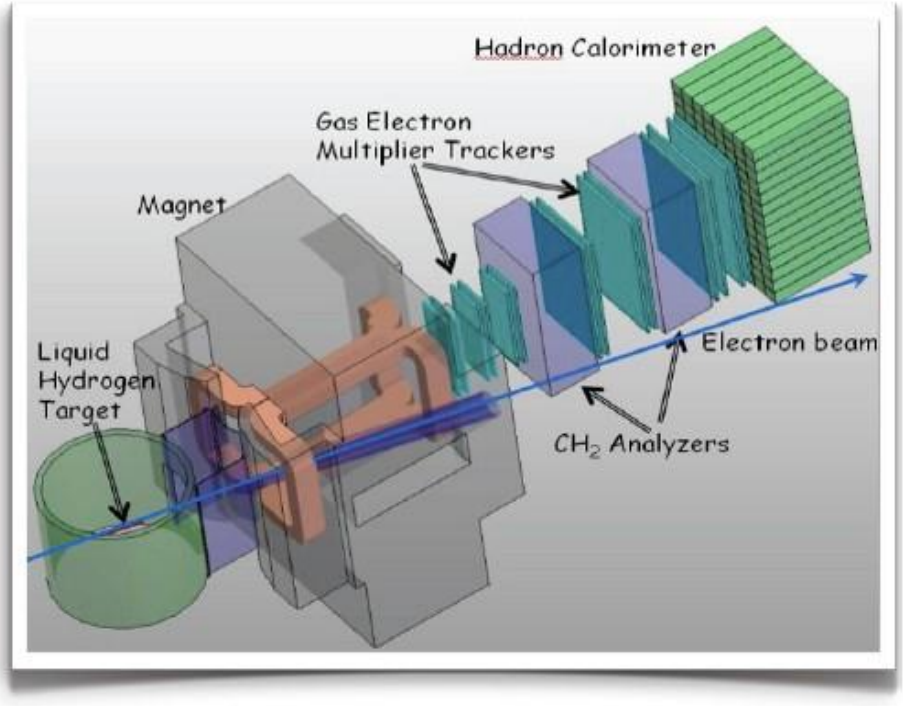
Jefferson Lab
Thomas Jefferson National Accelerator Facility

Super-BigBite-Spectrometer (SBS)

Monthly Progress Report

October 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 thirteenth Monthly Progress Report for the SBS Program.

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.

A contract between JLab and UVa for the manufacture of 29 GEM modules was finalized and signed on September 30, 2013.

Bids for the new magnet coils are due on October 14.

The third Project, Proton Form Factor (WBS 3), is scheduled to start in 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 9/1/2013	Expected Date 10/1/2013	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	8/15/2013		**8/21/2013**
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 September 4, 11, 18, and 25. Participants included Jefferson Lab, University of Virginia, University of Massachusetts, Carnegie-Mellon University, William and Mary, Norfolk State University, St. Mary's University, University of Connecticut, University of Glasgow, North Carolina Ag. and Tech. St. University, and INFN Rome.
- 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:

- Yoke modification drawings. (100% completed)
    - Expect to start procurement mid-October
- Detail drawings of new coils and procurement specification. (100% completed)
    - Coil procurement started. Bids are due October 14

WBS 1.2 Magnet/Detector Platforms:

- Continuing design details on magnet counter weight support. (80% completed)
- Designing detector supports. (40% 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 as of 10/1/2013: $410,543 (49%)
    - $838K includes $181K contingency
    - WBS 1 would be costed and obligated at 76.4% but the lab had to shift procurements to FY14 due to the financial situation. Since the shifting involved funds that were obligated, but not yet spent, there is no impact on the SBS schedule.

