

LArIAT (T-1034) Status

Sept. 22, 2014

All Experimenters' Meeting

J. Raaf

LArIAT (Liquid Argon In A Testbeam)

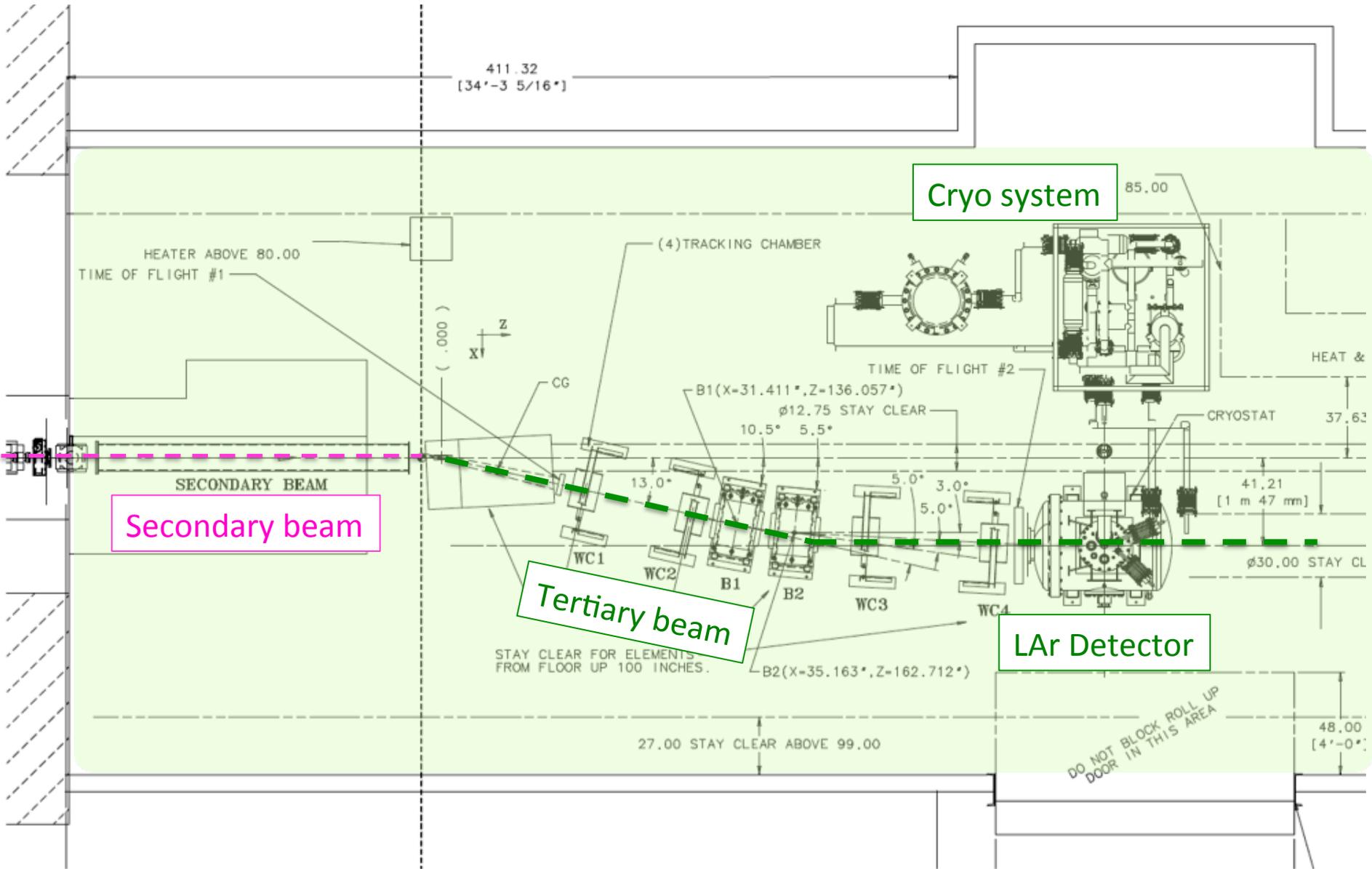
Repurposed 550-liter ArgoNeuT LArTPC detector with modifications for operation in Fermilab charged particle test beam.



