

School pupils to study space radiation belts

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Teacher, scientist and pupil all standing in front of the new AARDDVARK receiver at Headlands School and Community Science College. Credit: Andrew Kavanagh

(PhysOrg.com) -- The Van Allen radiation belts are a hazardous environment, full of 'killer' electrons that can be lethal to orbiting satellites. And when those electrons sometimes hit the atmosphere, they alter its chemistry with implications for climate variation. Now students at a school in Yorkshire are set to help scientists better understand the belts.

Dr. Andrew Kavanagh will present this innovative project between Lancaster University and Headlands School and Community Science College on Wednesday 20 April at the Royal Astronomical Society's National Astronomy Meeting (NAM 2011) in Llandudno, Wales.

The belts were discovered at the dawn of the space age by the Explorer 1 satellite launched in 1958, but scientists still do not really understand how they form and how they change with time.

In the new partnership, Headlands School will host a sensitive radio receiver supplied by ionospheric physicists from the [Space Plasma Environment and Radio Science Group](#) at Lancaster University. The receiver will form part of the global Antarctic-Arctic [Radiation-belt \(Dynamic\) Deposition - VLF Atmospheric Research Konsortium \(AARDDVARK\)](#) consortium of international universities and will pick up signals from very low frequency transmitters from around the globe.

Van Allen belt electrons that drop into the atmosphere between the transmitters and the receiver will change the radio signals between them. The Headlands receiver is particularly well placed as it will monitor signals that cross right under the footprint of the radiation belts.

Long-term monitoring will let the AARDDVARK scientists determine how much of the change in the radiation belts is due to loss to the atmosphere and how much of a direct impact geomagnetic storms have on the middle and lower regions of our atmosphere. The project will support the aims of the NASA Radiation Belt Storm Probe Mission due to be launched in 2012.

The students from Headlands School will have direct access to the data and will undertake projects looking at how the signal varies and look at sources of radio noise such as lightning. They will also be in direct contact with the project scientists giving them an insight into how

modern scientific research is carried out.

Dr. Kavanagh sees the collaboration as a real way to engage schoolchildren with science: "We hope that by interacting with this project the students will get a better feel for how important science can be for their everyday lives, as well as stimulating them to ask questions about the wider Universe.

'And the really exciting thing is that this is a project of mutual benefit. The work that the Headlands pupils do will contribute to our understanding of the Earth's space environment and our place within it.'

Provided by Royal Astronomical Society

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