PERFORMANCE WORK STATEMENT (PWS)
HUMAN-AGENT TEAMING RESEARCH AND ENGINEERING SERVICES
BASE IDIQ
4/20/2020

C.1. OBJECTIVE

The purpose of this effort is to establish an Indefinite Delivery/Indefinite Quantity (IDIQ) contract vehicle under which Task Orders (TOs) may be issued.

C.2. BACKGROUND

The Army Research Laboratory (ARL) is the Army's corporate basic and applied research laboratory and serves as a bridge between the Army and the nation's scientific and technical communities. ARL requires concept development, fabrication, prototyping, and testing of advanced research and development efforts for military applications.

Through the release of the Multi Domain Operations Concept and Modernization Priorities, the US Army is rapidly moving towards an advanced technology-enabled force. More specifically, intelligent technologies, enabled by recent advances in machine learning and the broader field of artificial intelligence (AI), are envisioned to be increasingly prevalent across the operational space. These technologies will eventually reduce the number of Soldiers in harm's way, however, they will not simply replace Soldiers one-for-one. The emergence of intelligent technologies will bring to the battlefield capabilities that far exceed that of Soldiers, such as the ability to: 1) process and store greater amounts of data; 2) greatly out-number humans; 3) effectively access environments inaccessible to humans; and 4) sense, act and react at super-human speeds.

However, AI technologies will also introduce limitations and will not have the same set of capabilities that our Soldiers have (e.g., adaptability, flexibility, common sense and other traits) necessary to always complete the mission. The "rapid proliferation of capabilities, constantly co-evolving" (BG Coffman, 2018) nature of these emerging technologies, points directly to the broad critical problem that advancing intelligent technologies will change the nature of the battlefield. They will change the very nature of the tasks that Soldiers perform, and thus the capabilities that Soldiers need. Combined with 1) "adversaries, including super-empowered individuals" (BG Coffman, 2018), 2) "operations among populations in complex terrain" (BG Coffman, 2018), and 3) "contested in all domains" (BG Coffman, 2018), the constant technological change points to a requirement for our teams to handle "dynamic complexity". This means that the teams must be able to handle constant changes in technology-based complexity –from Government systems, adversary systems, and civilian systems.

The specific problem is that current approaches to human-technology interaction are not sufficient to handle "dynamic complexity" on the scale that is expected. Development of AI technologies to support teams of Soldiers and autonomy will change the way that team members, both human and autonomous, interact with the environment, the enemy, and with each other. AI technologies will be able to learn, not only how to interact with individuals and teams, but how to collaboratively make decisions and solve problems as part of teams, maximizing the strengths and minimizing the weaknesses of individual team members (Human or autonomous). This improved decision making and problem solving will directly lead to improved crew member / team interactions with AI technologies and enhanced team performance across several modernization priorities. Further, the insights from this integrated concept development will shed critical light on the operational effectiveness of new doctrinal methods at the tactical level (e.g., role of the Soldier within the team; the effects of AI training with individual Soldiers and teams) in order to outperform and out-adapt enemy AI-based technologies.

As the Army continues to move in the direction of integrating more advanced technologies, including AI technologies, Soldiers will be required to simultaneously operate multiple advanced technologies to achieve mission success. The efforts described here focus on developing approaches to allow Soldiers to simultaneously operate these advanced and AI technologies without being overburdened or otherwise unable to perform. More specifically, the tasks described here will support fundamental research in support of the Army's goal to develop and field systems requiring Soldiers to team with AI technologies by facilitating the exchange of information between the

Soldier, system, and environment. These efforts build on prior work in neuroscience, human factors, psychology, and engineering to enhance our understanding of Soldier brain function and behavior in complex operational settings, assessed outside the confines of standard research laboratories. These efforts will provide Army researchers with capabilities to enhance the development of technologies for improved Soldier-intelligent technology performance.

C.3. REQUIREMENTS

The Contractor shall provide personnel and materials required to perform the following highly-technical, cutting-edge military research and development efforts. Specific technology thrusts are identified under each of the major research and development and business areas below.

