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U.S. Army CCDC Ground Vehicle Systems Center
Led by the University of Michigan

Automotive Research Center
A U.S. Army Center of Excellence for Modeling and Simulation of Ground Vehicles
Led by the University of Michigan

Armored Vehicle Baseline Driving (AV-BADR) Tasks
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Motivation (the Problem)
The Army regularly conducts a number of experiments to evaluate the effectiveness, usability, and other properties of new technologies in armored vehicles (e.g., head-mounted displays for closed hatch driving, route guidance displays). However, each study uses a different set of scenarios, different test environment (simulation vs. field), different soldiers, and variations of the technology, so the studies are not comparable.

Fundamental Research Questions
Q1. What is a common set of move, shoot, and communicate tasks that can be conducted both in simulation and in the field to provide baseline performance data useful for comparing studies?
Q2. What are the details of how test courses should be constructed and the instructions to subjects?

Objectives
• Develop set of baseline driving move (driving), shoot (gunnery), and communicate tasks.
• Tasks should be easy to implement in simulation (GVSC Turret Motion Simulator) and in the field (Camp Grayling).
• Task set should require <1 hour of driving and < 2 hours to complete.
• Task set must be safe to conduct and pass both safety and the human subjects reviews.
• Set is applicable to single vehicles and a section of 1 manned vehicle and 2 remotely-driven vehicles.

Approach
• Review Army training manuals to determine what users, especially drivers of Bradley, Stryker, and Abrams vehicles, are taught about driving, gunnery, and communication tasks.
• Review reports on vehicle dynamics test facilities at Aberdeen Proving Grounds and Yuma Test Center.
• Meet with Mission Engineering to learn about actual use of these vehicles and problems in performing the 3 core tasks.
• Obtain input from other technical experts at GVSC, Parsette, and DCS Corporation.
• Review prior GVSC studies of interface evaluation.

Results – Initial move task proposals
• Paved road (simulated road march – common task)
• Mogul (induces roll)
• Minefield (narrow path, see below)
• Ditches (induces pitch)
• Trenches (negative feature - difficult to see)
• Slalom (classical handling test with hedgehogs)
• Formation change (requires coordination)
• Berm Drill (standard defensive maneuver)
• Urban Cover (hide behind buildings – defensive maneuver)
• Urban Drive (narrow streets, see around corners)

Example: Minefield Task
Drive as quickly as you can through the simulated minefield without leaving the cleared lane.

Difficulty = (lane width – vehicle width) / lane width

Future Work
• Continuing to refine set of tasks
• Predict task completion time
• Get buy-in from GVSC developers and Camp Grayling logistics personnel
• Assist simulator developers and Camp Grayling staff with implementation
• Analyze data from test subjects to improve set of tasks