



DEPARTMENT
OF
ENGINEERING



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for strategic partnerships
and applied research



MESSIAH
COLLEGE

Kenya Mobile Medical Clinic Transportation Group

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Project Definition

- Problem

- Client

“Dala Development Program is a faith-based, grassroots development organization working to improve livelihoods in Upper Nyakach, Kenya.

-daladevelopment.org

- Location of Interest



<http://goafrica.about.com/library/bl.mapfacts.kenya.htm>

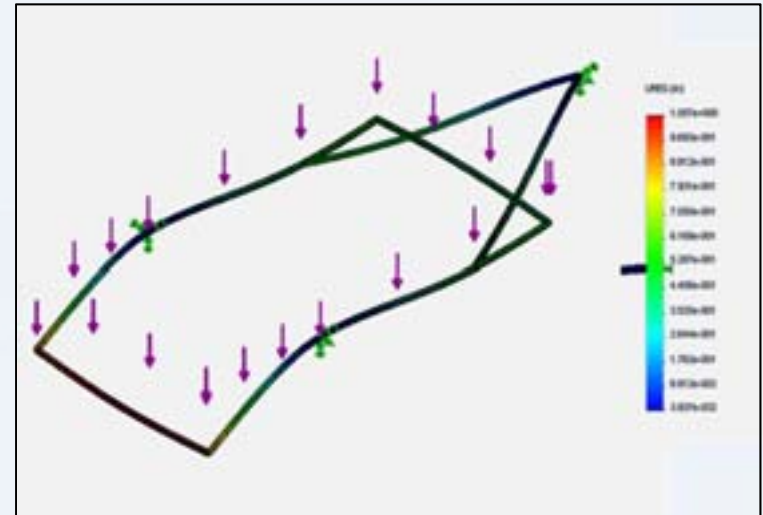
Past Work

- Original vision
 - Mammography screenings
 - Cervical cancer testing and treatment
- Trailer
 - Searched local dealers and used options
 - Biodiesel group
 - Not large enough



Problems

- Mammography machine
 - Dimensions of trailer
 - Large power requirement
 - Significant point load



