

# Magnet, Support and Infrastructure

Whit Seay

September 11, 2015

- Director's Review Comments
- Update on Engineering Tasks from May 2015
- Hall A Layout for SoLID
- Magnet Transfer to JLAB
- Transport and Storage of CLEO
- New Lifting Beam for CLEO
- Visit to Cornell for Initial Iron Removal.
- CAD Model Available to Collaboration

## 2B.

- The Committee strongly recommends testing the CLEO magnet coils (cold test), power supply and controls, before installation in Hall A.

*Response: Cornell will begin sending CLEO-II parts to Jlab in Summer 2016. Jlab plans to setup cold test of Cryostat when received. Need to coordinate manpower and facility to conduct tests before putting Cryostat in storage area. - Initial space request has been made for cryostat. Further develop plan in early FY16.*

- A new magnet power supply should be included in the total cost of SoLID.

*Response: Recent purchase of 2200A/290V power supply = \$181k. Need ~3500A.*

- Evaluate the schedule impact of mapping the magnetic field in situ in Hall A.

*Response: Need Collaboration to define specifications for magnetic field mapping. Ideally, use (borrow) an existing mapper. 3D simulation or not ?*

## 2D.

- It should be confirmed that the baffle design, including the support structure, is optimized for background rejection and signal acceptance. Furthermore the baffle design should minimize generation of secondary backgrounds.

*Response: Nose and baffle support design are in initial analysis stage, iterations will continue as design develops.*

### 3B.

- A cost benefit analysis for any systems being reused should be carried out, including the magnet power supply.

*Response: As the CLEO-II magnet is disassembled detailed parts and part conditions can be identified; cryogenic lines, controls, power supply... this effort will continue through Summer of 2016.*

### 3C.

- We strongly recommend tests at JLab of the CLEOII magnet coils (cold test), ideally with the new power supply and controls, before installation into the hall.

*Response: Agree to cold testing of cryostat, need to coordinate timing such that controls and power supply are ready. New controls and power supply ready by FY16-FY17 would be “challenging”.*

- An effort should be made to clearly specify resources required from JLab that are not explicitly in the project (effort, noneffort, equipment, building space, etc.)

*Response: Agree. Expect to have more definition of space and utility requirements by early FY16, then start coordinating with Jlab facilities and cryo groups. – in the process of requesting needed space*

### 3D.

- The project should develop a preliminary resource loaded schedule for the installation and the corresponding space management plan for the hall floor.

*Response: Agree, planned engineering effort for late FY15 – basic layout updated with other experimental equipment included. Space for mobile crane used for assembly taken into account. Preliminary installation estimate complete for manpower.*

- The project should start planning the process of how to change from one SoLID configuration to another in order to better understand the time and effort involved and if there are any potential issues such as radiation

*Response: Agree, integrated into design of magnet and detector supports, more detail in FY16*

