

# Multi-Link System Test and Training Tool (MLST3)

*Standard data link certification tool for U.S. military and its allies*

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**NORTHROP GRUMMAN**

# Comprehensive Capabilities Enable Full Life-Cycle Testing

The Multi-Link System Test and Training Tool (MLST3) generates simulated tactical scenarios to stimulate data link networks for testing. MLST3 is used by the Navy, Air Force and joint testing organizations to test conformance with tactical data link standards and interoperability certification requirements. MLST3 is deployed throughout the world as a leader in data link testing, contributing to multinational interoperability.

The MLST3 generates a flexible interactive environment to run pre-scripted scenarios or manually inserted events. The pre-scripting ensures desired capabilities are all tested, while manual insertions allow flexibility during training or development investigation. To support these capabilities, MLST3 operates in three modes: Pre-Test Application, Real-Time Application and Post-Test Analysis.

## Pre-Test Application

Analysts use the MLST3 scenario-developer program to build reusable scenarios for real-time testing. The scenario files define tactical exercises in complete environments. Among the file's many capabilities is simulating tracks, Link 11A participating units, Link 11B reporting units, Link 22 NILE units and Link 16 units. Scripted analysis report files present logical information about the exercise scenario, viewed from aspects such as time, track history and errors. The graphic user interface simplifies exercise development by enabling users to create tracks manually.

## Real-Time Application

During real-time tests, the MLST3 injects scripted scenarios into the system under test. An Automatic

Data Analysis Tool allows operators to analyze a single Link 16 unit in real time. Dual message monitor windows show all messages exchanged and are configurable by the operator to display selected information. Concurrently, the tactical situation display provides tactical data systems symbology and data readouts for selected tracks. Operators can conduct tests without scenarios by entering data online and controlling the content and reporting of information in real time.

## Post-Test Analysis

The MLST3 records all data exchanged, including messages, scenario data, operator commands and system alerts. Data reduction programs analyze data in readable text, octal and binary format. The Automatic Data Analysis Tool enables the MLST3 to automatically analyze Link 16 data. Processed data can be displayed at a workstation, printed, and stored to disk.

## MLST3 User Interface

To facilitate testing, the MLST3 Test Control User Interface features the look and feel of conventional Windows™ interfaces.

**Message Monitor Display** - Data are time-tagged and displayed in readable format. Operators can filter messages by link type, transmitted/received, message source, track number and identity.

**Tactical Situation Display** - Pairing and engagement lines, modifiers and track numbers are displayed. The Data Readout window displays link and simulation attributes for tracks. Operators can filter related information.

Operators use dynamic, menu-selectable displays to control the system during testing. The Message Monitor Display shows all transmitted and received tactical messages, as well as scenario and operator-initiated events. The Tactical Situation Display depicts filterable track symbology with background geopolitical maps scalable from global to one square mile.

