

Challenges with the Integration of Robotics into Tactical Team Operations

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Abstract:

As robotic systems become increasingly sophisticated, there is strong interest in deploying them in challenging and stressful environments. There are many potential advantages for the use of robotic systems in law enforcement and military operations. Robotic systems can provide the ability to perceive and act at a safe distance. However, achieving the full potential of robotic systems integration presents significant research challenges. The authors have observed field evaluations of candidate robotic systems, assessed potential roles for robots in tactical operations, evaluated standard and novel command and control interfaces, investigated levels of automation, and developed intelligent systems to support robot operations. Recently, a 6-month evaluation of an iterative development process for a command and control interface for distractionary devices (lights and sounds) with multiple levels of autonomy was completed. Effective integration of a robotic system presents significant communication and machine intelligence challenges. A fully integrated robotic system should be able to understand and participate in actions as a team member with limited direct communication. This requires that the robot demonstrate scene understanding, situation awareness, knowledge of tactical operations, and more. The authors will discuss lessons learned and identify opportunities for future research to expand the capabilities of tactical robotic systems.