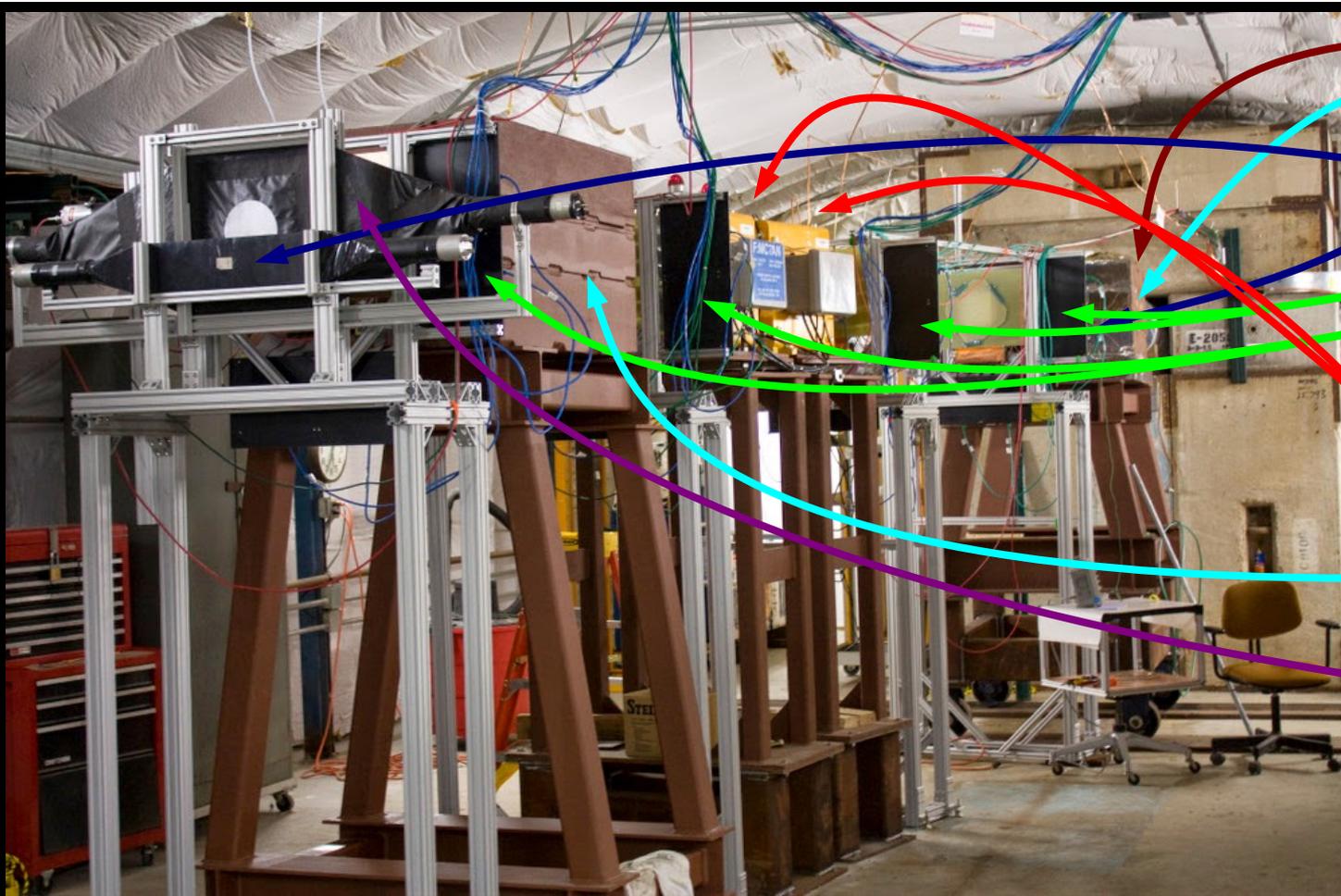
Goals Characterize LArTPC performance in the range of energies relevant to upcoming MicroBooNE, SBN, and LBN experiments for neutrino physics and for proton decay searches.

