

Soldier Protection System (SPS)

The Army continues to field the Second Generation Modular Scalable Vest (MSV Gen II) and Third Generation Vital Torso Protection (VTP Gen III) hard armor plates, with fielding expected to complete in 4QFY28. Since last year's Annual Report, the Army completed First Article Testing (FAT) for multiple vendors and over 150 Lot Acceptance Tests (LAT) for all SPS systems with zero LAT failures. The Army should plan testing beyond FAT and LAT for the Next Generation Integrated Head Protection System (NG-IHPS) to be able to assess soldier survivability.

SYSTEM DESCRIPTION

The SPS is a suite of personal protection subsystems. The Army intends to provide equal or increased levels of protection against small-arms and fragmenting threats compared to existing personal protective equipment (PPE) at a reduced weight. The SPS is a modular system and provides soldiers the capability to configure the various components into different tiers of protection depending on the threat and their mission. The SPS subsystems are designed to protect a soldier's head, eyes, and neck region; the vital torso

and upper torso areas (including the extremities); and the pelvic region. The SPS consists of three major subsystems shown on the following page.

MISSION

Units will accomplish assigned missions with soldiers wearing the SPS which provides protection against injury from a variety of ballistic (small-arms and fragmenting) threats.





Soldier Protection Subsystems

PROGRAM

SPS is an Acquisition Category III program comprised of three major subsystems. Each of the three major subsystems is developed, tested, and fielded independently. The Army entered full-rate production of the Torso and Extremity Protection (TEP) system in September 2016, the Integrated Head Protection System (IHPS) in October 2018, and the first generation of the VTP system in December 2019. Each subsystem has follow-on engineering change proposal efforts:

- MSV Gen II is replacing the initial MSV in TEP.
- VTP Gen III is replacing previous generations of VTP.

- NG-IHPS is replacing IHPS.

The Army started early fielding of MSV Gen II and VTP Gen III plates in 4QFY21 and plans to field through 4QFY28. The target acquisition quantity is approximately 150,000 sets of each of the SPS torso subsystems. The Army plans to begin fielding of the NG-IHPS in 1QFY24.

DOT&E, in coordination with the Program Executive Officer Soldier, and the Commander of Marine Corps Systems Command will provide a briefing to the House Committee on Armed Services not later than December 23, 2023, on female soldier and marine equipment evaluation and what, if any, processes are in place to ensure future body-worn systems

are evaluated for fit and appropriate wear through the 98th percentile of all possible sizes.

» MAJOR CONTRACTORS

TEP Vendors:

- Armor Express – Eden, North Carolina (MSV, BPP)
- Bethel Industries, Inc. – Jersey City, New Jersey (MSV, BPP)
- Slate Solutions – Sunrise, Florida (MSV)
- Point Blank Enterprises, Inc. (Protective Apparel & Uniform) – Pompano Beach, Florida (MSV, BCS)
- Carter Enterprises, LLC – Brooklyn, New York (BCS)

VTP Vendors:

- Engense, Inc. – Camarillo, California (ESBI)
- Florida Armor, LCC – Miami Lakes, Florida (ESBI)
- Leading Technology Composites, Inc. – Wichita, Kansas (ESAPI, ESBI)
- TenCate Advanced Armor USA, Inc. – Hebron, Ohio (ESAPI, XSBI)
- Avon Protection– Irvine, California (XSAPI, ESAPI, XSBI)

NG IHPS Vendors:

- Avon Protection – Salem, New Hampshire
- Gentex Corporation – Carbondale, Pennsylvania

TEST ADEQUACY

The Army conducts multiple FATs and LATs every year to qualify new vendors and designs. In FY23, the Army completed FAT for multiple vendors to include: TEP's MSV, VTP's Enhanced Small Arms Protective Insert (ESAPI) and Enhanced Side Ballistic Insert (ESBI) designs, and NG-IHPS. The designs that passed FAT proceeded to LAT. The Army completed all test series at Aberdeen Test Center, Maryland in accordance with DOT&E-approved test plans. DOT&E observed most of the FAT testing. As recommended in the FY22 Annual Report, the Army has begun an expanded developmental test series, which is scheduled to be completed in 1QFY24, to compare legacy VTP and SPS VTP Gen III plates against nonstandard fragmenting threats.

The Army is investigating the options to test beyond FAT and LAT to be able to assess potential injuries to soldiers from threats that penetrate the NG-IHPS, and to compare the results with IHPS protection.

Current PPE test methods are limited in the ability to accurately assess soldier injuries. Test mannequins for soft armor vests and hard armor plates do not sufficiently mimic the wearer. The Army developed the Hybrid Foam Mannequin to address these limitations in FY16, but still has not finished the accreditation process. As DOT&E recommended in the FY22 Annual Report, the Army should complete accreditation of the Hybrid Foam Mannequin and adopt test methods used by lethality programs (e.g., use of gel blocks, and instrumentation to characterize the in-flight projectile characteristics) to be able to assess potential injuries to soldiers from penetrating threats. Test data are needed to enable modeling of the relevant hard plates and helmets as penetrable materials, limiting the ability to use modeling and simulation to assess conditions without LFT&E.

PERFORMANCE

» SURVIVABILITY

Two MSV Gen II designs tested in FY23 met the ballistic FAT requirements. Four VTP designs (a combination of ESAPI and ESBI plates) were submitted for FAT since last year's Annual Report; LAT is ongoing for the three

designs that met the FAT ballistic requirements. Currently, there are no XSAPI Gen III designs that meet the ballistic FAT requirements. Since the last Annual Report, over 150 LATs (for all SPS systems) have been conducted with zero LAT failures.

As reported in the FY22 Annual Report, one vendor failed to meet the NG-IHPS FAT ballistic test requirements. The vendor submitted a redesigned helmet for re-FAT in FY23 and the redesigned helmet passed FAT. Additional testing is required to assess NG-IHPS protection compared to legacy helmets and to assess the degree of potential injuries to warfighters from penetrating threats to the NG-IHPS.

RECOMMENDATIONS

The Army should:

1. Plan and conduct testing on the NG-IHPS to enable a comparison to the protection provided by the legacy IHPS and the assessment of warfighter injuries against penetrating threats.
2. Start the accreditation process of the Hybrid Foam Mannequin or develop another accredited soldier surrogate for assessing injuries from penetrating threats to hard and soft body armor.
3. Collect the necessary data to improve modeling and simulation capabilities to be able to assess potential warfighter injuries for a range of conditions not tested.