

# Group M1.01 – NXP’s “El Mandadero”

Oscar Garza, Connor Good, Eric Reyes, Cathryn Tamney

Sponsor: Iain Galloway – NXP Semiconductors – Mobile Robotics, Drones, and Rovers Program Lead

## Project Description

“El Mandadero” is a delivery rover with a common base and purpose-built top having four individual compartments. This is a development tool for designing autonomous robotic last mile delivery.

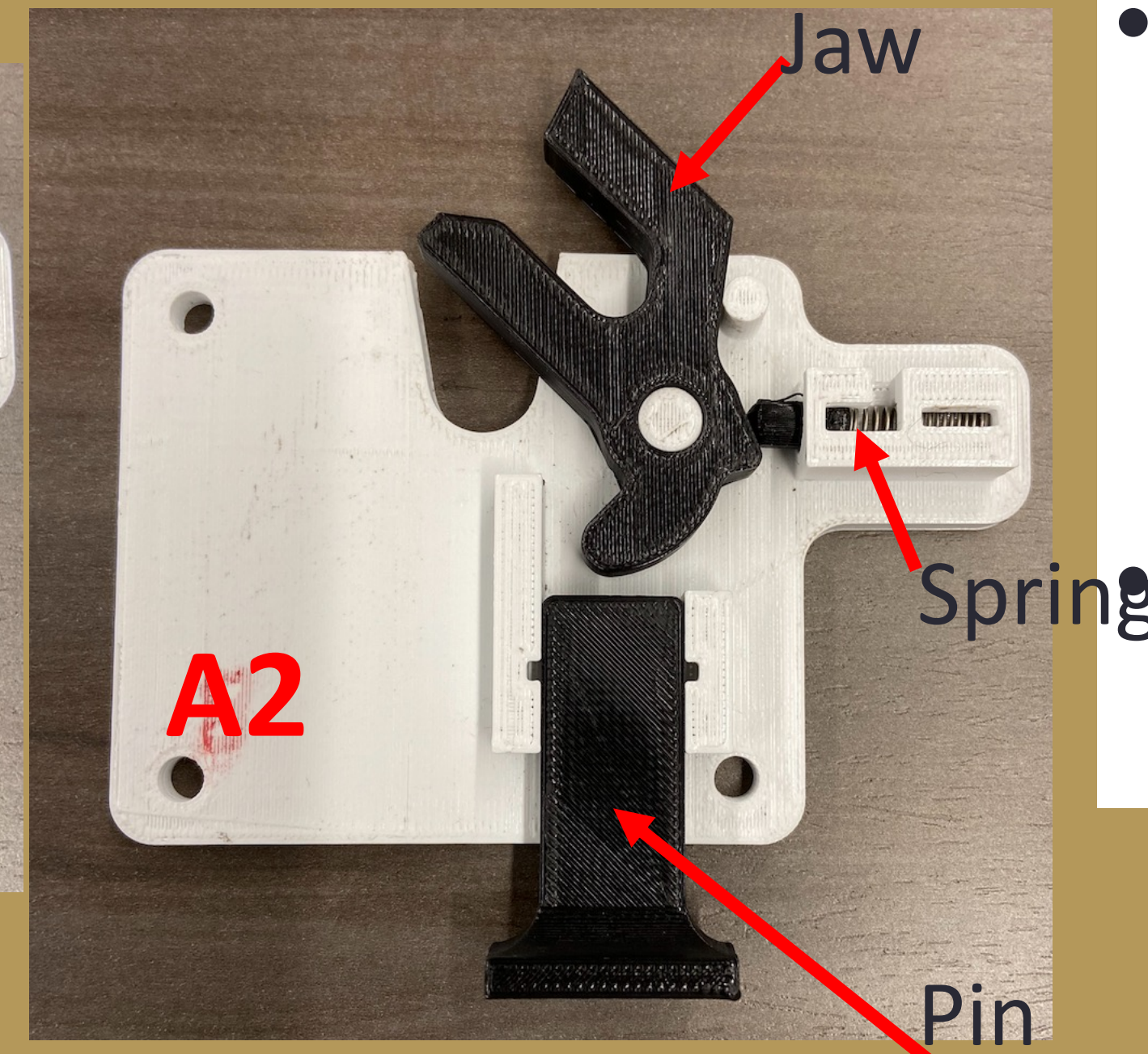
Problem for the M1.01 Team to work on:

- Prepare a compartment lid locking mechanism which allows for interaction with the end user.
- Create a bumper to sense collisions and dampen initial impact
- Present alternatives to the current torsion-bar suspension

