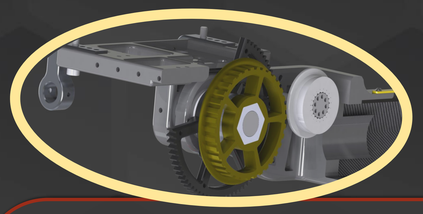
HEXAREACH ROBOTICS

Revolutionizing UAVs with Agile Robotic Arm Solutions

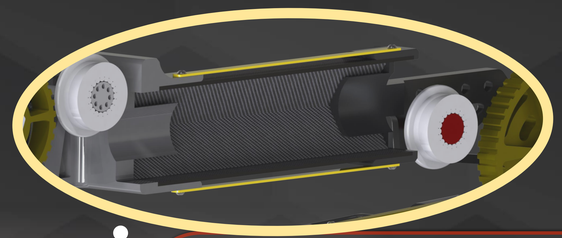
Purpose

An arm designed to facilitate seamless interaction between UAVs and their surroundings, enabling agile manipulation of objects or payloads. Tailored to optimize search and rescue operations, bolstering the capabilities of first responders with unparalleled efficiency.



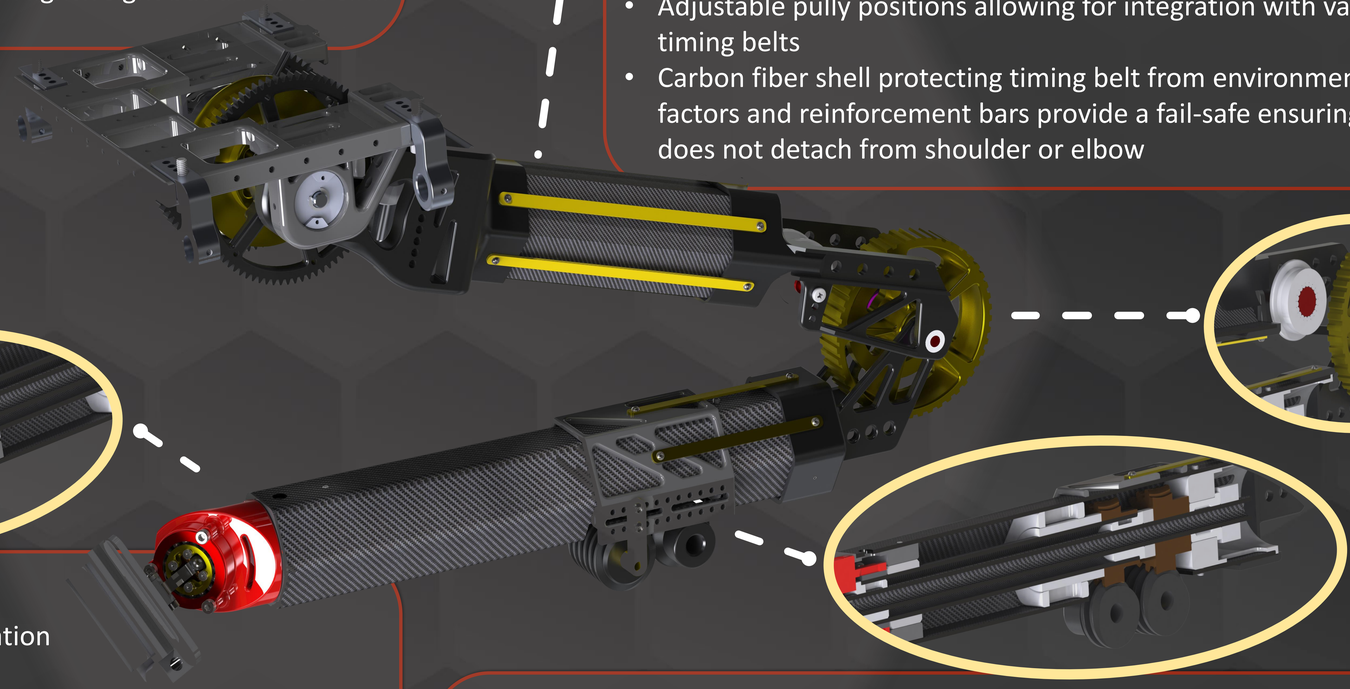
Shoulder

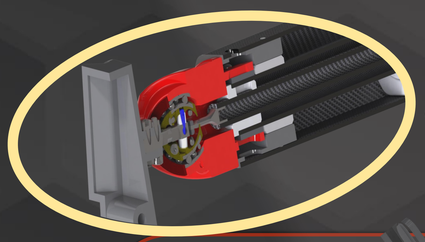
- Serves to attach arm to UAV through four adjustable mounts
- Two stepper motors secured in recessed slots allowing for smooth motion transfer to the arm
- Spur gear facilitating upper arm movement and timing belt pully for lower arm movement
- Manufactured from lightweight but durable Delrin



Upper Arm

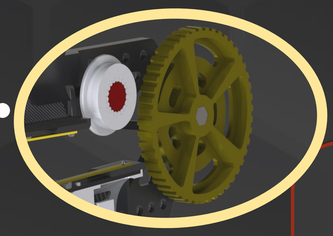
- Pulleys positioned to route the timing belt through the upper arm to the elbow allowing for seamless motion transfer
- Adjustable pully positions allowing for integration with various timing belts
- Carbon fiber shell protecting timing belt from environmental factors and reinforcement bars provide a fail-safe ensuring arm does not detach from shoulder or elbow





Wrist

- 360° Rotation
- 45° Tilt
- Inspired by fighter jet nozzle gimble
- Utilization of plastic-glass ball bearings for weight reduction
- Outer shell manufactured from lightweight but durable Delrin



Elbow

- Lightweight elbow joining the upper arm and forearm
- Lightweight timing belt pully transferring motion from the shoulder motors to the forearm via the timing belt
- Manufactured from aluminum to balance strength, cost, and weight

Forearm

- Encloses drive mechanism for wrist
- Two sets of worm gears drive concentric shafts translating tilt and rotation motion to the wrist
- Utilization of low-friction nylon bearings in lieu of ball bearings for maximum weight reduction
- Specialized motor bracket for mounting dual DC motors to drive worm gears
- Carbon fiber shafts and shell to minimize deflection and torsion while keeping weight to a minimum

Impact

Weight	Center of Mass
15 % (250 g Reduction)	67 % (Closer to UAV)

Precision	Robustness
52 % (Increase)	300 % (Increase)

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