



HATS

HITEC ANTENNA TRACKING SIMULATOR

The HATS (HITEC Antenna Tracking Simulator) is a simulator for ground station antenna motion as well as open- and closed-loop satellite tracking and is fully compatible with HITEC's ACU (Antenna Control Unit).

The RF signal simulation takes into account the full RF path from the satellite to the tracking receiver to offer realistic tracking behavior and performance for both step-track and monopulse tracking. It comprises a whole set of subsystems emulating satellite trajectories and their imperfections, the evolution of the RF signals (atmospheric attenuation and ray bending) as they travel from the satellite to the ground station, the impact of the antenna pattern and the downlink chains, the dynamical behavior of the servo system and the antenna's mechanical structure, the mechanical imperfections of the antenna mount, as well as the behavior of components such as the SCU, the ACU and the tracking receiver.

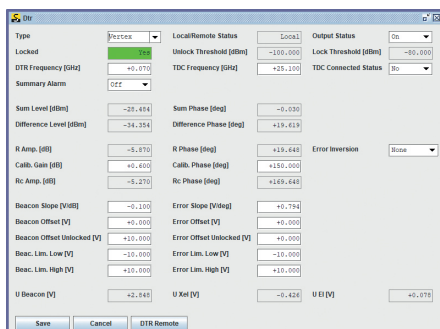
In addition to evaluating the antenna tracking performance, the simulator can be used as a testbed for the behavioral verification of existing or new functionalities in one of the subcomponents, such as for example the tracking algorithms in the ACU. Furthermore, it can be used for educational or training purposes or for demonstrating the underlying principles of the tracking concept or of one of the subsystems.

Key features

- Simulation of a closed-loop satellite ground station tracking system
- Designed to work with HITEC's ACU product range
- Allows to use all of the ACU's functionalities, including the different tracking types (e.g., program track, step-track and monopulse modes)
- Visualization of the hemisphere, the antenna and the antenna patterns

Customer satisfaction promise

We offer engineering support for customizations, installation and training by our experienced engineers and technicians.



Visit our website to get more information:

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HATS

CHARACTERISTICS

Simulation of antenna subsystems

- Antenna dynamics using a configurable state-space model and position controller
- Antenna mount mechanical imperfections
- Simulation of antenna pedestal tilt
- Simulation of stow pin
- Configuration of up to 4 axes: azimuth, elevation, polarization and tilt (or second polarization)

Simulation of RF subsystems

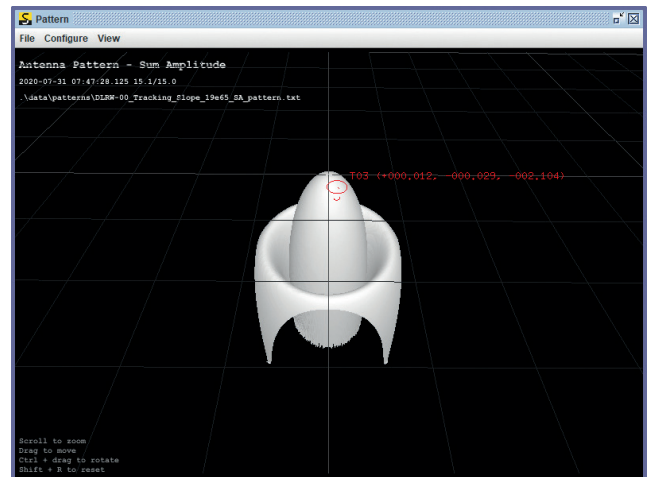
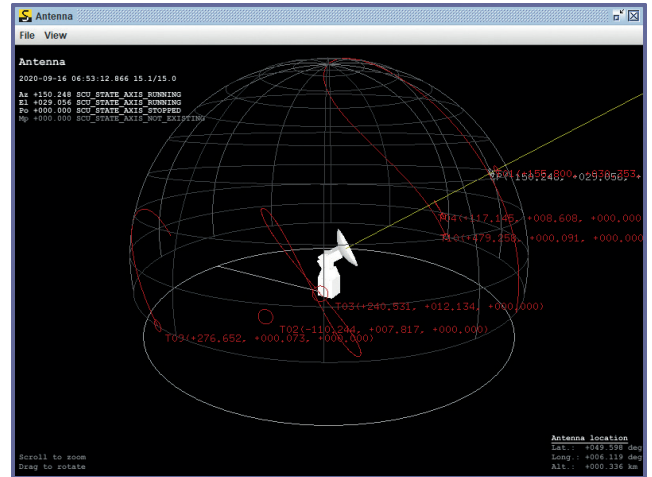
- Configurable sum and difference channel antenna patterns for realistic tracking behavior
- Simulation of gain, phase shift and noise of the RF chain
- Simulation of DTR functionalities
- Support of all tracking receiver and LNA controller protocols compatible with the HACU product range
- RF switches

Simulation of antenna environment

- Definition of up to 10 satellites in parallel, a satellite being defined by its trajectory, its distance to the ground station antenna and its EIRP
- Satellite trajectories defined by AZ/EL/range files, Intelsat 11-parameter files or a nominal longitude position
- Looping functionality of geo-stationary satellites based on 48h long AZ/EL/range files
- Free-space losses
- Polarization mismatch loss
- Atmospheric attenuation
- Atmospheric refraction

Hardware and software

- Siemens industrial PC with Windows 10
- Java-based software



The 'SCU' window is a configuration interface for the antenna system. It contains several sections with settings:

- Alarms:** Alarm 1 (ES Loop), Alarm 2 (SCU SW), Alarm 3 (SCU HW, SF) - each with a dropdown menu and a green status indicator.
- Stow Mode - Timeout Pointing Phase [s]:** +10.000000
- Stow Mode - Timeout Stow Pin Phase [s]:** +20.000000
- Stow Mode - Position [deg]:** Azimuth: +120.000000, Elevation: +20.000000, Polarization: +30.000000, Multi-Purpose: +40.000000
- Stow Mode - Behaviour:** Conf. (dropdown), Conf. (dropdown), Conf. (dropdown), Conf. (dropdown)
- Stow Mode - Stow Pin Present:** Yes (dropdown), Yes (dropdown), Yes (dropdown), Yes (dropdown)
- Stow Mode - Stow Pin Alarm:** No (dropdown), No (dropdown), No (dropdown), No (dropdown)
- Stow Mode - Stow Pin Alarm Status:** Disabled (dropdown), Disabled (dropdown), Disabled (dropdown), Disabled (dropdown)
- Stow Mode - State:** Disabled (dropdown), Disabled (dropdown), Disabled (dropdown), Disabled (dropdown)
- Stow Mode - Stow Request:** No (dropdown), No (dropdown), No (dropdown), No (dropdown)
- Limit Switches:** None (dropdown), None (dropdown), None (dropdown), None (dropdown)
- Motors:** Mtr 01 (dropdown), None (dropdown), None (dropdown), None (dropdown)
- Emergency Stop Alarms:** None (dropdown)
- Access Door Alarms:** None (dropdown)
- Hardware Alarms:** None (dropdown)
- Hardware Statuses:** None (dropdown)
- General Alarms:** Byte 01 (dropdown), None (dropdown)
- ACU Summary Alarm:** (dropdown)

At the bottom, there are buttons for 'Save', 'Cancel', and 'Request Stow'.