- Experimentally measure e- γ separation
- Develop criteria for charge sign determination
- Optimize pion and kaon ID capabilities
- Characterize anti-proton stars in Ar
- Study energy resolution improvement by combining information from scintillation light and ionization charge signals

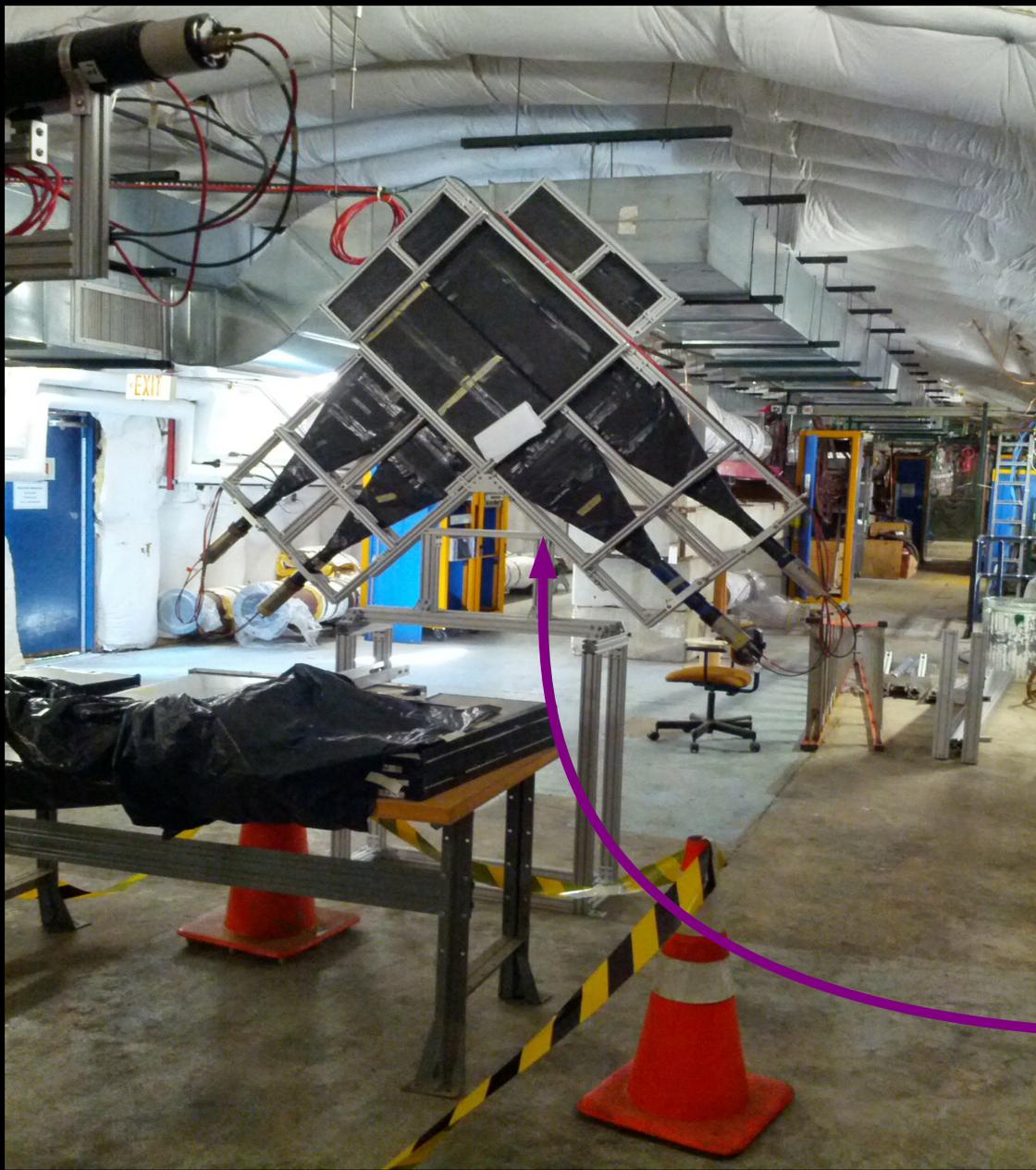
Layout in MCenter Enclosure



In MCenter



- Cu Target
- Fe Collimator
- Time-of-Flight Scintillators
- Multi-Wire Proportional Chambers
