



Near Earth Object Program

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Northeast Fireball Pinpointed

SKY & TELESCOPE'S NEWS BULLETIN - August 3, 2001

NORTHEAST FIREBALL PINPOINTED

It now appears that July 23rd's dazzling daylight fireball punched through the atmosphere over central Pennsylvania and may have scattered meteorites over the rugged woodlands of Sproul State Forest. Defense Department satellites tracked the meteoroid's flare for several seconds beginning at 6:19:11 Eastern Daylight Time. The path began over Scranton (75.6 deg. W, 41.5 deg. N) and ended 140 kilometers to the west over the town of Williamsport (77.3 deg. W, 41.3 deg. N), during which it dropped in altitude from 82 to 32 km. Despite occurring in daylight, the meteor was bright enough to be spotted by eyewitnesses from Canada to Virginia.

In its final moments the fireball created a deafening sonic boom that shook the ground. Meteor expert Peter Brown (Los Alamos National Laboratory), who is analyzing the satellite records, told Sky & Telescope, "I can almost guarantee that this object broke up." He says that reconstructing the object's orbit and flight path are proving difficult because the entry velocity is uncertain, though it's probably in the "asteroidal" range of 17 to 20 km per second. Brown believes that whatever remains of the incoming object probably fell in an elongated pattern up to 30 km long.

The meteoroid's size is also still a guess. The satellites' visible and infrared sensors recorded 1.3 billion joules of luminous energy, which corresponds to a kinetic-energy wallop equivalent to 3,000 tons of TNT (one-fifth that of the Hiroshima bomb). Meteoroids in this energy range strike Earth roughly 10 times each year. If it was stony, as most meteorites are, such an object would have weighed 30 to 90 tons and been the size of a car. However, Brown says acoustic and seismic data argue for much less kinetic energy and, in turn, a much smaller object. "I'd hoped to have had some meteorites recovered by now," Brown concludes, but the many uncertainties diminish that possibility. "That's why I'm here in New Mexico instead of heading for Pennsylvania."

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