

Solution 1: Disc Launcher

Background



Current solutions for disc launching include either **large, highly motorized machines** that remove user involvement, or **simple mechanical devices** that require significant upper body mobility. Neither option serves individuals with **partial quadriplegia**—who have enough motor function to engage with a device but not enough to use manual launchers effectively. This gap excludes them from meaningful participation in the sport.

Disabled American Veterans Design Challenge



“Design adaptive sports equipment for veterans.”



Over **294,000 Americans** live with spinal cord injuries (SCI), with nearly **43,000 Veterans** affected—many experiencing some degree of paralysis such as **partial or complete quadriplegia**. Additionally, over **1 million Veterans** live with visual impairments, ranging from **low vision to complete blindness**. These challenges limit the ability to perform necessary daily activities and engage in recreational sports such as **disc golf**, which has become an increasingly popular and accessible activity.

Based on user research at the 2024 National Disabled Veterans Golf Clinic...

**Design
Criteria**

**Safety,
Comfort,
Reliability,
Ease-of-Use**

**Opportunity
Spaces**



Solution 2: Locator Armband

Background



Current solutions for visually impaired veterans to play disc golf are **shaking the chains** so the player knows where the goal is. This can be problematic at noisier courses as the chains can be hard to hear and require the user to be playing with someone else. To find the disc, visually impaired players may use **beeper devices** on the disc, however, it is common for veterans to have tinnitus, so the beeping can result in ringing in the player's ears.

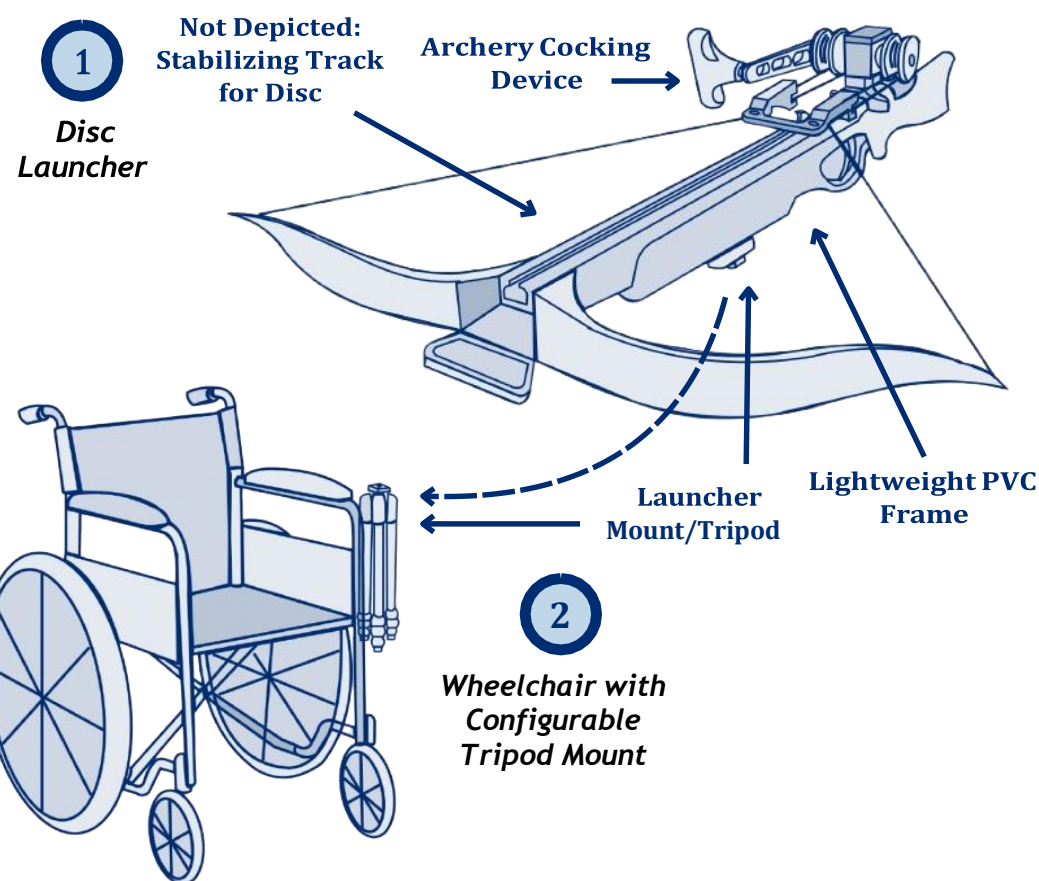
Solution 1 Design Overview: Partial Quadriplegia



Disc-Loading Mechanism
A semi-automatic cocking device acts as a winch for the sling of the crossbow. Its higher gearbox ratio allows for greater draw weights.