- Client lost communication with donor

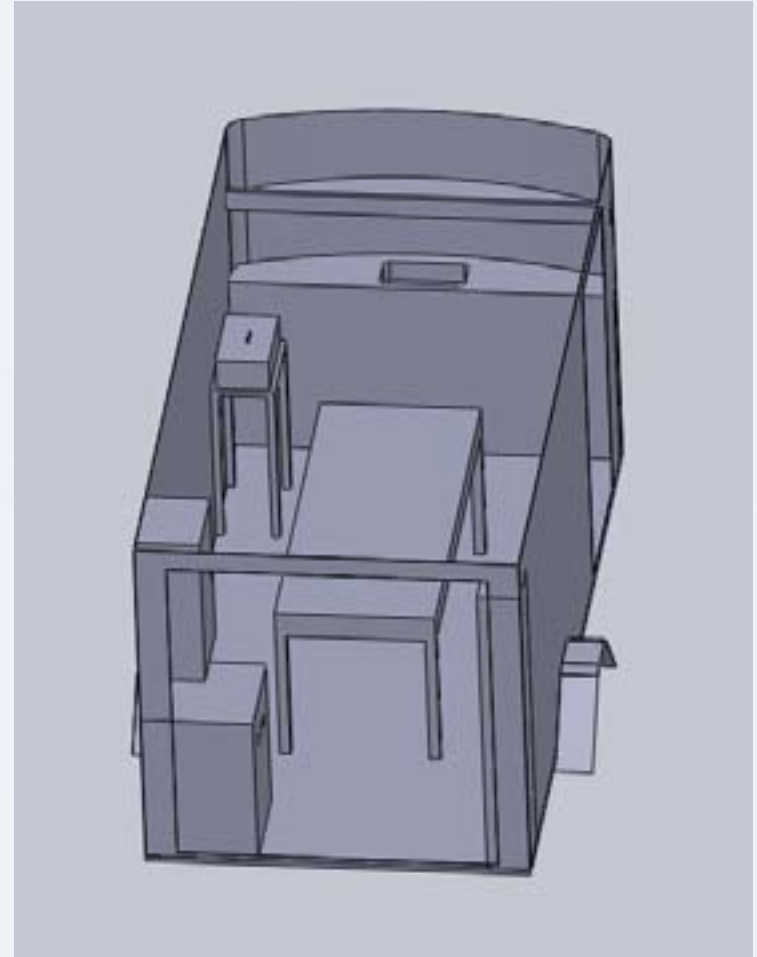
New Vision

- Mobile Clinic
 - Expand capabilities
 - Cervical cancer screening and treatment



Present Work - Overview

- Flooring
- Suspension System
- Floor Plan



Present Work - Flooring

- Problem
 - Existing flooring was rotted through.
- Significance
 - Need a water-resistant, durable, flooring option.
- Solution

Mondo Rubber

Plywood

Mondo Rubber

Present Work – Suspension System

- Problem
 - Rural Kenyan roads are very rough and often unpaved.
- Significance
 - There are many fragile items within the trailer.
 - The current leaf-spring system may not handle the conditions of the roads.



Present Work – Suspension System

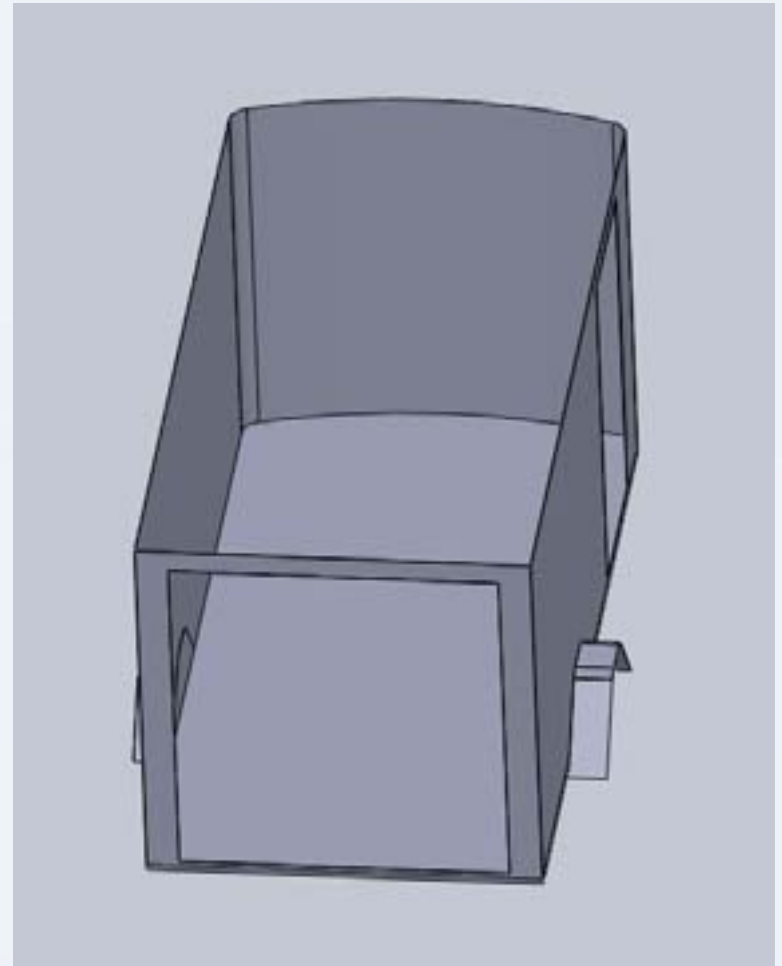
- Solution
 - Accelerometer Testing
 - Design Criteria
 - Progressive Spring Rate
 - Reliability
 - Ease of Repair
 - Possible Options
 - Helper Leaf Spring
 - Torsion Axle System



