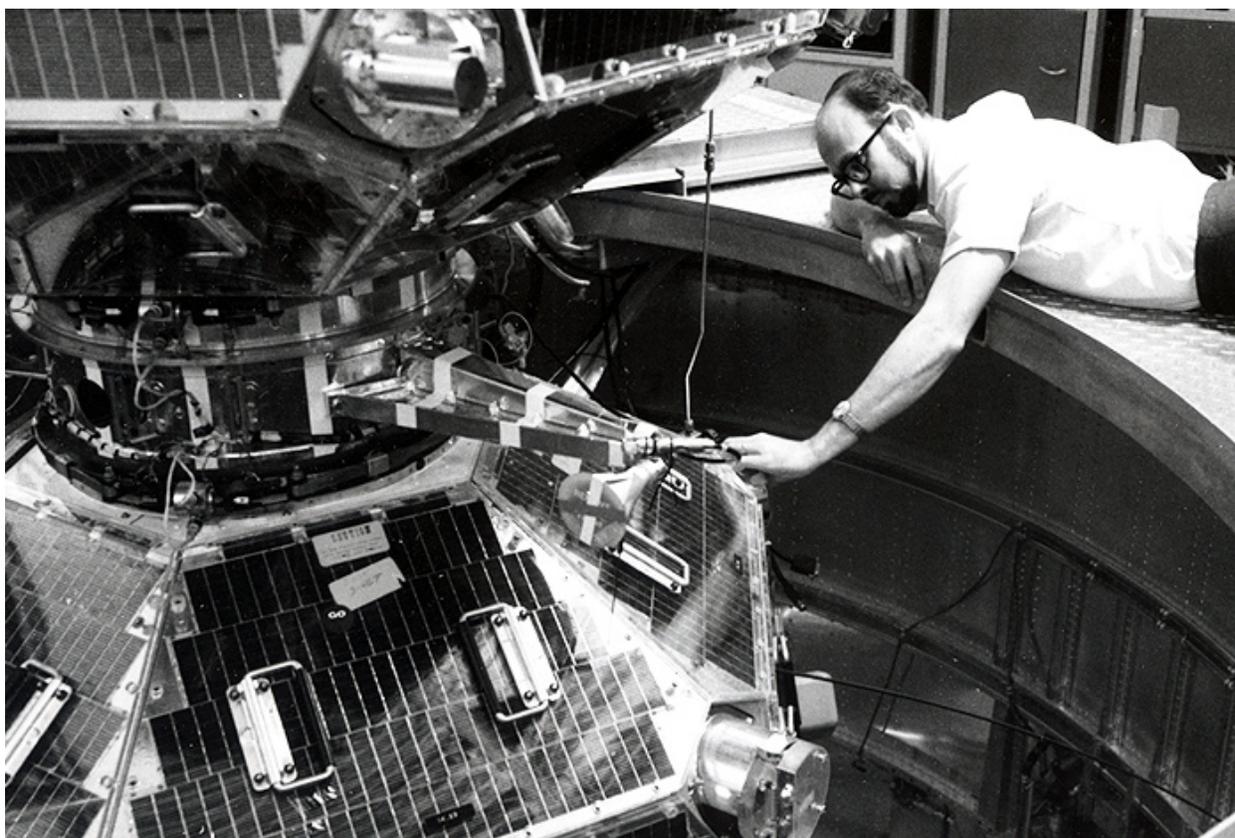


A golden anniversary for space-based treaty verification

October 22, 2013



Los Alamos celebrates 50-year anniversary of launch of first pair of ‘Watchmen’

LOS ALAMOS, N.M., Oct. 22, 2013—Fifty years ago this month, Los Alamos National Laboratory sensor technology lifted off into space to help verify that world Superpowers were abiding by the newly signed Limited Test Ban Treaty—a pledge by the United States, the former Soviet Union and the United Kingdom to refrain from testing nuclear weapons in the atmosphere, underwater or in space.

“For the past 70 years, Los Alamos National Laboratory has serviced the country and provided technical solutions to the some of biggest national security challenges facing the nation,” said Terry Wallace, Principal Associate Director for Global Security at Los Alamos. “On October 4, 1957, the Soviets launched Sputnik, an event that changed the world. Space became a national-security concern; Los Alamos played the key role

in providing a space platform to monitor nuclear weapons testing and treaties, and 50 years later the lab still has this role.

“As we celebrate our golden anniversary of space-based treaty verification, we remember not only our successes in our mission, but also how this mission has enabled scientific discovery,” Wallace said. “Without a focus on national security, we could not continue to produce cutting-edge science; without our commitment to scientific excellence, we could not succeed in our mission. It is this synergy that makes Los Alamos a truly unique national treasure.”

