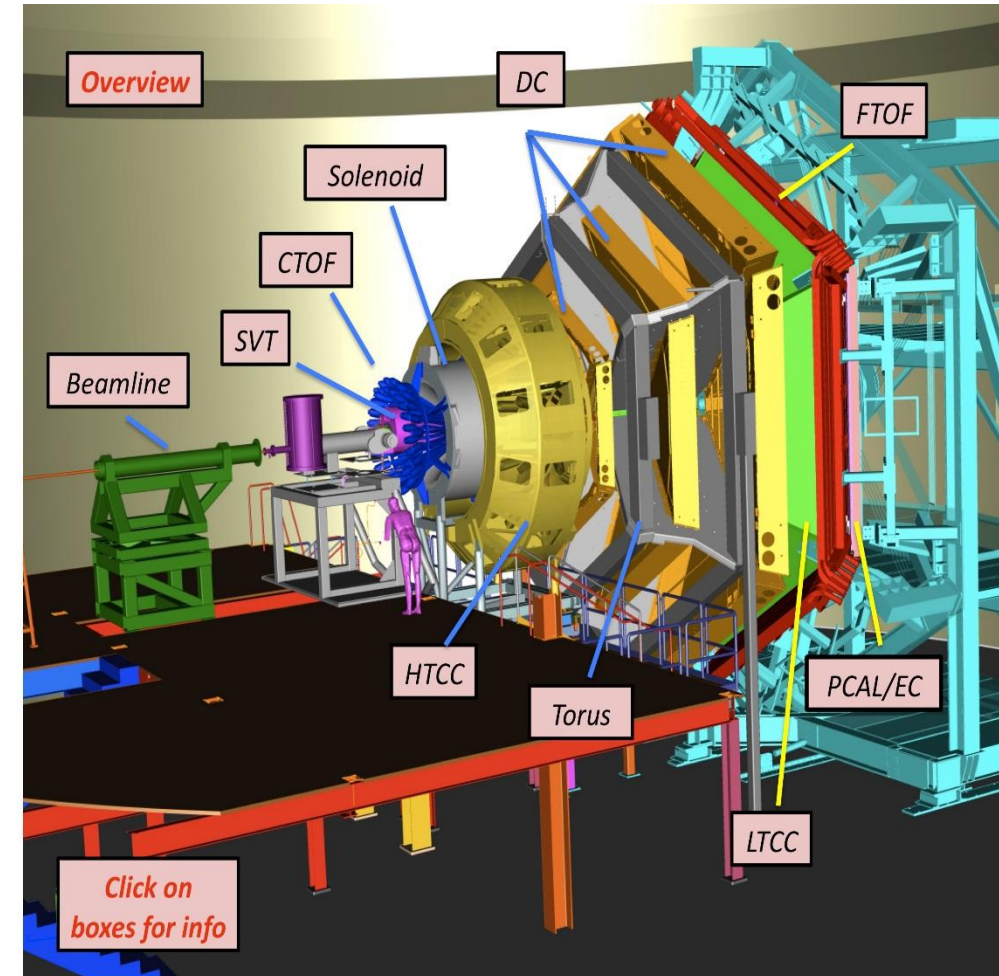
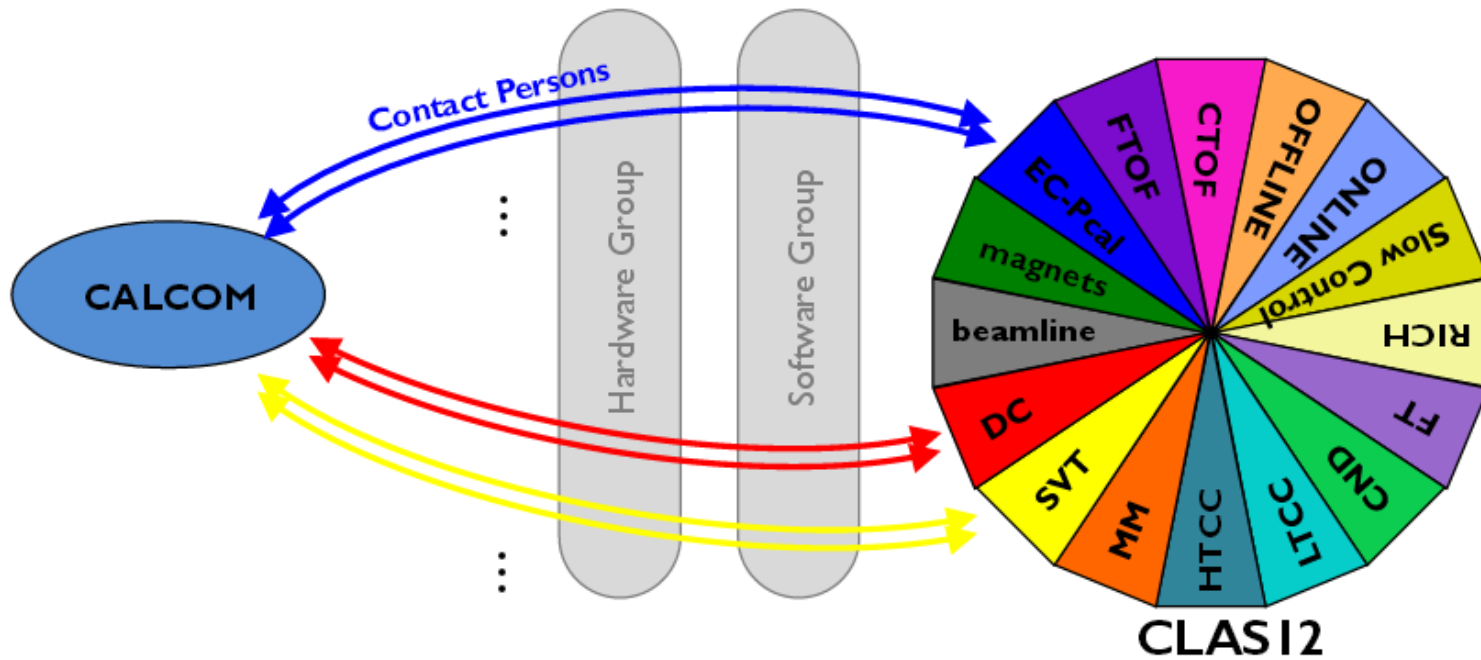


