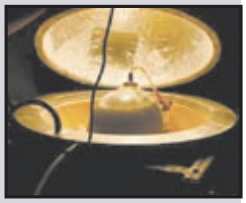
Low Cost Manufacturing of Materials for Improved Warfighter Protection

Provides manufacturing technology solutions for enabling thermoforming of mass-efficient ballistic thermoplastic fibers and matrix materials for enhanced warfighter survivability and mobility.

Enhanced Combat Helmet (ECH)



Integrally Stiffened Helmet Chassis

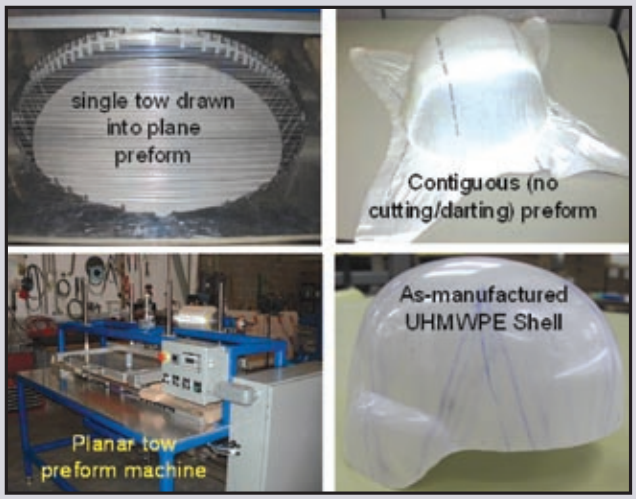
OBJECTIVE / SOLUTION

Provide the Warfighter with either lighter weight armor or higher levels of ballistic protection using thermoplastic-based fibers and matrix materials.

The technology solution is two-fold: develop and implement low cost thermoforming manufacturing technology to enable ballistically improved materials for both current and next generation helmet shells, multifunctional headgear systems, and body armor; and second, develop and implement newly invented preform fabrication and co-processing technologies developed for fiber-based tows, thermoplastic matrices, and multifunctional materials.

ACHIEVEMENTS

- Demonstrated a first-of-its kind automated process for near-net tow deposition of ultra high molecular weight polyethylene (UHMWPE) tow over a hemispherical surface



- Demonstrated improvements in the rapid heat and cool cycles of the low thermal mass tooling by actively plumbing both male and female portions of tooling
- Demonstrated highly novel, 100% automated planar prefrom prototype capable of generating a near-net flat perform with less than 5% scrap
- Submitted a fully signed and endorsed Technology Transfer Agreement (TTA) to ManTech Office

BENEFITS

- Exceeded original ManTech ballistic improvement goals
- > 35% increase in fragmentation protection at current Army Combat Helmet (ACH) areal density
- > 70% reduction in scrap/waste of expensive ballistic fibers with near net preforms
- 30-50% reduction in touch labor due to net shape preforms
- 15-20% weight reduction over currently fielded Army Combat Helmet (ACH)
- 15-20% cost reduction due to improved manufacturing processes

STATUS

- ManTech Program cited by Army and Marines as key enabler for new Enhanced Army Combat Helmet (ECH), which will deliver > 35% increase in frag ballistic protection
- Focusing on maturing technologies to MRL = 8
- Final validation of ManTech metrics underway
- Built and demonstrated first phase of automated planar preform system

WEAPON SYSTEMS / SECONDARY ITEMS IMPACTED

- Enhanced Army Combat Helmet (ECH)
- Ground Soldier System (GSS)

POTENTIAL COST AVOIDANCE

- Return on Investment of 16.6:1 with a cost benefit of $83M