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 9/1/2013	Expected date 10/1/2013	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	2/1/2014	
2.2-20M	2	UVa receives electronics parts	8/20/2014	8/20/2014	8/20/2014	
2.2-10MA	3	UVa 5 GEM modules assembled and tested			6/2/2014	
2.2-10MB	3	UVa 15 GEM modules assembled and tested			9/30/2014	
2.2-10MC	2	UVa 29 GEM modules assembled and tested	10/17/2014	10/17/2014	3/9/2015	
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 September 4, 11, 18, and 25. Participants included Jefferson Lab, University of Virginia, University of Massachusetts, Carnegie-Mellon University, William and Mary, Norfolk State University, St. Mary's University, University of Connecticut, University of Glasgow, North Carolina Ag. and Tech. St. University, and INFN Rome.
- 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):.

GEM pre-R&D: In September the two full sized GEM modules were prepared for a beam test at Fermilab. Both chambers were first tested at UVa with cosmics, then were moved to Fermilab . The two chambers are now installed in the beam test area at Fermilab, along with detectors from Florida Tech, Stony Brook University, Yale University, and Brookhaven National Lab. The beam test is scheduled to take place in October.

GEMs: A contract was awarded on September 30 for the construction by UVa of 29 GEM modules. The proposed contract milestone 2.2-01M is maintained. Given the now well-known duration for construction of GEM modules, milestone 2.2-10M is split in three with completion of the first five modules on 6/2/2014, completion of the next ten modules on 9/30/2014, and completion of the final fourteen on 3/9/2015, leaving seven months of float in the schedule.

WBS 2.2 GEM Electronics (UVa):

Readout Electronics pre-R&D:

The new 8,000 channel APV25 based SRS electronic system procured from CERN was fully assembled at CERN and tested using high power radioactive sources. This successful test demonstrated that the SRS system is capable of collecting data at a DAQ rates exceeding 5 kHz. The SRS system was then moved to Fermilab and assembled there for the beam test.

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 as of 10/1/2013: $75,400 (93%)
    - $81K includes $19K contingency

WBS 3: Proton Form Factor

This Project is scheduled to start October 1, 2013. The WBS structure and milestone table are included below for completeness.

