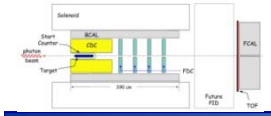
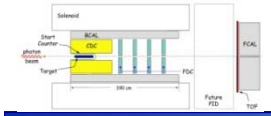


GlueXII and DIRC ERR

Tim Whitlatch

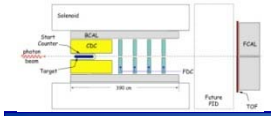
Hall D Engineer

DIRC Installation, Schedule and ESH&Q Considerations

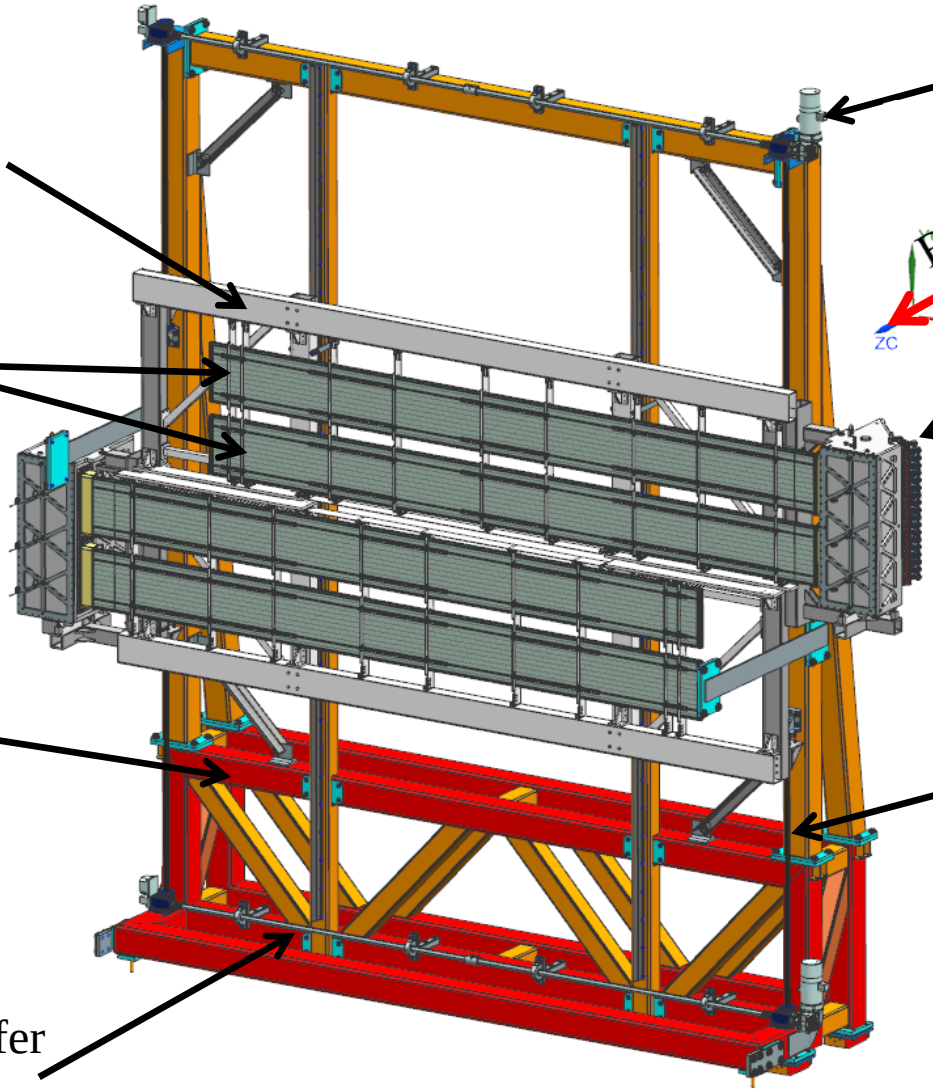


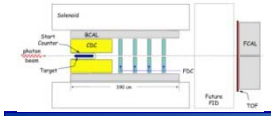
Outline

- DIRC System Design
- Installation Progress for ½ Detector
- Operations
- Controls
- Remaining Installation Tasks/Resource Loaded Schedule
- Summary

