

# Two-Step Hub Deployment Mechanism



Team 5:

Noah Nichols

Chris Rudolf

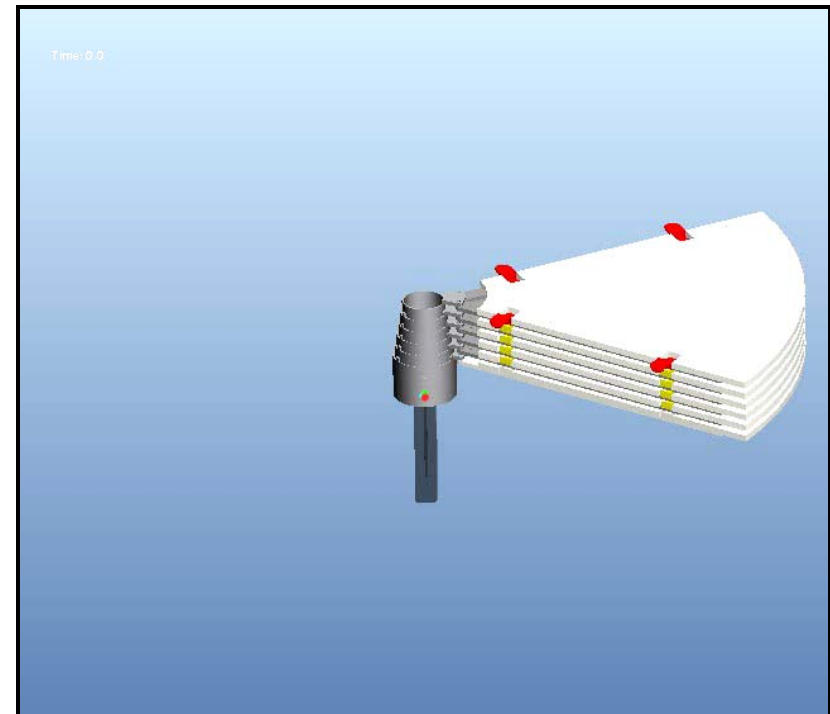
Audrey Wright

# Project Goals

- Design a hub mechanism to deploy a segmented solid reflector in a two-step motion
- Create a CAD model to show the dynamic simulation
- Build a functioning scale prototype

