

A PEOPLE SATELLITE

Education, health care and rural development are major tasks of ATS-F

by Jonathan Eberhart

In Fredonia, N.Y., a teacher-trainee asks for clarification of a chart on an easel at the University of Kentucky. A doctor in Tanana, Alaska, examines a patient 130 miles away in the tiny village of Galena (pop. 425). Village farmers in rural India gather in a hut to study irrigation techniques being demonstrated hundreds of miles away in Ahmadabad.

These are all among the jobs planned for ATS-F, the closest thing yet to a community service satellite.

Set for an early June launching, it will be the sixth in NASA's Applications Technology Satellite series, a program of orbiting test-beds for trying out ideas for the future. Although only two of the series have been completely successful (numbers two and four suffered launch vehicle failures; number five got into the wrong orbit), they have proven the feasibility of a wide variety of techniques and devices. The "spin-scan" camera tested for weather photography on ATS-1 led to the imaging photopolarimeter that gave earthlings their first close look at Jupiter from Pioneer 10 last December (including the SCIENCE NEWS Photo of the Year). The electric rocket engine, or resistojet, that made tiny corrections to keep ATS-5 facing the right direction will lead to future engines that can maintain a small thrust for years on unmanned flights to other planets.

ATS-F (NASA doesn't like to number its satellites until they're safely in orbit), by contrast, is aimed much closer to home. It has its space-oriented experiments too, such as a refined electric rocket engine, but the emphasis is on a group of programs that could have major impact on education, health care and rural development. NASA's role is strictly technological, but a long list of Federal, state, local and foreign agencies have been working for years to plan the best use of what will be an unusually people-oriented satellite.

Most of the activity within the United States will be concentrated in three areas—Appalachia, the Rocky Mountain states and Alaska. Several kinds of programs are planned for each. The organizations involved all

stress that they will just be test projects, preliminary trials and so on, but many will last a full year and involve tens of thousands of people. The basic tool is two-way, live television, an idea that has been around for so long that it almost seems old hat, yet this will be the first time that it has been used on a large scale. The satellite's contribution is primarily the avoidance of the time, expense and difficulty of setting up land lines among such a diversity of often hard-to-reach places.

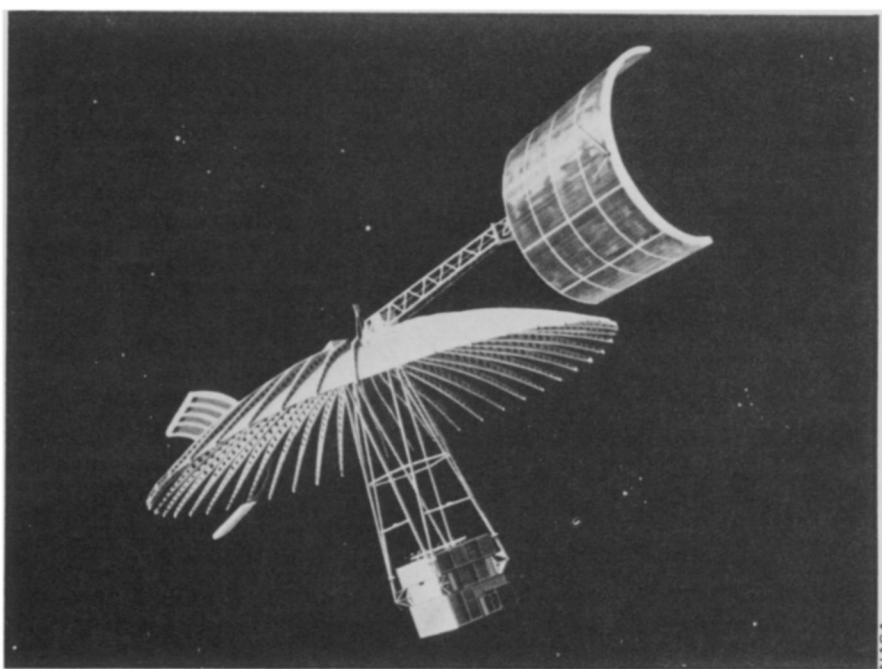
The Appalachian Regional Commission, for example, in 1971 asked 32,000 public school teachers from New York to Alabama simply what they felt they needed in their work. As a result, this summer the University of Kentucky plans graduate courses for elementary school teachers in both career training and the teaching of remedial reading. In each of five states—New York, Maryland, Virginia, Tennessee and Alabama—there will be a two-way satellite link in one city and a receive-only link (joined by two-way land lines with the main installation) in two others. There will be the usual pre-

