&D report has been submitted by UVa and accepted. UVa has reliably achieved the capability needed to construct GEM chambers for SBS. A purchase requisition has been submitted to the JLab procurement department for the construction by UVa of 29 GEM modules. Within the proposed contract milestone 2.2-01M is maintained and milestone 2.2-10M is split in three with completion of the first five modules on 5/30/2014, completion of the next ten modules on 9/30/2014, and completion of the final fourteen on 3/1/2015, leaving seven months of float in the schedule.

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.

- The UVa group completed the purchase of SRS electronics for 8000 channels from CERN. Currently this electronics setup is tested at CERN.
- After the final testing the setup will be shipped to UVa in August.
- In September and October this electronics setup will be tested in a high rate beam test at Fermilab to study its capabilities at rates approaching SBS conditions.
- After that the work will start to interface the SRS system with the CODA DAQ system.
- UVa is still waiting for some of the electronics modules ordered from Italy.
- Currently work is continuing at Jefferson lab to interface the Italian electronics modules with the CODA DAQ system.

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 8/1/2013): $??,??? (??.?%)

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 5/1/2013	Expected date 6/1/2013	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	