



## **The C-REX Sounding Rocket Mission**

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On November 24, 2014, NASA launched a Black-Brant 12 sounding rocket from Andoya Space Center out over the Greenland Sea and into the ionospheric footprint of Earth's geomagnetic cusp. Roughly ten minutes later, ten barium/strontium tracer clouds were released into the thermosphere, at heights ranging from 190 to 420 km, and dispersed into a 3D volume extending over many tens of km around the main trajectory. Subsequent motions of the ionized barium and neutral barium/strontium components of the clouds were determined by photographic triangulation, using cameras based at Longyearbyen, Ny-Alesund, and aboard a NASA aircraft flying just south of Svalbard. For reasons that are currently not understood, there is a permanent enhancement in the neutral mass density in this part of Earth's thermosphere, which is expected to cause small but important and currently unpredictable perturbations to the orbits of spacecraft flying through it. Work in progress will use the C-REX photographic triangulations to measure winds and ion motion at multiple locations inside this density enhancement. By combining these very localized results with larger scale maps of wind derived from UCL's SCANDI interferometer and ion drifts measured by the EISCAT Svalbard radar, we hope to understand the flows that are responsible for creating and sustaining the thermospheric density anomaly.