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ANALYSIS AND VERIFICATION OF SATELLITE THERMAL DEFORMATION INFLUENCE ON  
POSITIONING ACCURACY

**Abstract**

Earth remote sensing satellites through the push-broom imaging or other imaging methods to obtain ground images or spectral information. Combined with the known internal and external orientation elements to obtain correspondence between the image and the actual position. Image positioning accuracy is an important indicator of high-resolution satellite systems, and it requires high-precision satellite attitude and position measurements including high-precision system clock. Measurement.

Affected by the periodic variation of Orbit external thermal flux, satellite temperature level and gradient change will cause the deformation of structure. This structure thermal deformation will cause a dynamic change between the output data of attitude measuring components and payload reference, and the positioning accuracy of satellite exists a periodic heat-induced low frequency error.

The first step is to establish the thermal simulation model of satellite, obtain the temperature distribution which in various working modes and different times. Through the mechanical analysis software to establish satellite mechanical model. Mapping between two kinds of analysis model of temperature field, the temperature data of thermal simulation as the load applied to mechanical model for thermal deformation analysis. Extract the error data which thermal deformation influence on positioning accuracy. Finally, the ground thermal deformation test was carried out, the deformation of several special temperature distribution were measured with high precision. Experimental results show that, the error analysis model can be precisely given thermal-induced low frequency error data accurately. In practice, when determining the coordinates of the satellite image, this error analysis method can be used to improve the positioning precision of the satellite