## *Hall A Engineering Group Tasks*

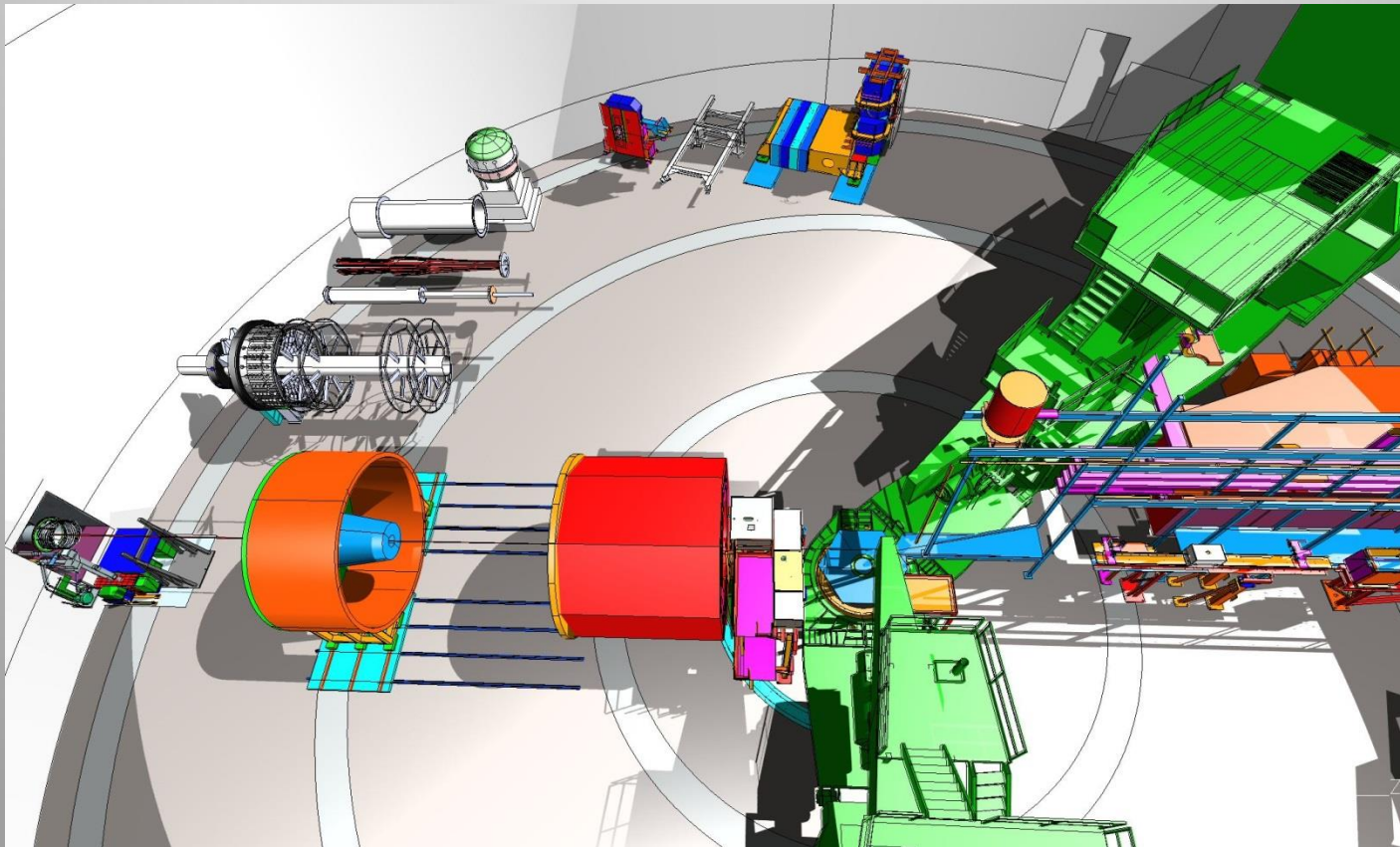
### *FY15 (2MW design/4MW engineer)*

- *integrate detector models into overall CAD model of SoLID – All detector CAD models provided to engineering by the collaboration were integrated into the most current SoLID CAD*
- *observe disassembly efforts of CLEO-II at Cornell – Completed Sept 2, 2015*
- *update resource loaded schedule and cost estimates; including cost benefit analysis of used equipment and definition of Jlab resources required - pushed to FY 2016*

### *FY16 (6MW design/10MW engineer)*

- 3D magnet analysis to aid in magnet mapping definition and defining forces
- FEA of magnet and detector supports
- Develop plan and coordinate setup of Jlab facility for cold test of cryostat
- Define new power supply
- Define utility and facility needs

# Layout in Hall A



- HRS beam right spectrometer moved back beyond the truck ramp opening and will allow direct access for delivery of SoLID items.
- Target to be 115cm downstream of pivot for magnet to clear pivot bearing. Center of the CLEO-II magnet would be 350 cm downstream of the target center.

# Magnet Transfer to JLAB

- Cornell is currently determining the detailed steps required for CLEO II disassembly and working hard to develop a plan based on current variables.
- The summer 2015 work will give Cornell a better understanding of manpower and schedule needs.
- Project variables include the outcome of their CESR upgrade proposal, timeline of available JLAB funds, and optimizing their schedule while still meeting the minimum amount of run days for their NSF contract.

