

Soldier Protection System (SPS)

The Army started fielding the Second Generation Modular Scalable Vest (MSV Gen II) and Third Generation Vital Torso Protection (VTP Gen III) hard armor plates in 4QFY21 and will field through 2QFY24. The Army completed First Article Testing (FAT) for multiple vendors for MSV Gen II, VTP Gen III (a combination of front/back and side plates), and Next Generation Integrated Head Protection System (NG-IHPS). The assessment of protection provided by VTP Gen III plates against non-standard threats, and comparison to legacy VTP plates, is not yet possible due to delays conducting expanded developmental testing.

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 protection 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

The SPS program is an Acquisition Category III program comprised of three major subsystems. Each of the three major subsystems are developed, tested, and fielded independently. The Army entered the Torso and Extremity Protection (TEP) full-rate production in September 2016, the IHPS in October 2018, and the VTP 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
- Next Generation IHPS is replacing IHPS

The Army is not planning a formal acquisition decision for the VTP Gen III, despite the significant design changes from VTP Gen II. The Army started early fielding of MSV Gen II and VTP Gen III plates in 4QFY21 to a select number of soldiers as authorized by the Army G8 on February 16, 2021. The target acquisition quantity is approximately 150,000 sets of each of the SPS subsystems.

» 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 (BCS)
- Carter Enterprises Industries Inc. – Brooklyn, New York (BCS)
- Eagle Industries Unlimited – Virginia Beach, Virginia (BCS)

VTP Vendors:

- Engense Armor Systems – Camarillo, California (ESBI)
- Florida Armor Group – Miami Lakes, Florida (ESBI)
- Leading Technology Composites – Wichita, Kansas (ESAPI, ESBI)

- TenCate Armor – Hebron, Ohio (ESAPI, XSBI)
- Avon Protection/Ceradyne – Irvine, California (XSAPI, ESAPI, XSBI)

NG IHPS Vendors:

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

TEST ADEQUACY

The Army completed FAT for multiple vendors to include: MSV, VTP (ESAPI and ESBI designs), and NG-IHPS. The designs that passed FAT proceeded to Lot Acceptance Testing. 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.

FAT consists of a series of non-ballistic and ballistic tests of a random sample of PPE from the first production lot, to ensure the effectiveness of the manufacturing process, equipment, and procedures. Lot Acceptance Testing (LAT) is similar to FAT, but is a reduced set of tests on a small random sample of subsequent PPE lots. LAT is used to ensure that the manufacturers continue to produce PPE in conformance with contract specifications. The Army has not yet begun an expanded developmental test series they proposed for 1QFY21 to compare legacy VTP and SPS VTP Gen III plates against fragmenting threats. The Army has delayed this test series until 1QFY23, prioritizing FAT

and LAT testing. DOT&E approved the ballistic testing component of all test series (FAT, LAT, and expanded developmental test) in June 2021 and earlier.

The Army does not have the capability of assessing potential injuries to soldiers wearing body armor. In order to adequately assess soldier protection in the future, the Army must accredit the available Hybrid Foam Mannequin for evaluating penetrating injuries and model the body armor plates as a penetrable material.

PERFORMANCE

» SURVIVABILITY

All MSV Gen II designs tested met the ballistic FAT requirements. Five VTP designs (a combination of ESAPI and ESBI plates) were submitted for FAT in FY22; 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. As of August 2022, over 150 LATs have been conducted with a failure rate of less than five percent. The assessment of protection provided by VTP Gen III plates against non-standard threats, and comparison to legacy VTP plates, is not yet possible due to delays conducting expanded developmental testing.

Two vendor designs completed FAT for NG-IHPS. One vendor failed to meet the ballistic test requirements. FAT failures for all commodities will necessitate

a redesign of the ballistic layout, followed by retest.

RECOMMENDATIONS

The Army should:

1. Complete expanded developmental testing to enable the comparison of legacy VTP and SPS VTP Gen III plates against nonstandard threats.
2. Improve modeling and simulation capabilities so that penetration, threat breakup, and fragment behavior can be assessed on ceramic hard armor plates for a range of conditions not tested.
3. Reinitiate their efforts to accredit a mannequin as an evaluation tool for assessing injuries from penetrating threats in body armor testing.