- Momentum-Selecting Dipole Magnets
- Final Collimator
- Beam Halo Scintillator



Cu Target
Fe Collimator

Time-of-Flight
Scintillators

Multi-Wire
Proportional
Chambers

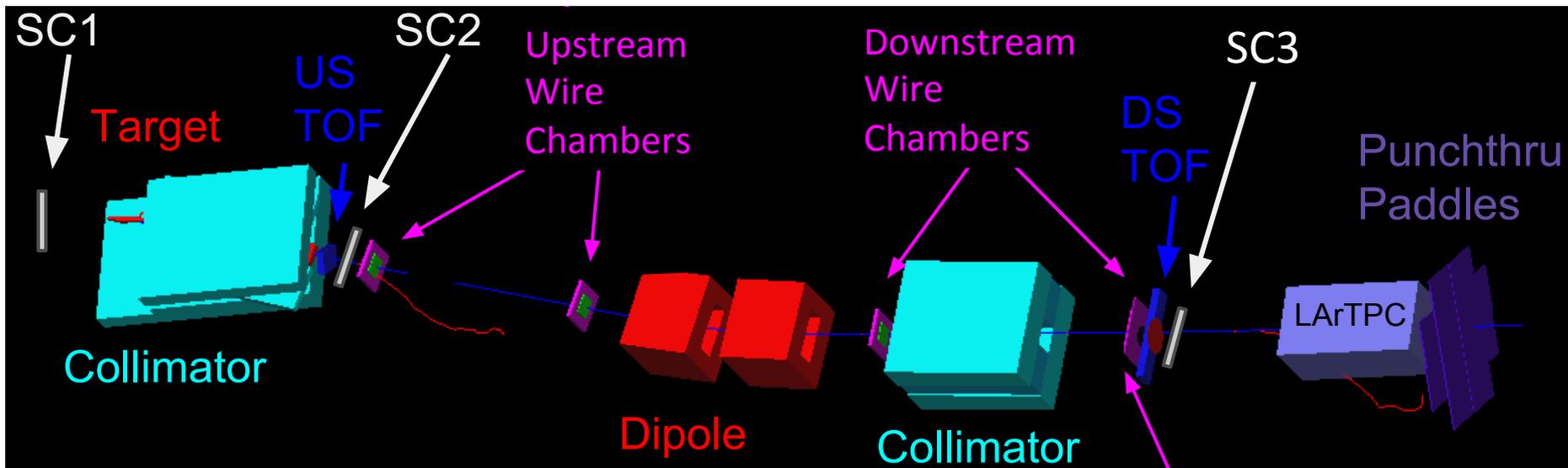
Momentum-
Selecting Dipole
Magnets

Final
Collimator

Beam Halo
Scintillator

Punch-Through
Paddles

Beam Commissioning



Two DAQ systems:

- simple wire-chamber miniDAQ
- full LArIAT FPGA-based trigger & DAQ

Several trigger configs, π^\pm

(e.g., SC2 & WC3 & SC3 for simple DAQ)