## Current planning scenario:

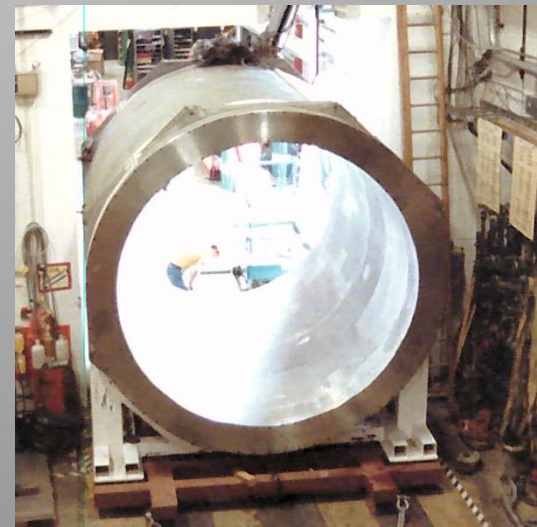
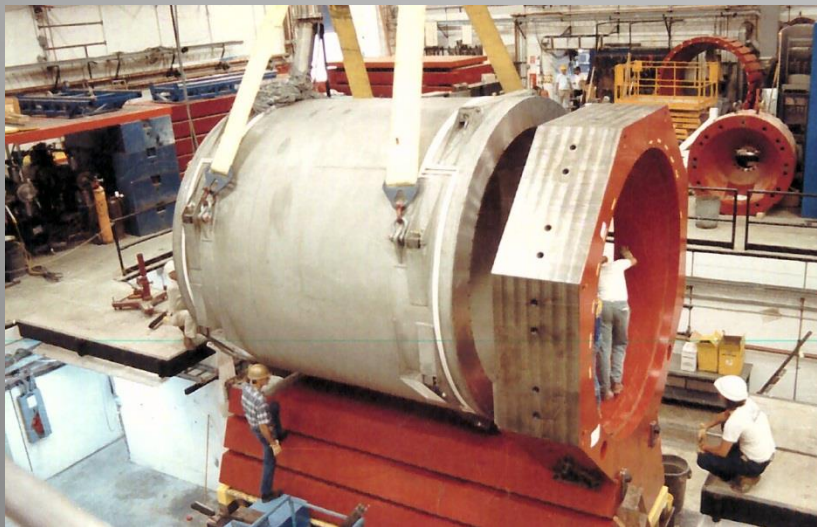
- Summer 2015 – Preparatory work begins. Removal of scaffolding, adjacent electronics, outer shielding and sections of iron completed Sept. 2015.
- Summer 2016 – Further disassembly of magnet. Cornell will try to maximize amount of work accomplished during this down period to minimize down time in the Summer of 2017.
- Summer 2017 - Final CLEO removal and shipment of parts to JLAB

CESR upgrade will be a concurrent project requiring a good amount of coordination. Experimental equipment and many shielding blocks will be removed during this timeframe.



