

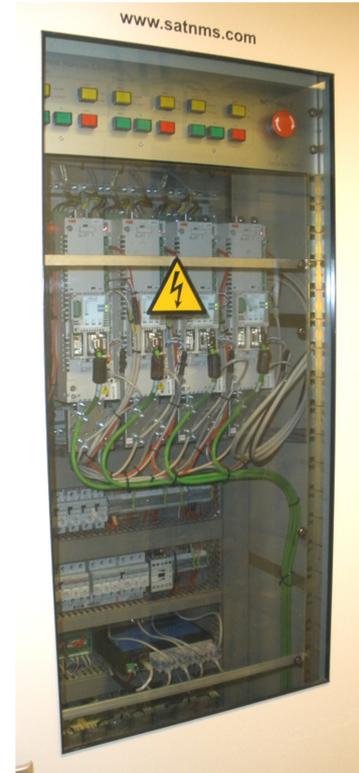
sat-nms Antenna Counter Torque Drive System ACDS

The **sat-nms** ACDS is an antenna manufacturer independent tracking system that can be easily connected to any large satellite ground station antenna which requires counter torque motor drive. The three core modules are:

- **sat-nms** Motor Control Drive System
- **sat-nms** ACU-ODM Tracking System with the **sat-nms** LBRX19 Beacon Receiver
- **sat-nms** ACU-IDU Indoor Unit

This special application of the standard tracking system is used in for large satellite ground station antennas which have been implemented with a counter torque drive system.

A standard antenna drive system consists of motors, gearboxes and gears. The backlash inside these mechanical parts and the steelwork itself is too high and has to be compensated. This is especially the case for large antennas which have gear rings with huge diameters due to the heavy support structure necessary to cover the high wind loads due to the high reflector surface. These toothed-wheels forming the gear have to fit into each other and generate quite a backlash. This certainly causes degradation of the antenna tracking accuracy. In order to maintain a perfect antenna pointing, the backlash is eliminated by implementing at least two motor drives with a specific torques difference between them. This torques difference is called counter-torques, or torques bias. So the two motors will move against each other even if the antenna is standing still, as they generate opposite moments against each other. The counter torque is large enough to bring the antenna through the gap for the maximal allowable torques load, but small enough that it will not cause excessive local stress, friction, or wear. The proper dynamics of the torques bias-shaping loop is necessary to assure antenna tracking precision.



sat-nms Motor Control Drive System



Azimuth Drive

The antenna drive is realized by a pair or very often also four motors on each axis. When the antenna is not being moved the power applied to each pair of motors is balanced to hold the antenna in position. To move the antenna in a particular direction the motors will be driven by the drive system with additionally current to generate an additional torque on the gear. This torque difference between the two motors will stay the same during the movement to eliminate the backlash in the drive mechanism during movement. Once the antenna has reached the required position both motors are again supplied with balanced power and the antenna maintains its position.

Key Features

- High sophisticated **sat-nms** ACU-IDU Indoor Unit
- Powerful Counter Torque Motor Drive System
- Adaptive Step-Tracking with self-learning Orbit Model Tracking Algorithm
- Together with **sat-nms** LBRX a complete step- track System
- HTTP Protocol for external MNC Interface

