

## Sounding Rockets Carry Science Into Space

By William G. Schulz  
Smithsonian News Service  
WHITE SANDS MISSILE RANGE, N.M. — A round burst of fire, followed by the deep thunder of a sonic boom, recently marked another rocket launch at this Defense Department test facility, a flat expanse of desert that sprawls north 100 miles from the city of Las Cruces.

This launch, however, was not involved with the nation's defense. It was a NASA sounding rocket, which, for five precious minutes in space, allowed an onboard telescope to capture unique X-ray images of the sun.

Approximately 30 times a year, the National Aeronautics and Space Administration launches sounding rockets, many from the White Sands facility. Other nations with sounding rocket programs include Great Britain, Australia, Canada, Brazil and the Soviet Union.

About 15 different rockets — names like Nike, Taurus and Aires — make up the NASA sounding rocket fleet. The name "sounding" is taken from the nautical "sound," which means to take measurements from the sea. Sounding rockets take measurements from the upper atmosphere and beyond.

On this particular occasion, a Terrier Black Brant sounding rocket carried the specially designed telescope for Dr. Leon Golub, an astrophysicist at the Smithsonian Astrophysical Observatory in Cambridge, Mass. With this and other launches, Golub hopes to

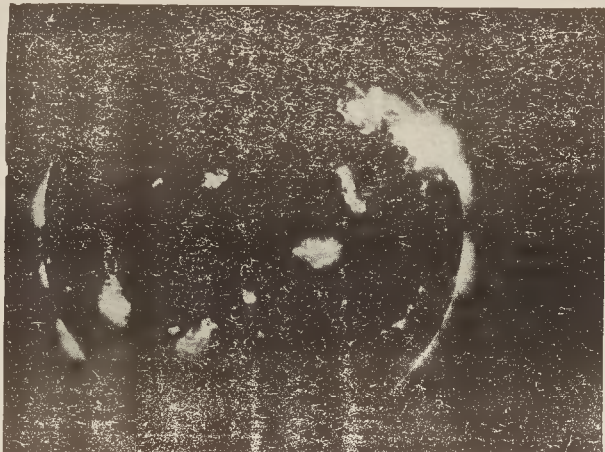
compile detailed X-ray images of the solar corona and learn more about processes that occur in this turbulent, outer layer of our sun.

Golub's research continues the Smithsonian's historic involvement with the development and use of sounding rockets. The idea for these rockets in the United States began with physicist and rocket pioneer Dr. Robert Goddard, says Frank Winter, a curator in the space history department at the National Air and Space Museum in Washington, D.C. In 1916, Goddard approached the Smithsonian Institution to fund his research.

Three years later, the Smithsonian issued Goddard's report on solid-fuel rockets, "A Method of Reaching Extreme Altitudes," which established his reputation as a rocket pioneer. Goddard's early days are recounted in a new book by Winter, *Rockets Into Space*, published in 1990 by Harvard University Press.

To obtain funding for his research, Goddard knew that he needed first to sell the idea of studying the upper atmosphere with rockets. "Politically, it was easier for Goddard to sell this idea," Winter says, "because the idea of space flight was just too way out at that time."

Goddard's contact at the Smithsonian was Dr. Charles Greeley Abbot, then assistant secretary of the institution and director of the Smithsonian Astrophysical Observatory. Abbot championed Goddard's work because of his own keen interest in studying



Smithsonian News Service Photo courtesy SAO/IBM Research

A telescope flown above New Mexico, aboard a NASA sounding rocket, captured this X-ray image of the sun. The picture was taken during a solar eclipse in July 1991. The X-ray data are part of a study of the sun's corona by the Smithsonian Astrophysical Observatory in Cambridge, Mass.

"meteorological problems" such as the composition and temperature of the upper atmosphere as well as phenomena of solar physics, Winter says. Balloons could not fly high enough for this work.

Later, Goddard obtained research funds from other organizations, including the U.S. Weather Bureau and the Carnegie Institution. These organizations added collecting air samples, studying cosmic rays and measuring magnetic intensities to Abbot's list of phenomena that sounding rockets might be used to explore.

Ultimately, Winter says, Goddard's career was spent developing liquid-fuel

propulsion systems for rockets. He did launch one rocket in 1929, which carried two small instruments aboard but also ruptured its gasoline fuel tank upon landing. Big leaps in modern rocketry did not happen again until the 1940s, especially by the end of World War II when Germany had developed the large-scale V-2 liquid-fuel rocket. After the war, the United States captured Germany's V-2s. Moreover,

Germany's rocket scientists were brought to America where they helped build the country's space program.

Today, NASA operates a sounding rocket program from its Wallops Flight Facility on Wallops Island, Va. "It's not glamorous, but it's a very useful program for the dollar," Warren Gurkin, head of the NASA program, explains.

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Smithsonian News Service Photo by William Schulz

A control room at the White Sands Missile Range in New Mexico hums with activity before the launch of a sounding rocket. Here, Wendy Bedey — dubbed "the counsellor" because she conducts countdown-to-launch and fires the rockets — checks a control panel before sending Smithsonian, IBM Research telescope into space.

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