AUSA Army Artificial Intelligence and Autonomy Symposium and Exposition
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Cobo Center, Detroit, MI

Panel Topic Descriptions

Introduction: The AUSA A/AI symposium panel topics are framed to address the five Multi-Domain Operations Problems below and organized into three foundational elements: Weapon Systems, Enhanced Decision-Making, and Enabling Enterprise Level Efficiencies.

Multi-Domain Operations Problems

1. How does the Joint Force **compete** to enable the defeat of an adversary's operations to destabilize the region, deter the escalation of violence, and, should violence escalate, enable rapid transition to armed conflict?
2. How does the Joint Force **penetrate** enemy anti-access and area denial systems throughout the depth of the Support Areas to enable strategic and operational maneuver?
3. How does the Joint Force **dis-integrate** enemy anti-access and area denial systems in the Deep Areas to enable operational and tactical maneuver?
4. How does the Joint Force **exploit** the resulting freedom of maneuver to achieve operational and strategic objectives through the defeat of the enemy in the Close and Deep Maneuver Areas?
5. How do U.S. forces **re-compete** to consolidate gains and produce sustainable outcomes, set conditions for long-term deterrence, and adapt to the new security environment?

LOE 1. Weapon Systems

1. Autonomy and Artificial Intelligence (A/AI) for Continuous Integration of Intelligence and Fires in an A2/AD Environment

How will A/AI enable "continuous integration" of multi-domain operations (focus on intelligence and fires) to penetrate and disintegrate A2/AD systems?

A key component of future Army operations will be the penetration and disintegration of strategic and operational anti-access and area denial (A2/AD) systems to enable expeditionary movement. The future operating environment will be crowded with sensors – both military and non-military, stationary and mobile. These will generate tremendous amounts of data, much of which will have utility to Army efforts. The Army will require AI-enabled capabilities to enhance the speed of information collection, data

processing, and analysis in order to enable Army forces, in support the stimulate-see-strike process required to penetrate and disintegrate. This process will be key to offensive and defensive operations, should feed the targeting cycle quickly with a high-degree of assurance, and be within the commander's intent and Army Ethic. How can A/AI systems provide the necessary information without causing cognitive overload? How can the Army facilitate the development of trust between commanders (and staffs) and their A/AI systems? Given that these A/AI systems will "learn," how can leaders "train" their A/AI systems to perform as required? How can the Army ensure that these A/AI systems perform within an ethical framework?

2. Robotics, Autonomy, and Artificial Intelligence in Small Units

How will A/AI enable small unit operations? What early, high priority A/AI capabilities should be employed at the small unit level and how does the Army create the Manned/Unmanned Teams (MUM-Ts) to deploy them?

Autonomous ground and air systems enabled by AI will soon start providing significantly increased lethality, protection, mobility, and situational awareness at platoon level through Manned/Unmanned Teams (MUM-Ts). Operating within the Close and Deep Maneuver Areas, MUM-Ts will enhance Soldier performance, extend the operation, and reduce the risk to the Soldier on the battlefield. Autonomous ground and air systems must be developed so that Soldiers and small team leaders do not experience cognitive overload or create other distractions from their combat tasks under chaotic battle conditions. These systems must be resistant to spoofing, jamming, etc., be easily refueled (or recharged) and resupplied (with ammunition, medical items, etc.), and Soldiers must be able to quickly pass control of these systems to other Soldiers as the tactical situation dictates. Should the Army adopt a logistics strategy to quickly repair or replaced these systems in hostile environments, or should it assume combat expendability? What autonomous and AI capabilities should the Army prioritize to best support the Soldier in the near and far term? What systems are best suited to provide these capabilities? How does the Army prepare Soldiers and units to receive and use these systems in Manned-Unmanned Teams?

LOE 2. Enhancing Decision Making

3. Autonomy and Artificial Intelligence (A/AI) in periods of Competition

During Competition, how will A/AI enable commanders to understand a region, see adversary operations, and support stabilization and turn denied spaces into contested spaces?

Achieving situational awareness and understanding will become increasingly challenging. In future fast-paced, multi-dimensional environments, the operational environment could change rapidly within all five domains, often at the speed of information and the technology which propagates it. The Army recognizes the importance of security operations during periods of competition and formally identifies

Army roles in defeating opponent efforts to destabilize a region and in deterring escalation of violence. To succeed at these, Army leaders at multiple echelons are required to understand a region, see adversary operations, and direct efforts to support stabilization. Should deterrence fail, leaders must enable strategic and operational maneuver by understanding how opponents will attempt to deny physical and virtual spaces and convert denied spaces into contested ones. This requires the collection, analysis, and presentation of tremendous amounts of data from across the region. This must be done continuously over the extended period of competition with the ability to surge given changes in the situation. Some of this data, such as that on opponents, will be intentionally hidden or disguised. A/AI could greatly assist future leaders at the tactical, operational, and strategic levels to understand the complexities of the operational area, the adversary's capabilities and intent, and the military requirements to overcome enemy A2/AD efforts. A/AI could also support commanders in understanding the dynamics of competition. How can A/AI assist in the collection, analysis, and presentation across echelons so Army leaders can anticipate situations? How can this be done in a joint, inter-organizational, and multinational environment? How can A/AI systems assist commanders (and staffs) to assess the risk of courses of action within competition?

