

# DRYDEN DROP TOWER RIG REDESIGN



// Presenters //

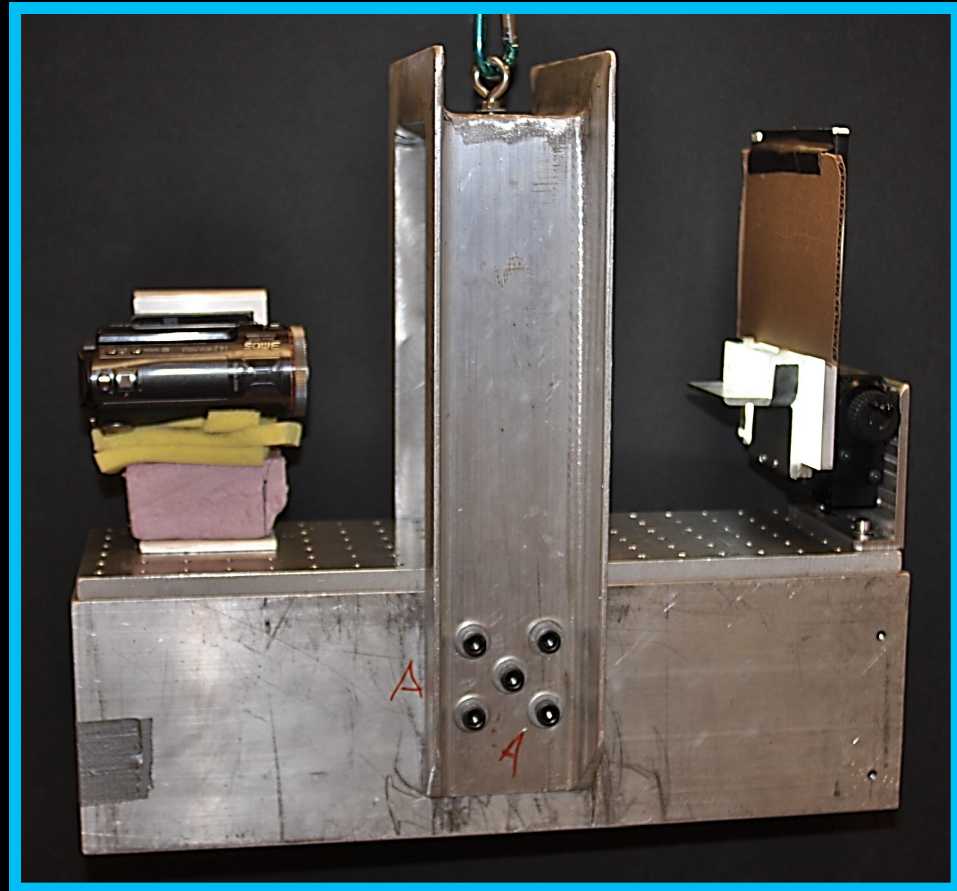
Briand Oaks &

Amanda Thoreson

Faculty Advisor: Mark Weislogel

Group Members: Briand Oaks | Mattea Brown | Tyler Milhem | Pamela Wallace | Amanda Thoreson

