

## Study on electron density along the trajectory of KAGUYA (SELENE) using LRS/WFC instruments

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The waveform capture (WFC) is one of the subsystems of the Lunar Radar Sounder (LRS) onboard KAGUYA to measure plasma waves and radio emissions around the moon. It measures two components of electric wave signals detected by the two orthogonal 30 m tip-to-tip antennas. The WFC consists of a fast sweep frequency analyzer (WFC-H) covering the frequency range from 1kHz to 1MHz and a waveform receiver (WFC-L) in the frequency range from 10Hz to 100 kHz. To perform spectral analysis with very high time and frequency resolution, the WFC-H has two hybrid ICs called PDCs (Programmable Down Converters). The PDCs are used for converting the wide band signals below 1MHz into narrow band signals and for down-sampling the data. The PDCs are controlled by the onboard software implemented in a digital signal processor (DSP), and thus, a digital sweep frequency analyzer with very high time and frequency resolution can be realized.

The WFC-H is performed almost 24 hours a day at an altitude of 100km around the moon. The spectral feature obtained by the WFC-H when KAGUYA is in the solar wind revealed that UHR emissions are constantly observed in the frequency range of 10-20kHz in the sun-lit region while the frequency suddenly decreases in the shade region. This feature is quite similar to the observation by the WIND spacecraft, which passed through the solar wind wake of the moon at a distance of 6.8 lunar radii. In the present paper, we investigated the electron density profile along the KAGUYA trajectory in order to study the lunar wake structure as a result of solar wind-moon interaction at much lower altitude (=100km).

[1] Y. Kasahara, Y. Goto, K. Hashimoto, T. Imachi, A. Kumamoto, T. Ono, and H. Matsumoto, Plasma Wave Observation Using Waveform Capture in the Lunar Radar Sounder on board the SELENE Space-craft, Earth, Planets and Space, 2008, (in press).

[2] T. Ono, A. Kumamoto, Y. Yamaguchi, A. Yamaji, T. Kobayashi, Y. Kasahara, and H. Oya, Instrumentation and Observation Target of the Lunar Radar Sounder (LRS) Experiment on-board the SELENE Spacecraft, Earth, Planets and Space, 2008, (in press).