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Using virtual satellite passes through Earth's magnetosphere to infer properties of the ionosphere ROBERT BRUNTZ, RAMON LOPEZ, University of Texas at Arlington — The Sun continuously emits a solar wind, composed of charged particles embedded in a magnetic field, which flows out through the entire solar system. As the solar wind passes Earth, it interacts with Earth's magnetic field, both through a purely magnetic interaction and through a more friction-like viscous interaction. The viscous interaction is typically weaker than the purely magnetic interaction and is affected by the solar wind magnetic field in a non-linear way, making it very difficult to quantify. We are investigating a technique in which we simulate the solar wind-magnetosphere interaction using the Lyon-Fedder-Mobarry (LFM) magnetohydrodynamic (MHD) simulation, then fly a "virtual satellite" through the region of the viscous interaction, in order to measure the interaction directly. These results can be compared to actual satellite passes that occurred during similar conditions, to ascertain their validity. Earth's magnetic field is linked directly to the ionosphere, the upper layer of the atmosphere, so the virtual satellite passes will provide information about plasma motion in the ionosphere, as well.

Robert Bruntz
University of Texas at Arlington

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