

## Motivation

### Main Issues:

- Veterans are unable to hold the bow and draw it back simultaneously
- Majority of the veterans are in a wheelchair or present some physical disability
- Current device lacks stability
- Current device requires multiple assistants to operate properly and safely

### Objectives:

- Create a modified archery stand that enables disabled veterans to enjoy the sport of archery
- Provide a sense of independence and empowerment
- Promote a healthy lifestyle and camaraderie amongst the veterans

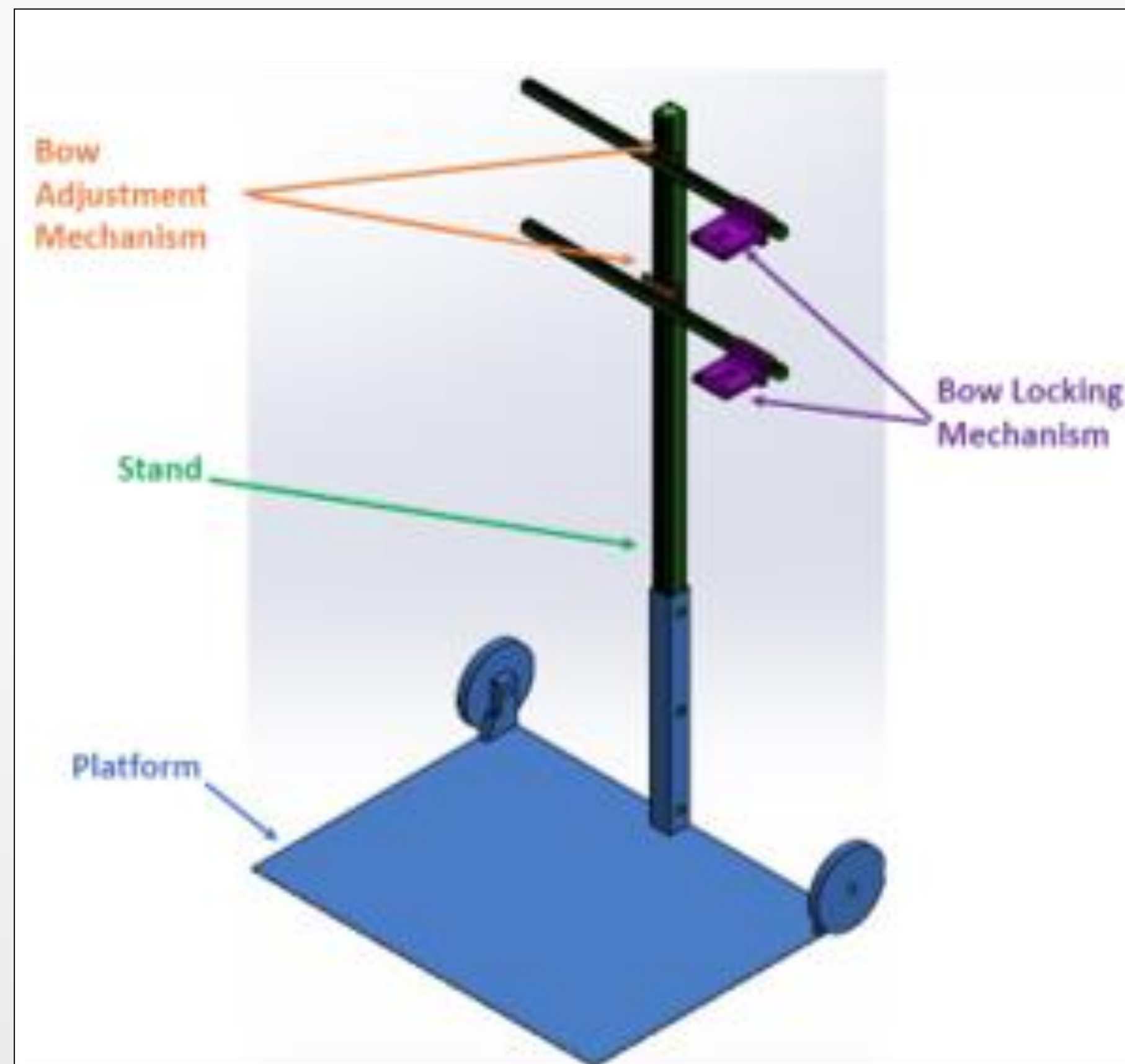
## Design & Modeling

To ensure that the device met all customer requirements it was broken down into 4 critical components

