

Transparent SPINEL Armor Manufacturing Scale-Up

Scale-up of manufacturing capabilities to produce large, transparent SPINEL armor windows and SPINEL plates for other applications.



Front Armored Window



Side Armored Window



Hot Pressed SPINEL Window for Forward Looking Infrared Targeting Pod (AT-FLIR) in Mounting Bezel



Sintered SPINEL HELLFIRE Dome

OBJECTIVE / SOLUTION

- There is a compelling need to scale up the manufacturing capabilities to produce large, transparent SPINEL armor windows to provide lighter weight and improved ballistic protection for tactical vehicles. Recent ballistic experiments on ceramic SPINEL-based armor against advanced threats at Aberdeen Proving Ground have demonstrated multi-hit performance at weights and thicknesses 50-60% less than currently deployed glass-based armor. Direct spin-offs for rotorcraft and anti-tank airborne vehicles would become feasible.

ACHIEVEMENTS

- Full set of Armor windows were delivered for Family of Medium Tactical Vehicles (FMTV) 1083A1 P2 for Tactical Wheeled Vehicle Survivability Army Technology Objective (TWVS ATO) Demonstrator
- A SPINEL HELLFIRE Dome has been delivered for evaluation
- The Navy is flight testing hot-pressed SPINEL for a window for the new AN/ASQ-228 Advanced Targeting Forward Looking Infrared targeting pod (AT-FLIR) being developed for the F18
- A SPINEL window has been delivered and successfully undergone flight testing

BENEFITS

- Improved multi-hit protection against current and emerging threats:
 - Light weight transparent armor in sizes up to 16" x 40"
 - Weight savings and thickness reductions of 50-60% over current systems
 - Reduces manufacturing costs per square foot by 20-50% for SPINEL ceramic plates for armor
 - Superior resistance to scratching, sand erosion, and fracture due to rock strikes will provide major replacement cost avoidance payoffs
 - Operations and Support (O&S) cost savings will be achieved as a result of reduced vehicle maintenance and increased window service life.

STATUS

- SPINEL/Plastic Transparent Armor capable of defeating Long Term Armor Strategy (LTAS) objective threats have been demonstrated
- The size of hot-pressed SPINEL plates available for DoD applications has been increased from 170 to 300 in²
- The ManTech SPINEL production line at TA&T has transitioned to a Low Rate Initial Production (LRIP) capable transparent armor integration line at AMORLINE. ARMORLINE is funded by private investments, target date for full scale production (230 metric tons/year) is 1QFY11

WEAPON SYSTEMS / SECONDARY ITEMS IMPACTED

- SPINEL transparent armor will be fabricated in sizes large enough to meet vehicle dimensions including Heavy Expanded Mobility Tactical Truck (HEMTT) and Family of Medium Tactical Vehicles (FMTV)
- Coordinated with Army's Long Term Armor Strategy (LTAS) program
- Other potential platforms include Army, Air Force, Navy, and Marine systems:
 - F-18 (AT-FLIR AND SNIPER XR Targeting Pod)
 - Navy DDG-1000 Destroyer
- Potential to impact rotorcraft, airborne vehicle, and infrastructure protection throughout the US military

POTENTIAL COST AVOIDANCE

- Return on Investment of 8.7 to 1 with a cost benefit of \$68M

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