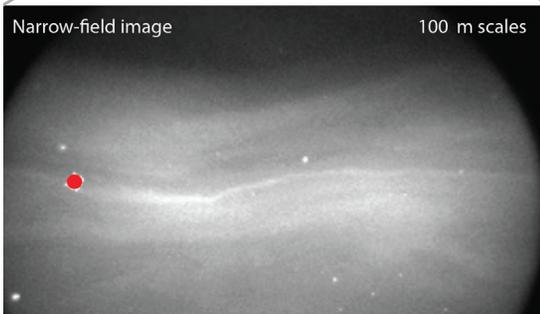
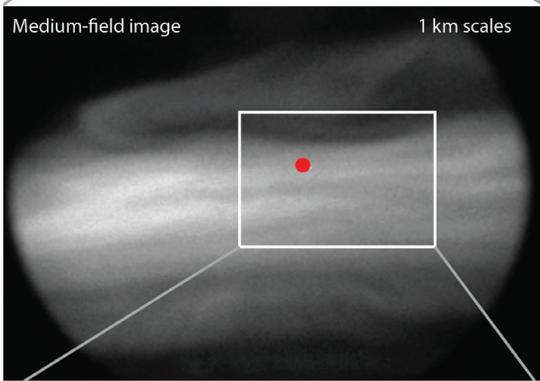
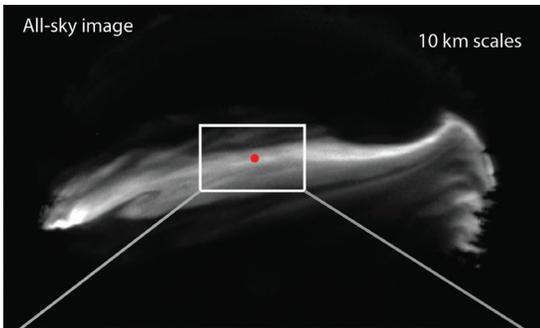


Ground-to-Rocket Electric-Electron Correlative Experiment-> Sounding Rocket Over the Aurora

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First Flight! through aurora with multiple corresponding field-of-view video imagers!
First Measurements! of source electrons & aurora light w/ high spatiotemporal resolution!
First Science! with electron spectra closely matching ground based auroral signature!

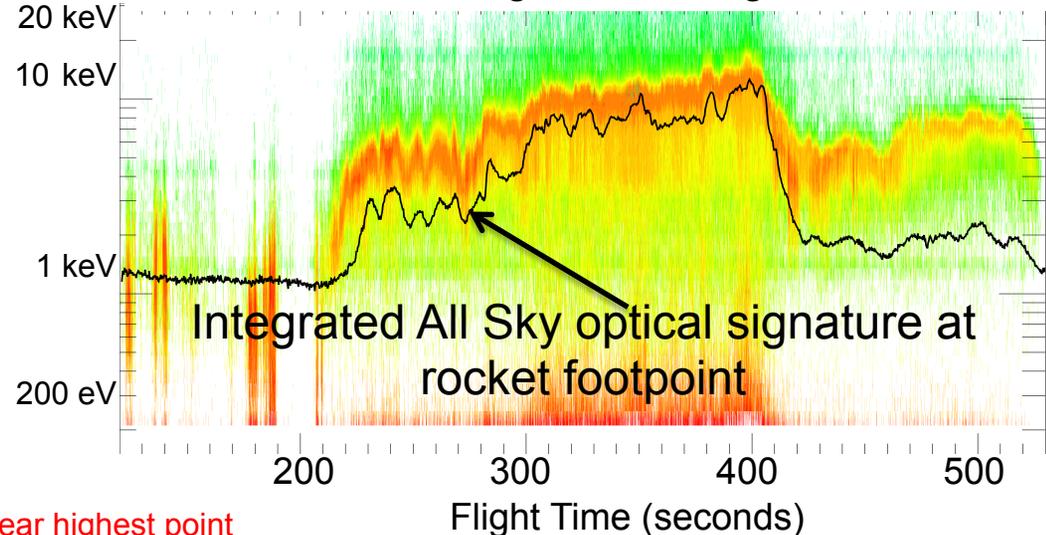


Investigate how plasma data (particles and fields) and imaging data can be used to constrain the possible sources of small-scale auroral structures.



Launch: 3 Mar 2014
11:09:50 UT
Poker Flat, AK
336 km apogee
Dynamic, highly structured auroral arc system

GREECE rocket flight Field-Aligned Electrons



● Payload magnetic footprint (of Earth's field) near highest point

During the most dynamic displays, the aurora exhibits strong fluid-like motions in the direction perpendicular to the magnetic field. While these apparent flows have been observed and explored since the start of aurora studies, it is not yet understood what drives them and where in the near-Earth space environment those forces are acting. The GREECE mission set out to investigate the electrodynamics associated with these fluid-like auroral structures in an attempt to determine the driving forces behind them.

GREECE used a combination of onboard instrumentation to measure the plasma environment (particles and fields) as well as an array of ground-based optical auroral imagers positioned at a downrange site—located under the payload trajectory—in order to image the fluid motions of the aurora with high temporal and spatial resolution. The imagers provided information about the aurora on both the large-scale (>10 km) and the small scale (~ 100 m) and we were able to correlate emission line brightness data, corresponding to the rocket magnetic footpoint, with electron characteristics.

We were able to determine that the auroral flows are not caused by large-amplitude electric fields in the low altitude (<400 km) ionosphere. The nature of the electron precipitation reveals that the flow structure is caused by motions of the electron source region, occurring much farther out in the near-Earth space environment.