# BACKGROUND



# RIG SETUP – DRAG SHIELD



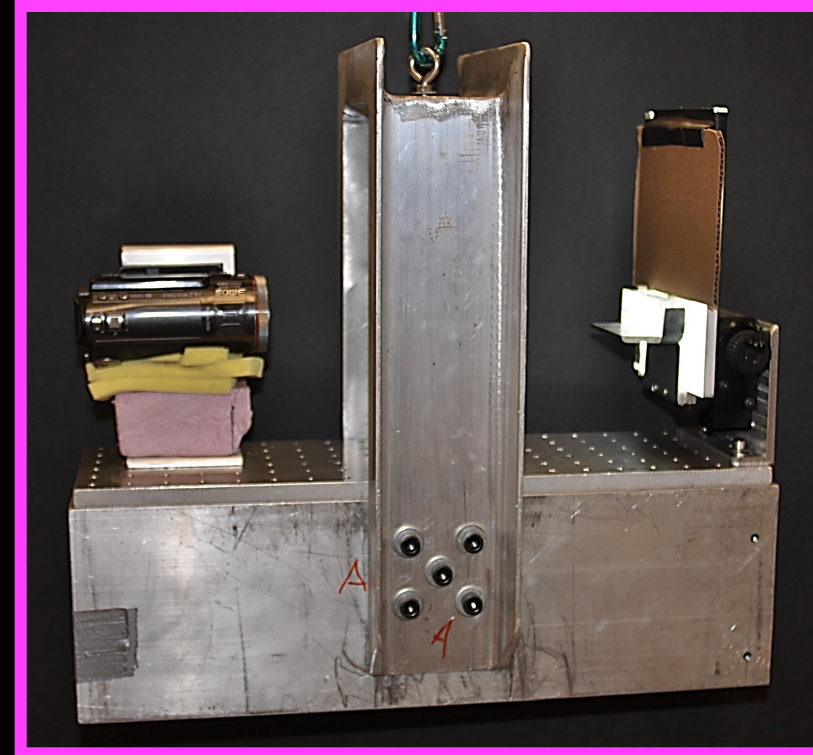


# PRIMARY DESIGN REQUIREMENTS

- LIGHT WEIGHT
- ERGONOMIC
- INCREASE RIGIDITY
- EFFICIENTLY HOUSE

## COMPANION COMPONENTS:

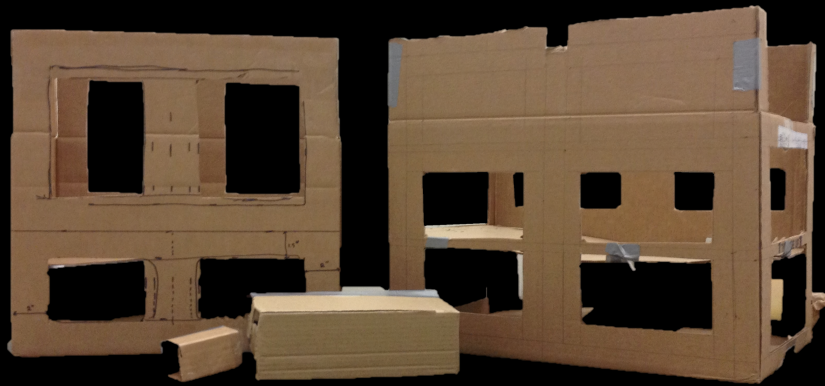
