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UNBF EXPERTS EXPLORE COMPLEX EARTH, SUN RELATIONSHIP

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The Earth and the sun have had an extremely long and complex relationship.

Now, experts at the University of New Brunswick in Fredericton will play a pivotal role in helping create profiles for new data sources to understand the age-old complexity.

Researchers at UNBF are developing a Global Positioning System (GPS) instrument designed for Cassiope, Canada's first multi-purpose satellite. The dual mission satellite will be used to test extremely wide bandwidth communications techniques while collecting a wealth of scientific data to study the Earth's atmosphere.

Richard Langley of the department of geodesy and geomatics engineering is leading the UNBF team, which includes research associate Donghyun Kim and graduate student Chungshin Kang. They are working closely with Bristol Aerospace of Winnipeg to develop the instrument know as GPS Attitude and Profiling (GAP).

"The instrument actually consists of five Canadian-built GPS receivers which will work together to accurately determine the position, velocity and attitude of the satellite anywhere along its polar orbit," said Dr. Langley. "It will also provide accurately-referenced time to the other instruments on the satellite. Another job is to profile the atmosphere's electron density."

Electrons produced in the atmosphere by the sun's ultraviolet radiation play a key role in space weather.

"The ionosphere affects the speed and direction of travel of radio signals including those transmitted by the GPS satellites," said Dr. Langley. "By making measurements on GPS signals as they just skirt the Earth's surface, GAP will be able to determine the concentration of electrons at different heights in the ionosphere. Data will help scientists understand that complex Earth and sun relationship."

GAP is one of eight scientific instruments on e-POP, the Enhanced Polar Outflow Probe on the Cassiope satellite. The probe will study space weather phenomena in the Earth's upper atmosphere.

"That's also where the solar wind interacts with the magnetic field of the Earth," said Dr. Langley. "Conditions on the sun and the solar wind can have potentially devastating effects on satellites, communications, navigation and power systems."

Cassiope, scheduled for launch in 2007, is being funded by a $140-million contribution from the Canadian Space Agency and Technology Partnerships Canada.

Officials have indicated they hope to turn the satellite communications mission into a $100-million dollar per year revenue generating project.

It will be aimed at customers requiring large amounts of data to be delivered from remote locations within a 24-hour period such as resource exploration companies or the military.