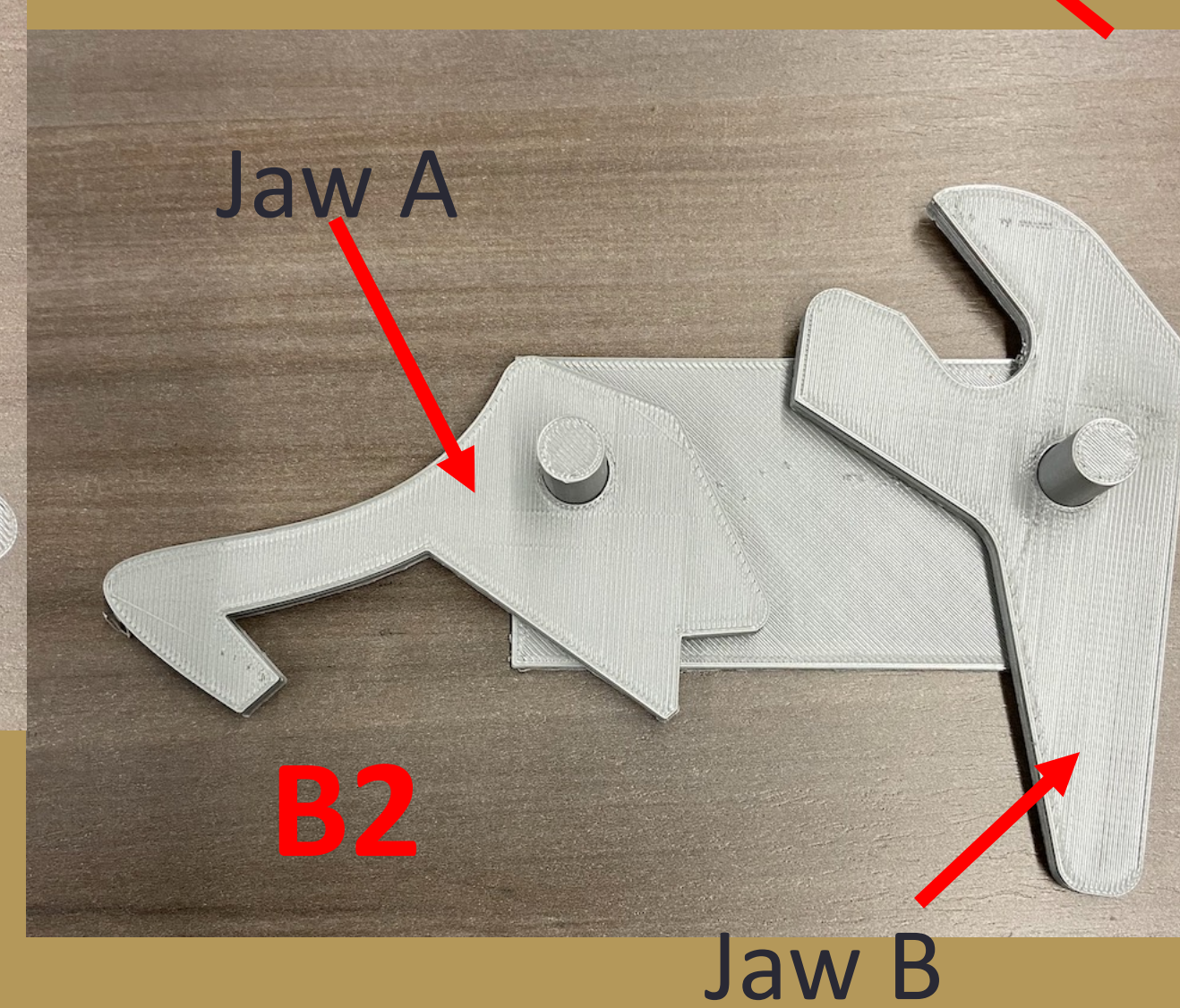
