



The Living With a Star Radiation Belt Storm Probes Mission

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This presentation provides an overview of the Living With a Star (LWS) Radiation Belt Storm Probes (RBSP) mission. Missions to Geospace offer an opportunity to observe in situ the fundamental processes that operate throughout the solar system and in particular those that generate space weather effects in the vicinity of Earth. The RBSP mission targets Earth's space radiation belts that comprise multiple components of high energy, penetrating charged particles. These belts are hazards to spacecraft and astronauts alike and are controlled by dynamic processes that govern particle radiation mechanisms occurring throughout the universe. The two RBSP spacecraft will make measurements in low-inclination, elliptical, lapping orbits around the Earth to quantify mechanisms for energetic particle acceleration, transport, and loss in space environments. The mission's in situ probes will provide access to and detailed observations of the full range of processes associated with the highly energetic particles that operate within Earth's inner magnetosphere. The two-point measurements by the RBSP spacecraft will enable researchers to discriminate between spatial and temporal effects, and therefore differentiate between the various proposed mechanisms for particle acceleration and loss. The science investigations on NASA's LWS program's RBSP 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. Instruments on the RBSP spacecraft will observe charged particles that comprise the Earth's radiation belts over the full energy range from ~ 1 eV to more than 10 MeV (including selected elemental composition), the plasma waves which energize them, the electric fields which transport and energize them, and the magnetic fields which

guide their motion.

The two-year prime mission lifetime will provide sufficient local time, altitude, and event coverage to determine the relative significance of the various mechanisms that operate within the radiation belts and their interaction modes. The measurements taken by the RBSP spacecraft will enable data modeling projects that will improve the understanding of these fundamental processes, the generation of better predictions, and the creation of new physics-based and empirical models for the Earth's inner magnetospheric environment that are important for engineering applications.