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INTELLIGENT GROUND SYSTEMS

TARDEC

Crew Station Development Efforts

The U.S. Army Tank Automotive Research, Development and Engineering Center's (TARDEC's) Intelligent Ground Systems (IGS) mission for crew station development is to maximize Soldier-system effectiveness, reduce warfighter training burdens and increase control of a variety of unmanned systems.

Critical focus areas include:

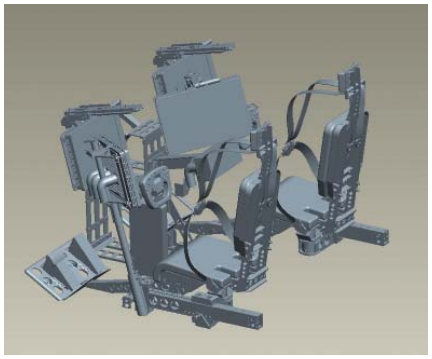
- Soldier workload exploration — reducing task times and optimizing workloads through effective design and automation.
- Crew interfaces — intuitive layout of controls, displays and information presentation for increased effectiveness and greater situational awareness.
- Automation technologies — advanced algorithms and techniques to assist Soldiers in more effective task execution.

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Application Areas

TARDEC's IGS technical area has more than 20 years' experience designing and developing advanced crew stations and mission workstations. Programs have addressed the fight, scout, carrier and robotic control missions, emphasizing greater capability and increased performance with fewer crew members. A variety of crew stations have been embedded in manned ground vehicle systems and tested in military-relevant environments to provide the Army with insight for the following applications:

- Soldier-machine interactions:
  - o Indirect vision driving/drive-by-wire.
  - o Control devices, including multifunctional yokes, joysticks, speech recognition, tactile feedback, 3-D audio and other modalities.
  - o Scalable, reconfigurable Soldier-machine interface designs based on sound human factor principles.
  - o Semi-autonomous capability and driving aids utilizing laser detection and ranging sensors.
- Robotic Control:
  - o Control of complex operations, such as formation monitoring and maintenance.
  - o Increased understanding of robot intent.
  - o Techniques to minimize control lost due to latency.
- Embedded Simulation:
  - o 2-D and 3-D simulation hardware — rehearsals, after-action reviews and training.



Future Development Capabilities

- Advanced warfighter-machine interfaces to provide improved closed-hatch operations and increased situational awareness.
- Task automations that account for environmental conditions, battlefield situations and current operational state.
- Adaptive crew stations that dynamically re-task mounted crew members based on physiological assessments of real-time workload.
- Task sharing and seamless delegation among crew members.