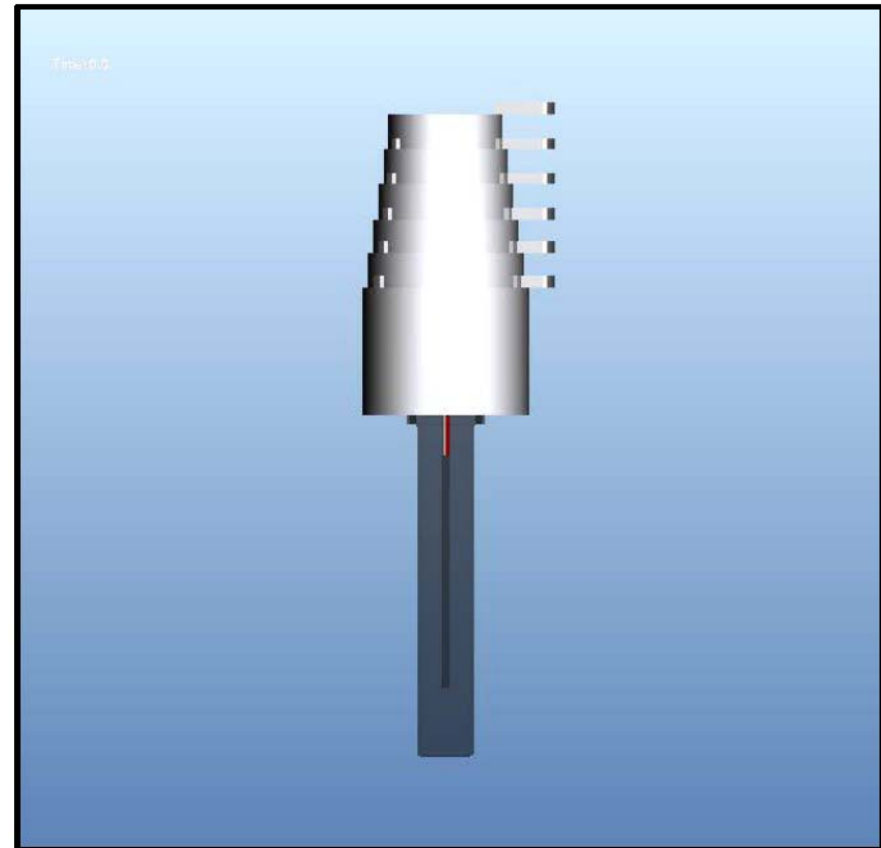
# Concept Requirements

- Must rotate panels into position and retract them into the same surface plane while maintaining desired spacing between panels during deployment
- Two ways to retract panels into position
  - Two separate motions
  - Step down motion

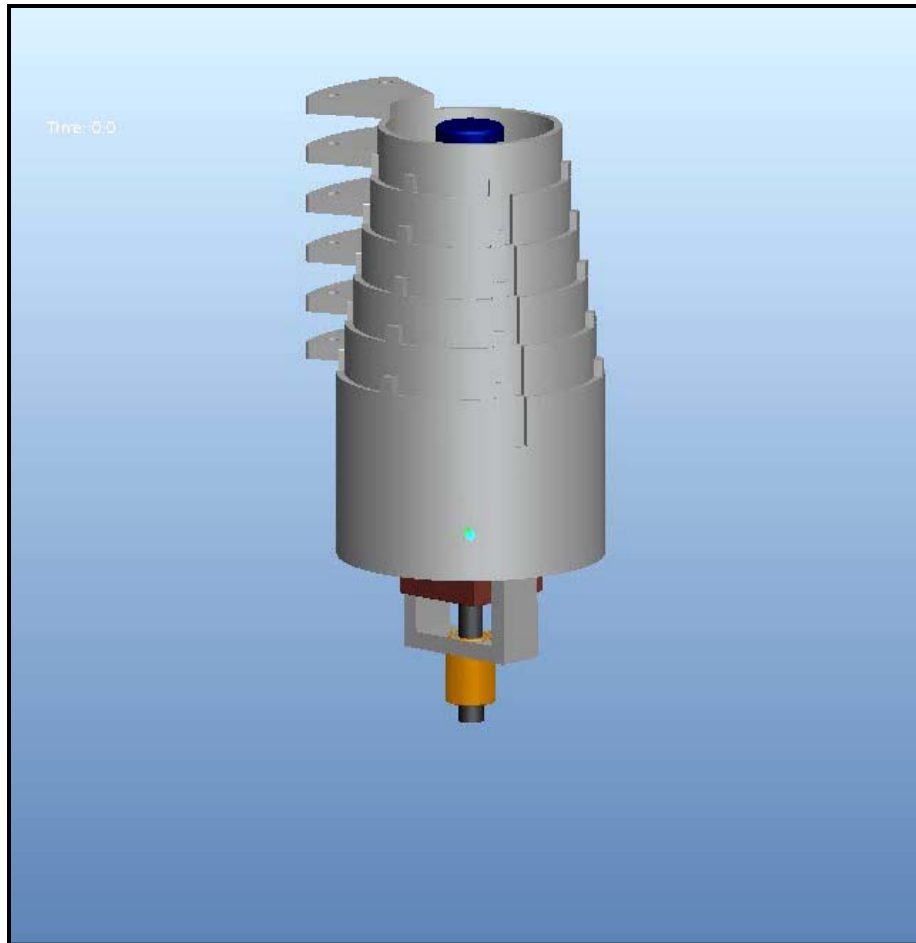


# Issues Encountered With Previous Design

- Torque offered by the actuator was found to be insufficient
  - Offered around 1.2 lb-in of torque
- Could not be used in a full-scale model
- Revert back to earlier design with synchronizer

