

Measurement and analysis of vibration disturb during the rotation of satellite antenna

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Abstract

As an important equipment for satellite signal reception and transmission, the satellite antenna needs to be rotated in real time to achieve real-time tracking of the target and complete signal transmission during use. Antenna drive assembly is generally composed of the drive motor and other components, which will cause some structural vibration during rotation. The vibration disturbance torque is the main factor that affects the pointing accuracy of the antenna. For high-stability satellite applications, the vibration disturbance torque caused by the rotation of the movable antenna is also a major factor affecting the stability of the satellite. In order to study characteristics of the vibration disturbance torque and obtain the magnitude and regularity of the vibration, the vibration data of the antenna drive assembly under different rotation conditions are measured. The test results show that, the disturbance torque characteristics of stepper motor and antenna are the natural frequencies of the structure under low speed operation conditions. Under high speed operation conditions, the main frequency of the antenna disturbance torque is the step frequency of the antenna motor.

Keywords: Vibration disturb, Rotation, Satellite antenna