Light panels, balance weights,  
Focal Mirrors, high-speed camera,  
internal battery



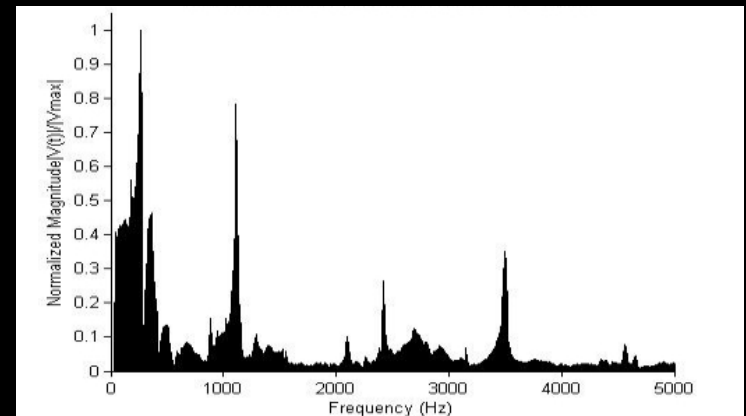
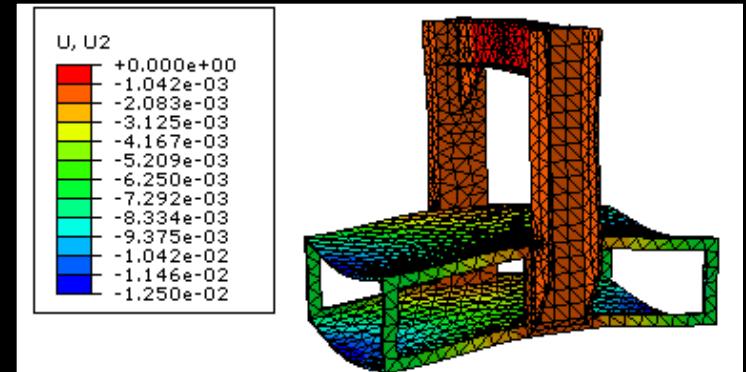
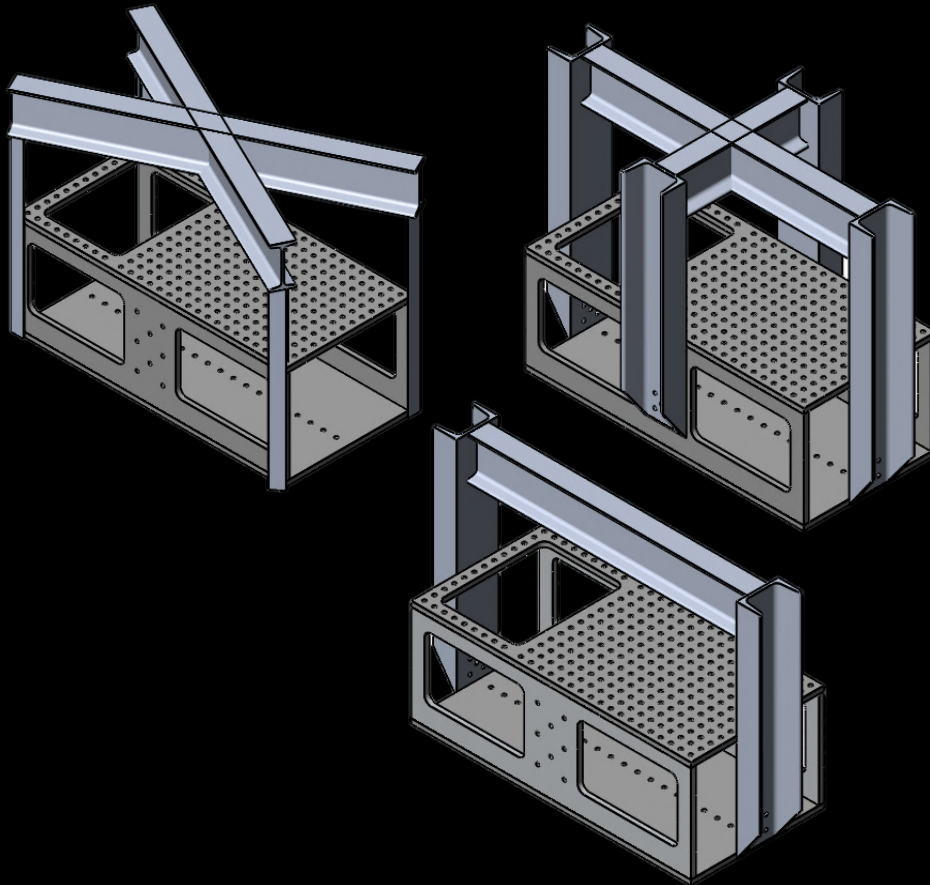
Better...

