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detections of the OSIRIS-REx Sample Return Capsule re-entry

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On 24 September 2023, NASA's OSIRIS-REx mission achieved a significant milestone by successfully returning particles from a nearby asteroid to Earth via a Sample Return Capsule (SRC). The SRC generated shock waves as it entered the atmosphere, traversing California, Nevada and Utah before landing at the Utah Test and Training Range (UTTR). Since SRCs are well-characterized objects with known parameters, their re-entries can be leveraged towards studying meteor phenomena, characterizing high-altitude shock wave dynamics, improving entry and propagation models, and advancing global monitoring efforts. Under desirable conditions, SRCs generate infrasound which can be detected by microbarometers. We deployed ground-based and balloon-borne infrasound sensors in Nevada and Utah to capture the signals as a function of distance from the trajectory and from different parts of the trail. We will present signal characteristics at different stations, and how these might relate to SRC altitude and point(s) along the trajectory. These findings not only hold promise for enhancing future observational campaigns on Earth but also offer valuable perspectives into the detection and characterization of shock wave signatures on extraterrestrial bodies with atmospheres, including Mars, Titan, and Venus.

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