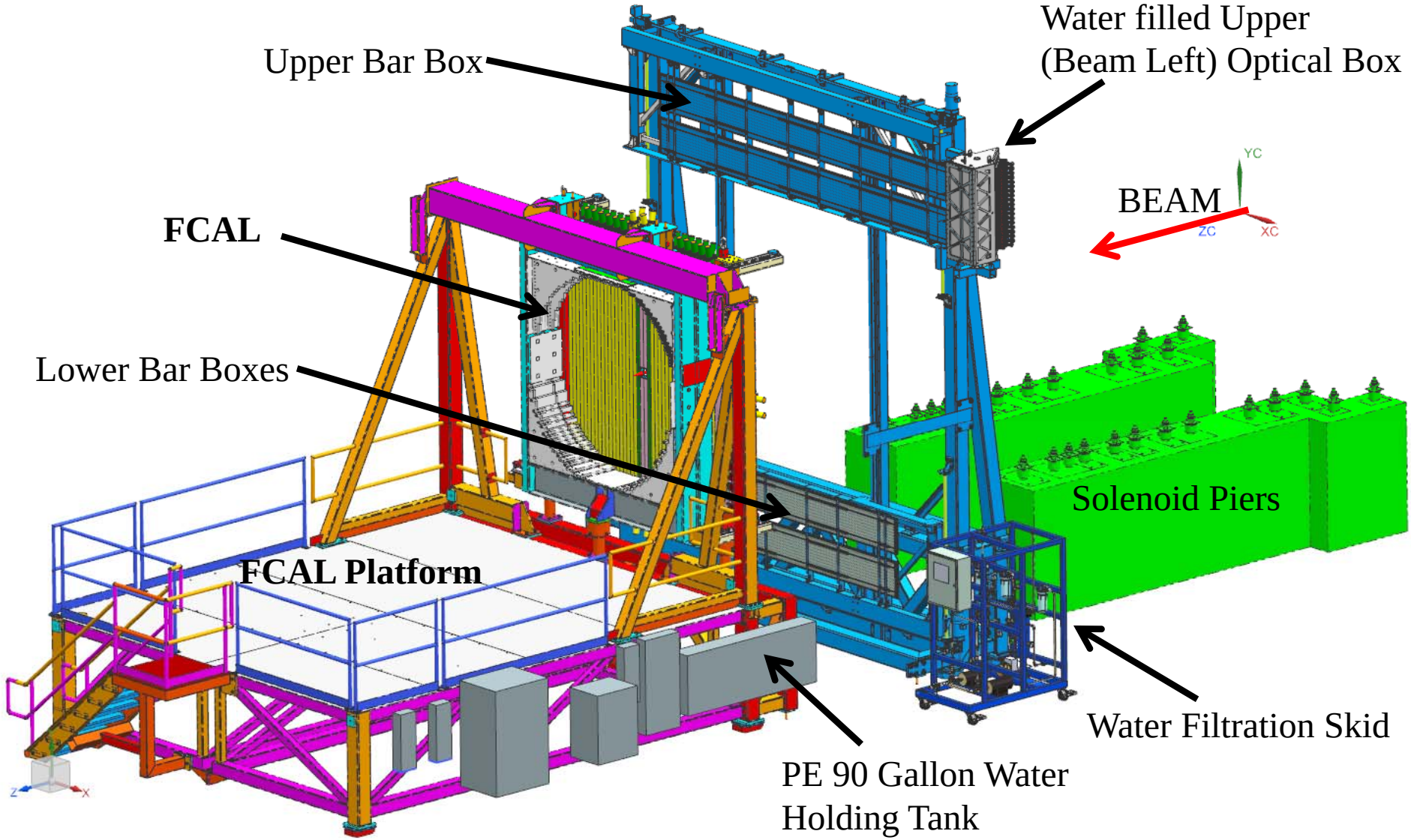


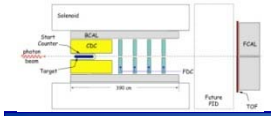
DIRC Assembly



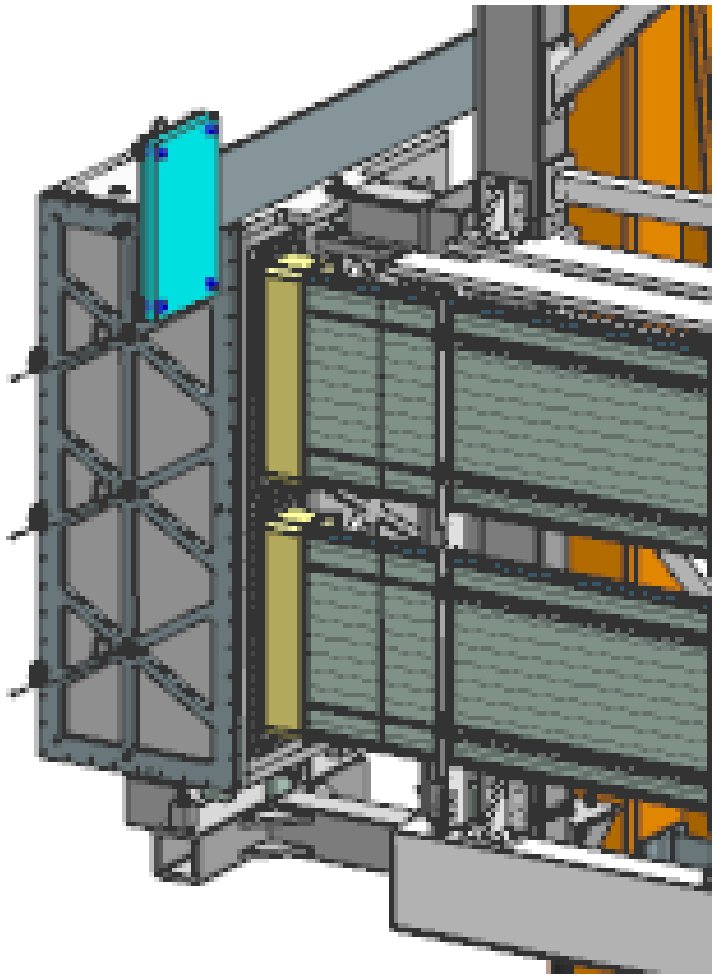


DIRC Installation

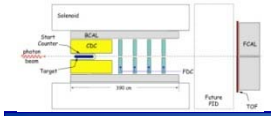




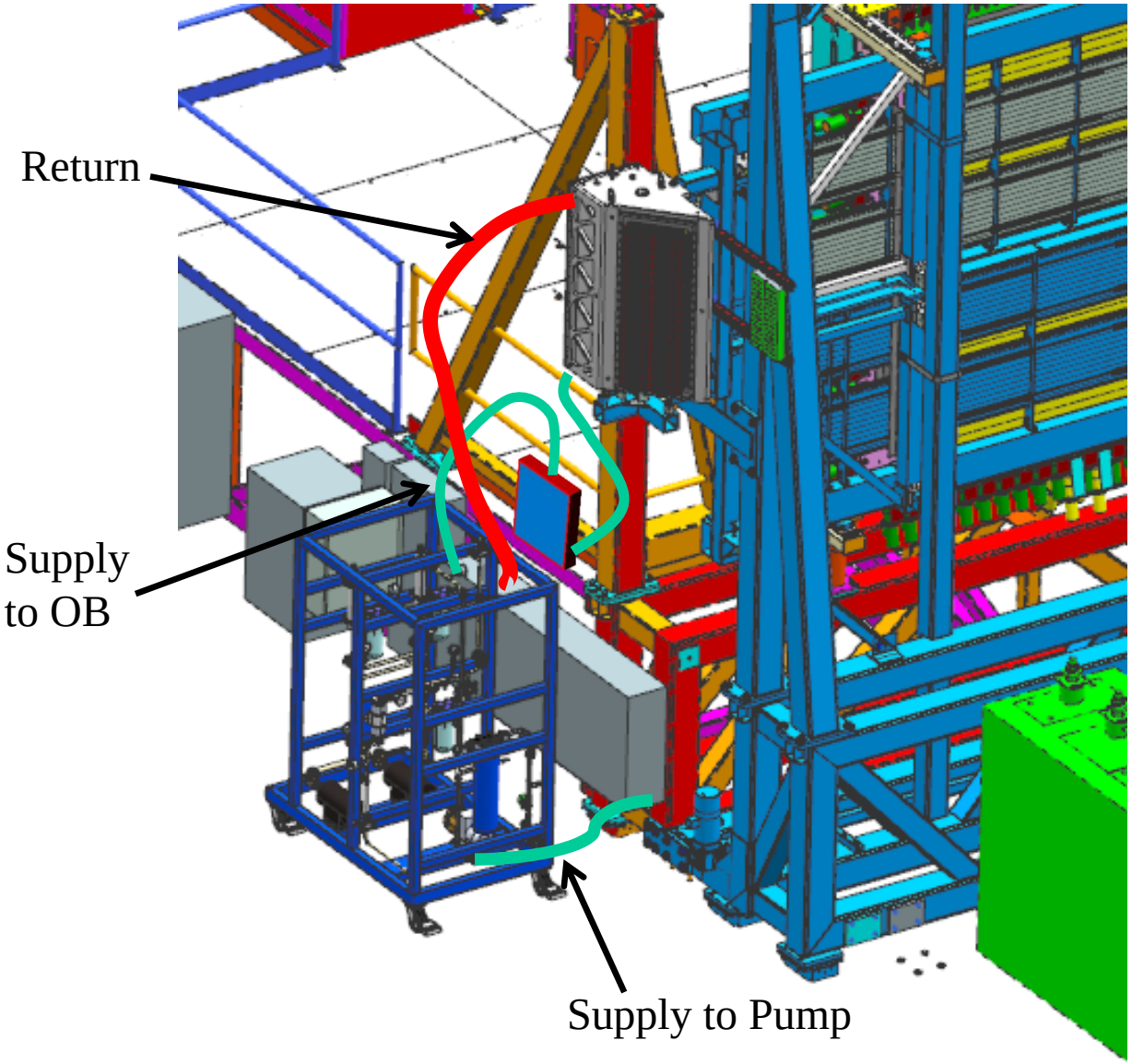
Installation of Optical Box

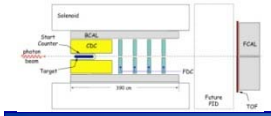


- Survey Bar Boxes to ensure proper positioning
- Fiducialize OB on ground so flanges will line up
- Retract Bar boxes and install OB (S&A group present to help locate)
- Pre-Install rubber seal over Bar Box flange
- Survey to ensure OB orthogonal to Bar Boxes
- Lock down OB and Bar Boxes
- Install 2-piece flange to capture seal