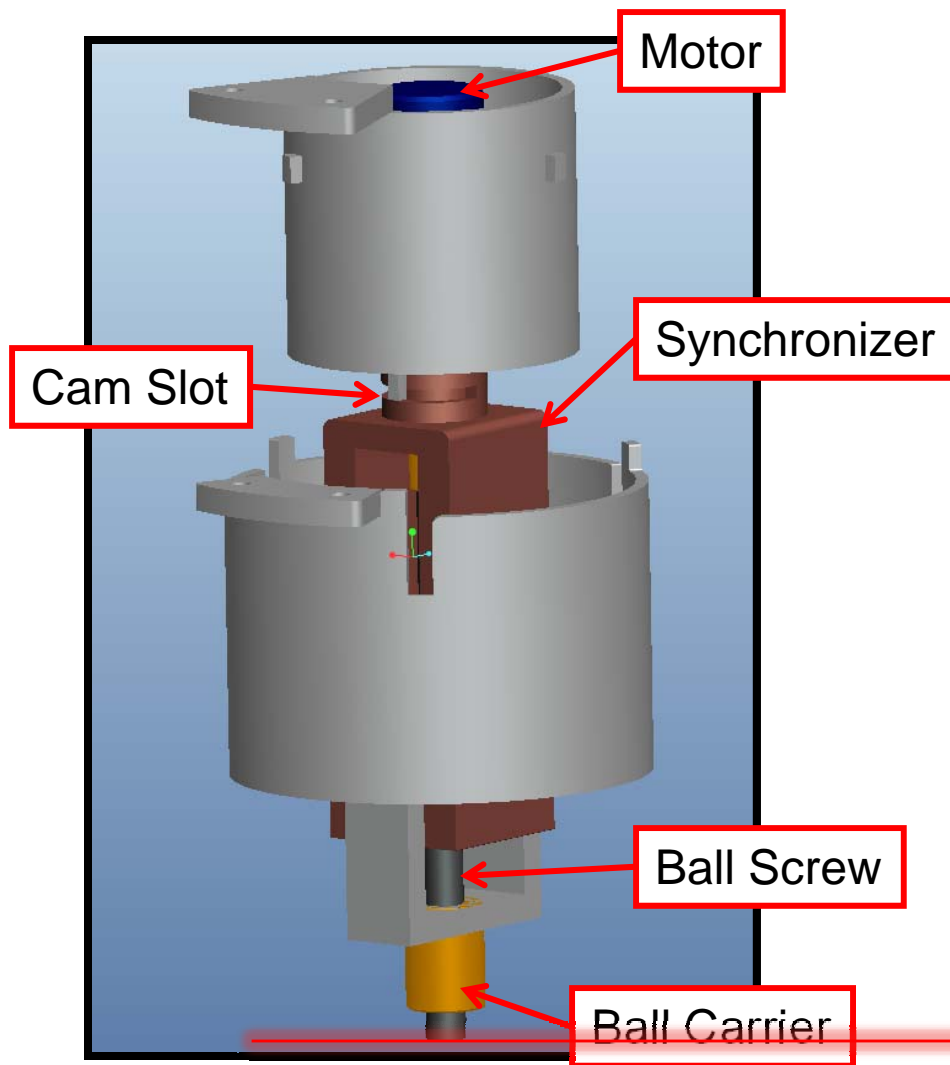


# Final Design



- Synchronizer switches hub from rotary to linear motion
- Once synchronizer is disengaged, the motor will drive the ball screw and collapse the hub

# Final Design Breakdown



- Motor shaft initially fixed to synchronizer
- Once rotation is complete, synchronizer is pushed downward by the cam slot
- This disconnects the synchronizer from the motor

# Project Status

- Parts ordered
  - Aluminum for rings
  - Ball screw
  - Connection Rods
- Parts to be ordered
  - Motor



# Project Schedule

- January
  - order all raw materials for rings and ball screw
  - Finalize Pro/E CAD model
  - Receive all materials
- February
  - Machine rings with tabs
  - Preliminary build of hub mechanism
  - Anodize rings
  - Additional machining if needed



# Project Schedule

- March
  - Final build of hub mechanism
  - Fine tuning of parts to get correct fit
  - Connect panels to the hub mechanism and test
- April
  - Testing and analyzing of system as a whole

# Project Schedule

Project Schedule					
	Duration	January	February	March	April
Finalize Pro/E Model	3 weeks				
Order Parts	3-4 weeks				
Receive Parts	1 day				
Machine Parts	2 weeks				
Preliminary Build	1 week				
Anodizing/Extra Machining	1 week				
Final Build	4 weeks				
Testing and Analyzing	3 weeks				
Write Report	All				

# Summary

- Receive all materials
- Machine all parts
- Preliminary build
- Anodize rings with connection tabs
- Final build
- Testing and Analyzing

Questions?