

Operation Morning Light



A microwave ranging transponder unit is placed under a landmark. The distance limitations of the units meant constant movement was necessary as the search moved along the footprint.



Team members, dressed in specially designed arctic clothing, begin the painstaking process of searching the area with hand-held radiation detectors.

Introduction

In the pre-dawn hours of January 24, 1978, a Canadian Mounted Police corporal located in Hay River, in the Canadian Northwest Territories, reported a meteor sighting. One hundred and twenty-five miles north, in Yellowknife, a night janitor reported mysterious lights streaking across the darkened sky. What these eye-witnesses actually saw was the re-entry of the Soviet satellite Cosmos 954 into Earth's atmosphere.

Background

Cosmos 954 launched into orbit on September 18, 1977. The satellite was designed to cover the world's oceans at a 150-mile high orbit. The cylindrical satellite weighed approximately 4.4 tons and contained a nuclear reactor to generate power. Although it did not pose an explosive danger, the reactor produced radioactive isotopes, including strontium, cesium, and iodine.

The North American Aerospace Defense Command, the organization that tracks all the satellites and debris orbiting in space, first noticed Cosmos 954 slipping in its orbit soon after its launch - a potentially dangerous situation that might result in an impact with Earth. Acting on this information, the U.S. National Security Council directed the U.S. Department of Energy (DOE) to take operational control of emergency response efforts in the U.S. and place its nuclear emergency response capabilities on alert.

Preparing for impact

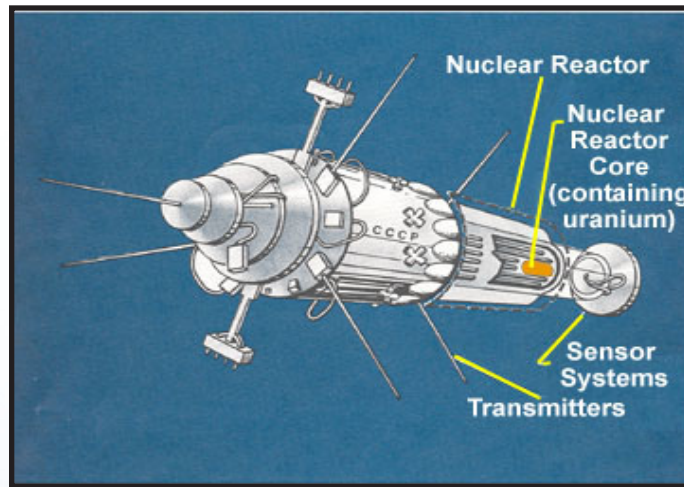
Team members from the DOE Nuclear Emergency Support Team (NEST) began preparing to deploy

to the point of impact from locations in Las Vegas, Nevada; Fairfield, California; Washington, D.C., and Albuquerque, New Mexico.

DOE nuclear response capabilities include the world's leading scientists, engineers and technicians. NEST is deployed to locate and identify nuclear materials, assess suspected nuclear devices, render safe procedures in recovery of nuclear devices as well as packaging and transport of devices to disposition locations. Team members were prepared to deploy on two hours notice.



When re-entry occurred over Canada, U.S. President Carter contacted Canadian Prime Minister Trudeau to offer specialized U.S. capabilities in locating and isolating the errant satellite and its radioactive byproducts. The American response team, under the direction of the Nevada DOE manager, arrived in Canada on January 24, 1978 and reported to the Canadian Forces for assistance in recovery efforts code named 'Operation Morning Light.' By January 28, NEST members were in Yellowknife awaiting deployment to satellite debris locations.



Artist rendition of the Soviet Cosmos 954 satellite.

Recovery

Field operations in the Canadian Northwest Territories largely consisted of joint Canadian-American airborne radiation surveys, local area helicopter radiation surveys, ground search and recovery operations, and airborne logistical support during the winter and spring of 1978. A 500-mile long 'footprint' pinpointing the area of fallen debris was identified and field crews began the arduous task of recovering the debris along the vast, frozen area.

Based on computer calculations, two characteristics of satellite debris were identified:

- A number of beryllium cylinders, rods and products separated from the nuclear reactor in the satellite
- The reactor core, which began to disintegrate over a range of 310 miles, would result in small radioactive particulates scattered over a wide area

Actual debris was located in four areas in the Northwest Territories. Plates, disks, rods, and other objects with radiation levels measuring from one to 200 roentgens/hour were recovered. Approximately 100 radiological objects, ranging in size from particles to large pipes, were collected.

Scientists could not collect the microscopic radioactive fission products that resulted from the reactor core disintegration upon re-entry into Earth's atmosphere. A survey conducted in the Great Slave Lake area of the Northwest Territories revealed elevated background radiation caused by the widely dispersed matter from the reactor core. Both Canadian and U.S. experts concluded that any health hazard created by the remaining particulate matter was minimal and would decrease with time. The team recovered more than 90% of the radioactive material in the reactor inventory.

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