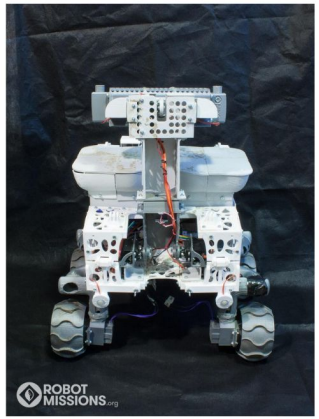
Mi Casa es Su Casa

GNG1103-A Project Group A14

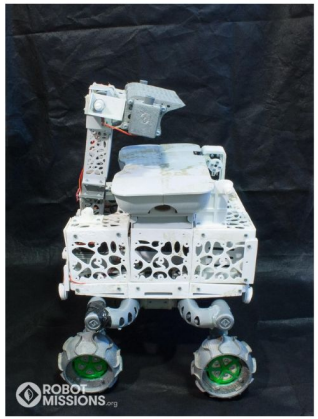
Problem Identification/Needs

Erin, from Robot Missions, is seeking a module to add to Bowie the Robot. Bowie cleans up small pieces of garbage on beaches.

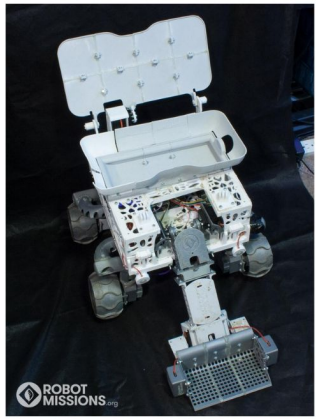
- Environmentally friendly module
- Module needs to be affordable
- Our product would have a wildlife monitor
- The attachment is portable
- It is lightweight
- It requires secure storage
- Necessitates little to no maintenance
- Can operate at a quiet volume



Front



Side



Overhead

Image from: uottawa.brightspace.com

Problem Statement

Alternative means for environmental restoration implemented to Erin on the existing Bowie robot during its mission will be evaluated upon its current abilities with an attachment that is lightweight, affordable, and uses materials that are environmentally friendly, to more effectively reduce the amount of litter and pollution on parks and beaches.

Conceptual Design

The key focus areas this semester could cover:

1) Continuous intake of soft sand – As a faster alternative to scooping debris, take all the sand and filter through it

2) Secure storage – As an automated location Bowie can dock and recharge at when deployed in the field

3) Wildlife monitoring and remote surveillance – With a camera pivot mount and software

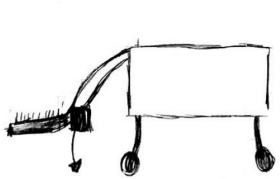
4) Open ideas for mitigating

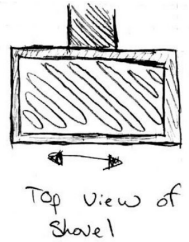
The design that Team A14 selected:

Initial design choice was a vibrating sand remover. ⟶ Not realistic, could damage the robot!

Following the client meeting, it was highly recommended that a new design be chosen.

We followed up with another design choice which was to build a secure portable storage unit.





SPSU!!!

(Secure Portable Storage Unit)

Project Plan

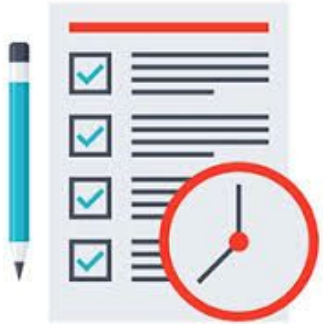


Image form
http://theconversation.com/shaking-hands-is-disgusting-heres-what-else-you-can-do-98097

- Task list
- Risks
- Costs
- Materials

Image from:
https://rospaworkplacesafety.com/2013/01/21/what-is-a-risk-assessment/

Risks

- Obtaining larger materials
- Incorrectly manufacturing an expensive part
- Proper scheduling to have prototypes done
- Shipping costs
- Improper installation/Human mistakes

Features

- Safe and Secure
- Lightweight
- Portable
- Water-Resistant
- 24/7 Camera Security
- Produces almost No Sound
- Wildlife Surveillance From a Safe Distance

