sat-nms MNC – Monitoring & Control System

The ***sat-nms* MNC** Monitoring & Control System from SatService is a comprehensive software-based system providing monitoring and control for **any equipment with any remote-control protocol on any interface**, specialized in satellite communication systems and associated equipment. Our customers use the ***sat-nms* MNC** system for their mission critical 24/7 operation of satellite ground stations, teleports and broadcast stations. It provides a perfect view to your complete network and controls all of your connected equipment with our user-friendly and intuitive graphical user interface.

Markets

- Public and private broadcaster
- Satellite operator
- Telecom operators
- Teleport service provider
- Government & military

The TCP/IP based client-server architecture allows to deploy all components of our M&C system on virtual machines or on pre-installed servers provided by SatService and provides a high degree of scalability. The system consists of the following components

- MNC service to monitor and control the equipment
- Backend service providing the REST-API
- Event database to store alarms and events
- Reverse proxy and web server to provide HTTPS access for the client
- Unlimited number of web browsers clients

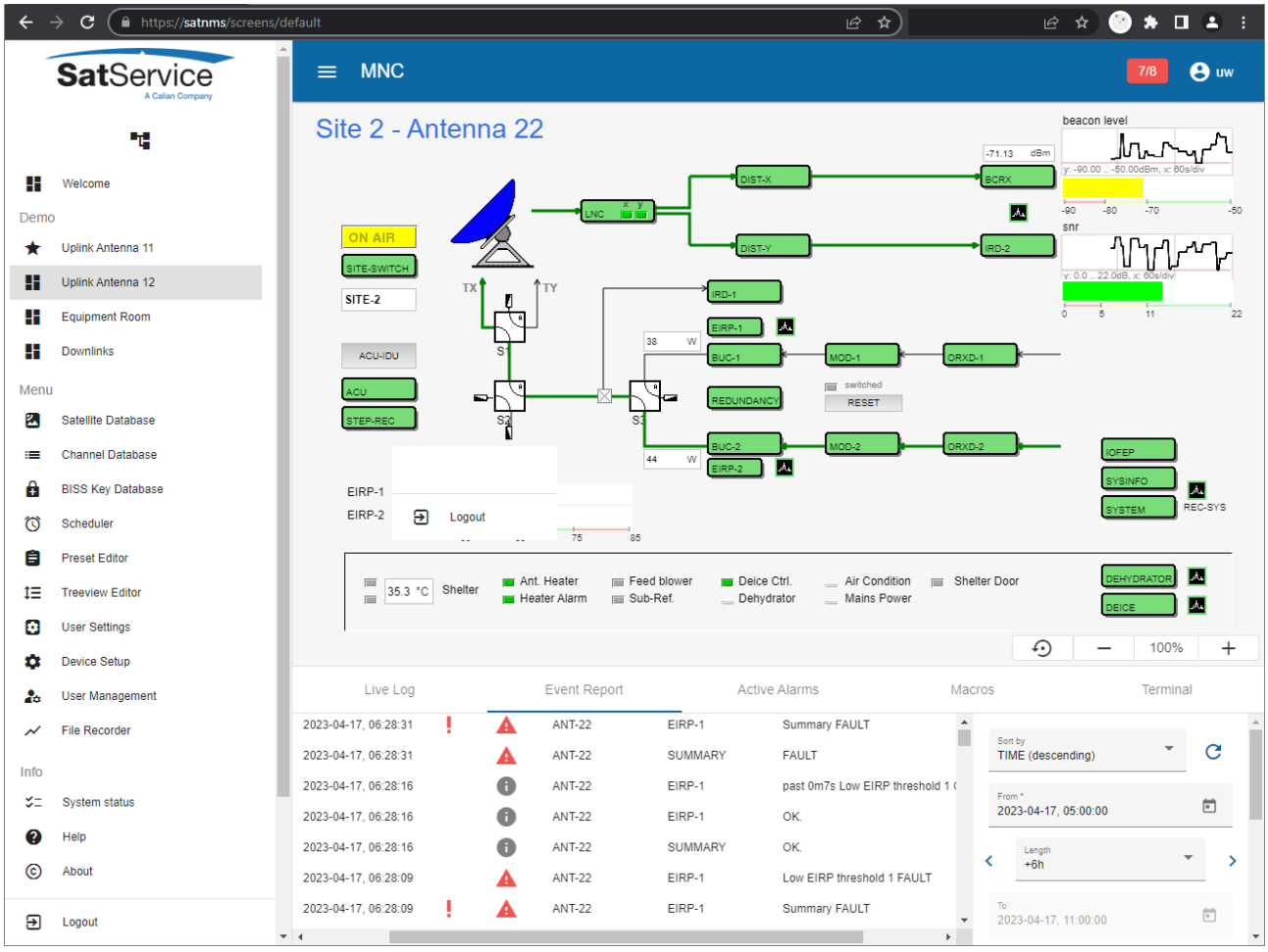

Figure 1: Typical web interface for uplink station

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Different setups are possible depending on the number of remote sites and equipment to be connected. Here are some examples:

- Standalone MNC system for a satellite ground station or SNG with one bare metal server running all services (Backend, Web, M&C, Database)
- Ground station with a pair of redundant MNC systems and one central server for databases, API and webserver (Figure 2)
- Fully virtualized system for one or more ground stations with each service running on a dedicated VM
- Setup for one Teleport with one MNC systems per ground station and a central backend and database
- MNC systems distributed over different sites with a central backend and database (Figure 3)

Applications

- Satellite ground stations
- Satellite teleports
- Terrestrial applications
- Satellite uplink and downlinks
- Cable headend
- TV contribution and distribution
- Satellite news gathering
- and more …

By adding additional MNC servers to your setup the system can grow without running into limitations. Redundancy is available for MNC servers with automatic switch over and for the backend and web server.

The following drawings show two typical scenarios:

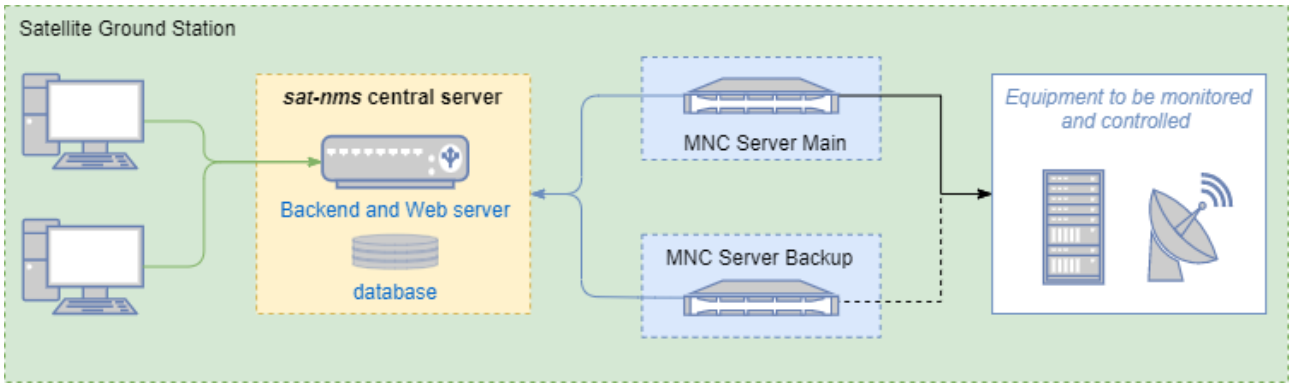

Figure 2: redundant standalone MNC system for satellite ground station

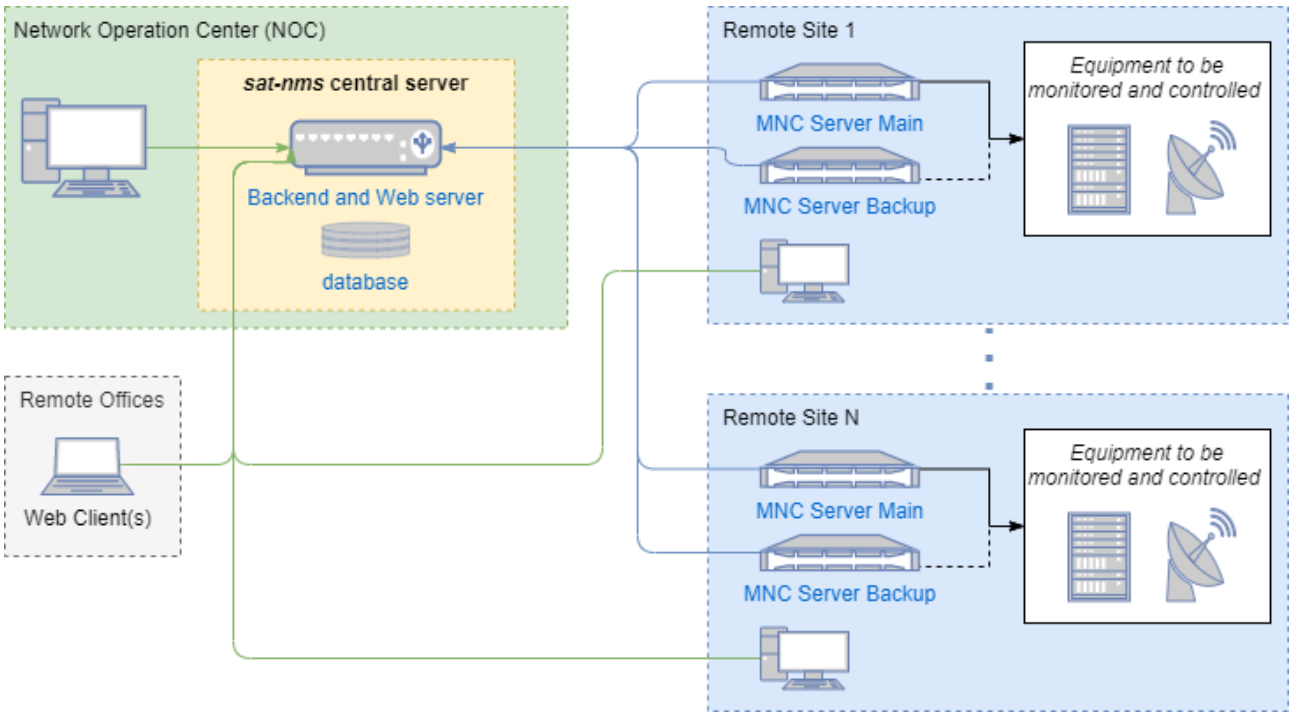

Figure 3: multi-site setup with central server and redundant MNC's at each remote site

The ***sat-nms* MNC System** monitors and controls equipment via different interfaces and protocols. The monitoring is performed locally on the MNC server without the need of any connected operator client. The connected equipment is polled continuously and in parallel to have fast reaction times. Fault flags and fast fluctuating parameters are polled more frequently and provide a near real-time view on the state of your system. Our device drivers give full control over the equipment. Customers are able to change the connected equipment by its own so that the system can grow with your needs. Even new drivers can be created by yourself. Equipment can be grouped to summarize fault states and to easily access sub systems with the built-in tree view.

Events and alarms are stored in the internal ***sat-nms*** Event Database and the operator is alerted via both a graphical and an audible alarm. The internal database can easily be scanned and searched via a user-friendly interface for analysis. The MNC Operator can store complete equipment configurations and can generate presets for easy retrieval of equipment configuration.