- 8, 32, and 80 GeV
- ± 20 , ± 40 , ± 50 , ± 100 A magnet current

Simple DAQ \rightarrow big help in commissioning and testing full DAQ

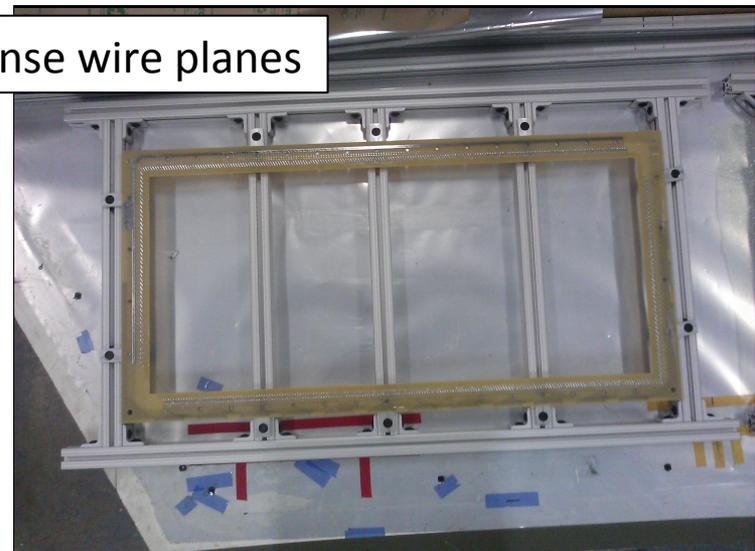
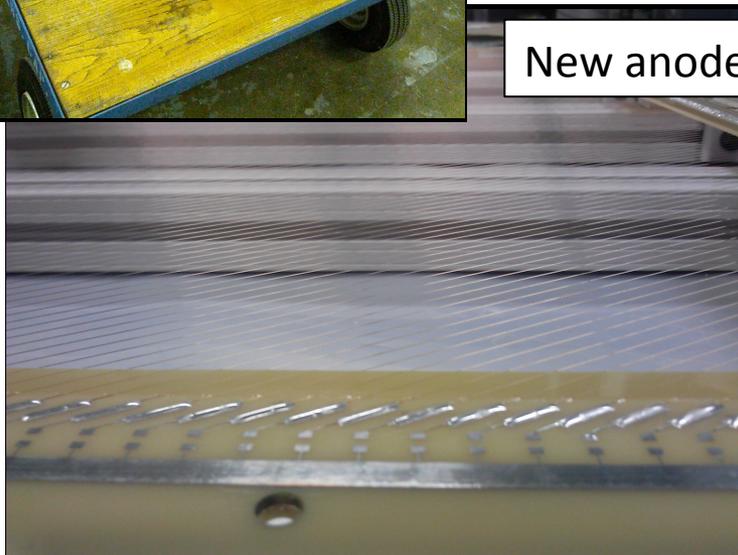
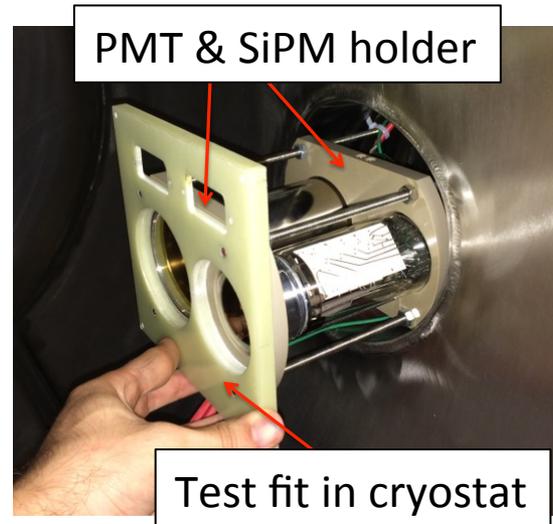
Gained familiarity with all systems

- What to keep an eye on
- What “normal” looks like

Studies underway:

- production rates
- wire chamber timing & track reco

Preparing cryostat & TPC



Summary

- Collected invaluable beam data before shutdown.
Studies underway
 - DAQ and trigger commissioning nearly complete
 - Beamline tuning is better than we hoped!
- Now preparing for full installation in MCenter
 - Cryostat & internal active detectors testing and prep work in progress now, plan for installation as soon as possible (planned first week of October)
 - Working on cryogenic system solutions (delayed delivery from vendor)