The DICE mission consists of two identical 1.5U CubeSats deployed simultaneously from a single P-POD (NASA’s Poly-Picosatellite Orbital Deployer) into the same orbit. Each carries two Langmuir probes to measure in-situ ionospheric plasma densities and electric field probes to measure DC and AC electric fields. These measurements permit accurate identification of storm-time features, such as the SED bulge and plume, together with simultaneous, co-located electric field measurements, which have previously been lacking. The satellites separated relative to each other over time due to differences in the ejection velocity. The use of two identical satellites permits the de-convolution of spatial and temporal ambiguities in the observations of the ionosphere from a moving platform.

Magnetic storms are part of space weather, conditions in near-earth space that can influence the performance and reliability of spaceborne and ground-based technological systems. Ionospheric variability has a particularly dramatic effect on radio frequency systems. Some of the largest gradients are found on the edges of Storm Enhanced Density (SED) features, which regularly occur over the United States in the afternoon during magnetic disturbances. These ionospheric features need to be better characterized and understood. The DICE program provides simultaneous key electric field and electron density measurements in the early afternoon sector where many SEDs seem to form. The DICE mission also provides new measurements of SED features and insight into what causes their formation, evolution, and decay.