Faster.....

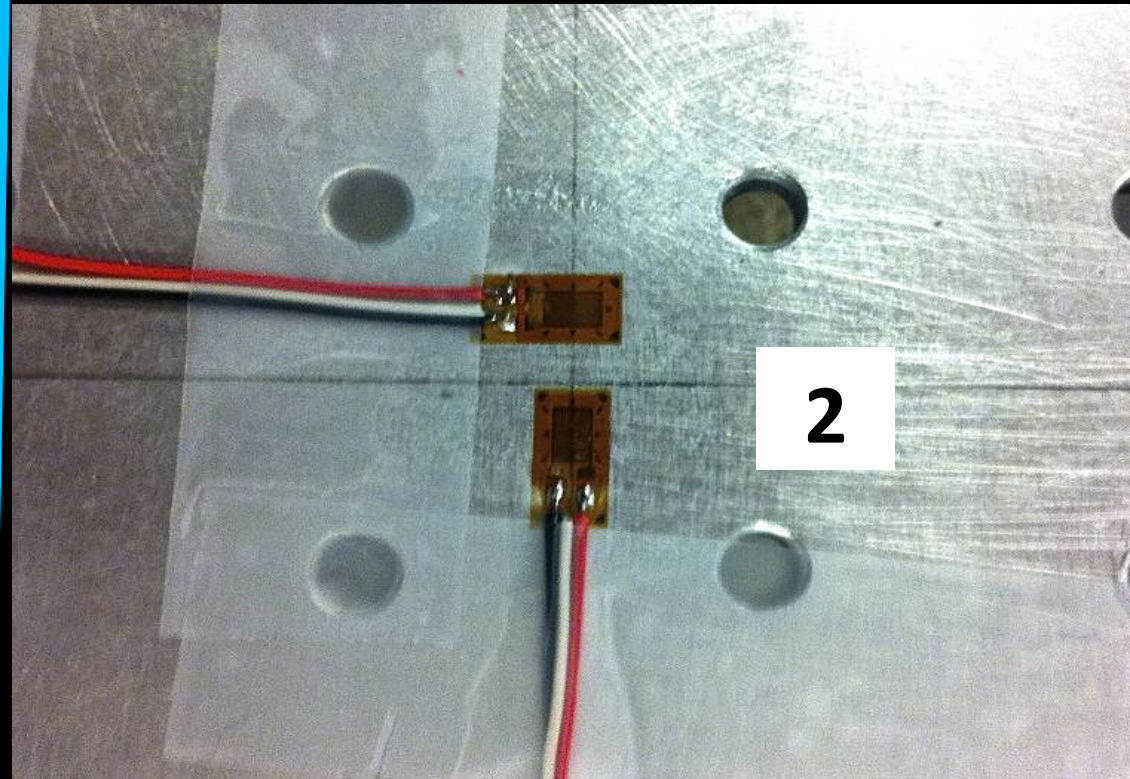
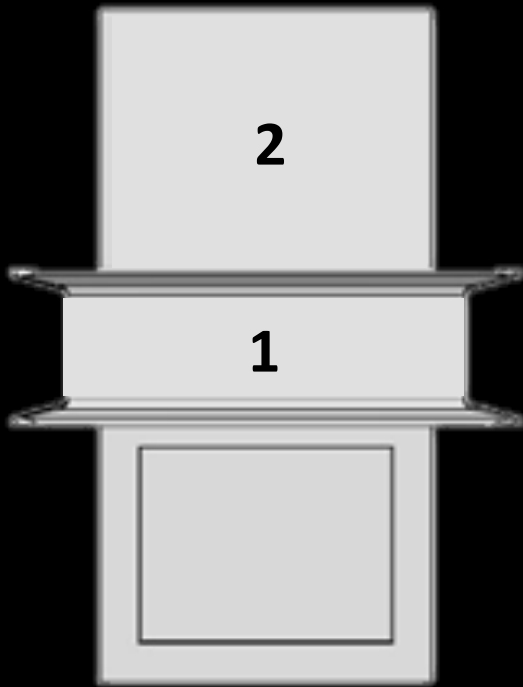
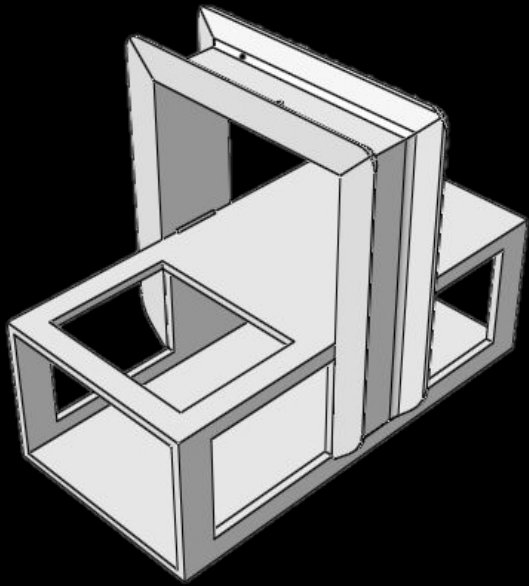
Stronger...



