



# HIGH FIDELITY SIMULATION TO SUPPORT ARMY'S TANKS

As the Australian Army anticipates the impending arrival of 75 Abrams M1A2 SEPv3 Main Battle Tanks (MBTs), another delivery is set to transform tank crew training. Developed by Sydney-based Thomas Global Systems (TGS), the Abrams Immersive Tactical Trainer (ITT) represents a significant advance in military simulation technology.

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**T**HE ITT, described as "a containerised Abrams MBT" by Michael Hall, TGS' General Manager of Simulation and Training Solutions, is a complete, high-fidelity full-crew simulation system housed within a 21ft ISO shipping container. This deployable unit is designed to accurately replicate the crew environment of an Abrams tank, with positions for the commander, gunner, loader, and driver, as well as an instructor station. This configuration enables a versatile range of training scenarios, from individual crew roles to full-crew operations and multi-vehicle engagements, or as part of larger networked scenarios via a High-Level Architecture/Distributed Interactive Simulation (HLA/DIS) gateway.

The ITT addresses multiple training requirements in one cohesive system. It serves as a Tactical Crew Trainer, an Advanced Gunnery Training System, and a Driver Trainer, effectively imitating all the controls, interfaces, and sensory experiences of the actual tank. The system's design allows for flexibility in training, whether focusing on individual skills or coordinating complex tactical manoeuvres across multiple vehicles. This level of versatility is particularly valuable for modern military forces, where adaptability and precision are crucial.

### CONTRACT AWARD

In May 2022, TGS defeated strong competition to win a five-year \$42.4 million contract as prime system integrator to deliver 16 Abrams ITTs to Defence by 2025 – 12 containerised units deployable by land, sea and air, and four static classroom versions that will be located at the School of Armour at Puckapunyal. The project includes a separate agreement with TGS for ongoing sustainment and support services.

**LEFT:** The driver's controls undergoing testing

**ABOVE:** The Abrams Immersive Tactical Trainer has been developed by Army by Thomas Global Systems

TGS is well-practised in military training systems. The company has collaborated with Thales on ASLAV crew procedural trainers, and in manufacturing complex user interface panels for the Collins-class submarine platform training simulator. More recently TGS has provided Rheinmetall Australia with the hardware element of the company's tactical trainers for Army's Boxer Combat Reconnaissance Vehicles (CRVs). According to Hall, this groundwork laid the foundation for the Abrams ITT, enabling TGS to deliver a product featuring superior standards of fidelity and functionality.

Hall also credited the company's success to being a relatively small and agile business, and to directly addressing customers' requirements. "We have to be agile, most of our 65-strong Sydney team are multi-skilled; they're taking part in design work, documentation, working closely with local suppliers and they're in the facility doing hands-on integration," he commented.

One of the most notable features of the ITT is its ability to simulate the complexities of tank operations with high fidelity. The system replicates all crew positions and equipment with precision, down to the sensitivity of individual controls, buttons, and switches.

### GUNNERY TRAINING

The ITT's advanced gunnery training component features various engagement scenarios with the simulated 120mm main gun that challenge crew members to adapt to different combat situations, such as moving targets and instructor-induced system malfunctions. The instructor can introduce faults such as a loss of laser rangefinder functionality or hydraulic power, requiring the crew to use manual controls. These scenarios are designed to test and enhance the crew's ability to respond to unexpected situations, a critical skill in actual combat.

The system also incorporates the commander-controlled 12.7mm remote weapon station, providing a comprehensive training experience that covers all aspects of tank operations. The realism extends to the loader's position,



**LEFT:** A bird's eye view of the Abrams ITT

**BELOW:** A render of the visual systems in the ITT

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where traditional switches and levers are replaced by a touchscreen interface. This design choice emphasises procedural accuracy, allowing loaders to focus on selecting the correct ammunition and executing precise commands, rather than physically handling munitions.

Another innovative feature is the instructor's ability to modify training scenarios in real-time. Using a keyboard, mouse, and CCTV displays, the instructor can alter the training environment, introducing new challenges or changing conditions to test the crew's adaptability. The system's after-action review capability allows the instructor to analyse the crew's performance in detail, including the

gunner's point of aim, the commander's decision-making process, and the timing of key actions. This level of analysis provides valuable feedback, helping to identify areas for improvement and ensuring that crews are fully prepared for real-world operations.

"The ITT's development involved meticulous attention to detail, ensuring that every aspect of the simulation closely mirrors real-world conditions," Hall said. For instance, the system includes authentic audio cues and visual displays that replicate the sensory

experiences of operating an Abrams tank. This includes sounds captured from an actual tank, such as startup and shutdown sequences, turret traverse, and weapon systems.

### DELIVERY

TGS's headquarters at Sydney's Olympic Park is home to its engineering and project management teams; the company's state-of-the-art manufacturing facility in nearby Newington is the production centre and handles all aspects of ITT assembly and testing.

The first containerised ITT system has commenced environmental testing at the Monegeetta proving ground in Victoria. The system will then be delivered to the School of Armour at Puckapunyal and later join the other 11 con-

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tainerised systems destined for Townsville and 3 Brigade, where deployable Abrams capability is to be based.

The four classroom systems intended for Puckapunyal will be delivered next year.

The current Abrams training system used by the US Army simulates only the commander and gunner roles, and the global implications for the ITT are significant.

"We now have the only full-crew M1A2 training system in the world," Hall said.

"It has attracted considerable interest from international markets, and we're actively exploring export opportunities, including potential sales in Europe and the Middle East, where there are sizeable Abrams fleets."

TGS's potential expansion into the international market is further supported by its facility in Irvine, California. This site specialises in advanced avionics, including a multi-year contract with Boeing for the design and manufacture of latest-generation cockpit displays for the AH-64E Apache attack helicopter. This diversification not only enhances TGS's technical capabilities but also positions the company as a player of note in both the military and civilian aerospace sectors.

Looking ahead, TGS is exploring adapting the ITT system for other platforms, including earlier Abrams models and armoured vehicles such as the US Bradley Fighting Vehicle and Hanwha's AS21 Redback Infantry Fighting Vehicle (IFV), 129 of which are being acquired by Army under Project Land 400 Phase 3.

The system's modular design allows for the integration of different turret and driver cabins as well as new components and upgrades, ensuring its relevance in a rapidly evolving defence landscape. ■