Water Fill and Return



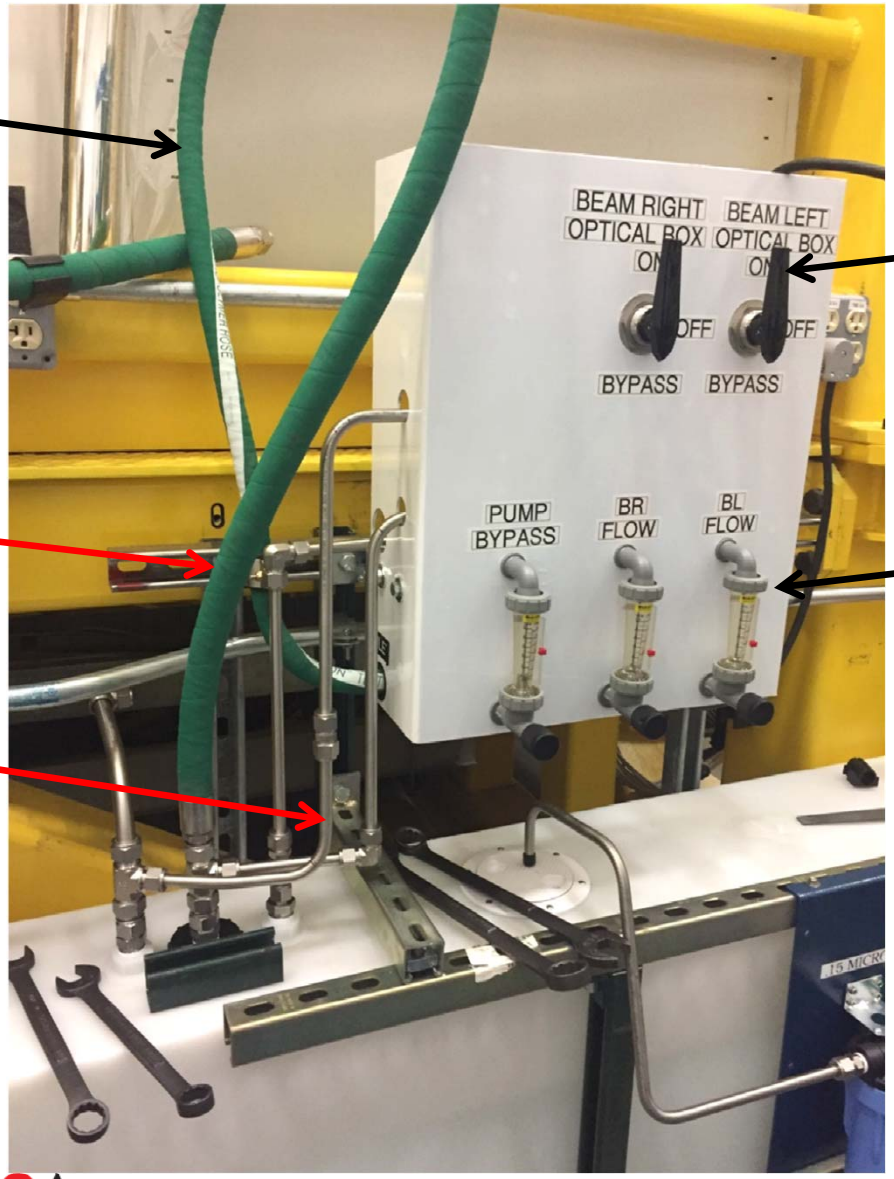


Water Distribution Panel

Supply from Skid

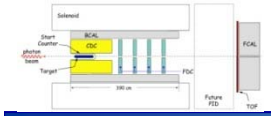
Return from OB

OB Bypass Line

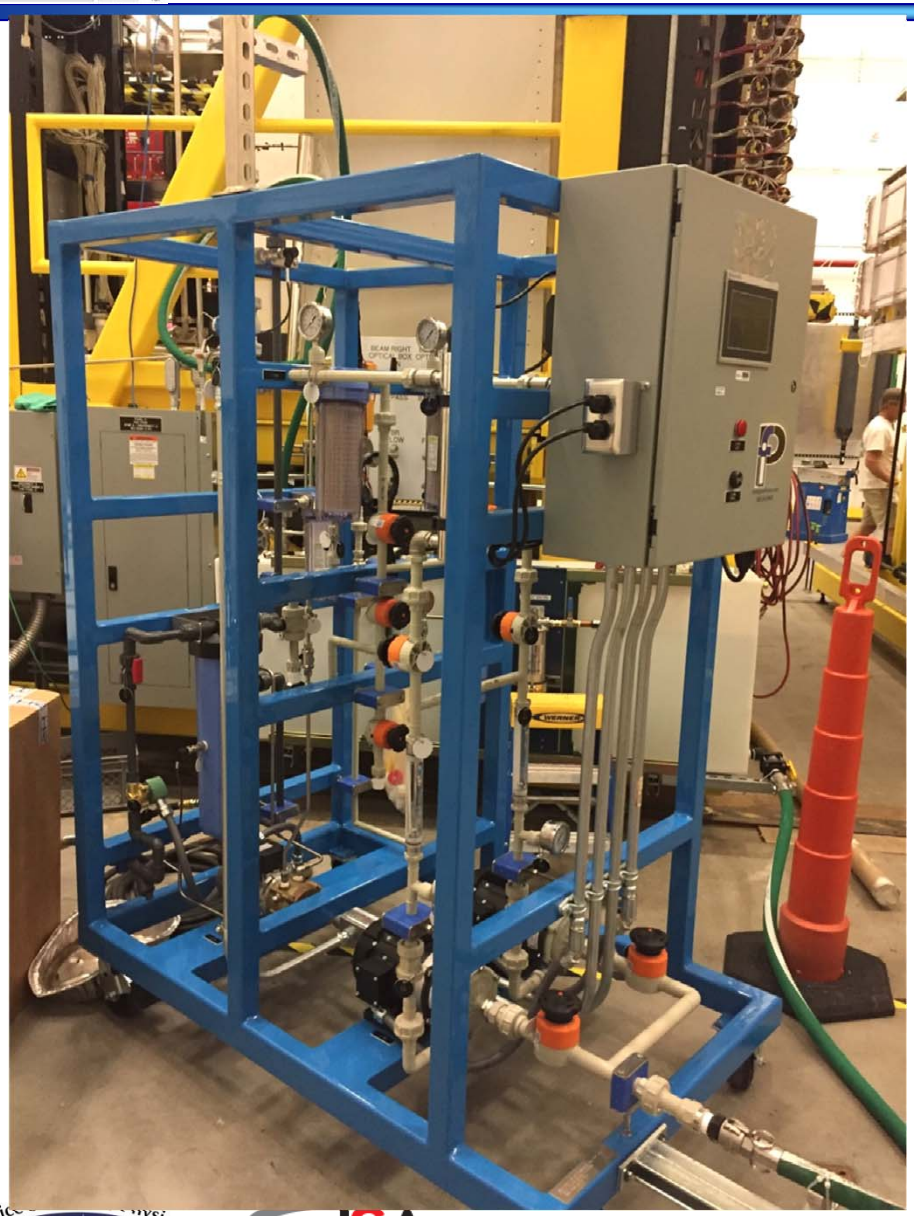


Flow Control Valves

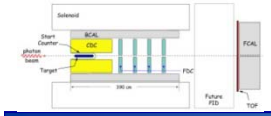
Flow Balancing Meters



