

# USA ODS

## *U.S. Army Operator Driving Simulator*



**Training Category:** Motor Transport Operation

**Originating Agency:** TACOM, TRADOC

**Security Classification of Device:** UNCLASSIFIED

**Purpose of Device:**

Provide a simulation-based training curriculum to master skills necessary to operate medium and heavy tactical vehicles in all operational conditions.

The USA Operator Driving Simulator (USA ODS) provides simulators for the USA Medium and Heavy Transportation Fleet Simulators allow students to learn and master beginning to advanced on/off road operation, as well as dangerous and hazardous conditions, without risk to man or machine.

USA ODS represents a significant advancement in training techniques at an affordable price. Using simulation, students can be exposed to 100% of the learning objectives. Simulation reduces the excessive burden on schoolhouse resources with regards to instructors, actual vehicles, and associated O&M costs. As the technology is integrated into the curriculum, efficiencies of simulation training will be realized— increased stick time, potential for reduction in overall course length, efficient use of schoolhouse resources, and more thoroughly trained students—resulting in better-trained operators at a reduced cost.

The USA ODS provides:

- Unparalleled realism and high fidelity vehicle dynamics for believable operational experience. Simulated vehicles include: FMTV, M915, M939, HEMTT, PLS, & HET
- More complete training than ever before,
- Standardized training with automatic monitoring and robust scoring algorithms,
- Increased efficiency by as much as 200%,
- Reduced overall O&M costs.

**Functional Description:**

The USA ODS consists of four major parts: visual display system, cab and dash instrumentation/controls, motion cueing device, and instructor operator station. The visual display system provides an immersive, fully interactive, realistically depicted virtual world using high-resolution fully textured 3-D databases. Each student station can be configured with 3 or 5 visual channels to provide over 180° and 220° field of view, respectively. Manufactured cabs with 3 configurations of instrumentation/controls (emulating the HTV, MTV, Generic vehicles) provide the operator interface. Cabs include fully functional gauges and indicators with a force feedback steering system. All cabs are compatible with all vehicles simulated; with the particular cab types being designed to more closely match the controls of the target vehicle. The student station has been produced in two configurations: a full-motion system and a limited motion system. The full-motion

version mounts the cab and visual displays on a full 6-Degrees-of-Freedom motion platform. The limited motion system incorporates a 3-DOF seat actuator. Both versions provide a realistic sense of vehicle performance over the operational envelope, with the full-motion system better able to represent the terrain slopes and dynamics associated with extreme off-road operation. The Instructor Operator Station is the main simulation control point supporting the instructor's role in simulator training. The Instructor Operator Station initializes/configures the attached student stations, conducts training scenarios, monitors and assesses student performance, and maintains simulation and the curriculum.

High-fidelity physics-based vehicle dynamics - replicating actual vehicle performance- responsive to operator inputs provide a realistic operational experience. Simulated procedures encompass vehicle operation on-road and off-road -over a range of terrain- with a variety of weather conditions. Weather effects include wind, rain, snow, and fog. Daytime and nighttime, including operations, are included. Intelligent autonomous traffic is simulated to



provide a realistic environment to train for vehicle maneuvering.

The simulation curriculum supports the full breadth of training skills. New operators are exposed to practical skills training. Basic vehicle operation under innocuous conditions is introduced and reinforced. Intermediate operators are drilled to hone their decision-making skills. Advanced operators will be exposed to vehicle operation with traffic and pedestrians, defensive driving conditions, international roadways, and rough terrain operations.

USA ODS provides an increased training effectiveness by applying advanced technology to improve learning retention, offers additional opportunities for skills development, and provides realistic training simulations. In addition, USA ODS increases training efficiency by increasing student throughput, reducing learning times, and reducing total training costs.

Simulation technology provides a consistent baseline for operator preparation that far exceeds training methods that rely solely on actual vehicles. Simulation exposes all operators to the same standard by enabling repeatable exercises. In addition, dangerous and potentially

hazardous situations can be experienced safely without risk to man or machine. Students will be realistically trained in emergency condition driving and accident avoidance. Simulation creates a more intense driving situation where every variable such as terrain, weather, traffic, and towed loads can be changed in a matter of seconds. Geographic and climatic limitations can be overcome with simulation. No longer will inclement weather result in lost training days. Furthermore, simulation enables training independent of current weather, such as training snow operations at Fort Leonard Wood in July. Simulation will not only produce a more thoroughly trained soldier, but industry studies have

indicated that simulation can reduce overall training time by as much as 2-3 times faster.

Beyond the advantages to the operator, simulation benefits instructors. The simulator quantitatively measures performance, standardizes evaluations, and highlights necessary areas of improvement. Complete lists of performance metrics support constructive debriefing sessions. Problem areas and operator deficiencies are quickly highlighted for focused instructor

involvement. Simulators also automatically guide students through a training exercise, warning instructor and student of incorrect behavior on the spot. Automating tedious instructor tasks, like pre-briefing and giving directions, enable the instructor to focus on the essential aspects of student instruction and evaluation. In addition, simulation is capable of reducing measured student performance criteria to a succinct set of information for real-time monitoring and assessment. Student scoring information is available instantaneously, supporting instructor feedback, and then logged for long-term record keeping and trend analysis. With simulation, the instructor is capable of monitoring multiple students -simultaneously- with the system assisting in directing the instructor's attention.

USA ODS enables students to learn proper operational techniques under all terrain, weather, road, and traffic conditions. Instructors use simulation as the primary instructional device quantitatively evaluating student performance under controlled, repeatable, scenarios. The product of USA ODS is an Army motor transport operator more thoroughly trained than ever before.

**Physical Information:**

Full-Motion STS: Operational envelope – 12’6” high x 15’ wide x 22’ long

(does not include a suggested 2’ safety buffer)

Limited-Motion STS: 7’ high x 10’ wide x 16’ long.

IOS: 7’ high x 5’ wide x 8’ long.

Installed locations:

Fort Leonard Wood, MO

52 total STSs (14 pods):

48 Limited motion STSs

4 Full motion STSs

Fort Bliss, TX

18 Limited motion STSs (4 pods)

Fort Eustis, VA

1 Full motion STSs (1 pod)

USAREUR, Germany

1 Full motion STSs (1 pod)

Camp Carroll, KOREA

1 Limited motion STS (1 pod) - mobile

**Equipment required (but not supplied):**

None

**Power Requirements:**

Standard 120VAC

IOS – two dedicated 20-Amp circuits

Full motion STS - three dedicated 20-Amp circuits and a single 30-Amp dedicated circuit

Limited motion STS – four dedicated 20-Amp circuits

**Installation Requirements:**

Installation site(s) must be first floor or elevator accessible

Passages or doorways must be at least 80” wide and 7’ in height.

Floor Loading Requirements for Full-Motion STS – Standard 6 bag mix 4000 psi non-air entrained 4” thick concrete pad is capable of supporting loading requirements. Normal maximum loading would be 2000 lbs. per STS

Safe equipment tolerance is 32°F to 140°F and 5% to 80% humidity, non-condensing

Recommended operating environment is a continuous climate controlled environment of 65°F to 70°F with 50%-65% relative humidity, non-condensing

Optional mobile system installed in a 38’ trailer for fully self-contained operation. Completely self-contained with diesel generators and support for shore power.

**Personnel:**

Instructor/Operator – 1 instructor per pod stationed at the IOS, up to 6 STS per pod

Trainee – 1 trainee per STS

Roaming Instructor (suggested) – 1 instructor per pod to provide individualized instruction, as necessary

**Related Training Equipment:**

None.

**Contractor Identification:**

Designed, developed, and manufactured by