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Ion and Electron Imaging on Swarm and ePOP: A New View of the Ionosphere¹

DAVID KNUDSEN, University of Calgary

Late 2013 has seen the successful launch of two new space missions. Canada's Enhanced Polar Outflow Probe (ePOP) was launched in September in order to search for the causes of so-called polar outflow: loss to space of significant amounts of atmospheric material in spite of the fact that Earth's atmosphere is bound strongly to the planet by gravity. The European Space Agency's Swarm satellites, launched in November, are carrying out precision mapping of the Earth's geomagnetic and, simultaneously, electric fields, allowing detailed study of the flow of up to 10^{12} W of solar wind energy into the upper atmosphere. Both of these missions carry a new generation of CCD-based charged particle detector capable of recording 2-D snapshots of particle distribution functions at rates of 100 per second (in the case of ePOP), providing a picture of ionospheric dynamics at unprecedented resolution in time, space, and energy. This talk will provide an overview of the two missions and the first scientific findings resulting from the low-energy particle imagers on both.

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