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Mark Summers

About Us

➢ With a desired need for sustainable energy, solar panels have become one of the most efficient and environmentally friendly energy sources on the planet.

➢ Our technical mentor and lead sponsor, Mark Summers, created the foundation of this project by making a dual axis tracking system that will utilize a Panasonic solar panel that was donated by our co-sponsor, HE Solar.
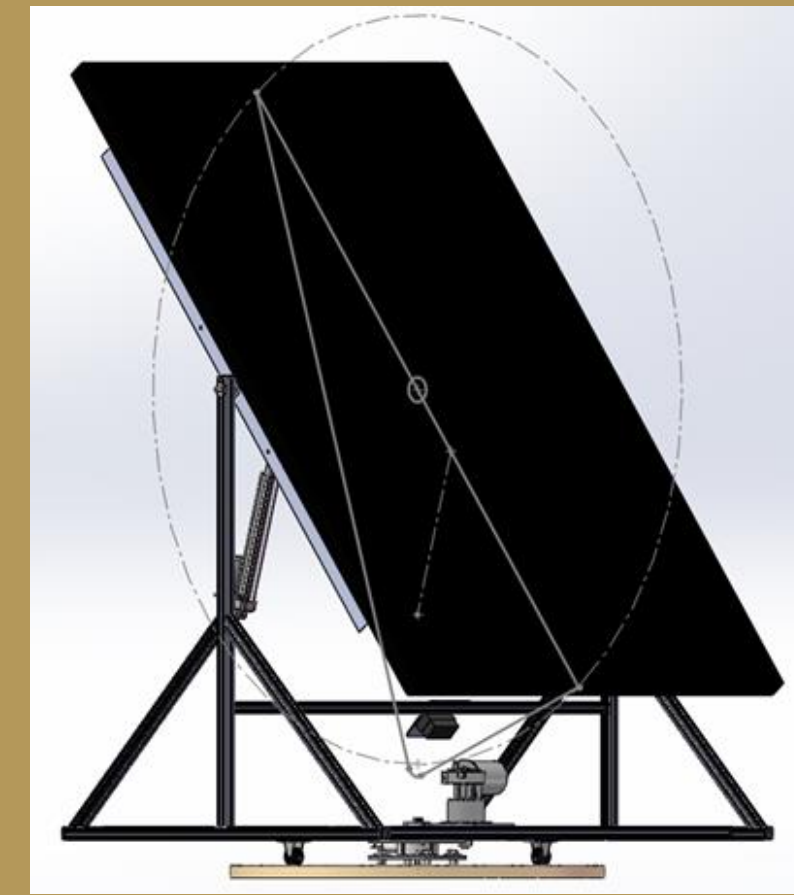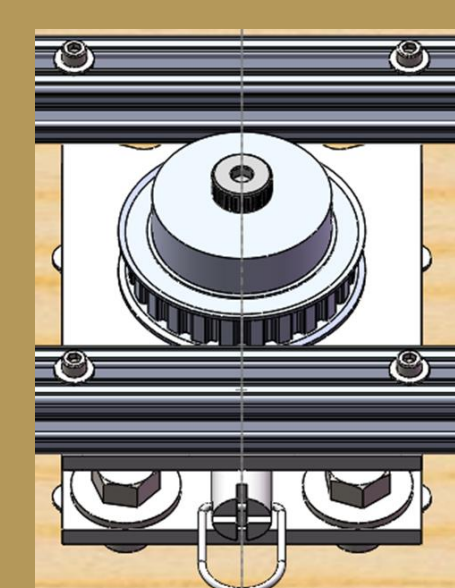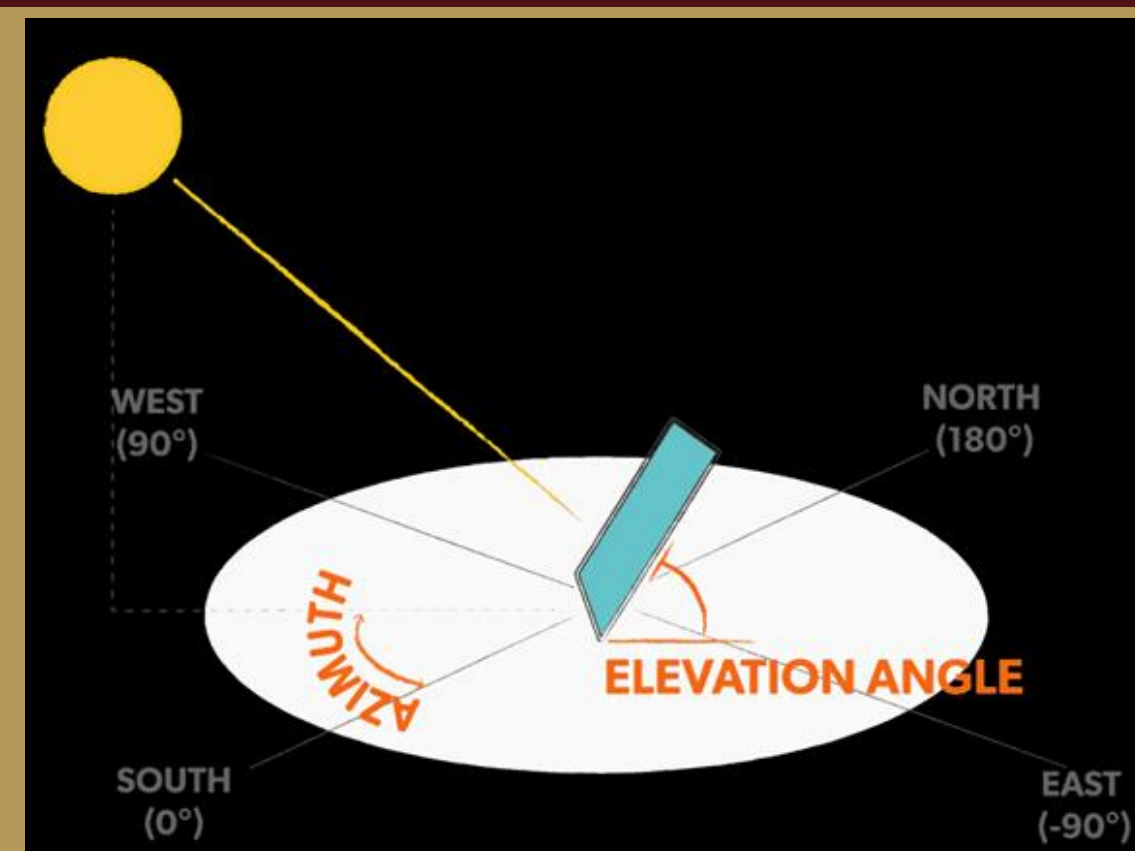