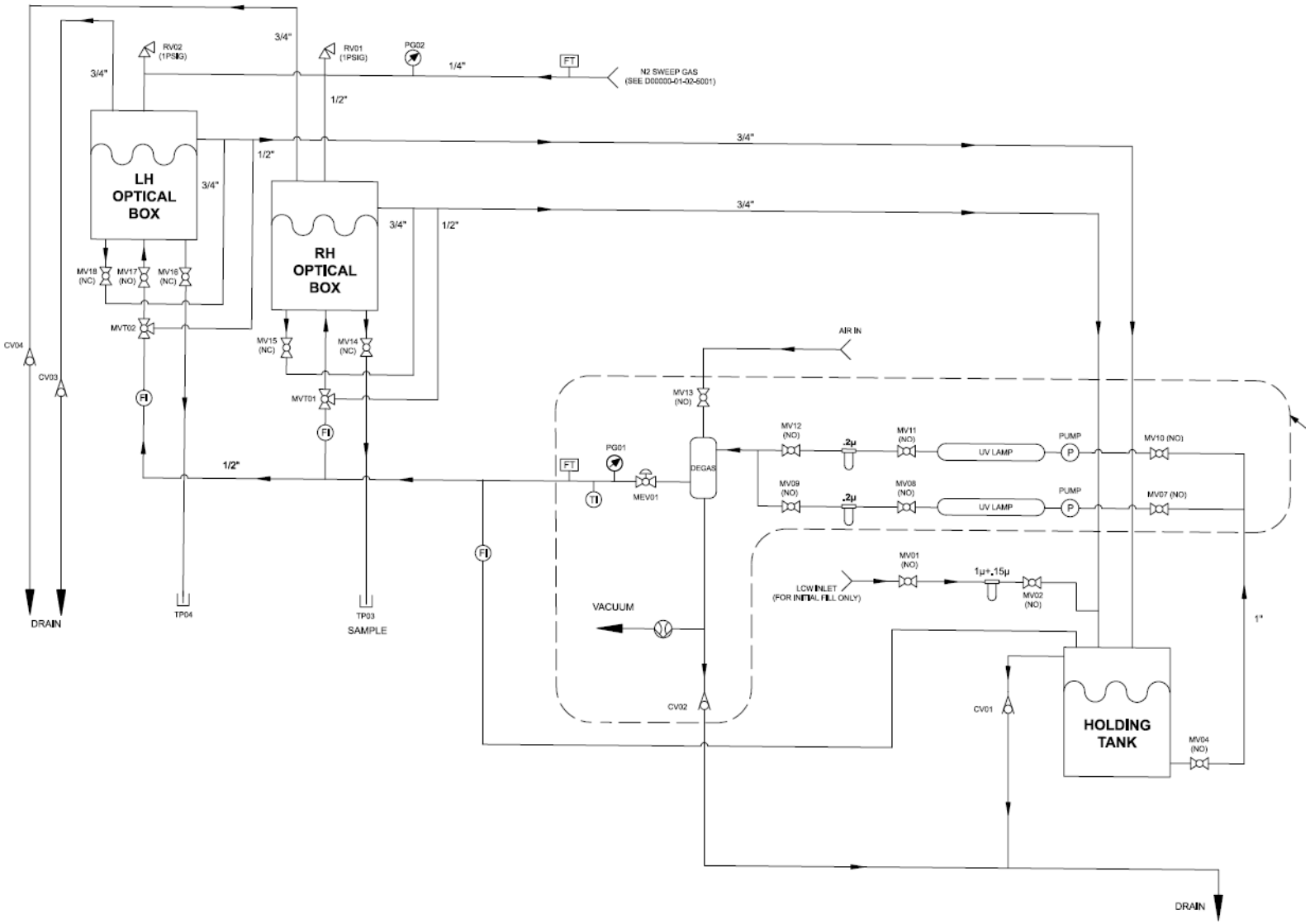
DIRC Water Skid

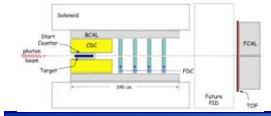


- Initial Water from Hall LCW – additional filtering to 1.5 micron
- Allen Bradley Control Panel – Ethernet connection to Hall PLC
- Redundant UV Filtering
- 0.2 micron filter
- Vacuum De-gas System
- Redundant Pump

