

SS520-3 Sounding Rocket Experiment Targeting the Ion Outflow over Dayside Cusp

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The SS520-3 sounding rocket is currently planned to be launched from Ny-Ålesund, Svalbard in Spitsbergen in December 2017. The objectives of this sounding rocket is to understand the particle acceleration processes that cause the ion outflow by making in-situ observation of the wave-particle interaction over the dayside cusp region. The wave-particle interaction is going to be resolved by WPIA (Wave Particle Interaction Analyzer) that is newly developed for satellite missions. Since these wave-particle interactions are predicted to be effective above ~800km altitude, a two-stage sounding rocket SS520 whose apex can be higher than 800km is necessary. The rocket range where SS520 can be launched over dayside cusp is only SvalRak at Ny-Ålesund in Svalbard. This sounding rocket experiment is a part of the comprehensive observation campaign including ground based radar (EISCAT Svalbard Radar) and optical observations. Following 10 science instruments are planning to be on board the SS520-3 sounding rocket. 1) Digital FluxGate magnetometer (DFG) 2) Coupled Dark State Magnetometer (CDSM) 3) Low Frequency Analyzer System (LFAS) 4) Thermal ion Spectrum Analyzer (TSA) 5) Low Energy Particle experiment (LEP) 6) Ion Mass Spectrometer (IMS) 7) Fast Langmuir Probe (FLP) 8) Needle Langmuir Probe (NLP) 9) Plasma and Wave Monitor (PWM) and 10) Sun Aspect Sensor (SAS). Part of the data simultaneously obtained by LFAS, TSA and IMS are stored in a memory on the sounding rocket with high data rate and the downloaded data are analyzed on the ground, which functions as WPIA. Two of the 10 science payloads CDSM and NLP are going to be provided by Austria and Norway, respectively.

Keywords: Sounding Rocket, Ion Outflow, Cusp