## Problem Definition

Current State of The Solar Panel
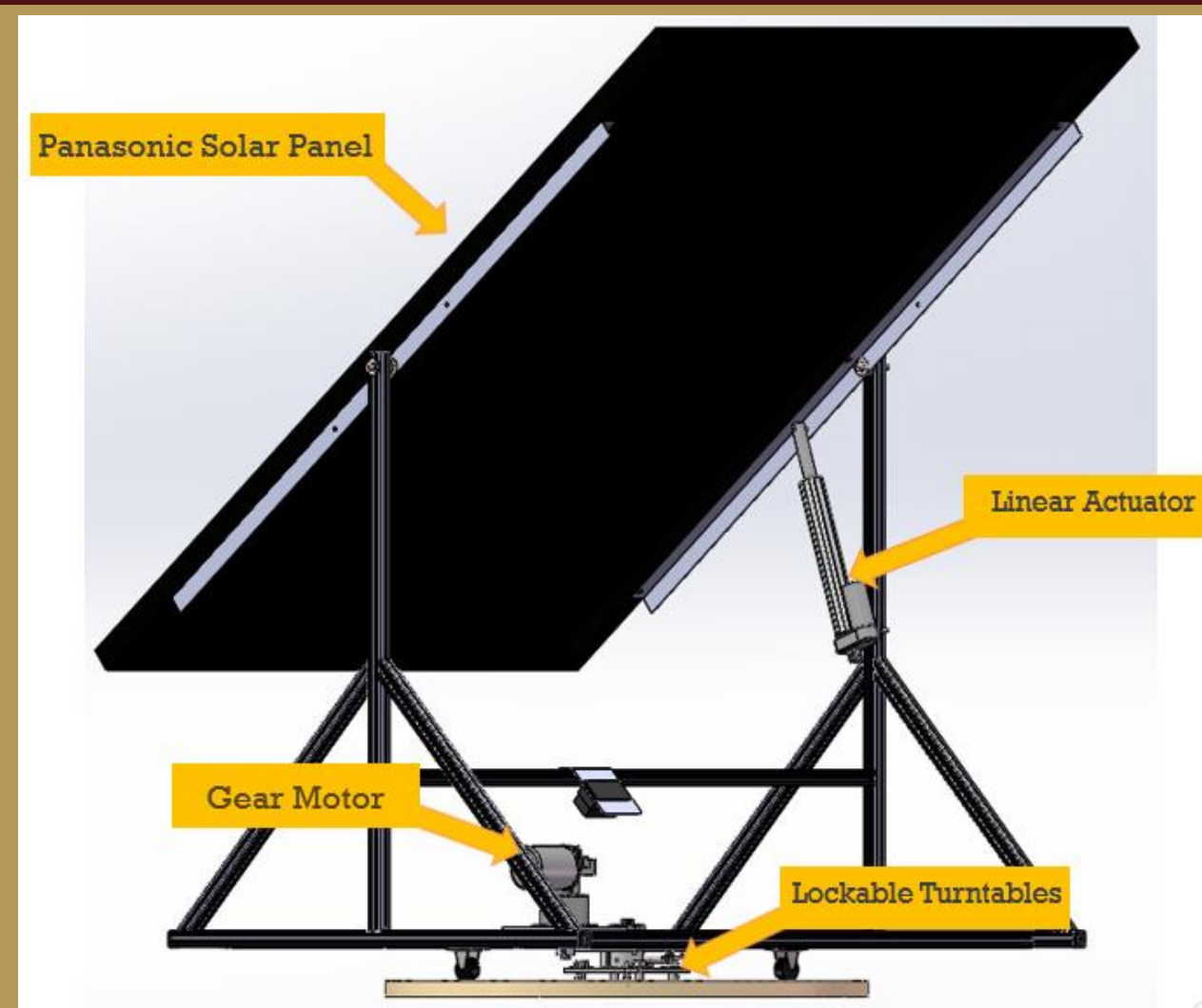
➢ The overall goal of this project is to get the solar panel to orient itself to face the sun with the use of a GPS tracking system.