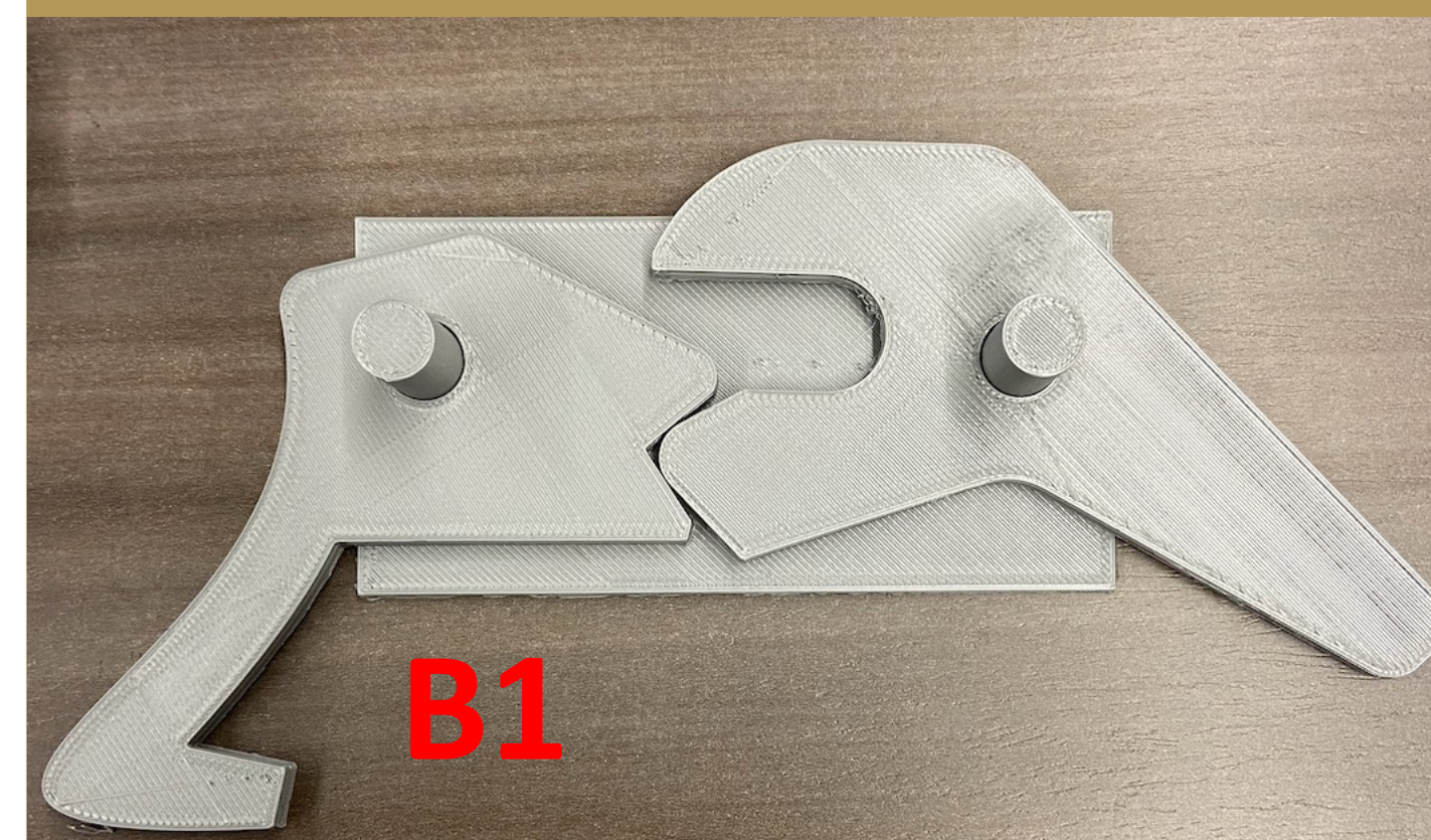


