

NASA News

P78-10061

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release:

Nicholas Panagakos
Headquarters, Washington, D.C.
(Phone: 202/755-3680)

IMMEDIATE

Peter Waller
Ames Research Center, Mountain View, Calif.
(Phone: 415/965-5091)

RELEASE NO: 78-58

NASA REVIVES INSTRUMENT ON SATURN-BOUND PIONEER

A scientific instrument aboard Saturn-bound Pioneer 11, designed to measure the flow of the solar wind, is operating again after lying dormant for three years.

The solar wind detector seems to be in good shape in time for use when the spacecraft encounters the ringed planet next year to take closeup pictures and make other first-time measurements.

-more-

(NASA-News-Release-78-58) NASA REVIVES
INSTRUMENT ON SATURN-BOUND PIONEER (National
Aeronautics and Space Administration) 4 p



N78-75653 1978

Unclas
00/15 13549

The solar wind instrument had been inoperative since 1975, despite scientists' repeated efforts to revive it. Experimenters have now completed an exhaustive checkout program on the instrument and are confident it is working properly.

The solar plasma analyzer maps the flow of the million-mile-an-hour solar wind -- the streaming gas of ions and electrons which continuously flows out from the Sun across the solar system. The instrument will provide important information about the interaction of solar wind particles with Saturn and its mysterious rings. Investigators will compare these data with data gathered by the instrument three years ago when Pioneer 11 swung around Jupiter.

The instrument operated properly during Pioneer 11's 21-month, billion-kilometer (620-million-mile)-journey from Earth to Jupiter, which it reached in December 1974. The spacecraft then flew up around Jupiter from pole to pole, using the planet's enormous gravitational field to help propel it high across the solar system on its way to Saturn -- 160 million km (100 million mi.) above the orbital planes of most of the planets. The instrument ceased operation shortly after Jupiter encounter.

Then in October 1977, after exhaustive analyses of the instrument and the sending of a variety of commands to the instrument, none of which had worked, investigators decided to send radio commands to turn on the instrument's high voltage power source in an attempt to "thermally shock" the output circuits into operation. The effort apparently worked. Thirty-six days later, NASA tracking stations reported the first transmission of data in nearly three years. Since then the solar wind instrument has responded to all radio commands and appears to be in good working order for the Saturn encounter.

As Pioneer 11 approaches Saturn, it will slowly descend from a high arcing trajectory that enabled it to see phenomena from 160 million km (100 million mi.) above the plane of the ecliptic (the plane in which the Earth circles the Sun). This distance would measure 17 degrees above the solar equator as seen from the Sun and is the highest above the ecliptic that any spacecraft has ever flown. Pioneer 11 is presently traveling through this uncharted space dominated by the solar wind.

An important recent finding of Pioneer 11 is related to the character of the Sun's magnetic field.

It appears the Sun has a simple dipole field as viewed from the perspective of the interplanetary medium far from the Sun. That is, it has a relatively simple north pole and south pole configuration (a dipole) similar to Earth's, at least at this phase of the solar cycle. Scientists now believe this finding of a dipole field is a basic discovery which may apply to virtually every star in the universe. Ground-based observations indicate that the solar fields on the Sun's surface are normally quite complex even when viewed with coarse spatial resolution.

The trajectory of Pioneer 11 on its way from Jupiter to Saturn carried it through an electrical "current sheet" and into the Sun's northern magnetic hemisphere. NASA investigators discovered that this current sheet weaves through the solar equatorial plane like a warped disc and divides the spherical space around the Sun (the heliosphere) into roughly even northern and southern magnetic hemispheres. This heliosphere is the region filled by the solar wind surrounding the Sun and extending far beyond the Earth, at least as far as Pioneer 11 has measured in its odyssey through our solar system.