STATEMENT OF OBJECTIVES (SOO)

For Prototype Project Agreement (PPA)

Integrated Visual Augmentation System (IVAS) Program

Section 1: Scope Determination

The IVAS program is suitable for execution under Other Transaction Authority per 10 USC 2371B (Section 815 of FY16 National Defense Authorization Act (NDAA)). There is an operational need for the IVAS capability to regain overmatch against peer and near peer threats, as well as the need for improved training and simulation tools to provide the warfighter with the ability to train and rehearse using the same equipment utilized in actual operations. Rapid and agile prototyping is necessary to achieve this capability. A limited number of production equivalent systems will be procured over a 24 month period, beginning with a commercial proof of concept and evolving to a tailored military solution to prove out manufacturing feasibility. An iterative test-fix-test approach will be utilized to rapidly incorporate changes into the design with the end state of developing a system suitable to transition to production upon successful completion of the prototype project.

Section 2: Program Objective

The Government seeks proposals for establishing a set of core solutions to achieve the capabilities required for the IVAS program. Sample hardware will be submitted and evaluated during the proposal phase for this Prototype Project. The objective of the IVAS Prototype Project is to rapidly develop, test, and manufacture a single platform that Soldiers can use to Fight, Rehearse, and Train. IVAS is comprised of the Heads Up Display 3.0 (HUD 3.0) integrated with the Synthetic Training Environment (STE) Squad capability. This platform will provide increased lethality, mobility, and situational awareness with the following features:

- Head Borne Vision System (no helmet mount assembly; low profile, conformal goggle/visor system providing 24/7 squad situational awareness in all operating environments; see thru, wide field of view binocular 3D display; dual high resolution digital color sensors, integral ballistic, laser and hearing protections with 3D sound field); provides a natural field of view for the user similar to current types of eye protection
- Day/Night Rapid Target Acquisition (RTA) from Family of Weapon Sights-Individual (FWS-I) and remote viewing from Family of Weapon Sights–Crew Served (FWS-CS)
- Machine Learning Capabilities/Artificial Intelligence (AI)
- Synthetic Training Environment (STE) Squad Capability (One World Terrain, Training Simulation Software, Training Management Tools, and associated integration hardware)
- An Adaptive Squad Operating System
- Nett Warrior 3.0/Tactical Assault Kit (TAK) Connectivity (operating on Secure But Unclassified (SBU) portion of the Integrated Tactical Network (ITN) using current military radios; operation in open, contested and denied environments with minimum capability to see/shoot/move/navigate)
- Fused Day/Night Vision Capabilities for multiple sensor/imaging feeds
- Intra-Soldier Wireless (ISW) Connectivity (multi-point wireless) for on body Soldier devices

- Squad Lethality Ratings/Metrics (real-time measure of squad & soldier performance; physiological feedback to include but not limited to concussions, heart rate, breathing rate, readiness)
- Mixed/Live Reality for Combat Training and Rehearsals including Navigation, Targeting, Phase Line (Symbology)
- Automatic or Aided Target Recognition (ATR) for relevant threats
- Government Owned Soldier/Squad Architecture (collaboratively developed by Government and industry over 24 months with key interfaces across squad identified, developed, validated, and implemented; tactical power architecture and management system)
- Modular open source data, unclassified or perishable Position, Location, Information (PLI) and stored in the Cloud

The IVAS Prototype Project seeks to provide a HUD 3.0 and integrated STE Squad capability within the Squad Architecture in support of Army, Marines, and Special Operations Forces within 24 months. The PPA shall deliver a baseline standalone STE Squad capability within 12 months, and STE Squad capability integrated into HUD 3.0 within 24 months. This complete IVAS capability shall be suitable to begin production as early as 4Q20 to ensure clear overmatch in Close Combat engagements and drastically increase Squad Lethality.

This PPA will conduct an accelerated development effort for the HUD 3.0 and STE Squad capabilities with a plan to deliver multiple Capability Sets (CS) over a 24 month period which will be evaluated in various operational settings. This approach will allow simultaneous maturation of technology and manufacturing through multiple builds and Soldier Touch Point (STP) engagements. Design Reviews (DR) and Build Readiness Reviews (BRR) will serve as Knowledge Points informed by User Juries (UJ) and STP Test Reports (TR). The STPs will provide information to incrementally refine the HUD 3.0 and STE Squad capabilities with the objective to achieve a fieldable IVAS by 4Q20, followed by transition to a production contract. The end state for IVAS at the end of 24 months provides:

- Overmatch warfighting capability plus a Close Combat STE Squad capability with Synthetic Training Environment (STE) core capabilities.
- A single integrated digital, low profile, conformal day/night device that allows Soldiers and Squads to Fight, Rehearse and Train in any operational environment.
- An open architecture that allows these capabilities to be delivered/integrated.

Section 3: Background

The IVAS capabilities are required to support operational needs identified in the 2018 National Defense Strategy (NDS). Near peer threats have capabilities that match or exceed those of U.S. forces. Adversaries can detect, target, and lethally engage before U.S. forces become aware of their presence. The Close Combat Force suffers the highest casualty rate in combat. Current and future battles will be fought with small distributed formations in urban and subterranean environments where current capabilities are not sufficient, a recognized training capability gap the Government has sought to fill since 2009. The IVAS will address this shortfall by providing increased sets and repetitions in complex environments utilizing its STE Squad Capability integrated with HUD 3.0, allowing U.S. forces to conduct “25 bloodless battles before the 1st battle”. Soldier lethality will be vastly improved through cognitive training and advanced sensors, enabling squads to be first to detect, decide, and engage. Accelerated development of these capabilities is necessary to recover and maintain overmatch.

Limited integration of lethality and mobility capabilities currently constrain the warfighter in combat. HUD 3.0 will provide integration of Head-Body-Weapon to provide significant enhancement of detection, targeting, engagements, and AI that match the speed of war. Current training simulations provide limited representative terrain, structures, and locations. There is not simulation capability for dismounted close combat squad collective training. The STE Squad capability will provide global terrain and high fidelity replication of operational environments for squad close combat training and rehearsals prior to actual engagements in those environments. Past dismounted training has relied on computer/projector screens that severely restricts Soldier movement and displaying a limited range of artificial OEs. The STE Squad capability merges the live and virtual environments creating an enhanced live training capability via the operationally worn HUD 3.0 allowing the warfighter to "Train as You Fight".

Section 4: Design, Analysis, and Test Requirements

The prototype project vendor (hereafter vendor) shall deliver to the Government within 24 months four Capability Sets (CS) evaluated during multiple STPs. STPs will occur in controlled environments initially and progress to Arctic, Desert, Jungle, Urban and Subterranean environments – capability of prototype builds will shape each event. The Government will prepare a Test Report following each STP event and the vendor shall prepare a Developmental Test Report to document findings for vendor action and incorporation into subsequent Capability Sets. The following table describes the STPs/DTs, which correlate to each CS:

Element	STP 1	STP 2	STP 3	STP 4
HUD Integration	COTS Plus - Modified COTS headset w/ integrated COTS thermal camera	Conformal low profile head mounted design w/ day/night see-through, full color, all conditions, immersive reality display, off-axis GFE thermal and low-light-level sensors	HUD 3.0 w/ conformal day/night see-through, full color, display waveguide optics and improved (2nd run) GFE thermal and low-light-level sensors w/ FOV >50 degrees per eye	HUD 3.0 w/ conformal day/night see-through, full color, display waveguide optics and latest GFE thermal and low-light-level sensors w/ FOV >50 degrees per eye
HUD Sub Elements	Metrics for Sub Elements			
Field of View	Horizontal Field of View: 55 degrees (threshold), 110 degrees (objective)			
System Level Distortion	<3% with electronic correction			
Operating Temperature	Commercial Temperature Range		-20°C to +40°C	-40°C to +60°C
Display Visibility	Indoors and limited outdoor day/night uses		Daylight readable to True Dark	
Display Frame Rate	≥60 Hz	≥60 Hz (threshold) ≥120 Hz (objective)		
Low Light Detection	Sensor or camera that provides 80% probability of Detection (Pd) of a man sized object at 150 meters with 25% ¼ moon illumination (Threshold) Sensor or camera that provides 90% probability of detection (Pd) of a man size object at 150 meters with 5% (Starlight illumination) (Objective)			
Thermal Recognition	Provides 80% probability of recognition of personnel (upright and moving), given a detection, out to a range of 300 meters in clear air at all light levels (Threshold)			

	Provides 80% probability of recognition of personnel (upright and moving), given a detection, out to a range of 500 meters in clear air at all light levels (Objective)			
HUD Weight (headborne)	1.5 lbs (threshold) 1.0 lbs (objective) Includes all head borne system components			
Light Security	Provisions for light security (non detectability)			
System Latency	33 milliseconds			
Image Alignment	For multiple image sources, the images must align within 1 pixel when fused. Any imagery provided to the user must be within 1 milliradian of the true position.			
On-body Computer	Commercial version of on-body computer w/ Nett Warrior (NW) 3.0	HUD 3.0 Body Pack w/ NW 3.0, ISW	HUD 3.0 Body Pack w/ NW 3.0, ISW	HUD 3.0 Body Pack w/ NW 3.0, ISW
On-body Weight	2.5lbs (threshold) 1.25 lbs (objective) Includes all body borne system components			
Power	Power source for commercial product	Conformal Wearable Battery	Conformal Wearable Battery	Conformal Wearable Battery
System availability	Fused imagery only (-20°C to +49°C) 7.5 hours (threshold), 24 hours (objective) Fused imagery only (-20°C to -40°C) 5.0 hours (threshold), 16 hours (objective) Fused/RTA/AR (-20°C to +49°C) 3.5 hours (threshold), 16 hours (objective) Fused/RTA/AR (-20°C to -40°C) 2.1 hours (threshold), 8 hours (objective)			
Controller	Controller for commercial product	Tactile, voice, and gesture control	Tactile, voice, and gesture control	Tactile, voice, and gesture control
Comms Scenario	N/A	Open	Contested	Denied
Processing	STE Server	STE Server	STE Server	STE Server
Formation Size	Individual/ Squad	Platoon	Company	Battalion
Miscellaneous				
	-Shall not have a helmet mount or positioning assembly -Compatible w/ existing helmets	-Shall not have a helmet mount or positioning assembly -Compatible w/ existing helmets	-Shall not have a helmet mount or positioning assembly -Compatible w/ existing helmets -Ballistic eye protection -Laser Eye Protection -3-D sound field hearing + hearing protection (e.g., TCAPS)	-Shall not have a helmet mount or positioning assembly -Compatible w/ existing helmets Ballistic eye protection - Laser Eye Protection - 3-D sound field hearing + hearing protection (e.g., TCAPS)

Nett Warrior 3.0 Integration				
	Software: -Display Nett Warrior Data 2-D flat map or virtual screen (T) 3-D georegistered (O)	*Software:* -3-D Nett Warrior data (georegistered) (for Situational Awareness) -Voice comms & voice to text	*Software:* -3-D Nett Warrior data (georegistered)(for Situational Awareness) -Voice comms & voice to text -Change detection -Target Cueing -Comms automation (for example, set up call groups)	*Software:* -3-D Nett Warrior data (georegistered)(for Situational Awareness) -Voice comms & voice to text -Change detection -Target Cueing -Comms automation (for example, set up call groups) -Automated data throttle for comms denied scenario -Foreign language translation/auto-display
Artificial Intelligence and Machine Learning				
	Augmented Reality: -2-D Navigation -Simulated RTA video display -Simulated SUAV video display	*Augmented Reality:* -3-D Navigation -Rapid Target Acquisition -User Interface Control -External Sensors Compatibility -Shared SA/C2 and Squad and below-level maneuver graphics	*Augmented Reality:* -3-D Navigation + user designated routes -Rapid Target Acquisition -User Interface Control -External Sensors Compatibility -Shared SA/C2 and Platoon and below-level maneuver graphics -Post-mission AAR	*Augmented Reality:* -3-D Navigation + user designated routes -Rapid Target Acquisition -User Interface Control -External Sensors Compatibility -Shared SA/C2 and Company and below-level maneuver graphics -Post-mission AAR -Weapons field of fire, range, and obscuration overlay -3D round trajectory path spatially aligned and overlaid in the user's FOV

	Artificial Intelligence: -Pre-mission planning workflow -Squad duty position configurations and performance -Route planning and selection in TAK	*Artificial Intelligence:* -Collaborative Planning (Platoon and below) -Pre-mission planning workflow -Squad and below configurations and performance -Route planning and selection in AR model -Auto-target detection (personnel detection) -Soldier position tracking in GPS degraded/denied areas (Visual Odometry) -Short term change detection (target movement) -Long term change detection (explosive hazards) -Voice command input	*Artificial Intelligence:* -Collaborative Planning (Company and below) -Pre-mission planning workflow -Platoon and below configurations and performance - Route planning and selection in AR model -Auto-target detection (personnel detection) -Soldier position tracking in GPS degraded/denied areas (Visual Odometry) -Short term change detection (target movement) -Long term change detection (explosive hazards) -Voice command input -In-mission objective advisor -Post-objective resource re-distribution -Detect and pinpoint GPS and communications jammers -AI generation mission plan	*Artificial Intelligence:* -Collaborative Planning (Battalion and below) -Pre-mission planning workflow -Company and below configurations and performance - Route planning and selection in AR model -Auto-target detection (personnel and weapon detection) -Soldier position tracking in GPS degraded/denied areas (Visual Odometry) -Short term change detection (target movement) -Long term change detection (explosive hazards) -Voice command input -In-mission objective advisor -Post-objective resource re-distribution -Detect and pinpoint GPS and communications jammers -AI generation mission plan -Network based targeting solution -Red Force Tracking -Trip Wire Detection -Hostile fire locator -Camera based foreign language translation -Audio based foreign language translation -STE Machine Learning-enabled OPFOR -Anticipate user needs and provide courses of action

