



## INTELLIGENT GROUND SYSTEMS



### Convoy Active Safety Technologies (CAST)

The TARDEC Intelligent Ground Systems CAST team **MISSION** is to:

- Improve safety for the line-haul ground fleet. Use automated, robotic leader/follower capabilities.
- Reduce vehicle collisions and driver fatigue.
- Decrease driver workload.
- Increase Soldier safety through force protection.
- Increase situational awareness and cognition.

**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**

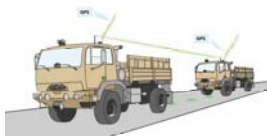


## Application Areas

CAST incorporates four separate navigation capabilities used in a complementary effort based on embedded and continuous inputs and adjustments:

### Global Positioning System (GPS) Leader-Follower

- Lead vehicle provides trail of GPS waypoints.
- Is a simple approach available in most locations.
- Allows for near-term deployment opportunity.



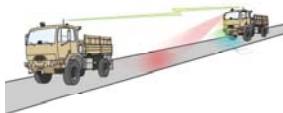
### Radar-Vision Tracking

- Follow vehicles use a combination of radar and vision to estimate trajectory of lead vehicle.
- Enables high-speed following at a close distance.
- Allows for convoy reconfiguration.
- Has near-term deployment opportunity.



### Vision-Based Route Following

- Lead vehicle reports position en route.
- Follow vehicles use road following and obstacle avoidance to navigate en route.
- Enables following at widely separated distances.



### Map-Based Following

- Lead vehicle develops a map of recognizable features.
- Follow vehicles provide relative navigation by registering features.
- Enables operations in GPS-denied areas.
- Uses Soldier-machine interface integration.
- Decreases convoy misdirection.



## Capabilities

CAST is a Future Force technology that applies Current Force systems using capabilities and commercial off-the-shelf products. Through the applications of CAST, Soldiers have the ability to:

### Mission Plan

- A touch screen allows Soldiers to observe vehicle resources in real time.
- Route sharing displays consistent path of direction or obstacles.
- Touch screen displays vehicle system and status consistently throughout convoy.

### Add Tasks

- Operate an unmanned conventional stand-off weapon turret remotely.
- Perform mission planning en route.
- Rest.

### Reduce Crew Manning

- A truck with CAST assumes driver responsibilities.
- Driver can assume vehicle command duties.
- A one-man crew is used for select missions.

### Un-man Trucks in Line-haul Convoys

- An extra prime-mover/Bob-tail (without trailer) is used for trailer recovery during convoy breakdowns, thereby removing two Soldiers from a convoy mission.

## Future Capabilities

### Technologies

- Ultra wide band radio relative vehicle positioning.
- Infrared light tracking.
- Graphical warfighter interface.
- Robust communication architecture.
- Road and vehicle following algorithm upgrades.

### Capabilities

- Multi-vehicle heterogeneous convoying.
- High-speed functionality (50+ mph).
- Improved obstacle avoidance.
- Decreased convoy misdirection.
- Increment weather functionality.
- Night operations with headlights and blackout settings.