

Will Nimbus G be Fishsat A?

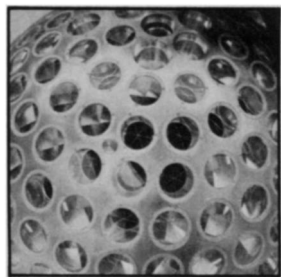
Following indications that the Landsat earth-resources satellite has been able to detect chlorophyll concentrations indicative of promising fishing grounds (SN: 1/17/76, p. 41), researchers are working to see whether the advanced sensors planned for the 1978 Nimbus G satellite can be used to monitor ocean productivity on a large scale.

Last year, scientists from the National Oceanic and Atmospheric Administration, Scripps Institution of Oceanography, NASA and the Environmental Research Institute of Michigan studied spectral characteristics, scattering, particle concentrations and chlorophyll-a distribution of the water off the southern California coast. They used buoy-mounted instruments to take measurements 1 and 6 meters below the surface, and aircraft to take readings from 3,000, 12,000 and 65,000 feet up. Now Scripps researchers, under a \$170,000 NOAA contract, are analyzing the data to see how well the characteristic spectral "signature" of chlorophyll-a is likely to hold up when observed from satellite heights.

The concentrations of chlorophyll observed by Landsat were quite large and relatively easy to detect. The Nimbus G planners need to know whether a more sophisticated version of Landsat's multispectral sensing can spot concentrations as small as 0.1 microgram per liter, considered to be the lower limit, by fishing standards, of "productive waters." Also, says Dennis Clark of the NOAA team developing the Nimbus G "coastal-zone color scanner" (the chlorophyll sensor), there are "very encouraging" signs that the chlorophyll-a concentration at or near the water's surface gives a representative indication of the mean concentration in the water column beneath. Chlorophyll-a is sought as a productivity indicator because it is found in phytoplankton which are at the beginning of the ocean food chain, and thus can mark potential fish-feeding grounds.

LAGEOS is in orbit

The first LAGEOS (LAsER GEodynamic Satellite) was launched into a near-perfect orbit on May 4, where it is expected to provide data on geophysical phenomena such as continental drift for decades to come and to stay aloft for millions of years.



The 903-pound, 60-centimeter-diameter sphere is covered with 426 reflectors designed to send back laser pulses from earth so that accurate timing of the pulses' journey can be used to measure changes in the relative positions of various points on the planet's surface. The achieved orbit has an inclination of 109.8° (versus 110° planned), and ranges from 5,845 kilometers above

the earth (versus a planned 5,891) to 5,940 kilometers (versus 5,900). The time for a single circuit of the earth is right on the money at 225.5 minutes. Precise knowledge of the satellite's orbital characteristics are necessary to enable proposed calculations of distance changes as small as a few centimeters.

High above even the fringes of the atmosphere, the dense satellite is expected to stay in orbit for as long as 10 million years, and it carries a message (SN: 4/17/76, p. 248) in case far-future generations should find it. The operational life of the probe is expected to be much shorter—possibly decades or a few centuries—because of solar radiation and space dust degrading the reflective qualities of the mirrors. An accelerated test at the NASA Marshall Space Flight Center, representing 50 years of solar irradiation (but no space dust), showed "no detectable degradation."

MAY 22, 1976

Ups and downs of Soviet exchange

Scientific exchange programs with the Soviet Union so far have not resulted in any major volume of technology transfer from West to East, concluded a panel of experts meeting at Stanford University earlier this month. But, they said, the Russians may acquire more American technology in the future through expanded trade, and American priorities should shift toward improving relations with other European countries.

The exchange program has been attacked in this country by those fearful of giving away trade secrets and by those who want to use such programs as a lever to change Soviet society. Caltech professor John Baldeschweiler says the Russians also have legitimate fears of losing hard-earned discoveries, since U.S. firms may be able to exploit them more quickly commercially. Certain Soviet-developed chemical catalysts have met such a fate, he said.

George Hammond, the foreign secretary of the National Academy of Sciences, said that the Academy's exchange program has been under "severe attack" for "failing to effect change in Soviet policy." U.S. funding for the program is being cut, he added, creating credibility problems with Moscow.

The assistant administrator at NASA for international affairs, Arnold Frutkin, said that even with the dramatic Soyuz-Apollo linkup, "darn little's been done" on technology transfer. Emphasizing that he was speaking for himself and not necessarily for his agency, Frutkin said the Soviets favored the joint space linkup because it "presented the appearance of parity" after the early U.S. achievements on the moon.

As international scientific cooperation grows around the world, Russian scientists are apparently becoming more restive in their isolation. The Soviet Academy of Science is in "considerable turmoil," said Frutkin. "These people want to get out in the world and meet their colleagues."

'Fleeced' researcher fights back

Senator William Proxmire (D-Wisc.) has been giving monthly "Golden Fleece" awards for a little over a year to research projects that he thinks are the biggest waste of the taxpayers' money (SN: 3/15/75, p. 165). Now, one of the scientists thus ridiculed, who says he has lost some grant support because of the incident, has decided to fight back. The May SCIENCE AND GOVERNMENT REPORT says that experimental psychologist Ronald Hutchinson is suing Proxmire and a staff assistant, Morton Schwartz, for libel—to the tune of \$6 million.

When Hutchinson was director of research at Kalamazoo (Mich.) State Mental Hospital, studying stress response in rats, monkeys and humans, Proxmire issued a press release saying: "The good doctor has made a fortune from his monkeys and in the process made a monkey out of the American taxpayer." Generally such statements are not subject to libel suits because a member of Congress has legal immunity in connection with his official duties. But Hutchinson says Proxmire subsequently discussed the award on radio and TV talk shows, and thus can be sued.

University R&D spending up

The National Science Foundation has announced that separately budgeted R&D spending by universities and colleges totaled \$3.4 billion in 1975. This represented a 12-percent increase over the previous year; but in constant dollars, the increase was only two percent—following a five percent decline in 1974. The increase was primarily due to a 17-percent increase in Federal funding for the life sciences, reflecting the release in 1974 of \$150 million of impounded funds.

331