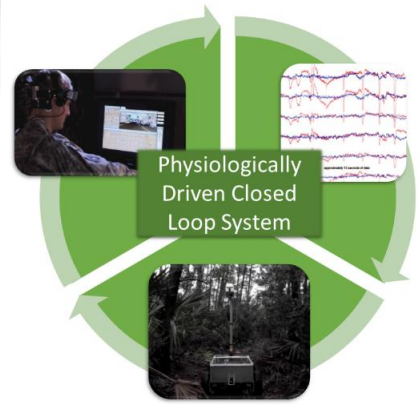
Ground Robot-Aided Intelligence, Surveillance, & Reconnaissance (GRAISR)

The Ground Robot-Aided Intelligence, Surveillance, and Reconnaissance (GRAISR) program is a multi-year effort sponsored by the U.S. Army Research Laboratory (ARL). This program primarily focuses on enhancing the effectiveness of human-robot teams, specifically within intelligence, surveillance, and reconnaissance (ISR) operations.

The demand for advanced technological systems implemented for ISR operations is increasing in response to changing military threats. With opponent forces striving for a competitive edge within the area of ISR and counter-ISR technology, demands will only increase. Advancing from human supervised teleoperated robot assets, future robots will autonomously make decisions intended to enhance human performance and alleviate workload. The goal for this program is to bridge that gap from robots as tools to teammates.

Investigational questions:

- How should the state of workload be modeled to build a closed-loop system?
- What should the robot do in response to the Soldier's workload state?
- How should multimodal squad level interactions be simulated for Soldier-Robot teaming?



Technical Approach:

Physiologically driven robot behavior

- Model workload data from Electroencephalogram (EEG), Electrocardiogram (ECG), transcranial Doppler (TCD), functional Near-Infrared (fNIR), and Eye Tracking
- Create and implement algorithm for human-robot closed-loop system
- Test closed-loop triggering of robot behavior change driven by human workload level
- Experimentally evaluate the effectiveness of the robot's behavior change to workload on human performance
- Publish results

Multimodal Human-Robot Interaction Simulation

- Transition Robotics Collaborative Technology Alliance (RCTA) multimodal interface to an ARL virtual world to serve as an integrated test bed for researchers

ARL Prodigy

UCF Institute for Simulation & Training