

Integrated Visual Augmentation System (IVAS)



The Army conducted an Operational Demonstration (Ops Demo) in May - June 2022 to support a production and rapid fielding decision. The Integrated Visual Augmentation System (IVAS) 1.0 did not demonstrate improvements to deficiencies identified during previous IVAS Capability Set (CS) 4 testing. Based on results of the Operational Demonstration (Ops Demo), the Army is adjusting the IVAS acquisition and fielding strategy. The IVAS 1.2 variant will be the full-rate production system, incorporating an improved form factor within 24 months.

SYSTEM DESCRIPTION

The Army intends for the IVAS to increase close combat lethality by providing improved communication, mobility, situational awareness, and marksmanship. The IVAS includes a heads-up display (HUD), a body-worn computer known as a puck, a networked data radio, and three conformal batteries for each soldier. The IVAS HUD provides a see through display and augmented reality capability with integrated thermal and low-light imaging sensors, a built-in compass for navigation, and Tactical Assault Kit situational awareness software. The Intra-Soldier Wireless ultra wide-band network enables passive targeting capabilities, connecting the Family of Weapon Sights – Individual (FWS-I) mounted on a soldier’s weapon to the sight picture in the HUD. The IVAS radio enables all IVAS-equipped soldiers to pass data within the company.

MISSION

The Army intends close combat infantry forces to employ IVAS during day (optional) and night missions to increase warfighter lethality through improved mobility, situational awareness, and marksmanship by providing the ability to train, rehearse, and fight on a single system.

Squads will train with IVAS in the Squad Immersive Virtual Trainer in a high fidelity, live and mixed reality, immersive environment, enabling

rapid conduct and repetition of training scenarios.

PROGRAM

IVAS is a Middle Tier of Acquisition program in the rapid prototyping and fielding phases, intended to equip over 100,000 close combat soldiers. The rapid prototyping program used an iterative approach of four CSs. In December 2020, after the completion of CS 3 testing, the USD(A&S) approved the IVAS program to transition from rapid prototyping to rapid fielding, authorizing the Army to procure up to 10,000 CS 4 systems. The Army established IVAS as a Middle Tier of Acquisition rapid fielding program. USD(A&S) required the Army to fix problems noted during CS 3 testing and verify corrections prior to Ops Demo and CS 4 fielding.

The Army intended IVAS CS 4 to be a production-ready system addressing CS 3 deficiencies. Microsoft and the Army made changes to IVAS CS 4 and tested CS 4 Engineering Version (EV) 1 at Soldier Touchpoint (STP) 4 in April 2021 and CS 4 EV 2 at User Jury 4.3 in July 2021. Based on the results from STP 4 and User Jury 4.3, the Army delayed the IVAS Ops Demo from September 2021 until May-June 2022, to allow time for the IVAS program to correct deficiencies. The Army conducted STP 5 in March 2022 with CS 4 EV 3 and the Ops Demo with IVAS 1.0 to inform a fielding decision. DOT&E approved the IVAS T&E strategy in May 2022.

Based on results of the Ops Demo, the Army is adjusting the IVAS acquisition and fielding strategy. The updated acquisition strategy provides time for the Program Office and Microsoft to grow reliability, improve low-light performance, and develop a new form factor. The Army intends to field 5,000 IVAS 1.0 systems with improved reliability and 5,000 IVAS 1.1 systems that meet the reliability requirement and are equipped with an improved low-light sensor. The IVAS 1.2 variant will be the full-rate production system, incorporating an improved form factor within 24 months.

» MAJOR CONTRACTOR

- Microsoft Corp., – Redmond, Washington

TEST ADEQUACY

The IVAS Program Manager, with support from Army Test and Evaluation Command, conducted STP 5 with IVAS CS 4 EV 3 in March 2022 at Fort Bragg, North Carolina to validate performance and reliability improvements. STP 5 did not have a DOT&E-approved test plan, but was observed by DOT&E. STP 5 was adequate to support an assessment of military utility, user acceptance, human factors, training, and reliability of CS 4 EV 3.

The Army conducted the Ops Demo with IVAS 1.0 in June 2022 at Fort Bragg, North Carolina in accordance with the DOT&E-approved test plan, and was observed by DOT&E. The Ops

Demo was adequate to assess operational performance, military utility, user acceptance, reliability, and cyber and electronic warfare vulnerabilities. Testing included two 72-hour company-level missions with soldiers equipped with the IVAS, one 72-hour company-level mission with soldiers equipped with their current equipment, and three live fire ranges. The live fire ranges consisted of an individual static qualification, buddy team maneuvering, and squad maneuvering live fire iterations. Soldiers executed all three ranges in both daytime and nighttime with IVAS and with their current equipment.

PERFORMANCE

» EFFECTIVENESS

IVAS CS 4 EV 3 did not demonstrate improvements to deficiencies identified during STP 3 or STP 4. DOT&E recommended improvements to FWS-I integration, low-light sensors, HUD display, and field of vision. IVAS CS 4 EV 3 changes focused on improvement to the HUD display quality. Display quality improvement was variable between systems and did not translate into increases in soldier satisfaction with sensors or with their ability to detect and recognize enemy forces. Performance results are detailed in the IVAS CS4 EV 3 STP 5 report from June 2022.

In the Ops Demo, the infantry company was more successful accomplishing their operational missions with their current

equipment than with IVAS 1.0. Soldiers hit fewer targets and engaged targets more slowly with IVAS 1.0 than with their current equipment on the buddy team life fire range. IVAS 1.0 did not demonstrate improvements in low-light sensors, HUD display, FWS-I integration and field of vision identified during previous IVAS CS 4 testing. IVAS 1.0 performance is detailed in the IVAS 1.0 Ops Demo report published October 2022.

» SUITABILITY

IVAS CS4 EV 3 demonstrated its requirement for mean time between system abort (MTBSA) during STP 5. Suitability results are detailed in the IVAS CS4 EV 3 STP 5 report.

The results of the Ops Demo show user acceptance remains low. Soldiers prefer their current equipment (Nett Warrior and PVS-14 and Enhanced Night Vision Goggle-Binocular night vision devices) to IVAS. The majority of soldiers reported at least one symptom of physical impairment to include disorientation, dizziness, eyestrain, headaches, motion sickness and nausea, neck strain and tunnel vision. Soldiers cited IVAS 1.0's poor low-light performance, display quality, cumbersomeness, poor reliability, inability to distinguish friend from foe, difficulty shooting, physical impairments and limited peripheral vision as reasons for their dissatisfaction. IVAS 1.0 MTBSA reliability metric declined during Ops Demo compared to IVAS CS4 EV2 in STP 4. Although the results were less favorable than STP 5,

MTBSA is improving. Results for mean time between essential function failures have not improved between CS4 EV2, CS4 EV3 and 1.0. Suitability results are detailed in the IVAS 1.0 Ops Demo report published October 2022.

» SURVIVABILITY

IVAS 1.0 vulnerabilities in a cyber-contested and electromagnetic spectrum environment are detailed in the classified survivability annex to the IVAS 1.0 Ops Demo report published October 2022.

RECOMMENDATIONS

The Army should:

1. Correct the deficiencies identified in the Ops Demo and verify the corrections in developmental testing/operational testing prior to further operational testing to reduce resources and ensure better operational test results.
2. Revise the T&E strategy to support an assessment of performance for IVAS 1.1 and 1.2.