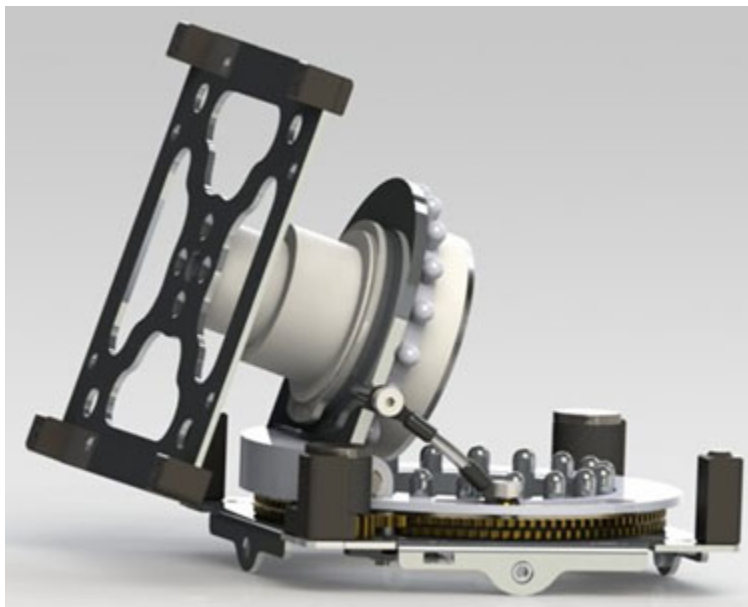


# **Hemispherical Anti-Twist Tracking System (HATTS)**

Researchers at Stanford have invented a two degree of freedom hemispherical tracking joint called Hemispherical Anti-Twist Tracking System (HATTS). HATTS is a tracking system that can be used for satellite solar arrays, antennas or sensors that require pointing independent of the satellite body's orientation. Important capabilities and design advantages include one full hemisphere of coverage, two identical motors controlling azimuth and elevation, no twist on cables connecting the satellite to the tracking platform enabling continuous tracking without slip rings, and a low stowed volume to maximize volume available for instruments and other hardware. The HATTS system provides a low-volume, low-mass, low-power, low-complexity solution to tracking within a hemisphere.

## **Figure**



**Figure description -** HATTS CubeSat Implementation SolidWorks Rendering

# Applications

- **Nanosatellites and microsatellites**
- **Satellites** that must maintain a particular orientation of their solar panels, instruments, antennas, etc. with respect to an inertial frame of reference.
- **Ground or vehicle-based systems** tracking signals through a hemisphere with continuous rotation.

# Advantages

- Continuous tracking within a hemisphere without the use of slip rings.
- Simplistic design increases reliability by using identical drive motors rigidly attached to joint base, eliminating slip rings, and reducing part and bearing count.
- HATTS stows into a volume small enough to be suitable for use in small satellites and CubeSats.
- HATTS provides a low-volume, low-mass, low-power, low-complexity solution to tracking within a hemisphere.

# Publications

- U.S. Published Patent Application 20130206957, , ["ANTI-TWIST JOINT, ORIENTING SYSTEM AND METHOD"](#)

# Patents

- Published Application: [20130206957](#)
- Published Application: [20160176547](#)
- Issued: [9,086,098 \(USA\)](#)
- Issued: [10,246,201 \(USA\)](#)

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