



Nitrogen Supply and Distribution

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October 9, 2013

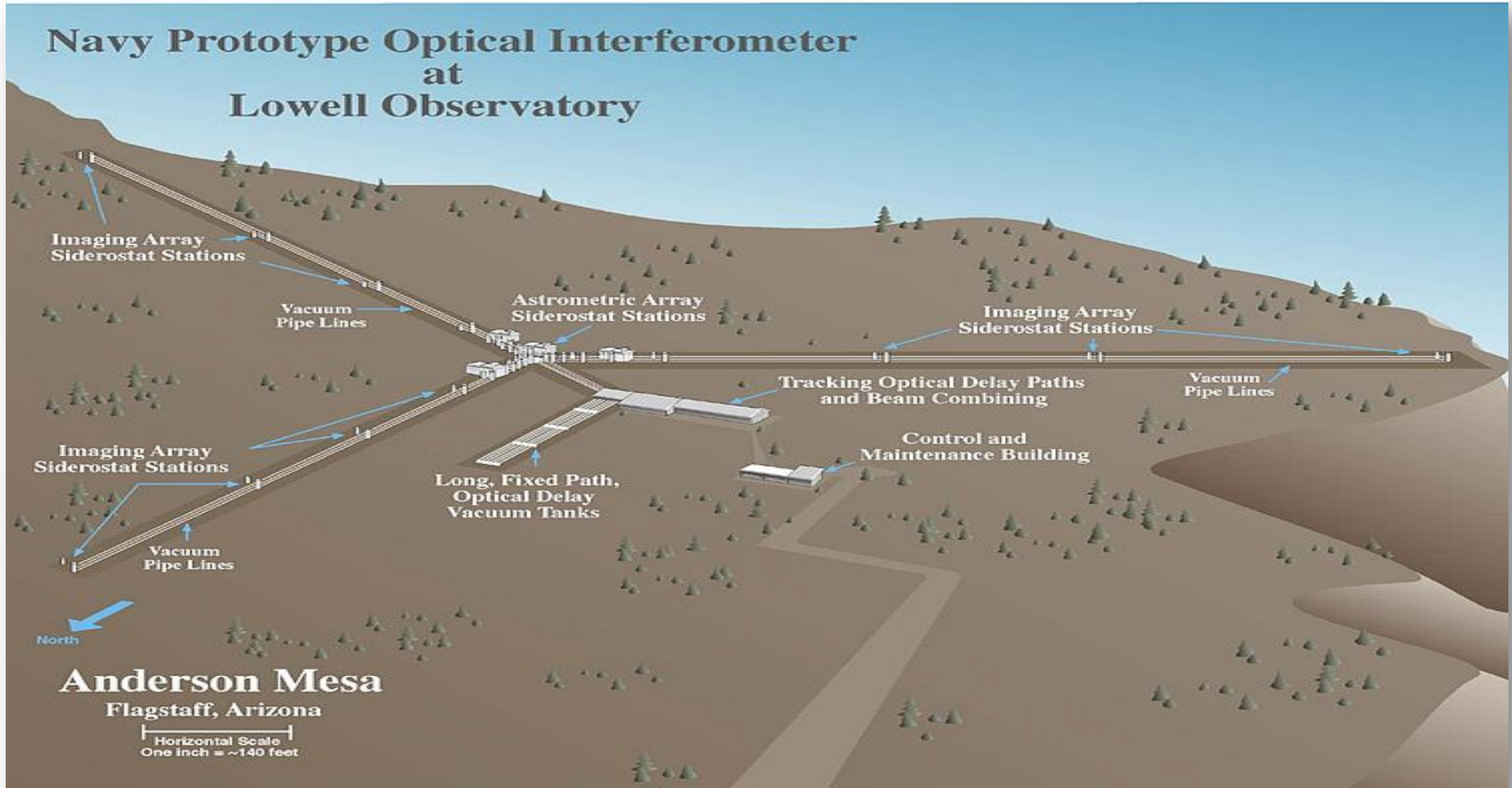
Presentation Overview

- Introduction
- Needs Statement
- Project Goal
- Operating Environment
- Objectives
- Constraints
- Project plan
- Conclusion

U.S. Naval Observatory

- Navy Precision Optical Interferometer
 - Sponsored by facility operators
 - Anderson Mesa near Flagstaff
- Navy bases navigation on astrometric position
- Remapping is continuously required

