

The Next Generation Automatic Test Station (NGATS) Offers Organic Off-System Test Capability for the U.S. Army

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Sustainment of the Army's weapon systems is a significant capability requirement for the Soldiers and program managers charged with the task of deploying and maintaining various weapon systems. No matter how a faulty weapon system is diagnosed at the platform, there will be a requirement to repair the component, unless deemed nonreparable. This defines the mission of the Army's off-system testers. They ensure the availability of the Army's weapon systems by providing the diagnostic and test capability that enables the repair of the faulty system components. The support structure needed to ensure sustained system readiness has evolved, supported by academic and practical analysis with actual wartime experiences. This evolution took form from a system-centric concept with each platform requiring a suite of special purpose test equipment to a multisystem test, diagnostic, repair capability enabled by the Army's Integrated Family of Test Equipment (IFTE) general purpose automatic test systems (ATS).

Soldiers install a Bradley Fighting Vehicle line-replaceable unit (LRU) during an operational test event at Fort Hood, TX. Soldiers benefit operationally from the NGATS system with its improved test capability, reliability, supportability, and deployability. (U.S. Army photo.)



IFTE

DOD and the Army have developed objectives and policy enablers to support the IFTE concept. Findings from a RAND Corp. study in 1990 titled *Supporting Combined-Arms Combat Capability with Shared Electronic Maintenance Facilities* foreshadowed the shift in support concept from four to two levels of maintenance and recognized the need to move component maintenance tasks from the maneuver elements to the rear echelons, thus, relying on distribution channels to support simpler remove/replace tasks forward. There was also evidence that IFTE, as an adaptable maintenance system that can support multiple platforms, can improve system readiness and availability, resulting in significant cost savings.

DOD; the Assistant Secretary of the Army for Acquisition, Logistics, and Technology; and the services embraced and implemented this concept, issuing policy and regulatory guidance at

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all levels to include creating a joint services ATS Management Board to provide oversight. In the July 2004 *Undersecretary of Defense for Acquisition, Technology, and Logistics Memorandum, DoD Policy for Automatic Test Systems*, DOD established the IFTE program as the Army's designated organic "single family" of ATS. Currently, IFTE supports multiple systems, such as the Kiowa Warrior; Tube-launched, Optically-tracked, Wire-guided missile; Abrams; Bradley; Paladin; and Avenger, with capability in development to support systems such as the Common Remote Weapons Station and Stryker Remote Weapons Station components. The IFTE off-system tester can

diagnose and enable the repair of both electronic and electro-optical components and assemblies.

NGATS

NGATS is the latest iteration of the Army's organic off-system test capability. NGATS is managed by Product Director Test Measurement and Diagnostic Equipment (TMDE), aligned under the management of the U.S. Army Project Manager Joint Combat Service Support, which is under the leadership of Program Executive Office Combat Support and Combat Service Support. NGATS takes advantage of modern commercial-off-the-shelf (COTS) test instruments



Soldiers perform LRU diagnosis during an operational test event at Fort Hood. (U.S. Army photo.)



NGATS is easily reconfigurable and adaptable to any weapon system requirement. Shown is the Army's NGATS tactical configuration. (U.S. Army photo.)

and open-system architecture, resulting in significant improvements in capability and system reliability and reduced system costs over the previous solutions. Using COTS-based instrumentation allows the NGATS to take full advantage of modern test program development tools, improving the speed of test development for weapon systems and reducing total development costs. NGATS represents the evolution of the IFTE off-platform test capability and the achievement of the DOD and Army goal to reduce the multiple unique ATS to a single tester that can support any weapon system at any level.

NGATS meets the Army's sustainment, transportability, mobility, and logistics

modernization capability objectives in the sustainment area, in support of the supply chain, and as required in the forward area in direct support to maintenance organizations. Also, the system can support the national maintenance centers, such as depots, with a more in-depth testing and repair capability inherent in the system. The ability to support multiple maintenance echelons with the same tester enables sharing of Test Program Set (TPS) development and data, which increases the effectiveness of diagnostics at all levels, resulting in a reduction in total support cost. TPS procurement is the responsibility of the weapon system program offices.

Components

NGATS is composed of a maintenance shelter that houses the actual test system and a second shelter that stores the system-specific TPS hardware required to test the system's components. Separating the prime mover from the test system eliminates the maintenance downtime related to vehicle maintenance and increases availability of the test system. The shelters were developed in the standard 20-foot International Organization for Standardization (ISO) container configuration, allowing for access to any commercial or military transportation mode. This gives maximum flexibility while meeting the Army's theater and strategic transportability requirements, to include C-130 transport, without any changes to the system configuration. Mobility is provided by the self-deploying and self-retrieving M1120A2 Load Handling System, which allows the system to be emplaced in minutes and operational shortly after emplacement. This ISO configuration enables the system to be

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easily relocated using various prime movers available to commanders, from tractor trailers to Heavy Expanded Mobility Tactical Trucks.

The improved test capability allows faster and more accurate diagnosis and repair of faulty or suspected faulty components. The state-of-the-art test instrumentation, coupled with system software and TPS, allows maintainers to diagnose and repair a wide array of system components, from repairable circuit cards to sophisticated electro-optic sensors and other critical weapon system components. NGATS is easily reconfigurable and adaptable to any weapon system requirement. As the Army embraces policies for DOD Enterprise Resource Planning and the net-centric environment to connect logisticians with maintenance, this data-rich environment will be used to enhance supply chain operations, maintenance decisions, and component design decisions. NGATS, as a net-centric capable system with an enhanced data capture and analysis capability, can capture and share component failure data throughout the supply chain, including all maintenance levels from field to organic sustainment to depot to factory.

The NGATS system has the advantage of being a joint capability. Its

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technology is derived from the U.S. Navy (USN)-led Agile Rapid Global Combat Support Advanced Concept Technology Demonstration (ACTD), which has an objective of exploring the potential benefits of developing and deploying a joint service automatic test capability. During the ACTD, NGATS was used as a demonstration system and was able to execute testing of Army, USN, and U.S. Marine Corps system components. This validated the contention that general purpose ATS is an interoperable commodity that can be leveraged for financial savings and, more importantly, an operational advantage to the warfighter.

NGATS offers significant advantages over currently fielded ATS, satisfying the dual sustainment functions of both diagnosis and repair while also achieving the DOD and Army objective to consolidate all ATS to a single, standard ATS family. A reduction in the logistics footprint by displacing several aging and obsolete test systems with a modern test capability also supports the Army's logistics modernization initiatives. This is done by leveraging its net-centric capability into the component diagnostics and repair data collection and management process. This enables closed loop diagnostics by making real-time reliability and performance data available from the field to the factory. Even as systems

move to become more self-diagnosing through embedded diagnostics and prognostics, until those same systems become self-repairing, NGATS will be required to provide organic support for system component diagnostics and repair.

NGATS has proven to be joint capable with its open-system architecture and use of industry standards and COTS components. The warfighter benefits operationally from the NGATS system with its improved test capability, reliability, supportability, and deployability. When coupled with its extreme flexibility, NGATS will be positioned to provide any level of component support at any point within a system's support strategy.

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The NGATS interior automatic test equipment console is pictured. (U.S. Army photo.)