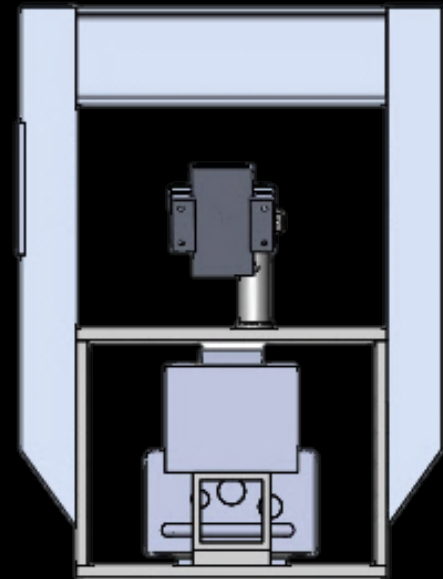
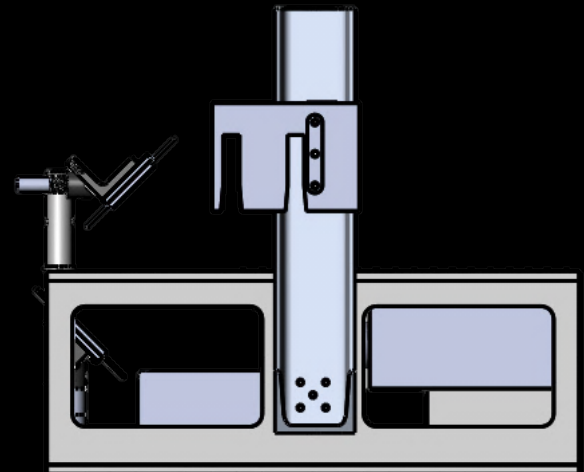
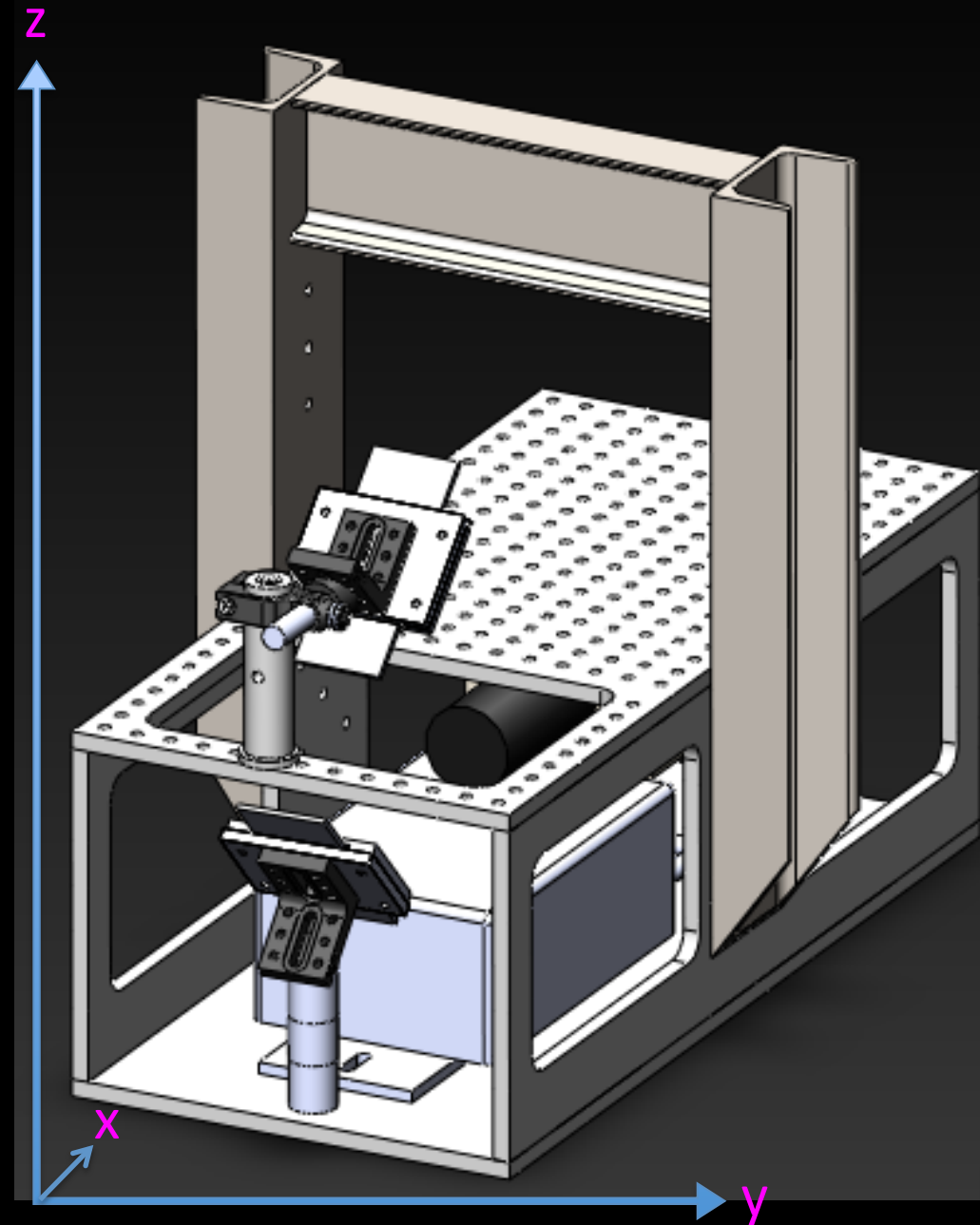
# PROTOTYPING AND EVALUATION PROCESS



