U.S. ARMY ARTIFICIAL INTELLIGENCE TASK FORCE

U.S. ARMY FUTURES COMMAND

AREAS OF INTEREST

AITF is seeking artificial intelligence research and development solutions in support of new technologies and translational research-based approaches that support the identification, alignment, and exploitation of applied research and technology to enable the Army of 2028 to be ready to deploy, fight, and win decisively against any adversary, anytime, and anywhere, in a joint, multi-domain, high- intensity conflict, while simultaneously deterring others and maintaining its ability to conduct irregular warfare.

Areas of interest include, but are not limited to, the following:

a. **Autonomous platforms** – The Army is particularly interested in research in autonomous ground and air vehicles, which must operate in open, urban and cluttered environments. Robotics and autonomous systems regardless of their missions require similar concepts and technologies including:
   i. Ability to move in very cluttered, irregular, urban and underground terrains
   ii. Ability to move effectively in contested environments and survive attacks
   iii. Technologies to enable low electronic and physical profiles
   iv. Architectures to enable reprogrammable platforms under dynamic conditions
   v. Sensors to detect obscured targets and to characterize terrain obstacles
   vi. Autonomous ground and air structures, propulsion, and mobility components
   vii. Technologies to significantly reduce logistical burdens

b. **Artificial Intelligence and Machine Learning (AI/ML) -** The Army is interested in AI/ML research in areas which can reduce the cognitive burden on humans and improve overall performance through human-machine teaming. AI/ML research is needed in areas such as:
   i. Autonomous, intelligent maneuver and behaviors of autonomous ground and air vehicles - object recognition, threat warning, etc.
   ii. Ability to analyze large, diverse data sets to predict enemy intent and behaviors
   iii. Technologies to ensure robust, resilient and intelligent networking, cyber, electronic warfare and analysis of adversary signals
   iv. Data analysis capabilities to engage with and exploit classified and unclassified sources in order to produce enhanced intelligence products
   v. Techniques to fuse data from disparate sources to improve a particular mission

c. **Data visualization and synthetic environments** – The Army is interested in research involving concepts that enable improved situational awareness and the visualization and navigation of large data sets and to enhance operational activities and training and readiness. Research is needed in the visualization of data in following areas:
   i. Sensor data and large data sets
   ii. Complex multi-source mode data sets
   iii. Novel visualization and synthetic environment approaches to enable improved training
   iv. Synthetic environments and networked instrumentation approaches for virtual-live validation of concepts and prototypes

d. **Assured Position, Navigation, and Timing (PNT)** – The Army is interested in research involving novel new PNT technologies which could be key enablers for many capabilities including autonomous vehicles, communications, and land navigation. Solutions that enable robust PNT for vehicles, Soldiers, munitions might include research in the following areas:
   i. PNT technologies which operate reliably in GPS-degraded or denied areas which cannot be exploited by adversaries
   ii. Enhancements to commercial technologies to enable them to meet Army needs
   iii. PNT-enabled guidance and control
   iv. Algorithms and techniques to fuse data from multiple PNT sources to provide robust capabilities

e. **Sensing** – The Army is interested in developing a detailed understanding of the environments and activities in the areas where it operates. Research is needed in the areas of sensors and associated processing in order to:
   i. Detect people, equipment, weapons, and any other object or action of interest
   ii. Detect all targets even when obscured
   iii. Detect based upon, physical, behavioral, cyber or other signatures

f. **Communications & networks** – It is critical the Army maintain secure, reliable communications for Soldiers, vehicles and at fixed locations even in austere environments. Research is needed in the areas related to following:
   i. Concepts and methodologies to enable robust, secure networks
   ii. Network interoperability
   iii. High efficiency components

g. **Computation** – The Army has a growing need for high performance computational capabilities to exploit large data sets and to compute complex AI/ML algorithms for many applications. Research is needed to improve computational capabilities in the following areas:
   i. Edge computing, throughput, and power efficiency

h. **Internet of Things (IoT)** – The Army needs to better integrate a wide range of capabilities and equipment and capitalize on commercial developments in the industrial and human IOT. The Army's interested is driven in part by the fact that the amount of usable communication bandwidth on the battlefield will be dynamic, and as such automated reallocation of communication resources and information sharing strategies are more challenging than commercial ones. Research is needed to improve Army IOT in the following areas:
   i. New concepts, quantitative models and technical approaches enabling automated management of IoT
   ii. New machine learning techniques that accelerate decision making to address the scale/volume of IoT information and advance the science
   iii. New approaches, low-complexity algorithms, and methods to enable secure, resilient, and automatically managed IOT networks in highly complex, mixed cooperative/adversarial, information-centric environments

i. **Protection** – The Army faces a number of current and future threats which it must address to protect it Soldiers. Research is needed to enhance Army capabilities for survival in the following areas:
  i. Sensors to detect chemical, biological, radiological, nuclear, and explosive threats
  ii. Cyber protection technologies, methodologies, and concepts to protect Army systems including Soldiers, platforms, networks, and munitions
  iii. Human performance optimization to endure harsh and extenuating conditions

j. **Human Performance –** The Soldier is the foundation of all Army capabilities. Technologies that reduce Soldiers' mental or physical burden and allow them to react faster than their adversaries are needed in the following areas:
  i. Human-machine interaction to insure autonomous platforms are efficiently managed and exploited
  ii. Methodologies and approaches for effective augmentation of Soldiers in areas of cognition, perception, and physical performance

k. **Underpinning Methodologies -** Methodologies, frameworks, tools, facilities, techniques, and experimentation concepts, which underpin and enable advanced research and development in all of the areas are of interest including those which enhance the abilities to:
  i. Collect, standardize, transform, and maintain data to focus research and validate concepts
  ii. Rapid modeling, development, and assessment of technologies across widely distributed research teams
  iii. Integrate innovative technology applications into current or future warfighting systems, applications, and analysis systems to assess the potential operational effectiveness of novel new technology elements
  iv. Automate data analytics to enhance discovery, development and transition management of technologies that address Army capability gaps

Submit questions and whitepapers for Army Artificial Intelligence Task Force (A-AITF) consideration to the following POCs:

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