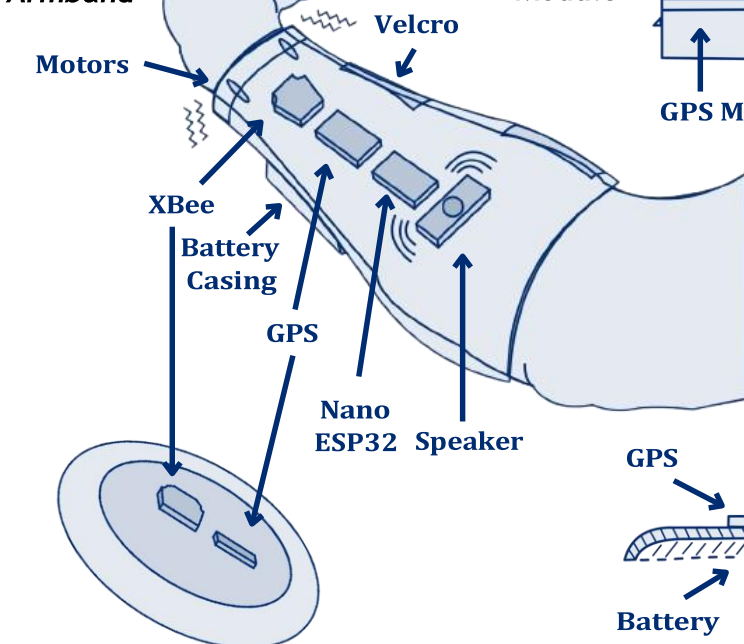
Wheelchair Attachment
Multiple locking points allows for adjustable position and angle of the launcher on wheelchairs.



Solution 2 Design Overview: Low Vision and Blindness

1

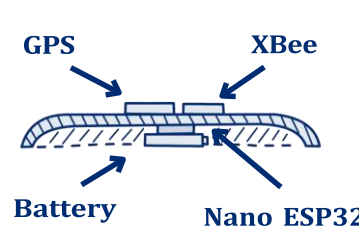
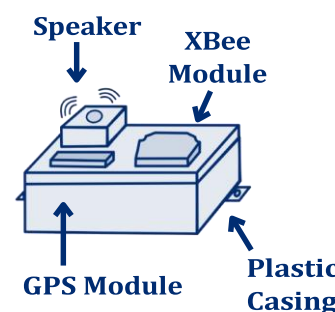
Locator Armband



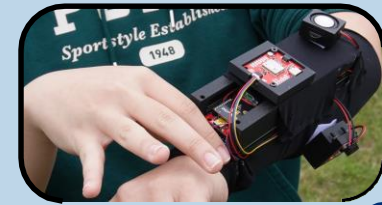
Disc Module - Isometric View

2

Basket Module



Disc Module - Cross-Sectional View



Armband
Distance and angle to the basket and the disc are communicated via vibration motors and a speaker. GPS and 2.4 GHz RF enable communication between the armband and the modules.



Basket Module
A modular box attaches easily to the top of the basket with a speaker that provides auditory feedback when the user is nearby.



Results and Next Steps



Consistent launch up to 20 feet
~1 min. setup time per launch
User-approved Ease-of-Use



Increase disc rotation to maximize distance
Test different winches to decrease setup time

Acknowledgements

Interested in learning more about our project? Scan the QR code to watch our full project video and see the designs in action!



We would like to thank John Kleindienst and Oscar Olguin from the Disabled American Veterans (DAV), Patrick Gray from Veterans Affairs (VA) and Jeff Shattuck from the Paralyzed Veterans of America (PVA) for their valuable input.

Results and Next Steps



Detection up to 200 feet
Precision of 10 degrees
User-approved Comfort



Make armband reusable without calibration
Modify disc to be more aerodynamic