M21: Gopher Tortoise Scope

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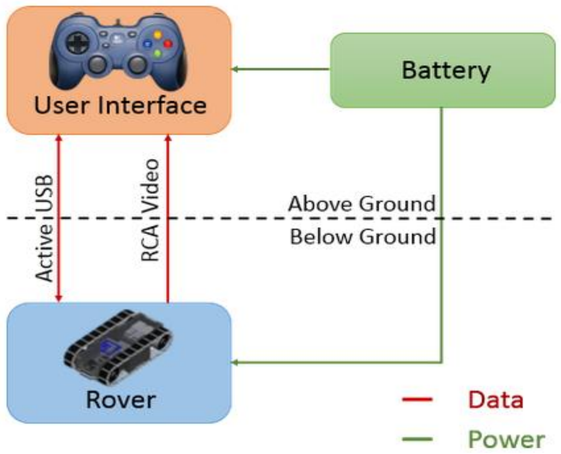
Objective

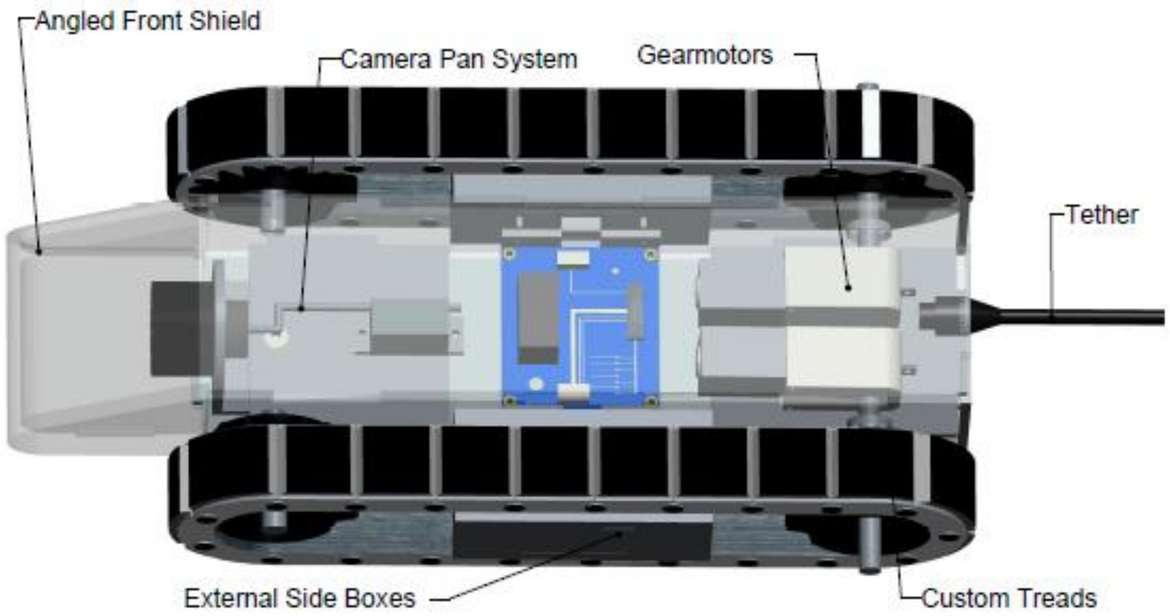
The Tall Timbers Research Station & Land Conservancy studies burrowing gopher tortoises. Our goal is to enhance research methods by creating a robotic scope with video capability and temperature and humidity sensing in a non-invasive manner.



Top Level Diagram of Scoping System

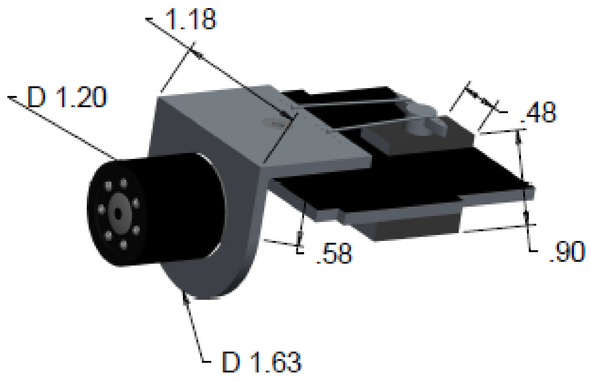
Specifications

- Rover measures 2.5” by 6.5” by 11.0”
- Lithium-ion battery (five hours of continuous operation)
- User interface includes a gamepad controller a cased screen



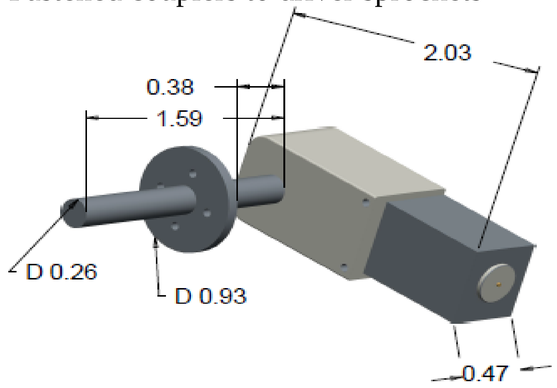
Cam Pan-Servo

- 30° left-right pan
- Aileron system attached to servo



Gearmotors

- Built in clutch with 90° output
- 200:1 torque ratio
- Fastened couplers to driver sprockets



Tether

- 50 ft Kevlar exterior sheath
- 8 pin waterproof connection

Body Casing

- ABS and infrared-capable Plexiglas
- Angled front shield to mitigate glare
- Splash-proof with silicone sealant

7” Display Monitor

User Interface

- Raspberry Pi B+ microprocessor
- 7 inch IPS screen displays video feed and temperature and humidity data
- Gamepad allows for intuitive rover control, camera control, and data acquisition
- 16 GB SD card
- Encased in splash-proof Plexiglas with a compact tripod mount