Key Features

- Modern and lightweight web-based client
- Supports all protocols and all devices
- Configuration instead of programming
- User-created drivers (full documentation available)
- Made by SATCOM experts together with our users
- Virtual device driver concept
- Full TCP/IP network-based architecture
- Efficient and event-based communication between client and server requires only small bandwidth
- Deployed on standard servers or virtualized
- Multi-user, roles, authentication
- Full remote administration and support
- Unlimited number of clients
- Spectrum analyzer display and command
- Browser multi-tab / multi-window support
- Scalable multi-monitor screens
- Block diagrams with path highlighting

The client user interface is adaptable to the special operational requirements of the user. Several different views can be created with the integrated screen editor tool. Device-oriented or block diagram views provide all parameters of the satellite ground station equipment, the signal flow and a deep insight into the equipment for system engineers. Task-oriented screens reduces the interface to the special requirements of the operator's daily tasks.

Application logic is capsuled in logical devices. These logical devices providing additional functionality beside the pure monitoring and control of equipment, where the modular architecture allows you to only use what you need and provides a way for future expansion with new functions and interfaces as well. Logical devices are already included like:

- 1+1 and N+1 device redundancy
- Uplink power control
- EIRP calculation and EIRP control loop
- Site diversity switching
- MNC server self-monitoring
- Ephemeris file handling for TLE or i11 tracking
- Satellite lists for antenna pointing
- Antenna wind protection
- Arithmetic calculations and logic functions
- Channel and BISS-key database
- Satellite pass scheduler
- and much more…

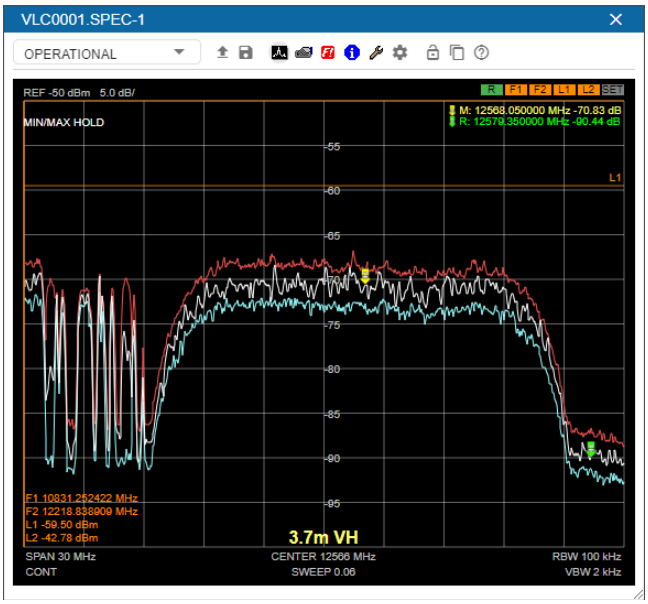

Figure 4: Spectrum Analyzer device window with Min/Max Traces

While you can create your own screens with all parameters of interest you can also access the full list of available device parameters in automatically available device windows. Each device is represented in its own window and the concept of the Virtual Device Driver defines families of satellite ground station equipment with common user interfaces for operators with multi-vendor equipment in the field. These device windows have the same look and feel for equipment of the same group, only with small differences depending on available features of equipment.