# STRAIN GAUGE TESTING

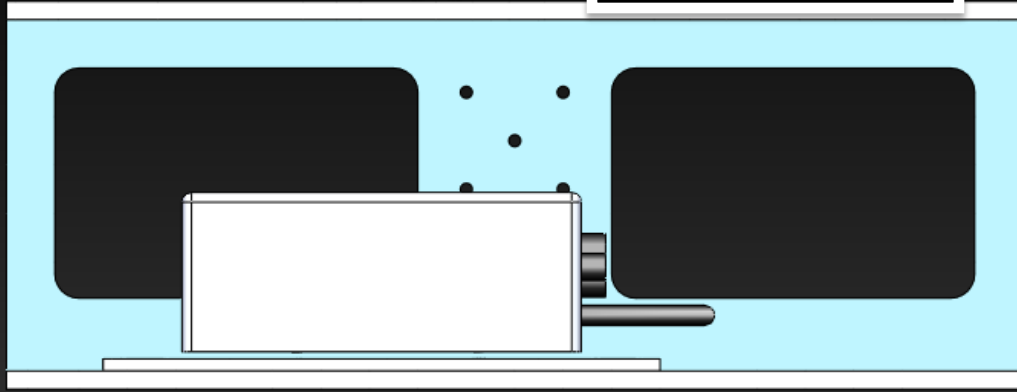


# FINAL DESIGN

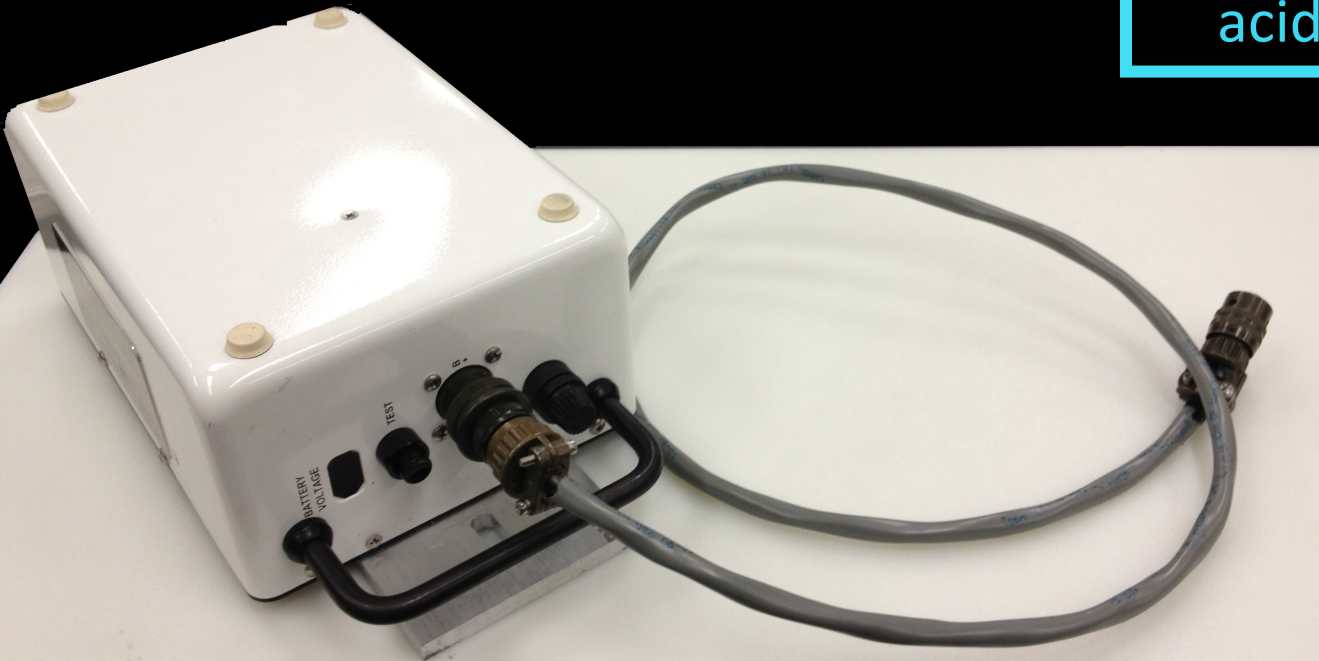


# BATTERY

## EXPERIMENT

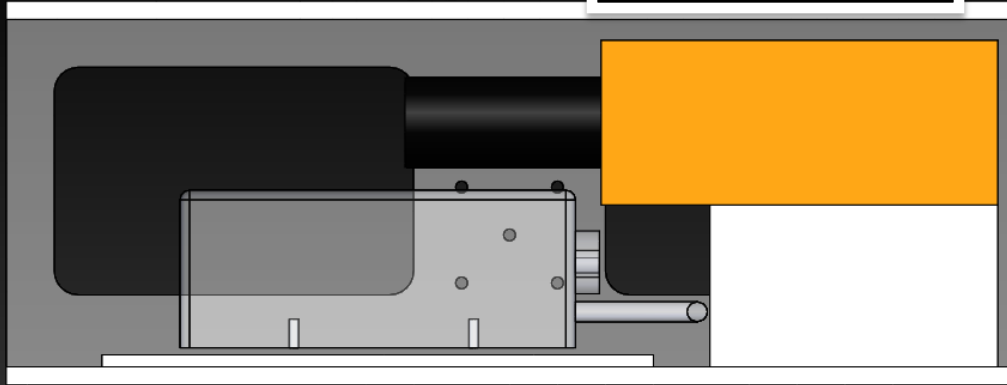


- 30V
- Voltage indicator
- 100 G rated
- High current for short durations
- Sealed cells to prevent acid leakage



# CAMERA

## EXPERIMENT



- High-G rated
- Up to 90,000 FPS
- Triggered video capture
- Gigabit Ethernet connection