## Designs

### Latching Mechanism



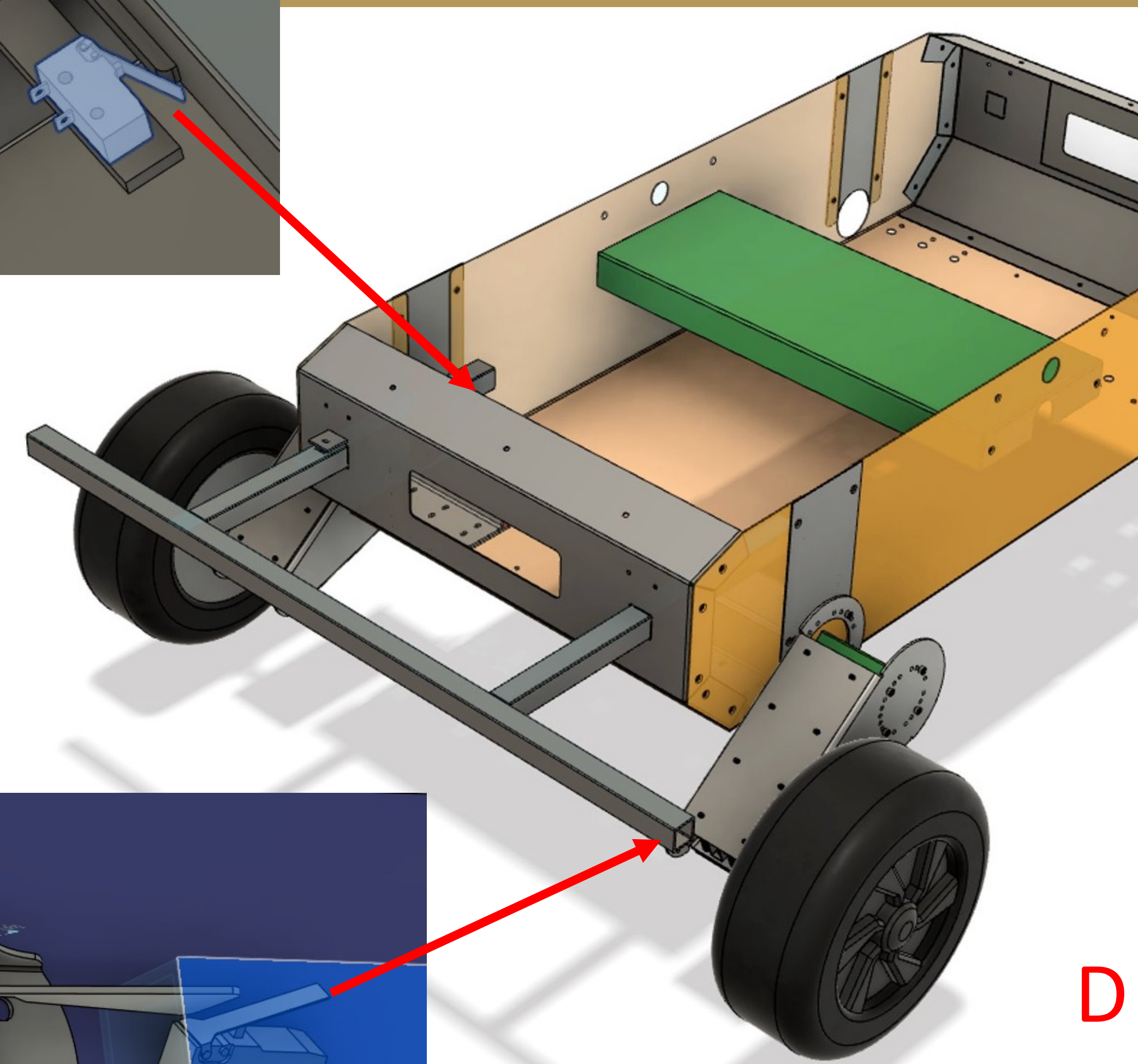
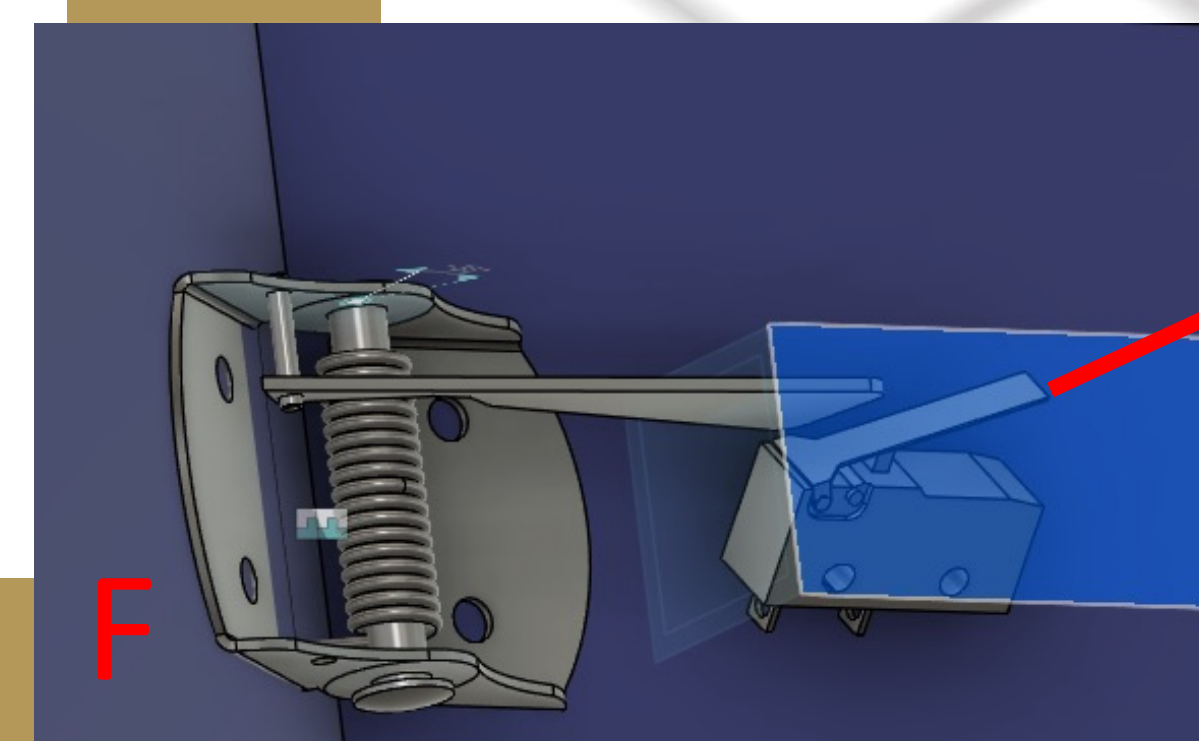
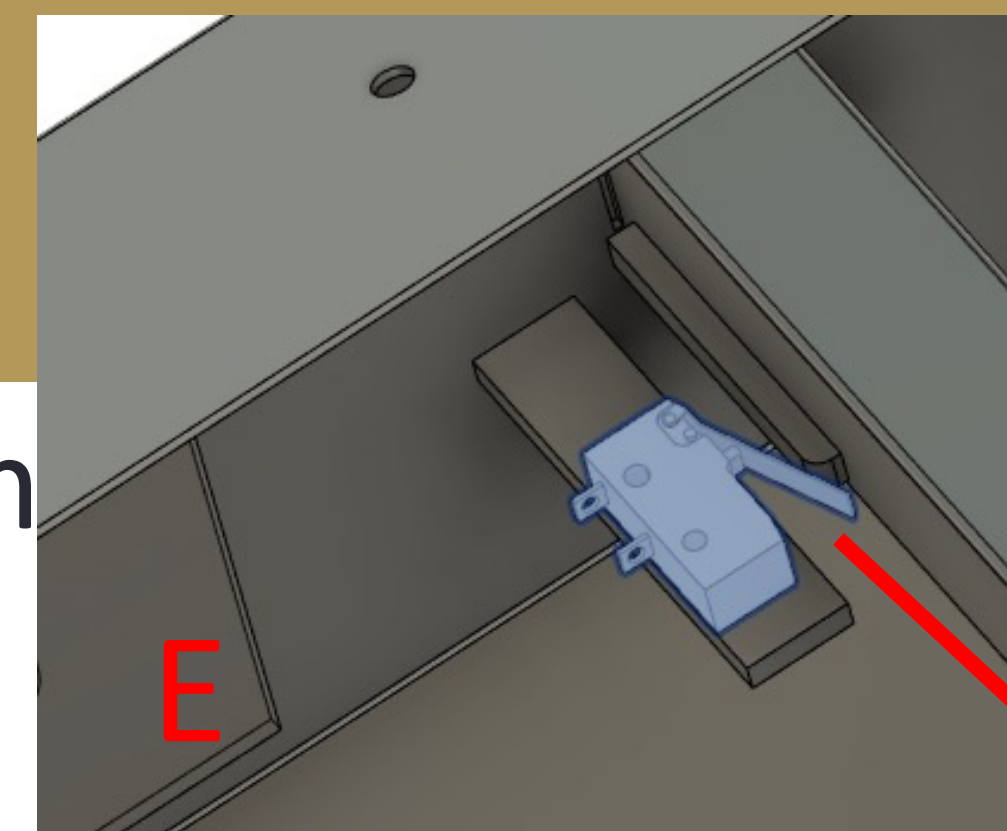
- A1 is the closed latch, A2 shows the open latch that is popped open via the spring. The actuator will move the pin



- Both jaws on B are spring loaded, with a gear locking mechanism
- Actuator moves Jaw A releasing Jaw B

### Bumper Design

- D shows the entire bottom chassis with the bumper
- E is the switch that will be mounted just inside the chassis to stop the rover in case of collision
- F is the switch that will be connected to side flaps(not pictured) in case of corner collision to correct course



## Process

### Customer Needs:

- Latching Mechanism
  - Remains closed unless actuated
  - Each latch costs under \$20
  - Requires minimum effort from the customer
  - Function even when not perfectly aligned
  - If latch closes before the door closes the door still needs to lock into place
- Bumpers
  - Cost under \$30 per bumper
  - Activate a snap action switch
  - 2 inches of max travel

### Future Scope:

- Latching Mechanism
  - Determine final design
  - Make it from laser cut aluminum
- Bumpers
  - Create a prototype and test
- Suspension
  - Test torsion-bar suspension
  - Determine if torsion-bar is best fit
  - Produce alternative designs
- Build a prototype of the rover