C.3.1. Tactical Awareness via Collective Knowledge (TACK), Neuroscience, and Cybernetics (Dismounted Operations)

C.3.1.1 The Contractor shall collect and analyze multimodal physiological, behavioral, and environmental data. The integration of coincident data streams from multiple physiological (e.g., electroencephalography (EEG), cardiac activity and eye movements), anatomical, behavioral, and environmentally-based sources is seen as having the potential to dramatically enhance the interpretation and use of brain-based recordings. The Contractor shall develop and evaluate improved approaches and algorithms for integrating non-EEG data streams with EEG data, with an emphasis on prediction of EEG metrics by other data streams and analysis of EEG concurrent with eye-tracking data. The Contractor shall process and curate multimodal physiological, behavioral, and environmental data. The Contractor shall develop and extend software tools for efficient ingestion into, access to, and exploitation of, ARL's large-scale heterogeneous data repository. The Contractor shall develop advanced Deep Learning (DL) models (including convolutional and recurrent networks) to isolate the transient macro-state changes in EEG data.

C.3.1.2 The Contractor shall perform additional characterization of the conductance profile and artifact susceptibility of different polymer and ionic materials used for dry EEG electrodes. The Contractor shall develop and validate additional methods for mitigating noise artifacts related to motion and electromagnetic interference (EMI) within physiological signals. The Contractor shall develop and execute a plan for testing the artifact, noise susceptibility, and signal-to-noise properties of different electrode materials and commercial EEG products using phantom devices and a motion platform.

C.3.1.3 The Contractor shall support development of technologies for test and evaluation (T&E) of human-autonomy teams. The Contractor shall design experimental approaches necessary to collect and analyze data to develop effective algorithms for T&E of human-agent systems. The Contractor shall participate in data collection efforts within the Information for Mixed Squads (INFORMS) lab and other facilities as necessary. The Contractor shall develop and validate algorithms for estimating state and/or performance of the human, intelligent agent, and the combined team. Algorithms must be developed for offline, post-hoc analysis as well as for online real-time applications.

C.3.1.4 The Contractor, shall develop and validate algorithms and methodologies for defining objects of interest within a scene of various distances, perspectives, and clutter. The Contractor shall collect the necessary human-in-the-loop data to validate these algorithms and methodologies. The Contractor shall create Virtual Reality (VR) environments, stimuli, and scenarios. The Contractor shall develop and validate algorithms for estimating state, intent, or performance of the human in complex VR scenarios. Sensing techniques and algorithms must be developed for offline, post-hoc analysis as well as for online real-time applications.

C.3.1.5 The Contractor shall design and develop a multi-agent reinforcement learning environment using high-fidelity simulators such as Microsoft AirSim and machine learning architectures such as OpenAI Gym. This software platform shall be capable of real-world multi-agent reinforcement learning, human-in-the-loop reinforcement learning, and human-agent teaming research to solve Army relevant tasks. The Contractor shall develop a system to test and validate state-of-the-art computer vision algorithms for image classification and target identification.

C.3.2. Human Agent Teaming (Mounted Operations)

ARL's efforts in support of the Army Modernization Priority for the Next Generation Combat Vehicle requires refinement and the addition of new capabilities within an immersive vehicle simulation laboratory that enables experimentation with future technology concepts for enhanced teaming between Soldiers and AI-based technologies. The immersive vehicle simulation takes place in the Information for Mixed Squads (INFORMS) laboratory and includes three (3) major elements: 1) A software-in-the-loop (SIL) simulation environment that simulates a set of ground vehicles operating in a variety of Army scenarios; 2) A physical crewstation environment of the interior of a vehicle to emulate a set of interconnected vehicle crew station hardware necessary to operate a set of ground vehicles; and 3) the Warfighter-Machine-Interface (WMI) software that provides an interface for vehicle crew members to interact with the vehicle controls and sensors. The requirements for each of these components are specified in the following sections.

