Seismoacoustic tracking and characterisation of space debris re-entries

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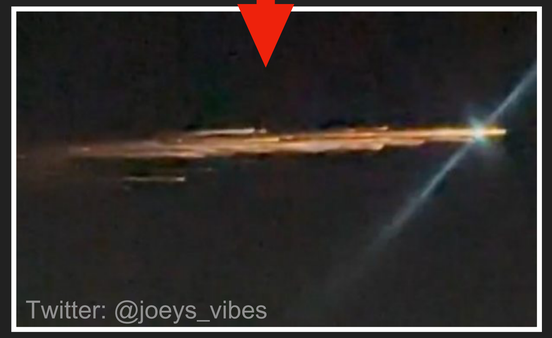
1. The Shenzhou-15 orbital module re-enters over California



Speed: Mach 25-30
Trajectory: 64°
Altitude: 80-150 km
Descent Angle: 1.2°
Fragment Size: 0.5 m

The Washington Post
Democracy Dies in Darkness

Hidden Planet

Earthquake sensors could help track a different threat: Falling space debris

As more space junk is falling to Earth uncontrolled, scientists are using seismometers to track the debris.

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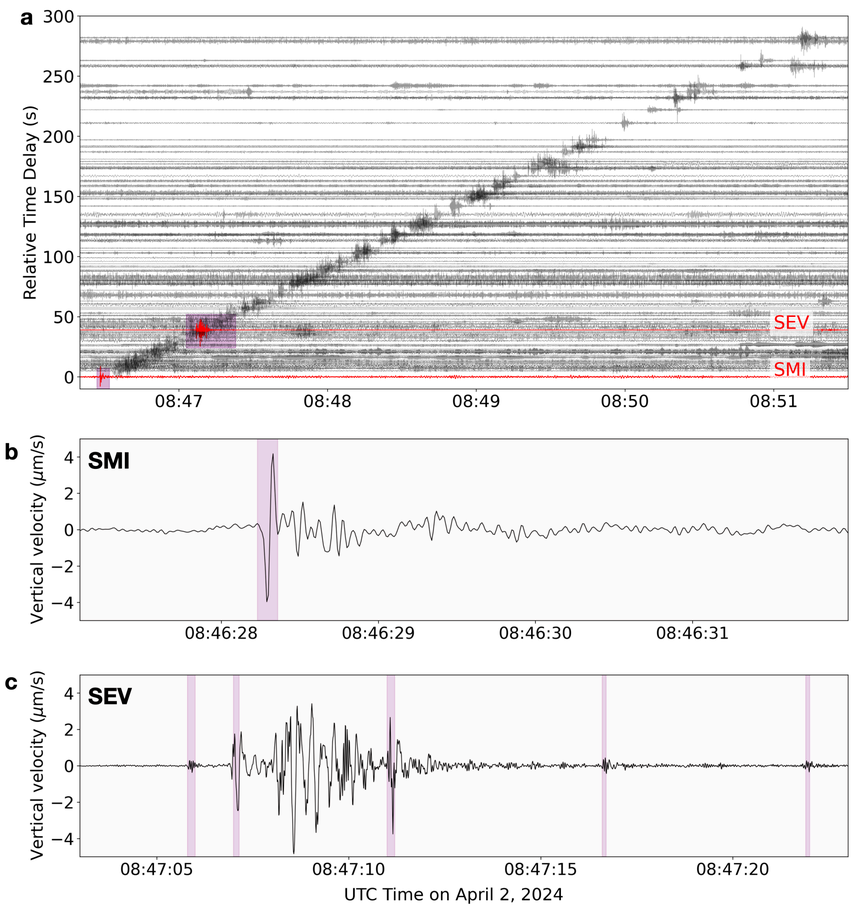
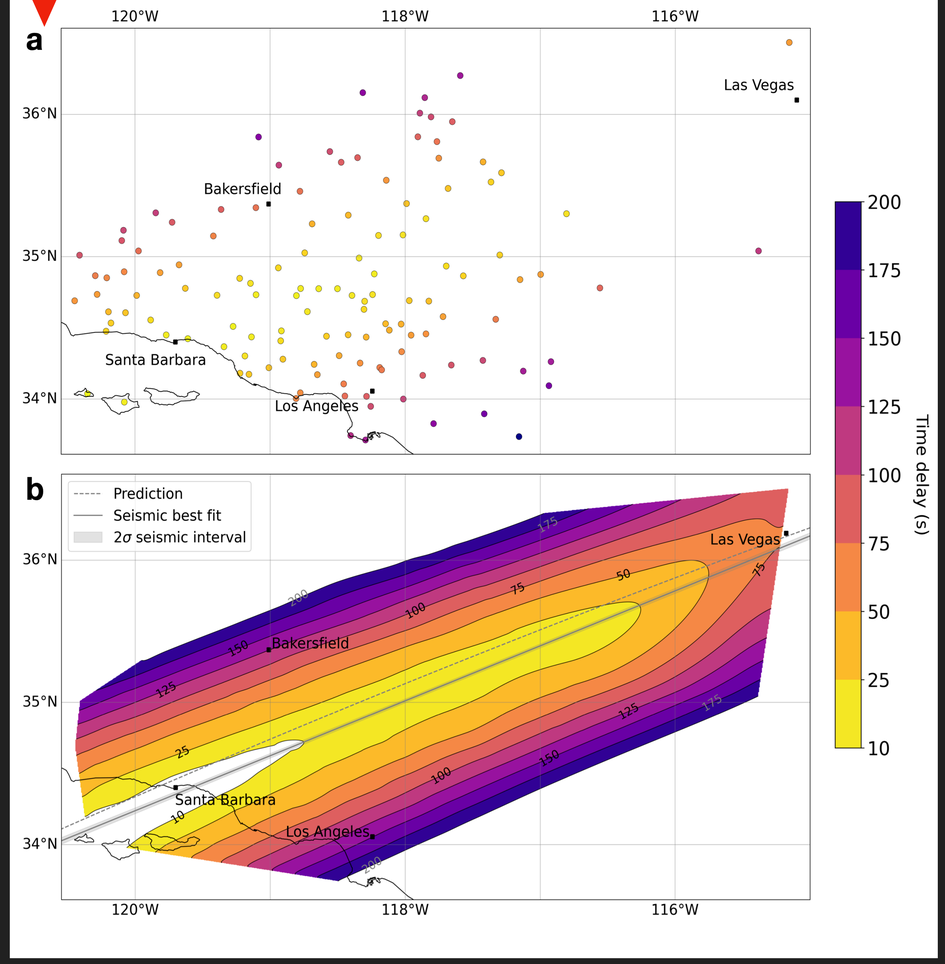
2. Sonic booms are recorded across the California and Nevada seismic networks



3. Arrival time inversion yields speed, trajectory, angle, and altitude



We have demonstrated that seismic data enable tracking and characterisation of debris re-entering the atmosphere.
Relative arrival times enable inversion of speed, trajectory, altitude, and descent angle.
Boom characteristics enable inversion of fragment size.