Present Work – Floor Plan

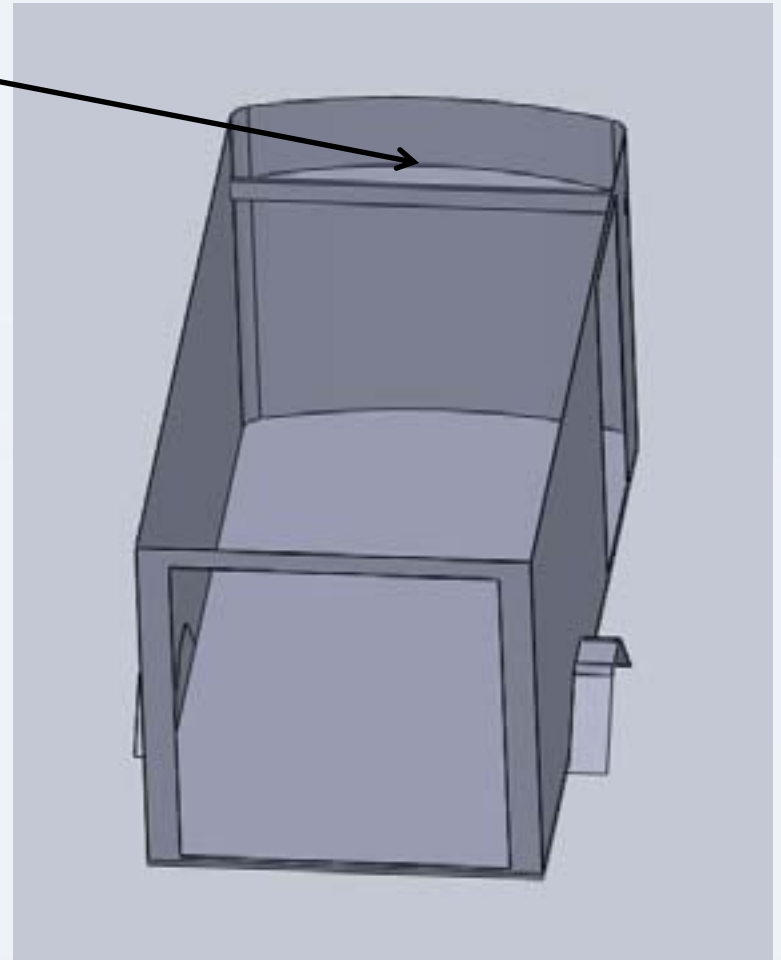
- Problem
 - Limited space inside trailer
- Significance
 - Variety of components that must be strategically placed as to maximize space
- Solution
 - An optimized floor section