C.3.2.1 The Contractor shall refine the existing SIL simulation environment that has been developed jointly between ARL and the Combat Capabilities Development Command Ground Vehicle Systems Center (GVSC). The Contractor shall design a simulation architecture that interfaces with the WMI and supports integration of technologies that interface with the WMI. The simulation environment must include co-simulation capabilities, including the following components to effectively model multiple intelligent components for ground vehicle systems: WMI, Unreal engine, Microsoft AirSim, GVSC's Robotics Technology Kernel, and SimCreator.
The simulation environment shall support simulation of Army missions using standard Army operating procedures (i.e., move, shoot, communicate, etc.) and procedures supporting future Army operating concepts. The simulation environment must enable multiple distributed distributed seven (7)-person crews to engage in simulated military missions. The simulation environment must be capable of supporting simulated operations at multiple echelons including section and platoon level operations in the presence of opposition forces. The Contractor shall ensure that refinements to the simulation environment enable expansion to company level simulated operations.

C.3.2.2 The Contractor shall refine the existing physical crewstation environments at Aberdeen Proving Ground (APG), MD and Warren, MI. Two (2) crewstation environments have bene established at APG, and one (1) environment has been established in Warren, MI. The Contractor shall design, procure, and, install material and equipment to ensure that physical crewstation environments consist of seven (7) individual, identical crewstations that must allow for: 1) interchangeable roles among crew as well as the distribution of roles or parts of roles to autonomy; 2) individualization to and personalization by crew members; 3) multiple phases of missions including planning, execution, and after-action review; 4) WMI feedback/learning/adaptation across numerous missions based on both mission data and subject matter expert (SME) after-action reviews; and 5) Integrated AI/crew team-based maneuver that seamlessly integrates across multiple control schemes. The crewstation environments must be capable of supporting simulated operations at multiple echelons including section and platoon level operations in the presence of opposition forces. The Contractor shall ensure that refinements to the crewstation environments will enable expansion to company-level simulated operations. Individual crewstations must include, but are not limited to: one (1) to four (4) touch screen monitors per station; steering wheel or vehicle yoke interface; computing hardware necessary to run vehicle interface software; seating;and mounting hardware to configure the touch screen interfaces and steering interface into a crewstation layout. Each individual crewstation environment must be reconfigurable to enable experimentation with different vehicle control interfaces within simulated military operations.

C.3.2.3. The Contractor shall support the development, integration, and testing of new capabilities within the Warfighter-Machine Interface (WMI). The Contractor shall integrate methods for enabling interchangeable roles among crew as well as the distribution of roles or parts of roles to autonomous or AI systems. The Contractor shall integrate methods for individualization to and personalization by crew members. The Contractor shall develop and integrate the capability to simulate multiple phases of missions including planning, execution, and after-action review. The Contractor shall provide WMI feedback/learning/adaptation across numerous missions based on both mission data and subject matter expert (SME) after-action reviews. The Contractor shall integrate simulated AI/crew team-based maneuver that seamlessly integrates across multiple control schemes. The Contractor shall provide a modular and extensible WMI software solution that enables addition and modification of features to allow for concept testing and experimentation for new features. This includes, but is not limited to, integrating sensing capabilities on the crew members and providing the capability to process and store sensed data in real time. The

Contractor shall demonstrate that the WMI interfaces within a simulated environment as describedin Section C.3.2.1 or within a real vehicle environment with physical sensors and controls.

C.3.2.4 The Contractor shall ensure appropriate software controls, including but not limited to version control and documentation, to enable a three (3)-phased development approach where: 1) new concepts are lightly tested through rapid integration and usability testing; 2) successful concepts are integrated and further tested in an experimental phase; and 3) features successful at the experimental stage are integrated and tested in a physical platform. Concept integration should support multi-phase mission rehearsal, rapid development, and testing. The Contractor shall test newly integrated concepts for feasibility and utility. The Contractor shall integrate concepts that have passed initial concept testing into an experimental framework for more advanced testing. The Contractor shall support the transition from conceptual features to experimental features by translating/integrating software and. algorithms from the COR into the WMI. The Contractor shall integrate features that have succeeded through experimental testing into the WMI for physical platforms.

