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Satellite Falls to Earth, but We Know Not Where

By KENNETH CHANG

A dead NASA satellite, intently tracked by people around the world over the last couple of days, finally fell back to Earth — and NASA is still not quite sure when and where it crashed, although the Pacific Ocean seems like a good guess.

On its final orbital trajectory, the six-ton Upper Atmosphere Research Satellite passed to the south of Australia and then headed to the northeast across the Pacific toward Vancouver, British Columbia. As it was nearing Canada, the satellite dropped out of the sky. The space agency said the satellite crashed between 11:23 p.m. Friday and 1:09 a.m. Saturday.

“It could have fallen into the Pacific,” a NASA spokesman, Stephen Cole, said. “It could have continued a little further into Canada. But we don’t have confirmation of that.”

Mr. Cole said NASA was awaiting more details from the Joint Space Operations Center at Vandenberg Air Force Base in California, which tracks space debris. There were no reports of damage or injuries.

The fate of the satellite stirred online interest and speculation Friday and early Saturday. NASA said through Twitter that debris remained the property of the United States government and warned that people should not approach or touch any pieces they might come across.

The satellite had been expected to re-enter on Friday afternoon, but then its rate of fall slowed.

“The satellite’s orientation or configuration apparently has changed,” the space agency said in an earlier update. Perhaps some piece had broken off, leaving it more streamlined as it tumbled through the upper atmosphere. “That is now slowing its descent,” NASA said.

The satellite circles the Earth on a tilted orbit, and as the planet turns each day, different locations pass underneath.

At least 26 pieces, the largest at 330 pounds, had been expected to survive the plunge and land along a path 500 miles long.

NASA had forecast a 1-in-3,200 risk that debris from the satellite could injure someone, and the

risk for any individual is infinitesimal. NASA's Twitter feed emphatically said: "The chances that you (yes, I mean YOU) will be hit by a piece of the #UARS satellite today are one in several trillion. Very unlikely."

There are no known instances of anyone being injured by falling space debris (though in 1997, a woman in Oklahoma was brushed by a piece of mesh from a Delta 2 rocket booster that did her no harm). When the space shuttle Columbia disintegrated during re-entry in 2003, the seven astronauts aboard died, but no one on the ground was hurt as 42.5 tons of debris showered down from West Texas to southwest Louisiana.

Under international treaty, NASA would have paid compensation for damage or injuries caused in other countries. But if the satellite had caused damage in a United States territory, "the harmed U.S. person would have no recourse under international law, but would have to sue the U.S. government under the Federal Tort Claims Act, which can be very difficult," said Mark J. Sundahl, a law professor at Cleveland State University.

NASA satellites receive considerably more attention when they come back to Earth than other debris of similar size. About one satellite five metric tons or larger re-enters the atmosphere every year. For example, on a test flight of its Falcon 9 rocket in June 2010, the Space Exploration Technologies Corporation placed the second stage and a prototype capsule into orbit. That object, comparable in weight to the Upper Atmosphere Research Satellite, came crashing back to Earth two and a half weeks later, close to the northeast coast of South America with hardly a media ripple.

The UARS satellite was launched in 1991 by the space shuttle Discovery and was decommissioned in 2005, when it was placed into a lower orbit so it would not cause any problems for the International Space Station.