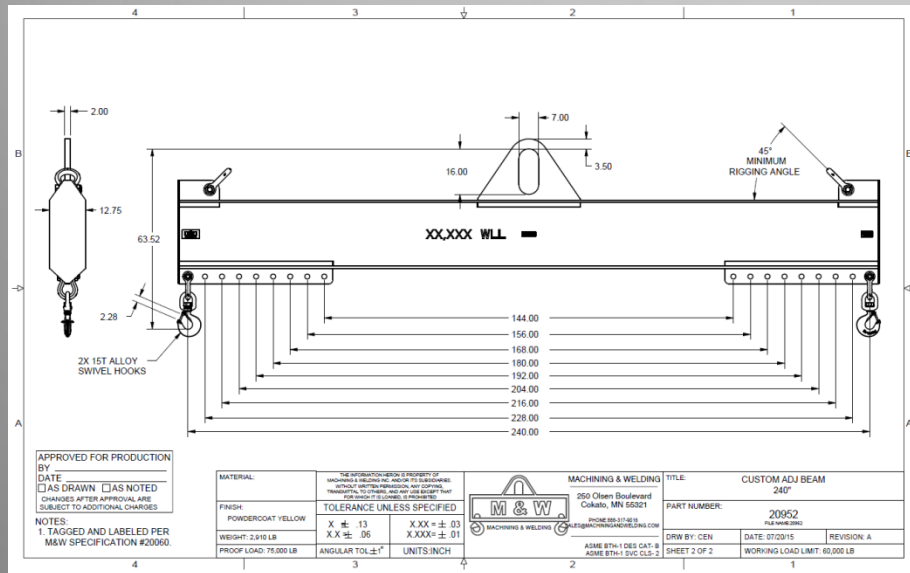
# Transport and Storage of CLEO II

- Disassembled and loaded on trucks for shipping by the Cornell personnel with oversight by Jefferson Lab. It will require 52 trucks to transport the magnet and related equipment.
- We have identified all of the parts of the CLEO magnet, with sizes and weights, anticipating a need for storage of these parts at Jefferson Lab starting Summer 2016, total weight of 1,053k lbs.
- The cryostat (44k lbs) and power supply will need to be stored in an environment-controlled area of approximately 400 square feet. Space in the Test Lab and utility needs are being requested.
- Jefferson Lab projects the use of the CMSA site for storage of all iron parts.



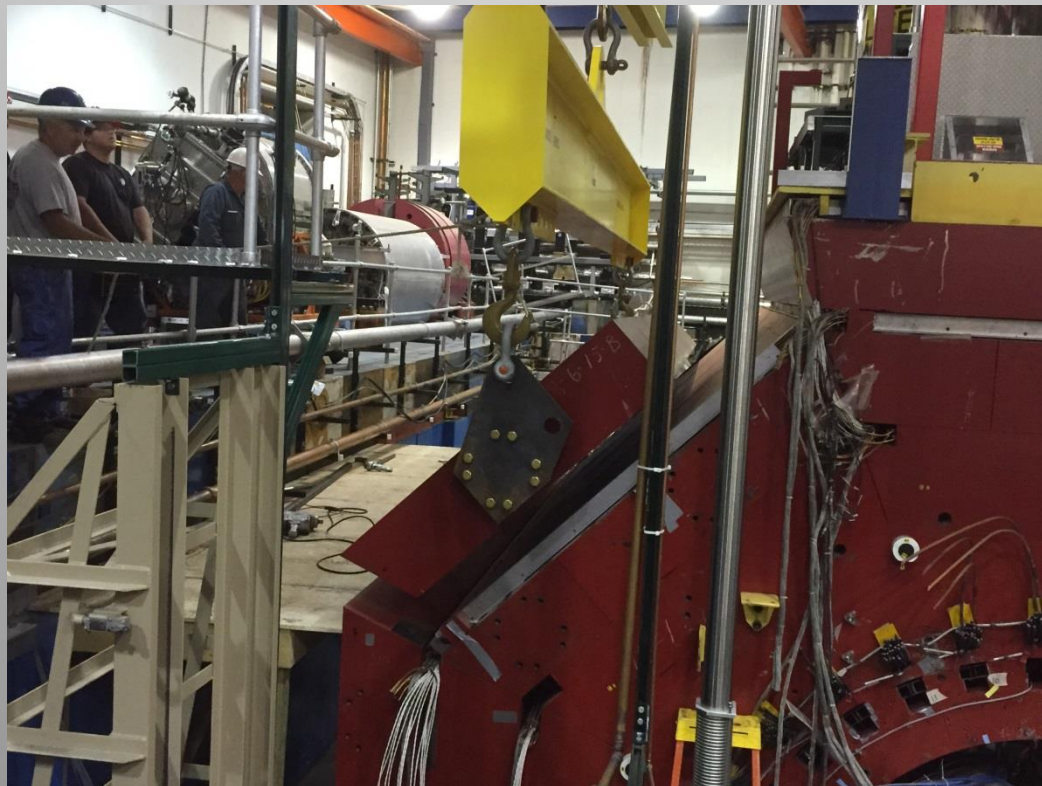
# New Lifting Beam

- New 60,000 lbs capacity lifting beam purchased by JLAB
- Replaces old lifting beam that no longer meets current safety code and has been rusting in Cornell's storage field for 20+ years.