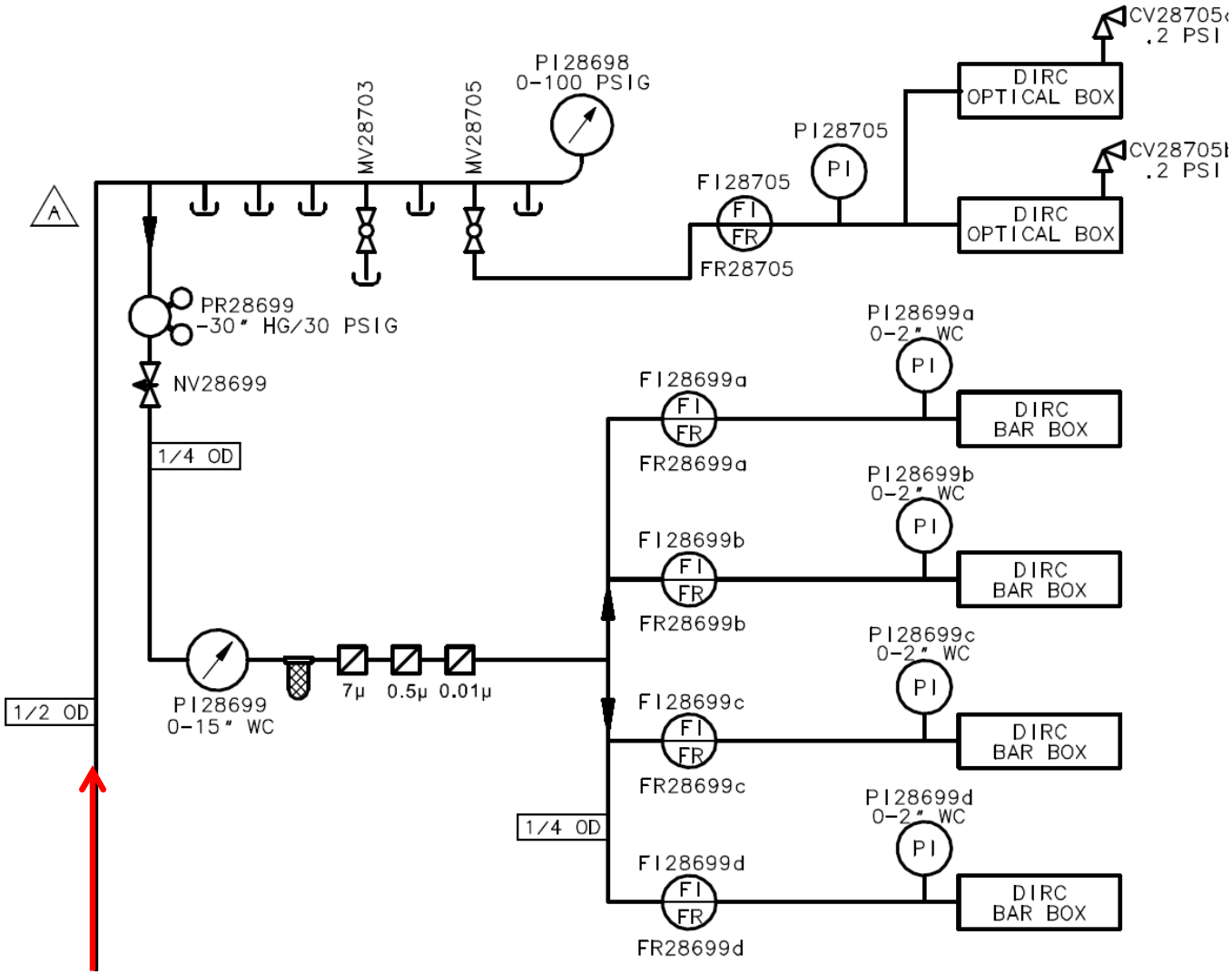


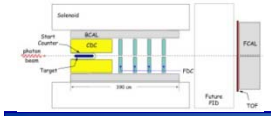
DIRC Water System P&I Diagram



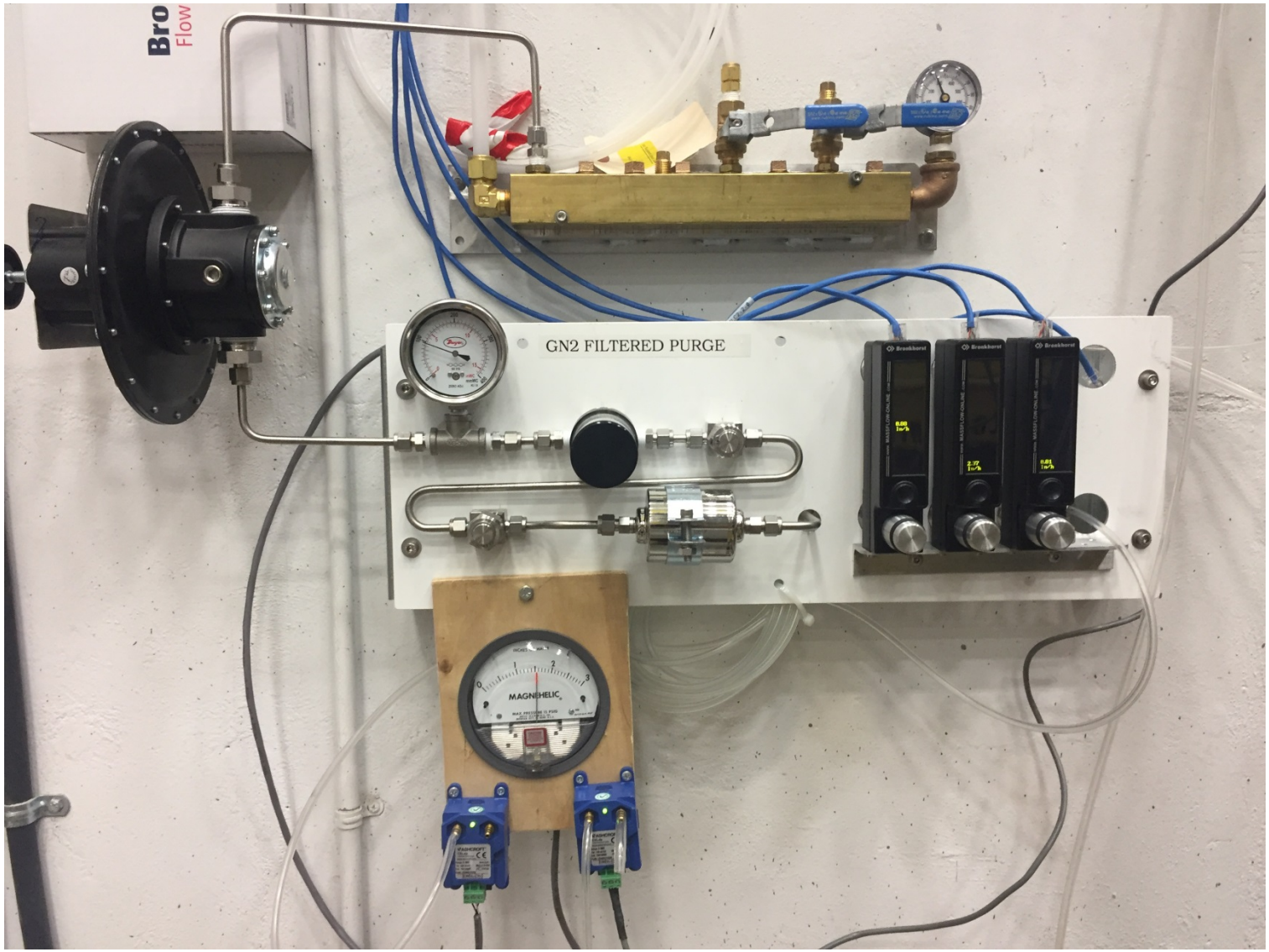


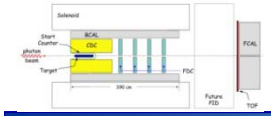
DIRC Nitrogen Purge P&I Diagram



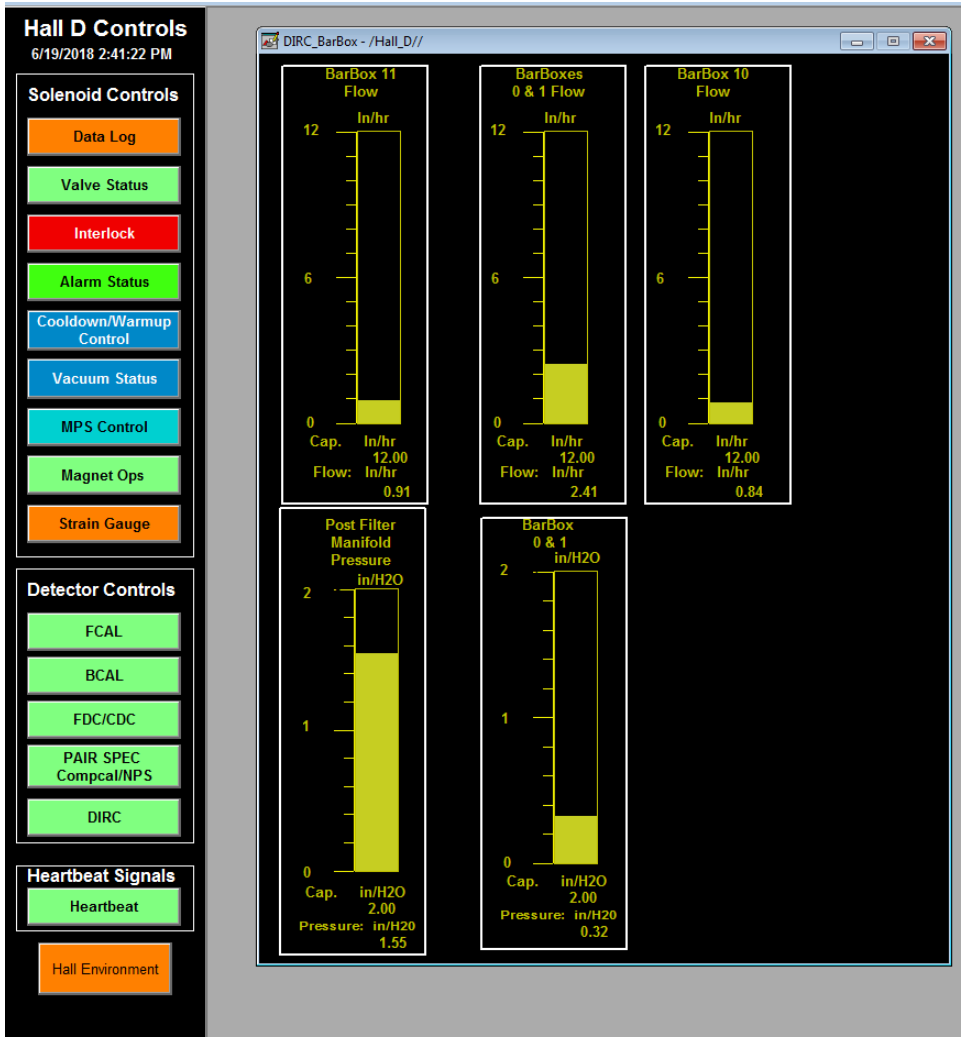


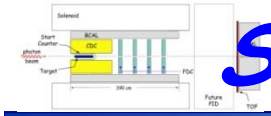
Nitrogen Purge Control Panel





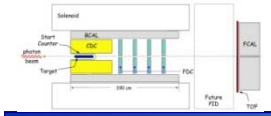
Nitrogen Purge PLC GUI





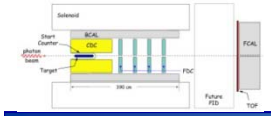
Support Equipment Design and Hardware

- Support Structure designed to a Factor of Safety to 3 or higher on all components
  - Analysis Checked/signed by JLAB Facilities Structural Engineer
  - All design, fabrication and Inspections done to AWS D1.1
- Optically Clear Water System
  - Waterskid delivered Sept 2017 – tested and operational
  - Final Plumbing – Designed and partially installed – Complete upon Optical Box Installation
- Nitrogen System
  - Bar Box Designed/Installed/Tested and Operational
  - Optical Box Designed – to be complete upon OB Install
- Lifting Fixtures Designed/Tested and Certified
- Controls Hardware Identified and Purchased
- Controls Software in work

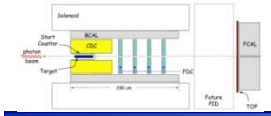


Installation Progress

- Lifting fixture and procedures approved by JLAB Facilities Structural Engineer and Crane and Rigging Authority
- Many practice runs performed before actual lifts
- Detailed Installation drawing issued
