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Living With a Star Radiation Belt Storm Probes and associated Geospace missions

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The selected investigations on NASA's Living With a Star Program's (LWS) Radiation Belt Storm Probes (RBSP) mission will provide the measurements needed to characterize and quantify the processes that supply and remove energetic particles from the Earth's Van Allen radiation belts. The RBSP mission fits within the context of the broader Geospace program whose missions explore in situ fundamental processes that operate throughout the solar system and in particular those that generate hazardous space weather effects in the vicinity of Earth. RBSP instruments will measure the properties of charged particles that comprise the Earth's radiation belts, the plasma waves which interact with them, the large-scale electric fields which transport them, and the particle-guiding magnetic field. There are two RBSP spacecraft in nearly identical eccentric orbits. The orbits cover the entire radiation belt region and the two spacecraft will lap each other several times over the course of the mission. The RBSP in situ measurements will discriminate between spatial and temporal effects, and compare the effects of various proposed mechanisms for charged particle acceleration and loss. The measurements taken by the RBSP spacecraft will improve the understanding of these fundamental processes and allow better model predictions. NASA's LWS program has also selected three teams to study concepts for Missions of Opportunity that will augment the RBSP program, by (1) providing instruments for the Canadian spacecraft ORBITALS in the Earth's radiation belts, (2) quantifying the flux of particles precipitating into the Earth's atmosphere from the Earth's radiation belts, and (3) remotely sensing both spatial and temporal variations in the Earth's ionosphere and thermosphere. During the next stage of the LWS Geospace program, Ionosphere-Thermosphere Storm Probes will join the fleet to provide further crucial

geospace measurements.