



LAND NETWORK MANAGEMENT SYSTEM COMMUNICATIONS PLANNING, CONFIGURATION & CONTROL

NMS-2K Network Management System is designed for Tactical Communications Planning, Configuration and Control. It provides a comprehensive and operationally proven set of management capabilities and is in service with many European nations in addition to users in South America, North Africa, and the Middle East. The NMS-2K family provides a flexible solution to meet all aspects of the Network Management cycle, including Planning and Design, Network Provisioning, Monitoring and Dynamic Network Management.

The system leverages the company's experience in delivering turn-key network solutions. A fully scalable architecture provides a flexible and expandable platform from a single node to a distributed wide area infrastructure with multiple cooperating nodes, supporting management challenges for the Dismounted, Vehicular, and Deployable scenarios.

By embedding defence equipment and solutions within the critical decision chain, we enable members of the armed forces, from front-line military personnel to senior commanders, to focus on their core mission to obtain the best outcomes.

KEY BENEFITS

- A model-based management solution enables rapid network planning and 'what if' analysis, drastically improving reaction to changes
- Automatic on-the-fly configuration files generation simplifies the deployment and provisioning of the network, reducing configuration errors and inconsistencies
- Support of multiple mission profiles, activated upon specific events during operations
- Comprehensive situational awareness (SA) through local and network status monitoring
- Overall key network performance management for proactive interventions
- Enforcement of management system data and access security
- Geo-referenced interactive planning & control layers, enabling intuitive radio links feasibility estimation, and dynamic evaluation of radio coverage areas
- Automatic radio frequency assignment
- Easy-to-learn and easy-to-use, even for low or medium profile operators.

NMS-2K

NMS-2K software represents a single unifying solution for managing networks and devices, featuring intuitive situational awareness display, effectively reducing the critical decision chain.

Composed by an integrated family of applications specifically tailored for military tactical networks, it simplifies complex environments by delivering efficient Service, Network, and Element management solutions covering the complete portfolio of communications equipment.



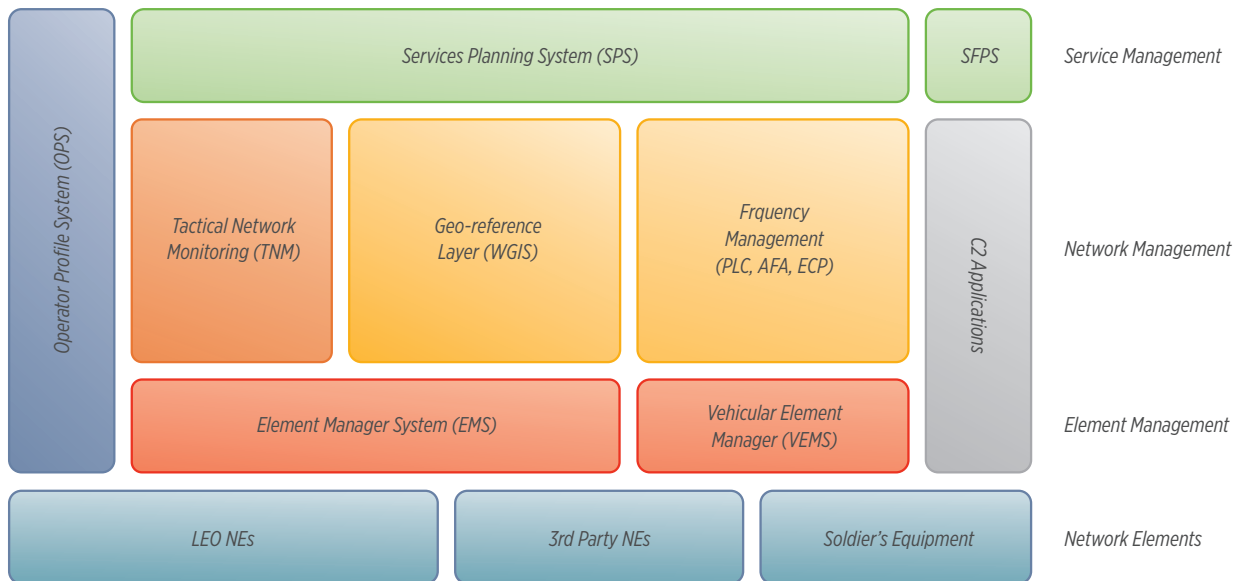
NMS-2K APPLICATIONS AND FUNCTIONS

The core of the NMS-2K suite is composed of products that provide coverage across network fault, availability, performance, configuration, change as well as security.

