AMPTE's last blast: Another comet made

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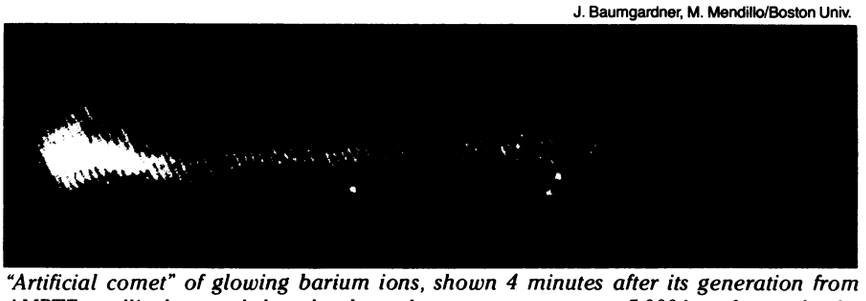

"Artificial comet" of glowing barium ions, shown 4 minutes after its generation from AMPTE satellite last week, here has been drawn out across some 5,000 km of space by the solar wind. (Bright spots are stars; parallel lines are early processing artifact.)

It was a gamble that paid off. Last Dec. 27, a group of scientists only minutes away from generating the first "artificial comet" ever produced in space decided that the stream of sun-spawned charged particles called the solar wind was coming on too fast. They were preparing to jettison four canisters of barium from a satellite in the border region of earth's magnetic field, in hopes that the solar wind would ionize the barium and drag it out into a huge "tail" like that of a comet. That had been the plan all along, but because the onrushing "wind" raised the threat of destroying the comet before it could fully develop, principal investigator Gerhard Haerendel of the Max Planck Institute in Munich decided to expend only two canisters, leaving a second pair for another shot later on. Both comets would be less dense than desired, but at least there would be two chances to try.

The first comet worked (SN: 1/5/85, p. 6), but the second, released late on July 17 (July 18 at the control center in Germany), worked even better. The solar wind was traveling barely half as fast as it had the first time, and the comet, says Michael Mendillo of Boston University, seems to have lasted about twice as long, developing an ionized purple tail of barium covering thousands of kilometers.

Scientific measurements of the phenomenon were provided by the German satellite that had released the barium, as well as by a U.S. satellite monitoring signs of any barium ions that might get inside earth's magnetic field. A British satellite that had monitored the first comet from a location near the German probe had since malfunctioned and thus could not help, but earth-based observers recorded the whole show from sites in Peru, Texas, Arizona and California, as well as from an instrumented Argentine 707 jet.

The researchers are now analyzing their diverse results, including unanswered questions raised by the first comet. Both earth-based and satellite data have indicated, for example, that ions in the first comet's tail did not simply go with the flow of the solar wind, as had been expected. One image from Boulder, Colo., says Mendillo, showed an elongation of the barium cloud that was actually at right angles to the flow. "The acceleration," he says, "was absolutely not in the direction predicted."

Meanwhile, though the project called the Active Magnetospheric Particle Tracer Explorers (AMPTE) has finished its comet-making, its two surviving satellites will continue their studies in space.

One mishap associated with the project was the destruction of NASA's Galileo II airborne observatory (no relation to the forthcoming Jupiter-bound spacecraft of the same name). The heavily instrumented Convair 990 jet had been used to study targets from Comet Kohoutek to terrestrial monsoons since the agency acquired it in 1973, and had photographed AMPTE's first artificial comet in December. On July 17, it was rolling toward a takeoff from March Air Force Base near Riverside, Calif., to photograph the second one from a route over the Pacific Ocean when it blew a tire. Fuel from a leak or puncture somehow connected with the blowout (an investigation is in progress) ignited, and the plane, still on the ground, was lost. The 15 scientists and four crew members all escaped without injury, evacuating the craft within 30 seconds.

Galileo II had been acquired following the destruction of its predecessor, Galileo I, in a 1973 midair collision with another aircraft. Replacing it, said one NASA official a day after the fire, will take at least nine months.

The next artificial ion-clouds-in-space project in the works, now planned for launching by the space shuttle in 1987, is the Combined Release and Radiation Effects Satellite (CRRES), which brings together the goals of two separate NASA and Air Force projects that had been cancelled. Carrying 48 canisters of barium, lithium, strontium, sulfur hexafluoride and other materials, CRRES will be used in tests ranging from the generation of electron-free "holes" in the ionosphere to the triggering of auroras. After conducting most of its ion releases for NASA at a relatively low altitude (350 km), the satellite will be boosted to a much higher level, in part for Air Force studies of radiation effects on microcircuits. —*J. Eberhart*

EPA approves compound 1080 for collar use

In a move that has aroused the ire of some conservationists, the Environmental Protection Agency (EPA) last week approved the pesticide sodium monofluoroacetate, or "Compound 1080," for use in special "livestock protection" collars. The collars, to be worn by sheep, goats and other livestock, are designed to control coyotes that prey on such animals.

Compound 1080 has been banned since 1972 because of evidence that it could accidentally kill animals other than coyotes, including endangered species and human beings. But the collar, according to EPA, is a "more selective way" to use the compound, "controlling only those coyotes that prey on livestock." Since coyotes normally kill their prey with bites to the throat, they are expected to receive fatal doses of the compound when their teeth puncture the rubber collar's reservoir containing the compound.

Conservationists say they are concerned with difficulties in controlling the pesticide, such as secondary poisonings. "One of our concerns is with the 1080 dribbling down a sheep's neck after the coyote's killed it," says Susan Hagood of the Washington, D.C.-based Defenders of Wildlife. "Out there in the wide-open spaces you can't control how much 1080 gets consumed by nontarget scavenger species, like golden eagles, vultures or crows." However, EPA spokesperson Al Heier says, "since the amount used in the collars is . . . a low concentration, we think the Compound 1080 will only affect the coyotes and wild dogs."

Hagood, who estimates that one teaspoon of the compound in powdered form could kill 30 to 100 people, says she's also concerned that ranchers, once they obtain the collars, could easily extract the poison in order to engage in the illegal practice of lacing bait carcasses and placing them out on the range. This was common practice before the 1972 ban, but only employees of the Fish and Wildlife Service — and not ranchers — were legally authorized to use the poison in this way. EPA, however, says it will not let the ranchers use the collars unless they are specially trained and certified in the product's proper use and disposal, 3 feet underground and one-half mile from human habitations or water. "We're concerned about illegal uses too," says Heier, "and that's why the regulations are written so that it's a federal offense to extract the poison."

Says Dick Randall, a Wyoming-based representative of Defenders of Wildlife, "You can put all the regulations you want on paper, but we're talking about millions of acres with no one looking over your shoulder." Randall has been collecting information on illegal poisonings with 1080 and other substances in Wyoming, Utah and Colorado. —*J. Mathewson*