# Visit to Cornell

Removal of outer layer of steel on the UP-NORTH sector of the magnet.





# Visit to Cornell

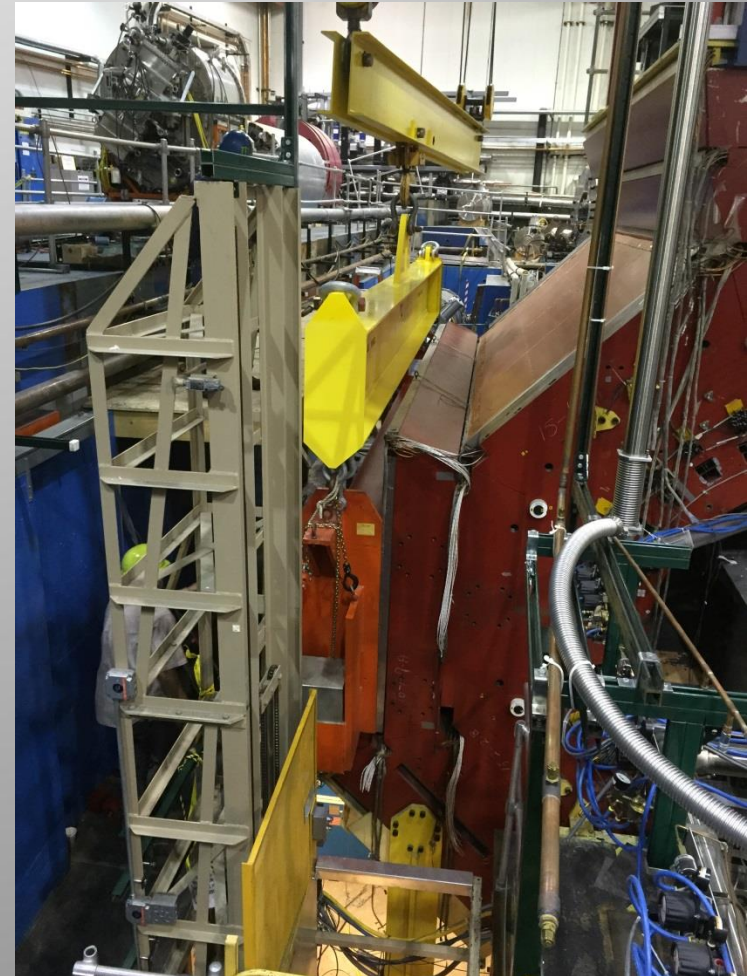
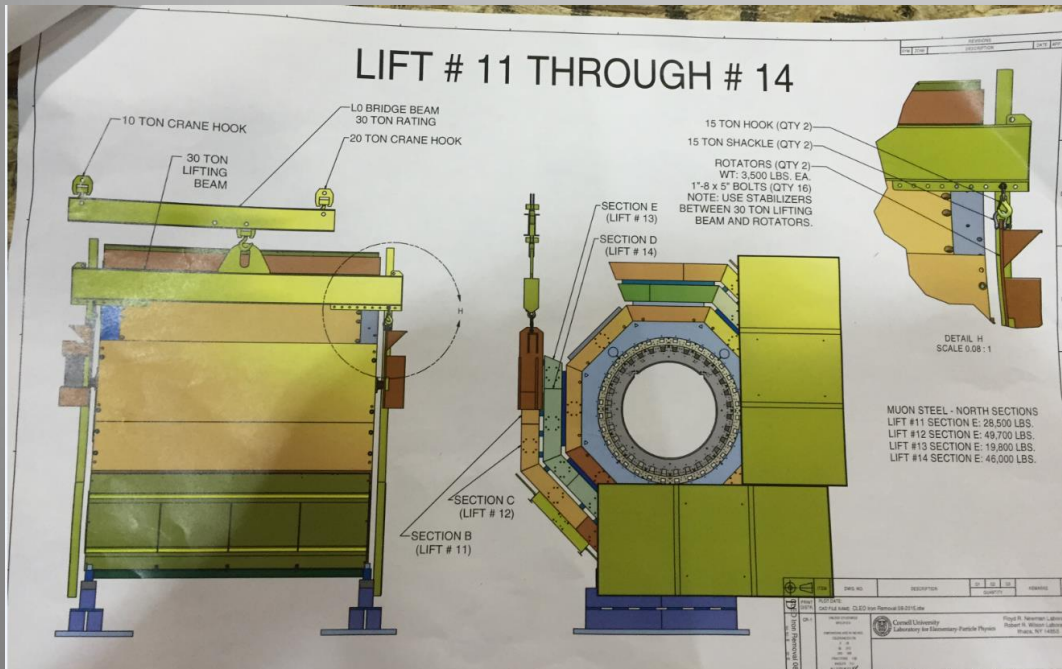
Mechanical rotators used to orient each slab of the iron to its proper angle for the particular section it is mounted within.



