

Title of the methodology:

Image Motion Compensation for Spacecraft Payloads Pointing Error and Jitter Minimization

Keywords:

Low-Earth Orbits, Geosynchronous Orbits; spinning radar, antenna, reflector; earth remote sensing; image navigation, registration; geolocation

Write-up: (Maximum 500 words)

Satellites payloads in orbits while imaging the earth are subjected to vibrations caused by various sources including those generated by the reaction of the payload drive motors on their spacecraft bus platforms. These vibrations could be deterministic or stochastic with some frequency spectrum.

Another source of payload image disorientation arises from unavoidable small inclinations and eccentricities of geostationary satellites orbits, which facilitate compensation of the Sun and Moon gravitational and solar radiation perturbing accelerations. But as a result, the satellites orbital paths exhibit well-known latitude-longitude figure-eight motions. Consequently, for accurate imaging of the spots on the Earth, for accurate image navigation, registration and geolocation, the line-of-sights of payloads must be compensated for their azimuth and elevation motions on the ground. Though this compensation happens routinely for meteorological satellites around the world, it appears from the literature that the formulation of these motions is not available in public-domain.

The objective of this research is to develop the techniques of image motion compensation for both above-mentioned situations.