Sounding rocket missions (LAMP and SS520-3) for ionospheric and magnetospheric explorations

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We are participating into two sounding rocket missions, both of which will be launched in the coming winter. LAMP (Loss through Auroral Microburst Pulsations) is NASA's sounding rocket mission which will provide the first simultaneous measurements of the micrburst precipitations of high-energy electrons into the auroral ionosphere and optical emissions of pulsating auroras with high-time resolution. LAMP is one of approaches to quantify the magnetospheric / radiation belt electron loss through auroral activities. For LAMP, we will provide four scientific instruments onboard: a high-energy electron detector, two auroral imagers, and a magnetometer, and ground support observations as well. They have not only the scientific purposes, but also aspects of technological demonstration for future space missions.

SS520-3 is led by JAXA. It carries plasma wave instruments, a sensor package measuring supra-thermal to low-energy plasma particles, Langmuir probes, and a magnetometer, in order to reveal the generating mechanisms of ion outflows from the polar ionosphere, where the many of the instruments also contain state-of-art techniques as technological demonstration including wave-particle interaction analysis.

Using the sounding rocket, we can exlore the low-altitude regions which is difficult for satellites. Moreover, interface requirements are usually quite milder with a lot of aspects when we compare them to those of spacecraft, which saves time and resources for development/verification to meet the requirements. We will report the status of LAMP and SS520-3, and benefits from usage of the sounding rocket platform.

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