# Visit to Cornell

## Removal of outer layer of NORTH section using rotators.

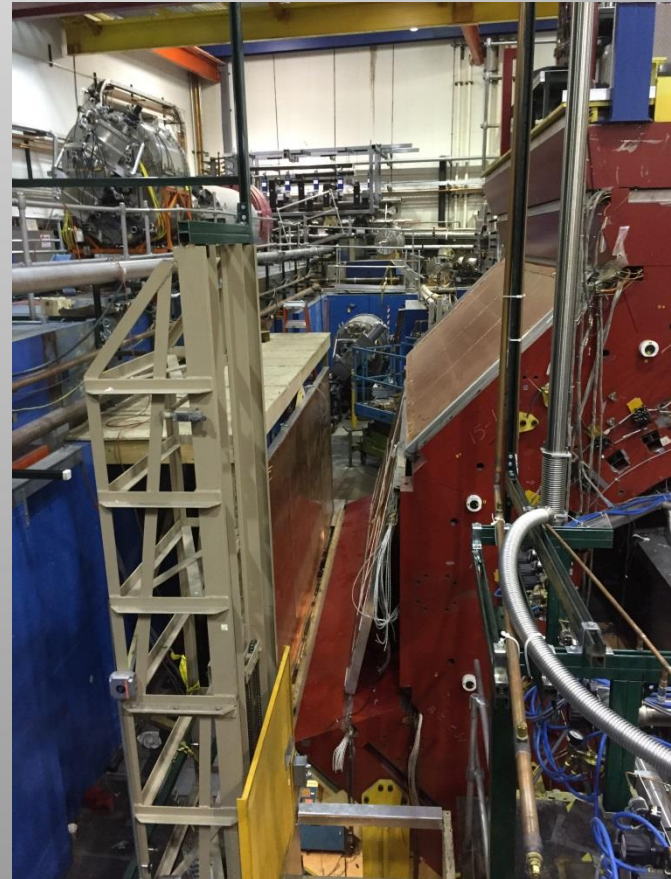
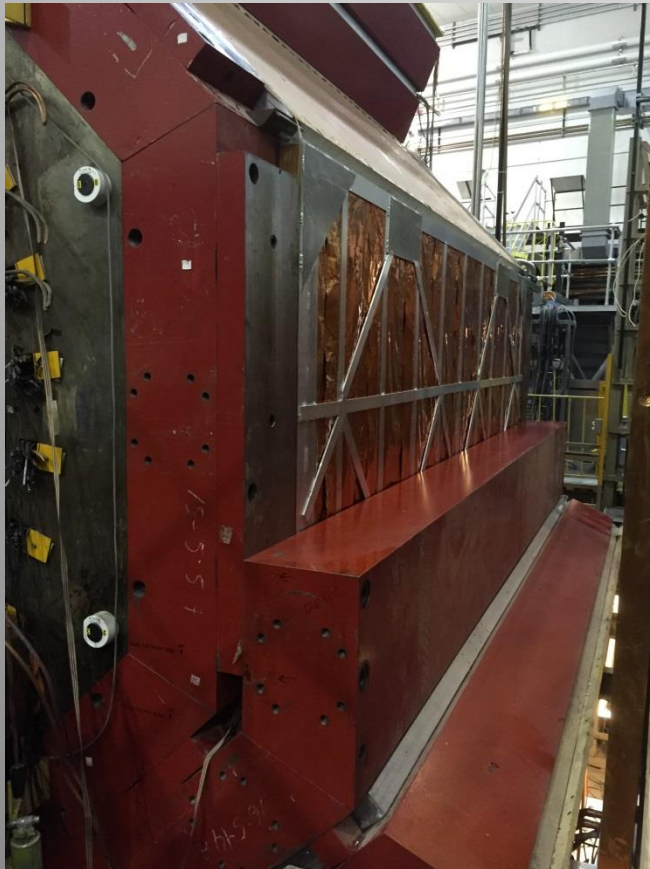
Cornell has developed a lift plan for each section.





