The **sat-nms ACU-ODM Module (Outdoor Module)** is the core module of a complete antenna step-track system, which tracks precisely any antenna size on the satellite. The software implements the standard step-tracking mode as well as an improved Adaptive Tracking Algorithm. The **sat-nms ACU-ODM Module** records the tracked positions for several days based on these data and calculates a mathematical model to predict the antenna position. This reduces possible step-track failures and provides continuous operation in case of a beacon receive failure.

In the third operation mode called “Program Tracking” the antenna follows a path defined by a file that contains time stamped azimuth, elevation and polarization values, which usually has been calculated by external software.

The **sat-nms ACU-ODM Module** can also be used as a pure and very cost-effective antenna-positioning controller for smaller antennas as in this case. The tracking software option needn't be installed.

The DIN Rail Module provides all necessary interfaces to any antenna. The **sat-nms ACU-ODM Module** can be very flexibly adapted to any type of antenna as the motor controllers can be selected independently.

- Three motor controllers, like DC servos for smaller antennas or frequency inverters, which are commonly used in larger antennas.
- Limit switches, alarm circuits
- Angular detectors measuring the azimuth, elevation and polarization angle, three different daughter boards are available that cover most of the angle detectors used in satellite ground stations:
  - Analog resolver, covering the existing antennas
  - Digital angle detectors with SSI interface
  - A/D interface to measure the voltage across a precision potentiometer

The DIN Rail Module can be directly integrated into a cabinet at the antenna. Together with the **sat-nms LBRX Beacon Receiver**, also available as DIN Rail Module, it is possible to have a complete step-track system integrated into the antenna cabinet.

The **sat-nms ACU-ODM Module** includes an integrated web server and provides its operator interface via web browser. The **sat-nms ACU-ODM Module** includes also http and ftp for remote diagnosis and support. The system is easy to maintain. The support can be performed remotely and the interface to high-level MNC Systems is provided via Ethernet and TCP/IP.

---

**Key Features**

- Web-based, user-friendly Operator Interface
- Step-track Algorithm as Option available
- Together with **sat-nms LBRX** a complete step-track System in a Cabinet at the Antenna
- Outdoor Unit: high quality Frequency Converters for AZ and EL Drive Speed Control
- HTTP Protocol for external MNC Interface

---

**Contact Information**

SatService
Gesellschaft für Kommunikationssysteme mbH

Hardstrasse 9, D-78256 Steisslingen, Germany

Phone +49 7738 99791 10,
Fax +49 7738 99791 99
E-Mail sales@satservicegmbh.de

Technical Specification

Positioning

Operational Modes

- Manual Mode (Positioning)
- Step-Track
- Adaptive Tracking, takes into account last 8 Days History
- Program Tracking, based on time stamped File Data

PRESETS, Storage of sat-nms ACU System Configuration

- 99 (including Beacon Receiver Configuration of sat-nms LBRX)
- Resolver, Digital SSI and Potentiometer

Daughter Boards

- Quantization Error: Resolver 16bit: 0.0055°, SSI 13bit: 0.044°, 16bit: 0.0055°, 17bit: 0.0028°, 19bit: 0.0007°
- 0.001°

Display Position Resolution

- Interface to Beacon Receivers selectable sat-nms LBRX or Analog Voltage Input
- Analog Voltage Input: 0 to 10V
- Option Tracking Accuracy: Better than 10% of receive 3dB Beamwidth (RMS). The encoder coupling and alignment error should not exceed 0.003° to achieve the specified tracking accuracy. The influence of antenna structure thermal error is not considered.

Maximum Travel Rate of each Antenna Axis

1°/sec

System Interfaces

Interface Connectors

- To sat-nms MNC and sat-nms ACU-IDU Mini Combicon MCV1.5/XX-G-3.5
- To 6 Limit Switches Ethernet or RS232
- Interlock and Motor-off Switches Opto-Coupler Input
- 3 Angular Detectors Resolver, SSI or A/D Input
- Motor Driver Interface for Frequency Inverter, DC Servos etc. Via Opto-Coupler In- and Outputs:
  - Motor on/off and Direction (Output)
  - Low and High Speed Selection (Output)
  - Reset Driver (Output)
  - Driver Fault (Input)

MNC Interface Specification

- Ethernet Interface for sat-nms MNC and User Interface 10-Base-T, via HTTP GET Requests
- RS232 MNC Interface Mini Combicon MCV1.5/10-G-3.5
- Summary Fault Indication Mini Combicon MCV1.5/12-G-3.5

Electrical and Mechanical Specification, Environmental Conditions

- Supply Voltage: 22V to 28V unregulated DC, 500mA
- Temperature Range: 5° to 50° C
- Humidity: Up to 90% non-condensing
- DIN Rail Module: 425x105x60mm