# Onboard Processing on PWE OFA/WFC (Onboard Frequency Analyzer/Waveform Capture) aboard the ERG(ARASE) Satellite

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Exploration of energization and Radiation in Geospace (ERG) is a mission for understanding particle acceleration, loss mechanisms, and the dynamic evolution of space storms in the context of cross-energy and cross-regional coupling [Miyoshi et al., 2012]. The ERG (ARASE) satellite was launched on December 20, 2016, and successfully inserted into an orbit.

The Plasma Wave Experiment (PWE) is one of the science instruments on board the ERG satellite to measure electric field and magnetic field in the inner magnetosphere. PWE consists of three sub-components, EFD (Electric Field Detector), OFA/WFC (Onboard Frequency Analyzer and Waveform Capture), and HFA (High Frequency Analyzer). Especially, OFA/WFC measures electric and magnetic field spectrum and waveform from a few Hz to 20 kHz. OFA/WFC processes signals detected by a couple of dipole wire-probe antenna (WPT) and tri-axis magnetic search coils (MSC) installed onboard the satellite. The PWE-OFA subsystem calculates and produces three kind of data; OFA-SPEC (power spectrum), OFA-MATRIX (spectrum matrix), and OFA-COMPLEX (complex spectrum). They are continuously processed 24 hours per day and all data are sent to the ground. OFA-MATRIX and OFA-COMPLEX are used for polarization analyses and direction finding of the plasma waves. The PWE-WFC subsystem measures raw (64 kHz sampled) and down-sampled (1 kHz sampled) burst waveform detected by the WPT and the MSC sensors. It activates by a command, automatic triggering, and scheduling.

The initial check-out process of the PWE successfully completed, and initial data has been obtained. In this presentation, we introduce onboard processing technique on PWE OFA/WFC and its initial results.

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