C.3.2.5 the Contractor shall perform WMI and SIL simulation development while also enabling the Government to execute experiments and concept tests in a stable and functioning software environment. The Contractor shall support the COR in demonstrations and tours of the facilities and the integrated concepts. The Contractor shall design a version of the simulation environment and WMI in a portable setup to support offsite demonstrations. The Contractor shall procure all necessary hardware and software necessary for such a demonstration system. The Contractor shall, in consultation with the COR, periodically update the portable demonstration system.

C.3.3. Human Variability and Longitudinal Prediction

C.3.3.1 The Contractor shall stream synchronized sensor data as input to the continuous multidimensional human sensing system. The Government requires the ability to monitor the physiological and behavioral state of a human subject in context in real time. To fulfill this requirement, the Contractor shall extend the previously developed data collection architecture and Multi-Aspect Real-World Neuroimaging (MARIN) system to support new sensor devices, enable data buffering, increase synchronization, and improve usability. The Contractor shall integrate new sensor devices with the system, including, but not limited to: Vivoactive HR+; Gear S3; video sources; and weather stations. This integration includes synchronization of the signals from these sensors with the signals currently supported by the MARIN system. The Contractor shall implement data buffering in the system such that all data is buffered locally (in relation to the sensor) until it is streamed to the data collection server. The data buffer will be able to retain at least 24 hours of data before overwriting. The Contractor shall synchronize the data as close to the point of collection as is feasible such that all data streams are aligned within a single sampling interval of the sensor with the highest sampling rate. The Contractor shall enhance the usability of the system by minimizing setup time and maximizing ease of use, such that the daily startup for the system places minimal burden on the user. The Contractor shall provide application programming interfaces (APIs) for using the extended data collection architecture and MARIN systems as well as for adding additional sensor streams. To enable storage and processing of input data to the continuous, multidimensional human sensing system, the Contractor shall ensure on-demand access to both raw and processed forms of the data.

C.3.3.2 The Government requires the ability to store and access the physiological and behavioral data streamed from many human subjects at multiple locations. To fulfill this requirement, the Contractor shall augment the previously developed data collection architecture to increase scalability and to provide long-term data storage while guaranteeing on-demand access to all stored data for analysis and processing. The Contractor shall increase the scalability of the system such that it simultaneously handles at least 500 human subjects with 20 concurrent sensor streams each and at least 500 off-body devices. Leveraging Government hardware, the Contractor shall provide data storage for both raw and processed data. The Contractor shall ensure on-demand access to stored data such that all data is readily accessible without long delays. The Contractor shall provide APIs for using the data collection architecture and accessing the stored data. ARL asserts ownership of this data in both raw and analyzed forms.

C.3.3.3 The Contractor shall enable remote control of continuous multidimensional human sensing system components in order to effect changes and visualize data. The Government requires the ability to effect changes in system components and the environment based on results from processing input data to the system. To fulfill this requirement, the Contractor shall integrate various actuators and create a visualization and control graphical user

interface (GUI). The Contractor shall integrate at least three actuators (e.g., lighting, smartphones, audio sources, iSpresso, etc.) such that they are remotely controlled by the system.

C.3.3.4 The Contractor shall implement a GUI that provides both real-time and historical interactive visualizations of the system's, users', sensors', and actuators' states and allows control of the actuators in the system. The GUI will allow users to query the system for detailed information about any constituent individuals, sensors, and devices, and to view live streaming data as well as past data streams. The Contractor shall provide APIs for the integrated actuators and the visualization and control GUI, as well as for adding additional data syncs and actuators. The Contractor shall provide all relevant source code and full documentation of the system and APIs. The Contractor shall provide at least three implemented examples demonstrating use of the continuous, multidimensional human sensing system and APIs. These examples must include the capabilities of data streaming, data access and storage, and control of the system.