4. Autonomy and Artificial Intelligence (A/AI) Enabled Mission Command in Multi-Domain Operations

How will A/AI enable "continuous integration" of multi-domain operations (focus on mission command) to achieve asymmetric awareness and decision?

MDO describes the concept of domain "convergence" whereby leaders at all echelons possess the requisite ability to see and understand what is occurring in the Air, Land, Maritime, Space, and Cyberspace that impacts one's operation and, conversely, how one's operation affects activities at higher echelons. Convergence will require continuous and rapid integration of all capabilities to achieve situational awareness and decision faster than an adversary. A/AI-enabled technologies must be able to "see" the environment, understand its patterns, and discern actionable decisions to enable the quickening pace of events. With the expected severity of hostile conditions, where communications will be disrupted, US forces will require the maximum application of mission command. How can A/AI enable commanders to build cohesive teams through mutual trust? How can A/AI assist commanders to create shared understanding, communicate a clear commander's intent that encompasses all five domains, allows for the exercise disciplined initiative, and enables the acceptance of prudent risk? How can A/AI enable to Army to operate in dispersed small teams with the capability to swarm (create mass) at the right place and time?

LOE 3. Enabling Enterprise Level Efficiencies

5. Managing A/AI Development and Fielding

How will the Army manage the development and fielding of A/AI capability, including leveraging commercial off the shelf (COTS), to create efficiencies and accelerate capabilities to the field?

The future operating environment will be one that both impacts and is affected by the pace of technology. The force that quickly identifies technological opportunities and exploits their potential will gain an advantage. A/AI is already becoming ubiquitous. It is found in our smart phones and fitness trackers. It is also at the cusp of an explosive growth in capability that will transform all of our enterprises, including the Army. As with the emergence of earlier, transformational technology such as the internal combustion engine or silicone chip, unmanaged exploitation will lead to inefficiencies in application, which will greatly delay and limit the total achievable value. The Army will require an institutional ability to rapidly identify technological opportunities, adapt them to its operations, and quickly field new capabilities (with the necessary training, organizational change, etc.). How does the Army manage the application of A/AI? How centralized should that management effort be? As development of A/AI for commercial use has already and will continue to outstrip development for specific military use, how does the Army monitor commercial capabilities, choose which capabilities have military utility, and manage the conversion to military use? How does the Army contend with the challenges of industries which may not want to share their technologies with the U.S. military? What policies should the Army, and US writ large, promulgate in order to keep pace with these technological changes?

6. Using Autonomy and Artificial Intelligence (A/AI) to Streamline Acquisition and Logistics

How will the Army use A/AI to enable the acquisitions enterprise and global logistics?

For a large, technologically advanced Army, the acquisition process is understandably complicated and ponderous. Moving from a recognized requirement to a fielded capability is far too complicated and takes far too long. There is insufficient room for initiative and innovation. It is far too difficult for decision makers to see requirements and the linkages between those requirements and proposed capabilities. Today's JCIDS process requires extensive study, research, and analysis to satisfy acquisition and procurement requirements. A/AI could accelerate this process, allowing for a more rapid development and fielding of materiel solutions. Furthermore, the future operating environment will consist of contested and denied spaces making strategic sustainment and battlefield logistics more difficult than today. Getting the right resources to the point of need in a timely fashion is paramount to enabling freedom of maneuver. A/AI could greatly assist in ensuring that smaller, dispersed forces can maintain the required operational tempo. How can A/AI be used to quicken the acquisition process? How can it be used to better inform acquisition decisions? How can it be used to enable innovation and flexibility in the acquisition process? How can it be used to create efficiencies in moving resources from the industrial complex or other sources to the point of use (the operational area)?

7. The Autonomy and Artificial Intelligence (A/AI) Capable Force: Evolving the Institutional Army

How must the Army change as an institution to become an A/AI capable force? How must the Army's human capital, infrastructure, and policies evolve?

The wide fielding of A/AI will have significant impact upon the Army as an institution. The introduction and common use of A/AI systems by Soldiers and Army Civilians will require revisions in Army policies (Army Regulations, etc.), processes, and procedures. Installations may require significant infrastructure upgrades to allow for storage, access, analysis, and transmission of massive amounts of data. The Army may find that it must recruit, access, and hire human capital with fundamentally different skill sets from what is familiar today. These new types of human capital and the routine use of A/AI systems may even impact Army culture. What current Army policies are prohibiting or hindering our adaptation of A/AI systems? How can the Army allow for the authorized routine access of data to support A/AI systems while ensuring necessary security and privacy? What network or bandwidth challenges must be overcome to realize the Army's routine use of A/AI systems? Will preparing Army personnel to use A/AI systems increase or decrease training requirements? What must we do today in our recruiting and accessions programs to ensure that we have the right human capital for the future? What training and education programs are necessary to ensure that our current human capital is ready for tomorrow's challenges? How should the Army's talent management programs evolve so that the Army is placing the right person in the right job at the right time? What incentives are necessary to ensure that the Army retains the right talent? What will be the required Soldiers and leader attributes in a force with widely fielded A/AI? What can the Army learn from industry to address this challenge?