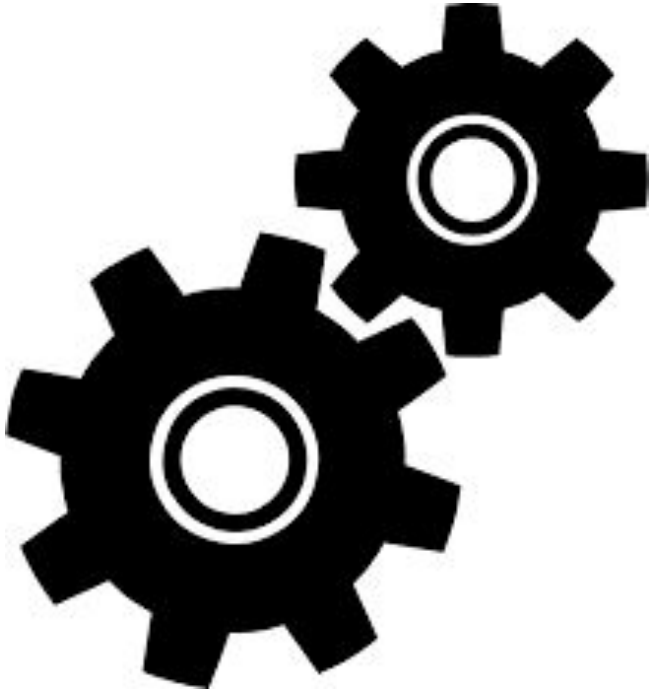


Image from:
https://openclipart.org/tags/gear?query=gear&page=7

Prototype I

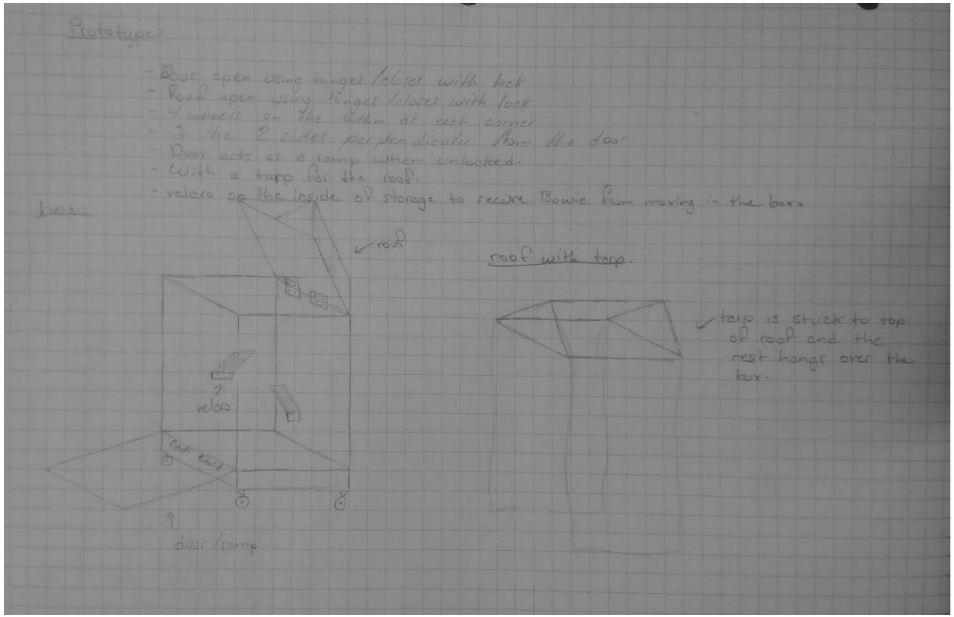
Objective: Construct a small scale comprehensive, physical prototype from cheaper materials in order to communicate the general design and intended functionality of our shelter.

