

# ERG Satellite Mission to Study on the Formation of Radiation Belt

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<http://www2.nict.go.jp/dk/c231/im>

For the purpose of study on the unresolved major problems underlying in geospace, a small satellite mission named as ERG (Energization and Radiation in Geospace) is proposed being focused on the temporal variation of the radiation belt associated with magnetic storms. A comprehensive measurement of particles and fields on-board a small satellite of less than 150kg is planned based on the heritage of the achievement of previous and undergoing Japanese scientific satellite missions. The on-board scientific instruments are arranged to make definitive evaluation of possible mechanisms. The on-board instrumentation is characterized as following; (i) measurement of the distribution functions of electrons and ions in wide energy range such as 10eV to 10MeV for electrons and 10eV to 1MeV for ions, (ii) measurement of DC electric and magnetic fields with resolution of 0.1mV/m and 0.1nT, and (iii) measurement of electric and magnetic components of plasma waves in a frequency range from 1Hz to 5MHz.

The ERG project also involves ground-based observation facilities of optical measurements (6 stations), Super-DARN HF radars (10 stations), 210( meridian magnetometer chain (25 stations) and CPMN chain (10 stations), which make it possible to detect responses of geomagnetic and ionosphere disturbances associated with geomagnetic storms. Theory and data analysis group analyze the comprehensive data set comparing with results of computer simulation to achieve new understanding of the geospace, based on the structure, electro dynamics and wave-particle interactions carried out in the geospace plasma The ERG project team is planning to collaborate with ORBITALS (Canada) and RBSP (NASA) missions.

Main characteristics of the proposed satellite are following: Weight; about 150 kg: Mission Life; 6 months ( more than 1 year: Orbital character; perigee 250 km, apogee 6.6 Re: Inclination; ( 10(: Attitude; spin stabilized (about 4 rpm), directed to sunward: Telemetry; high speed (( 0.5Mbps) for key stations, and low speed for local stations:

Extended sensors; 4 sets of wire antennas of 20m for DC electric field and plasma waves; 1.5 m extensible booms for the magnetometer sensor and loop antennas: Proposed launch date; before next solar maximum; 2010: Launch carrier; Under study.