Soldier Performance				
	-Research M&S capabilities, Identify/prioritize M&S gaps. Establish Performance Data Lake. Begin collecting existing Soldier performance studies/research data, execute evaluations, studies, and data collection to close gaps. -System capable of utilizing Army/ DoD sponsored models and simulations, existing Soldier and Squad performance research data (studies, experiments, sprints, unit demographics, etc), and feedback/ measurements (warfighter movement speeds, orientation, duration, proximity within the unit) from Soldier worn sensors during the "train, rehearse, fight" cycle, then ordered in a central database type system, batch or real-time updates, for recall and comparison with similar unit types to asses, inform, and optimize Soldier and Squad performance to inform potential	-Analytics dashboard, structure and scope/fidelity of Model, M&S roadmap. -System capable of utilizing Army/ DoD sponsored models and simulations, existing Soldier and Squad performance research data (studies, experiments, sprints, unit demographics, etc), and feedback/ measurements (warfighter movement speeds, orientation, duration, proximity within the unit) from Soldier worn sensors during the "train, rehearse, fight" cycle, then ordered in a central database type system, batch or real-time updates, for recall and comparison with similar unit types to asses, inform, and optimize Soldier and Squad performance to inform potential Soldier and Squad level Measures of Performance (MOP) and Measures of Effectiveness (MOE) (threshold). -System capable of providing an equipment and mission optimization tool with real time updates to provide users with courses of action, training scenarios, individual training techniques, performance improvement plans, etc… based real-time and previously categorized data (objective).	-Collection of HUD 3.0 initial sensor capability. Capture and re-create Squad activity in virtual environment using Soldier and equipment sensors. DOE to support additional evaluations, studies, and data collection to close gaps. Utilization of Machine Learning to identify correlations with performance data. -System capable of utilizing Army/ DoD sponsored models and simulations, existing Soldier and Squad performance research data (studies, experiments, sprints, unit demographics, etc), and feedback/ measurements (warfighter movement speeds, orientation, duration, proximity within the unit) from Soldier worn sensors during the "train, rehearse, fight" cycle, then ordered in a central database type system, batch or real-time updates, for recall and comparison with similar unit types to asses, inform, and optimize Soldier and Squad performance to inform potential Soldier and Squad level Measures of Performance (MOP) and Measures of Effectiveness (MOE) (threshold).	-Incorporates Adaptive Soldier Architecture data, incorporate rudimentary AI feedback from STE training. Virtual evaluation environment (Decision Support Tool) V&Ved (to an agreed upon level of fidelity). Utilization of Machine Learning to identify Proposed MOPs / MOEs. SLR and Initial Squad Performance Baseline published. -System capable of utilizing Army/ DoD sponsored models and simulations, existing Soldier and Squad performance research data (studies, experiments, sprints, unit demographics, etc), and feedback/ measurements (warfighter movement speeds, orientation, duration, proximity within the unit) from Soldier worn sensors during the "train, rehearse, fight" cycle, then ordered in a central database type system, batch or real-time updates, for recall and comparison with similar unit types to asses, inform, and optimize Soldier and Squad performance to inform potential Soldier and Squad level Measures of Performance (MOP) and Measures of Effectiveness (MOE)

	Soldier and Squad level Measures of Performance (MOP) and Measures of Effectiveness (MOE) (threshold). System capable of providing an equipment and mission optimization tool with real time updates to provide users with courses of action, training scenarios, individual training techniques, performance improvement plans, etc… based real-time and previously categorized data (objective). System capable		-System capable of providing an equipment and mission optimization tool with real time updates to provide users with courses of action, training scenarios, individual training techniques, performance improvement plans, etc… based real-time and previously categorized data (objective).	(threshold). -System capable of providing an equipment and mission optimization tool with real time updates to provide users with courses of action, training scenarios, individual training techniques, performance improvement plans, etc… based real-time and previously categorized data (objective).
Adaptive Soldier Squad Architecture	Configuration Database (CD): -Initial physical data, performance specifications, capabilities & comprehensive interface control documentation for infantry squad	Architecture Assessment Tool (AAT): -Demonstrate initial predictive analytics model -Hybrid application functionality on all required platforms	-Soldier Architecture for Soldier Performance and Equipment, -Squad-on-Squad performance data collection to update Architecture Tool -Demonstrate STE Squad Capability with expanded Training Simulation Software (TSS) -Configuration Management Plan (CMP): Initial Draft	CD: -Comprehensive physical data, performance specifications, capabilities & comprehensive interface control documentation for infantry squad -Full redundancy (backup & recovery); concurrency control sub-systems are operational; access management (read/write) process in place; hosting strategy provided for Govt concurrence AAT: - Squad Architecture output, Squad performance baseline

				and Soldier Lethality Rating -STE Squad Capability for Battle Drills 1-11 and Marine Corps Squad & Fire Team T&R tasks and Scalable TSS, OWT, and TMT. -Hosting and access management strategy

Element	STP #1	STP #2	STP #3	STP #4
STE Squad Training Capability				
	TSS: Demo of military content & application (avatars, models, and behaviors) **OWT:** 50m mesh inside and outside, supports terrain of current location **TMT:** Basic scenario editor for plan , prepare, execute, and assess) with AAR **OE Wraps:** Daylight operations, Desert, Coniferous Forest **AAR:** Capture 3D video with editing tool **SQD CAP:** Demo scale from 1-4 warfighters & 2 trainers, initial FoT	**TSS:** BLUFOR SQD & OPFOR models **OWT:** Include terrain inserts, geo-imported; 100m inside/outside mesh, import soldier location into OWT geo-location **TMT**: Plan, prepare, execute, and assess capability with customized data content displayed by trainer, basic scenario editor with rewind/edit **OE Wraps**: Mountains, Wetlands/Littoral, DUT **AAR:** Did hit, should hit data, sectors of fire (flagging), line-of-sight tracking, target acquisition time, speed of engagement. **SQD CAP:** 1-9 warfighters & 2 trainer with ability to execute 11	**TSS:** OPFOR and BLUFOR SAF interoperable with voice commands, full FoF, FoT, Civ models Squad Enablers: Forward Observer (FO), Medical Evacuation (MEDEVAC), Platoon Unmanned Aerial Sensor (Plt UAS), squad-level quadcopter UAS, & Common Call for Fire functionality **OWT:** 200M meshing collection of terrain from HUD to OWT, 600m Field of View (FoV) for enablers, Thermal/IR models Binaural audio **TMT:** Plan, prepare, execute, and assess capability with scenario editor populates BLUFOR, OPFOR, civilian models	**TSS:** Organic squad w/ AI SAF & wrap at PLT level, NETT Warrior interoperability, observe red IDF, Interactive voice commands w/ SAF avatars **OWT:** Scalable terrain w/ 1k observation of effects & enablers **TMT:** Scalable scenario editor/AAR with local repository & AAR Analysis Tool, Selected Individual Task development toolkit **USMC Squad CAP:** 8 Marine Corps Squad Collective Capabilities (Cordon and Search (INF-MAN-4213), Patrolling ops (INF-MAN-4301), Lead traffic control PT (0311-MOUT-2002), Conduct

	Equipment: Simulated Individual Weapon (M-4) **OPFOR:** Virtual Small Arms, SAF provides effects on user/enemy Local STE TSS server Local TMT server and workstation(can reside on local STE TSS Server) Wireless or cellular network connecting TSS server to client devices Hardwired Network connecting Local STE TSS server to cloud based TSS and OWT servers Simulated M-4 (4) with hard cases Charging devices if required for Simulated M-4 (4)	Squad Collective Capabilities (React to Direct Fire Contact (07-3-D9501), Conduct a Squad Assault (07-4-D9515),Break Contact (07-3-D9505),React to Ambush (Near) (07-3-D9502),Enter and Clear a Room (07-4-D9509),Knock Out a Bunker (07-3-D9406), Enter a Trench to Secure a Foothold (07-3-D9510), Conduct the Initial Breach of a Mined Wire Obstacle (07-3-D9412), React to Indirect Fire (07-3-D9504), React to a Chemical Attack (03-3-D0001)), React to IED (05-3-D1703 **Equipment:** Integrate squad organic weapons: M4/16, M27, M249, M203/320, M9/17, Grenades/Smoke/ Flash Bang To support 3X squads (ie PLT) Each squad requires the following: Local STE TSS server Local TMT server (can reside on local STE TSS Server) Wireless or cellular network connecting TSS server to client devices and transferring terrain meshes. Hardwired Network connecting Local STE TSS server to cloud based TSS and OWT servers Tracking devices for Soldiers/Marines (13) Tracking instrumentation for M-4 (9) Recoil generating devices for M-4 (9) and ancillary	Initial ability to collect Soldier biometric tracking tool **OE Wraps:** Artic **AAR:** Expanded AAR data capture **Squad CAP:** Integration of Squad w/ organic platoon enablers to include FO, Medevac functionality, Virtual drone functionality, Common Call for Fire, CAS, 9 line Medevac **Equipment:** M240B, Javelin, AT4, Sqd Tools: Shotgun, Claymore, door breach charges, breaching equipment for a mine-wired obstacle To support 9X squads (ie CO) Each squad requires the following Local STE TSS server Local TMT server (can reside on local STE TSS Server) Wireless or cellular network connecting TSS server to client devices and transferring terrain meshes. Hardwired Network connecting Local STE TSS server to cloud based TSS and OWT servers Simulated Hand grenades (Smoke, frag, flash bang)	recon patrol (INF-MAN-4302), Conduct ground attack (INF-MAN-4001), Clear a room (INF-MAN-3002), Integrate fires (INF-FSPT-4001), Provide offensive and indirect fires (INF-MGUN-4001)/ (INF-MORT-4002; 60mm Mortars)/ (INF-MORT-4003; 81mm Mortars)) To support 27X squads (ie BN) Each squad requires the following Local STE TSS server Local TMT server (can reside on local STE TSS Server) Wireless or cellular network connecting TSS server to client devices and transferring terrain meshes. Hardwired Network connecting Local STE TSS server to cloud based TSS and OWT servers Simulated Hand grenades (Smoke, frag, flash bang) M72A7 LAW M3 Carl Gustav 60 MM Mortars 81 MM Mortars Simulated Javelin weapon system Simulated AT4 Simulated Claymore Simulated breaching equipment Charging devices if required for Simulated weapons Tracking devices to provide PLT for Soldiers/Marines (13) Tracking instrumentation for real M-4 (9) Recoil generating devices for real M-4 (9) and

		equipment required for operation Simulated magazines for M-4 (7 per) Tracking devices for M9 (4) M17 (5) Recoil generating devices for M9 (4) M17 (5) and ancillary equipment required for operation Simulated magazine for M9 (3 per) M17 (3 per) Tracking devices for M249 (1) Recoil generating device for M249 (1) and ancillary equipment required for operation Simulated drum magazine for M249 (2 Per)	M72A7 LAW M3 Carl Gustav 60 MM Mortars 81 MM Mortars Simulated Javelin weapon system Simulated AT4 Simulated Claymore Simulated breaching equipment Charging devices if required for Simulated weapons Tracking devices to provide PLT for Soldiers/Marines (13) Tracking instrumentation for real M-4 (9) Recoil generating devices for real M-4 (9) and Ancillary equipment required for operation Simulated magazines for real M-4 (7 per) Tracking devices for real M9 (4) M17 (5) Recoil generating devices for real M9 (4) M17 (5) and Ancillary equipment required for operation Simulated magazine for rea M9 (3 per) M17 (3 per) Tracking devices for real M249 (1) Recoil generating device for real M249 (1) and Ancillary equipment required for operation	Ancillary equipment required for operation Simulated magazines for real M-4 (7 per) Tracking devices for real M9 (4) M17 (5) Recoil generating devices for real M9 (4) M17 (5) and Ancillary equipment required for operation Simulated magazine for real M9 (3 per) M17 (3 per) Tracking devices for real M249 (1) Recoil generating device for real M249 (1) and Ancillary equipment required for operation Simulated drum magazine for real M249 (2 Per) Tracking devices for real M240 (1) Recoil generating device for real M240 (1) and Ancillary equipment required for operation Simulated ammunition belt for real M240 (2 Per)

			Simulated drum magazine for real M249 (2 Per) Tracking devices for real M240 (1) Recoil generating device for real M240 (1) and Ancillary equipment required for operation Simulated ammunition belt for real M240 (2 Per)	

Table 1. STP/DT Requirements

- CS #1 (50 systems). CS #1 shall provide a commercial proof of concept integrating a commercial thermal sensor, establish squad performance Data Lake, and demonstrate initial STE Squad Capability development efforts. Two UJ events will be conducted during the build out of CS #1 to provide early user input regarding the system design. Additional laboratory testing will be conducted as necessary on the technical capabilities of the system during this time. CS #1 shall be delivered within 4 months of initial PPA and will be evaluated during STP #1.
- CS #2 (300 systems). CS #2 shall represent the final form factor design of the new military goggle, integrate Nett Warrior 3.0 software for Augmented Reality (AR) and initial IVAS architecture as baseline capability, and demonstrate STE Squad collective capability to include Squad training capability for squad collective tasks identified below, Organic Squad Weapons, Training Simulation Software (TSS), One World Terrain (OWT), and a Training Management Tool (TMT). A DR will be conducted upon completion of the CS #2 system design, followed by two UJ events during software and process development. Additional laboratory testing will be conducted as well on the technical capabilities of the system during this time. A BRR will be conducted prior to the build out of CS #2. Systems from CS #2 shall be delivered within 11 months of initial PPA and will be evaluated during STP #2.
- CS #3 (600 systems). CS #3 shall include a wide field of view display, ballistic and laser protection, Soldier Architecture for Soldier Performance and Equipment, Squad-on-Squad performance data collection to update Architecture Tool, and demonstrate STE Squad collective capability with expanded TSS as well as the following enablers: Forward Observer (FO), Medical Evacuation (MEDEVAC), Platoon Unmanned Aerial Sensor (Plt UAS), squad-level quadcopter UAS, and Squad and Platoon Weapons. The vendor shall integrate low light level and thermal sensors provided as Government Furnished Equipment (GFE). Additional laboratory testing will be conducted as well on the technical capabilities of the system during this time. A DR will be performed prior to the start of software and process development, and a BRR will be conducted prior to CS #3 build out. Multiple UJ events are anticipated throughout the design and build process to provide frequent user feedback regarding the emerging system design. CS #3 shall be delivered within 17 months of initial PPA and will be evaluated during STP #3.