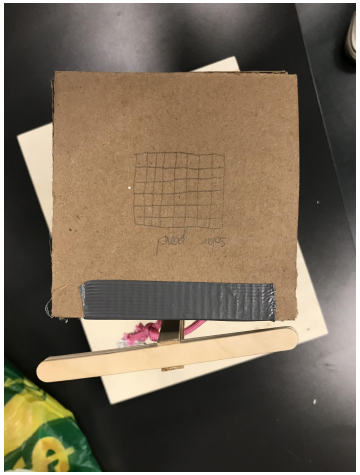
Building Process:

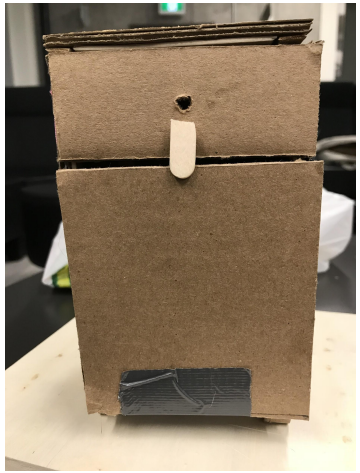
Before: Choosing the materials to use

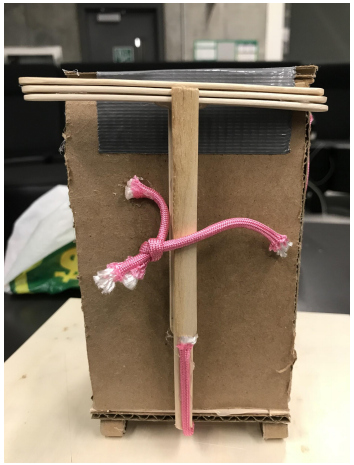
During: Draw sketches of the design, build the prototype.

After: Discuss materials and second prototype type.









Prototype I

Materials & Costs:

Popsicle sticks - $2.50
Wooden dowels - $3.75
Fabric - $1.25
Platform (cardboard, wood platform) - $3
Rope - $1.25

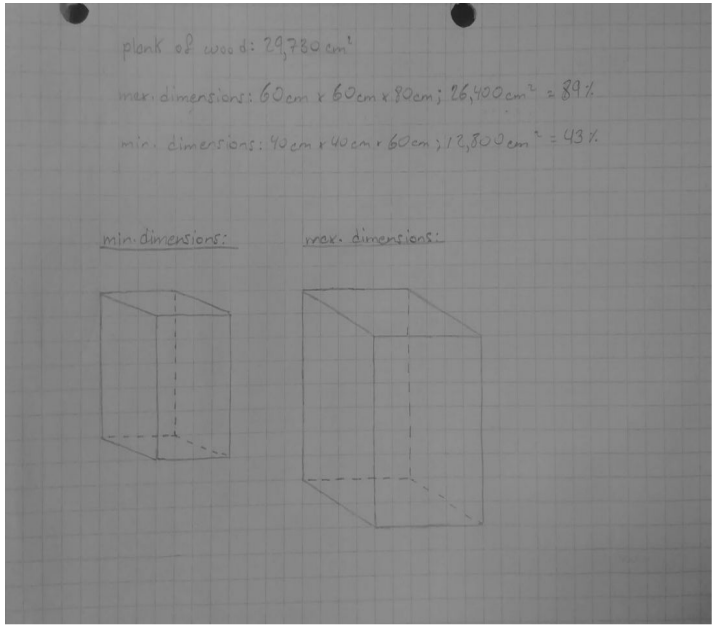
*Note: The duct tape and hot glue are not included in the price because they were refurbished materials.

Total = $11.75

Prototype II

Objective:

Construct a focused physical prototype targeting the general structure and frame of the shelter.

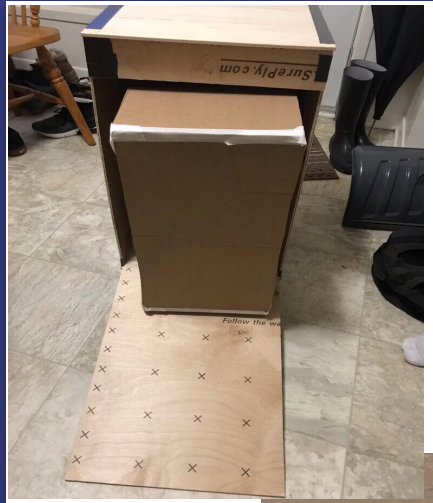


Building Process:

Before: Examine results of previous prototype.

During: Draw sketches of design dimensions, build frame of prototype.

After: Develop the third prototype and final product from the materials used in this prototype.