➢ With that major goal in mind, our customer has presented our team with few problems that focus on the azimuth mobility of the solar panel.
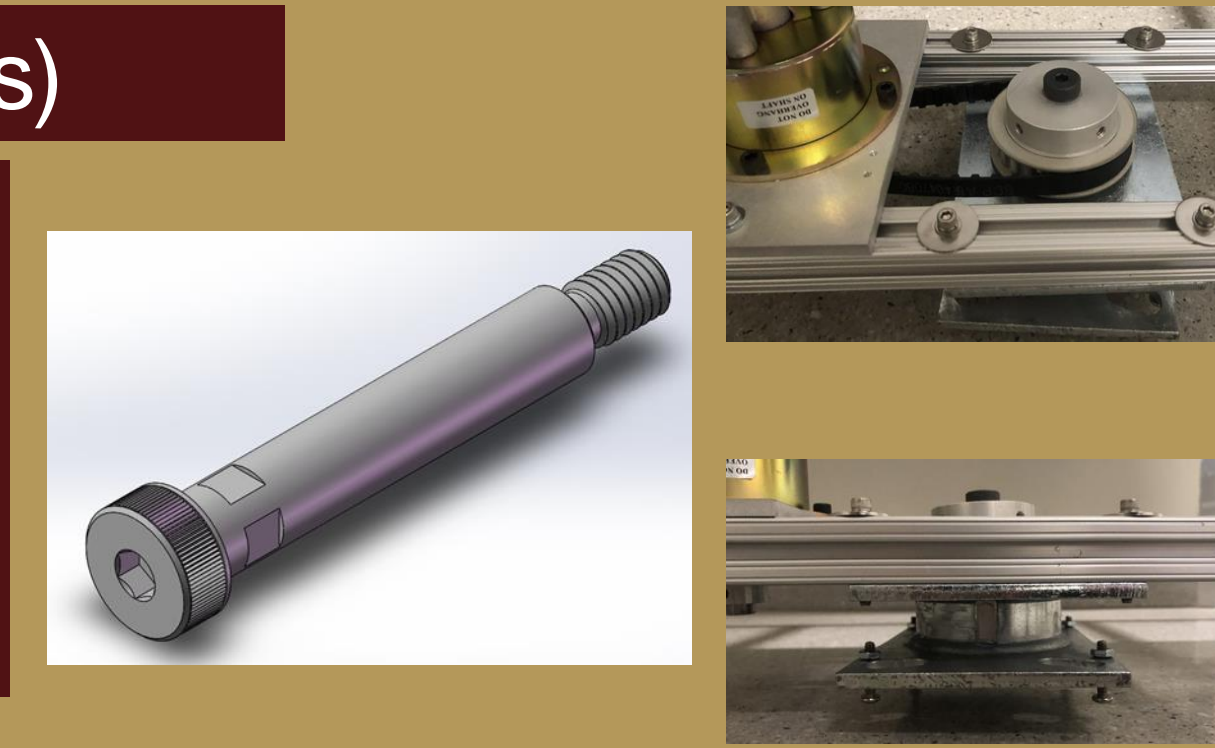

