Mission-Adaptive, Modular Law Enforcement Helmet Design

Science and Technology

CHALLENGE: NEED FOR A MODULAR LAW ENFORCEMENT HELMET

Law enforcement (LE) officers in the United States are vulnerable to a wide range of head and neck injuries, including ballistic threats, while responding to active shooter responses, civil unrest, and motor vehicle patrol situations. Existing LE helmets are not multifunctional and do not provide an adequate level of protection against both concussive and ballistic threats. This, in turn, forces LE officers to possess multiple helmets to meet different/individual operational needs: one for riot protection and another for ballistic protection. The primary objective of this Department of Homeland Security (DHS) Science and Technology Directorate (S&T) technology effort is the development of a multi-purpose LE helmet that provides concussive and ballistic protection, is mission-adaptive, lightweight, and may be worn for an extended period of time during civil unrest or riot situations.

## SOLUTION: S&T'S MISSION-ADAPTIVE DESIGN PROJECT

S&T has partnered with Texas Tech University (TTU) to support the development of a multi-purpose and customizable LE helmet prototype capable of achieving Technology Readiness Level 8. Due to the evolving threats faced by many first responders, specifically LE officers, the need for a lightweight, comfortable and mission-adaptive helmet is critical. The solution under development by TTU will provide officers a helmet that meets all applicable standards for riot protection and complies with the Police Scientific Development Branch Protective Headwear Standard for UK Police (2004), pending standards under development by the U.S. National Institute of Justice (NIJ). Additionally, the proposed technology will provide concussive and ballistic protection to mitigate the risks and injuries first responders encounter during civil unrest or when unknowingly responding to potentially violent situations.

PROJECT IMPACT

The successful completion of the project would lead to a mission-adaptive helmet for LE officers and first responders that incorporates both ballistic and concussion protection, covers the occipital and temporal skull bones, includes Picatinny accessory rails to mount communications, face shield, lighting systems, etc., and facilitates functional mobility, visibility, and stability while being deployed in various missions.

ACCOMPLISHMENTS TO DATE

- Developed a project roadmap
- Developed finite element model of sandwich-structured suspension pads
- Obtained Institutional Review Board approval for human subject testing of the helmet prototype
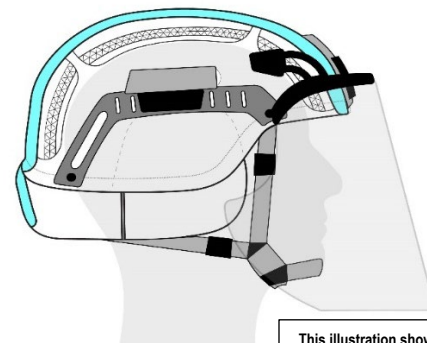
This illustration shows a design of the mission adaptive helmet being developed

UPCOMING MILESTONES

- Numerical testing of the suspension padding system
- Head-helmet simulation to determine the concussion risk of common ballistic threats
- Establish ballistic testing setup
- Characterize foam materials using rheological testing
- Digital scanning of helmet components

PERFORMERS/PARTNER/CUSTOMERS

The following groups are focusing on development of this project:

- TTU, Lubbock, TX
- North Carolina State University, Raleigh, NC
- United States Capitol Police
- Norfolk (VA) Police Department Bomb Squad

Customers include the First Responder Resource Group.