C.3.3.5 The Contractor shall manage operations in a shared-use innovation facility (hackerspace/makerspace) at ARL's Human Research and Engineering Directorate (HRED) on APG. The long-term goal of this work is to create adaptive soldier technologies. The users of this facility will be engaged in research to monitor, alter, and control human behavior through enhanced technologies such as wearable and environmental sensors, displays, and effectors. The Contractor shall document all activities under this task in the monthly reports. The Contractor shall perform the setup, adjustment, and operation of the technical infrastructure (hardware and software) adapted to the project based on the available equipment and software. The Contractor shall develop and implement policies for managing shared facilities, such as resource scheduling and equipment safety protocols. The Contractor shall coordinate and facilitate knowledge sharing through informal lectures, workshops, and ad hoc interactions. The Contractor shall engage with government personnel to acquire equipment and to evaluate inventory to ensure that consumable items are replenished as necessary. The Contractor shall establish and organize required testing schedules and maintain the storage, security, and organization of raw data following acquisition. The Contractor shall coordinate with the research study team. This will include facility recruitment, subject sampling, staff scheduling, interviewer monitoring, and equipment and supplies procurement. The Contractor shall also establish and maintain database files and reports on progress of programs, studies, and/or projects and shall perform data analysis and interpretation. The Contractor shall support ongoing research; participate in field visits; respond to requests and questions from individuals, institutions, government agencies, and funding agencies; and participate in the design of research studies.

C.3.3.6 The Contractor shall perform data collection, synchronization, processing (including prediction), and dynamic visualization in near real time for various experiments. Specific signals should be selected in conjunction with the COR and shall include a combination of physiological, behavioral, and derived data, for example: Microsoft Hololens, wearable wristwatch with physiological sensors, sleep monitors, eye tracker, user completed survey, beat-by-beat blood pressure, EEG, electrocardiography (EKG), respiration, photoplethysmography (PPG), eye-tracking, performance prediction, and video streaming from the HTC Vive. The Contractor shall leverage efforts from the Cognition and Neuroergonomics Collaborative Technology Alliance, Cybernetics, and Continuous Multifaceted Soldier Characterization for Adaptive Technologies (CMSCAT) programs to collect multifaceted data to support various experiments: (a) a longitudinal neurofeedback study; (b) a longitudinal study in which teams of individuals complete an escape room task across multiple sessions; and (c) a longitudinal study in which participants use HTC Vive systems and desktop computers or mobile platforms to complete tasks in a simulated environment using Unity or Unreal game engines and complete daily surveys/games/tasks through the application developed in the previous paragraph. The Contractor shall synchronize all data streams (physiologic, behavioral, video) within 10ms temporal resolution. The Contractor shall securely store the synchronized data streams with appropriate synchronization signals for offline analysis. The Contractor shall display the synchronized data on multiple large high-resolution displays. The Contractor shall provide software modules in one of the software languages: Python, Mathworks MATLAB, or R, which take synchronized data streams (as above) as input and output control parameters that will modify ongoing visualizations to show predicted behavior.

C.3.3.7 The Contractor shall perform the development, setup, adjustment, and operation of the technical infrastructure (hardware and software) adapted to the project based on the available equipment and software. The Contractor shall provide equivalent applications in mobile platforms that administer surveys, implement games to collect behavioral data, and cue users to charge equipment and complete surveys and games. The Contractor shall develop an application that incentivizes participants to participate with the data collection. All components will be

modifiable to incorporate new online analyses, display modalities, and additional input signals. The Contractor shall perform required analysis of the collected physiological data using ARL-approved techniques and will provide complete drafts of manuscripts and/or demonstration of systems. The Contractor shall coordinate the research study team. This will include facility recruitment, subject sampling, staff scheduling, interviewer monitoring, and equipment and supplies procurement. The Contractor shall also establish and maintain database files and reports on progress of programs, studies, and/or projects and shall perform data analysis and interpretation. The Contractor shall engage with government personnel to acquire equipment and to evaluate inventory to ensure that consumable items are replenished as necessary. The Contractor shall integrate existing physiologic monitors to support this ongoing research and where possible use Government Owned Equipment for which they are granted permission to use.

