

# Software Tasks

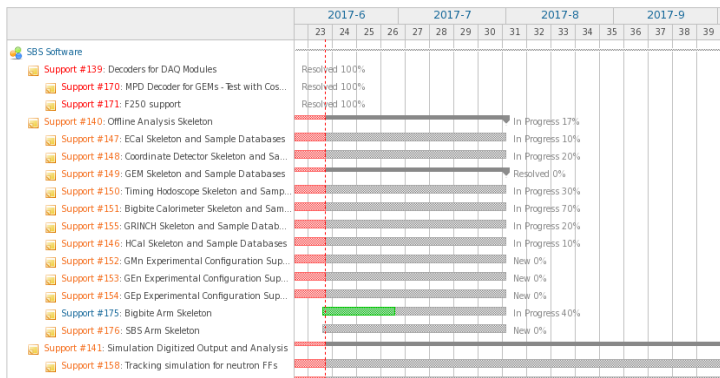
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July 14, 2017

- Software Overview and Scope
- Task Responsibilities
- Status and Timeline
- Tracking Simulations

- Progress tracking now in redmine



<https://redmine.jlab.org/projects/sbs-software>

- Ole Hansen (ole@jlab.org) can add new members
- Milestones are added

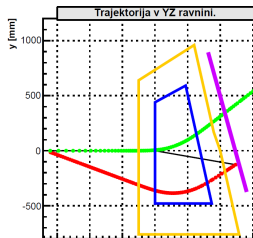
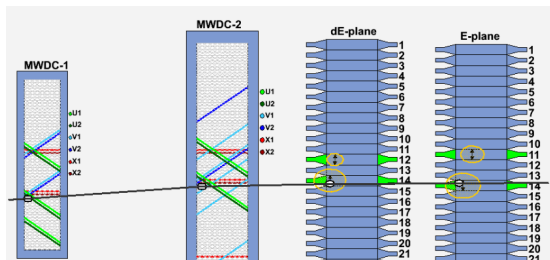
# Future SBS Software Milestones

- Nov 2016 - Software Review
- Jan 2017 - Start Digitized Simulation Output
- Apr 2017 - Decoders for all DAQ modules written
- Jul 2017 - Each detector system in analyzer, experiment configurations, basic reconstruction algorithms
  - Can analyze channel-level raw data at this point
- Dec 2017 - Simulation Interfaced to analysis, Have detector event displays, calibration scripts
- Jan 2018 - Start simulated analysis for detector reconstruction
- Jun 2018 - Begin simulated experimental analysis for core form factor experiments
- Jan 2019 - Ready for beam for form factor, start simulated experimental analysis for SIDIS and TDIS
  
- Spring 2019 likely earliest start of neutron experiments
- Spring 2020 likely earliest start for GEp

# Detector Subsystem Software

<https://www.github.com/JeffersonLab/SBS-Offline>

- Added to analyzer framework GEMs, CDet, GRINCH, ECal, RICH, Bigbite
- more later
- Have GEM classes from previous experiments available
  - Existing GEMs very bare bones
  - Need to bridge new GEMs with clustering and tracking
- New decoders written
  - MPD and F250 written and available in repository
- Event displays required



# Subsystem Responsibilities

## General Purpose Software

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analyzer Development	Hansen
Front End Decoders	Camsonne
Event Reassembly	JLab DAQ Group

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## SBS Specific

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	Contact	Supporting Groups
Repository Maintenance	Riordan	JLab
MPD Decoding	Riordan	JLab, UVA, INFN
GEM Tracking	Puckett	UConn, INFN, JLab
HCal Analysis	Franklin	CMU
Coord. Det	Monaghan	CNU
GRINCH	Averett	WM
BigBite Legacy	Riordan	JLab
Online	Riordan	JLab

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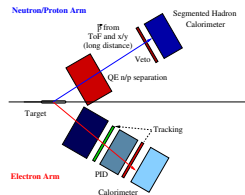
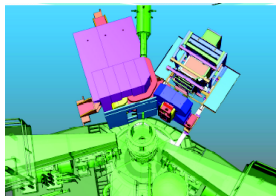
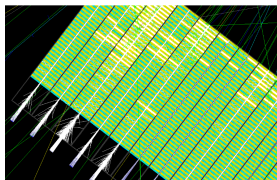
## GMn Analysis

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GMn	Quinn
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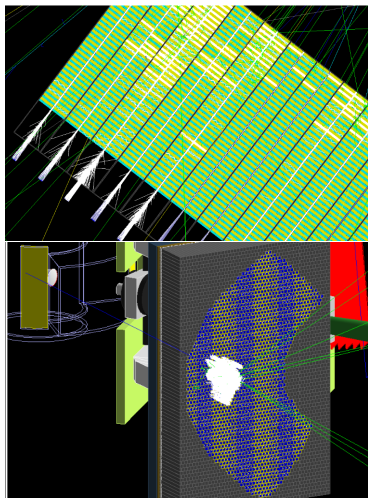
# Experiment Analysis Software

- Need development for analysis of each specific experiment
- Algorithms for PID and associating between detectors/arms needs to be in place
- Optics, target specific analysis very important
- Scripts for commissioning and calibration
- Framework for offline analysis software



<http://github.com/JeffersonLab/g4sbs>

- Full Geant4 Monte Carlo for all experiments
- Under continuous development since 2010
- Event generators to cover physics and backgrounds
  - Elastic, quasielastic, DIS,  $\pi$ , Pythia, ...
  - Random backgrounds
- Detailed detectors with full responses, optical photon production
- Includes beamline, shielding, support structures for backgrounds and radiation studies





Time to start putting in effort from subgroups!

Milestone for channel-level data to output end of July

<https://www.github.com/JeffersonLab/SBS-Offline>

- If you have decoding software - please look at integrating
- Hodoscope and Bigbite calorimeter very similar to previous analysis
- CDet work has begun at CNU (placeholder in repository)
  - Have specific geometry transformations
- GRINCH
  - Position layout of PMTs should be defined
  - Using BB  $d_2^n$  Cerenkov of starter
- HCal
  - FADC analysis should be defined

# Further Experiment Analysis Software

- Major goal of “end to end” simulation with production of pseudodata - simulation of data sizes
- Requires realistic digitization of new subsystems from Geant4 responses
- Ultimate demonstration of event-by-event analysis for full experiment
- Non-trivial and requires well defined standards/interfaces for flexible design

