

Amateurs see fireballs from U.S. satellite kill

Astronomy magazine, July 2008, p. 24

Observing unique time-critical sky events always takes a little luck, especially because of hit-or-miss weather conditions. On February 20, a group of skywatchers at Prince Georges Astronomical Observatory in British Columbia took the chance that a break in the clouds would let them glimpse the evening's total lunar eclipse then in progress. When the clouds briefly parted, the astronomers considered themselves fortunate.

But their luck was more extraordinary than they first realized. That hole in the clouds made these skywatchers the only North American eyewitnesses to the demise of the American spy satellite USA-193.

Only minutes before, as the spacecraft raced north of Maui, a head-on impact with a missile launched by the *USS Lake Erie* had smashed the 8-ton derelict. The reason for the strike was the satellite's half-ton cargo of toxic hydrazine fuel, which dispersed harmlessly into space. Thousands of small fragments scattered in all directions. At 7:43 P.M., many of the pieces hit the atmosphere directly over the eclipse observers.

Because the satellite exploded, its fragments followed random trajectories. Some pieces were flung forward into higher orbits, where a few could survive for several months. Others were flung off to the side, leading to a gently zig-zagging path that quickly decayed due to atmospheric drag. But many pieces were thrown downward along a track that passed over the Canadian skywatchers.

According to eyewitness Brian Battersby, observers spotted many simultaneous fireballs moving generally southwest to northeast. "One was especially bright and long-lasting," he reported in an e-mail, adding that he recalled "about six bright trails and 15 fainter ones."

The grouping of these man-made meteors differed from natural ones. "The debris trails seemed to come in 'waves,' with the first ... being brighter than the debris that followed behind it," Battersby explained. "The trails seemed to be in a fan shape, with the trails being wider apart in the northeast than they were in the southwest."

Unlike a natural meteor shower, where trails originate from a single steady point on the celestial sphere, the debris radiant was the disintegrated satellite's center of mass. That point was traversing the Canadian sky at about 2° each second. The fast-moving "shower" radiant explains the unusual pattern seen by observers.

Bonnie Bird of the Royal Astronomy Society of Canada relayed Battersby's report and searched for any other observers located far enough west to have seen the satellite's fireballs. But elsewhere in western Canada, the cloud cover had been nearly unbroken. Bird found no other witnesses.

The 30-odd skywatchers in Battersby's group defied the meteorological odds and were rewarded with the sky show of a lifetime: a man-made meteor storm no other humans had ever seen — or are likely to see for many years. These lucky observers, the envy of every other amateur astronomer and satellite watcher on the planet, will just have to inspire others to keep looking up.