C.3.3.8 The Contractor shall support ongoing research; participate in field visits; respond to requests and questions from individuals, institutions, government agencies, and funding agencies; and participate in the design of research studies. The Contractor shall provide all source code for the software developed as part of this task. The Contractor shall provide ongoing assistance and support for the development of demonstrations highlighting ARL research, such as a system in which longitudinal and real-time data of humans are fused to generate closed loop interaction with autonomous systems.

C.3.3.9 The Contractor shall organize a workshop comprised of subject matter experts in Human Variability and provide written recommendations for longitudinal experiments to better understand, model, and predict human variability. The Contractor shall invite five (5) to 10 subject matter experts, coordinate their travel and accommodations. The Contractor shall provide a venue in the Baltimore area for a one (1) to two (2) day conference. The Contractor shall provide a written set of recommendations for multi-year, continuous, large scale experiments (100s of participants) that are focused on better understanding, modeling, and predicting human variability.

C.3.3.10 The Contractor shall develop and provide a prototype sensor system that is not currently available on the commercial market and support longitudinal data recording of multiple physiologic signals. The Contractor shall support efforts in the CMSCAT by providing both a wristworn and suprasternal notch sensor system that is capable of providing data on respiration, heart rate, and swallowing. The Contractor shall provide evidence that the developed sensor system are minimally noticeable and wearable for greater than a working day. The Contractor shall provide the source code for software that receives raw data from the sensor, performs pre-processing, and performs preliminary analysis to include but not limited to respiration rate, heart rate, and swallowing events. provide enough sensor systems to monitor 300 persons for at least 180 days.

C.3.3.11 The Contractor shall: (1) develop analytics on the multimodal human and system-based data collected to identify a variety of behavioral and physiological states such as fatigue, poor sleep, and stress; and (2) develop real-time, online analytic capabilities to support demonstrations that fuse behavioral and psychological state estimates with real-time behavior that shall be used as machine readable data within Next Generation Combat Vehicles. The Contractor shall leverage efforts in the CMSCAT program to develop real-time, predictive algorithms of human state. The Contractor shall provide a variety of visualizations of these predictions including but not limited to: behavioral performance, social interaction/compatibility, and physiology. The Contractor shall provide a visualization of online learning in a machine learning/AI framework that provides intuitive understanding of how the online learning and error minimization is occurring. The Contractor shall perform a closed loop experiment wherein predictions are used to modify experimental parameters in real time to demonstrate closed human in the loop reactivity.

C.3.3.12 The Contractor shall develop a software tool for test and evaluation for human-intelligent agent teams. The Contractor shall leverage previous efforts to allow for simultaneous data collection from multiple people each wearing multiple wearable devices along with environmental and task-based sensors. The Contractor shall securely store the synchronized data streams with appropriate synchronization signals for offline analysis. The Contractor shall provide the capability for researchers to embed real-time data processing algorithms within the software tool. Results of the real-time processing algorithms should be available for display in the tool. The Contractor shall provide a user-interface that enables a user to interact with the data. The user interface should include a real-time visual display of the raw and processed data streams, and should allow the user to perform basic functions such as, but not limited to, scroll back/forward and zoom in/out. The Contractor shall provide at least five (5) systems that include the software tool and any necessary hardware needed to run the system. The Contractor shall leverage

government owned sensors as government furnished equipment to satisfy parts of this requirement. The Contractor shall integrate the software tool within the ARL-INFORMS laboratory to enable use of the tool to evaluate performance of 14 participants simultaneously performing a single mission. The Contractor shall support ongoing research; participate in field visits; respond to requests and questions from individuals, institutions, government agencies, and funding agencies; and participate in the design of research studies. The Contractor shall provide all source code for the software developed as part of this task.

