



A.L.I.C.E

Animal Lair Imaging and Cartographic Exploration

What is Alice?

- Alice is a miniature robot, designed to be used in studying populations of burrowing animals throughout Idaho.

Design Goals

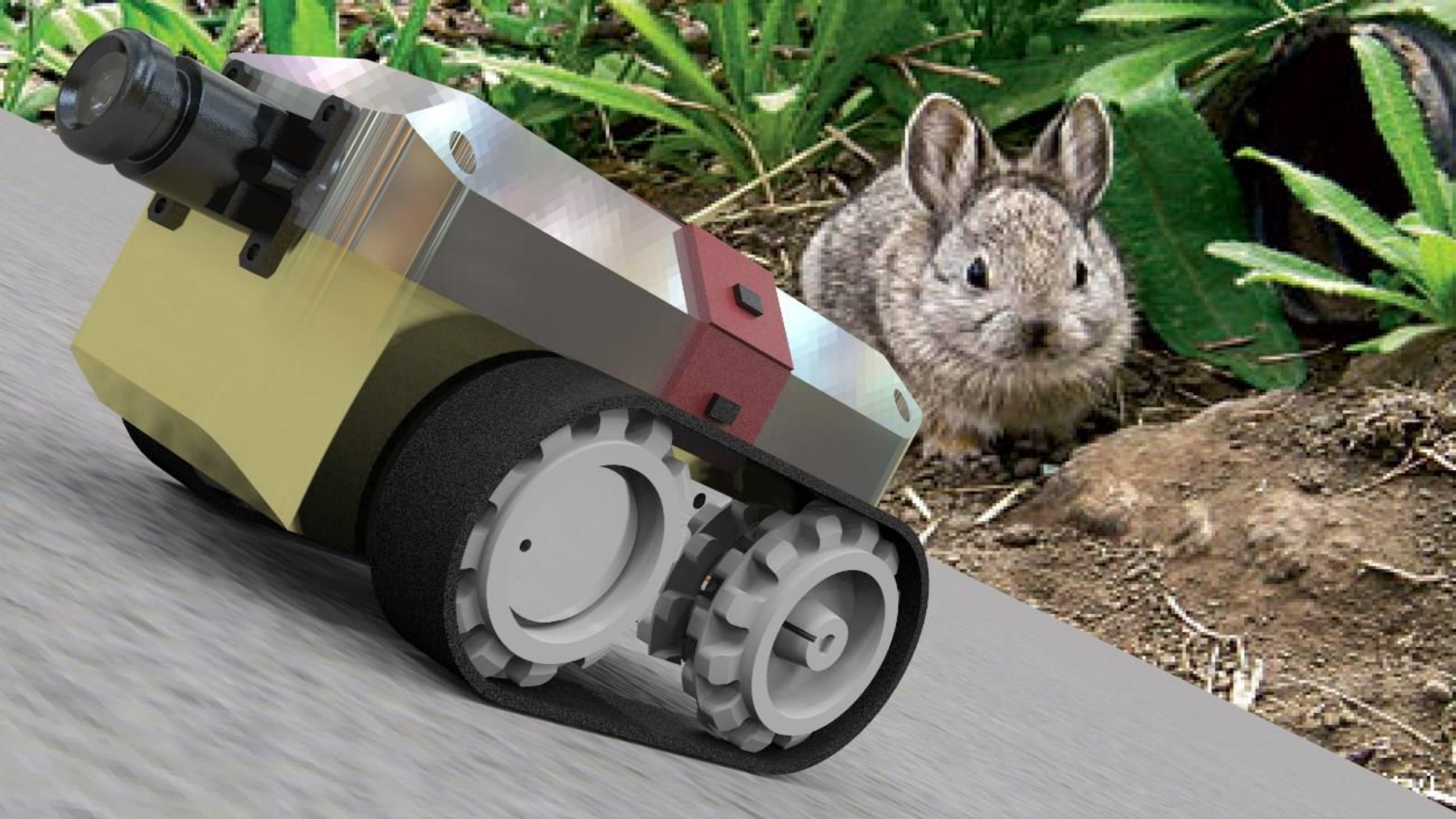
- Mapping
 - Create “floor map” of tunnel with three dimensional data
- Volumetric Measurements
 - Measure overall volume of tunnel system
- Imaging
 - Produce video footage of the tunnel interior

Design Process- Hurdles

Burrow size – about three inches across

Burrow terrain- the burrows are made up of a large amount of loose earth and roots, which would make maneuvering inside them difficult.

Pygmy rabbits are endangered- which means no destructive methods could be used in exploring their burrows



System Overview- Drive Train

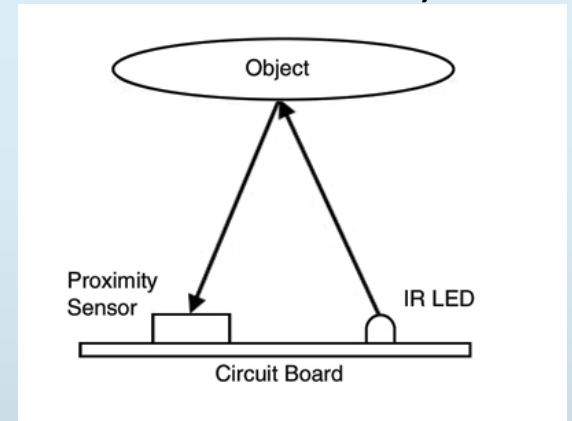
Drive Train

- Dual gear motors, on the left and right sides of the robot provide power to rubber treads
- The gear motors are small and very reliable
- Moving only one tread at a time allows the robot to be steered by rotating the robot in place
- About 0.5 inches of clearance under the body of the robot

System Overview- Sensors

Infrared proximity sensors

- Eight IR sensors will measure distance from the robot to the burrow walls, allowing us to measure the size of each burrow
- Each sensor will take multiple measurements each second, generating many points which may later be connected to generate a map and volume measurements
- Sensors will save data on board the robot
- Data will be accessible through a USB jack on the back of the robot



System Overview-Video

Camera

- 640X480 Black and White composite video
- Front and rear cameras
- Will be sending visual data back to controller to allow piloting of robot
- Records higher resolution video to the robot's memory which can be retrieved later through the USB jack on the robot

System Overview- Power

Battery

- The robot will be powered on a rechargeable battery, which has an estimated use time of one hour
- Battery can be recharged in about one and a half hours
- Charger can be run through most any power source

Improvements In the Future

- Increase accuracy of map and volumetric data
- Improve User Interface
- Optimize electrical systems to make A.L.I.C.E. smaller