- Successful install of 2 Bar Boxes
- Lessons Learned incorporated into future Box installs
- Initial Survey and Alignment complete
- Bar Boxes Installed
- Support Structure Installed, Tuned and Surveyed
- Nitrogen System Operational (Minus Optical Boxes)
- Water System Operational (Minus Optical Boxes) and Water Tested.
- Preliminary Controls and PLC Screens in Place
- PMT's tested

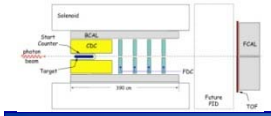


Bar Box #10 Installation



Operations

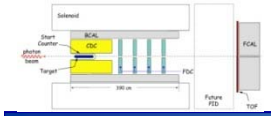
- EPICS Screens for control/monitoring
- Engineering group to commission Mechanical systems
- Mechanical On Call Trained for systems
  - Water
  - Nitrogen
  - Vertical Stage movement
- Training of Shift Leaders Needed
- Nick and Hovanes on call For PLC/EPICS Controls Issues



Start Up/Operational Procedure

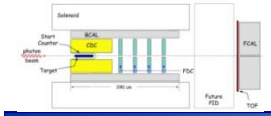
- DIRC Water system operations
  - Water Skid Operations Manual Complete
  - Overall System Maintenance/operation plan underway
- DIRC Nitrogen System Operations
  - Overall System Maintenance/Operations Plan underway
- DIRC Mirror box fiducialization procedure worked out with S&A Group
- DIRC System Z and Y Location Change Procedure underway
- Installation of 2 Additional Bar Boxes and the 2nd Optical Box Planned for January 2019

- Maintenance Plan for all systems to be loaded into the Hall D web based Maintenance database

