

Attachment 1 – DAGSI Research Topic Template

1. Research Title: Investigating Team Structural and Process Factors to Maximize Human-Machine Teaming

2. Individual Sponsor:

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3. Academic Area/Field and Education Level

Psychology (Human Factors/Cognitive) MS or PhD

4. Objectives:

Examine relationships between team structural factors (e.g., composition, size, roles, organization) and critical team processes (e.g., communication, decision-making, team cognition) related to team performance outcomes in the context of human-machine teaming.

5. Description:

The development and eventual deployment of advanced autonomous/agent systems is a top Air Force priority. Future Air Force team compositions are envisioned to be a mix of human and machine teammates, with human team members receiving collaborative input from sophisticated agent teammates. However, plans to team autonomous agents with Air Force personnel raise new questions about the effects that such teammates might have on important team psychological processes, such as team cognition, performance satisfaction, collective efficacy, and trust. Research is needed to explore how changes in team structure, such as changes in team size and composition (all humans, humans and agents), may influence team dynamics, communication, team strategies, and performance. Importantly, it is unclear how the presence of an intelligent agent might affect the emergence of coordinative structures and interaction dynamics that are thought to underlie team performance. Such influence may be of particular consequence during the initial stages of team task learning and skill acquisition.

Given the importance of team performance and trust in most contemporary military operations, a detailed understanding of the processes that support coordinated team behaviors is a critical Air Force need. However, the scaling of coordinated behavior as a function of team size and composition, especially when that team composition involves one or more machine agents, is only beginning to be addressed. As such, we are interested in proposals exploring relationships between structural aspects of human-machine teams, e.g., team size, roles, and composition, and critical team processes, e.g., team cognition, team dynamics, and task learning.

6. Research Classification/Restrictions: Unclassified/unrestricted

7. Eligible Research Institutions: All