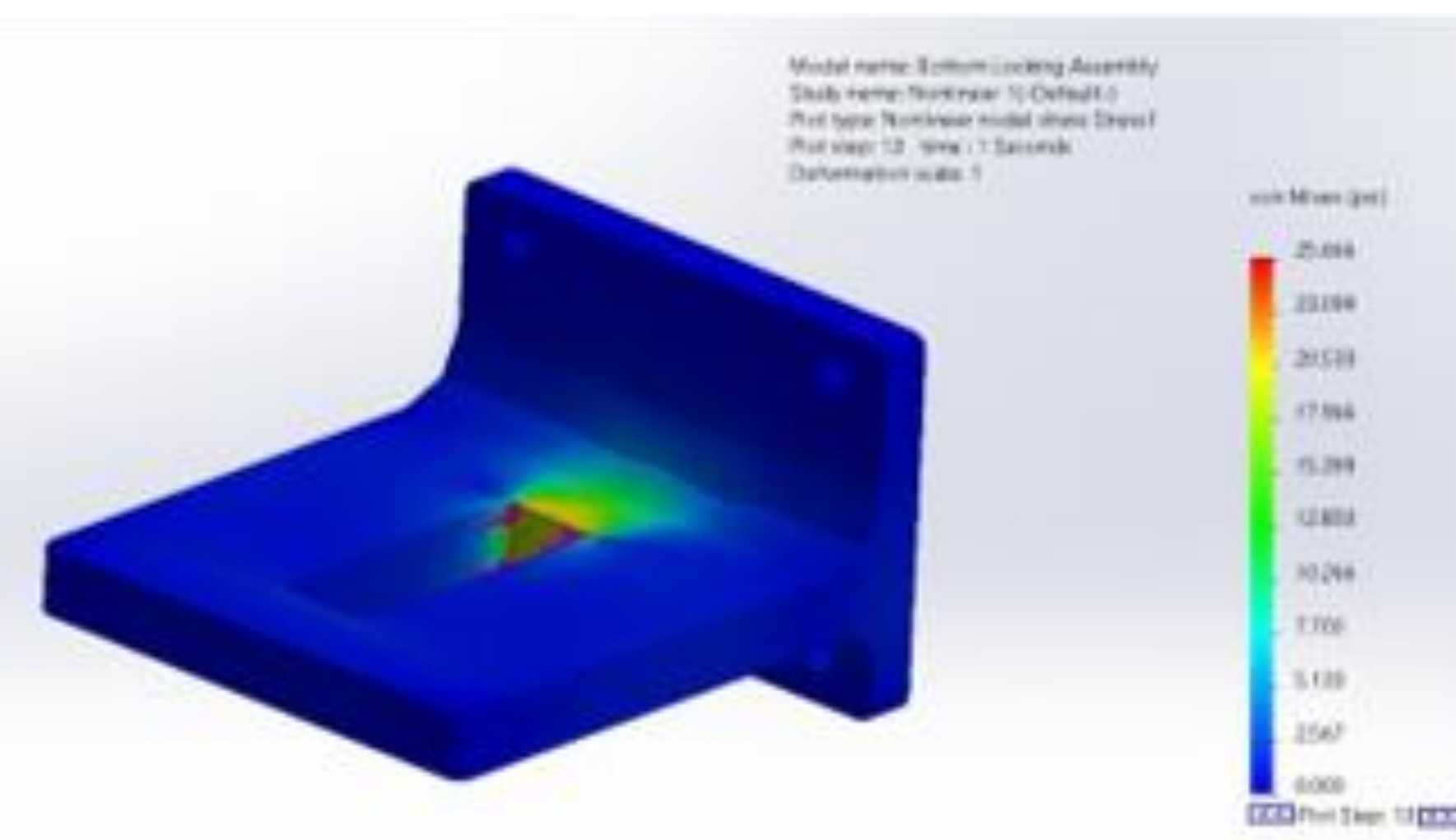
- Bow adjustment mechanism** - allows for vertical and horizontal adjustment
- Bow locking mechanism** – secures the bow in place and attaches bow to device
- Stand** – main point of attachment and provides adjustability
- Platform** – provides structural support and mobility