- CS #4 (1600 systems). CS #4 shall represent the first fieldable military HUD 3.0 system demonstration, with Squad Architecture output from the Architecture Tool, Squad performance baseline and Soldier Lethality Rating from Data Lake information, STE Squad collective capability and Marine Corps Training and Readiness (T&R) Tasks Fire Team, and Scalable TSS, OWT, and TMT. The vendor shall integrate improved low light level and thermal sensors provided as GFE. A DR shall be conducted prior to software and process development, and a BRR shall be conducted prior the CS #4 build out. Multiple UJ events are planned during development and build to provide real time user feedback for incorporation into the system. Additional laboratory testing will be conducted as well on the technical capabilities of the system during this time. CS #4 shall be delivered within 21 months of initial PPA and will be evaluated during STP #4.

The STE Squad capability will be a mixed reality simulation training capability to train the following dismounted squad close combat tasks and squad collective tasks: (i.e. React to Direct Fire Contact (07-3-D9501), Conduct a Squad Assault (07-4-D9515), Break Contact (07-3-D9505), React to Ambush (Near) (07-3-D9502), Knock Out a Bunker (07-3-D9406), Enter and Clear a Room (07-4-D9509), Enter a Trench to Secure a Foothold (07-3-D9510), Conduct the Initial Breach of a Mined Wire Obstacle (07-3-D9412), React to Indirect Fire (07-3-D9504), React to a Chemical Attack (03-3-D0001), React to an IED (05-3-D1703)); and USMC Squad Collective Training and Readiness tasks (Cordon and Search (INF-MAN-4213), Patrolling Ops (INF-MAN-4301), Lead Traffic Control PT (0311-MOUT-2002), Conduct Recon Patrol (INF-MAN-4302), Conduct Ground Attack (INF-MAN-4001), Clear a Room (INF-MAN-3002), Integrate Fires 123456 (INF-FSPT-4001), and Provide offensive and indirect fires (INF-MGUN-4001)/ (INF-MORT-4002; 60mm Mortars)/ (INF-MORT-4003; 81mm Mortars)). This training capability shall be scalable from individual Soldier/Marine through Squad sized formations of up to 15 personnel (Army Squad of 9 or Marine Corps Squad of 13, plus 2 trainers) with organic (M-4, M-27 Infantry Automatic Rifle (IAR), M-9/17, M-249, M203/320, and M-240B) and simulated (Hand Grenades (Frag, Smoke, Flash Bang), M72A7 Light Anti-Armor Weapon, AT-4, M3 MAAWS (Carl Gustav), Javelin, Mortars 60 & 81mm) weapons. IVAS will provide the Army/Marine Corps with a Squad collective training capability comprised of the following:

The vendor shall develop Training Simulation Software (TSS) comprised of a common synthetic environment that presents operational variable elements and their interrelated effects that make up the Operational Environment (OE) (military, social (pattern of life), information, infrastructure, physical environment, and time) to execute multi-domain operations that include land, air, and maritime domains. A global terrain and atmospheric effects to provide and present a 200m square meshed battle space maneuver box for the intended training event while correctly accounting for atmospheric effects. The TSS must accurately represent the warfighting functions consistent with the unit and force type (i.e., combat arms, combat support, combat service support) associated with those functions, to include the ability for users to observe each other's hand and arms signals and other cues, enabling non-verbal communication between Soldiers/Marines within the system. The three dimensional models of persons, vehicles, systems, equipment, and objects with attendant dynamics, behaviors, and characteristics for the intended training event and objectives must correctly account for and consider vulnerabilities to damage, sensor capabilities, thermal signatures, and other model attributes. Munitions external and terminal ballistics must portray correct behavior of direct and indirect fire munitions while in flight (external ballistics) and at impact and fuse function (terminal ballistics); atmospheric, weapon, and

terrain influences must also affect munition behaviors and their effects (e.g., spin drift, smoke dispersion, cratering). AI in automated entities (mounted/ dismounted, friendly/enemy/neutral, civilians) must have correct and consistent adjudication of all interactions among all entities, live and simulated while participating in the synthetic environment. The TSS must replicate the visual and audio effects of company organic and non-organic direct and indirect fire supporting arms assets and must accurately model the fragmentation effects, ballistics, and surface danger zones (SDZs) of all munitions per standards presented in the Department of the Army Pamphlet (DA Pam) 385-63 Range Safety, in order to prevent negative training. TSS must facilitate a two way data exchange with the TMT construct for the purposes planning, preparation, execution, and assessment of scenario development and After Action Review (AAR) with interoperability with current mission command information systems (e.g., Nett Warrior 3.0/TAK). TSS must deliver an open, well-defined documentation of an API that provides external simulations to gain control of and pass data & processing (i.e. AI Machine Learning) while maintaining acceptable HUD TSS performance.

One World Terrain is a foundational element under development for the Synthetic Training Environment (STE). The government will provide the standards, framework, data sources, and sample data sets to support this developmental effort. The vendor shall integrate with OWT foundation datasets and formats throughout the development lifecycle. These foundation datasets are broken into six conflated layers: 1) Elevation; 2) Imagery; 3) Roads; 4) Buildings; 5) Vegetation; 6) Clutter. The foundational datasets should include attribution to support rendering of thermals and enhanced vision capabilities. During the first increment, the vendor will be given an area of interest (AOI) and they are to pull directly from source data the elevation (DTED-2), imagery (geotiff), roads (OSM, XML), buildings (.dae, .obj, .fbx, .gltf), vegetation (XML), and clutter (.dae, .obj., fbx, .gltf). Example datasets for each layer will be provided upon request. Vendors shall process and conflate the data automatically. Additionally, the vendor will demonstrate the ability to use the already-adjudicated example datasets provided. These datasets will be accessed via standard REST web services. At a minimum, the vendor must support 1cm level resolution (polygons and textures) and ground-level accuracy (MGRS), or at the level of fidelity provided in the government provided sample datasets. Each dataset must support a minimum of 5 levels of detail (LOD) that are capable of being rendered at a minimum of 90 frames-per-second (fps). All terrain data must have colliders and navigation meshes assigned for collision-detection and non-player character (NPC) navigation/interaction. Terrain attribution and metadata must also be capable of being interpreted and displayed in the runtime. The vendor shall also polygonise and texture an AOI with the on-board sensors to 1cm resolution and accuracy. This capability should be Soldier enabled to allow this data capture and processing to occur in near real-time supporting training events. This meshed data should be stored to support future training and AAR activities.

The vendor shall develop Training Management Tools (TMT) to plan, prepare, execute, and assess with a capability tool to access, query, retrieve, and modify authoritative and other data needed to plan and design training scenarios to meet the required training objectives. This tool shall allow the trainer and scenario creator to build a scenario for execution in the simulation. Through the interface (e.g., monitor/keyboard) the trainer and or scenario creator shall be able to choose the terrain, the desired weather conditions, friendly, opposing, and non-combatant forces to be placed appropriately on the terrain, and the time of day needed for the training event. Any systems, equipment, and objects, both static and dynamic shall be selectable and may be placed appropriately on the terrain with applicable movement waypoints defined and linked to appropriate automated entities. Scenario trigger capabilities

shall be available to establish conditions identified and structured to cause those triggers to activate, thus initiating events, given the actions (or inaction) of the intended initiator (user, automated entity, or some other event). When the scenario creator is satisfied that all elements of the operational environment relevant to the training event and the training objectives are captured, the TMT produces a simulation scenario initialization executable data. At the appointed time and place for the training event, the user runs and executes the simulation scenario file. After the training scenario is complete, an AAR will be conducted. The AAR will display a moveable God's eye view, Soldiers view (First & third person viewpoint during replay), weapons orientation view, Pause function to facilitate correction during execution (in-stride AAR), Hit counts per user (rounds fired, critical hits vs non-critical hits), Time to completion (applicable to the standards), Bookmark function (to skip to relevant points in the training event), Shareable replay (for distribution and best practices), Capture voice traffic (radio and non-radio), Biometrics (i.e. heart rate, blood pressure, eye tracking, and temperature), and the ability to export training data to external systems (e.g., Army Future DTMS systems or Marine Corps future training information management systems). The system shall collect, store, analyze, and transform biometric/physiological and performance data into meaningful metrics allowing the assessment of performance of critical close combat related behaviors, skills and tasks to understand root causes of performance/training effectiveness. Performance assessment will result in recommendations for future training into the IVAS from the system Training Management Tool (TMT) to optimize human performance and or address close combat skill gaps. Data collection and analysis will identify perceptual performance and other performance parameters to predict resilience and identify factors (e.g. fatigue) and other health indicators that may impact mental/physical readiness. Additionally, performance data will be contextualized and transformed into meaningful metrics (e.g. operational stress) and available as a dashboard that enables various individual, peer, and unit performance comparisons. Raw and analyzed data will be exported through the Synthetic Training Environment (STE) Training Management Tool for Test & Evaluation, as well as Research & Development purposes (e.g. Squad Lethality Rating).

The Biometric capability provides performance and biometric data collection to best support training outcomes for the Soldier/Marine during their training event. The intent is to use an interactive biometric data tool to capture a holistic picture of human performance to include physiological and emotional states. This data will be used to determine the effects operational stress on operational resiliency that will serve as a tool for both the Soldier/Marine and leaders to better understand themselves or their organizations. The collection and integration of biometrics and cognitive/perceptual performance metrics into performance feedback is required for both real-time measures collected during a performance as well as off-line measures collected before and/or after performance. Biometric data shall provide metrics required to garner qualitative measures to inform inferences regarding psychological and physiological stress, and better understand the impacts on cognitive and physical performance.

In order to execute squad training at the point of need a local network and additional hardware with interfaces (i.e. server, local network, instrumented and/or simulated squad organic weapons to execute squad collective training tasks) shall be provided to the government as part of the comprehensive IVAS system.

The STE Squad capability is used by the Army/Marine Corps to enable realistic individual and squad training for Squad collective training. Regardless of training scenario used, the instrumented and replicated weapons for training must either replicate 95% look, 95% feel, and 95% performance of the

live weapons issued to Soldiers/Marines or use the Soldiers/Marines live squad organic issued weapons and military devices. This extends not only to the instrumented or simulated weapons and devices themselves, but to accessories mounted on the equipment or that the equipment is mounted on, and the performance of the munitions fired from weapons. Replicated devices shall enable Soldier/Marines to employ more than one replicated device at a time. These devices shall not impede the user's movement nor the manipulation of the device. The location tracking coupled with the near real-time terrain meshing using on board sensors will correctly occlude the TSS generated content to provide realistic target array, weapon user sight alignment and picture, as well as weapons effects. Live organic weapons will also be instrumented to achieve realistic performance, i.e. cycling of the bolt, recoil, ammo capacity, magazine changes, etc. This may be accomplished via pneumatic, electric, or other means as long as they meet user expectations and do not reduce the normal lifespan and usability of live weapons. Any additional hardware, software, and equipment required to achieve integration and realistic performance shall be provided as part of the system (i.e. pneumatic magazines, air compressors, sensors, etc.).

The vendor shall develop Squad Architecture and Performance tools to include a Configuration Database, Architecture Assessment Tool, and Squad Performance Model. The Configuration Database shall provide a Soldier-level and Squad-level architecture that documents all existing and future Soldier and Squad variations as follows:

- Includes all performance capabilities and interface controls between Soldier and Squad systems and external systems.
- Includes interface definitions between components.
- Includes a configuration management capability for base architecture and all future architecture developments.

The vendor shall develop and maintain a secure Data Lake. The Data Lake acts as a data source for the Configuration Database, Architecture Assessment Tool and Squad Performance Model to capture and recreate squad actions in M&S environment.

