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 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 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
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Technical Specification

Positioning

Operational Modes

- Manuel Mode (Positioning)
- Step-Track
- Adaptive Tracking, takes into account last Days History
- Program Tracking, based on time stamped File Data
- 99 (including Beacon Receiver Configuration of sat-nms BBRX)

PRESETS, Storage of sat-nms ACU System

- Configuration
- Position Encoding with three different Interfaces via Daughter Boards
- Quantization Error
  - Resolver 16bit: 0.0055°
  - SSI 13bit: 0.044°, 16bit: 0.0055°, 17bit: 0.0028°, 19bit: 0.0007°

Display Position Resolution
- Interface to Beacon Receivers selectable
- Analog Voltage Input
- Option Tracking Accuracy
  - Better than 10% of receive 3D 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.
  - 1 °/sec

System Interfaces

- Interface Connectors
  - Mini Combicon MCV1.5/XX-G-3.5
  - Ethernet or RS232

- To sat-nms MNC and sat-nms ACU-IDU
- To 6 Limit Switches
- Interlock and Motor-off Switches
- 3 Angular Detectors
- Motor Driver Interface for Frequency Inverter, DC Servos etc.

- Option Tracking Accuracy
  - Better than 10% of receive 3D 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.
  - 1 °/sec

MNC Interface Specification

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

Antenna Control Unit ODM — SatService GmbH — Mozilla Firefox

1,8m Antenna

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Az. target value</td>
<td>114.681°</td>
</tr>
<tr>
<td>El. target value</td>
<td>46.844°</td>
</tr>
<tr>
<td>Pol. target value</td>
<td>-60.700°</td>
</tr>
</tbody>
</table>

Target name: Telecom 2D
Tracking mode: OFF
Beacon level: 95.56 dBm (var 0.00 dB)
Temperature: 42.1 °C
ACU Faults
Tracking Faults
AZ Tracking State: M=NONE A=0% J=0%
El. Tracking State: M=NONE A=0% J=0%
Time: 2006-06-06 12:47:06