Accelerometer



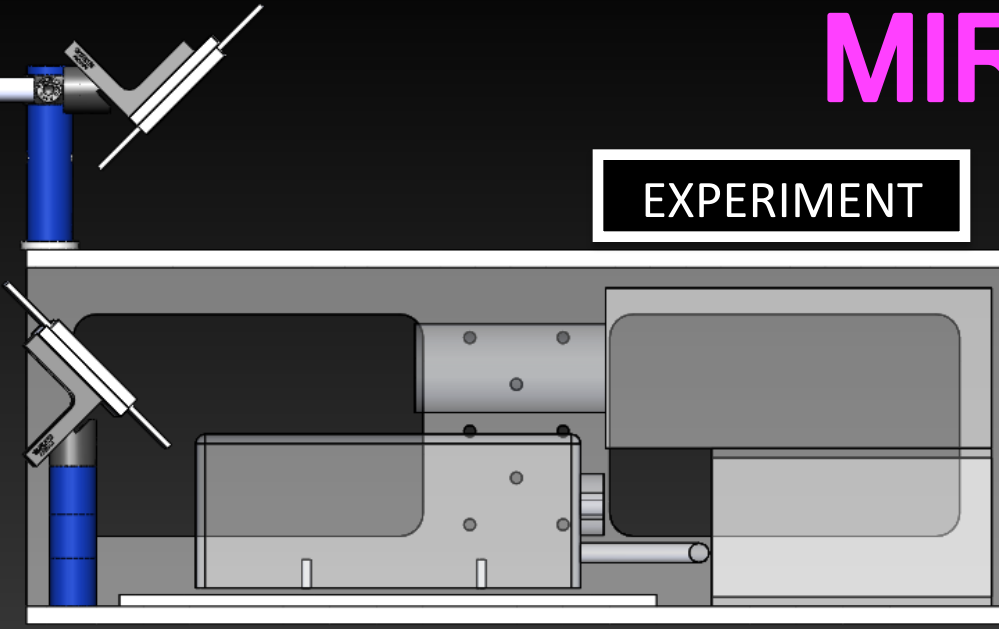
Wireless Bridge



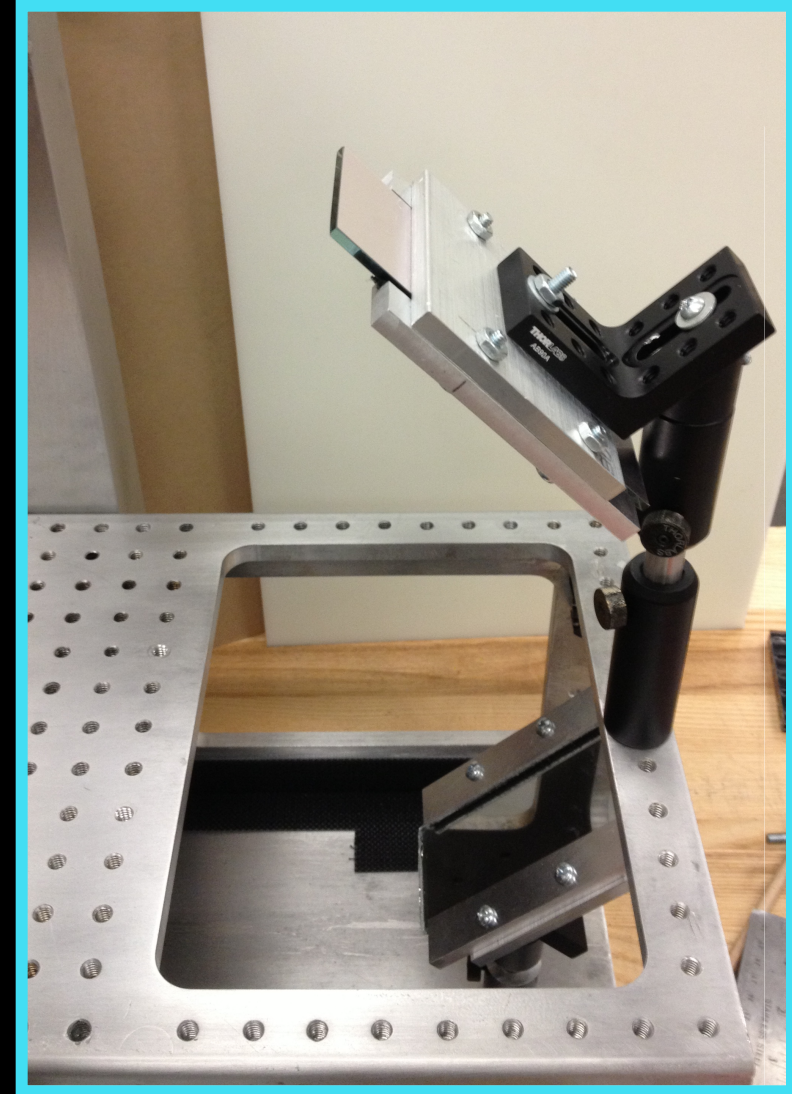
Phantom V4.3

# MIRROR SYSTEM

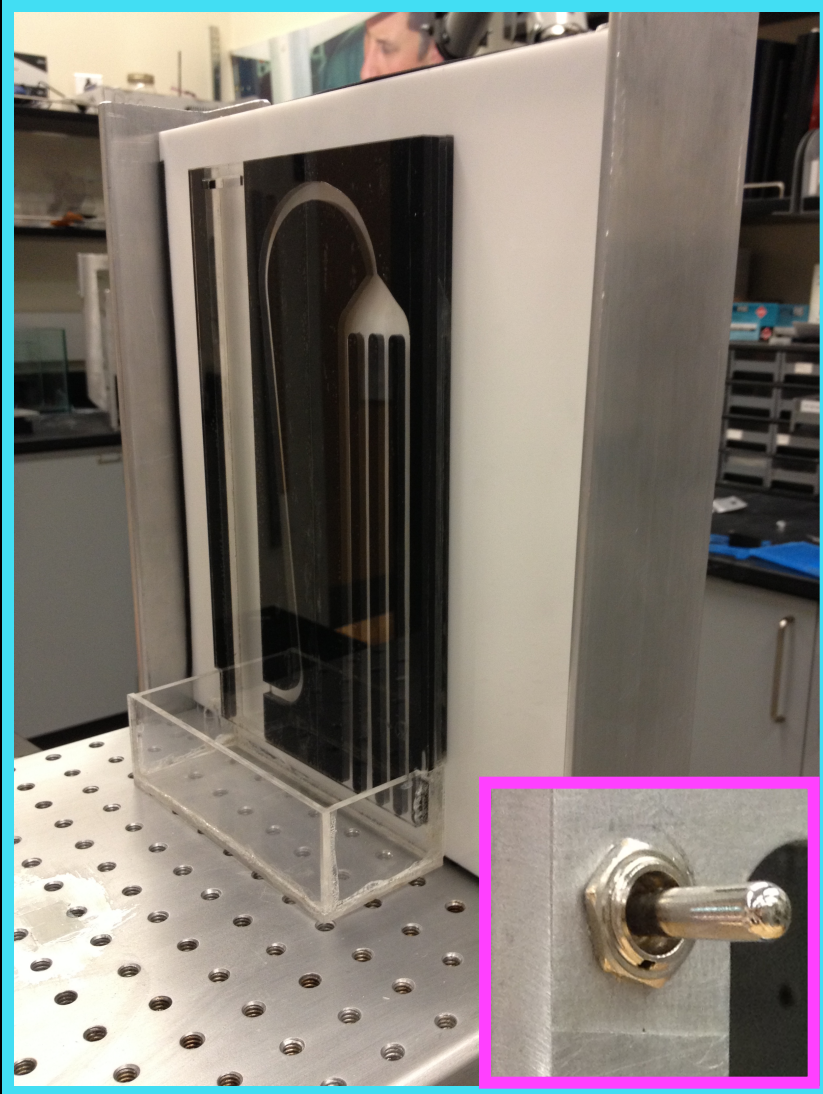
## EXPERIMENT



- 45-degree mirror angles
- 670 mm working distance
- Adjustable to a field of view of 110mm
- Silver-coated mirrors for high index of refraction



# LIGHTING



# Design Evaluation

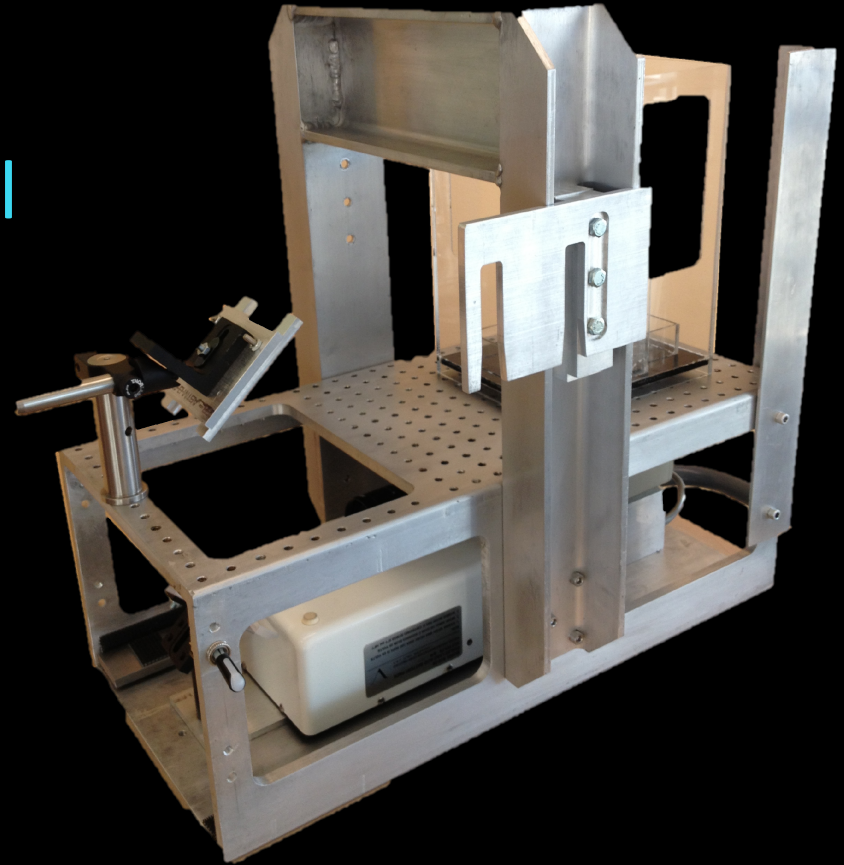
CRITERIA	NOTE	STATUS
Internal Power Supply	30 V high g rated battery	YES
Backlight	24 V LED light panel	YES
Adjustable weight balances	Velcroed steel weights	YES
Adjustable field of view	something mirror	YES
Consistent Metric	All rig mount sizes ¼ 20 “ bolts	YES
Automation of Light	Switch	YES
Automation of Camera position	Remote controlled translation	NO
Light Weight	< 50 lbs	NO

# Future Considerations

- Vibrational Properties of
  - Mirrors and camera
- More experimental validation
- Automation of camera
- Weight Reduction

# SPECIAL THANKS

- Dr. Mark Weislogel
- Phantom Tech personnel
- Evan Waymire
- Jenna Bell
- Bob Turpin & Bobby Johnson
- Ryan Jenson



QUESTIONS?