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Link Management System (LMS)

Dynamic Network Management

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Link Management System Dynamic Network Management

The diverse sets of equipment and platforms that participate on today's tactical data links (TDLs) can cause a complex communications environment challenging reliable network performance. Northrop Grumman's Link Management System provides a comprehensive solution, offering the Joint Interface Control Officers (JICOs) and network managers dynamic management and analysis of theater communications during real-world operations.

With decades of deployed operational use, LMS provides a robust feature set to monitor, analyze, and manage the health and performance of each network and its participants.

Network Monitoring

Intuitive, tailorable displays graphically provide the overall network topography, network performance data, and any faults or failures causing network degradation.

The Tactical Situation Display (TSD) orients the user, geographically, to the network topography.

TSD features include:

- Displays the common tactical picture using a three-dimensional situation display, allowing the operator to zoom from global landmass to street-level views. The mapping engine leverages Internet-based earth image repositories or mission-specific maps uploaded by the operator.
- Provides color coding schemes to differentiate participants' by identity, track age, reporting responsibility, or altitude.
- Displays track histories, color-coded by reporting unit, track identification, or reception quality.

Network monitoring capabilities:

- Shows which units are directly participating on each TDL, their real-time status, and any message forwarding that is taking place.
- Trend windows display historical information on precise participant location and identification (PPLI) connectivity, range, surveillance usage, Time Slot Duty Factor (TSDF) measurements, data erasure levels, and distribution of track identifications/categories.
- An Any-Point-in-Space TSDF heat map overlay feature displays geographic regions with a high pulse density. respond appropriately in order to comply with the applicable Frequency Clearance Agreement (FCA).

Network Analysis and Control

The LMS user has powerful capability at their fingertips to assess and optimize network performance. LMS uses ACO, ATO, and OPTASK Link messages to build a comprehensive network plan. Network performance is then monitored in real time and compared to this plan to identify trends and provide a comprehensive understanding of the network and its participants. Armed with this knowledge the user can take the appropriate steps to resolve issues and optimize network performance.

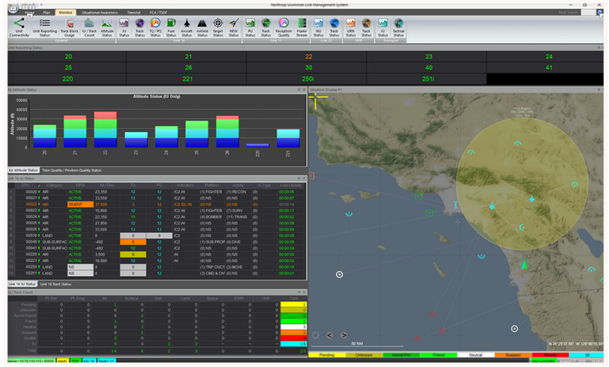
The user can:

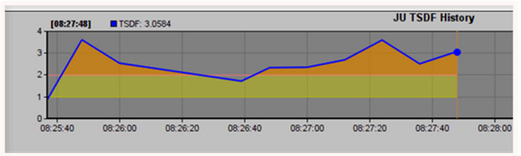
- Display how network capacity is allocated among functional groups.
- Focus in on one network participant or participating unit, or compare performance among participants/units.
- Identify which units require more capacity to prevent loss of data.
- Identify any unanticipated network participants or usage.
- Identify faults such as dual designation, reporting responsibility conflicts, and data looping.

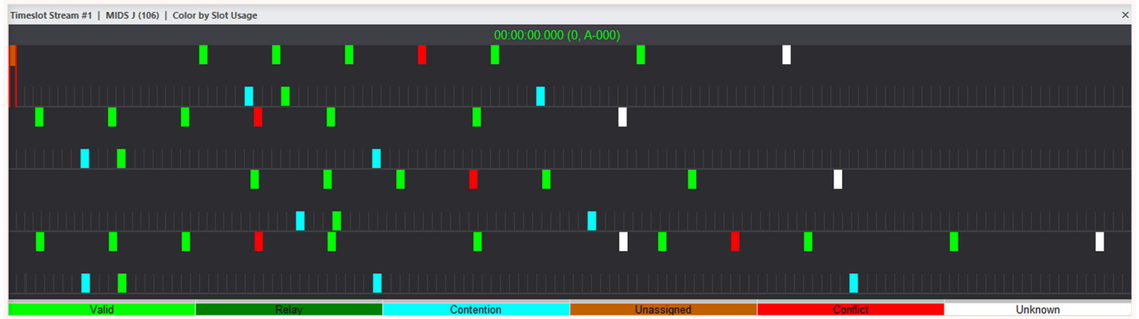
Robust Tool Suite Facilitates Beginning-to-End Mission Success

Leveraging decades of deployed operational use, LMS's toolset has been hardened and enhanced to support mission needs from network configuration to after action review:

- LMS supports the industry's most widely used TDL types and protocols.
- LMS records operational data at the raw data level to ensure that playback provides the same robust analysis capability that is available during live operations.
- Supports multiple workstations, with individually customized alerts, displays, and network filters
- Includes a one-year subscription providing user support and release updates







Multiple displays present a seamless tactical picture and summarize multi-TDL network performance. The operator can customize the display to include the most useful data — including signal quality and connectivity information — enabling an at-a-glance view of how networks are performing and which units are experiencing problems.

Features & Benefits

Monitoring

Monitors the health and performance of connected networks and their participants:

- 2-D and 3-D common tactical picture with panning and zoom
- Displays TDL participation
- Connectivity matrix shows who is connected to whom
- Graphically displays Air Space Control Orders (ACOs) in the affected map region
- Easily focus in on units of interest by filtering and/or color coding
- Displays PPLI and TSDF trends and data erasure levels, identifying where network performance has degraded
- Link 16 timeslot monitoring for Modernized Link 16 features including Concurrent Multinetting (CMN-4), Concurrent Contention Receive (CCR), Enhanced Throughput (ET)

Network Analysis and Optimization

Improves network performance by identifying faults and providing tools to resolve them:

- Compares bandwidth usage to allocations
- Identifies FCA violations and areas of high TSDF
- Identifies unexpected network participants
- Identifies network faults

Robust Feature Set

- Supports 30+ protocols including Link 16, Link 11, Link 22, SADL, VMF, JREAP-A/B/C, DIS/SIMPLE/GCCS/MTC, Eurogrid, and others
- Records network traffic for after-action analysis and playback
- Supports multiple workstations

Better Network Performance for Today's Battlefield