taped lessons and programmed instruction, but the teachers will also be able to have live seminars and discussions, just as though they were in the same room—a glorified, and far more flexible, TV conference call.

This and other summer programs may have to start in something of a rush, however. The satellite was supposed to have been launched in April, and has been delayed twice in recent weeks by technical difficulties. "Everybody'll get in all right," says an ATS official at NASA, "but we're having some rescheduling to do."

A larger training program in career education will run throughout the regular 1974-75 high-school year. This one will consist almost entirely of two-way seminars, broadcast after school hours. There are even plans to enable individual discussions between a teacher and the University of Kentucky on the problems of particular children.

A more diverse use of the two-way capability will be the key to another Appalachian program, a medical service to be tried out in 10 Veterans Administration hospitals in Pennsylvania,



The 30-foot antenna of ATS-F will give a clear view from 22,300 miles up.

Virginia, West Virginia, North Carolina, Tennessee and Georgia. Although the ground stations in the hospitals will be able only to receive from the new satellite, they will use audio channels on ATS-3, launched in 1967 and still working, to complete the circuit.

Besides live seminars originating at the National Medical Audiovisual Center in Atlanta, there will be computer-assisted instruction (the satellites also handle computer data), "tele-consultation," allowing the VA doctors to consult with specialists at teaching institutions, and even full patient-case presentations and diagnosis. Stationary visual data such as X-rays and slides will be sent by slow-scan television, which is much less expensive than conventional wide-band TV, again using land lines for responses.

Students themselves will get a crack at the people satellite in a program developed by the Federation of Rocky Mountain States. Twenty-four junior high schools in rural communities with populations as small as 100 will be able to see and talk to one another and to the program's center in Denver. Another 32 schools will have receive-only terminals, as will a dozen TV stations in the Public Broadcasting Service.

A unique part of the Rocky Mountain experiment ought to be the envy of every teacher who has ever had to wait three months or more for a requisitioned movie or film strip. Called the Materials Distribution Service, it will provide catalogs of about 300 videotaped programs on a variety of subjects such as history and mathematics. The teacher has only to tell the catalog number of the desired tape to the Denver center, and it will be trans-

mitted through ATS-F to a videotape recorder in the school.

One-way communications are still important, since the satellite will be there anyway, and once a month the center will broadcast community-oriented programs on topics such as drugs, aging and health care to all 56 schools.

An important part of the Rocky Mountain test, and of the others as well, is to find out whether the people using it will accept it. Officials are almost uniformly optimistic, but there is the possibility that some of the users, particularly in rural areas, may resent the presence of so much overt technology in what is otherwise a people-to-people educational system. NASA has received letters, for example, from people who firmly believe that the Apollo moon landings never happened, that they were an elaborate hoax perpetrated through the technological flash of the Government and the media. An executive of IBM admits that "we still have employees who won't stay alone in a room with a big computer." Another factor is the very visibility of the two-way TV system, which is a constant reminder that both it and the satellite, sophisticated technology for most schools, cost money.