Contact Information

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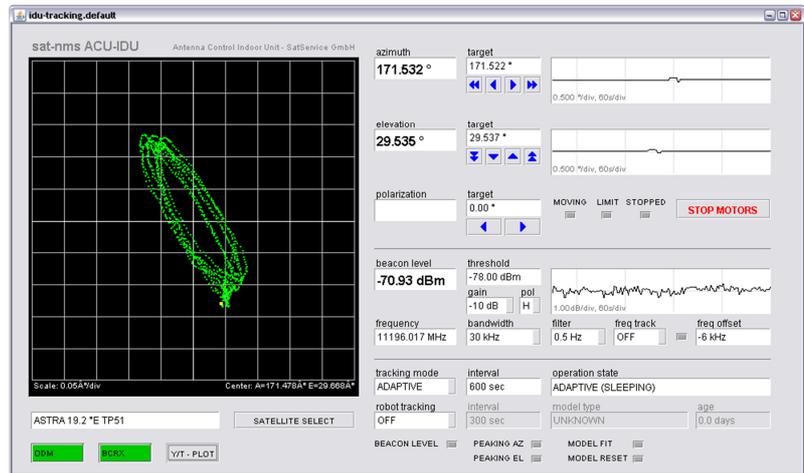
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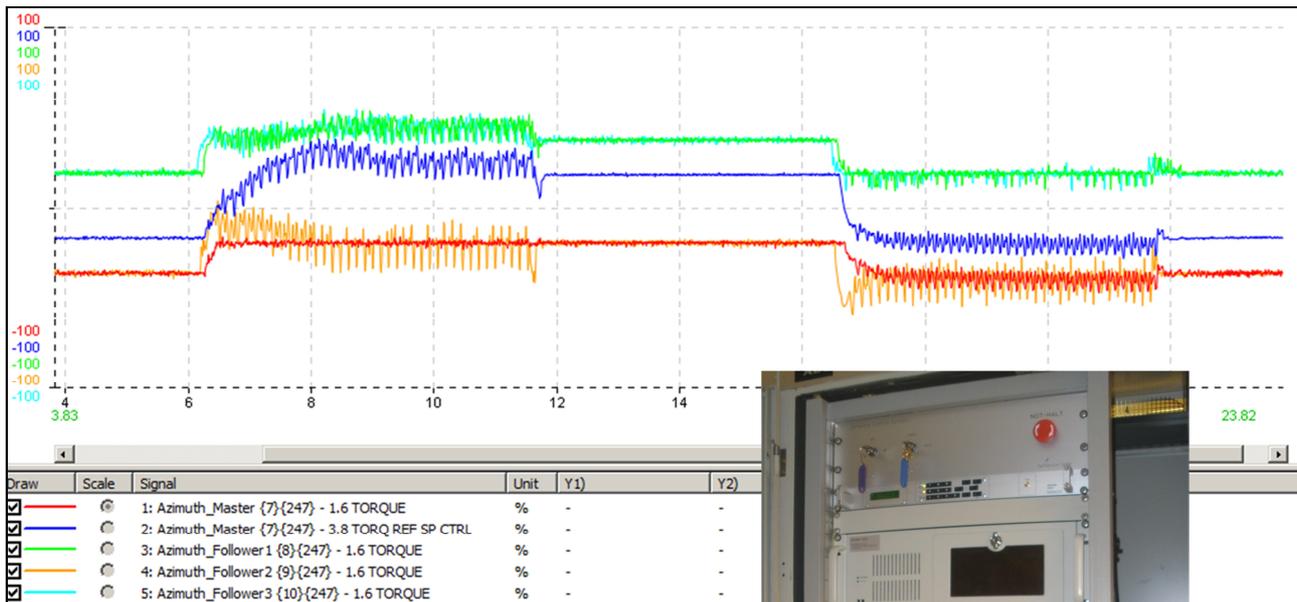
This functionality is implemented by software within the frequency inverters of the motor drive system developed by SatService. Always two or four frequency inverters talk to each other by software and generate the counter torque functionality. Such a motor control drive system normally occupies a 19" rack of equipment and has interfaces normally to four motors. Also integrated on one of the drive systems is the **sat-nms** ACU-ODM module which interfaces to the master frequency inverter and performs the high precision step tracking algorithm as in any SatService antenna tracking system.

The **sat-nms** ACU-IDU indoor unit provides even more functionality, like data archiving, adaptive tracking, tracking on the basis of Intelsat data, two-line Kepler elements, graphical presentation of the angular and beacon level variation via time and other sophisticated features.

The **sat-nms** ACU-IDU is an industrial PC incorporating digital technology for accurate antenna tracking with high reliability, flexibility and a user-friendly operator interface. This system is ideally suited for all kind of satellite ground station antennas.



sat-nms IDU user screen



Torque characteristic of the azimuth axis



sat-nms IDU + control panel