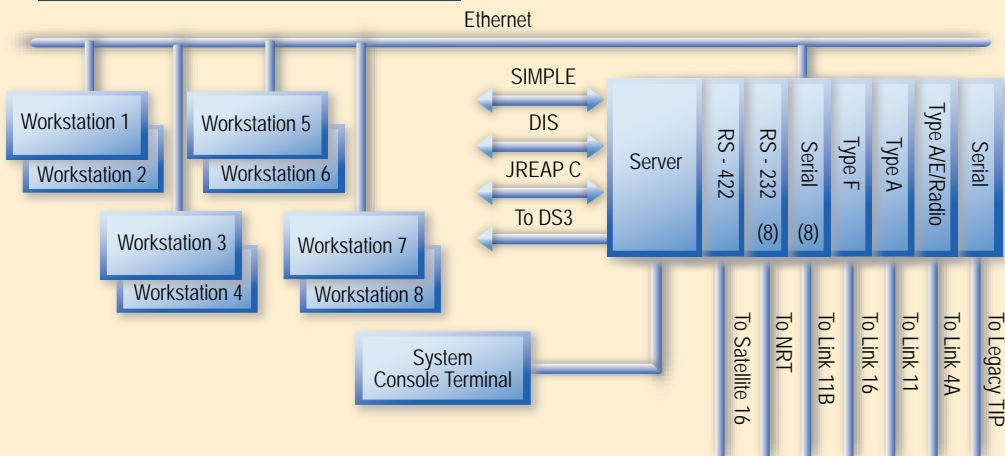
## Extended Capabilities

MLST3 can be networked for distributed testing and training using Northrop Grumman's Gateway Manager. The Gateway Manager enables the use of geographically distributed networks for communications transport using the Standard Interface for Multiple Platform Link Evaluation (SIMPLE) protocol and other protocols used to communicate with legacy test equipment over commercial telephone lines or the Internet. To achieve a wrap-around, closed loop test configuration for system integration and qualification, the MLST3 also communicates with Northrop Grumman's Distributed Simulation Stimulation System (DS3), which adds a powerful sensor-simulation capability.



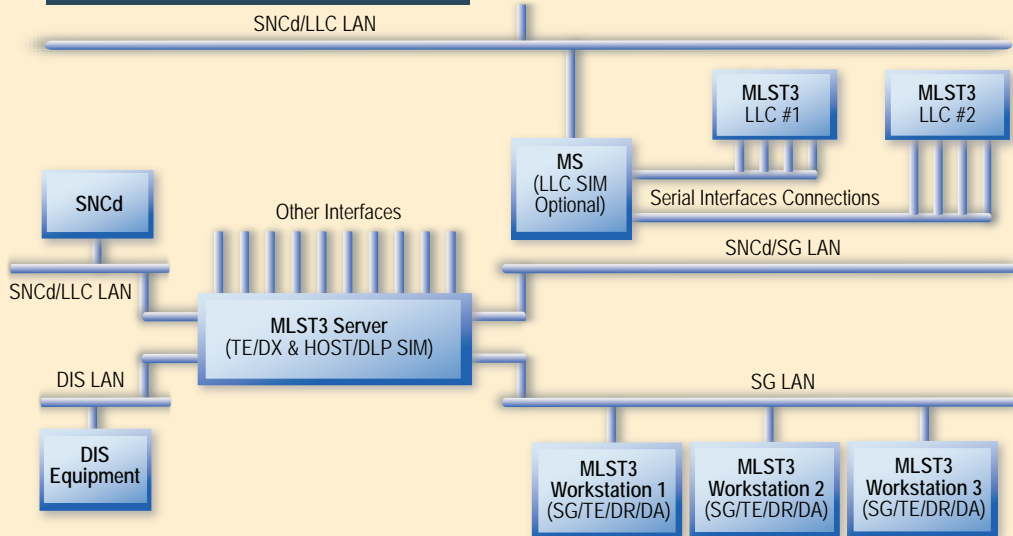
MLST3's standard configuration includes a server and four workstations.

## MLST3 System Architecture



For Link 16, MLST3 interfaces via MIL-STD-1553B or Ethernet. For Link 11, it uses MIL-STD-1397A or ATDS. MLST3 communicates on JREAP C and SIMPLE and with DIS via Ethernet.

## MLST3 Link 22 Architecture



## Development Support Testing

Operators test software as they develop data link systems and components. The MLST3 identifies errors early in the development cycle, enabling corrections and significantly reducing costs.

## Qualification Testing

The MLST3 verifies that tactical data systems of individual platforms conform to all operational requirements during qualification testing.

## Platform Integration

The MLST3 supports wrap-around platform integration testing with its coordinated data link and sensor environment.

## Tactical Data System Certification

The MLST3 is the standard certification tool used to exercise tactical data systems when they are tested and certified for compliance with U.S. military standards, NATO STANAGS and joint pubs, as well as ensuring interoperability with joint and coalition forces.

## Readiness Testing

Operational commanders use the MLST3 to perform operational verification of tactical systems before deployment using networked and live-link RF configurations.

## Training

By generating data link messages that represent a complete battle scenario, the MLST3 provides realistic training exercises that sharpen the skills of combat system teams. The MLST3 implements Distributed Interactive Simulation protocols, enabling the teams to participate in geographically distributed exercises.



