

1.1 Design and Procedure

1.1.7 Infrastructure and Support Structure

1.1.7.1 Detector Support

- 1.1.7.1.1 Design internal detector support system for magnet
- 1.1.7.1.2 Design internal detector support system for endcap
- 1.1.7.1.3 Integration of individual detectors into support system
- 1.1.7.1.4 Design detector installation fixtures

The conceptual design of the internal detector systems for the magnet and endcap will use a common design approach and utilize off the shelf components where possible. A rail system is envisioned that will allow all detectors to be loaded and rolled into position for each of the experimental configurations. This will allow all of the detectors to be integrated into the detector support system using common parts. The lab has experience designing detector supports that are loaded in a similar way. The installation fixture for the endcap detectors will require a custom space frame structure. Many examples of this structural design exist at the Lab. The installation fixture for the detectors inside the magnet will use a system similar in design to the one used for loading the inside of the CLEO II magnet at Cornell. The lab as a whole has a wide range of experience designing many different types of detector supports and methods of installation. Labor estimates were based off of this combined experience.

1.1.7.2 Baffles

- 1.1.7.2.1 Baffle Layers
- 1.1.7.2.2 Baffle Support System

Technical drawings that convey the baffle layer geometry designed by the collaboration will need to be created. The support system for the baffles will be required to support the heavy weight while remaining outside of the acceptance. The baffle support will use the same rail system as the internal detectors to mount inside the magnet.

1.1.7.3 Access

- 1.1.7.3.1 Design personnel access platform for cyro/controls on top of magnet
- 1.1.7.3.2 Design personnel access system for endcap detectors

Personnel access platforms are a typical part of experimental apparatus at JLAB. The general requirements to design access platforms to OSHA standards are well understood.

1.1.7.4 Power

Labor estimates for specifying the needed connections between the SoLID experimental equipment and the existing Hall A power utilities is based on past lab experience.

1.1.7.5 Beamline

Modifications to the beamline has become more common in Hall A with larger experimental installations. Judgement from past experience will be used to design the beam transport piping, supports and required instrumentation.

1.1.7.6 Hall A Modifications

1.1.7.6.1 Ramp

1.1.7.6.2 Existing Hall

Modifications to the ramp and/or a new low clearance transport frame will be required to safely transport the cryostat down the truck ramp and through opening in the hall wall. Estimates on the modifications to the existing hall to accommodate SoLID are based on judgement from previous large experimental requirements similar to SoLID.

1.1.7.7 Layout

Estimates for laying out the experimental configurations in the CAD system was based on previous lab experience.

1.1.7.8 Assembly/Installation

Lab experience was used to estimate the labor needed for the assembly/installation planning.

1.2 Construction

1.2.7 Infrastructure and Support Structure

1.2.7.1 Detector Support

- 1.2.7.1.1 Procure internal detector support system for magnet
- 1.2.7.1.2 Procure internal detector support system for endcap
- 1.2.7.1.3 Individual detector integration procurements
- 1.2.7.1.4 Procure detector installation fixtures

Cost estimates for the various support systems and installation fixtures was based on judgement and experience gained from previous support structures and detector mounting systems at the lab. Examples include magnet supports in Hall D.

1.2.7.2 Baffles

- 1.2.7.2.1 Baffle Layers
- 1.2.7.2.2 Baffle Support System

Judgement and lab experience was used to estimate the cost of casting the large lead baffles and the baffle support frame. The lab has experience working with vendors that can accomplish the large casting requirements of the baffles.

1.2.7.3 Access

- 1.2.7.3.1 Procure access platform for cyro/controls on top of magnet
- 1.2.7.3.2 Procure access system for endcap detectors

Personnel access platforms are a typical part of experimental apparatus at JLAB. Cost estimates are based on judgement gained from previous experiments in Hall A.

1.2.7.4 Power

Cost estimates for connecting the SoLID experimental equipment to the existing Hall A power utilities are based on past lab experience.

1.2.7.5 Beamline

The procurement cost estimates for the beamline components and supports are based on recent experience and judgement from other large experimental installations.

1.2.7.6 Hall A Modifications

1.2.7.6.1 Ramp

1.2.7.6.2 Existing Hall

Cost estimates for the modification to the ramp and/or a new low clearance transport frame are based on judgement and experience on similar work for transport frames and ramp modifications. Estimates on the modifications to the existing hall to accommodate SoLID are based on judgement from previous large experimental requirements similar to SoLID.

1.2.7.7 Layout

Lab experience has shown that a small amount of labor for the experimental layout support in the lab's CAD system is required during the procurement and installation phases.

1.2.7.8 Assembly/Installation

The cost and labor estimates for the assembly of the magnet, installation of utilities and detectors and testing/commissioning of experimental apparatus is largely based on lab experience with the Hall D superconducting solenoid. That installation is reasonably comparable in scope with the SoLID installation. Experience from Hall A Work Coordinators also factored into the initial installation estimate.