Clemson University TigerPrints

Focus on Creative Inquiry

Research and Innovation Month

Spring 2015

CU Defense - Lightweight Cranial Protection and Low Altitude Parachute Systems

Nicholas Boone *Clemson University*

Collin Clemons *Clemson University*

Devin Gibson *Clemson University*

Charles Weirick *Clemson University*

Casey Young Clemson University

See next page for additional authors

Follow this and additional works at: https://tigerprints.clemson.edu/foci

Recommended Citation

Boone, Nicholas; Clemons, Collin; Gibson, Devin; Weirick, Charles; Young, Casey; and Rimer, Shayne, "CU Defense - Lightweight Cranial Protection and Low Altitude Parachute Systems" (2015). *Focus on Creative Inquiry*. 126. https://tigerprints.clemson.edu/foci/126

This Poster is brought to you for free and open access by the Research and Innovation Month at TigerPrints. It has been accepted for inclusion in Focus on Creative Inquiry by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.

Authors

Nicholas Boone, Collin Clemons, Devin Gibson, Charles Weirick, Casey Young, and Shayne Rimer

CLEMS#N

聳 CU DEFENSI



Low Altitude Parachute Systems

• Current military parachute systems are designed to operate at altitudes greater than approximately 450 feet.



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.

Students: Nicholas Boone, Collin Clemons, Devin Gibson, Charles Weirick, Casey Young, Shayne Rimer Mentors: John D DesJardins, Christopher W. Norfolk

 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.
- 300 ft -

100 ft

- **=** 200 ft
- -
 - 50 ft