Northeastern U.S. snowstorms impact large populations in major urban corridors, and cause major disruptions to transportation, commerce, and public safety. Snowfall within these storms is frequently organized in multi-scale banded structures that are poorly understood and poorly predicted by current numerical forecast models. Despite this, no major study of U.S. East Coast snowstorms has taken place in over 30 years. To address these needs, the Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) Earth-Venture Suborbital-3 (EVS-3) field campaign will take place during the winters of 2020–2022 to sample a range of East Coast snowstorms using airborne remote sensing and in situ instrumentation. The ER-2 aircraft will fly at high altitude and carry a suite of remote sensing instruments including cloud and precipitation radars, lidar, and passive microwave instruments to simulate satellite-borne instrumentation. The P-3 aircraft will fly within clouds and sample environmental and microphysical quantities using a turbulent air motion measurement system, microphysics probes, and a dropsonde system to sample vertical profiles of temperature, humidity and winds. These airborne measurements will be supplemented with ground-based measurements from rawinsondes launched from mobile sounding systems and at National Weather Service stations, ground-based radars stationed over Long Island, and the New York State mesonet ground network. With this suite of instrumentation, IMPACTS will provide observations critical to the understanding of the dynamical and thermodynamical mechanisms of snowband formation, organization and evolution. IMPACTS will also examine how the microphysical characteristics and likely growth mechanisms of snow particles vary across snowbands and apply this understanding to improve remote sensing and modeling of snowfall.

Keywords: Field Experiments, Microphysics, Airborne Radar