Geophysical Research Abstracts
Vol. 18, EGU2016-17841, 2016
EGU General Assembly 2016

The Scintillation Prediction Observations Research Task (SPORT) Mission

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Abstract: Structure in the charged particle number density in the equatorial ionosphere can have a profound impact on the fidelity of HF, VHF and UHF radio signals that are used for ground-to-ground and space-to-ground communication and navigation. The degree to which such systems can be compromised depends in large part on the spatial distribution of the structured regions in the ionosphere and the background plasma density in which they are embedded.

In order to address these challenges it is necessary to accurately distinguish the background ionospheric conditions that favor the generation of irregularities from those that do not. Additionally we must relate the evolution of those conditions to the subsequent evolution of the irregular plasma regions themselves. The background ionospheric conditions are conveniently described by latitudinal profiles of the plasma density at nearly constant altitude, which describe the effects of ExB drifts and neutral winds, while the appearance and growth of plasma structure requires committed observations from the ground from at least one fixed longitude.

This talk will present an international collaborative CubeSat mission called SPORT that stands for the Scintillation Prediction Observations Research Task. This mission will advance our understanding of the nature and evolution of ionospheric structures around sunset to improve predictions of disturbances that affect radio propagation and telecommunication signals. The science goals will be accomplished by a unique combination of satellite observations from a nearly circular middle inclination orbit and the extensive operation of ground based observations from South America near the magnetic equator. This approach promises Explorer class science at a CubeSat price.