C.3.3.13 The Contractor shall develop mobile and computer-based team games that enable research of Human-Agent Teaming by incorporating heterogeneous data about humans to modulate the activity of intelligent agents and human teammates within the game environment. To fulfill this requirement, the Contractor shall develop gameplay environments. The games shall include surveys and cognitive and/or behavioral tasks. The Contractor shall enable networking of multiple workstations for gameplay. The Contractor shall develop software in popular open-source programming languages such as Python when possible. Moreover, software should be compatible with Windows, Macintosh, and Linux operating systems. The Contractor shall integrate the output of various physiological sensors for use in gameplay. These sensors shall be in the form of Lab Streaming Layer data streams (e.g. heart rate variability (HRV), behavioral signals) and provide manipulations of the game based on the incoming data. The contractor shall design intelligent virtual agents for multi-player games. The virtual agents must be able to implement various gameplay policies that adapt to the behavior and physiology of human gameplayers. The Contractor shall develop intelligent virtual agents that use state-of-the-art techniques in AI such as deep learning and reinforcement learning. The Contractor shall make available the source code for the games to ARL and ARL-authorized academic collaborators. Further, the Contractor shall maintain version control and release history of the game software (git-based version control software is preferred). The Contractor shall maintain current and accurate documentation and application programming interfaces for all games to allow other users to install and use the software. The Contractor shall design graphical interfaces for real-time monitoring of gameplay to support demonstrations of the underlying scientific principles. The Contractor shall develop and test the games to ensure the synchronization of all physiological, behavioral, and game event data streams. The Contractor shall store the collected data from gameplay (behavioral and physiological) and enable remote access to ARL and ARL-authorized academic collaborators. The Contractor shall make the games modular to incorporate new display modalities, gameplay rules, and physiological signals. The Contractor shall coordinate the research study team. This will include facility recruitment, subject sampling, staff scheduling, interviewer monitoring, and equipment and supplies procurement. The Contractor shall also establish and maintain database files and reports on progress of programs, studies, and/or projects and shall perform data analysis and interpretation. The Contractor shall engage with government personnel to acquire equipment and to evaluate inventory to ensure that consumable items are replenished as necessary. The Contractor shall use Government Owned Equipment whenever possible in the development of the games. The Contractor shall support ongoing research; attend regular meetings with the COR during active development of software; respond to requests and questions from individuals, institutions, government agencies, and funding agencies; and participate in the design of research studies.

C.4. DELIVERABLES

The Contractor shall perform work in accordance with the agency scheduled work hour parameters. Other deliverables will be specified by the Government in each individual Task Order issued under this basic contract. The Contractor shall submit all reports and deliverables to the COR for inspection and acceptance. The Contractor shall provide all reports and deliverables, as requested by the COR, in hard copy or submitted via electronic means chosen by the COR.

C.5. TRAVEL

Travel to various Continental United States (CONUS) is required. The Contractor shall ensure that all travel is performed in accordance with the Joint Travel Regulations (JTR) when possible. The Contractor shall request approval for travel from the COR in writing. The COR will provide approval in writing within two (2) weeks after receipt of the travel request. Local travel does not require prior approval from the COR. The Contractor shall not commence any travel unless authorized by the COR in writing.

C.6. FACILITIES AND EQUIPMENT

The Government will provide the Contractor access to Government-owned facilities and equipment. The Government will furnish or make available to the Contractor computer equipment to access Government local area network (LAN) and Government information systems for Government related work and mandatory training. The Government will specify any required Government Furnished Equipment (GFE)/Government Furnished Property (GFP) at the task order level.

C.7. SECURITY

This contract requires access to documentation up to SECRET. All Contractor personnel working on this contract shall have the appropriate personnel security clearance IAW ARL security authority. The Contractor shall provide National Agency Check with Inquires clearance or higher for all employees. Contractor shall provide required documentation to ARL security personnel for in-processing.