Proposed Solutions - Synthesis

Current State of Lockable Turntable (Azimuth Designs)
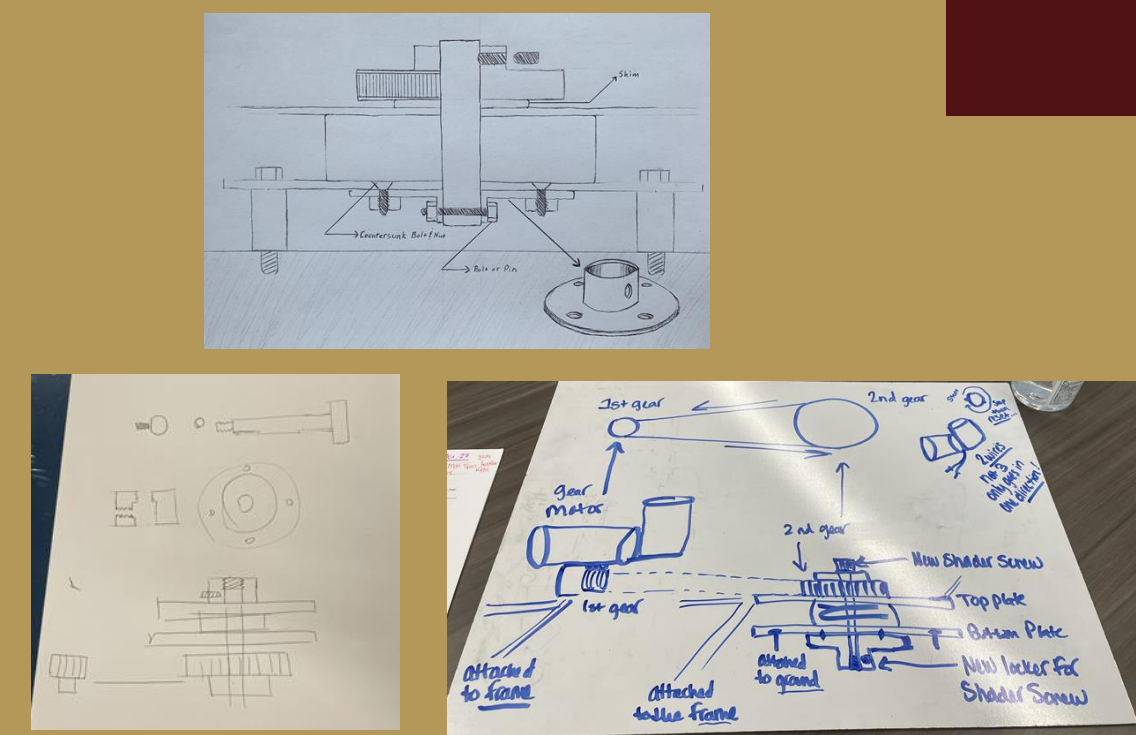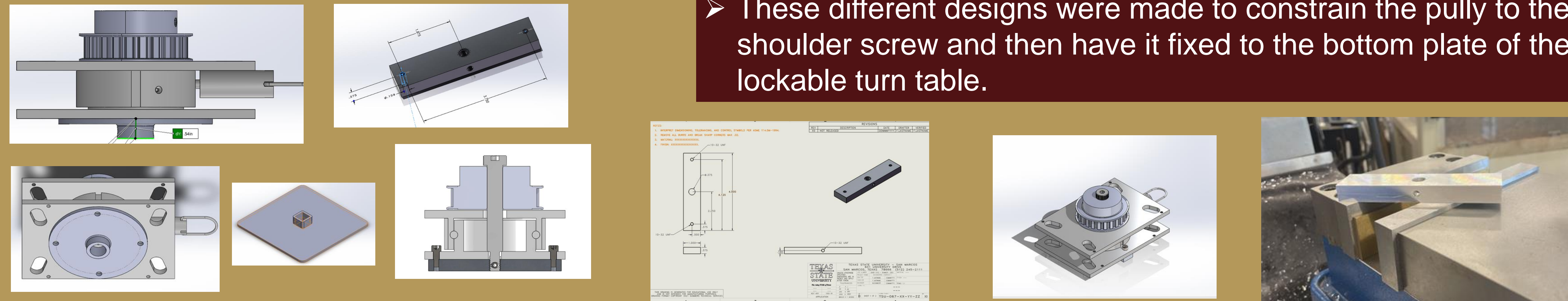
Lockable Turn Table Findings

