Alignment test of the SPRINT-A satellite

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The satellite SPRINT-A, which is the JAXA's small scientific satellite project, is now under development to be launched next summer. The scientific objectives of SPRINT-A are mainly two planetary scientific topics with the extreme ultraviolet spectroscopic observation: one is the atmospheric escape from terrestrial planets by interaction with the solar wind plasma, and the other is plasma and energy transfer mechanism in the Jupiter's inner magnetosphere from the emission intensity variation of the Io torus and the Jupiter's aurora.

The mission payload, EXCEED, has the main telescope of the extreme ultraviolet imaging spectrometer (EUV), the camera guiding field-of-view (FOV) for feedback to the satellite attitude control system, and the mission data processor (MDP). The payload electronics are connected to satellite bus system with the space wire network. The satellite will be orbited around the earth with an apogee of 1150km, a perigee of 950km, and an inclination angle of 31 deg.

EXCEED will observe the plasma environment around some planets from the earth orbit. The requirement level about the attitude control accuracy and the thermal strain reduction is exacting against a small satellite. The attitude control accuracy are required to be within an angular resolution of 10 seconds. The alignment displacement between the telescope optical axis and the satellite body axis will be required to be within the above value, even though the satellite is subject to acceleration force during the launching period and to the on-orbit thermal strain stress.

All environment tests, such as the vibration acceleration and the static load in the launching periods, and the on-orbit thermal stress, for the achievement of the requirements is performed using the test model of the SPRINT-A satellite. In this presentation, the test results are reported to confirm satisfying the system requirement.