Balloons in space

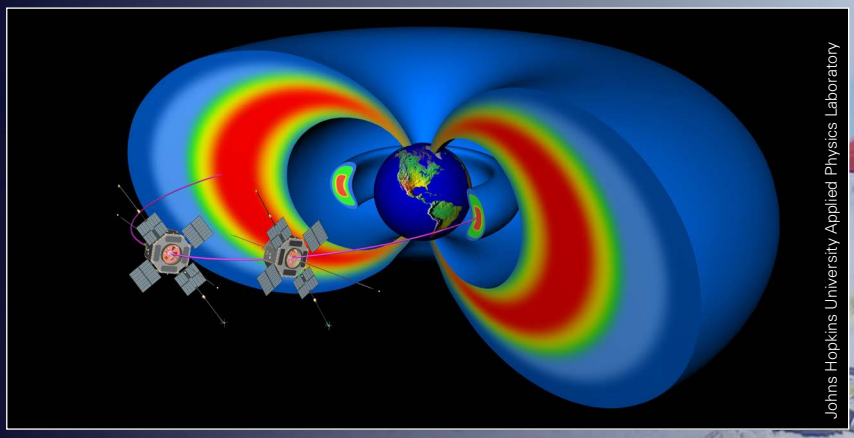
The Big Picture on pages 10-11 of this issue of Catalyst shows scientists in Antarctica launching a balloon which will travel up through the atmosphere to a height of 34 km above the Earth's surface. This balloon is part of NASA's BARREL mission, probing the radiation belts which surround the Earth.

The Van Allen Belts consist of fast-moving charged particles, mostly electrons and protons, held in place by the Earth's magnetic field. The particles spiral down, following the magnetic field lines, before bouncing back when they approach the poles. Because the belts are closest to the Earth's surface at the poles, this makes Antarctica a good place to investigate them.

NASA already has two satellites, the Radiation Belt Space Probes, in orbits which take them through the radiation belts. Balloons are being used to gather extra information.

Robyn Millan is the chief scientist on the BARREL project. She explains that, as the charged particles slow down, they emit X-rays. These are detected using instruments hanging below the balloon. It is important to understand the radiation belts because they represent a hazard to astronauts passing through them and to the on-board instruments of spacecraft.

Launching a balloon is like flying a kite. Here, NASA scientists run across the Antarctic ice below the balloon payload of instruments.



The Van Allen radiation belts are under investigation by two NASA spacecraft.

Robyn Millan, principal investigator for the BARREL project.

Why 'BARREL'?

BARREL stands for Balloon Array for Radiation-belt Relativistic Electron Losses. The electrons in the radiation belts are described as relativistic – they move at speeds close to the speed of light. The detectors on the array of balloons detect the energy they lose in the form of X-rays.

In Antarctica, NASA scientists launch a balloon with a payload of instruments to investigate radiation belts high in the atmosphere.

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