Present Work – Floor Plan



Present Work – Floor Plan

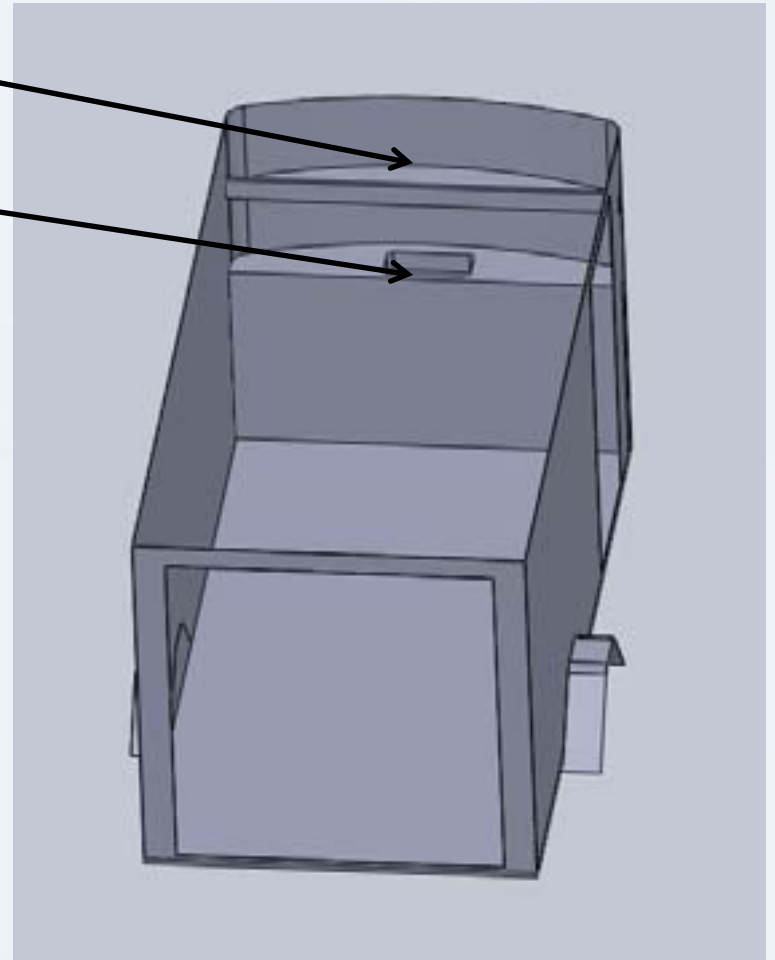
Shelf



Present Work – Floor Plan

Shelf

Sink and Cabinet

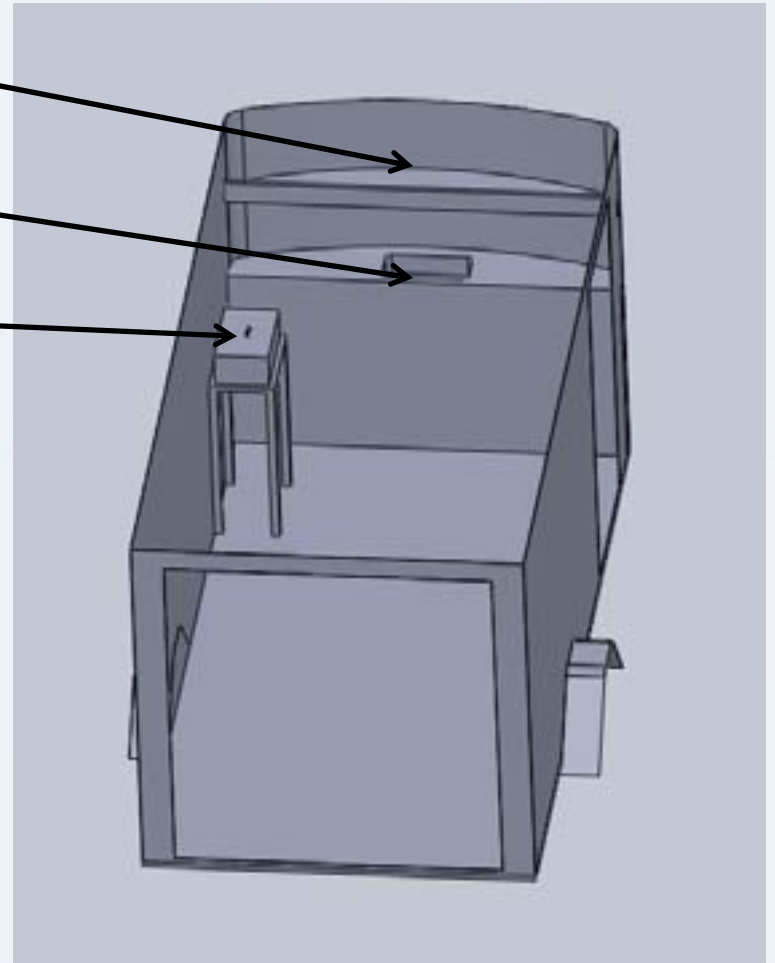


Present Work – Floor Plan

Shelf

Sink and Cabinet

Ultrasound Machine



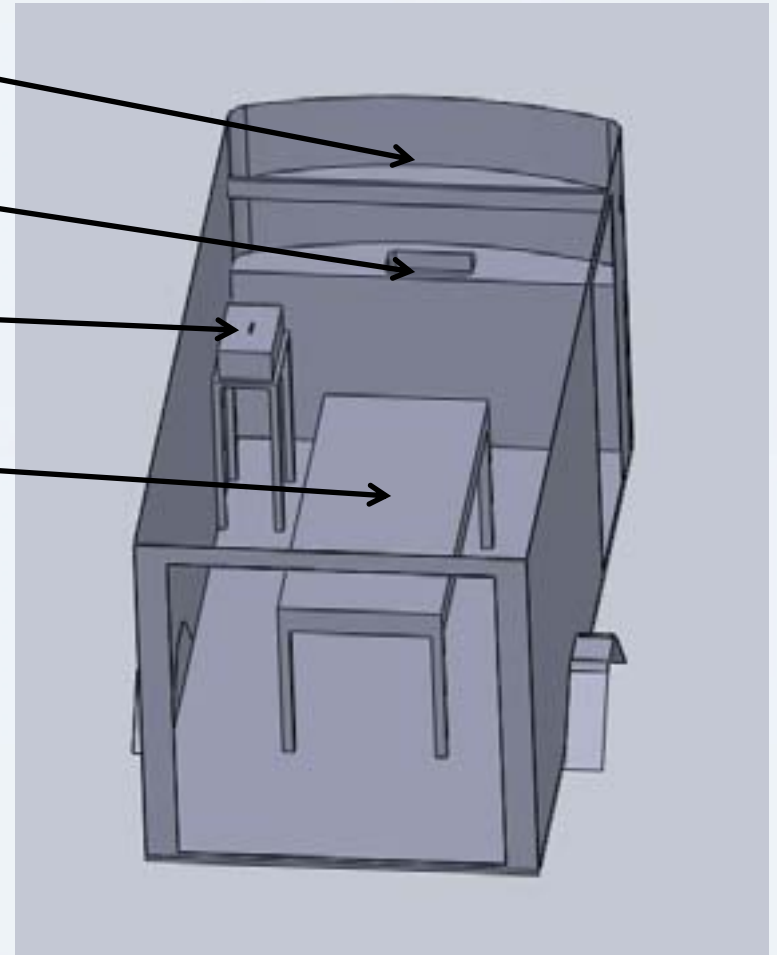
Present Work – Floor Plan

Shelf

Sink and Cabinet

Ultrasound Machine

Stirrup Exam Bed



Present Work – Floor Plan

