

NPOI Nitrogen Distribution Midpoint Review

Wyatt Huling, Amelia Fuller, and Scott Ryan

March 5, 2014

Overview

- Background information
- Prototype design
- Staff meeting synopsis
- Recent progress
- Prototype testing
- Analysis
- Future planning
- Conclusion

Background Information

- Navy Precision Optical Interferometer
- Used to map stars
- Array telescope
 - 250m arms
 - Stations along arms utilize nitrogen
- Central nitrogen supply system needed

Prototype Description

- 100 ft. section of west arm
- Contains one of each:
 - Astrometric hut
 - Gate valves
 - Imaging station
- Coil to simulate entire arm
- Two reservoir tanks



Staff Meeting Recap

- Installed supply tank near astrometric hut
- Installed astrometric hut purging infrastructure
- All tee fittings soldered
- Installed regulators



Recent Progress (3/5/14)

- Main supply line installed
- Supply line components installed
- Astrometric hut finished
- Main supply line pressurized to 40PSI

Recent Progress/Laying the Line



Scott Ryan

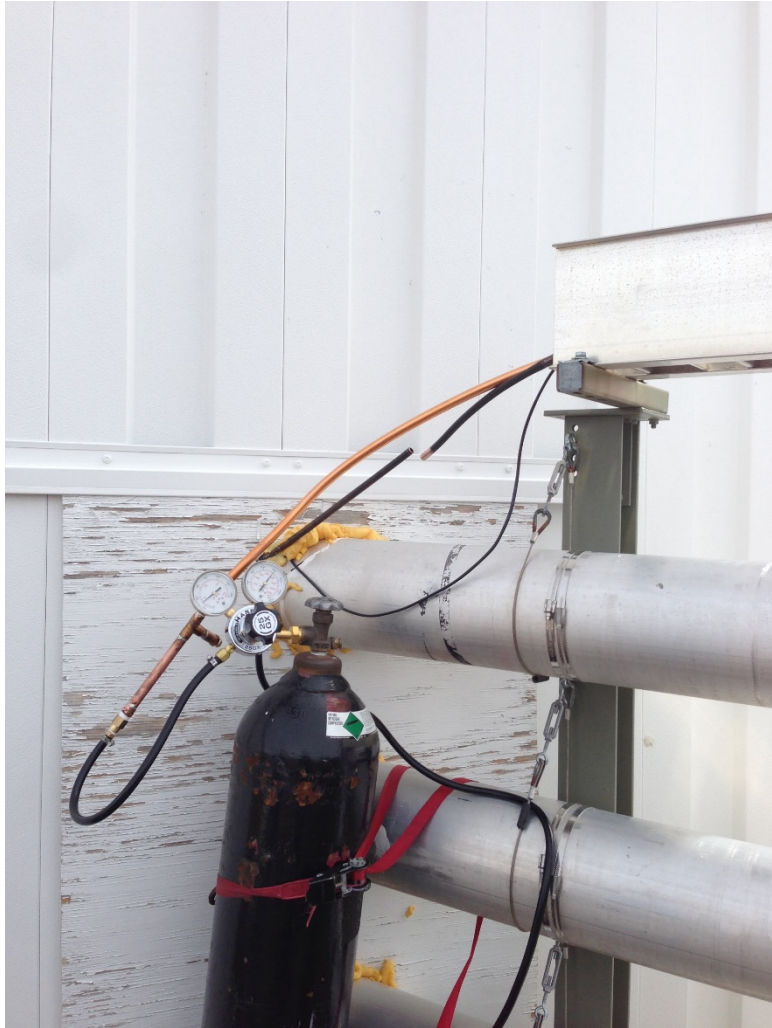
Recent Progress/Plumbing Installation



Pressure Testing

- NPT plugs used in tee fittings
 - Astrometric hut
 - Gate valve station
- Valve installed at imaging station
- Set to line pressure of 40PSI
 - NPOI staff to monitor gauge reading
- Soap solution can be used to find leaks

Pressure Testing cont.