The complete solution is integrated to provide greater operator efficiency and effectiveness. Lastly, the products can be extended through add-on modules, supporting advanced services.

Applications implement common core capabilities that can be tailored to satisfy specific customer requirements through simple configurations. Complete solutions are then created by stacking management layers that best fit the target deployment and able to meet operational needs.

NMS-2K is a distributed system, typically redundant, with no single point of failure. In case of need, it can seamlessly integrate third party devices or connect to other management systems through open and flexible interfaces, supporting heterogeneous networks and legacy systems.



SERVICES PLANNING SYSTEM (SPS)

SPS supports network planning operations according to customer's operational mission communications needs. Network elements and services are easily managed in a graphical environment, by combining building blocks to realize the required network functions.

Managed information includes:

- Locations and sites
- Network devices and management systems elements
- Links types and connections
- Network services
- IP addressing plans
- Voice numbering plans
- Network subscribers.

Planning system hides network complexity by providing abstraction of services and deriving fine-grain parameters to automatically generate equipment configuration files. Multiple hierarchical scenarios can be defined at a time, even supporting "what if" analysis. It performs consistency check and generates network reports.

Services Planning System supports:

- Provisioning of local and remote management applications
- A distributed and hierarchical management architectures
- Client/Server Architecture
- Synchronized reserve/standby redundancy
- Multi-level detailed views of logical and physical network topology
- XML modelling of network elements and services.

Services Planning System can be enhanced by additional Frequency Management and support applications:

- Automatic Frequency Allocation (AFA): analysis of the set of planned radio links and automatic assignment of working frequencies. Optimised algorithms minimises interferences maximising frequency reuse
- Path Loss Calculation (PLC): links feasibility evaluation to support network planning decisions, on the base of the analysis of device model, terrain elevation information and geographic location characteristics
- Electromagnetic Coverage Prediction (ECP): calculates the strength of a signal propagated over a circular area (or a sector) by considering radio factory, installation data, and terrain information
- Geographic Layer (WGIS): geo-referenced view supporting 3D representation of the operational scenario for planning and monitoring activities.

SPS planning approach and core software applications are shared with C2 Mission Planning Suite supporting Vehicular C2NSA and Dismounted C2SA Applications. Managed information includes:

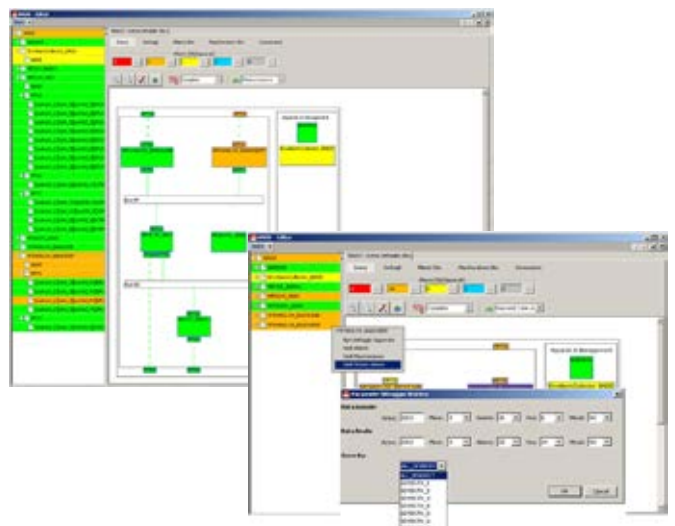
- Deployed Force Composition (ORBAT)
- Vehicle and Soldiers' assets (devices & applications)
- Radio networks and communications parameters
- Voice and Data services (COI)
- IP addressing plans
- Voice numbering plans.