# Visit to Cornell

Outer two layers of NORTH and UP-NORTH sectors of CLEO removed.



# SoLID CAD Files

The screenshot shows a web browser displaying a wiki page titled "SoLID CAD". At the top, there are tabs for "page", "discussion", "view source", and "history". The main content area includes a heading "SoLID CAD" followed by text stating that all files are at <http://hallaweb.jlab.org/12GeV/SoLID/download/CAD.gp> and a request to send files to Zhiwen and edit the wiki. Below this is a section titled "magnet" with a bulleted list: "v1.0, 'SoLID\_CLEO\_Mock\_Up\_V1\_0.igs'", "based on [https://jlabsvn.jlab.org/svnroot/solid/solid\\_gemc/database\\_io/field/CLEOv8.am](https://jlabsvn.jlab.org/svnroot/solid/solid_gemc/database_io/field/CLEOv8.am)", and a description of the model's components and dimensions. The left sidebar contains navigation links (Main Page, Community portal, Current events, Recent changes, Random page, Help) and a search box. The bottom footer shows the page was last modified on 8 September 2015, accessed 7 times, and includes links for Privacy policy, About Hall A Wiki, and Disclaimers. A "Powered By MediaWiki" logo is in the bottom right corner.

page discussion view source history

## SoLID CAD

all files are at <http://hallaweb.jlab.org/12GeV/SoLID/download/CAD.gp>  
please send file to Zhiwen and edit the wiki with some info

### magnet

- v1.0, "SoLID\_CLEO\_Mock\_Up\_V1\_0.igs"
- based on [https://jlabsvn.jlab.org/svnroot/solid/solid\\_gemc/database\\_io/field/CLEOv8.am](https://jlabsvn.jlab.org/svnroot/solid/solid_gemc/database_io/field/CLEOv8.am)
- "This model has the two layers of iron, the endcap, the coil collars, the cryostat, and the support frame inside the cryostat. The magnet portion has dimensions based off the Cornell drawings. The endcap has dimensions based off of information gathered from the SoLID wiki page." from Whit Seay on 2015/09/07