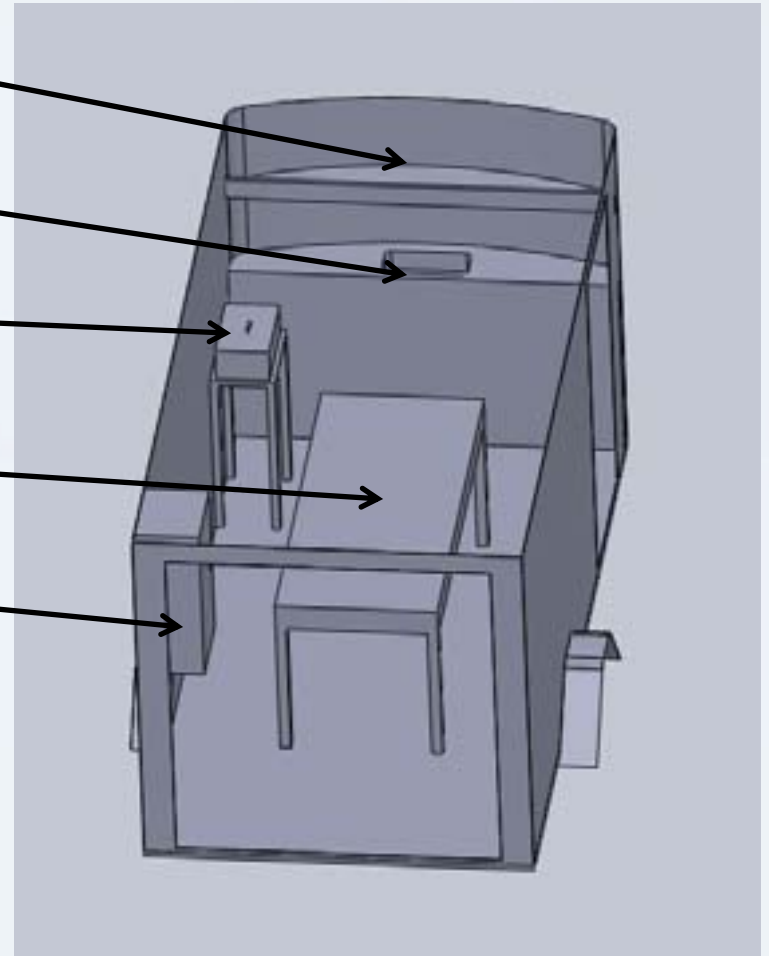
Shelf

Sink and Cabinet

Ultrasound Machine

Stirrup Exam Bed

Cabinet



Present Work – Floor Plan

Shelf

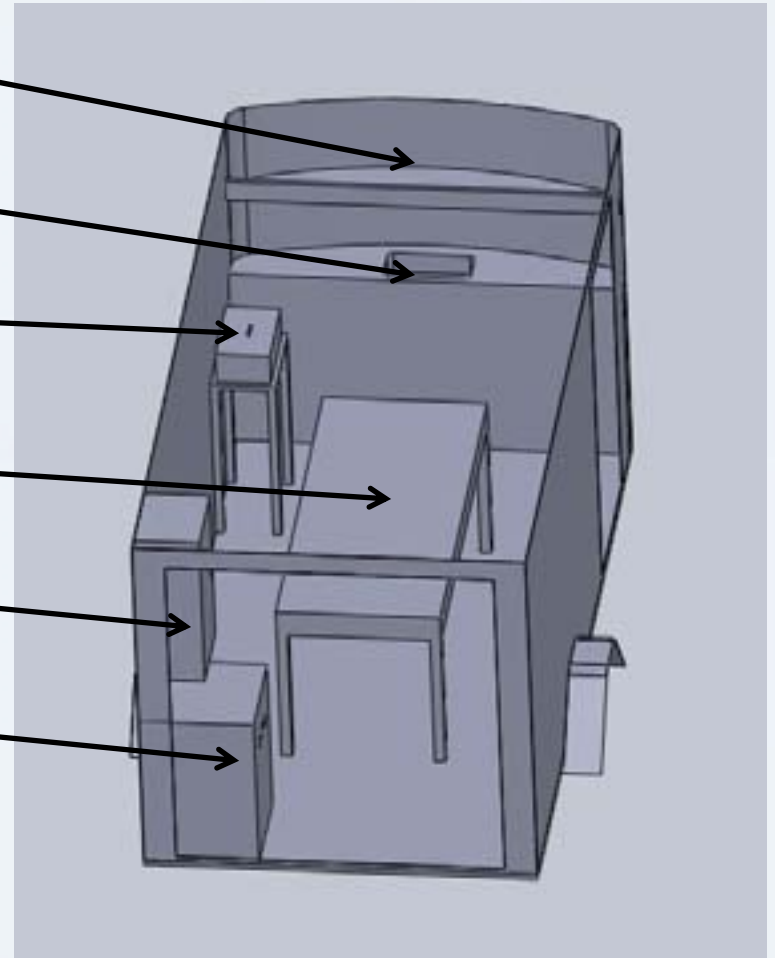
Sink and Cabinet

Ultrasound Machine

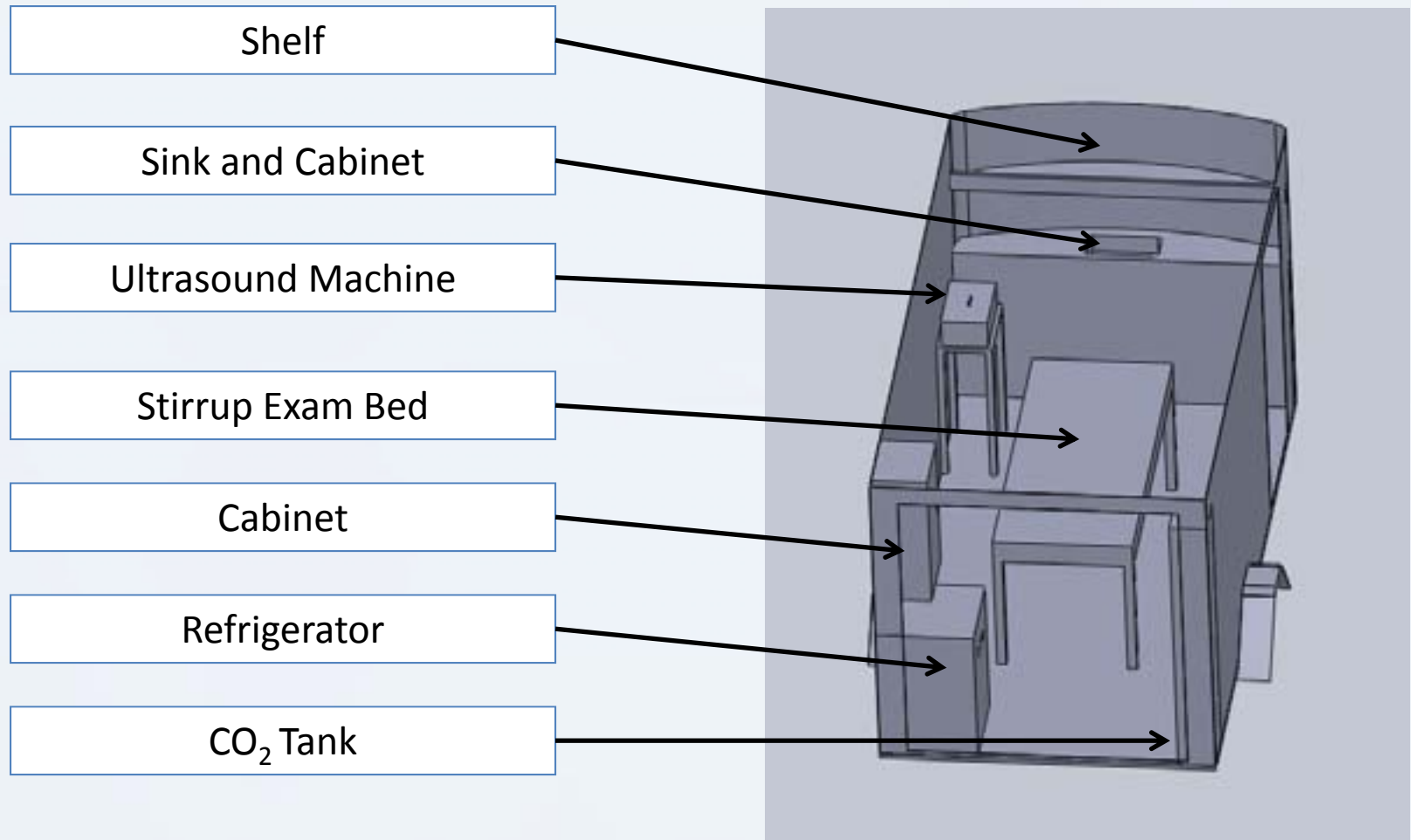
Stirrup Exam Bed

Cabinet

Refrigerator



Present Work – Floor Plan

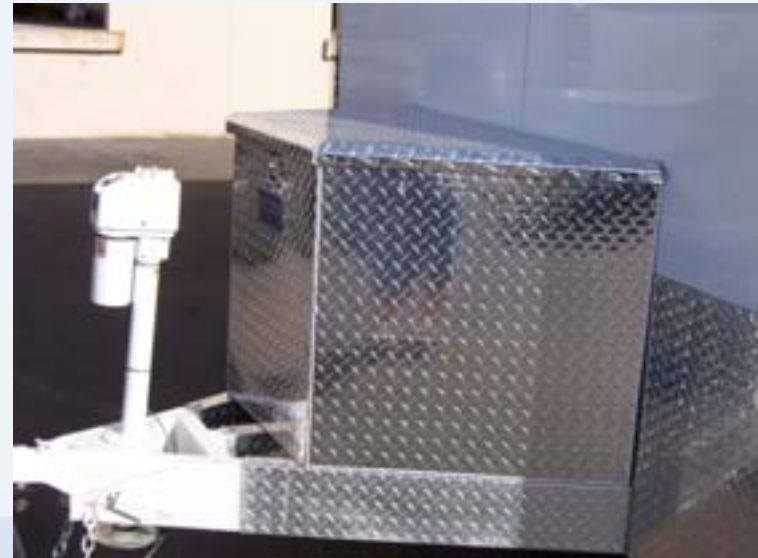


Future Work

- Medical Equipment
