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ISAS-NASA Cooperation in the GEOTAIL mission

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ISAS and NASA cooperated in the GEOTAIL satellite project to study the physics of space plasma in the Magnetotail. Instruments on board are designed to measure the electric and magnetic fields, ions and electrons, and plasma waves, focusing primarily on clarification of the magnetic reconnection process which plays a key role in energization of plasma in space. ISAS developed and has operated the spacecraft, whereas NASA provided the launch. Responsibilities for science instruments, telemetry data acquisition, and data provision and archiving are shared by both. The satellite has taken two orbit phases: a nightside double lunar swingby orbit extending to distances up to 220 Re and a low inclination orbit covering the geocentric distances of 10 to 50 Re. It was launched from the Kennedy Space Center on 24 July, 1992, and the satellite is still functioning in good shape. ISAS-NASA collaboration in the GEOTAIL project has been a pleasant and productive experience. U.S. and Japanese scientists shared the common objective and respected each other. Often each party went out its way to accommodate the other party; for example, ISAS scientists helped U.S. PI teams in their hardware integration and test procedures and operations, and NASA team members helped to convince the NASA reviewers of the ISAS standards for procedures. Scientifically the project has been recognized as a great success. Among the notable results are elucidation of the microscopic structure and energy conversion process at the reconnection site, discovery of the electrostatic solitary waves in collisionless space plasma, and clarification of the relation between reconnection and auroral phenomena. GEOTAIL was a member of the International Solar Terrestrial Physics Program (ISTP) comprising a network of about a dozen spacecraft deployed in the near-Earth space by ISAS, NASA, ESA and IKI in 1990s, and it played a leading role as the first to be launched.

Keywords: magnetosphere, reconnection, ISAS-NASA cooperation