To verify that the device met all customer requirements and performed its intended use theoretically various methods of modeling were utilized

- 1.Computer Aided Design (CAD)
- 2.Static Mathematical Modeling (SMM)
- 3.Finite Element Analysis (FEA)



**3D Rendered Design:** Featuring 4 primary components



**FEA Analysis:** Verified that the bow locking mechanisms would withstand the force applied by the bow



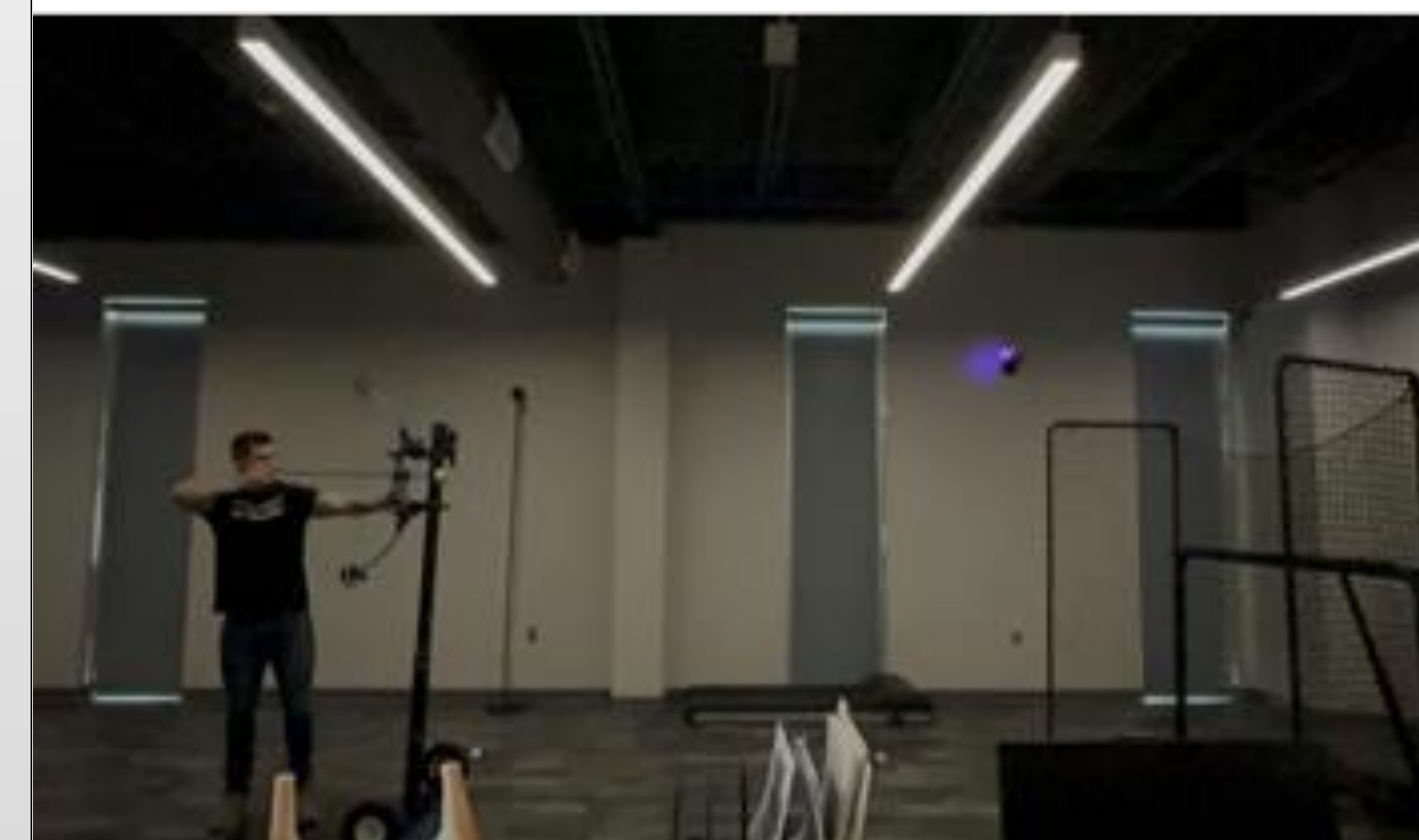
**Archery Range Testing:** Validate that the device could mimic any conditions experienced without losses in overall accuracy

## Testing & Validation

To verify and validate the device against initial customer requirement and design specifications, Archers' Choice performed three different testing methods to ensure the device would fulfill its intended purpose.

