

44th SYMPOSIUM ON SAFETY AND QUALITY IN SPACE ACTIVITIES (D5)
Space Weather Prediction and Protection of Space Missions from Its Effects (3)

Author: Ms. Nana Higashio
Japan Aerospace Exploration Agency (JAXA), Japan

THE RESEARCH SYSTEM OF RADIATION ENVIRONMENT IN JAXA

Abstract

It is well known that satellites and astronauts are always in danger in space and especially the cause is high energy radiation. Our group has observed space environment that are radiation particle, atomic oxygen, magnetic field and so on. Our research system of the radiation environment consists of the three parts. First part is to develop the instrument to measure the radiation environment. Now we have the Light Particle Telescope (LPT) that consists of the four types sensors, ELS-A, ELS-B, APS-A and APS-B. The ELS-A and the ELS-B measure electron. And APS-A and APS-B measure proton and helium particles. These sensors have been installed on the GOSAT satellite and the Jason-2 (CNES). Now We are developing XEP-e (or ELS-B) for the ERG satellite (JAXA/ ISAS) to achieve the science of the outer radiation belt. It measures the high energy electron whose energy range is from 200keV to 20MeV. The XEP-e consists of a few Solid-State Silicon Detectors (SSDs) and a plastic scintillator (GSO) and it has one way conic sight. The electric parts and the sensor are integrated and are covered with aluminum to protect from the detector contamination. The front part SSDs discriminates radiation and provides low-energy electron data, on the other hand the GSO provides high-energy electron data. The second part is to measure and analyse data. We have installed the instruments that were developed for more than ten satellites and have measured space environment for 20 years. We have been analyzing the data to make our own model of space environment. The third part is an alarm system. Many spacecraft are working around the Earth and they are always exposed to radioactivity. So we should watch our data in real time and predict the radiation environment data in two days by using them. When the expected value is over the threshold of safety, we inform a warning message to the operators of JAXA's satellites and ISS. On the other hand, we also have the website that is Space Environments and Effect System (SEES) for general users. New data and news are updated at the SEES (URL: <http://sees.tksc.jaxa.jp>). Example are data plots by ETS-8 (GEO), DRTS (GEO), SEDA-AP (ISS) and GOSAT (LEO).