MODELING AND SIMULATION
FOR MILITARY GROUND VEHICLES

Experiment subject wearing Microsoft Hololens and around-ear neuro signal sensor interacting in a VR environment

Point of Contact

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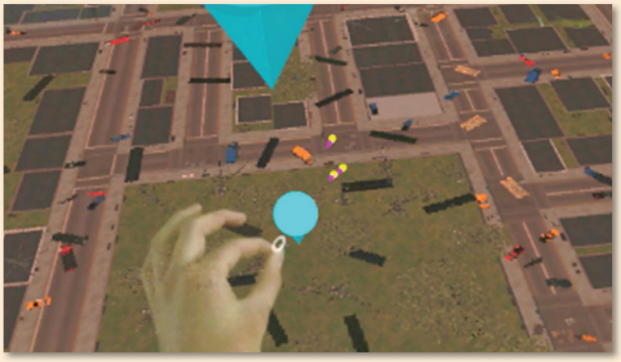
In support of our U.S. Army customers, DCS provides modeling and simulation (M&S) capabilities for combat vehicle technology research. In particular, we develop unique M&S solutions to facilitate exploration of future concepts in Human Machine Interface, AI-assisted perception and decision making, vehicle C2 integration, and manned and unmanned UxV teaming for military ground vehicles.

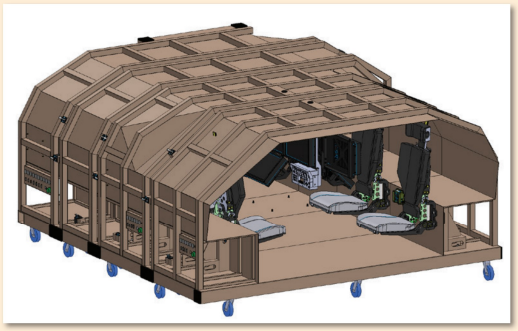
AUGMENTED REALITY / VIRTUAL REALITY / COMBAT VEHICLE HUMAN INTEGRATION

- Modeling and simulation for combat vehicle crewstation integration studies at platoon and below
- Unreal Engine programming
- Multi-vehicle, multi-crewstation human in the loop experimentation
- Physics based multi-body dynamics simulation of ground vehicles, motion simulator
- Terrain modeling
- Large scale virtual experiments to assess tactics, techniques, and procedures of new combat vehicle technologies
- Augmented reality interface for mounted and dismount command and control

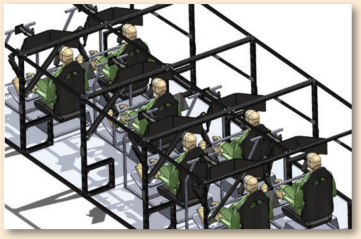


Subject Interacting with VR Environment Viewed through Hololens

- Vehicle and environment simulation for crew and autonomy integration studies
- Next Gen Combat Vehicle full platoon HITL simulation for Manned-Unmanned Teaming experiments (2 manned, 4 unmanned vehicles, 14 crew)
- Field experiment soldier training simulator
- Fully functional crew cab for motion simulator
- Modular, mobile vehicle trainer



Inside View of Modular Mobile Crewstation Simulator



ARL INFORMS Lab Manned-Unmanned Teaming Experiment Crewstations

Inside of GVSC Motion Simulator Cab with MET-D Crewstations

Leader / Follower Simulation of Simulated PLS Truck Integrated with Autonomous Convoy Behaviors

GROUND VEHICLE AUTONOMY SIMULATION FOR TESTING

- Manned and unmanned ground vehicle, sensor, weapon simulation, autonomous behavior simulation, LIDAR emulation, ground vehicle simulated scenario generation and planning
- Virtual environment for Robotics and Autonomy Systems – RAS-G Interoperability Profile testing
- LIDAR emulation using Unreal Engine
- Time of day and weather effects visual simulation
- In-line integration and testing with Warfighter Machine Interface
- In-line integration and testing with Robotic Technology Kernel
- Integration with ATEC Roadway Simulator for Autonomous System Test Capability Digital RAS Integrated Virtual Environment

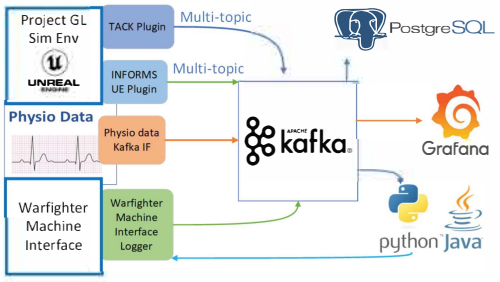
TACTICAL AWARENESS VIA COLLECTIVE KNOWLEDGE DEMO SYSTEM COMMANDER'S INTERFACE

Simulation environment based on Unreal Engine for rich interactive experimental scenarios to develop and validate models of human perception in the wild to:

- Inform automated analysis routines (opportunistic sensing)
- Provide quantitative feedback mechanisms for evaluation & training
- Enable more adaptive AI by exploiting perception & awareness at the group level using passive physiological sensing

HITL M&S EXPERIMENT DATA INFRASTRUCTURE

- Data acquisition software architecture for Human in the Loop M&S experiments
  - Built around Kafka, an open-source distributed event streaming platform
  - Enables high throughput, low latency, high durability and availability via horizontal scaling
  - Allows the addition of external systems for additional infrastructure without sever
- Data visualization tool to examine data live or after action
  - Simultaneous view of scenario progression, physiological data, system status and events



Apache Kafka based architecture for data stream management and synchronization, storage options for search and exploration

Human in the Loop M&S Experiment Multi-modal Data Visualization and AAR Tool

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