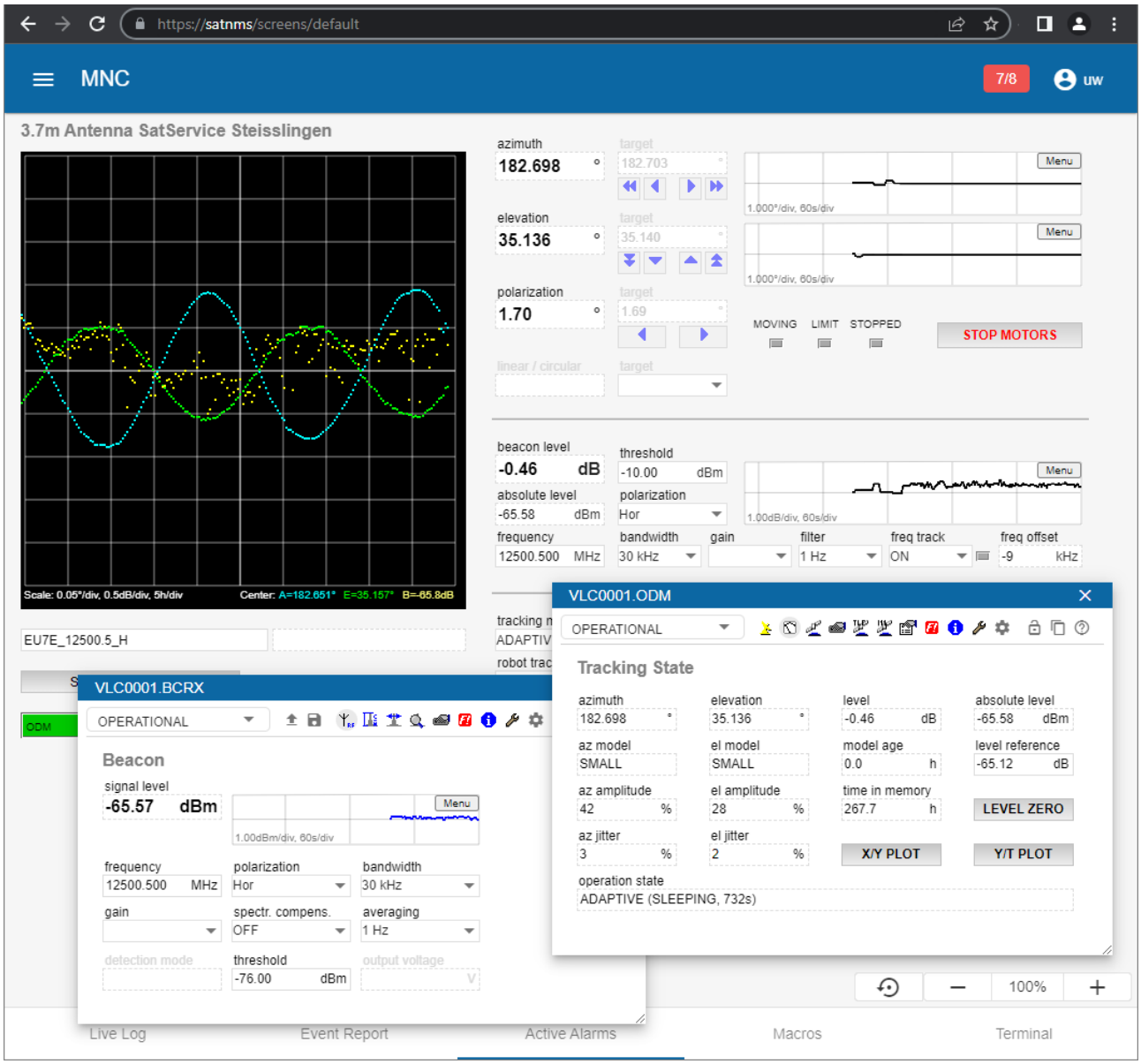

Figure 5: comprehensive screen for an antenna tracking system and ACU and beacon receiver device windows

SatService provides already a large number of device drivers for most of the ground station equipment from different vendors. Please refer to our MNC user manual on our web page to get the last recent list. All these existing drivers from the device driver pool are free of charge for all of our customers. But the user can also configure its own drivers without writing software because of ***sat-nms*** Universal Device Driver concept and in parallel to that, SatService will always provide the service to integrate new equipment to the system.

