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ScMvr-25

Human-Robot Interaction (HRI)

S&T Campaign: Sciences for Maneuver
Vehicle Intelligence

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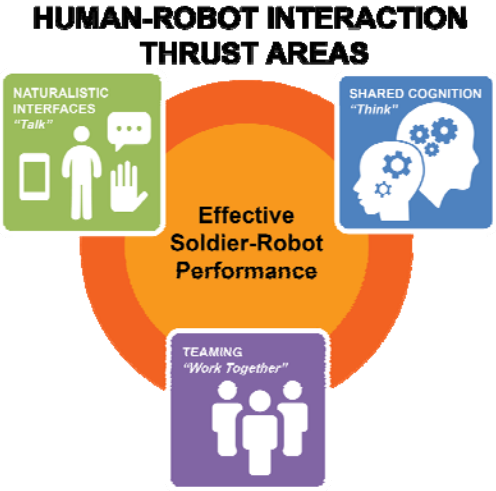
Research Objective

Discover, understand, and exploit fundamental human-system principles to develop effective teaming of Soldiers and autonomous, intelligent systems



Three primary thrust areas are naturalistic interfaces, shared cognition, and teaming to achieve effective Soldier-robot performance.

Challenges

- Identify how to exploit models of shared cognition for improved teaming and performance
- Understand how best to use multimodal capabilities and new interaction technologies to reduce cognitive and physical burden
- Perform research on technology that does not yet exist, using simulation and surrogates

Goals include developing natural interfaces, shared mental models, and appropriate trust.

ARL Facilities and Capabilities Available to Support Collaborative Research

- Cognitive Assessment, Simulation, and Engineering Laboratory (APG)
- Simulation and Training Technology Center (Orlando, FL)
- Simulation testbeds for human-in-the-loop experimentation
- ARL expertise: human factors, human performance assessment, evaluations with Soldiers, tactile interfaces, human-agent teaming, trust and transparency research
- Recent and current research topics:
  - Operator aids for shared understanding
  - Human-robot natural language interfaces
  - Tactile interfaces for Soldier navigation and communication
  - Trust development and transparency

Human-agent teaming for multi-robot management (the RoboLeader project; Chen & Barnes, 2012)

Complementary Expertise/Facilities/ Capabilities Sought in Collaboration

- Expertise in:
  - Team processes with autonomous systems
  - Impacts of social-cultural factors on HRI
  - Human-robot bidirectional language and communications
  - HRI with microsystems
- Testbeds to evaluate HRIs, including
  - Multimodal and natural language interfaces
  - Team processes
- Innovative solutions for HRI challenges to evaluate with Soldiers

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