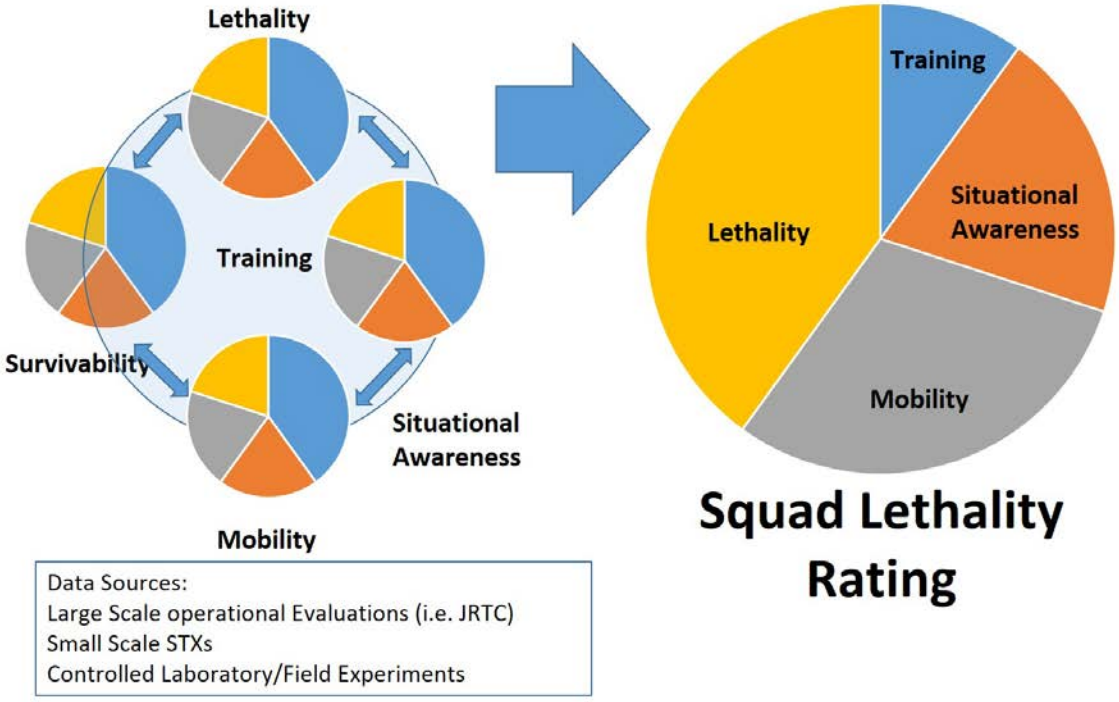
- **Sensor Data from the HUD into the Data Lake**
    - GPS
    - Biometric Data
    - Head, Weapon, & Body Orientation
    - Eye tracking
- **Data provided by the Government into the Data Lake**
    - Soldier Proficiencies
    - Demographic Data
    - Equipment Capabilities
    - Marksmanship
    - Physical Performance
    - Feedback from STE TMT
    - Existing Studies

The Architecture Assessment Tool shall provide a computer tool which leverages AI/ML to store, maintain and continuously develop and improve the Adaptive Soldier Architecture to include the following capabilities:

- Accessible to authorized users world-wide and able to interact/share data with other Army/Joint Program databases and tools
- Provide authoritative information regarding current systems, system-of-system configurations and formations that facilitates informed architecture decisions. Provides associated Lethality information from Squad Performance Model.
- Enables aggregation of components into systems and systems into higher level formations. Provides virtual integration environment for new/ existing components

The Squad Performance Model shall provide a performance model that allows for the evaluation of data from the Data Lake into the Adaptive Soldier Architecture Analysis Tool and outputs Soldier and Squad Lethality ratings (see figure below). The vendor shall develop and validate an optimization and assessment tool with the ability to predict Soldier/Squad performance and inform future investments to:

- Evaluate and utilize (as appropriate) Army/ DoD sponsored models and simulations.
- Evaluate and utilize (as appropriate) existing Soldier and Squad performance research data (studies, experiments, sprints, unit demographics, etc).
- Identify and address gaps in experimentation methodologies, and Soldier and Squad performance research data which would inform the Squad Performance Model.
- Utilize feedback/ measurements from the IVAS system during the "train, rehearse, fight" cycle in Squad Performance Model.
- Identify and recommend Soldier and Squad level Measures of Performance (MOP) and Measures of Effectiveness (MOE).



Section 5: Configuration Management

The vendor shall establish a configuration management process with a structured approach to controlling the hardware and software configuration integrity of the production systems, maintaining interchangeability of hardware, and assuring the functional baseline of the IVAS is maintained throughout the project. IVAS Squad Architecture will be collaboratively developed by Government and Industry in 24 months and owned by the Government. The vendor shall provide delivered data and software to enable Organic Industrial Base (OIB) Support and competitive procurement of spare parts for sustainment and allow for third party maintenance and upgrade of IVAS software. Interface Control Documents (ICDs) shall be submitted by the vendor at the spare part/assembly-level that assure 100% form, fit, and function interchangeability for the HUD 3.0 system with sufficient information to enable third party development of interoperable systems.

The vendor shall prepare and submit a Configuration Management Plan (CMP) which describes their CM program, how it is organized, how it will be conducted, and the methods, procedures and controls relative to the IVAS systems. The content of the CMP shall define the technical and administrative guidelines for change control, status accounting, and audits of the total hardware/hardware and software configurations. The vendor shall establish a CM process to manage the software technical baseline and provide the Government a complete audit trail of plans, decisions and software design modifications. The vendor shall submit electronic engineering change control documents for DD Form 1692 Engineering Change Proposal (ECP), DD Form 1695 Notice of Revision, and DD Form 1696 Specification Change Notice. The CMP is a project deliverable.

The Government provided and maintained IVAS and major component Performance Specification and ICD shall represent the IVAS Functional Baseline. The vendor shall allocate the requirements stated in the functional baseline, with Government approval, down to individual draft Product Baselines prior to commencement of testing. The final Product Baseline shall be established for IVAS at the successful completion of all testing. The Product Baseline shall be maintained by the vendor and provided to the Government as a project deliverable. The Product Baseline is defined by the system, spare parts lists, and specifications down to the spare parts level, which shall all be in vendor formats.

The vendor shall provide a Performance Specification for the system and its major components that capture the performance of their fieldable IVAS. Following completion of the final operational evaluation, the IVAS Integrated Product and Process Team (IPPT) shall finalize the performance specifications. These specifications shall become Government documents and may be used in conjunction with the contractually required spare parts ICDs to support competitive procurement of spared items during the life cycle of the proposed IVAS. The Performance Specification is a project deliverable.

Any changes to the Product Baseline shall result in a common configuration for Government operational use and maintenance activities that provides interchangeability and interoperability to the spare replaceable part level. The Product Baseline shall be documented in the vendor's configuration status accounting database. Any changes to the Product Baselines shall be made via ECP and shall identify any impact to the Government controlled Functional Baseline and ICD. Changes to each system's software configuration baseline shall be properly identified, recorded, evaluated, approved or disapproved, incorporated and verified per EIA-649. For each serial numbered system, the allocated baseline will include the relevant functional and product baseline, and any discriminating information down to the

spare level (serial numbers, item revision and/or lot number, software/firmware versions, date of manufacture).

For all applicable engineering documents, dimensioning and tolerances shall be IAW ASME Y14.5-2009 or equivalent. Electrical characteristics and performance parameters of parts, modules, assemblies, and units shall be expressed as numerical values with tolerances specifying upper and lower (or maximum and minimum) limits. Drawings and all drawing associated files shall not contain any copyright or proprietary markings and shall be in CAD format, PRO/Engineer preferred. Specifications shall be compatible with Windows 10, and Microsoft Office 2013 products.

The vendor shall prepare and submit Interface Control Documents/Drawings (ICDs) at the spare part/assembly-level that assure 100% form, fit, and function interchangeability for the fieldable HUD 3.0 design. The HUD 3.0 ICDs are a project deliverable. The ICDs shall contain sufficient information to enable development of interoperable systems. The ICDs shall include, but are not limited to:

- Configuration and interface dimensional data applicable to the envelope, mounting and interconnection of the related items
- Complete interface engineering requirements (e.g. mechanical, electrical, electronic, optical, human) which affect the physical or functional characteristics of co-functioning items
- Any other characteristics, including material and finishes, which cannot be changed without affecting system interfaces or interfering down to the spareable level
- Complete list of software commands and protocols required to facilitate communication between the HUD 3.0 end items

The list of ICDs to be supplied will include, but is not limited to:

- All physical, human-systems interface (HSI), data, power, other interfaces between components, equipment on the Soldier
- All physical, HSI, data, power, other interfaces between Soldiers and Squad-organic equipment
- All data, voice interfaces between Soldiers

For all requested configuration changes, the vendor shall prepare and submit ECPs, Value Engineering Change Proposals (VECPs), and Requests for Variance (RFVs) to the IPPT for concurrence. A separate ECP shall be submitted for each engineering change that has its own distinct objective and is against a Government approved baseline, with appropriate Notices of Revision, Specification Change Notices, and technical manual change pages, as necessary in accordance with the CMP. The vendor shall include a tolerance analysis as backup data for all configuration control document submittals. Each configuration control document submitted is a project deliverable.

The vendor shall conduct engineering analyses, studies, and maintenance/supply support related to the repair and/or improvement of the IVAS as Technology Insertion Engineering Change Proposals (TIECP) as necessary. These analyses and studies may be used to implement improvements under this contract to the performance, quality, and maintainability of the systems and/or related maintenance equipment. The Government will define the analyses, studies, or maintenance support to be conducted. The vendor shall develop a Statement of Work that includes all related engineering, program management, quality, and logistics tasks, and specific pricing, required to implement the repair/improvement effort. Orders

will be awarded on an as needed basis after the Government approves the repair/improvement Statement of Work and an agreement is reached on a negotiated price.

The vendor shall ensure that the IVAS presents no uncontrolled safety hazards to operators or maintainers, and shall submit a Safety Assessment Report (SAR) for the IVAS that identifies all safety features of the system, specific controls or precautions to be followed during use, and shall provide verification of compliance to safety requirements identified in the SOO. The vendor shall provide updates to the SAR for all configuration changes that occur. If toxic/hazardous materials are utilized, the vendor shall provide the technical information required to complete Part II of the DRMS Form 1930, Hazardous Waste Profile Sheet. The IVAS SAR is a project deliverable.

The SAR shall identify toxic materials used in the design and production of the systems and components, any possible alternative materials, and recommended actions to eliminate or reduce the use of hazardous materials. The SAR shall address any exposure concerns to personnel during operational or maintenance procedures to include fabrication, transportation, setup and tear down, or resulting from damage to the equipment. The vendor shall identify any material used in the system design that requires disposal as a hazardous waste. Radioactive material shall NOT be utilized in the system design and production without prior approval by the Government. The SAR shall specifically describe control measures taken to ensure that the hardware is free of any radioactive materials, including optical glass and lens coatings.

The vendor shall schedule sufficient time in the program schedule to permit a safety inspection of the system by the Government prior to Soldier involved technical or user testing and associated training, or project completion. The inspections will be used to verify the information contained in the SAR. The vendor must allow sufficient time to correct any unresolved high or medium risk hazards prior to testing or delivery of the system to the Government.

The vendor shall obtain a Common Access Card (CAC) sponsored by the US Army IVAS Project Officer. Once the CAC has been issued, CECOM Directorate for Safety via the COR/COTR will provide the vendor with the proper account information for entry into the eHATS system. The hazard tracking log created from this site shall be attached to the SAR.

The vendor shall implement a hazardous material and pollution prevention program ensuring compliance with all Local, State, and Federal laws.

The sensitive nature of these systems require constant surveillance and tracking during shipping IAW DoD 4500.9 Part II Transportation Regulation, AR 190-51 Chapter (3) Paragraph 3-6. This AR is the overriding controlling authority. The following documents provide additional guidance: AR 710-2, AR 735-2, DA Pam 710-2-1, and DOD 5100.76-M (Physical Security of Sensitive Items).

The Packaging and Labeling requirements shall be in accordance with MIL-STD-129 and MIL- STD-130, respectively, for commercial packaging, ASTM-D-3951, of similar items. Marking and labeling shall include Item Unique Identification (IUID). The HUD 3.0 shall be marked externally with the NSN, part number, vendor name, XX/XXX-YY designation, production date, serial number, and IUID. The HUD 3.0 shall be marked in compliance with the IUID standards outlined in MIL-STD-130 using construct #2. Markings shall be designed to be legible and permanent for the entire life of the system. The IVAS

transit/storage container shall be marked with the NSN, part number, and serial number IAW MIL-STD-129.

