



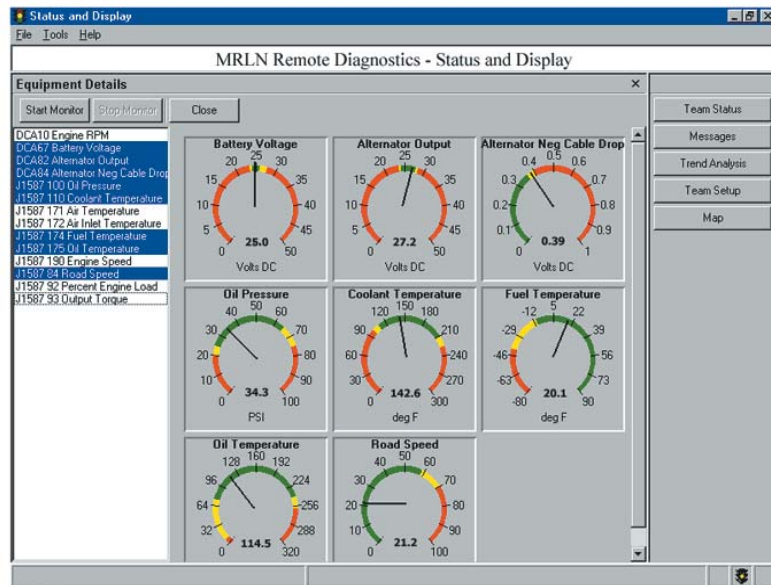
communications

Maintainer's Remote Logistics Network

MRLN Remote Diagnostics

MRLN Remote Diagnostics At A Glance

- Integrates onboard diagnostics with satellite communications
- Provides global, 24-hour, real-time vehicle health and position monitoring
- Allows immediate intervention via remote troubleshooting and diagnostics
- Requires very low communications bandwidth
- Improves readiness and reduces logistics footprint
- Supports prognostics and condition-based maintenance
- Enables automatic parts requisition
- Operates with standard Military computers, communication systems, and data bases



Description and Purpose

L-3 Communications and the U.S. Army Tank-automotive and Armaments Command (TACOM) have developed a remote monitoring and diagnostics system for U.S. Army tactical and combat vehicles. The prototype Maintainer's Remote Logistics Network (MRLN) is the backbone of this system. MRLN exploits the capabilities of Interactive Electronic Technical Manuals (IETM) authored with the L-3 Electronic Maintenance System (EMS).

EMS IETMs include an intrusive diagnostic capability that communicates with the electronic control modules and embedded sensors on military and civilian vehicles. The remote diagnostics system enables a motor pool, forward support battalion, or command post to interact with the on-vehicle IETM via satellite communications. Together, these systems provide real-time vehicle operational status and location information, as well as valuable logistics

support data. Benefits include improved readiness, lower operational costs, decreased logistics burden, increased operational flexibility, improved fleet management, and improved situational awareness.

Using MRLN, a maintainer can monitor an entire fleet that is on the move and drill down to a specific vehicle to display its location, monitor specific numerical sensor readings, and view selected gauges - all in real time. The maintainer can also remotely execute the IETM to conduct a troubleshooting session. The bandwidth needed to monitor or conduct remote troubleshooting via the embedded EMS IETM is very low - approximately 10 bytes per transaction. This is possible because the Maintenance Central computer contains the same IETM as the one embedded on the vehicle, so it is only necessary to transmit synchronization data between the two IETMs.

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With MRLN, the maintainer can communicate with the vehicle operator via text messages - even if there is no tactical radio installed on the vehicle. Thus, it is possible for the crew to assist with visual checks to help the remote maintainer successfully isolate the root fault. If parts are needed, MRLN allows the maintainer to remotely execute an automated requisition.

MRLN improves readiness by enabling more efficient maintenance support and a reduced logistics footprint. Real-time, condition-based monitoring prevents catastrophic and costly mission failures; critical symptoms can be detected and addressed immediately. MRLN also helps overcome the scarcity of weapon system experts by projecting the knowledge of a few expert maintainers to multiple points of maintenance as needed.

L-3 and TACOM have conducted numerous successful technical proofs-of-principle using satellite-, radio-, and cell phone communications. EMS and MRLN are designed to operate with the FBCB2 Appliqué computer, Movement Tracking System (MTS), Driver's Vision Enhancement display, next-generation L-3 Communications rugged products, and other standard Army systems.

The MRLN Process

- The onboard MRLN Remote Diagnostics software collects readings from the electronic control modules and embedded sensors while the vehicle is in operation
- The readings are transmitted via satellite link to the Maintenance Central control station

- Maintenance Central software displays a color-coded health status for all MRLN-equipped vehicles being monitored
- A technician at Maintenance Central can remotely detect system problems as they occur during operation, then remotely launch the onboard EMS IETM via the satellite link, and conduct a troubleshooting session to isolate faults
- As necessary, Maintenance Central uses MRLN to send text messages to the vehicle operator
- The maintainer determines the parts and tools needed to effect repairs before leaving to repair the vehicle in the field, or before the vehicle arrives at the motor pool for repair
- MRLN allows for just-in-time delivery of parts, tools, and technicians tailored to the specific maintenance problem

MRLN Remote Diagnostics: Supporting Army Transformation

The Objective Force arising from Army Transformation is a strategically responsive warfighting capability that can deploy to the Area of Responsibility (AOR) quickly. Transformation requires an aggressive reduction in the sustainment footprint and the leveraging of reach-back capabilities. MRLN Remote Diagnostics supports anticipatory logistics and prognostics - two key elements of the Revolution in Military Logistics (RML). MRLN is a tool to help sustain the Army in the battlefield at full spectrum performance and capability levels ... with reduced resources.

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