 - Exam Bed
 - Capable of cervical cancer screenings
 - General Exam Use
 - Ultrasound Machine
 - Donated by Capital Area Pregnancy Center
 - Portable, versatile, medical imaging tool
 - Compressed CO₂ Tanks
 - Used for treating cervical cancer

Future Work

- Onboard Water System
 - 20 gallon onboard tank
 - Source of clean water for medical procedures
 - Can also be used as drinking water
 - External tanks
 - for easy refilling
 - Electric Pump for sink



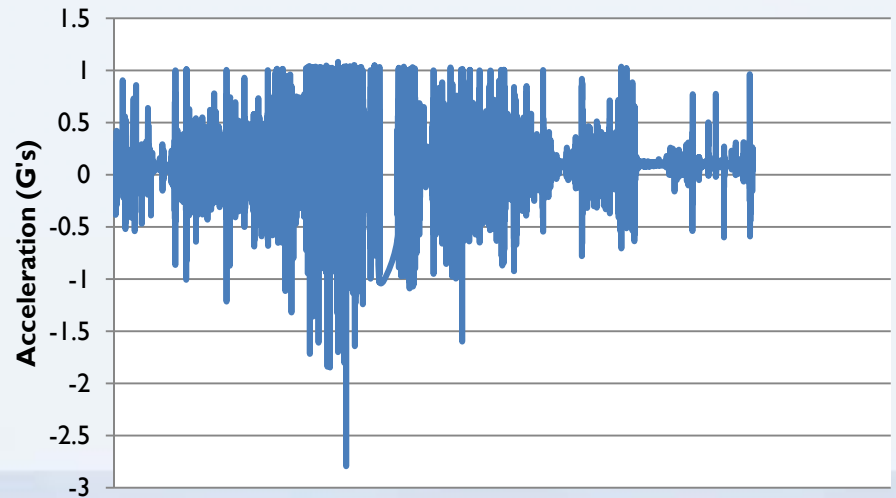
Future Work

- Electrical System
 - Solar Power
 - Electric Solar Panel on Roof
 - Approx. 800 W Output
 - Charge 12v batteries
 - Components
 - Ultrasound Machine
 - Refrigerator
 - Interior Lights
 - Ventilation Fan
 - Water Pump



Future

- Suspension Testing
 - Accelerometer Data Gathering
 - Before and After Comparison
 - Minimize vibrations during travel



Future Work

- Miscellaneous Upgrades
 - Off-road tires
 - Fans for interior cooling
 - Exterior awning



Future Goals

- Continue Research and Testing
- Implement Suspension System
- Install flooring
- Finalize floor plan design
- Install components

Acknowledgements

- Dan Okall
- Dr. Don Pratt
- Joel Zeigler
- Stephen Smeiles
- Kari Senum
- Capital Area Pregnancy Center

Questions?