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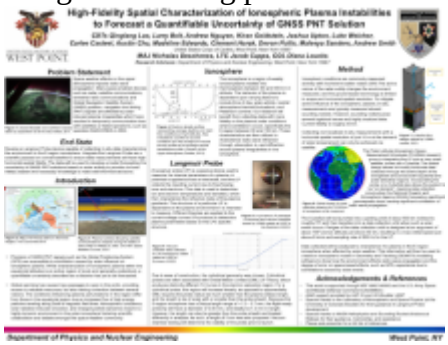
As human activity in the Arctic increases, so too has the reliance on Global Navigation Satellite Systems (GNSS) to traverse the inhospitable and often featureless terrain. The increased commercial and geopolitical competition has placed a premium on the accuracy of space-based navigation systems; however, these systems are often uniquely disrupted by interference due to the effects of solar activity in the Earth's upper atmosphere. While it is understood that increases in particle activity can significantly degrade the reliability of GNSS solutions, few existing tools boast both the precision and horizontal resolution to quantify the effects of these ionospheric disturbances. As such, it remains impossible to accurately forecast the severity of GNSS inaccuracies given a solar event.

The long-term objective of the United States Military Academy (USMA) Polar Latitude Atmospheric Space Measurement and Analysis (PLASMA) Team is to develop a high-resolution model of the E-region ionosphere that has the capability to predict and quantify scintillation effects on GNSS when solar activity impacts the atmosphere. A precondition of the model is high fidelity data of the ionospheric environment during a solar storm. As such, the PLASMA team is developing a cylindrical Langmuir Probe capable of measuring the internal parameters of ionospheric plasma. It will be integrated onto a CubeSat and maneuvered to such an orbit that maximizes the horizontal fidelity of collected data. This paper will discuss the team's progress in payload design and testing parameters.



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Wednesday, April 17, 2024
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