

A STUDY OF SIMULATION METHOD FOR SPACE TDICCD CAMERA MOTION IMAGING

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ABSTRACT: Space imaging system is affected by micro-vibration of satellite platform on orbit. Therefore, image quality is degraded by variance of attitude angle. High resolution image is easily smeared by motion error of satellite. However, it is very hard to find the error source on the space environment accurately. According to studying geometry model of space camera, the transform relationship between object plane and image plane is put up. Firstly, the paper analyses attitude error and motion source of TDI camera on orbit. Then, the transform matrix is analyzed between earth coordinate and image plane coordinate. The geometry model contains in-out orientation elements. Secondly, imaging procedure of TDI space camera is simulated. Different modes of micro-vibration are added into imaging model in order to simulate jitter on the image. Multi-mode micro-vibrations are simulated on the line of sight at same time. And then the experiment simulation is based on three axis. Imaging procedure of TDI space camera is simulated based on physical character of imaging system. Different images are simulated by changing number of TDI. Various motion errors of satellite are comprised in geometry model. Hereafter, the geometry distortion of pixel position is calculated on image plane. The measurement accuracy of geometry distortion is sub-pixel scale. Afterwards, the corresponding simulated image will be generated if the motion parameters of space imaging system are fixed. Finally, the boundary condition is analyzed. Over passing this extent, image quality will be obviously degraded by changing error amount of motion. The result is good for analyzing parameters of satellite platform and guiding design of remote sensor.