The first pair of Vela satellites launched on Oct. 17, 1963, just one week after the three nations had signed the historic treaty, and barely a year after the U.S. and Soviet Union had faced an extremely tense nuclear standoff during the Cuban Missile Crisis. With the launch of Vela—an abbreviated version of *Velador*, a colloquial New Mexican word for “night watchman”—a dangerous era of accelerated atmospheric and space-based nuclear weapons testing by the U.S. and Soviet Union subsided, thanks to collaboration between Los Alamos and Sandia national laboratories. One year later, China detonated its first nuclear weapon, underscoring the need for enhanced vigilance in a rapidly changing world.

The success of the Vela program marked the beginning of an enduring space-based treaty verification system that continues to enhance security for America and the rest of the world. Vela’s sensors focused on basic detection of electromagnetic- and energetic-particle emissions associated with open nuclear weapons detonations. But they also enabled serendipitous discoveries of remarkable natural phenomena such as cosmic gamma-ray bursts, X-ray novae and solar wind composition. Modern space-based verification systems rely on sophisticated sensors that have not only helped keep the peace, but also continue to help explain the origins of poorly understood natural events such as terrestrial lightning.

During the past 50 years, some 200 space vehicles have been launched with Los Alamos payloads aboard. Many of these support on-going treaty-monitoring missions, while others are experiments designed to push the boundaries of what is considered state-of-the-art. Notable Los Alamos experimental missions include:

- ALEXIS, the Array of Low-Energy X-ray Imaging Sensors, was Los Alamos’s first homemade satellite. Launched in April 1993, this small craft demonstrated and tested new X-ray and radio sensing technology. The satellite was controlled from inside a small room at the Laboratory and remains aloft today.
- The FORTÉ, Fast On-orbit Rapid Recording of Transient Events, satellite, launched in August 1997, was a satellite test-bed for nuclear-detonation-detection technologies. Weighing less than 500 pounds and built of graphite-reinforced epoxy (the first of its kind to go into space), the small, long craft was essentially an antenna attached to a capsule-shaped array of solar panels, giving the satellite a distinctive fish-skeleton appearance. The satellite was lauded by *Discovery* magazine as one of most innovative advancements in aerospace technology, and it explored a 30-year problem of discriminating between electro-magnetic pulses (EMPs) caused by nuclear explosions and those caused by other natural or manmade sources.
- The Cibola Flight Experiment, launched in March 2007, tested eight new technologies—among them whether a specially designed supercomputer could survive the rigors of space. Because spacecraft are constantly bombarded by

high-energy particles trapped in Earth's magnetic field, computers and computer equipment can fail in the harsh environment. Moreover, high-powered computing requires a lot of energy, yet space travel requires low weight and small packages. Cibola's supercomputer is testing new power sources and new strategies for hardening crucial computer components as well as new treaty verification technologies.

- In December 2010 Los Alamos scientists launched four satellites known as "cubeSats," each of which is tiny enough to be held in a human hand. These unique craft, part of the Perseus Program, demonstrated the ability to quickly build and launch a useful, low-cost satellite. They also helped validate a Los Alamos design methodology of using simple, off-the-shelf components to accomplish a specific mission. The tiny spacecraft showcased communication- and data-collection capabilities, as well as a major new space capability for the Laboratory.

In addition to these missions, Los Alamos space technology deployed on scientific satellites has helped scientists worldwide determine the elemental composition of the surface of the moon, including the presence of water; understand the structure and dynamics of the Van Allen radiation belts; characterize the moons of Saturn; study the origin of gamma ray bursts and supernovae; and, most recently, with key instruments aboard the Curiosity Rover, help characterize the Martian landscape.

"The capabilities and technologies we have developed and demonstrated in support of our treaty verification mission have also found wide application in basic space research, enabled our participation in multiple NASA projects and led to a number of important discoveries," said Kevin Saeger, leader of Los Alamos's Intelligence and Space Research Division. "It's a source of great pride to ISR Division employees to be able to support national security and at the same time participate in the human quest for greater knowledge and understanding of the universe."

An exhibit that includes highlights of Los Alamos National Laboratory's 50 years of space-based treaty verification, starting with Vela, is on display at U.S. Department of Energy Headquarters in Washington, D.C. The exhibit will next go to the U.S. Air Force's Space and Missile Systems Center in Los Angeles, and later to Patrick Air Force Base in Florida, key partners in the national program for space-based nuclear detonation detection.

Los Alamos is featuring achievements from the past 50 years in space throughout the month of October on its [Internet home page](#).

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