In Alaska, the way has already been partly paved by ATS-1, which handles voice communications between the Public Health Service hospital in Tanana and native "health aides" in 26 villages (SN: 7/8/72, p. 22). At the end of its first year, the program had already produced a 400 percent increase in the number of physician-health aide contacts, compared with the radio system which was sometimes out of contact for more than a week at a

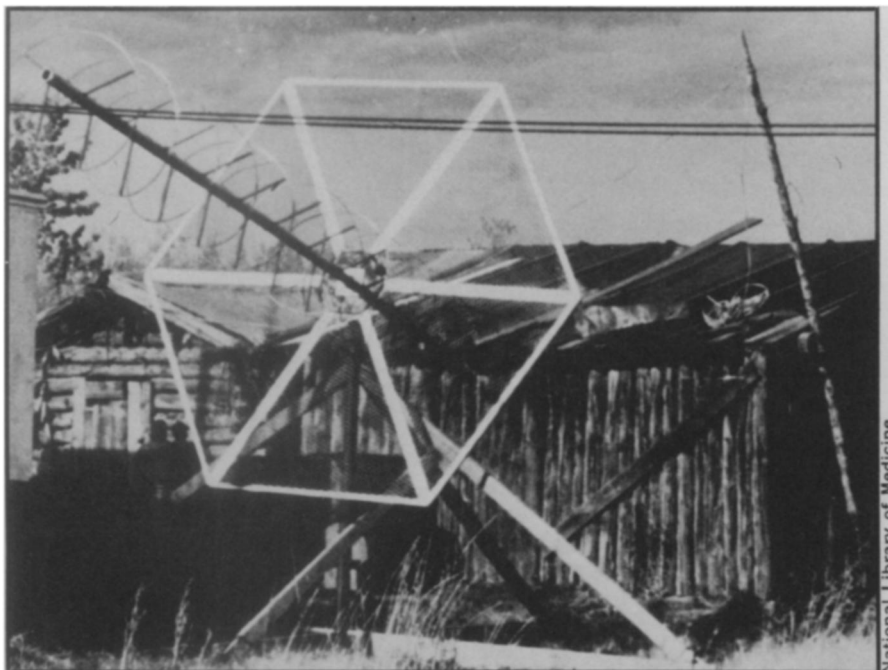
time due to terrain and climate.

ATS-F ground terminals will bring two-way video to four Alaskan sites (with video reception at a fifth) for consultations and diagnoses. For the sake of privacy both video and audio will be scrambled during the consultations. There will also be a variety of medical-training programs involving Alaska and the University of Washington in Seattle. A television series called "Alaska Native Magazine," covering areas of concern such as land claims and the impact of the Trans-Alaska Pipeline, will be broadcast in several native languages and English simultaneously, with built-in pauses for discussion and questions. The satellite will further be used to speed up the dissemination of news by relaying commercial TV network evening news programs, which at present are delayed from four to thirty hours in Alaska after they are broadcast in the contiguous states.

After ATS-F has been in orbit for a year, its motors will be reignited to move it from its position at 94 degrees west longitude over the equator to 35 degrees east longitude—a journey, at its 22,300-mile altitude, of more than 50,000 miles—within reach of India. There it will relay video and voice signals to a sprawling network of some 3,000 inexpensive community receivers in remote, rural areas throughout India. Programs will deal with food production, family planning, health, teacher training and occupational skills.

Besides all this television, ATS-F will explore a variety of other areas. One experiment is a precursor to future Atlantic air-traffic-control satellites. Aircraft flying the North Atlantic are at present assigned to a corridor 120 miles wide, and must follow at least 15 minutes apart. The future goal is a 30-mile corridor, with planes allowed to fly at mere five-minute intervals. In another test, ATS-F will track and relay data from a Nimbus weather satellite, working toward NASA's planned Tracking and Data Relay Satellite System (SN: 2/23/74, p. 125) which will do away with several earth-based tracking stations. Four experiments will explore different aspects of sending radio waves through the atmosphere, including the expansion of the unstable communications band up to 30 gigahertz, while a high-resolution camera will continue the ATS series' role as advanced weather-watchers.

ATS-F, like its predecessors, is technically a pathfinder for engineers. Beyond that, however, beyond the testing of new gadgets and the developing of new techniques, it stands to add a personal dimension to the communications satellite's formerly background role in bringing people closer together. □



Satellite ground antenna bedecks medical aide's cabin in Chalkyitsik, Alaska.