More information and all manuals are available at www.satnms.com

Technical Specification

Open platform	Interfaces and protocols to connect equipment
Screen Editor to customize user interface	IP Protocols: TCP, UDP, SNMP, HTTP, HTTPS, MODBUS/TCP, VISA
Device Setup Editor to add / remove / changes devices	GPIB via GPIB-to-Ethernet Converter
Create own device drivers	Serial interfaces RS232/RS422/RS485 via serial port server(s)
Northbound interfaces SNMP, REST-API/JSON/HTTPS, TCP	Parallel interface via ***sat-nms* IO-FEP2** or I/O-to-Ethernet converter
Client interface: HTTPS	Large library of device drivers and vendor protocols included

Security	Alarms & Logging
Authentication with username & password or LDAP	Central alarm and event database
Multi-level access rights (Administrator, Operator etc.)	View, search and filter historical events and alarms
Logging of user activity	Multi-level alarm severity
Web browser client connections via HTTPS	Definition of health criteria and alarm thresholds
Separation of equipment network and user network	Audible, visual and E-Mail notification

Platforms	More built-in features
1 HU, rack mountable, compact and energy-efficient server	Macro recorder and event trigger macro player
or virtualized on premises in customers data center	Device presets
Server Operating System: Debian or Ubuntu Linux	Daily, weekly, or monthly scheduling
Client: Any web browser (recommended Chrome)	Data export and report generation

Order information required basics	
MNC-L	MNC Server License, includes 5 device licenses
M-DL5	MNC Device Licenses, pack of 5
MNC-0/0-HW	MNC Server Hardware for all server types (see datasheet MNC-Server-DS for details)
MNC-API	MNC Backend Server License (supports multiple MNC systems)
MNC-WEB	MNC Proxy and Web Server License (supports multiple MNC systems)
MNC-EDB	MNC Event Database Server License (supports multiple MNC systems)
MNC-DB	MNC Database Server License (one per backend server required)

Order information Options	
MNC-L-S	Backup MNC Server License (backup device licenses included)
MNC-CDB	MNC Channel and BISS Key Database (feature)
MNC-SDB	MNC Satellite Database (feature)

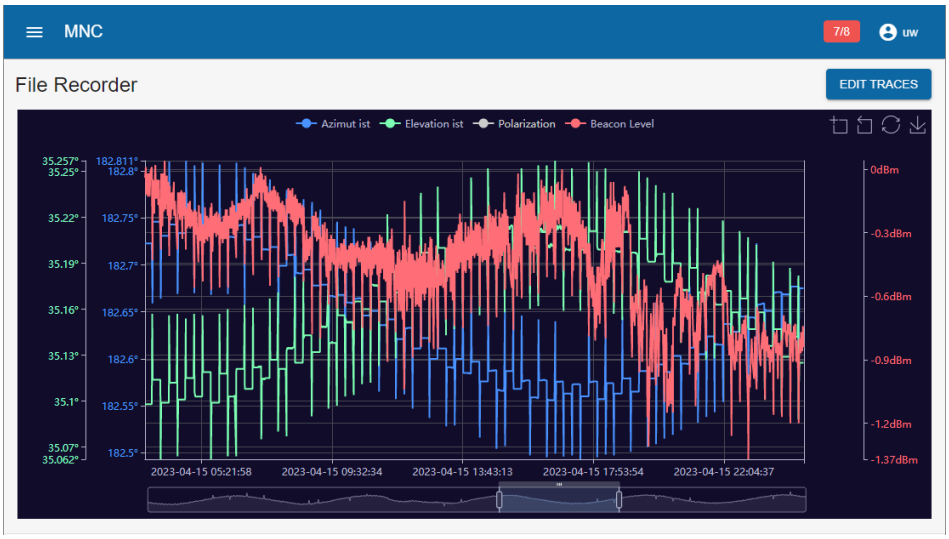

Figure 6: File-Recorder Plot Antenna Step Track

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