

ElectroStatic Analyzer (ESA) for KAISTSAT-1

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The electrostatic analyzer on the KAISTSAT-1 is designed to measure pitch-angle distributions of suprathermal auroral electrons with high sensitivity, wide dynamic range, good energy and angular resolution. These measurements support the scientific goal of the KAISTSAT-1 mission to understand the physical processes responsible for auroral particle acceleration and heating, and plasma instability. The instrument mounted on the top of spacecraft has 180° fields of view. Because the KAISTSAT-1 is the three axis stabilized satellite, ESA can observe magnetic field aligned particles during most auroral crossings. The analyzer serves as an electron spectrometer that obtains distributions of 32 energies at 8 angles every 2 seconds. Their standard energy ranges are 500 eV to 20 keV for electrons. The instrument electronics include MCP pulse amplifiers and counters, high voltage supplies, command/data interface circuits, and diagnostic test circuits. All data formatting, commanding, timing and operational control of the plasma analyzer instrument are managed by a microcontroller, 87C51.