

## Observation strategy of the plasma wave experiment (PWE) onboard ERG

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The SPRINT-B/ERG satellite is a Japanese small satellite mission to investigate dynamics of the inner magnetosphere. To achieve comprehensive observations of plasma/particles, fields, and waves, the Plasma Wave Experiment (PWE) is installed onboard the ERG satellite to measure electric field in the frequency range from DC to 10 MHz, and magnetic field in the frequency range from a few Hz to 100 kHz. Two CPU boards, one for electric field and another for magnetic field, are installed for the PWE and the measured data by the PWE are processed by these CPUs. A variety of operational modes can be implemented without changing the hardware configuration, and the telemetry data consists of several kinds of data such as power spectrum, waveform and spectral matrix. Some of them are continuously generated 24 hours per day and are downloaded to the ground, while the other data such as waveform data are once stored in the mission data recorder (MDR) and partial data is downloaded after data selection process. Besides the PWE, the Software-Wave Particle Interaction Analyzer (S-WPIA) will be equipped onboard the ERG in order to realize direct measurements of wave-particle interactions, and it is necessary to take into account the co-operational data processing and data flow with the S-WPIA.

The development of the PWE is almost reaching its final phase, but we still have some action items to be solved in the software development. One of essential items is generation algorithm of the spectral matrix. In order to determine the absolute direction of the wave using spectral matrix, it is indispensable to calculate cross spectra between electric and magnetic wave fields but the CPUs are independently assigned to them so that we need to introduce some synchronization technique to overcome this problem. Another one is the optimization of the operational plan of the MDR. We intermittently generate waveform data, which is so-called 'EWO-burst mode' and tentatively store them in the MDR. We prepare two kinds of EWO-burst mode; one is 'chorus-burst' and another is 'EMIC-burst'. As we need to select them due to the limitation of telemetry resource, efficient data selection scheme is very important to obtain maximum science output using the reproduced EWO-burst data from the MDR. In addition, triggering logic for the EWO-burst will play an important role.

In the present paper, we introduce a current design of onboard software preferable for the PWE onboard ERG according to the scientific objects of the mission.