The vendor shall submit a preliminary Production Manufacturing Plan (PMP) for IVAS production systems at PAC, and shall update the PMP no later than CS #4 BRR. The PMP is a project deliverable. The plan must provide sufficient narrative to enable an evaluation of the vendor's ability to produce IVAS at the rates required as part of this project, and future production (defined no later than CS #4). The PMP shall address the following:

- Manufacturing layout (including methods, manufacturing/test equipment, manpower)
- Production rates (initial rate, normal monthly rate based on 1 shift/8 hours per day/5 days a week, minimum monthly economical rate, and maximum monthly production capacity)
- Ramp-up activities, equipment/production station investment, and lead time needed to achieve normal production and surge production rates
- Identification of potential bottlenecks and limiting factors to production
- Existing manufacturing facilities
- Use of subcontractors and/or partners, both domestic and offshore, to provide components and/or subassemblies at production rates (initial monthly, normal monthly, minimum economical, maximum monthly, surge)
- Funding – When materials are to be ordered
- Testing – Procedures, failure reporting, analysis and trends
- Production - Manufacturing screening, product assurance, production control, yield thresholds, assembly flow charts
- Logistics – Manpower, support/test equipment, spares, Bill of Materials list for product baseline configuration with Original Equipment Manufacturer part numbers & supplier reference, training materials, technical manuals, critical processes, receiving inspection requirements
- Design – Requirements, traceability to specifications and testing, BIT/BITE, engineering release plan, design reviews and release process
- Management – Overall product strategy, personnel required, data management, risk, production breaks

Section 6: Quality Control

The vendor shall establish, maintain, and operate a Quality Management System (QMS) for IVAS in accordance with ISO 9001:2015, or an equivalent quality system. The vendor shall ensure the provisions, practices and protocols of their QMS extend into and include IVAS and unique areas. The vendor shall maintain a calibration system in accordance with ANSI/NCSL Z540.3-2006 or equivalent to ensure that all test/inspection, measurement, and diagnostic equipment, including all accessories and ancillary test equipment, are properly calibrated, identified by appropriate labeling, and are traceable to national measurement standards.

The vendor shall establish appropriate procedures for managing and controlling their supply base to ensure the quality and quantities of the materials/products and services provided do not adversely affect the program performance. Suppliers of key/critical components or processes shall be identified including names and contact information of key supplier personnel. The Government reserves the right to review/audit any suppliers of key/critical components.

The vendor shall maintain no fewer than five (5) vendor-owned HUD 3.0 systems as standards to support Government/vendor correlation testing for low light level (resolution, signal-to-noise ratio, and modulation transfer function) and thermal sensor (minimum resolvable temperature, signal transfer function, uniformity, 3D noise, modulation transfer function, RTA performance parameters including RTA alignment, and latency) key performance characteristics on an as-needed basis. The vendor shall perform and document these measurements on at least a quarterly basis, using actual production test and acceptance equipment. Measured data shall be presented to the Government at each program review to include comparisons to past data (both vendor and Government) with identification of any trends, positive or negative. The vendors shall address and correct to the Government's satisfaction any correlation issued identified at no additional cost to the Government. The vendor shall provide the Government with associated Measurement Interface Equipment (MIE) for HUD 3.0, to include deserializers to support Government measurement of required performance parameters. The MIE shall be a deliverable item.

The vendor's gauges, measuring tools, and testing devices shall be made available for use by the Government when requested to determine conformance with contract requirements. If requested by the Government, the vendor's personnel shall be made available for operation of such devices and for verification of their accuracy and condition.

The vendor shall maintain complete and accurate records of all inspections and tests performed and the corresponding results IAW contractual data retention requirements. The vendor shall make those records available for review or audit by the Government upon request.

The vendor shall perform testing in accordance with the table below.

CS #1	CS #2	CS #3	CS #4
Developmental Testing (Vendor & Govt)	**Developmental Testing (Vendor & Govt)**	**Developmental Testing (Vendor & Govt)**	**Developmental Testing (Vendor & Govt)**
HALT/HASS - determine limits of their system design, electronics, start bounding environmental temperature & vibration limits	Sensor performance measurement (to include acoustic/TCAPs in addition to mobility targeting/mobility sensors and RTA)	Same as Capability Set 2 DT focusing on implementation of corrective actions and DT of any added capability and corrective action implementation from earlier DT and OT testing	Full performance qualification test in accordance agreed upon LRIP initial increment performance specification
Primary Focus on Display - functionality, life, output brightness in day/night conditions	Core environmental testing (Vibration, TE, TS, Immersion, Humidity)		Potentially run another HALT/HASS effort as this will be the first fieldable design
If integrated sensor(s) incorporated - begin performance measurements/ evaluations	Battery Life		
	Transportation and Survivability Environment evaluation		
	Reliability		
	RTA functionality		
	NW 3.0/AR functionality		
Operational Testing	**Operational Testing**	**Operational Testing**	**Operational Testing**
Squad Level OT exercises, indoors (maybe limited outdoors in "optimal" environmental conditions, establish squad performance data lake	Platoon Level OT exercises, indoors/outdoors (day/night live fire qualification)	Company Level OT exercises, indoors/outdoors (day/night live fire qualification) squad on squad performance data collection	Battalion Level OT exercises, indoors/outdoors (day/night live fire qualification) Squad performance baseline and Soldier Lethality Rating
Demonstrate Ability to Populate Data Lake	Laser Vulnerability	EMI	EMI
	CBRNE	EA/ES	Laser Vulnerability
	Weapon Fire over Temperature	Weapon Fire over Temperature	EA/ES
		EW/Cyber Vulnerability Testing	CBRNE
		Ballistic & Laser Protection	Weapon Fire over Temperature
			Ballistics & Laser Protection
			Airworthiness Testing
			EW/Cyber Vulnerability Testing

The vendor shall provide IVAS test systems, for Government and vendor qualification testing. The vendor shall provide the required number of systems along with repair parts/System Support Package (SSP) and other ancillary items as required for the various test events in accordance with the IVAS Project Schedule included herein. The Government will conduct Soldier Touch Points and Government DT on each of the four configurations, to characterize performance, and ensure the contract requirements are satisfied both technically as well as in an operational environment by CS #4. During Government testing, the vendor shall provide on-call support at a location on or close to the test site. The vendor's representative(s) shall inspect, repair, maintain, modify, perform failure analysis, consult and train the IVAS as required. Government testing will encompass all testing required to confirm that the system meets all applicable performance goals.

The vendor shall conduct testing on each configuration of the IVAS using approved test procedures to demonstrate conformance to the IVAS performance goals as defined in this SOO. The vendor shall notify the Government of all changes to the materials configuration or processes utilized to manufacture the IVAS. The vendor shall bear all costs associated with corrective actions to include, but not limited to, documentation updates, design modifications, and retesting. The vendor, in accordance with their QMS requirements, will capture, analyze and evaluate production, inspection, and test data and as warranted, take the appropriate action to address and/or mitigate risk to the Government. At the conclusion of DT on each configuration, the vendor shall submit a Test Report in accordance with the requirements of this SOO.

The test plan shall provide the approach for ensuring the system and/or major components meet the required performance goals. The test plan shall include for each performance goal, as a minimum, the method of validation (e.g., test, demonstration, inspection, analysis, similarity); test conditions and applicable test standards, sample size, test schedules, and test sequences. The test plan shall address all inspections, demonstrations, testing, and analysis required to validate the Product Baseline, including validation of the processes necessary to build the design. Any modifications to the test plan shall be agreed to in writing by the COR prior to being implemented. Vendor test plans shall be approved by the Government prior to test execution and all vendor tests shall be executed with a Government witness. IVAS Test Plans are a project deliverable.

The vendor shall prepare and submit Test Procedures to the IPPT for concurrence. Final approval of the Test Procedures shall occur prior to commencement of testing. IVAS Test Procedures are a project deliverable.

The vendor shall prepare and submit a Test/Inspection Report following completion of each test event. The Test/Inspection Report shall include the test results, including raw data, compiled and calculated data (to include mathematical equations/models used), test conclusions, and test logs. The report shall address all testing performed and all failures encountered. All conclusions shall be clearly identified and shall be appropriately segregated from the objective results. Test Reports are to be submitted as a project deliverable.

The vendor shall establish, maintain, and operate a Reliability Program acceptable to the Government for the IVAS program, and shall provide an overview of their Reliability Program at the Post Award Conference (PAC). The Reliability Program shall be updated and addressed at each contractually-required review thereafter. The vendor shall reference the Failure Definition and Scoring Criteria (FDSC) Document provided by the Government for assessment against the operational requirements in this

SOO. Upon contract award, the Government and vendor shall jointly develop and operate a closed-loop failure-mode mitigation Reliability Program (using ANSI/GEIA-STD-0009 and DoD Guide for Achieving Reliability, Availability, and Maintainability, dated 3 August 2005, as guidelines) with emphasis on understanding the IVAS reliability requirements, designing for reliability, producing reliable systems, and monitoring/assessing field reliability.

The Reliability Program shall include the below elements as a minimum:

- Reliability Program Plan (RPP). The vendor shall prepare and submit an RPP as a comprehensive compendium of IVAS reliability activities, functions, processes, test strategies, measurements, data collections, resources, and timelines required to ensure that the specified reliability of the IVAS will be achieved before fielding. The IVAS RPP is a project deliverable.
- System Reliability Model (SRM). The vendor shall develop an SRM using reliability block diagram analysis. The SRM shall consist of the lowest identifiable functions/elements and their relationships to each other, encompassing all hardware and non-hardware elements including, but not limited to, Commercial Off-the-Shelf (COTS), Non-Developmental Items (NDI), GFE, software, human factors, and manufacturing. The SRM shall identify critical elements in the system design and additional design or testing activities required in order to achieve the reliability requirements and label the component manufacturers for logic bearing components. Critical elements are defined as those elements whose failure impacts mission completion, essential functions, or safety; or elements whose failure rates contribute significantly to the overall system. The SRM shall be updated whenever new failure modes are identified, failure definitions are updated, operational and environmental load estimates are revised, or design and manufacturing changes occur throughout the life cycle. Detailed critical component stress and damage models shall be incorporated as appropriate. The vendor shall assign each element of the SRM an assessed and consistent reliability metric (e.g., mean time between failures). The values shall be based on reliability analysis from comparable systems/elements, historical reliability from predecessor systems/elements, or documented subject matter expert engineering estimation. The vendor shall provide a table with all elements contributing to critical weaknesses of the SRM, including the associated reliability metric and risk criteria (low, medium, high) for each element based upon the following guidance:
    - Low Risk: Test data or reliability analysis of comparable systems (under IVAS -like Operational Mode Summary/Mission Profile (OMS/MP) conditions)
    - Medium Risk: Historical reliability of systems of similar complexity, test data, or reliability analysis of comparable systems (not following IVAS -like OMS/MP conditions)
    - High Risk: Subject Matter Expert engineering estimates

  The vendor shall develop a plan to mitigate all critical elements rated as high or medium risk. Mitigation plans may include additional testing, redesign, part selection.
- Life Cycle Loads. The vendor shall estimate life-cycle loads on all assemblies, subassemblies, and components, as a result of the product-level operational and environmental loads to include mechanical, thermal and electrical stress. The vendor shall use these estimates as inputs to engineering and physics-based models in order to identify potential failure mechanisms and resulting failure modes. These estimates of life-cycle loads shall be refined periodically as system-level loads are updated and/or design evolves.

- Identification of Failure Modes and Mechanisms. The Systems Engineering (SE) Working Integrated Product Team (WIPT) shall identify, confirm, and mitigate the critical failure modes through modeling, analysis, and test that will result when life cycle loads are imposed. Failure modes shall be mitigated by one or more of the following approaches:
    - Eliminating the failure mode
    - Reducing its occurrence probability or frequency
    - Incorporation of redundancy, and/or
    - Mitigation of failure effects (e.g., fault recovery, degraded modes of operation, providing advance warning of failure)
- Reliability Verification. The vendor shall perform reliability assessments on data from analysis, modeling & simulation, and test (vendor and Government testing), shall track the assessments as a function of time and compare them against reliability allocations, reliability requirements, and values to be achieved at various points during development to verify implementation of corrective actions. The SE WIPT will track progress against the curve during program execution at the end of each Soldier Touch Point. If the required reliability is not achieved by STP #4, an additional corrective action and verification test may be required.
- Systems Engineering Integration. The vendor shall incorporate reliability activities as an integral part of disciplined and documented systems engineering process and plan, manage and control reliability-critical items, monitor and evaluate the reliability impact of changes to the IVAS design or manufacture, and coordinate all reliability activities and findings with the system's design team.

The vendor shall conduct reliability testing on the system(s) and TMDE, as part of PQT and on every production lot IAW with the QVM to verify compliance with the system reliability requirements. The vendor shall submit Production Reliability Acceptance Test (PRAT) reports for all reliability tests as specified herein. Sampling of each lot shall be conducted IAW the QVM. At no additional cost to the Government, the vendor shall institute all necessary corrective actions to bring the systems and TMDE into reliability compliance (including previously delivered systems) and shall demonstrate reliability compliance following corrective action implementation.

The vendor shall utilize a closed-loop Failure Reporting, Analysis, and Corrective Action System (FRACAS) in accordance with ANSI/GEIA-STD-0009 and QMS as its mechanism for monitoring and communicating descriptions of test (Government and vendor) and field failures, analyses of failure modes and root cause mechanisms, status of design and/or process corrective actions, risk-mitigation decisions, corrective action effectiveness, and lessons learned. The vendor shall address failure modes in a timely manner, consistent with their impact on safety, reliability, performance, and total life cycle cost.

The vendor shall notify the Government within 48 hours of failure occurrence during all vendor testing. For all failures that occur in Government and vendor testing, the vendor shall document the results of their failure analysis and root cause corrective action investigation in accordance with a mutually agreed upon process. The complete content of the Failed Item Analysis Report (FIAR) and a list of personnel to be notified of failures shall be concurred on by the IPPT at the PAC. The Government reserves the right to stop acceptance of product at any time while any failure report is pending based on the impact of the failure in question. A failure report shall not be considered closed until the IPPT has concurred on the report in writing. Concurrence by the Government is required prior to shipment of any potentially affected production units.