Prototype II

Materials & Costs:

Plywood - $15.54
Wheels (x4) - $4
Tape - N/A

*Note: The tape is not included in the price because they were refurbished materials.

Total: $19.54

Prototype III

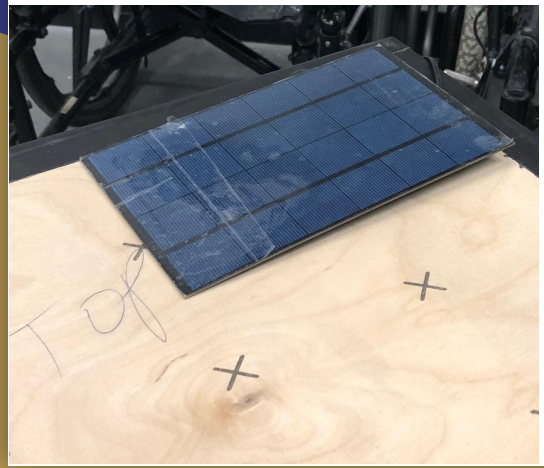
Objective: Build off of the second prototype to create a comprehensive, physical prototype with all the features that can be used for testing

Building Process:

Before: Test the functionality of previous prototype, make necessary adjustments

During: Draw sketches of the modified design and use student workshops to attach all components.

After: Perform final tests to ensure performance quality.



Prototype III

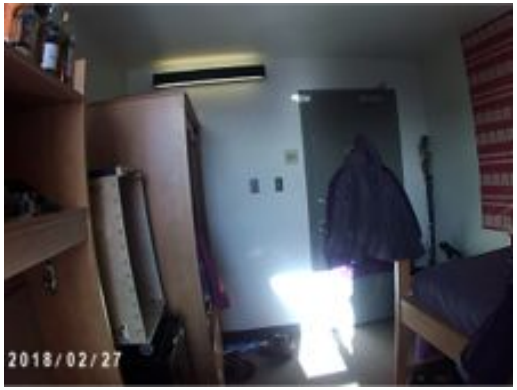
Materials & Costs:

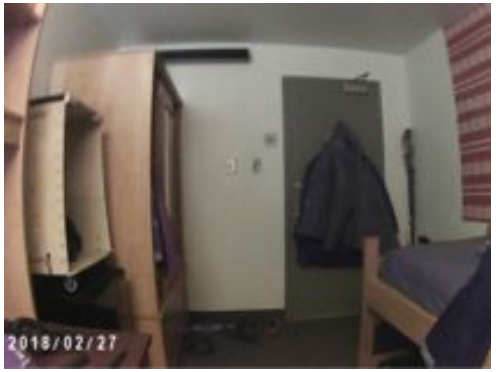
Plywood (from Prototype II) - $15.54
Camera + Water-Resistant Case - $15.54
Wheels (x4) (from Prototype II), Screws (x30), Hinges (x2), Brackets (x4), Nuts (x10) Bolts (x10) - $8.00
Bolts (x16) - $6.88
Nuts (x16) - $3.04
U-Bolt (x2) - $3.32
Water-Resistant Tape - $9.71
Velcro - $11.98
Aluminium Sheet Metal - $0.10
Solar Panel - $11.14
Wood blocks - $0
Fabric - $0

Total: $85.25

*Note: - The fabric and wood blocks are not included in the price because they were refurbished materials.
- The plywood and wheel prices are not additional costs as they were taken from prototype II.

Testing





Testing

Conclusion

Overall: The Project was a Success!!!

Image form:https://money.cnn.com/2014/12/26/investing/one-major-investing-mistake/index.html

Mistakes

Lessons

Improvements

Friendship

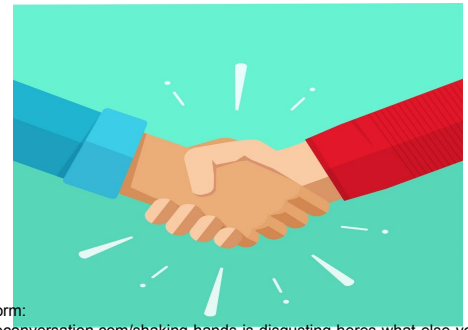


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Image form: http://dblcoverage.com/what-we-learned-in-2015/