aerospace

ASTROPHYSICS

Galactic Lyman Alpha radiation measured

Measuring the characteristic Lyman Alpha radiation from hydrogen gases in the Milky Way and other galaxies has long been a difficult task—an impossible one with any accuracy. This is because the hydrogen in earth's geocorona, the largely hydrogen gas cloud that surrounds the earth, produces its own Lyman Alpha radiation to confuse the matter. The geocorona extends out some 40,000 miles, so most satellites have not been able to make measurements from beyond it.

The fifth satellite in the Orbiting Geophysical Observatory series has finally done so, thanks to an orbit which carries it more than 88,000 miles from earth. The probe was launched March 4, 1968.

Using data taken from outside the geocorona, scientists from the University of Paris have been able to correct measurements from lower satellites to determine how much radiation comes from the geocorona itself and how much from outer space.

The result, so far, is a Lyman Alpha chart for half the celestial sphere. By December, the remaining half should have been covered, providing the first full chart known to be free of the effects of the geocorona.

INSTRUMENTATION

Remote sensors to be catalogued

The myriad scientific instruments that could be used on flyby studies of the outer planets will be compared and catalogued for the National Aeronautics and Space Administration by the Space Division of North American Rockwell Corp. in Downey, Calif.

Most of the year-long project will be done with no restrictions as to type of spacecraft, mission, weight, on-board power or compatibility for integration. Part one of the study will be a straightforward compilation of data to be gathered and the available instruments. Part two will be an estimate of how the instruments and their support requirements will evolve with technology, and part three will compare trade-offs of different instruments in hypothetical missions.

REMOTE SENSING

Air pollution measured from afar

An unmanned balloon carrying two specially designed spectral analyzers has made what are reported to be the first measurements, made from above almost all of earth's atmosphere, of the air-polluting gases below. The NASA-sponsored project is a step toward doing the same thing from orbiting satellites.

Launched from the Dowagiac, Mich., airport, the 200-foot-wide, helium-filled balloon was able to map the air column in a swath 10 miles wide across northern Indiana, Chicago, northern Illinois and part of Lake Michigan. The heart of the balloon's 500-pound payload consisted of two correlation spectrometers, developed by Barringer Research Inc. of Toronto, to measure sulfur dioxide and nitrogen dioxide, two major industrial pollutants, from 22 miles up.

The instruments work by measuring the intensity of the spectrum of the selected gas, and translating it directly into a gas concentration between the instrument and the earth's surface, which is the source of the reflected sunlight that provides the spectrum. Since most of the atmosphere is concentrated in the mile closest to the surface, the total pollutant concentration primarily reflects this region.

SATELLITE COMMUNICATIONS

Direct TV for India

The first mass test of direct television broadcasting by satellite has been scheduled to carry instructional programs to some 5,000 villages in India for up to a year.

The experiment, which will transmit programs directly to village receivers without the need for relay stations on the ground, is scheduled to begin in 1972, following the launch of the sixth Applications Technology Satellite. ATS-F will be placed in a synchronous orbit over the equator and will be available to India while U.S. and other experimenters conduct scientific experiments.

India will transmit the programs from an experimental ground station that already exists at Ahmedabad on the country's west coast. The direct broadcasts will be made possible by a more powerful transmitter and a large, accurately steerable antenna on the satellite; it will have, for example, more than six times the power and twice the antenna gain of ATS-3.

The just-signed agreement between NASA and India follows several years of preparation, including United Nations evaluation and a conventional TV broadcasting plan that has been operating in 80 villages around New Delhi for almost three years to test the effectiveness of the programming (SN: 8/16, p. 136).

SELENOLOGY

Solar blast and lunar glass

A giant outburst of radiation from the sun, in geologically recent history, glazed some areas of the moon's surface and created some of the glassy material reported by the Apollo 11 astronauts (SN: 9/6, p. 176), believes Cornell University astronomer Thomas Gold.

The glassy patches, studied in photographs taken by the astronauts, invariably occurred in the middle of little craters in the two-to-four-foot size range, according to the astronauts' descriptions. Such locations would have been ideal for melting from exposure to intense radiation, Prof. Gold says; if the sun was responsible, he theorizes, it must have flared up to 100 times its present intensity.

The outburst must have lasted only from about 10 to 100 seconds, however, the scientist maintains, because the glazed coating is so thin. Also, it must not have happened more than 100,000 years ago, as there has been time neither for micrometeoroid impacts to destroy the glaze nor for the lunar soil to move enough to cover it up.

It is unlikely that the glazes resulted merely from the impacts which formed the craters in which they were found, Prof. Gold adds, since many of them are frail structures which would not have survived the explosive impact.