Each HUD 3.0 system shall be subjected to an Environmental Stress Screening (ESS) with an appropriate failure-free verification period that is accepted by the Government. The ESS profile shall include both vibration and temperature exposures. The vendor shall include a proposed ESS profile as part of their proposal and shall be designed to effectively reduce/eliminate workmanship and infant mortality type defects. Causes of ESS failures shall be tracked, investigated, and closed per vendor internal procedures for the purpose of continuously improving the screen and the manufacturing processes. Modification of the stress profile may be allowed with Government approval based on data evaluations. The vendor shall present the ESS status (e.g., serial numbers, pass/fail, reasons for failure(s), corrective actions, analysis of corrective action effectiveness) at each IPPT review and ESS performance data shall be made available to the Government for review upon request.

Section 7: Logistics

The vendor shall plan, manage, and execute an Integrated Product Support (IPS) effort that assures the IVAS achieves an operational availability ≥ 90%. The vendor shall develop and implement a Logistics Support Plan (LSP) to deliver all materials and documentation required to support the IVAS. The LSP shall be developed from a supportability analysis completed in accordance with ANSI GEIA-STD-007. The logistics support requirements shall consist of Provisioning, New Equipment Training (NET), Training and Doctrine Command (TRADOC) training materials (training package, Interactive Electronic Training Materials (IETM), System Support Package (SSP), and Technical Manuals (TMs) (Operator and Field-level TMs), including repair parts and special tools list (RPSTL), Test Maintenance and Diagnostic Equipment (TMDE), Quick Reference Card (QRC), and Technical Orders (TOs). The IVAS LSP and TMDE LSP are project deliverables.

The vendor shall perform a Level of Repair Analysis (LORA) to determine the optimum maintenance concept for the IVAS and TMDE. The LORA is used to determine the repair level within the Army maintenance system and considers availability and requirements for additional tools, support equipment, and skills in intended supporting units. Maintenance Allocation Charts (MACs) are an output of the LORA, and reflect the approved maintenance concept. The initial LORA shall be submitted 30 days after the Logistics Start of Work meeting and shall be updated as the system matures. The IVAS LORA and the TMDE LORA are project deliverables.

Throughout this SOO, the term End Item refers to a final combination of IVAS end products, assemblies/materials which is ready for its intended use.

The term “spares” or “spare parts” refers to all Line Replaceable Units (LRUs), Shop Replaceable Units (SRUs) applicable to the IVAS and TMDE proposed. The offeror shall describe the method of validation/certification of each spare item to ensure when the item is correctly utilized in a maintenance action, it will function properly, meeting the system and component (if applicable) performance requirements. When spare parts are required to be shipped they shall be packaged and labeled IAW MIL STD-129 and MIL STD-130. The spare parts can be individually wrapped and labeled. If more than one spare part is required they can be packaged together with the labeling reflecting the appropriate number included in the package. Each system will include a Built in Test and/or Prognostic Health Monitoring/Diagnostic capability.

An LRU is an item removed and replaced “on the Line”, usually by the Unit to repair the end item. LRU items can be reparable or non-reparable. An SRU is an item removed and replaced “in a repair Shop” to

repair a reparable LRU or, in the case of IVAS, to repair the end item. SRU removal and replacement requires skills and tools not available at the Crew level, such as the low light level sensor, thermal sensor, antenna, or board level replacement. SRU items can be reparable or non-reparable. Piece Parts are minor consumable parts required for the maintenance, overhaul, or repair of a component, assembly, equipment or end item.

Upon award, the vendor shall utilize the Army Computerized Optimization Model for Predicting and Analyzing Support Structures (COMPASS) and the Logistics Cost Estimating Tool (LCET) model as the logistics cost estimating tools for this project. The Government will provide executable copies of the models either by download instructions or on disc. The Government will provide the vendor with baseline input data and instructions as required.

If organic maintenance is determined to be a requirement, TMDE shall be developed and delivered to support the IVAS. No special tools or TMDE shall be required to repair the IVAS at the Operator/Crew-level. The vendor's TMDE required for Maintainer-level maintenance shall be Class 3 and developed IAW MIL-PRF-28800F and shall have self-diagnostic capability to the LRU level.

The vendor shall provide a Logistics Support Plan (LSP) for the TMDE, special tools, any common tools, and fixtures to include the vendor's plan to deliver training materials (both crew level and maintainer level, warranty, calibration standards and levels, configuration control, and mid/long-term (5/10-year) supportability plan. The Special Tools, Common Tools, Fixtures, TMDE LSP is a project deliverable and shall be submitted NLT CS#3. If special tools/common tools/fixtures/TMDE are required for organic Maintainer-level (above the Crew-level) maintenance, they shall:

- Function with the HUD 3.0 design that successfully completes Government DT/OT and the vendor PQT
- Allow for active adjustment/setting of LRUs, SRUs, and piece parts to complete the repair of the HUD 3.0 without the use of a dark room
- TMDE solution weight will not to exceed 50 pounds. This weight is the total weight of all components of the TMDE (including transit case and all special tools)
- TMDE transit case will be developed IAW MIL-PRF-28800F

Any TMDE, special or common tool that will be used to repair and maintain the HUD 3.0 must be fully developed and delivered to the Government NLT 60 days prior to the Logistics Demonstration (LD) for independent evaluation and acceptance. Location for delivery of TMDE will be determined by the Government.

The Government anticipates a minimum of 1-xx sets of TMDE, special tools, common tools, and fixtures shall be needed to achieve organic Maintainer-level maintenance. This number includes any TMDE sets provided as a standalone interim solution for IVAS. The IVAS Special Tools, Common Tools, Fixtures, TMDE LSP is a project deliverable.

LDs are used to evaluate the adequacy of the System Support Package (SSP) and ensure that the gaining unit has the logistical capability to achieve initial operational capability (IOC). The vendor shall plan and support Operator/Crew-Level and Maintainer-Level LDs for the IVAS prior to STP#4: using an LD Plan, Government personnel representative of the target audience trained by the vendor, and vendor-provided training material and technical manuals. The vendor shall also prepare and provide test

systems, a System Support Package Component List (SSPCL) and SSP required for the LDs. The vendor will ensure the Government has the ability to insert/simulate faults to verify all repair actions. The SSPs provided will be returned (less consumables) to the vendor at the conclusion of the LD. The vendor shall prepare and submit an LD Report for each LD. The IVAS LD Plan, LD Report, SSPCL and SSP are project deliverables.

The Operator and Crew LD will demonstrate that the IVAS meets all logistics/maintainability and MANPRINT requirements at the Operator/Crew-Level, and will identify any system design changes needed for improved supportability and/or reduced life cycle cost. The Operator and Crew LD and supporting tasks shall be shown in the vendor's Integrated Master Schedule (IMS).

The Maintainer LD will demonstrate that the IVAS and TMDE meet all logistics/maintainability and MANPRINT requirements at the Maintainer-Level, and will identify any system design changes needed for improved supportability and/or reduced life cycle cost. TMDE must be available to support the IVAS Maintainer LD and supporting tasks shall be shown in the vendor's IMS.

The SSP is comprised of a list of items required to support a test event (e.g. LD, STP, OT). The SSP will consist of the following:

- Technical Manuals
- Training Documentation
- Common Tools
- Special Tools
- TMDE
- Repair Parts
- Lubricating/Cleaning Items
- Additional Systems
- Quick Reference Card (Operator)
- Any other item(s) required to support the system

The SSP will be verified by the Government prior to the LD or OT event. The vendor shall be prepared to provide the SSP items required to support the events for the IVAS to the Government test site as early as 30 days prior to the start of the demonstration/testing. The availability of the SSP shall be included in the IMS.

The SSPCL is a list comprised of all the items contained in the SSP to include the TMs, Training, common and any required special tools and TMDE, Spares and Repair Parts, lubricating/cleaning items, and any other item required to support the system during the LD and any required Operational Test, to include the Air Jump. The vendor shall be prepared to provide the SSPCL required to support the LD or OT events for the IVAS to the Government test site as early as 60 days prior to the start of the demonstration/testing.

The objective of the Instructor and Key Personnel Training (I&KPT) is to provide IVAS operators and maintainers the required skills to operate and support the systems in a structured school environment, in garrison, and in a field environment. The vendor shall conduct I&KPT at a location(s) selected by the Government. IVAS I&KPT is a project deliverable.

The vendor shall provide training material required to adequately reflect the IVAS and TMDE being provided under this contract and in accordance with the approved maintenance concept. The vendor shall conduct an Operator and Crew-level training course and a Maintainer-level training course. Training shall be conducted at CONUS Government-selected sites. Training shall provide students with the skills necessary to operate and maintain the IVAS and TMDE. Training shall include, but is not limited to, all tasks contained in the -10 and -23&P TMs. The training shall consist of two (2) classes for each course with options for two (2) additional classes for each course. Draft and final training material reviews, as well as scheduled class dates, shall be finalized and concurred upon by the Government and vendor at the PAC, and shall be integrated into the IMS. The vendor shall also prepare and deliver a CD or DVD of the training presentations for use as a reach-back or refresher training tool. The vendor shall provide updates to the Training for all configuration changes.

The vendor shall deliver to the Government all training materials reviewed and concurred to by the Government for use during the conduct of each course. The vendor shall provide drafts available for review, with updated drafts for training, as required. Finals as updated during the conduct of the training course are due 30 days after completion of the last training class. Final submissions shall be in electronic media format. IVAS Operator/Crew Training Material and IVAS Maintainer/TMDE Training Material are project deliverables.

The vendor shall develop Technical Manuals (TMs) to adequately reflect the IVAS and TMDE provided under this project and in accordance with the approved maintenance concept. TMs shall be provided for the IVAS and TMDE (if proposed) in accordance with MIL-STD-40051.2A or most current publication guide and as tailored by the Government IPPT. The IMS shall include development through final delivery of the TM material. The Government requires the digital files for review two weeks prior to the TM verification start date defined in the IMS. The Government's review/comments will be provided at the completion of the verification effort. Digital files are due from the vendor 30 days after receipt of comments from the Government. The vendor shall provide updates to the TM for all configuration changes that occur through Vendor PQT, Government DT/OT, and verification of the IVAS maintenance concept.

TMs for the IVAS shall consist of a pocket-sized Operator TM (-10) and a standard 8" X 11" Field Maintenance TM (-23&P) including a MAC, Repair Parts and Special Tools Lists (RPSTL), Component of End Item (COEI), Additional Authorized List (AAL), and an Expendable and Durable Items List. The Operator TM (-10) and Field Maintenance TM (-23&P) shall be in Work Package Format. The vendor shall also deliver a laminated Quick Reference Card (QRC) for the IVAS providing basic operating procedures. Each manual and the QRC shall reflect the configuration of the IVAS delivered under this project, and shall be prepared at the reading grade level (i.e., 8th grade reading level) and comprehension level described in the target audience description provided by the Government after contract award. The IVAS -10 TM, IVAS -23&P TM, and IVAS QRC are project deliverables.

The vendor shall deliver the TMs and QRCs digital files in native (editable) format (MS Word) in page orientation. The Operator TM (-10) and Field Maintenance TM (-23&P) shall be in Work Package Format. All TMs shall also be delivered in Portable Document Format (PDF) with all fonts embedded. The vendor shall deliver all required TMs in both PDF and MS Word format at the end of the TM verification and shall provide pricing for separate IVAS -23&P Interactive Electronic Technical Manuals (IETMs). If ordered, delivery of the Draft IETM shall be 90 days after award. The Final IETM would be

due 30 days after receipt of Government comments. The authoring/reader software (IADS, for example) shall also be delivered as part of the IETM and shall be based upon native Standard Generalized Markup Language (SGML). IADS or equivalent is required. The IETM will include: bookmarks to major sections in the manual, hyperlinks from the table of contents to all paragraph numbers, figures, and tables listed in the table of contents, hyperlinks in the body of the document on all cross-referenced sections. The bookmarks and hyperlinks will allow the IETM user to move quickly and easily through the IETM.

The vendor shall schedule and conduct a TM Validation at the vendor's facility prior to a Government-run TM Verification at a Government location (i.e. Ft Bragg, NC). Vendor personnel performing operating and maintenance procedures on the equipment during validation shall be independent of the vendor's TM preparation activity. The vendor shall certify validation of the TMs to the Government in writing. The Government will perform all of the operating and maintenance procedures in each publication during verification. The vendor shall provide the following support to the verification:

- Schedule sufficient time and materials (e.g. special and common tools, TMDE consumables) as needed for the Government to successfully complete its verification effort.
- Record and maintain records during the verification process.
- Maintain a master copy of each publication that shall be corrected during the verification process.
- Assist the contracting activity, as requested, during the verification process.
- Provide the contracting activity with a report of the corrective actions taken.

The vendor shall deliver to the verification site: ten copies of each validated TM and QRC to be verified, test equipment, i.e. TMDE, systems, minimum (2) each, spare parts and pieces IAW the MAC chart. The vendor shall provide: personnel necessary to document needed changes and resolve hardware issues; the subject equipment in each TM to be verified; all tools, expendables, and test equipment required, according to the MAC and maintenance procedures, to perform all procedures in each TM, if the Government selects the vendor's location. TMs must be verified at least 60 days prior to conducting the LD. The Government IPPT will verify that the TMs are suitable and that the content and features are correct. The manuals will be reviewed for the accuracy and completeness of all operating and maintenance procedures using a Government-provided target audience. The IVAS QRCs will also be verified at this time. The verification shall be at a site to be determined by the Government.