➢ Bottom plate is fixed, and shoulder screw is unscrewing from bottom plate
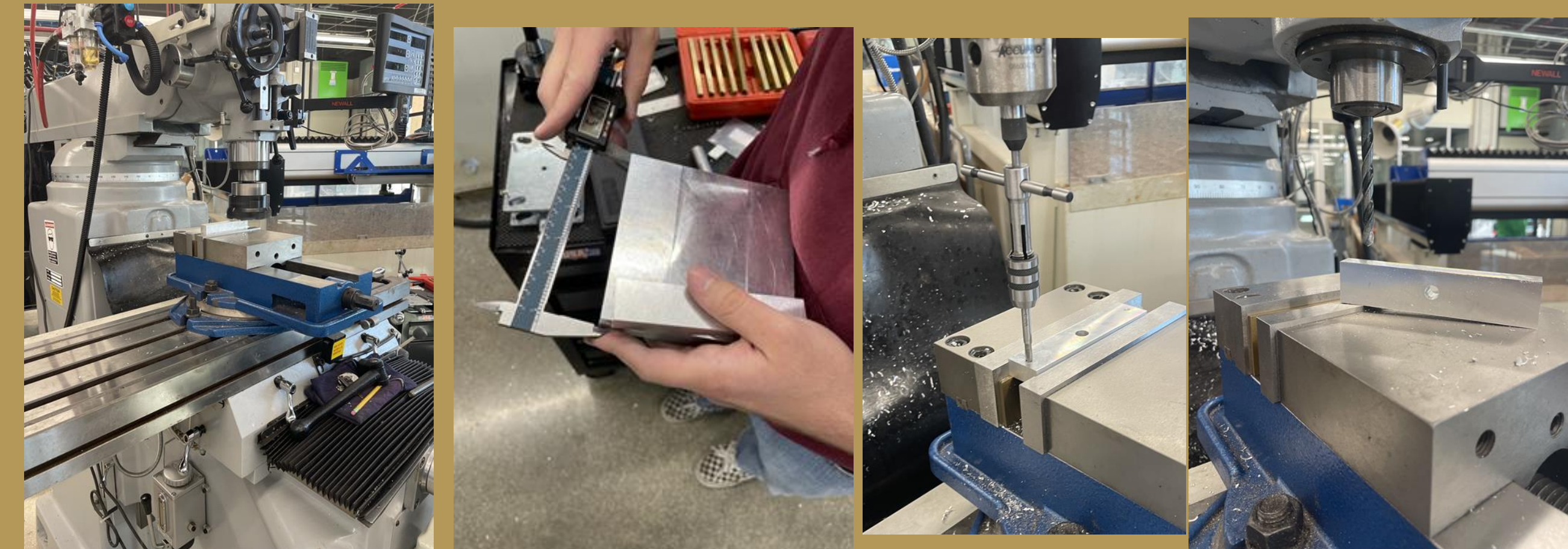➢ Caused the pulley to unscrew itself from the turntable

