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CU Defense - Lightweight Cranial Protection and Low Altitude Parachute Systems

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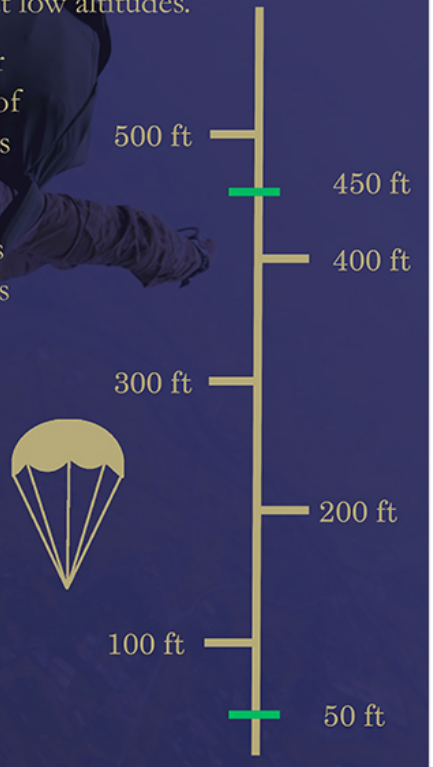
CU DEFENSE

CLEMSON UNDERGRADUATE RESEARCH

Low Altitude Parachute Systems

- Current military parachute systems are designed to operate at altitudes greater than approximately 450 feet.
- A system's minimum altitude is largely determined by the time it takes for the system to deploy. Deployment must be gradual to avoid injury or death upon inflation, however modifying deployment methods and system geometry could allow for faster deployment suitable at low altitudes.
- Using simulation software and small scale prototyping, our team is designing a low altitude parachute system capable of delivering military and rescue personal safely from altitudes below 450 feet.
- A low altitude system has multiple applications in both military and civilian rescue scenarios including rapid building evacuation and emergency vehicle egress.



Lightweight Cranial Protection

- Current US military standard-issue combat helmets weigh more and offer less protection than desired. Equipment weight reduction is a constant goal for the armed forces, and enhanced safety is always favored.
- With recent technological developments in the application of dilatants, or shear-thickening fluids (STF), it appears that a helmet's design and construction can be improved to offer less weight and greater protection.
- **Methods:** Several STF compositions will be applied to an array of ballistic fibers to create advanced composites. These treated fibers will be formed into several shapes of interest, and the range of final products will be tested for terminal ballistic performance as well as blunt impact attenuation. Procedures will be modeled after standard military armor tests, including "V50" -- finding the velocity at which 50% of identical projectiles penetrate fully and 50% do not.

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