Davis & Elkins College

Dr.Stauber

Ricard Marsal I Castan

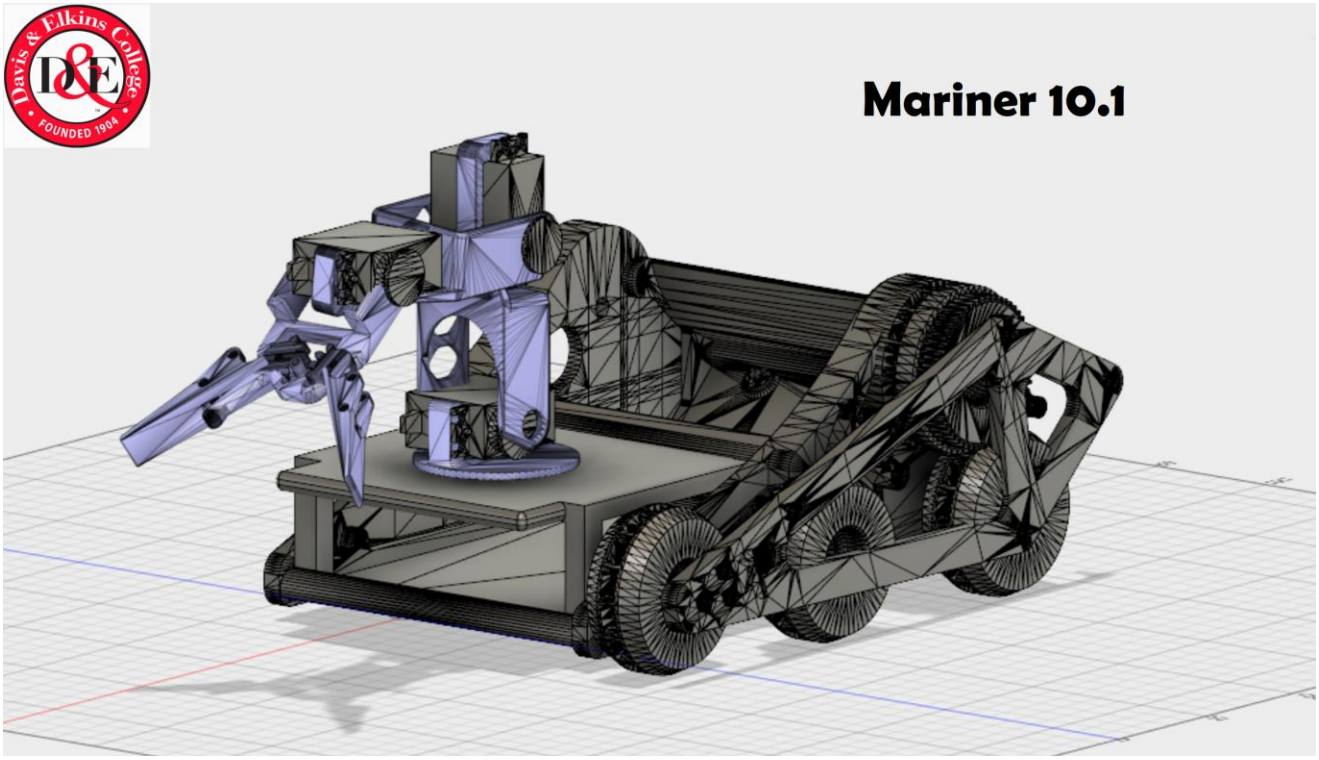
Jereomy Ayres

David Magda

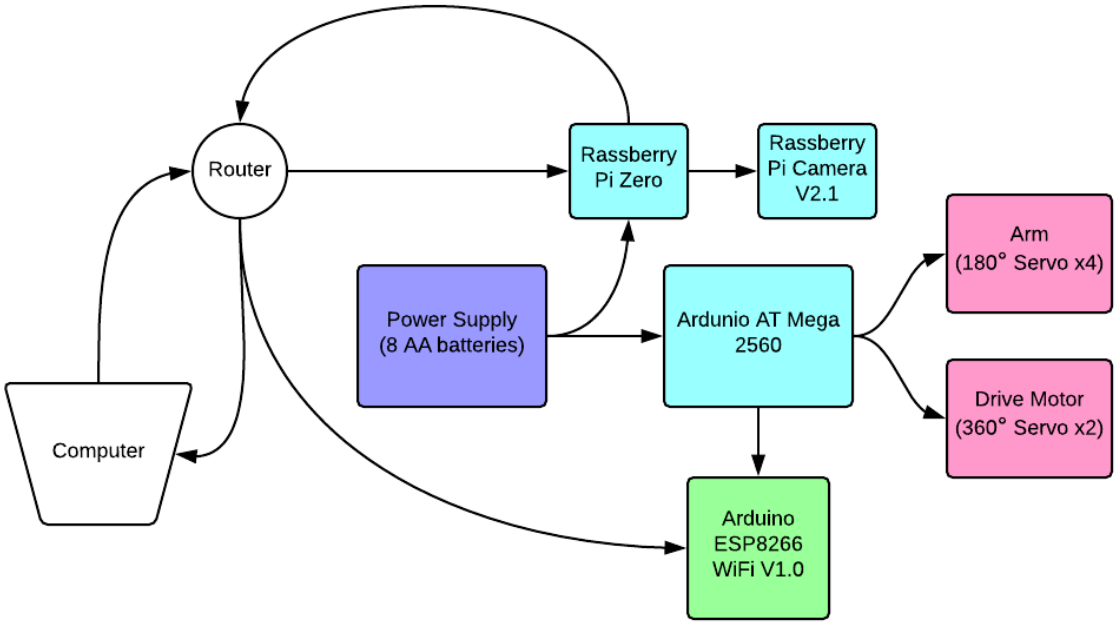
Caleb Enriquez

Blake Boswell

Mariner-10.1 Technical document



- Introduction
  - With the idea of the Mariner 10, the first satellite to orbit Mercury, we created Mariner 10.1 at Davis and Elkins College. Mariner 10.1 is the first Robotics Club project at the college and the first to participate at the Mercury Challenge in Oklahoma State University. With this first "pass" of a foreign planet we hope to obtain data to use for improvements our own environment through technological integration and demystification, much like the real Mariner 10 that visited Mercury.
  - Our team is formed by Blake Boswell, David Magda, Ricard Marsal I Castan, Jereomy Ayres, Caleb Enriquez and Dr. Stauber, our advisor.
- Block diagram



- UDP Communication system
  - The UDP protocol was selected over TCP for the lack of testing. If a command is missed, it should stay missed. If an input misses with TCP and tries to find its way back in it could mean our robot will continue moving after we stop sending input.
- Arduino main controller
  - We choose the Arduino because everyone in the team knew the language and it was easier and faster for us to start work on it.
- Raspberry Pi video controller
  - Since Arduino doesn't hold well sending video we decided to install parallel to the Arduino a Raspberry Pi Zero W with the appropriate camera just for the video.
- Driver Interface

    - We will use a PS4 controller and the program DS4 controller to send the movements commands and chose it for ergonomic feel and ease of use due to proprietary use with video games.
- Drive configuration
    - We used two 360-degree servos to operate the tank tracks to minimalize the amount of parts rigged onto the chassis. One servos for each tank track. This creates a more secure surface for the incline portion of the track while minimizing work load on the power supply and overall mass of the robot.
- Extra electronics
    - We use four 180-degree servos for the arm because they made the most sense for a sturdy moving piece and were the most intuitive for the task. The Raspberry Pi camera provides a feedback system that we can monitor to know where we are on the track.
- Chassis
    - We used a Prusa i3 MK2 to print all the 3D parts designed on Fusion 360. This makes the robot more of our own design while maintaining structural integrity and providing a safer method of creating the chassis instead of carpentry or metal crafting.
- Power subsystem(batteries)
    - We decided to put AA batteries because it will be easier to meet the safety requirements and travel with them with the plane. As well as being the most basic form of power for a brand new team.
- Video
    - https://www.youtube.com/watch?v=LDtZ1MyUK7I&feature=youtu.be