



## **Proton Spectrometer Belt Research (PSBR) Q&A**

### **What is the mission of the National Reconnaissance Office?**

The NRO is a joint Department of Defense-Intelligence Community organization responsible for developing, launching, and operating America's signals, imagery, and communications intelligence satellites to meet the national security needs of our nation.

### **What directorates in NRO are involved in this project?**

The Advanced Science and Technology Directorate (AS&T) and the Imagery Intelligence System Acquisition Directorate (IMINT) in NRO worked together on this project. PSBR is sponsored by AS&T, but the best qualified person to oversee the project is Dr. David Byers who holds a PhD in Space Physics and is experienced in the investigation of the effect of space environment upon spacecraft. Dr. Byers is a Naval Research Laboratory Scientist working with IMINT/ Research and Technology which supports AS&T in the execution of research and development projects.

### **When and where will it launch?**

RBSP will begin its exploration of the Van Allen Radiation Belts with a predawn launch scheduled for Aug. 24, 2012 at the Kennedy Space Center, FLA.

### **Why is the NRO participating in this project?**

When missions such as these occur, it is important for the scientific and operational space communities who have a joint interest to participate. Many of NRO's vehicles routinely pass through/operate in this region of space. This is an opportunity to bridge the gap of scientific understanding of the radiation environment of the inner magnetosphere for the entire space community.

### **Why is NRO collaborating with NASA on this project? Who else is NRO collaborating with on this project?**

For many years NASA has supported scientific investigations that have led to increased understanding of the trapped radiation environment. The RBSP is part of NASA's Living with a Star program which is designed to increase that knowledge. Radiation belts and plasma in the Earth's magnetosphere pose hazards to satellite systems, restricting design and orbit options which impact missions and cost. Considering NRO's mission, it made sense to collaborate with NASA on this project. Other partners are the Air Force Research Laboratory, The Aerospace Corporation, Los Alamos National Laboratory and the Naval Research Laboratory.



## **What is the instrument that NRO is providing for the ride share and what does it do?**

The NRO is providing a Relativistic Proton Spectrometer (RPS) instrumentation for rideshare on RBSP. The RPS instrument focuses primarily on the inner radiation belt, an area populated by some of the highest energy protons in the near-Earth space environment. These protons move fast enough that no spacecraft shielding can stop them. To study these particles, the RPS instrument measures the protons' energy and how their flux intensity varies over time, space and direction. This will help scientists understand the source and loss mechanisms for these particles and how the inner belt changes in response to solar activity.

## **What else has NRO contributed to the project?**

Working with Air Force Research Laboratory, Aerospace Corporation, Los Alamos Laboratory and the Naval Research Laboratory, NRO has produced the next-generation radiation belt models, the proton model (AP-9), the electron model (AE-9) and the space plasma model (SPM). These models replace the long standing NASA AP-8 and AE-8 standard space environment specification models used by the engineering community. The AE (P)-9 and SPM offer improvements in terms of the radiation hazards specified the accuracy and uncertainty of the models, spectral and spatial coverage of the models, and probability of occurrence statistics.

The scientific community will reap maximum benefit from this work by having the AP (E)-9 designated an international industry standard which will provide one space radiation specification applicable to the Air Force, NRO, NASA, NOAA, and their international partners. To achieve the development of AP (E)-9 was coordinated with the international Congress on Space Research (COSPAR) and the Panel on Radiation Belt Models (PRBEM) which handles coordination of international model development efforts. The new model will be submitted to the International Standards Organization (ISO).

## **When will the information from the program be available?**

Once the probes are launched and begin feeding data, the information will be available to the public at <http://rbsp.jhuapl.edu/index.php>



### **Why is the NRO interested in proton collection in the inner Van Allen Belt?**

Radiation belts and plasma in the Earth's magnetosphere poses hazards to satellite systems, restricting design and orbit options which impact missions and cost.

### **What will be gained from this information?**

Having a new way to look at the radiation belt will be a great tool for the NRO, as well as other members of the space community, to better protect our current satellite systems, help in the design of new systems, and expand orbit options, all of which will help NRO's mission be cost effective.