# Summary of the review of the preparation for the commissioning with beam of CLAS12 main detectors and future plan



# Reminder: Commissioning with beam document

<https://clasweb.jlab.org/wiki/images/b/b1/Commissioning-with-beam.pdf>

- This document describes the procedures that will be followed for the commissioning of the CLAS12 spectrometer using beam-induced reactions.
- The commissioning will consist of different phases, starting from low luminosity data taking for the initial detector turn-on and testing to production running for final calibrations.
- In each phase, the run conditions will be selected based on the requests of the CLAS12 subsystems and will be optimized to maximize efficiency and reduce time losses.
- Upon completion of these procedures, the functionality of all CLAS12 subsystems will be verified, the detector performance will be assessed, and the nominal running configuration will be optimized.

On Jan 15<sup>th</sup> CLAS12 went through a review to discuss the status of the preparation for the commissioning with beam of the main detector that will take place in the fall of 2016.

### Review committee:

Yves Roblin, JLab CASA

Lars Schmitt, GSI, PANDA

Elton Smith, JLab Hall D (chair)

Stepan Stepanyan, JLab Hall B

Glenn Young, JLab 12 GeV Project

### List of talks:

- 1- Commissioning with Beam Plan
- 2- DAQ and Trigger
- 3- CLAS12 Simulation Studies
- 4- Online and Offline Tools
- 5- Subsystem Commissioning
- 6- Management and Organization
- 7- Conclusions

## Review outcomes (final report is distributed today at 9:30 am).

- Commissioning with beam (CWB) plan:
  - Key performance parameters (KPP): Check what Hall D did.
  - Revise the CWB assuming longer beam time allocation (30 days)

In Today's report: **Reviewers recommendations:**

1. Work with the 12 GeV Project to determine the Key Performance Parameters (KPP) for Hall B. Optimize the commissioning plan to address the KPPs early in the plan.
2. The timeline for comprehensive commissioning is too ambitious. We recommend that the team develop a more realistic schedule. From our experience, we estimate the period should be extended by at least a factor of two.
3. In the extended time period begin commissioning with 3 pass beam. This will allow tuning the beam to the tagger dump before sending the beam through the detector, will make detector calibrations simpler, and allow direct comparisons with existing data.
4. Identify an on-site person to lead the slow control activities.

# Hall D Key Performance Parameters (KPP)

- 1- In Dec 11<sup>th</sup> 2014, Hall D got the formal DOE confirmation that the Key Performance Parameters (KPP) of the project have been met. The detectors got beam in Nov 2014
- 2- Hall D: “Detector operational: events recorded with a  $> 2$  nA electron beam at  $> 10$  GeV beam energy (5.5 pass)”
- 3- Detector running for ~one shift recording data from all subsystems.
- 4- Snapshots of beam status screens and accelerator Elog entries demonstrating the electron beam current and energy.
- 5- Plots showing relative timing (coincidence) of the signals in TAGx, TOF, BCAL, FCAL, ST, PS (with TAGx).
- 6- Event displays showing correlations of particle hits in the CDC, FDC, ST, TOF, BCAL, FCAL.
- 7- Plots of reconstructed particle trajectories showing target position.
- 8- Particle identification plots using signals from calorimetry and timing detectors (e.g. FCAL, BCAL, TOF).

From [https://halldweb1.jlab.org/wiki/index.php/KPP\\_November\\_30,\\_2014](https://halldweb1.jlab.org/wiki/index.php/KPP_November_30,_2014)

# Work Plan - Simulations

- 1- Estimate particle rates at 6 and 11 GeV to better define configuration and time allocation for the different tasks
  - Inclusive electrons
  - Hadron rates for detector calibrations
- 2- Prepare for detailed simulation studies of backgrounds and hadronic events:
  - Consolidate detector geometry description including passive materials
  - Read calibration constants from DB
  - Update/complete digitization routines
- 3- Determine expected backgrounds in all detector systems for different CWB phases
- 4- Verify feasibility of solenoid-off measurement and study alignment procedures
- 5- Optimize target configuration
- 6- Trigger simulations
- ...