Azimuth Designs

➢ These different designs were made to constrain the pully to the shoulder screw and then have it fixed to the bottom plate of the lockable turn table.
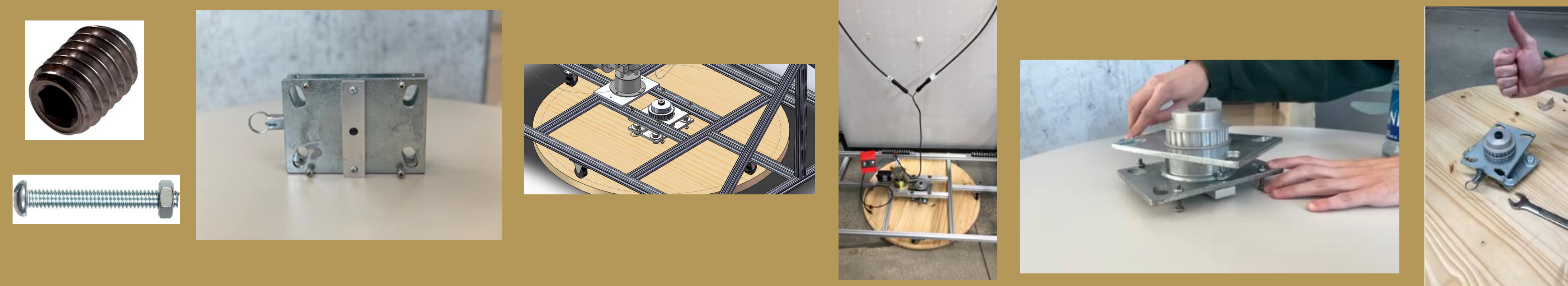

Machining of Bottom Set Screw Plate

Machining of Shoulder Screw

Assembling of Shoulder Screw and Set Screw Plate
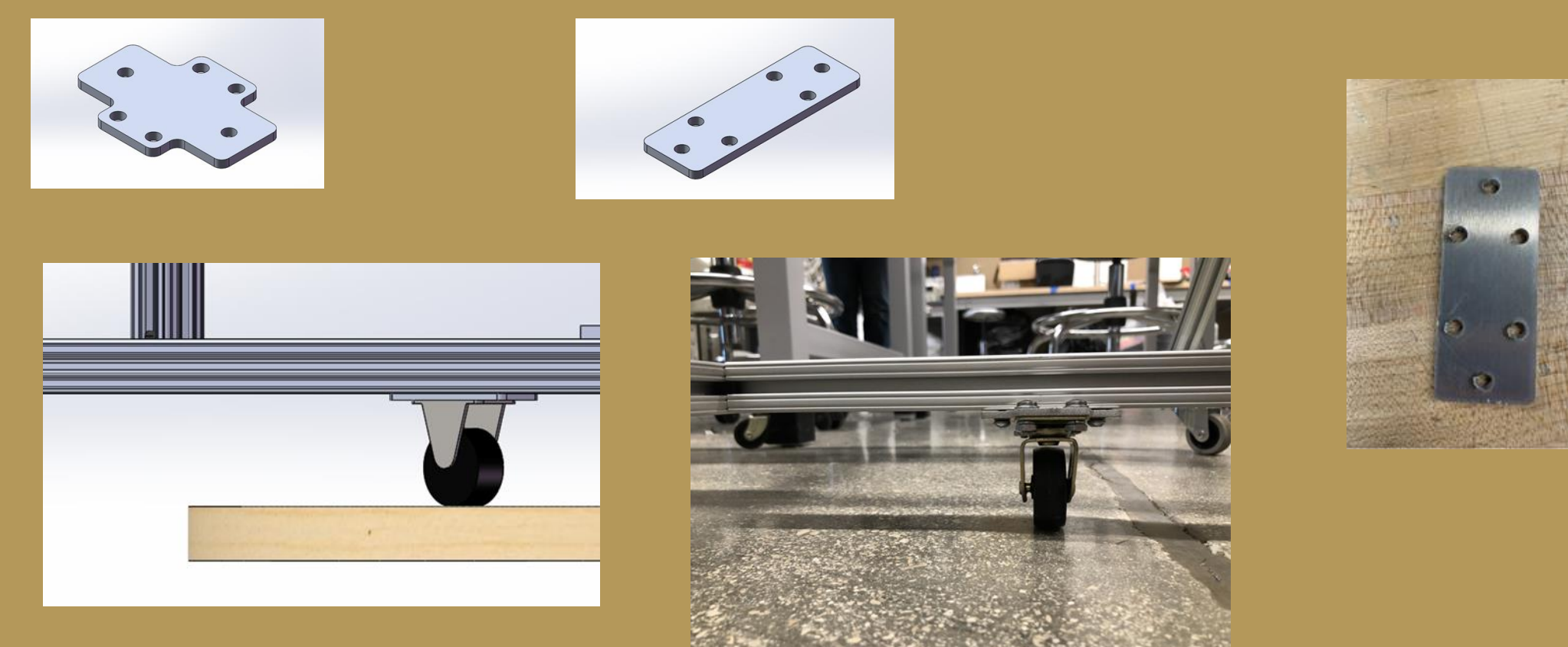

