The Influence of Coordination and Collaboration Instructions on UAV Team Performance

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In efforts to maximize team performance and minimize costly errors, the study of coordination and collaboration in teams has become a vital area of research. By understanding who does what, team members can function in a more cohesive and coordinated fashion. In addition, by understanding when and why team members enact particular behaviors, teams increase their ability to collaborate by anticipating each others needs, which ultimately increases efficiency. These subsequent benefits of efficiency have been shown to be particularly useful under conditions of high stress and time pressure, where verbal communication is often viewed as an impediment to optimal outcomes.

Because coordination and collaboration among team members is important for the overall success of UAV operations, we stress the necessity of a systematic program of research designed to increase such skills. We propose that increases in coordination will result in more efficient UAV flights, because through proper training, team members will have a more precise understanding of their objectives, and what their own and their teammate's roles and responsibilities are. Coordination training should reduce inefficiencies in communication, minimize confusion and errors, and lead to better decision making. It should also facilitate the implementation of optimal flight patterns, and increase team cohesiveness.

We believe collaboration training will also increase team efficiency, particularly under highly challenging situations. By having the ability to anticipate a teammate's needs, teams who have been trained to be collaborative should be able to reduce the amount of time necessary to complete objectives, and should be able to adapt and respond to novel situations or ad-hoc objectives with greater ease. By having the responsibility of anticipating teammate's concerns, an emphasis is placed on becoming more familiar with the situational constraints that may potentially interfere with a teammate's performance. Having this knowledge and situational awareness should lead to increased feelings of personal responsibility for a successful outcome, and should increase operator's motivation to perform well and provide backup behaviors. Additionally, collaboration should reduce the necessity of explicit verbal communication in some instances, which should increase the amount of time teammates can use to develop strategies and discuss the status of their current mission.

Borrowing from existing team training literature, a set of both coordination and collaboration instructions have been devised to allow us to examine the above mentioned propositions. In an experimental setting, we will be able to manipulate what instructions are given to participants (coordination, collaboration, both, or neither) and subsequently measure the impact of these various instruction conditions on performance in a series of simulated UAV missions. We are particularly interested in assessing performance outcomes and understanding the underlying mechanisms related to any increases and detriments to performance. Moreover, we hope to develop an understanding of how

errors originate and propagate in team performance during UAV missions, which will assist us in fulfilling our additional aim of modeling errors in UAV team performance.