Cospar report to the United Nations –PRBEM

BOURDARIE S., France

The radiation belt modeling is in continuous progress. This is mainly due to the increasing number of simultaneous multi-point in-situ measurements and also due to the combination of complementary measurements (particles, waves, magnetic and electric fields ...).
Because in was made clear that wave-particle interaction plays a major role in radiation belt electron dynamics (“killer electrons”), most efforts have concentrated in describing all waves present in the radiation belts and their detailed interactions with trapped electrons. Therefore, recent studies have allowed to understand global electron dynamics. Nevertheless it is still difficult to reproduce, in details, in-situ observations because the magnetic field and waves can vary very quickly. Of course more investigations are required and will be conducted in the future to refine the global description of the entire system (magnetic field topology, waves distributions…).
Thanks to the increasing understanding of the global inner radiation belt system, and also because important outstanding questions have been well identified, it is possible to envisage new dedicated missions in the radiation belts. To help scientists to put the progress forward, several new missions are planned in various countries. The Radiation Belts Storm Probe (part of the NASA Living With a Star program) have been defined in term of optimum orbits and necessary measurements to carry on. Also because having simultaneous multiple measurements available is crucial, other countries have worked out how to provide complimentary measurements. In Japan, ERG, in Russia RESONANCE and in Canada, ORBITALS missions have been proposed. According to progress done in these mission planning, most of them should fly at the same time, with a launch scheduled in 2011-2012. In most cases, instrument design is already done and match current prime science requirement. In parallel, science team have been set up to work out how these large amount of data will be made available to the community and will be stored. At this stage COSPAR PRBEM provides guidelines for standard particle data file format and particle measurements analysis.