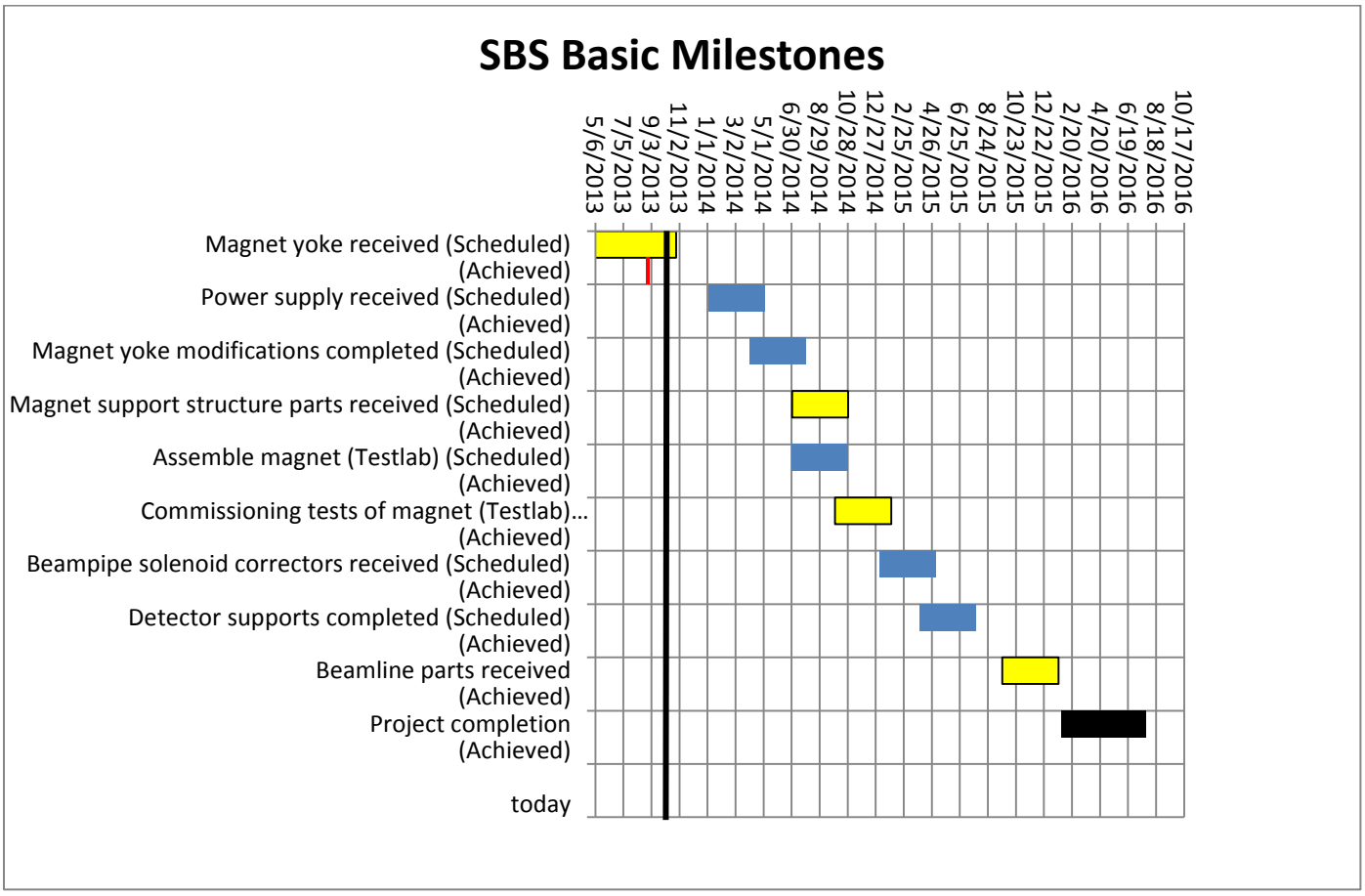
WBS 3	**Proton Form Factor**	**WBS 3.01**	Milestones
		WBS 3.02	Project Oversight
		WBS 3.1	Magnet Pole shims and exit field clamp