# Work Plan – DAQ & Trigger Comm.

1- Should define more clearly what can be achieved with pre-beam commissioning and what will be done during CWB

2- DAQ CWB commissioning:

- Reading from all detector systems
- Check system synchronization
- Study DAQ performances as a function of rate
- ...

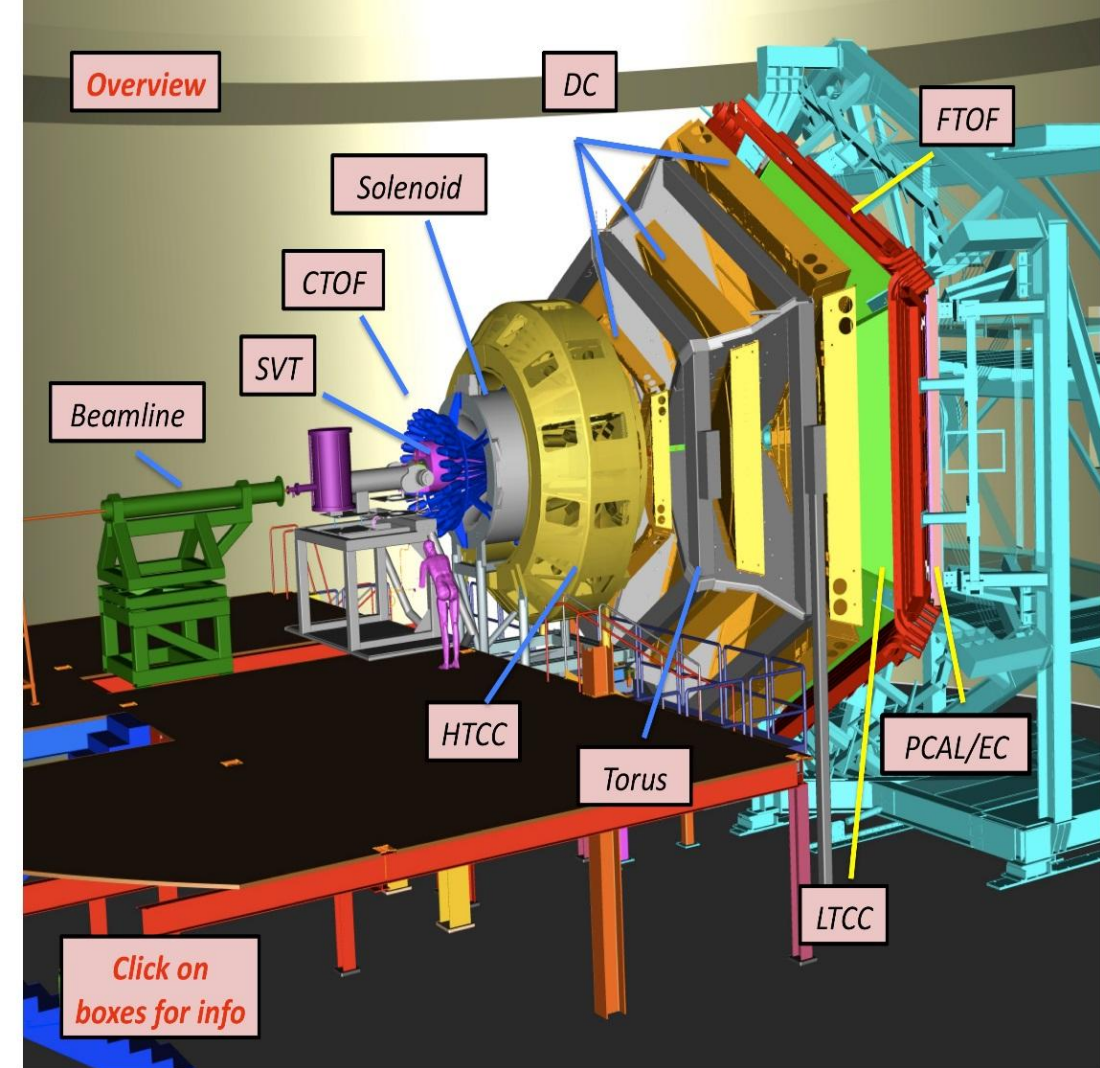
3- Trigger CWB commissioning:

- Focused on electron trigger
- Comparison of trigger configurations, different thresholds....



# Work Plan – Calibrations

- Define details of individual detector calibration procedures
- Develop global CLAS12 timing calibration
- Calibration tools status:
  - FTOF calibration development in progress
  - EC-Pcal calibration in progress, start using common tools soon
  - DC to start within spring 2015
  - HTCC-LTCC in progress, update in February
  - SVT first part done by Justin, Yuri presently using common tools to build plots, alignment procedures to be defined



<https://www.jlab.org/Hall-B/clas12-web/>