



Proton Therapy Device Manager

.decimal

Midterm 2 Presentation

Instructors: Dr. Shih & Dr. Gupta

Advisor: Dr. Clark

Team 14

Micah Baxter

Morgan O'Rorke

Sarah Sweat

Outline

- Background
- Project Motive
- Needs Statement
- Project Scope
- Design Concept
- Further Implementation
- Risk Mitigation
- Questions



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- Manufacturer of radiation therapy products
- Based in Sanford, Florida
- Established in 1986
- Helped over 50,000 patients



Proton Therapy

- Newest form of radiation treatment
 - Protons instead of x-rays
- Technician manually loads apertures
- Walk through reinforced hallways between dosages.
- Process takes about 4 minutes per aperture



Project Motive

- Reduce patient treatment time
- Reduce physical effort of technician
- Increase patients treated per day
- Improve the patient's proton therapy experience

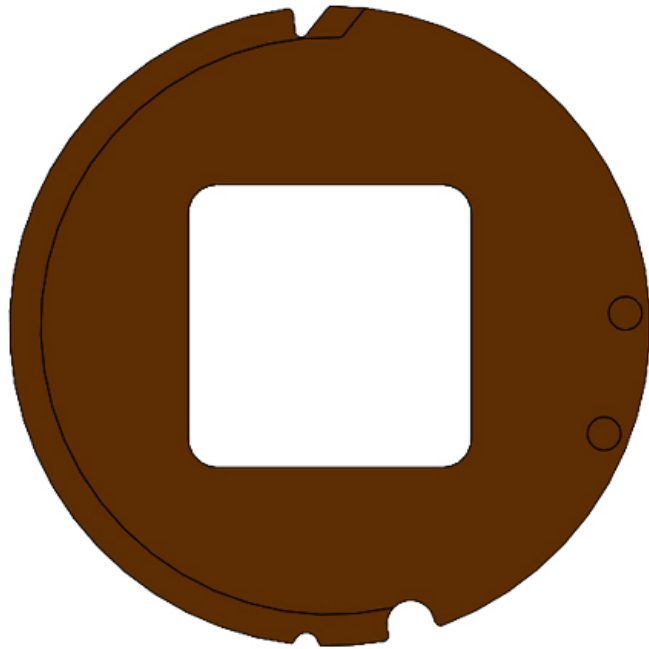
Needs Statement

Develop an automated device that safely loads and unloads apertures from the nozzle of the Mevion S250 proton therapy system.

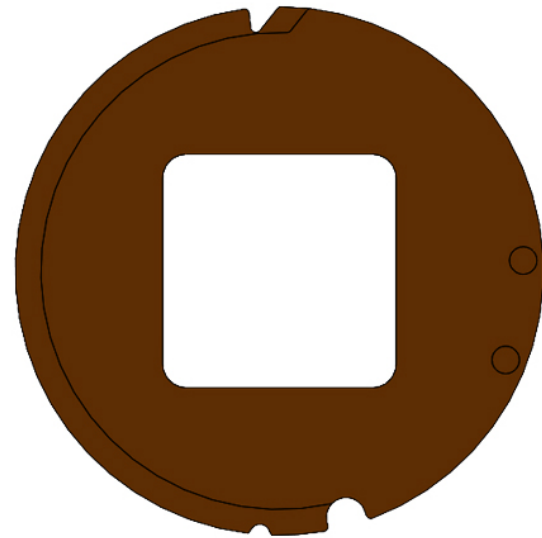
Project Scope

Provide proof of concept by designing and building a 1:4 scale model of our automated system and provide a cost estimate for the full scale system.