Benefits of Adding Caster Swivel Wheels

➢ Smooth rotating action and extended lead help to lower ergonomic forces.
➢ Swivel Section and wheels that utilize sealed precision ball bearings.
➢ These wheels will help drive the motor and not skid.

Machining of Caster Plate for Swivel Wheels

Conceptualization

Solar Panel Need To Know:
Solar Panel Weight = 40.81 lbs.
Calculated Max Wind Load of the Solar Panel = 130mph
It has a Maximum Rotation ≈ 90 Degrees
Length of Solar Panel = 41.5"

Actuator Need to Know:
Load Capacity of Actuator = 169 lbs.
Load Rate = 3.5 Amps Max at 12VDC
Diameter of Hole = ¼"
Extension Length = 8.1"
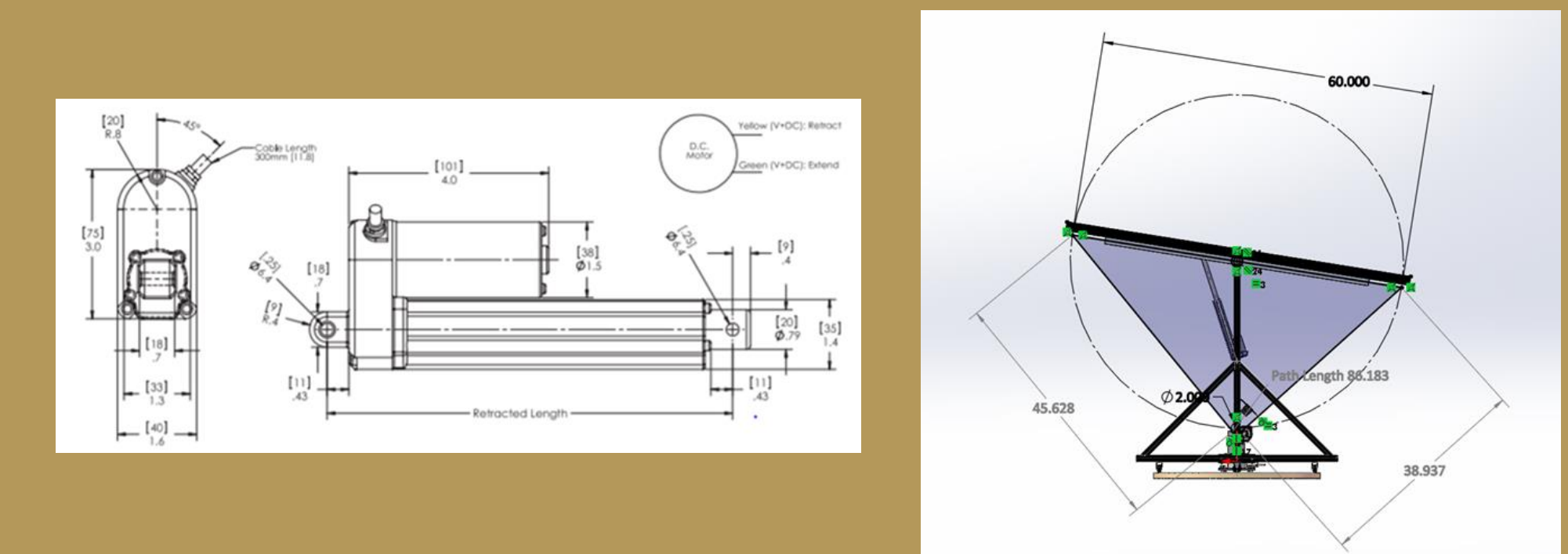
Elevation Conceptualization Findings

➢ The proposed idea was to find a way to distribute the weight of the solar panel evenly.
➢ Centering the actuator in the middle of the structure.

Centering the Actuator

➢ We would need to purchase 2 [¼" – 48"] Steel Threaded Rods.
➢ The length from the farthest ends of the solar panel structure is at 45.6in ≈ 4ft