		WBS 3.2	GEM's (UVa)
		WBS 3.3	GEM electronics (UVa)
		WBS 3.4	Trigger (RU)

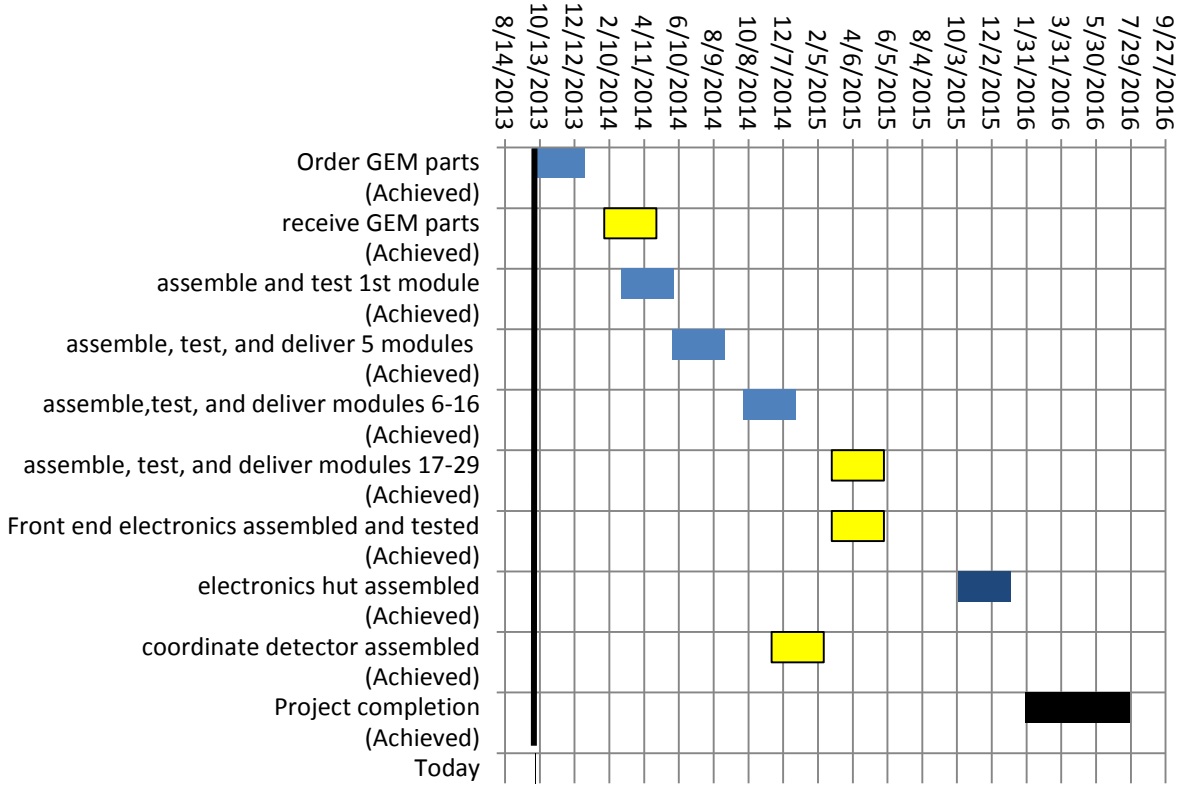
WBS 3.01 Milestones:

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	

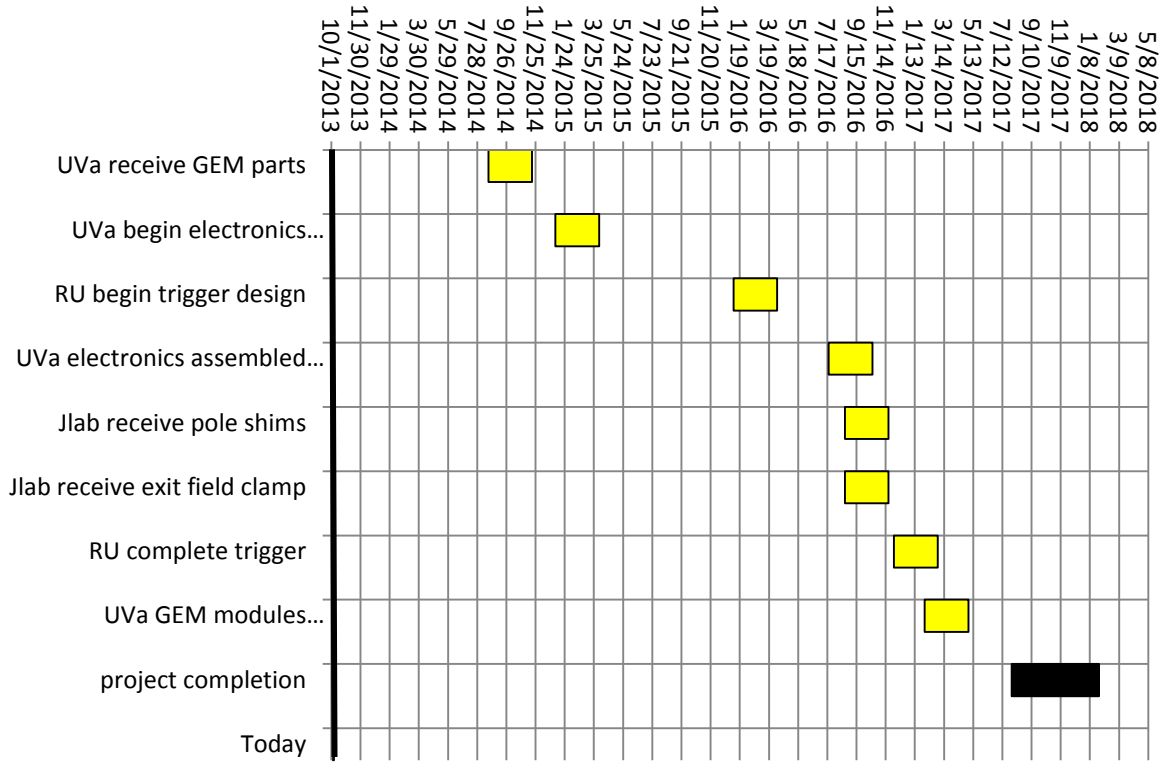
Appendix

The following are graphical representations of the milestones for SBS Basic (WBS 1), Neutron Form Factor (WBS 2,) and Proton Form Factor (WBS 2), updated on October 1, 2013. Black represents level 1 milestones as specified in the PMP. Yellow represents level 2 milestones from the PMP. Blue represents the new level 3 milestones to allow better quarterly tracking. The black vertical line indicates the day the chart was made. The red bar indicates when the milestone was achieved (e.g. Magnet yoke received). The milestones are presented in tabular form after the graphic representations.




SBS Nff milestones
8/14/2013
10/13/2013
12/12/2013
2/10/2014
4/11/2014
6/10/2014
8/9/2014
10/8/2014
12/7/2014
2/5/2015
4/6/2015
6/5/2015
8/4/2015
10/3/2015
12/2/2015
1/31/2016
3/31/2016
5/30/2016
7/29/2016
9/27/2016
Order GEM parts (Achieved)
receive GEM parts (Achieved)
assemble and test 1st module (Achieved)
assemble, test, and deliver 5 modules (Achieved)
assemble,test, and deliver modules 6-16 (Achieved)
assemble, test, and deliver modules 17-29 (Achieved)
Front end electronics assembled and tested (Achieved)
electronics hut assembled (Achieved)
coordinate detector assembled (Achieved)
Project completion (Achieved)
Today

SBS PFF milestones



WBS 1 Milestone	date
Magnet yoke received (Scheduled)	4/29/2013
(Achieved)	8/21/2013
Power supply received (Scheduled)	1/4/2014
(Achieved)	
Magnet yoke modifications completed (Scheduled)	4/1/2014
(Achieved)	
Platform parts received	6/27/2014
(Achieved)	
Assemble magnet (Testlab) (Scheduled)	7/1/2014
(Achieved)	
Commissioning tests of magnet (Testlab) completed (Scheduled)	10/1/2014
(Achieved)	
Beampipe solenoid correctors received (Scheduled)	1/5/2015
(Achieved)	
Detector supports completed (Scheduled)	4/1/2015
(Achieved)	
Beamline parts received	9/24/2015
(Achieved)	
Project completion	1/29/2016
(Achieved)	

WBS 2 Milestone	date
Order GEM parts	9/30/2013
(Achieved)	
receive GEM parts	2/1/2014
(Achieved)	
assemble and test 1st module	3/3/2014
(Achieved)	
assemble, test, and deliver 5 modules	5/30/2014
(Achieved)	
assemble,test, and deliver modules 6-16	9/30/2014
(Achieved)	
assemble, test, and deliver modules 17-29	3/1/2015
(Achieved)	
Front end electronics assembled and tested	3/1/2015
(Achieved)	
electronics hut assembled	10/5/2015
(Achieved)	
coordinate detector assembled	11/17/2014
(Achieved)	
Project completion	1/29/2016
(Achieved)	

WBS 3 Milestone	date
UVa receive GEM parts	8/20/2014
(Achieved)	
UVa begin electronics assembly	1/5/2015
(Achieved)	
RU begin trigger design	1/6/2016
(Achieved)	
UVa electronics assembled and tested	7/20/2016
(Achieved)	
Jlab receive pole shims	8/22/2016
(Achieved)	
Jlab receive exit field clamp	8/22/2016
(Achieved)	
RU complete trigger	12/1/2016
(Achieved)	
UVa GEM modules assembled and tested	2/2/2017
(Achieved)	
project completion	7/31/2017
(Achieved)	