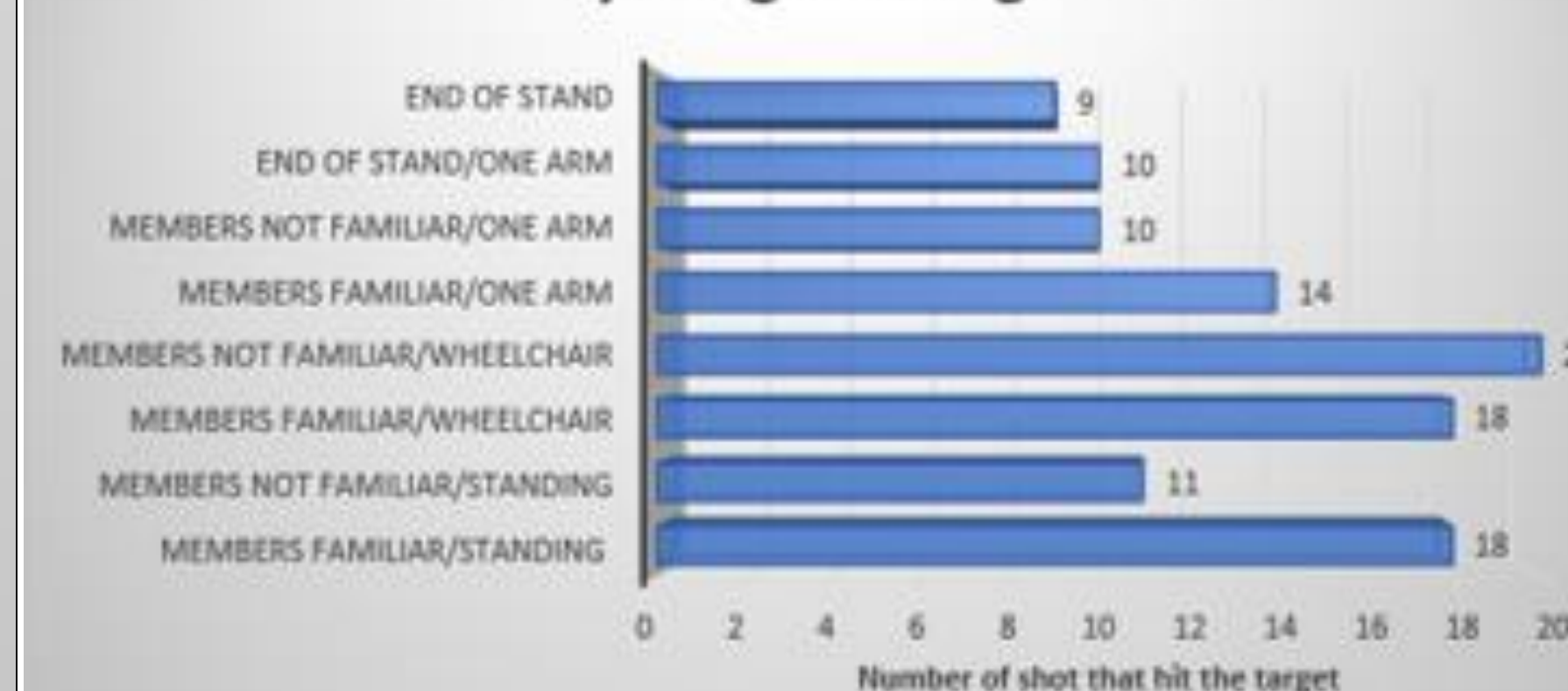
### Tests Performed:

1. Tensile/Compression - completed to assess safety and durability of bow locking mechanisms
2. Archery Range
3. Displacement



