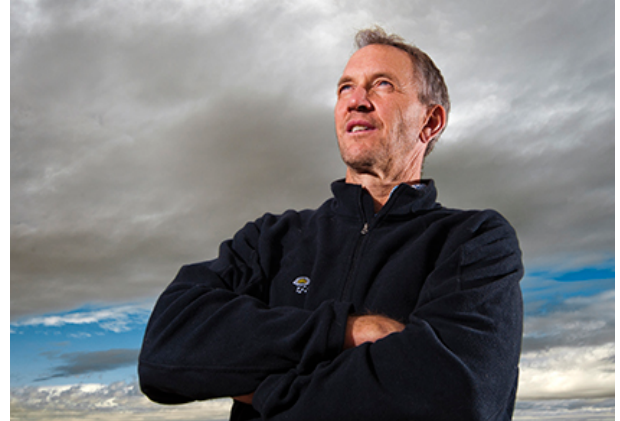


Mark Boslough Featured on NOVA Special about the Chelyabinsk Meteor

Sandia scientist Mark Boslough (Discrete Mathematics and Complex Systems Dept.) was featured in NOVA's special program "Meteor Strike," which aired Wednesday, March 27th. The episode is about last month's giant meteor explosion in Russia. Mark traveled to Chelyabinsk, where he performed astrometric calibrations of dashcam videos to help pinpoint the explosion's altitude and coordinates.



NOVA also spent a day with him at UNM, discussing event simulations that were performed on Red Sky. There is more about Mark's work at NBC News and Phys.org.

Background

On 15 February 2013, an asteroid, traveling at ~ 18 km/s (40,000 mph), entered Earth's atmosphere over Russia at $\sim 9:20$ a.m. local time. It became a brilliant superbolide meteor over the southern Ural region and exploded in an air burst ~ 15 – 25 km over Chelyabinsk.

The explosion generated a bright flash, small fragmentary meteorites, and a powerful shock wave. The atmosphere absorbed most of the object's energy, with a total kinetic energy before atmospheric impact equivalent to ~ 440 kt of TNT (~ 1.8 PJ), 20–30 times more energy than was released from the atomic bombs detonated at Hiroshima and Nagasaki. According to NASA's Jet Propulsion Laboratory, $\sim 22\%$ of the total energy of the fireball was emitted as visible light.

With an estimated initial mass of 11,000 tonnes, and measuring ~ 17 – 20 m across, the Chelyabinsk meteor is the largest known object to have entered Earth's atmosphere since the 1908 Tunguska event. The object had not been detected before atmospheric entry.

The predicted close approach of the roughly 30-m diameter asteroid 2012 DA14 occurred about 16 hours later. The Sodankylä Geophysical Observatory, the European Space Agency, and NASA indicated the two objects could not have been related because the two asteroids had very different trajectories.

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