The vendor shall pack one paper copy of the laminated QRC with basic system operating instructions, with each IVAS system delivered under this project. The vendor shall print both the TM and the laminated QRC through initial qualification.

The vendor shall implement a Human Factors Engineering (HFE) program to assure the IVAS and TMDE conforms to the requirements of its Performance Specification and to address any HFE issues found during Government DT/OT. The HFE program shall focus on Soldier portability, Soldier/system interface, system set-up and tear-down, and maintenance operations. The HFE program progress and current findings shall be presented at each IPPT review.

The vendor shall work with the IPPT to develop and provide a Provisioning Parts List (PPL) for the HUD 3.0 and TMDE. The PPL shall be structured for the end item, component, or assembly level as specified by the MAC in a top-down breakdown sequence, and shall be suitable for submission to the Provisioning Master Record (PMR) of the Commodity Command Standards System. The PPL shall contain the end

item, component, or assembly equipment and all support items which can be disassembled, reassembled, or replaced and which when combined, constitute the end item, component or assembly equipment and any special tools and/or kits. The PPL shall provide all data and information required to support the Repair Parts and Special Tools List (RPSTL) portion of the Technical Manuals. The HUD 3.0 PPL and the HUD 3.0 TMDE PPL are project deliverables. The vendor shall allow for up to 6 months for Government NSN assignment, which commences upon Government receipt of the proper Provisioning Technical Documentation (PTD) and associated drawings. The PTD, drawings, and National Stock Numbers (NSN) assignment are required to be completed prior to TM verification. The submission and approval process of the PTD and associated drawings shall be reflected in the IMS. The vendor shall provide Engineering Data for Provisioning (EDFP) for all HUD 3.0 and TMDE maintenance-significant items (SMR1='P') on the PPL which do not have NSNs. The EDFP shall be data such as specifications, sketches or drawings with descriptions necessary to indicate the physical characteristics, location, and function of the item to permit proper cataloging. The HUD 3.0 EDFP and the HUD 3.0 TMDE EDFP are project deliverables. Data within the PPL shall permit spares requirements calculations so that the provisioning parts buy can be initiated upon receipt of the stock number assignments. The vendor shall provide updates to the PPL, with accompanying EDFP, for all configuration changes that occur through final hardware delivery. The PPL and EDFP shall be developed in accordance with GEIA-STD-0007 and delivery of the PPL and the EDFP shall be as agreed to by the IPPT and documented in the IMS. The vendor shall provide updates to the PPL, with accompanying EDFP, for all configuration changes that occur through final hardware delivery. Delivery of the PPL shall be in .doc text format electronic media (fixed length 80 card format) together with accompanying hardcopy listing. Delivery of the EDFP shall be in electronic media where available. As a minimum, hardcopy EDFP is acceptable and must be of reproducible quality. See Provisioning Data Requirements Forms for PPL content information in the table below.

Program Data Requirements Form for Provisioning Guidance

DATA REQUIREMENTS FORM					
PROVISIONING REQUIREMENTS DATA ELEMENT TITLE	LSA 036 CARD BLOCK	REQD	SFPPL	PPL	DCN
CROSS FUNCTIONAL REQUIREMENT (SEE SOW)					
PCCN (Government provides)	1	X		X	X
PLISN	2	X		X	X
TYPE OF CHANGE CODE	3	X			X
INDENTURE CODE	A-4	X		X	X
CAGE CODE	A-5	X		X	X
REFERENCE NUMBER	A-6	X		X	X
ADDITIONAL CAGE CODE	A-5	X		X	X
ADDITIONAL REFERENCE NUMBER	A-6	X		X	X
ESSENTIALITY CODE	A-11	X		X	X
ITEM NAME	A-12	X		X	X
SHELF LIFE	A-13	X		X	X
UNIT OF MEASURE	B-16	X		X	X
UNIT OF MEASURE (UM) PRICE	B-17	X		X	X
SOURCE,MAINT AND RECOVER CODE	B-22	X		X	X
DEMILITARIZATION CODE	B-23	X		X	X
PRODUCTION LEAD TIME	B-24	X		X	X
PHYSICAL SECURITY PILFERAGE CODE	B-26	X		X	X
PRECIOUS METAL INDICATOR CODE	B-27	X		X	X
NEXT HIGHER ASSEMBLY (NHA) PLISN	C-29	X		X	X
QUANTITY PER ASSEMBLY	C-32	X		X	X
QUANTITY PER END ITEM	C-33	X		X	X
MAINTENANCE REPLACEMENT RATE I	C-34	X		X	X
MAINTENANCE REPLACEMENT RATE II	C-35	X		X	X
MAINT REPLACEMENT RATE MODIFIER	C-36	X		X	X
SAME AS PLISN	C-38	X		X	X
USABLE ON CODE (Government provides code)	D-43	X		X	X
MAINTENANCE TASK DISTRIBUTION (for reparable items only)	E-58	X		X	X
REPLACEMENT TASK DISTRIBUTION	E-60	X		X	X
CHANGE AUTHORITY NUMBER	F-67	X			X
INTERCHANGEABILITY CODE	F-68	X			X
SERIAL NUMBER EFFECTIVITY	F-69	X			X
REPLACED OR SUPERSEDING (R/S) PLISN	F-71	X			X
R/S PLISN INDICATOR	F-72	X			X

Program Data Requirements Form for Provisioning Guidance

OPTIONAL: Additional information may be included for “H” Remarks card and “J” and “K” RPSTL cards as useful for vendor and Government provisioning and RPSTL reviews.

The vendor shall provide their standard warranty. For the IVAS systems the warranty will be for a minimum period of 1 year and shall be included in the system unit price. During the warranty period, the vendor shall repair or replace – at no additional cost to the Government – any IVAS system and related spare parts that fail under normal operations, while in storage, or during transportation. The vendor will verify warranty status and ship a spec-compliant replacement system no later than 48 hours upon receipt of the failed unit. The warranty will exclude equipment failures caused by combat damage,

natural disaster, or misuse. Government acceptance of a storage warranty does not limit the Government's rights under any other term or condition of this contract. The vendor shall pay for all shipping costs for warranty items.

The vendor shall prepare and deliver an initial Return Process Flow Chart at the Logistics Start of Work meeting and shall provide a final update prior to the CS #4 BRR. The vendor shall prepare and deliver a Warranty Status Report every 90 days following delivery of the final CS until the warranty period is expired for all systems. Both the Return Process Flow Chart and the Warranty Status Report are project deliverables.

Section 8: Management Objectives

The vendor shall manage all aspects of the project with respect to cost, schedule, system design, development, fabrication, engineering, configuration management, risk management, test, technical performance, and supply control. The vendor shall provide timely programmatic, schedule and performance information to the Government throughout the life of the project. The vendor shall maintain a program management structure with a single point of contact for program oversight. The vendor shall perform administrative, technical, business, and financial management functions during the course of this effort to include organizing, directing, and controlling actions, reporting status, recommending solutions, and resolving issues to achieve project objectives. The vendor shall implement processes for the following:

- Program Planning, Management, and Control. The vendor shall manage and participate in necessary business and administrative planning, test planning, organizing, directing, coordination, and approving actions designated to accomplish overall program objectives. The vendor shall ensure that only technically qualified personnel with the proper security clearances and training support the program. The management operating procedures and dispute resolution process for addressing the day to day management concerns/issues that arise during this effort shall be clearly articulated as early as possible after contract award.
- Subcontractor/partner and Management. The vendor shall establish and maintain a subcontract management program, and shall facilitate Government and subcontractor discussions/activities as required by the Government.
- Integrated Program Management Report (IPMR). The objective of the IPMR is to provide sufficient detail and insight to the IVAS IPPT with the current project status and to project future project performance, see MIL-STD-881D, paragraph section 3. The IPMR is a monthly project deliverable discussed at weekly IPPT meetings. Defines activities and tasks for the entire effort under the contract. Tasks/activities shall be logically linked to the appropriate Contract Work Breakdown Structure, showing predecessor/successor relationships, and critical path. Contractor shall show information to the control account level. The schedule should be created in Microsoft Project 2013 following the Program CWBS, which shall be provided. All tasks should be logic-driven, there should be no constraints (other than the default "As Soon as Possible" constraint), all tasks should have at least one predecessor and one successor (except for the first and last tasks), task durations should be 25 work days or less. No Start-Finish relationships or negative lag will be allowed. Any exceptions to these requirements will be considered on a case by case basis.

- Risk Management/Mitigation Plan. The vendor shall conduct and document an in-house risk management program that shall identify, analyze, track, and plan alternatives to reduce schedule and technical risks. Risk items and their mitigation efforts shall be presented at formal reviews and on an as needed basis during other meetings. The risk management/mitigation plan shall include, but is not limited to, the following: risk description, rating (stoplight or low, medium, high), program impact, mitigation strategy, action officer, schedule and status. The Risk Management/Mitigation Plan is a project deliverable.

An IPPT will be established with membership from both the vendor and Government teams to foster an open, shared data/information environment and to implement a disciplined systems engineering approach to influence the design, manufacturing, testing, logistics support, and on-schedule delivery of required items. The IPPT will conduct both formal and informal reviews, to include PAC, DRs, and BRRs and shall use risk management to document/track/manage program risk, review/concur on program documentation, review/concur on FIARs/ECPs, and review IMS.

The IPPT chairs will develop an agenda for all reviews/meetings. The IPPT Agenda and Read-Ahead Briefing is a project deliverable. At the end of each review/meeting, the vendor shall prepare action items and meeting minutes for Government concurrence. The IPPT Meeting Minutes and Action Items shall be a project deliverable.

The vendor shall participate in and support IPPT Reviews at approximately 90-day intervals throughout the life of the project, or as agreed to by the IPPT chairpersons. The first IPPT Review shall be conducted no later than 30 days after the PAC. IPPT reviews may be conducted as teleconferences or video-teleconferences (VTCs) if mutually agreed upon by the IPPT co-chairpersons, however face-to-face meetings are preferred to be at the vendor's facility. With Government concurrence, IPPT reviews may be relaxed in frequency, and/or may be combined with other significant meetings or events. IPPT reviews shall provide a working level forum to identify, discuss, and resolve issues that could affect the system performance, design, production, quality, testing, logistics support, system deliveries, life cycle cost, and program schedule. The IPMR and Risk Mitigation Document shall also be reviewed at these meetings, as well as an agenda approved by the Government that includes items such as deliverable status, test status and TM development status.

The IVAS Project Manager will appoint a Government chairperson for the IVAS IPT. The IVAS IPT will include separate functional area WIPTs for Acquisition, Cost, Supportability, Technical, and Test & Evaluation. The vendor shall schedule (with Government concurrence), prepare for, and conduct the IVAS IPT Reviews, IPPT informal reviews, IPPT formal reviews (PAC, DRs, UJs, and BRRs). Reviews shall be conducted in accordance with the timelines established in this project. PAC shall be conducted to ensure there is a mutual understanding of the terms, conditions, and requirements among all parties responsible for the management and performance of the contract. The vendor shall host DRs to provide a preliminary assessment of the design of each CS. UJs shall be conducted to discover technologies challenges. A BRR shall be hosted by the vendor prior to STP. The vendor shall host a BRR to review the vendor's preparation and ability to execute test events in accordance with approved test procedures and test schedule. Exit criteria for the various reviews includes, but is not limited to:

- PAC Exit Criteria. Agreement on:
    - Agreement terms, conditions, and requirements

    - Requirements for on-line technical information
    - Request release for public announcement
    - PAC Report prepared and submitted by the vendor and approved by the Government
- DR Exit Criteria. Approval that the vendor has accomplished/verified the following:
    - Technical effort and design indicate operational test success (effective, suitable, and survivable)
    - Preliminary design, as disclosed, satisfies the IVAS SOO
    - Status of RAM engineering design activities (i.e., allocations, models, block diagrams, predictions, anticipated failure modes and effects) adequately summarized
    - System allocated baseline to enable the design to proceed with proper configuration management established and documented
    - Processes and metrics for the program to succeed adequately established
    - Human integration design factors included in the overall system design
    - Program risks and mitigation plan for all functional areas (e.g. SE, Software, Program Management, Quality/Test, Reliability, Logistics, Cybersecurity, Manufacturing) established/updated
    - Program schedule identifies critical path drivers and is executable (technical, cost, risk)
    - Program is properly staffed
    - All required unique tooling and test equipment required to produce and test the IVAS identified
    - All required system Functional Baseline performance is fully decomposed and defined in the allocated baseline
    - DR Report prepared and submitted by the vendor and approved by the Government
    - System initial product baseline established no later than CS #4.
    - Program development schedule including fabrication, test and evaluation, software coding, critical path drivers updated
    - LSP updated to include program sustainment development efforts and schedules based on current budgets, test evaluation results and firm supportability design features
    - All exposed materials of the design (to include ancillary items) to support Chemical, Biological, Radiological, and Nuclear (CBRN) Contamination Survivability analysis identified
    - All precious metals (including amount in grams), toxic or hazardous materials, and all material(s) for each optical element, of the entire design (to include ancillary items) identified
- UJ Exit Criteria.
    - Soldier ergonomics discovered
    - Validation of repairs/modifications of identified failures resolved
- BRR Exit Criteria. At the BRR, the Government shall verify the traceability of planned tests to program requirements, determine the completeness of their test procedures, and their compliance with test plans and descriptions. The vendor shall provide evidence to assess the system for development maturity, cost/schedule effectiveness, and risk to determine readiness to proceed to formal testing. Exit criteria for the completion of the BRR shall (at a minimum) include:
    - Test Plans and Test Procedures completed and accepted

    - Required test resources, to include roles and responsibilities of all test participants, identified and coordinated
    - Identified risk level acceptable to the program leadership
    - Configuration of the systems to be tested is defined for the complete Bill of Materials, both hardware and software, and all units to be tested are of the same configuration
    - All associated action items from previous meetings have been dispositioned and closed
    - BRR Report prepared and submitted by the vendor
- STP Exit Criteria. The Exit Criteria for each STP shall be demonstration of the deliverable per CS as defined in Table 1. The Government will review STP/DT results at Knowledge Point sessions and has discretion whether to proceed to the next STP or halt the program, based on the results.