C.8. ARL ANTI-TERRORISM/OPERATIONS SECURTY (AT-OPSEC) REQUIREMENTS

C.8.1. AT Level I training

All contractor employees, to include subcontractor employees, requiring access Army installations, facilities and controlled access areas shall complete AT Level I awareness training within 30 calendar days after contract start date or effective date of incorporation of this requirement into the contract, whichever is applicable. The contractor shall submit certificates of completion for each affected contractor employee and subcontractor employee, to the COR or to the contracting officer, if a COR is not assigned, within 10 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

C.8.2. Access and general protection/security policy and procedures

Contractor and all associated sub-contractors 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. Contractor workforce must comply with all personal identity verification requirements (FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel) as directed by DOD, HQDA and/or local policy. 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 contractor security matters or processes.

C.8.3. Common Access Card (CAC)

Before CAC issuance, the contractor employee requires, at a minimum, a favorably adjudicated National Agency Check with Inquiries (NACI) or an equivalent or higher investigation in accordance with Army Directive 2014-05. The contractor employee will be issued a CAC only if duties involve one of the following: (1) Both physical access to a DoD facility and access, via logon, to DoD networks on-site or remotely; (2) Remote access, via logon, to a DoD network using DoD-approved remote access procedures; or (3) Physical access to multiple DoD facilities or multiple non-DoD federally controlled facilities on behalf of the DoD on a recurring basis for a period of 6 months or more. At the discretion of the sponsoring activity, an initial CAC may be issued based on a favorable review of the FBI fingerprint check and a successfully scheduled NACI at the Office of Personnel Management.

C.8.4. iWATCH Training

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

C.8.5. Army Training Certification Tracking System (ATCTS)

All contractor employees with access to a government info system must be registered in the ATCTS (Army Training Certification Tracking System) at commencement of services, and must successfully complete the DOD Information Assurance Awareness prior to access to the IS and then annually thereafter.

C.8.6. Formal OPSEC Program

The contractor shall develop an OPSEC Standing Operating Procedure (SOP)/Plan within 90 calendar days of contract award, to be reviewed and approved by the responsible Government OPSEC officer. This plan will include a process to identify critical information, where it is located, who is responsible for it, how to protect it and why it needs to be protected. The contractor shall implement OPSEC measures as ordered by the commander. In addition, the contractor shall have an identified certified Level II OPSEC coordinator per AR 530-1.

C.8.7. OPSEC Training

Per AR 530-1 Operations Security, the contractor employees must complete Level I OPSEC Awareness training. New employees must be trained within 30 calendar days of their reporting for duty and annually thereafter.

C.8.8. Information Assurance (IA)/Information Technology (IT)

All contractor employees and associated sub-contractor employees must complete the DoD IA awareness training before issuance of network access and annually thereafter. All contractor employees working IA/IT functions must comply with DoD and Army training requirements in DoDD 8570.01, DoD 8570.01-M and AR 25-2 within six months of appointment to IA/IT functions.

C.8.9. Threat Awareness Reporting Program

Per AR 381-12 Threat Awareness and Reporting Program (TARP), contractor employees must receive annual TARP training by a CI agent or other trainer as specified in 2-4b.

C.9. ACCOUNTING FOR CONTRACT SERVICES REQUIREMENT – ENTERPRISE-WIDE CONTRACTOR MANPOWER REPORTING APPLICATION (CMRA)

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for the Army via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address: http://www.ecmra.mil/, and then click on “Department of the Army CMRA” or the icon of the DoD organization that is receiving or benefitting from the contracted services.

Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year, beginning with 2013. Contractors may direct questions to the help desk by clicking on “Send an email” which is located under the Help Resources ribbon on the right side of the login page of the applicable Service/Component’s Contractor Manpower Reporting website.

4/20/2020

X Christopher Moy

Contracting Officer
Signed by: MOY.CHRISTOPHER.RYAN.1285356217

4/20/2020

X Rebecca Clark

Legal Advisor
Signed by: CLARK.REBECCA.FRANTZ.1228895039