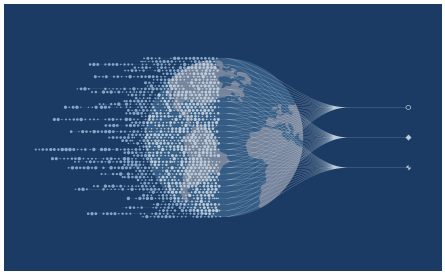

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the OSIRIS-REx Sample Return Capsule re-entry for infrasound detection of atmospheric events

The re-entry of NASA's OSIRIS-REx Sample Return Capsule (SRC) into Earth's atmosphere in 2023 provided a unique opportunity to detect and analyze infrasound generated by a controlled atmospheric entry. As the SRC traversed denser atmospheric layers at hypervelocity, it produced shock waves that decayed into acoustic signals. The strategic placement of ground-based and airborne sensors along the SRC's trajectory enabled the detection of signals from a substantial portion of the object's path. This data set offers an unprecedented foundation for refining atmospheric entry and shock wave propagation models. The well-defined parameters of the SRC (mass, size, velocity) allowed for comprehensive analysis, validating the critical role of acoustic monitoring in characterizing high-altitude phenomena. The findings in this study can be leveraged for differentiating anthropogenic atmospheric events from natural meteoroid and asteroid entries. Furthermore, the results demonstrate the strategic value of infrasound within regional and global monitoring systems, including those used for the CTBT, for detecting and characterizing atmospheric events of both natural and human origin.
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