

POINT PAPER

ON

HUMAN- ARTIFICIAL INTELLIGENCE COLLABORATION AND TEAMING IN SPACE

- BLUF: Human- Artificial Intelligence (AI) Teaming and Collaboration as the best method to employ AI capability in Space Operations, but to achieve this, teaming requires building warfighter trust.

BACKGROUND

- Research shows augmenting machine proficiencies with human operators can create teams that could outperform both humans and machines individually. By this means, machines could cover the areas humans show some weaknesses in, like rapid data assimilation and analysis, and still enable human counterparts to process contextual understanding of dynamic environments to apply military effects.
- EO 14110 directs the DoD to rapidly initiate development of and assurances that AI systems are safe, secure, and trustworthy, underscoring the public's trust in the Armed Forces, yet still be lethal and reliable in military operations to protect national interests which demands a need for warfighter trust.

DISCUSSION

- Achieving Warfighter Trust
 - DoD's Responsible Artificial Intelligence Implementation and Strategy Pathway document (RAI I&S Pathway) identifies six tenants that provides guidance and points out a speedy and successful adaptation of AI technology hinges on warfighter trust.
 - By following these tenets and lines of operations, and with the help of the RAI Toolkit, Space Force leaders can cultivate warfighter trust by developing and fielding systems that are transparent, explainable, reliable while meeting specific needs in operations.
- Employ AI While Progressing Warfighter Trust
 - Trust is critical to effective human-AI pairing because it affects the willingness of warfighters to adopt AI systems as aids, partners, and teammates. Positive interactions and feedback loops are critical pillars to forming successful teams.
 - Warfighters cannot change the way they fight in near-peer or peer-to-peer conflicts without changing the way they think about AI in military operations.
 - Education underscores general concepts and provides a deeper understanding of how to optimize human-machine collaboration and teaming on a wider scope.

- Learning the benefits of AI, alongside its limitations, risk factors, security vulnerabilities, and ethical awareness acknowledges AI is not a panacea or silver bullet and emphasizing human interaction is still essential and desired is critical to developing a responsible AI ecosystem and workforce.
- Teaching the difference between human-to human relationships, Human-Machine Collaboration (HMC), Human Machine Teaming (HMT), autonomous components and full automatous systems is vital to establishing desired interactions in space operations.
- Basic training on how to interact with AI or automated systems is needed but deeper training on how to form effective hybrid human and AI pairs is vital.
- Wargaming can help foster core competencies needed in high functioning teaming and collaboration by promoting data-informed decision-making with AI involvement to add another layer of cognizance alongside intuitive or experience-based options.
- Human-AI pairing in military operations is still in its infancy. More warfighters who are well-versed in innovative methods are needed to pioneer research and testing at all levels. Warfighters contributing in this way increases trust as they help build, test and improve AI systems they will eventually field and use.
- Achieving Desired Effects with Human-AI Pairing
 - Employment of human-AI pairings provide a mirid of possibilities in space operations without displacing existing abilities. Although it is likely to produce a combination of new and enhanced capabilities to achieve commander's objectives.
 - As with a greater understanding through research and wargaming, previously unfeasible or impossible maneuvers in space can become new concept of operations if developed.
 - As an example, DARPA is experimenting with using teams of 25 soldiers to command up to 250 AI-enabled air and ground vehicles each. If this is proven viable, this concept could be extended to controlling mega constellations which, in the future, could have more autonomous features for self-protection alongside outwitting red counterspace defenses with less risk to friendly orbital regimes.
 - Human-AI pairs can enhance military effects and bring the best available data to shape competition and conflict earlier which creates greater decision space for commanders and in most cases leads to decision advantage.

RECOMMENDATIONS

- AI technology in space can enhance how the Space Force executes its core competencies but there is opportunity to harness synergies from human-AI teaming and collaboration. To take advantage of these opportunities Space Force leaders should:

- Develop a decision matrix for each space competency viable in the global campaign, competition and conflict phases of military operations.
 - Once accomplished, the stakeholders can pinpoint which modes of operations according to the missions within the competencies would benefit from increased decision space.
 - Through that lens determine which instances the stakeholders want to benefit from human-AI pairing, that which is the most advantageous vice human or machine alone.
- Create a spectrum of wargames that educate and train warfighters on how to collaborate and team with AI systems to mature interactions between humans and machines.
 - Build scenarios which train to new concepts and induce stressful conditions with mental and cognitive pressures help mitigate mistrust, build familiarity, and instill confidence by learning how to respond as a pair, then a team and ultimately as a lethal or defensive force.
- Provide greater opportunities for early inclusion of operational units who have been educated and trained on AI systems to be a part of testing in some manner.
 - Warfighter buy-in is critical and encourages innovation and the creation of new concepts of operations as new AI capabilities are rolled out.

CONCLUSION

Human-artificial intelligence collaboration and teaming in space, is described in full as an independent research paper. Full analysis and the complete recommendations of the research are included for additional reading.