

Improving Survivability and Mobility

Concept vehicle illustrating new options for military combat vehicles is unveiled.

BY JOHN TOON

A concept vehicle designed to illustrate potential technology options for improving survivability and mobility in future military combat vehicles was unveiled in mid-September at a military technology meeting in Virginia.

The concept vehicle, known as the ULTRA AP (Armored Patrol), was built to help the U.S. military evaluate multiple science and technology options — including ballistic and mine protection — that could benefit future vehicle design. The concept vehicle combines proven vehicle technologies with advanced materials and engineering concepts.

Research and development for the ULTRA was conducted by the Georgia Tech Research Institute (GTRI), which led a unique team of research engineers from both GTRI and the automotive industry. The Office of Naval Research (ONR) sponsored the project.

“By bringing together experienced commercial vehicle designers with experts in advanced materials and cutting-edge engineering, we are providing a test bed for evaluating technologies that can help the military develop true ‘leap-ahead’ concepts,” says David Parekh, GTRI’s deputy director. “By including persons with high-performance automotive engineering and NASCAR expertise as part of our team, we were able to root this advanced concepts project in real-world vehicle design.”

The ULTRA AP emphasizes high-output diesel power combined with advanced armor and a fully modern chassis. The design matches the best of modern commercial automotive technology with racing experience, explains Gary Caille, a GTRI principal research engineer.

In the ULTRA AP, the GTRI/industry team made improvements in two key areas by taking a systems approach to survivability and safety:

Survivability: This factor involves a vehicle’s ability to shield occupants from hostile action. The ULTRA AP features novel design concepts and research advances in light-weight and cost-effective armor to maximize capability and protection.

The new armor was designed at GTRI in partnership with the Georgia Tech School of Materials Science and Engineering (see “From Curiosity to Cure” on page 18). The vehicle also incorporates a “blast bucket” designed to provide ballistic, blast and enhanced roll-over protection. New vehicle designs must incorporate dramatically increased resistance to explosions caused by mines and improvised explosive devices, Caille notes.

Safety with Performance: The ULTRA design explored the use of on-board computers to integrate steering, suspension and brakes to provide an unparalleled level of mobility and safety, Caille adds. The new vehicle’s integrated chassis represents an improvement over the most advanced current production vehicles.

In developing the ULTRA AP, GTRI brought together a group of industry professionals that included Scott Badenoch, an auto industry advanced development and racing professional; Tom Moore, former Chrysler vice president of Liberty Operations, the company’s advanced engineering center; Walt Wynbelt, former program executive officer with the U.S. Army Tank Automotive and Armaments Command, and Dave McLellan, the former Corvette chief engineer for General Motors.

@ Read more at: gtresearchnews.gatech.edu/newsrelease/ultra-ap.htm

CONTACT

Gary Caille at
404-463-4603 or
gary.caille@
gtri.gatech.edu



ABOVE: The ULTRA AP (Armored Patrol) vehicle is a research project funded by the Office of Naval Research and conducted by the Georgia Tech Research Institute. The vehicle features an innovative survivable crew capsule (below) that uses a new combination of armor materials, a commercial truck chassis and faceted crew capsule geometries to provide better deflection of pressure waves from blasts.