Navy Precision Optical Interferometer



Scott Ryan



Scott Ryan

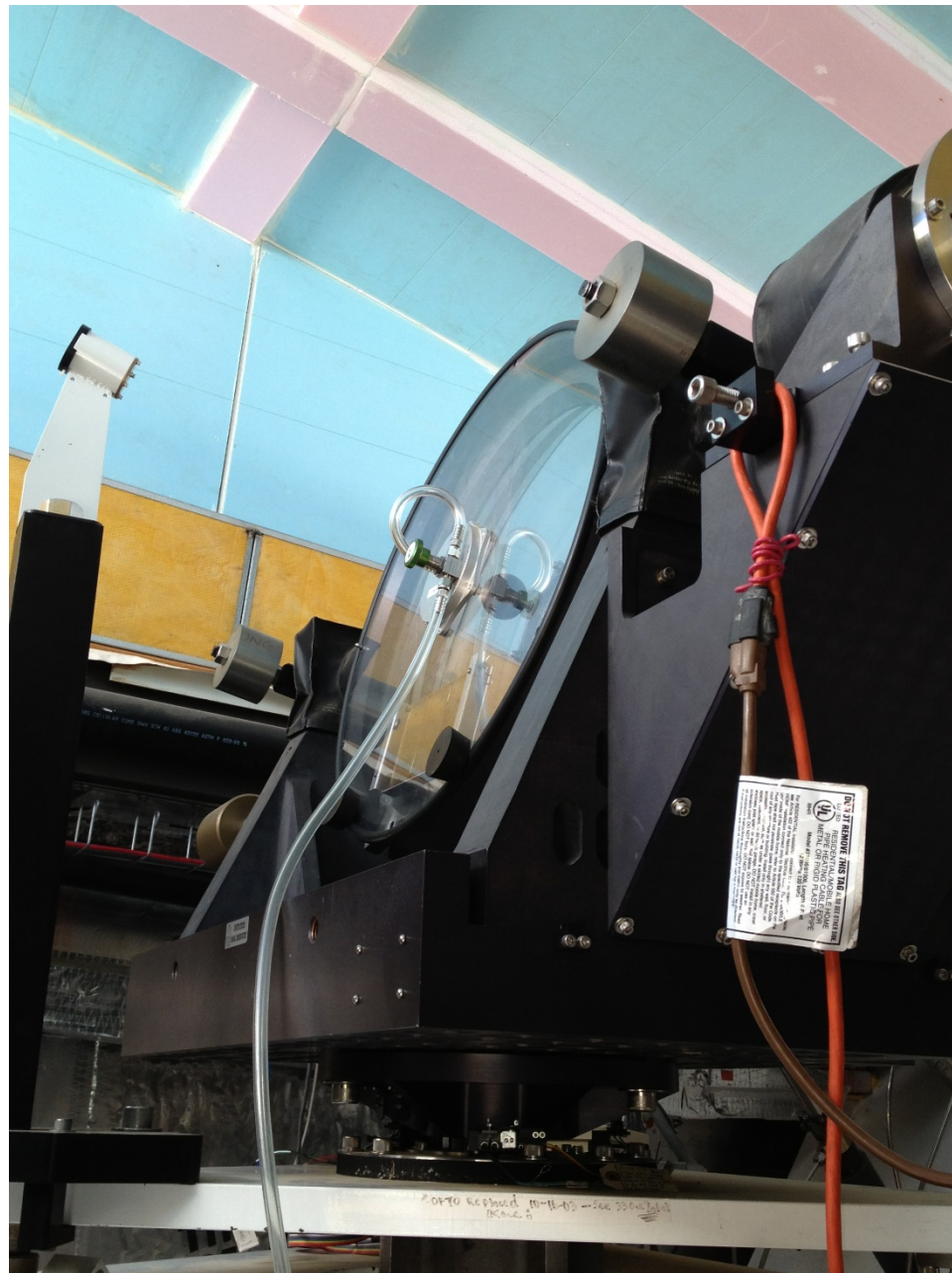




Closed

Open





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Current Nitrogen System

- Multiple stations
 - 150lb canisters at each
 - Replaced routinely
- Nitrogen is wasted at purge when cover is off

Needs Statement

- Current system is expensive, complicated, and labor intensive.