The MLST3 can interface on Link 22 with a unit under test in a variety of ways, including live-link RF, media simulation interface and as a Link 22 communications equipment simulator.

# MLST3 Product Features

| Parameter   | Capacity |
|---|----------|
| Commands  | 86       |
| Handovers   | 86       |
| EW Coordination                                     | 86       |
| Change Data Orders                                  | 32       |
| ID Differences                                      | 32       |
| Pairings (6 Max per Track)                          | 128      |
| Associations  | 128      |
| Engagements (6 Max per Track)                       | 128      |
| Correlations  | 128      |
| IFF/SIF Management                                  | 32       |
| Pointers  | 5        |
| Link 22 Message Streams                             | 100      |
| Link 16 Message Streams                             | 100      |
| Link 11 Message Stream Sequences                    | 20       |
| Background Tracks for Link 16, Link 11, and Link 22 | 4,100    |
| Mission Assignments                                 | 32       |
| Vectors   | 32       |
| Controlling Unit Changes                            | 32       |
| Simulation/Local Link Tracks                        | 2,400    |
| Remote Link Tracks                                  | 2,400    |
| Waypoints   | 400      |
| Groups of up to 40 Action Tracks                    | 10       |
| Anti-Submarine Warfare Contacts                     | 24       |
| Training Tracks                                     |          |
| Link 16   | 256      |
| Link 11   | 128      |
| Link 11 PUs, RUs, FPU's (one E-3)                   | 64       |
| Link 16 C2 JUs, IUs                                 | 100      |
| Link 16 non-C2 JUs                                  | 100      |
| Link 22 NILE Units (NUs)                            | 65       |
| Link Simulation (Terminal Mode)                     |          |
| Two-Way Aircraft                                    | 16       |
| One-Way Aircraft                                    | 16       |
| Downlink Targets                                    | 384      |
| Uplink Tracks to Each                               | 16       |
| TACAN Points  | 10       |

| Capability                    | H/W I/F     | MLST3 | MLST3 with Link 22 | MLST3 Deployable |
|-------------------------------|-------------|-------|--------------------|------------------|
| Link 1                        | RS-232      | X     | X                  |                  |
| Link 4A                       | NTDS/L4IC   | X     | X                  |                  |
| Link 11A                      | NTDS/ATDS   | X     | X                  | X                |
| Link 11B                      | RS-232 Sync | X     | X                  |                  |
| Link 16 MIDS                  |             | X     | X                  | X                |
| Platform A                    | 1553B       | X     | X                  | X                |
| Platform B                    | 1553B       | X     | X                  | X                |
| Platform D                    | Ethernet    | X     | X                  | X                |
| Platform G                    | 1553B       | X     | X                  | X                |
| Platform I                    | 1553B       | X     | X                  | X                |
| Platform J                    | Ethernet    | X     | X                  | X                |
| Platform M (MIDS on Ship)     | 1553B       | X     | X                  | X                |
| Platform Q                    | 1553B       | X     | X                  | X                |
| Platform R                    | Ethernet    | X     | X                  | X                |
| JTRS A                        | 1553B       | X     | X                  | X                |
| Link 16 JTIDS                 | 1553B       | X     | X                  | X                |
| USN Class 2 Air               | 1553B       | X     | X                  | X                |
| USN Class 2 Ship              | 1553B       | X     | X                  | X                |
| F15                           | 1553B       | X     | X                  | X                |
| MLE                           | 1553B       | X     | X                  | X                |
| JSTARS                        | 1553B       | X     | X                  | X                |
| Link 22                       | Ethernet    |       | X                  |                  |
| SAT TADIL J                   | RS-449      | X     | X                  |                  |
| UKSTD L                       | RS-232 Sync | X     | X                  |                  |
| Multipoint Monitor (N-series) | LLS         | X     | X                  |                  |
| USMTF/OTHG (NRT)              | RS-232      | X     | X                  |                  |
| DIS                           | Ethernet    | X     | X                  | X                |
| SIMPLE                        | Ethernet    | X     | X                  | X                |
| JREAP C                       | Ethernet    | X     | X                  | X                |
| Legacy TIP (used with JREAP)  | RS-422 Sync | X     |                    |                  |

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