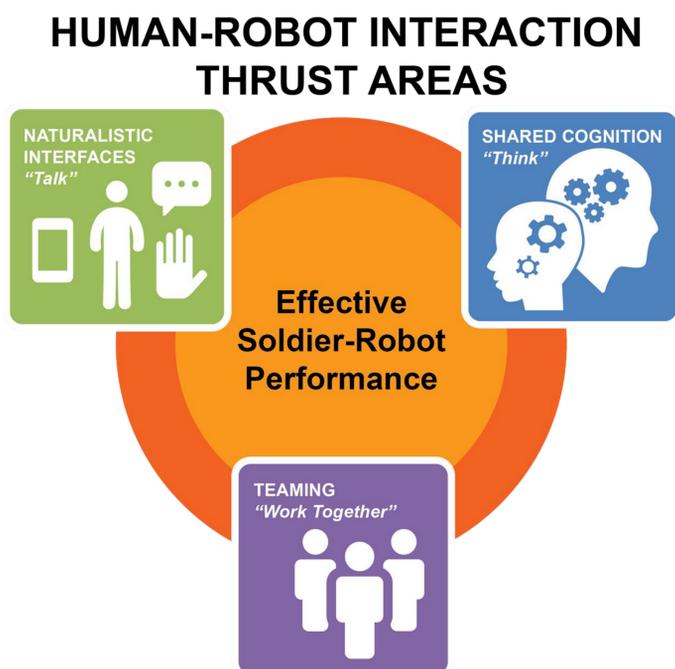


**S&T Campaign: Human Sciences**  
*Integration of Humans and Systems*  
*Integration Technologies*

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## Research Objective

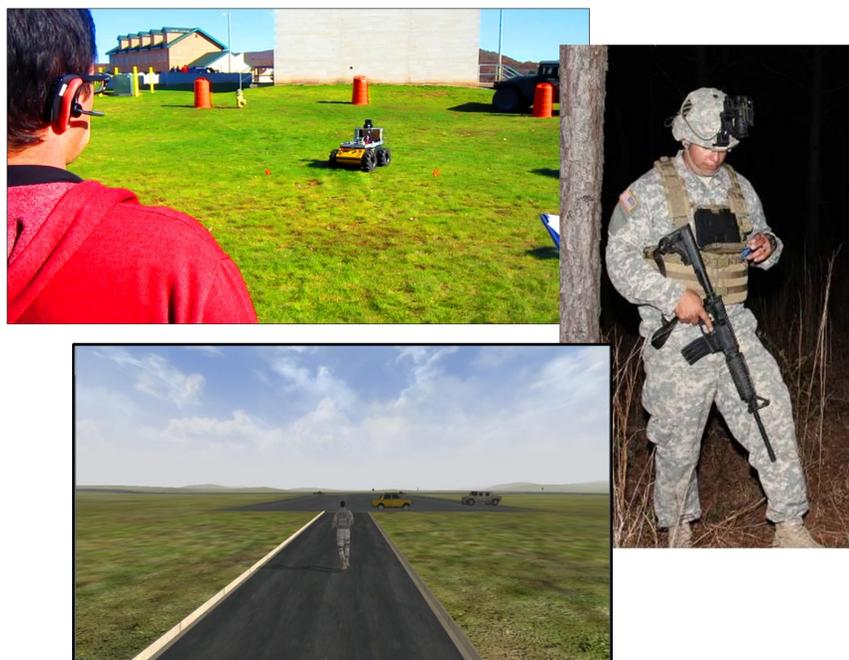
- Discover, understand, and exploit fundamental human-system principles to develop effective teaming of Soldiers and autonomous, intelligent systems



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
- Performing 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 & 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 & 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 & 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 bi-directional language and communications
  - HRI with microsystems
- Testbeds to evaluate human-robot interactions, including:
  - Multimodal and natural language interfaces
  - Team processes
- Innovative solutions for HRI challenges to evaluate with Soldiers