Planning solutions are thus harmonized in a homogeneous and coherent framework, providing to the customer a fully configurable planning dashboard.

NETWORK MONITORING SYSTEM (M40)

M40 is a lightweight tactical solution providing full-featured yet simple to manage control over the deployed network. Tightly integrated with the planning system, enables monitoring of the active network topology by collecting and correlating information coming from lower management layers and presenting the network operational status:

- Active monitoring of managed network elements, through reporting of detailed information on controlled devices, interfaces and routes through different ad-hoc views
- Intelligent filters and policies available to determine the level of information reported to the operator, including thresholds, triggers and synthetic information generation
- Low bandwidth consumption, by information redundancy removal and proactive filtering
- Integrated network performance management for a continuous feedback on resources usage and trends
- Logging of time-stamped acquired information for on-line and off-line analysis and mission debriefing
- Root Cause Analysis to guide system administrator in maintaining the network fully operational.



NMS-2K

VEHICULAR ELEMENT MANAGER SYSTEM (VEMS / VEMS-ENHANCED)

In a Vehicular scenario, VEMS supports direct configuration and monitoring for the embarked equipment, providing light but yet powerful FCAPS functionalities even on-board.

Mission and profile configuration files, generated by the dedicated planning system, are loaded into the system for continuous operation. Changing operational settings is easily performed 'with the push of a button'. At the same time, key parameter settings are available through a simple and effective interface.

Monitoring information for the controlled equipment is presented locally or may be sent in a synthetic and optimized form to higher management layers.

Vehicular EMS runs on a dedicated hardware platforms and can be integrated in the Sentinel MSR165 Multiservice Switch Router (VEMS-Enhanced).

ELEMENT MANAGER SYSTEM (EMS)

Performs direct configuration and monitoring for the equipment of the deployed network, supporting FCAPS (Fault, Configuration, Accounting, Performance, and Security) functionalities for the managed network elements.

EMS manages multi-technology network elements and combine management functions into a coherent and homogenous operator interface.

Element manager system interacts with the management hierarchy by:

- Receiving configuration files generated by Services Planning Systems and activating them on demand
- Exporting information to higher management layers through dedicated North Bound Interfaces (NBI).



OPERATOR PROFILE SYSTEM (OPS)

OPS is a web-based multi-platform application for generating digital certificates compliant to major security standards (PA/PKIX, RSA). OPS can optionally interface external Certification Authorities (CA) and having them integrated into the authentication process.

OPS supports NMS-2K security by managing configurable contexts, users, access profiles and digital certificates, compliant to X.509 standard.



TECHNICAL SPECIFICATIONS

SPS (WITH WGIS EXTENSION) AND M40

Operating System	Windows 7 x86/x64, Red Hat Linux, CentOS
Database	HSQldb
Protocols and Interfaces	SOAP/XML, JDBC
Minimum HW requirements	Intel i5 Processor, 2.8 GHz
	OpenGL 2.1+ compatible Graphic Card
	1024 x 768 graphic resolution
	4 GByte RAM
	160 GByte HDD
	DVD/CD RW
	1 Ethernet port, 1 USB port

EMS

Operating System	Windows 7 x86/x64, Windows XP (SP 2), Red Hat Linux, CentOS
Database	HSQldb
Protocols and Interfaces	SOAP/XML, SNMP V2c/V3, JDBC
Minimum HW requirements	Intel i5 Processor, 2.8 GHz
	1024 x 768 graphic resolution
	1 GByte RAM
	160 GByte HDD
	1 Ethernet port, 1 USB port

VEMS / VEMS-E

Operating System	Ubuntu, Gentoo Linux
Database	HSQldb
Protocols and Interfaces	SOAP/XML, SNMP V2c/V3