Numerical Modeling

- The MATLAB pressure drop code was completed using the following:
 - 85ft of supply line
 - 100ft coil with 1.5ft diameter
 - 4 tees in line flow
 - 3 tube to barb fittings
- Max equivalent length= 63.92m=210ft
- Max pressure drop= 0.1729PSI

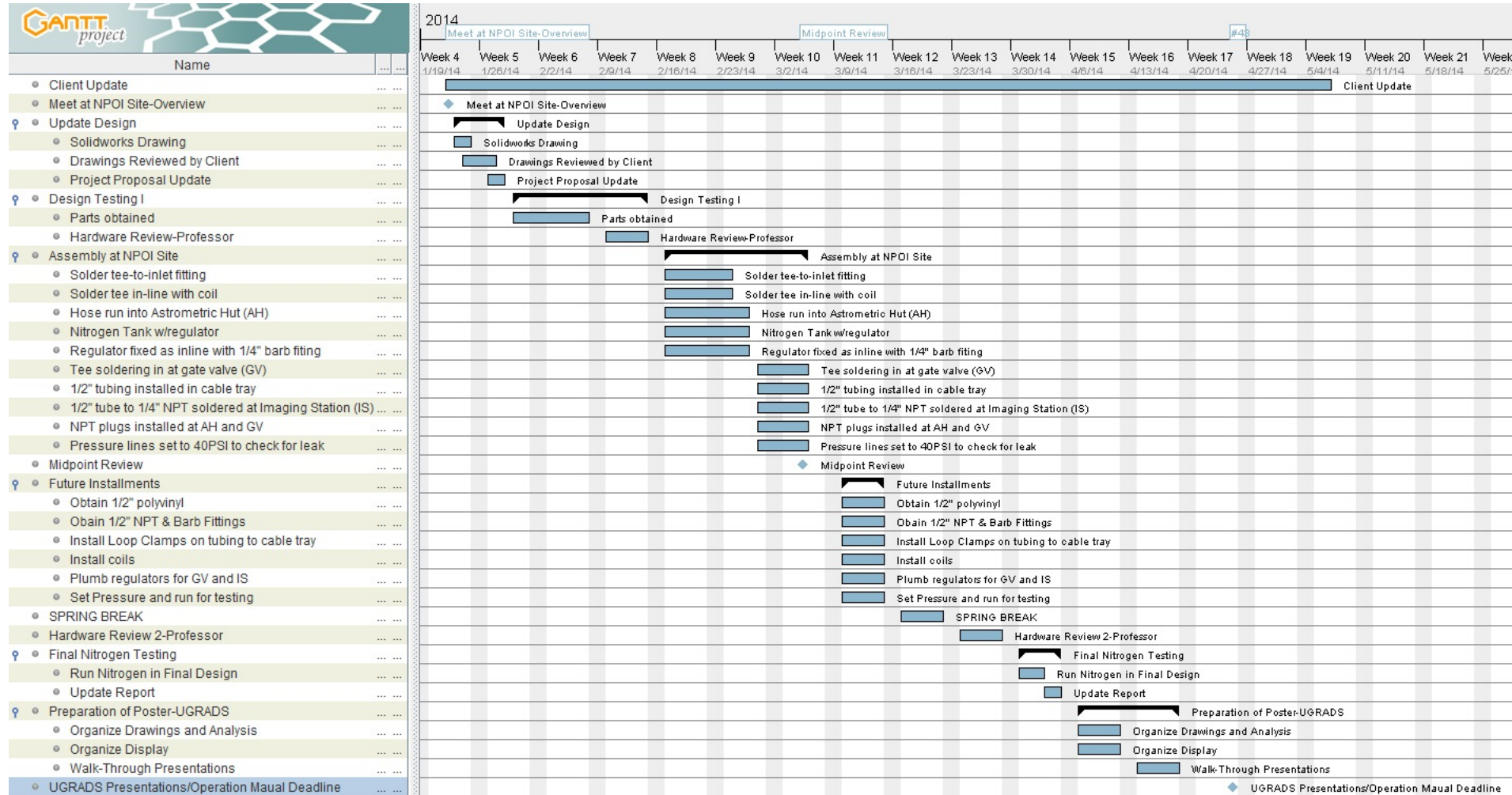
Future Plans

- Plumb regulators and valves
- Install coils and tanks
- Pressurize and test all solder joints
- Secure tubing in cable tray
- Finish prototype by March 26, 2014



<thomasnet.com>

Gantt Chart



Conclusion

- NPOI is in need of a centralized nitrogen supply system.
- The prototype employs one of every pneumatic device on site on a section of the west arm.
- Most of the astrometric hut was complete at the time of the staff meeting.
- Astrometric hut and main supply line have been completed.
- Preliminary pressure testing has begun.
- The prototype is projected to be finished within three weeks.