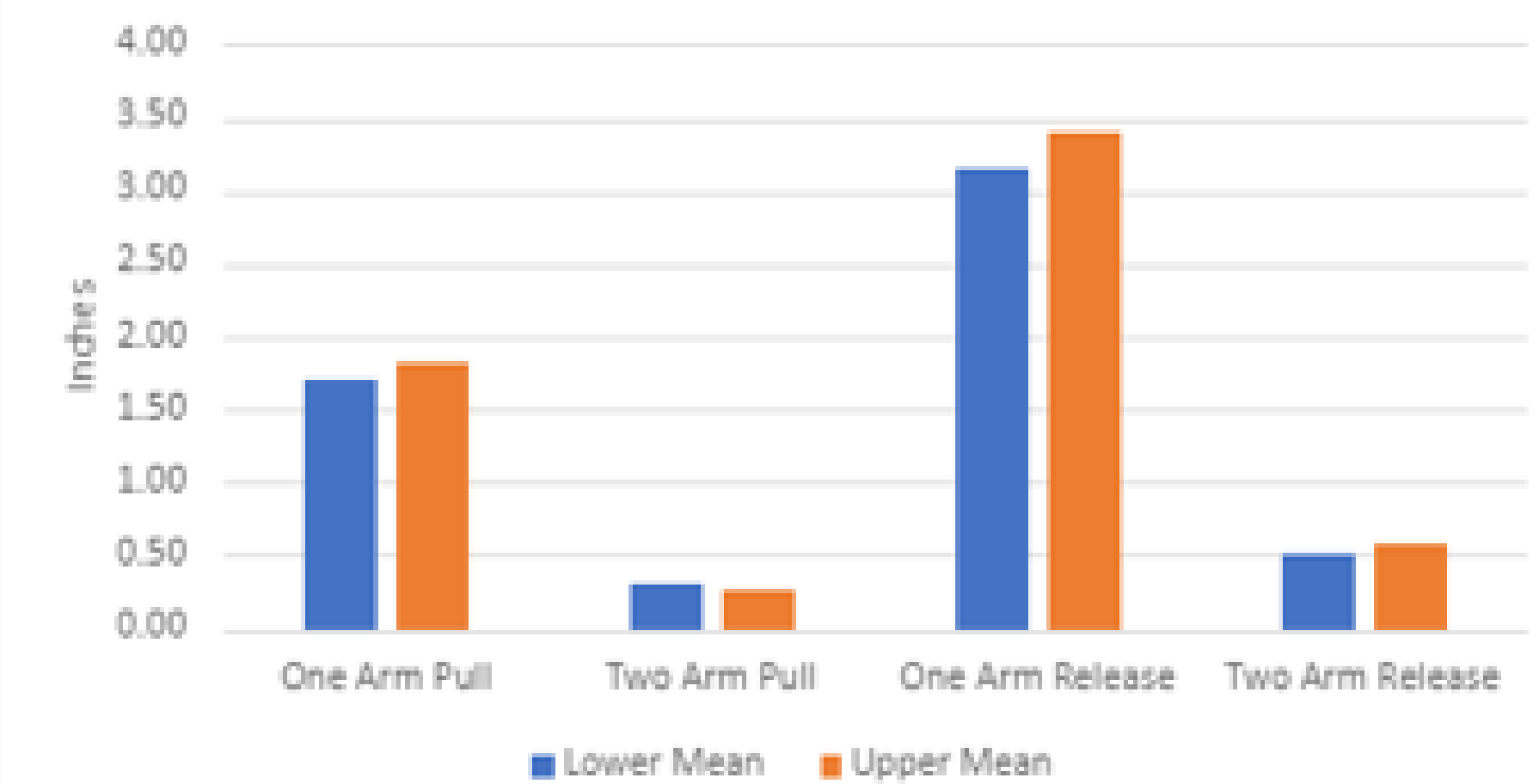
**Displacement Testing:** Validate the device's stability during use

### Archery Range Testing Results



**Key Takeaway:** Device possess the ability to mimic any condition and fulfills its intended purpose

### Average Displacement



**Key Takeaway:** Displacement does not have any effect on device stability

## Conclusions

1. The device can adequately mimic any condition it may encounter without detrimental effects to accuracy or overall stability
2. The device falls within all measures dictated by Archers' Choice signifying it is safe for any participant to use
3. The modified archery stand created possess the capability to truly impact the lives of the disabled veterans at Pineland Farms by promoting an independent and healthy lifestyle

## Acknowledgements



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