Project Goal

- Improved nitrogen supply system that provides easier operation of each station and provides efficient moisture control.
- One single supply station
- Shuts off when not in use

Operating Environment

- Exposed to elements (rain, snow, ice, UV light, animals)
- Temperature range -20°F to 120°F
- Vibrating cable trays
 - Wind
 - Operating Machinery



Cable Tray



Objectives

- Thermal expansion must be minimized
- Tubing needs to fit inside cable tray
- Must be inexpensive
- Must be vibration resistant

Objectives

Objective	Measurement Basis	Units
Inexpensive	Cost	\$
Tubing size	Diameter	m
No significant change in size	Length	m
Vibration resistant	Cycle life	# of cycles

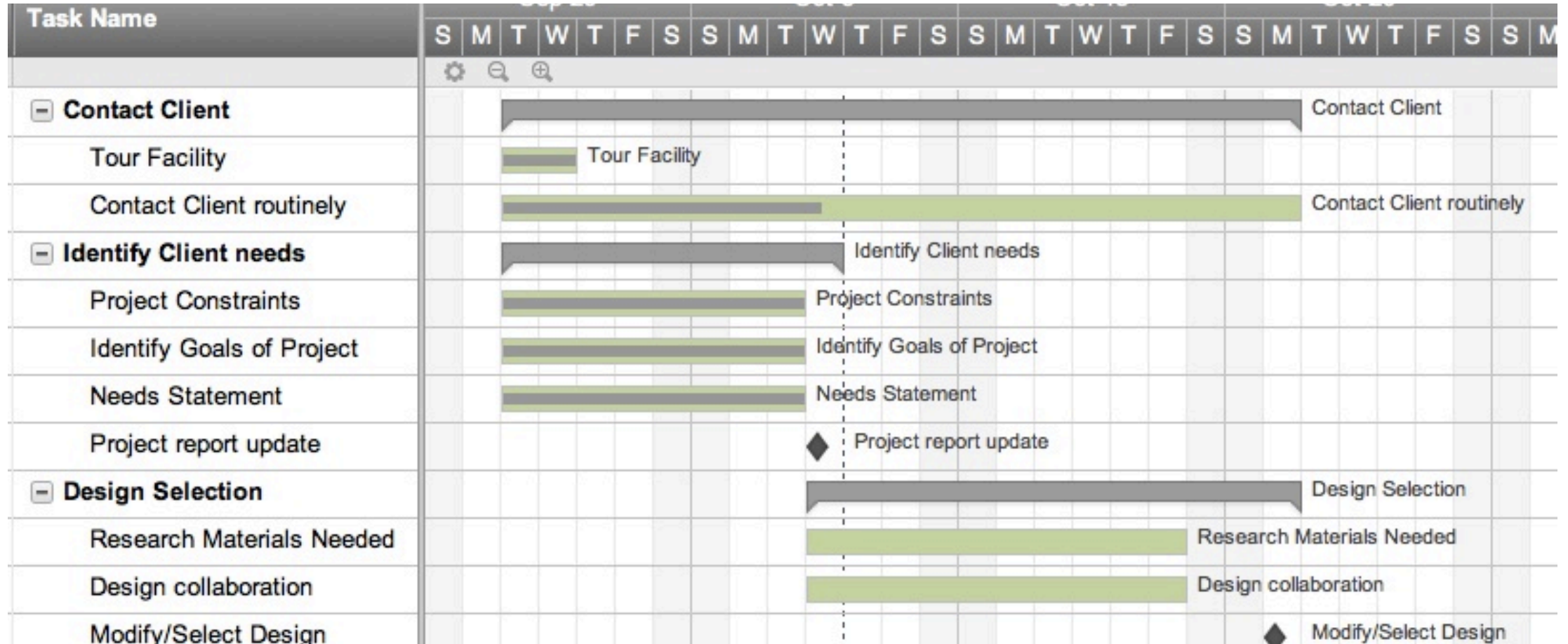
Constraints

- Tubing must be 300m long across 3 runs
- Each run requires 11 manifolds with 5 ports each
- Purge in cover requires 9psi
- Lizard head requires 30psi
- Gate valves require 40psi

Constraints cont.

- Solenoid to shut purge system when cover is off
- Manual shutoff valve prior to each manifold
- Must withstand movement between manifold and device
- Use off the shelf parts whenever possible

Project Plan



Conclusion

- NPOI creates star maps that are used for navigation
- Current system uses several small tanks and is labor intensive
- New system will use one large tank with supply lines to each station
- There will be 11 manifolds on each of the three 300m lines
- System must be tough, inexpensive, and resistant to vibrations and thermal expansion

References

- “NOFS-Naval Observatory Flagstaff Station.” N.p., March 2010. Web. 07 Oct. 2013
- "NPOI - Navy Precision Optical Interferometer." *NPOI - Navy Precision Optical Interferometer*. N.p., n.d. Web. 06 Oct. 2013.
- "USNO Flagstaff Station." *USNO Flagstaff Station*. N.p., n.d. Web. 06 Oct. 2013.

Questions?