Apertures



25 cm
~16 kg

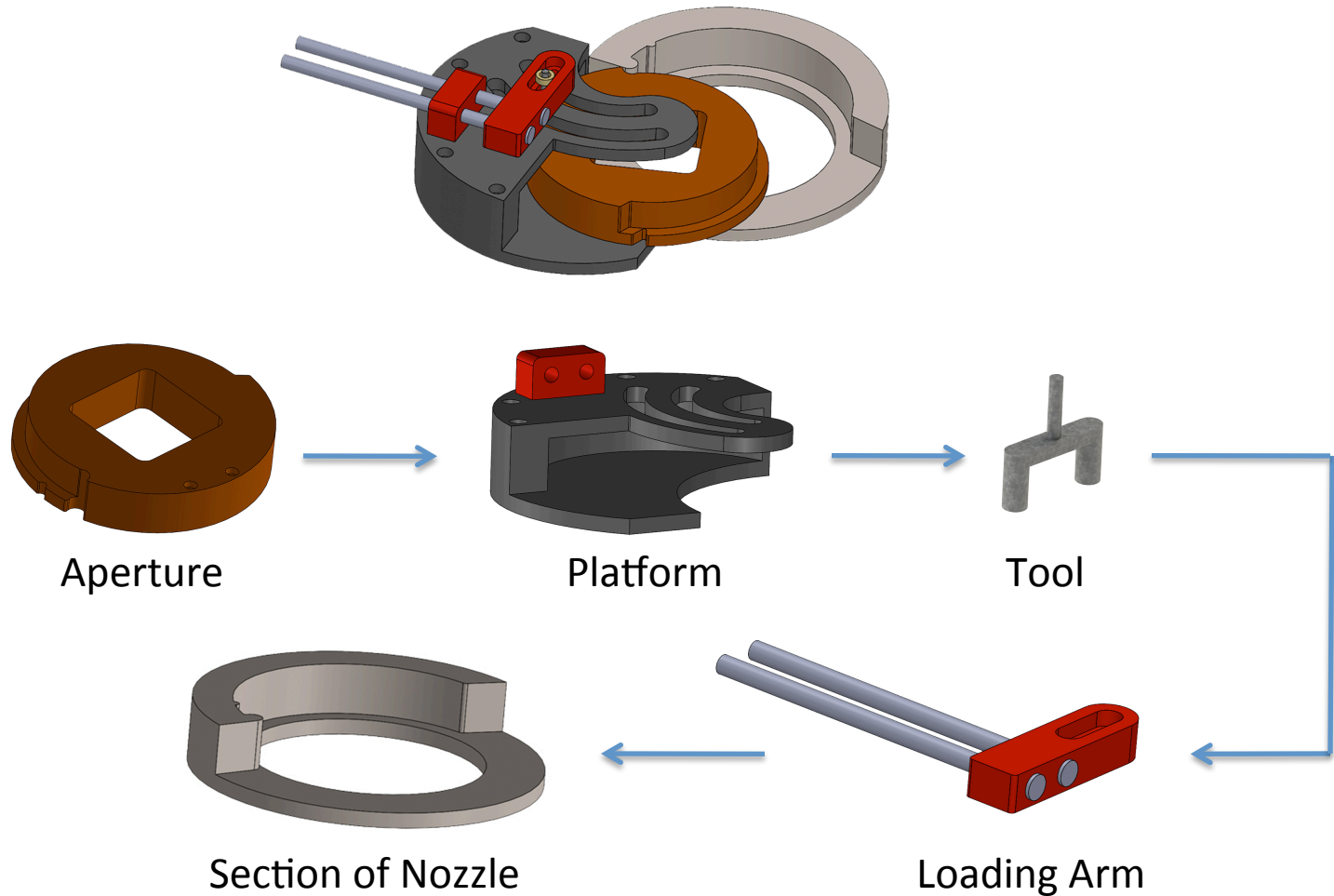


18 cm
~6 kg

Design Concept



Assembly



Video

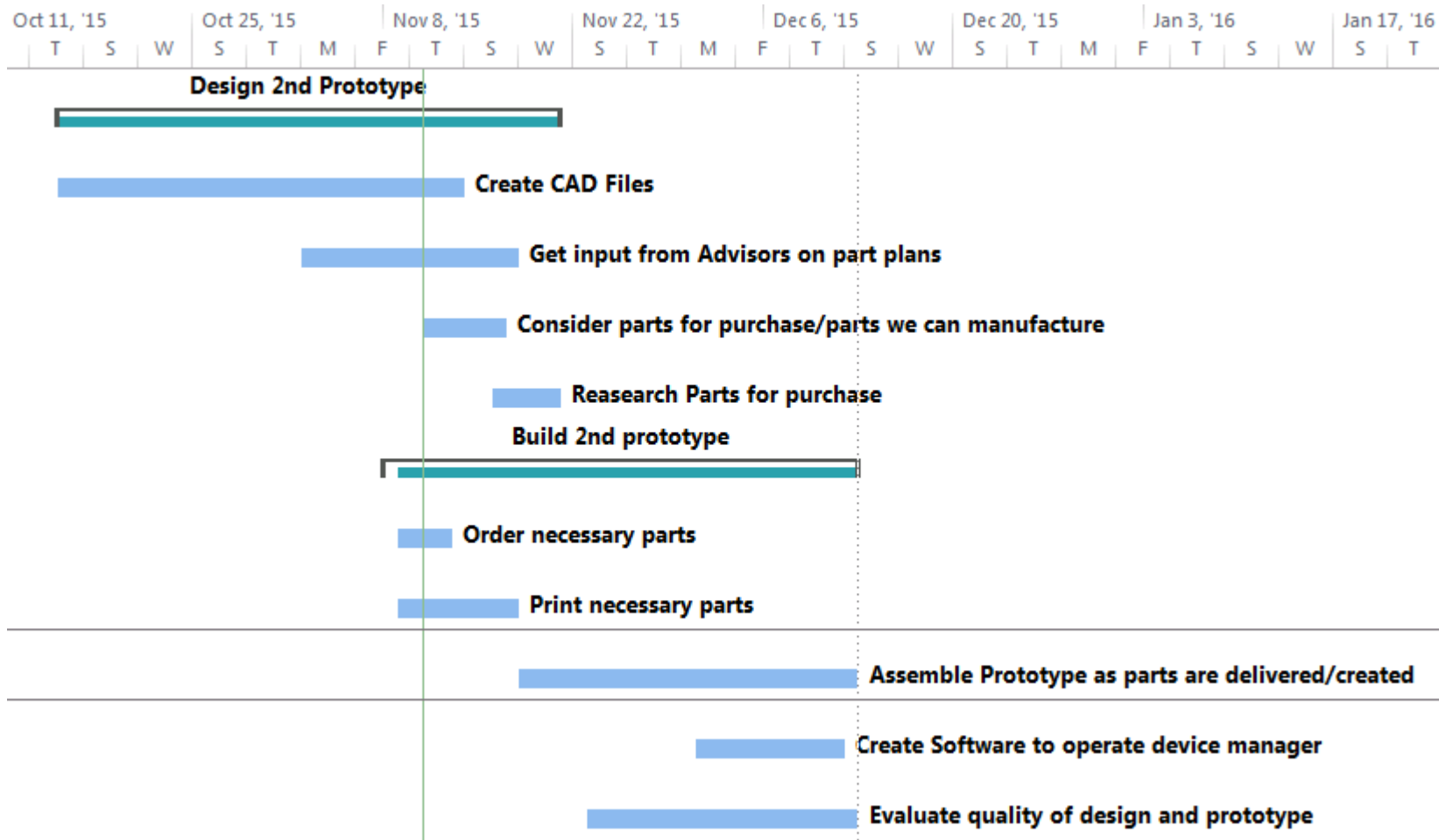
Further Implementation

- Mechanical
 - Linear railing system to move platform
 - Vertical adjustment system for platform
 - Rotational motion for platform
 - Mechanism to unlock safety latch on the nozzle
 - Optimize tool to handle applied forces
- Software
 - Barcode scanning system to identify products

Risk Mitigation

- Verify apertures are loaded into the correct position
 - Barcode scanning system
- Ensure no component failure during operation
 - Finite Element Analysis
 - Failure Mode Effects Analysis
- Implement aperture security safeguard
 - Utilize nozzle safety latch

Gantt Chart



Summary

- Dot decimal has requested an automated loading system
- Chosen design concept solves the loading/unloading problems
- Future Implementations
 - Scanning
 - Safety Latch
 - 3 DOF motion system

Questions