The vendor shall submit, as a minimum, written program correspondence or documentation via electronic submittal. The preferred method of file submission is via e-mail. Alternative correspondence submittal procedures may be allowed on a case-by-case basis, with Government concurrence (either Government IPPT chairperson(s) or Government contracting officer).

Deliverables shall be submitted to the Government via electronic media. The vendor shall submit written program correspondence and documentation which is compatible with Windows 10 and Microsoft Office 2013 products, Microsoft Project 2013, or Adobe Acrobat for dissemination via email to members of the IPPT. No cost, non-email alternative correspondence submittal procedures may be allowed on a case-by-case basis with either Government IPPT chairperson or Government Contracting Officer concurrence.

It is the intent of the Government to gain online access to vendor maintained data, configuration files, to include drawings down to the spare parts level, and information supporting the IVAS program. The type of information to be available online shall be concurred to by the IPPT prior to its implementation. The most recent version of all data shall be made available within five working days of being updated. The vendor shall allow the Government the capability of retrieving online all current and last-modified versions of documentation, as well as uploading documentation to facilitate an information sharing medium. Classified data shall be provided on magnetic or optical media. Classified data shall be handled in accordance with DOD 5220.22M and DD Form 254, Contract Security Classification Specification, attached to the contract. Any restrictions on the use of the electronic data shall be as prescribed in the Data Rights Clause.

The vendor shall establish and maintain an online file sharing website (e.g., SharePoint) for the program. Access shall be strictly controlled, and granted to vendor project members per vendor internal protocols, and to Government project team members, as identified by the Government. The vendor shall establish a common user file management system, concurred with by the IPPT, for the website. The vendor shall establish a specific file-sharing library entitled “Deliveries to the Government,” containing separate sub-files named exclusively for each contract data deliverable. The vendor shall post all submitted deliverable drafts, Government comments and deliverable final submissions in the appropriately named data item folder. This electronic library shall be the recognized file sharing point for electronic copies. The formal deliverables for the project shall be delivered to the Government agreements officer with copies provided to the appropriate Government functional leads. To facilitate the smooth flow of information, the Government highly encourages establishment of a standard,

comprehensive file management structure, approved by the IPPT, to support any contract file sharing arrangement.

The vendor shall, for all deliverables, establish and enforce a file naming convention that requires a standard format for naming the basic submitted file, and all subsequent serial revisions/versions separately, by basic filename, serial revision/version number and date. The file naming convention shall be defined/established as agreed to by the IPPT.

The Government will negotiate the IP clauses in order to determine the appropriate level of intellectual property rights required to support any follow-on development or acquisition. The Government envisions obtaining Government Purpose Rights, at a minimum, for all IVAS ICDs, AI, SDK, OS, Architecture data, ATR, RTA, APPs, spare part drawings and specifications delivered to the Government under this project. The vendor shall fill in the table below to identify components or software requiring restrictions:

Technical Data or Computer Software to be Furnished With Restrictions*	Basis for Assertion**	Asserted Rights Category***	Entity Asserting ****

The vendor asserts for itself, or the entities identified in the table above, that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted.

*For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such item, component, or process. For computer software or computer software documentation identify the software or documentation.

**Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was accomplished exclusively or partially at private expense. If development was not accomplished at private expense, or for computer software documentation, enter the specific basis for asserting restrictions. Note that funding provided by the Government during the development of an item is the basis for Government Purpose Rights.

***Enter asserted rights category (e.g., Government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted, or Government Purpose Rights under this or a prior contract, or specially negotiated licenses).

****Corporation, individual, or other person, as appropriate.

The objective of systems engineering under this project is to ensure the vendor successfully produces an IVAS that wirelessly communicates with the FWS-I, FWS-CS, STORM, and provided RTA and AR capability. The IVAS will be operable for an infantry squad in multiple environments (urban/subterranean, woodland, artic and jungle).

The vendor shall prepare an integrated Systems Engineering Plan (SEP) that describes their processes and resources to incorporate Systems Engineering (SE) practices to build, test, deliver, and support the IVAS. The SEP is a project deliverable and shall address the following items, at a minimum:

- Discussion of main IVAS components (head borne ballistic and laser protection glasses with integrated sensors, Compute Pack, cable, AI, ML, STE, conformal battery pack)
- Describe how Modular Open Systems Architecture (MOSA) principles are incorporated in the HUD 3.0 design to support technology updates, such as software updates and ensuring backward compatibility to previous versions
- Discussion of wireless components (AES 256 wireless transceivers, wireless protocol, RTA processor, RTA executable libraries)
- System performance to be achieved to include a system and component/sub-component power allowance table
- HUD 3.0 Interface/Interoperability with other equipment (e.g. FWS-I, FWS-CS, STORM, Test Maintenance and Diagnostic Equipment (TMDE), Conformal Wearable Battery, Tactical Radios, GPS systems,the Advanced Combat Helmet, the Enhanced Combat Helmet, the Integrated Head Protection System, and the Modular Scalable Vest.)
- Vendor's SE organizational integration (Technical, Quality & Test, Logistics), including sub-contractors
- Vendor's SE approach to the following topics for the system and components/sub-components: Reliability, Maintainability/Supportability, Chemical, Biological, Radiological, and Nuclear (CBRN), Electromagnetic Interference (EMI), Safety/Environmental, Human Factors Engineering (HFE), Producibility, Quality & Test, and Training
- System technical risk management (Technical, Schedule, Cost)

The vendor shall provide IVAS system integration support to ensure that the IVAS is properly integrated and functions with external program peripherals and other system interfaces. The vendor shall support Central Technical Support Facility (CTSF) testing, obtaining Joint Service Interoperability Certifications (AIC) and other required certifications / accreditations including but not limited to AIC & CEMA evaluations, and assist in obtaining Authority to Operate (AO) by following the Risk Management Framework (RMF) process and providing RMF required documents / artifacts to support field testing and fielding of the IVAS.

IVAS is a system of systems, composed of GFE and CFE equipment and software. To provide for successful system integration, the Government and vendor shall maintain contact with all relevant Government programs providing GFE hardware and software, to assure future decisions and activities

support ongoing IVAS requirements. Commercial item integration includes continuing market analysis and suitability testing. This test and analysis shall be accomplished through an integration testbed. This testbed and associated vendor testbed documentation, required to setup, use and maintain the testbed, shall be transitioned to the Government at the completion of this agreement and documented in the IMS.

The vendor shall use a System Integration Testbed (SIT) for integration testing of software and hardware subsystems, as well as, for evaluation of overall system-level performance. The SIT will accept actual IVAS hardware and software. The SIT shall have the capability to test hardware and software through use of simulation, as well as, breadboard equipment integration.

The SIT shall include the following: All hardware and software to exercise (by stimulation or simulation) any and all HUD 3.0 sensors, processors, interfaces, networks, power sources, Soldier controls, and displays on simulated missions; test equipment and data analysis capabilities to monitor and evaluate performance and interface to the HUD 3.0 system; and a software development station allowing development, evaluation and debugging software changes. All test equipment used shall meet calibration system requirements per Section 6.

At Request for Prototype Proposal (RPP), the Government will provide training manuals, Wireless ICD, Tactical Radio ICD, Data/Imagery ICD, Laser protection MIL-STD, HUD Controller ICD, ISW ICD, Weapon Enabler ICD, Dagger ICD, AR Style Guide ICD, Nett Warrior ICD, and STORM ICD with information necessary to assure HUD 3.0 interoperability with associated systems and components.

The vendor shall participate in Government established IPTs with other vendors to resolve technical issues to enable interoperability with IVAS and other devices/equipment/software procured from other sources.

The vendor shall prepare an integrated vendor Engineering Management Plan (EMP) that describes the vendor's processes and resources to incorporate SE practices to build, test, deliver, and support the IVAS. The EMP is a project deliverable.

The vendor shall submit an initial stage three DD1494 application for equipment frequency allocation for spectrum certification no later than 30 days after project award. The Government will coordinate with the Army Spectrum Management Office (ASMO) for DD1494 certification approval. An updated submission may be necessary if the wireless technology and/or frequency range(s) change during the design effort. The Government will coordinate with the Army Spectrum Management Office (ASMO) for the DD1494 certification approval. The vendor shall provide technical support to the Government for frequency spectrum testing and certification during the certification approval process as required. Upon direction from the contracting officer or contracting officer's representative, the vendor shall submit a stage four DD1494. Submittal of Frequency Allocation Data is a project deliverable.

The vendor shall develop an Operational Security (OPSEC) Standing Operating Procedure (SOP)/Plan within 90 calendar days of project award (and annually thereafter), to be reviewed and approved by the responsible Government OPSEC officer, per AR 530-1, Operations Security. At RPP, the vendor should use the provided Security Classification Guides (SCGs) to develop their SOP. The SOP/Plan will specify the Government's critical information, why it needs to be protected, where it is located, who is responsible for it, and how to protect it. In addition, the vendor shall identify an individual who will be

an OPSEC Coordinator and will ensure this individual becomes OPSEC Level II certified per AR 530-1. The Government will evaluate vendor OPSEC performance on an annual basis or as conditions warrant. The vendor will implement an employee verification process, whether through background checks or other similar processes, and provide a written response explaining how the verification process was completed and attest to the trustworthiness of the workforce, within 45 days of project award.

All vendor employees, to include subcontractor employees, requiring access to Army installations, facilities and controlled access areas shall complete AT Level I awareness training within 30 calendar days after project start date. The vendor shall submit certificates of completion for each affected vendor employee and subcontractor employee, to the COR or to the contracting officer, if a COR is not assigned, within 30 calendar days after completion of training by all employees and subcontractor personnel. AT Level I awareness training is available at the following website: http://jko.jten.mil.

Vendor and all associated subcontractor employees shall provide all information required for background checks to meet installation access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FPCON) at any individual facility or installation change, the Government may require changes in vendor security matters or processes.

Vendor and all associated subcontractor employees shall comply with adjudication standards and procedures using the National Crime Information Center Interstate Identification Index (NCIC-I) and Terrorist Screening Database (TSDB) (Army Directive 2014-05/AR 190-13), applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative), or, at OCONUS locations, in accordance with status of forces agreements and other theater regulations.

The vendor and all associated subcontractors shall brief all employees on the local iWATCH program (training standards provided by the requiring activity ATO). This local developed training shall be used to inform employees of the types of behavior to watch for and instruct employees to report suspicious activity to the COR. This training shall be completed within 30 calendar days of project award, and within 30 calendar days of new employees commencing performance, with the results reported to the COR NLT 30 calendar days after project award.

Per AR 530-1, Operations Security, new vendor employees shall complete Level I OPSEC training within 30 calendar days of their reporting for duty. All vendor employees must complete annual OPSEC awareness training.

The vendor shall comply with: (1) the Security Agreement (DD Form 441), including the National Industrial Security Program Operating Manual (DoD 5220.22-M); and (2) any revisions to the DoD 5220.22-M, notice of which has been furnished to the vendor.

Vendor employees with security clearances shall receive annual Threat Awareness Reporting Program (TARP) training by a counterintelligence agent or other trainer/method as specified in AR 381-12.

Cyber threats to vendor unclassified information systems represent an unacceptable risk of compromise of DoD information and pose an imminent threat to U.S. national security and economic security interests. This agreement requires the vendor to rapidly report cyber incidents involving covered

defense information on their covered vendor information systems or cyber incidents affecting the vendor's ability to provide operationally critical support. The vendor will also be encouraged to participation in the voluntary DoD (Defense Industrial Base Cybersecurity Information Sharing (DIB CS) program in which DoD provides cyber threat information and cybersecurity best practices to DIB participants. The DoD-DIB CS information sharing program enhances and supplements DIB participants' capabilities to safeguard DoD information that resides on, or transits, DIB unclassified information systems. Vendors and subcontractors are required to rapidly report cyber incidents directly to DoD at http://dibnet.dod.mil.

Vendors and subcontractors are required to provide adequate security on all covered vendor information systems. Adequate security is defined as “protective measures that are commensurate with the consequences and probability of loss, misuse, or unauthorized access to, or modification of information.”

Companies shall report all foreign ownership. If there is foreign ownership exists, the offeror shall define the percentage owned.