

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

A Network of Small Spacecraft for Multipoint Measurement of Auroral Plasma¹ T. MAXIMILLIAN ROBERTS, KRISTINA LYNCH, ROBERT CLAYTON, Dartmouth College, DONALD HAMPTON, University of Alaska Fairbanks — Measurement of ionospheric plasma is often performed by a single in-situ device, or remotely using cameras and radar. This constrains determination of small scale variation in plasma structure to somewhat restrictive assumptions. We have developed and tested a local, multipoint measurement system composed of a network of small spacecraft which are ejected from a main payload carried by sounding rocket. The low-resource, spin-stabilized projectiles radio measurements to the main payload for transmission to ground. Measurements from an onboard LED array and IMU are used to determine the separation of the devices from the main payload and orientation relative to the geomagnetic field. The primary measurements are made by two orthogonal retarding potential analyzers on each spacecraft, allowing for determination of local ion parameters. A test flight in October 2015 demonstrated the successful application of this system, as well as revealing several important design issues. This work is in preparation for the February 2017 ISINGLASS sounding rocket mission to study the gradient scale lengths in auroral plasma, involving the deployment of two of these spacecraft networks.

¹Supported by NASA grants NNX14AH07G and NNX15AK51A.

T. Maximillian Roberts
Dartmouth College

Date submitted: 07 Jul 2016

Electronic form version 1.4