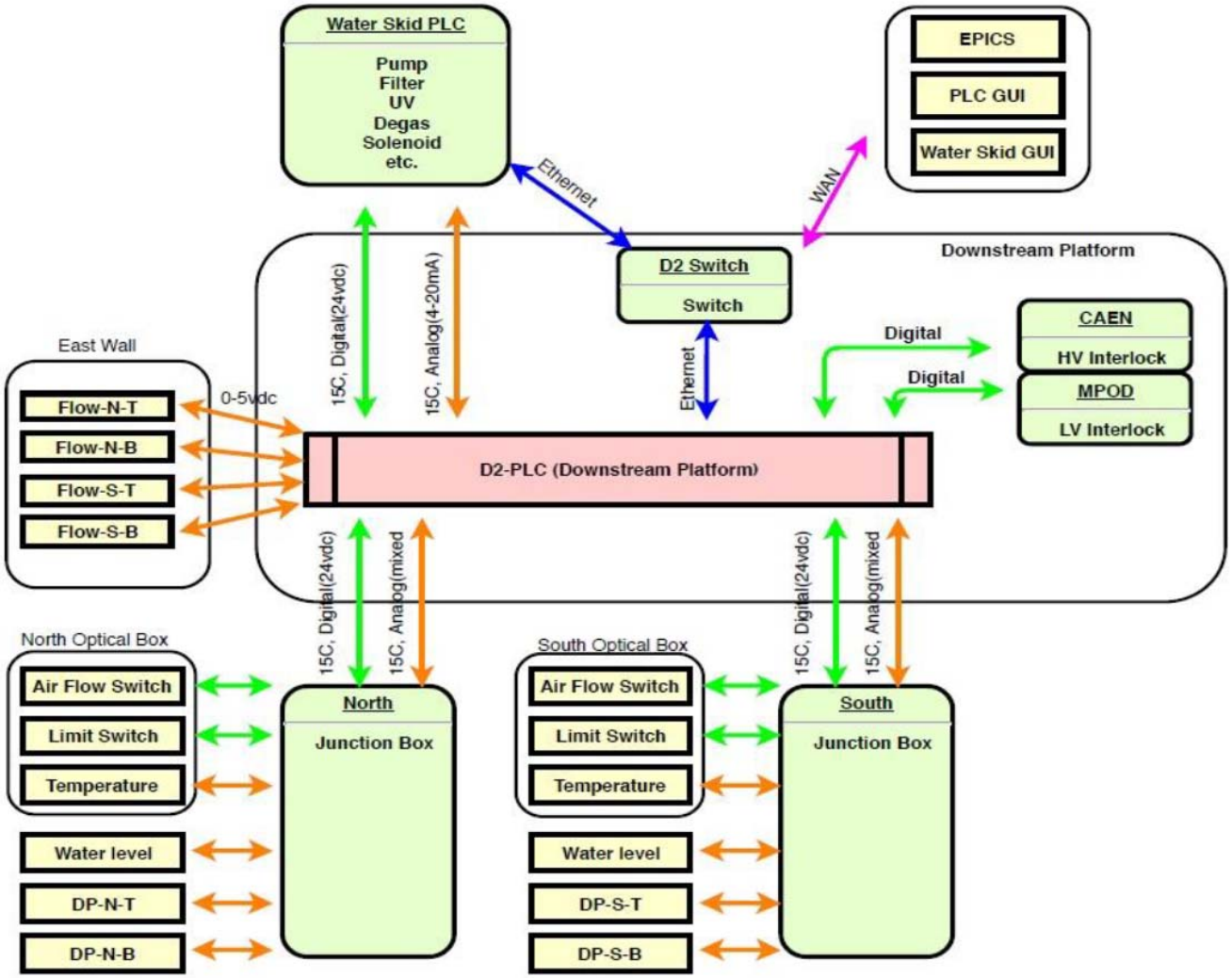


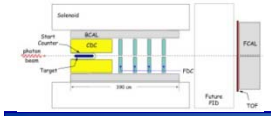
Controls Interlocks and Alarms

- Water level sensor in optical box (x2)
- Water Flow on water skid
- Water Temperature on water skid
- Water Pump fail alarm
- UV on/off
- Nitrogen Purge flow
- Nitrogen purge pressure
- Temp/humidity sensors in readout box
- High Voltage alarms/Interlocks



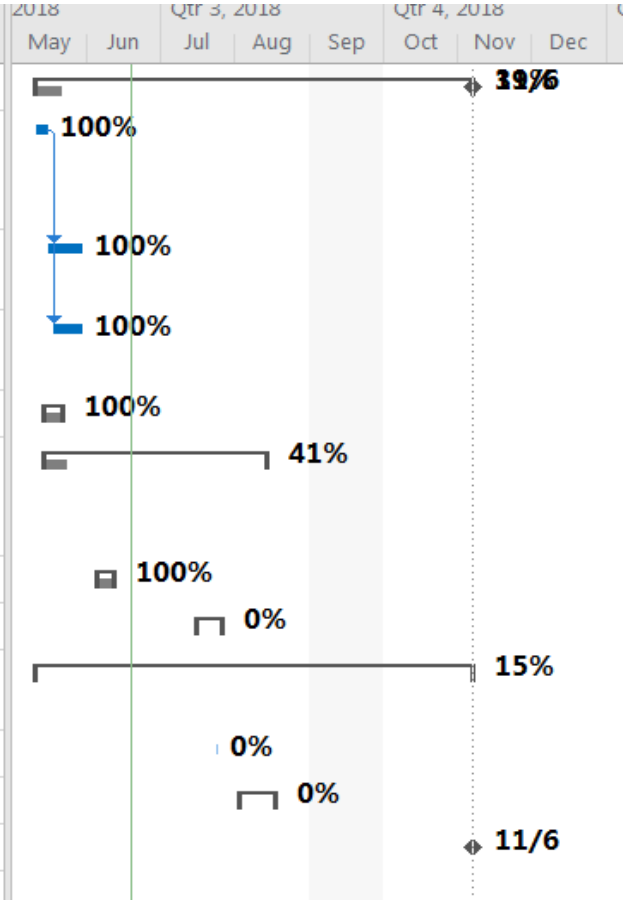
DIRC Controls and Alarms

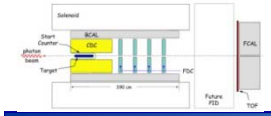




Resource Loaded Installation Schedule

Task Name	Duratio	Start	P	Finish
DIRC Detector - installation	**75 days**	**Fri 5/11/18**		**Tue 11/6/18**
Install Dummy DIRC Bar Box onto DIRC tower to test installation tools and procedure	3 days	Fri 5/11/18		Tue 5/15/18
Develop and test bar box horizontal adjustment	9 days	Wed 5/16/18	2	Tue 5/29/18
Develop and fabricate Bar box installation clamps	7 days	Fri 5/18/18	2FS+ days	Tue 5/29/18
DIRC tower - Set up limit switches	**6 days**	**Mon 5/14/18**		**Mon 5/21/18**
DIRC Water System - complete plumbing procurement and installation, and P&ID (Keith)	**64 days**	**Mon 5/14/18**		**Mon 8/13/18**
Bar Box installation	**5 days**	**Tue 6/5/18**		**Mon 6/11/18**
Optical Box installation	**9 days**	**Mon 7/16/18**		**Thu 7/26/18**
PMT/electronics/cable/controls installations	**75 days**	**Fri 5/11/18**		**Tue 11/6/18**
Quartz window delivery to JLAB	**1 day**	**Tue 7/24/18**		**Tue 7/24/18**
Final install optical box	**11 days**	**Fri 8/3/18**		**Fri 8/17/18**
Installation Complete	0 days	Tue 11/6/18	55,4	Tue 11/6/18





Summary

- Installation Plan Developed
- Operations/Maintenance Team/Plan in Place
- ½ of the Detector Will be Ready for Beam in November