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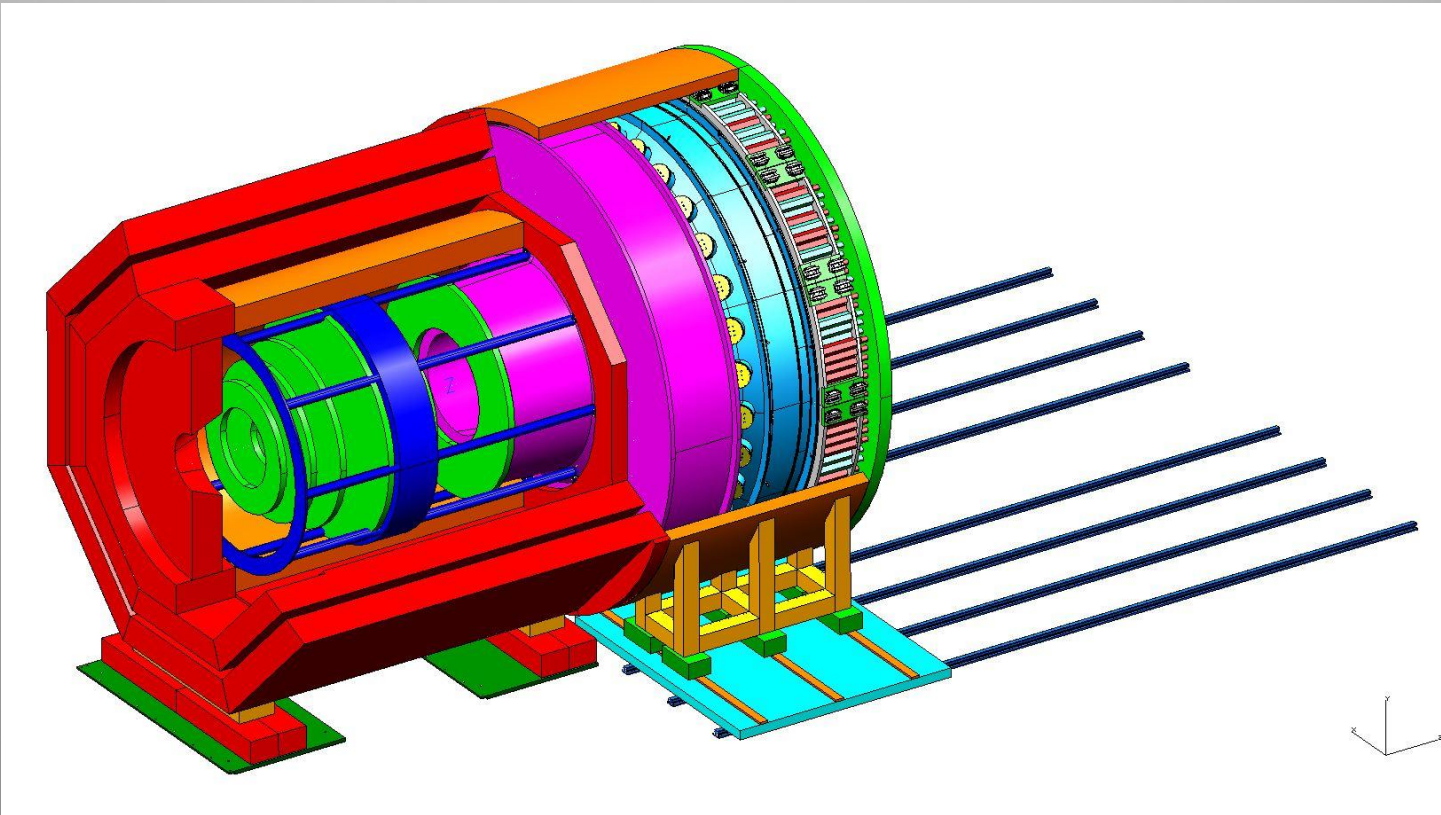
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please send file to Zhiwen and edit the wiki with some info

SoLID CLEO Mock up V1.0 is the current version of the magnet and endcap that has been used over the last year in presentations by the engineering group.

# SoLID CAD Files

SoLID CLEO Mock up V1.0





# Backup Slides

# SoLID Installation

- Preliminary installation estimate: 1.5 to 1.75 years
  - Total FTEs = 14
  - Preparation of Hall A            2.5 FTE
  - Magnet                                3.85 FTE
  - Detectors                            2.65 FTE
  - Target                                 2.0 FTE
  - Engineering Support            0.5 FTE
  - Installation Coordination    1.75 FTE
- 
- \$150k for installation tools/hardware
  - Additional funds to be estimated for crane and rigging  
(Recent contract for 60 ton crane & riggers-  
\$3800/day, estimate 52 days, need \$200k)