

Dismantling the alliance

Space research is an expensive business, so European countries banded together for the development and management of such programs. The two chief combines are the European Space Research Organization for satellite design and mission planning, and the European Launcher Development Organization to provide boosters for the satellites. Both have suffered from the difficulty European nations traditionally have had working together in scientific and technical areas (SN: 3/30 p. 302). Now, new politico-economic decisions by Great Britain and Italy threaten to do them more long-lasting, and perhaps permanent, damage than technical problems could ever do.

ESRO's first satellite—ESRO II-A—was launched last May 29, but never got into orbit due to a faulty fourth-stage engine in the American-built Scout rocket (SN: 6/10/67 p. 544). The next attempt, with an identical satellite, was set for this May 9, yet with this triumph on the horizon, more trouble has appeared.

Italy, which pays roughly 11 percent of ESRO's current budget, announced that it would not pay its proportional share in the cost of two planned ESRO satellites, called TD-1 and TD-2.

On April 26, ESRO announced that Italy's move had forced it to cancel plans for the two satellites. Designed for stellar and solar astronomy, gamma ray and X-ray studies, TD-1 and TD-2 would have been the organization's most ambitious projects to date. The satellites would have weighed 440 and 880 pounds respectively, compared to 164 pounds for the still-upcoming ESRO II-B. The cost of the project, however, has reportedly soared, and the Italian Government is believed to have felt that its share in the TD project—mostly the provision of power supplies—was too slight to justify the commitment.

Only three days before the ESRO decision, ELDO got its own lumps with England's announcement that it would not contribute to that organization's proposed budget expansion. This means that once the present program ends, about a year from now, England's contribution to the European booster is virtually over. Until this decision, the British Blue Streak rocket was to have been the first stage of an ELDO rocket capable of launching satellites weighing up to two tons, a necessity if the Continent plans to orbit its own sophisticated communications satellites.

(Originally the Blue Streak was to have been equipped with hydrogen warheads as Britain's chief nuclear weap-

on. When the Government decided that an "independent deterrent" was too expensive, the program was granted a last-minute reprieve by adapting it into a space booster for the proposed ELDO. Unless Britain mounts a more active space program on its own than it looks likely to do, the Blue Streak may now, without ELDO's business, be going down for the last time.)

The U.S. space agency has readily made launch vehicles available to other countries—besides ESRO, England, Australia, Canada and Italy, have all orbited satellites on NASA boosters but it is unlikely that the offer would apply to launching communications satellites that would compete with U.S. efforts in a potentially highly lucrative business. Thus the demise of ELDO's Europa rocket may well leave the members grounded, except for small-scale launches in which less-powerful boosters can be used.

Panic is not new for the members of ESRO or ELDO, however. Indeed, it has been said that they were born with it. A. V. Cleaver, a member of the British Interplanetary Society and chief engineer at Rolls Royce, has observed that ELDO was set up not because European leaders believed in the idea, but because fear of being left behind technologically made them afraid to say no.

ESRO, besides being economically expedient for its small members, was a stop-gap against the brain drain, which was losing scientists right and left to the U.S. space program.

As recently as last February, the British Interplanetary Society's Council on European Policy recommended that

EXTRAGALACTIC

Clouds rush in toward Milky Way

When radio astronomers look out of our galaxy to the north or the south—the directions in which it is easy to do—they notice patchy clouds of hydrogen. These clouds may be from 20 to 30 light years across and 300 to 450 light years apart.

They weigh on the average about 300 times what the sun does—six billion billion billion metric tons—but their size makes them extremely tenuous, about 10 atoms to the cubic centimeter. Most of the clouds are moving very slowly; 10 kilometers per second is the average speed.

Astronomers had become accustomed to these figures, and it was with some surprise that they began during the last few years to find some excep-



NASA

ESRO II gets a check out in England.

tionally fast clouds—with velocities of 100 to 150 kilometers per second. Observers at the Dwingeloo Observatory of Leiden University in the Netherlands, principally Profs. Jan H. Oort and H. C. van de Hulst, have counted at least 30 of these fast clouds that have one peculiar characteristic: They are all coming toward the plane of the galaxy.

As long as most space activity is concerned with measuring cosmic rays, analyzing the solar wind and other non-commercial activities, the big space powers may go on helping the small. U.S. boosters will no doubt appear in other countries in the future, and Russia has plans to provide a lift—probably in the form of large rockets—to France (though France is the only European nation to launch its own satellite from its own booster). When the profit motive becomes more important than foreign policy, however, the need for an all-European booster will become more glaringly apparent.

Prof. Oort thinks these clouds—between 900 and 1,500 light years away—are extragalactic objects that have been caught by the gravitational attraction of our galaxy and are crashing into it.

Dwingeloo looks mainly to the north of the galaxy, which is a broad flat disk lying roughly in the east-west di-

rection. If such fast clouds exist in the north, then, unless something very strange indeed is going on, they should also exist in the south. From Australia has come word that a few such clouds have been seen, but as yet, according to Prof. Frank J. Kerr of the University of Maryland, no systematic search for them has been carried out.

Prof. Kerr disagrees with Prof. Oort on what the clouds are doing. Prof. Kerr believes they are more distant and that they are satellites of our galaxy (SN: 5/11, p. 458), describing elliptical orbits around it, as the moon does around the earth, rather than driving toward it.

One reason for the wide disagreement is that although observers can tell the velocities of the clouds from direct observation they cannot tell precisely how far away they are and whether their motion is carrying them on a collision path or in an orbit.

In Prof. Oort's collision hypothesis, however, the distance the clouds ought to be at can be calculated from a model of the physical processes that should be taking place in the collision. Working out such a model might also give observers an idea of what sort of evidence they might look for to support the Oort hypothesis.

To this end Prof. R. A. Gross of Columbia University, a specialist in plasma physics, spent the last year in Leiden helping Profs. Oort and van de Hulst and graduate student Brahm van Leer work out such a model.

According to the model, described at the recent American Physical Society meeting, the galaxy itself has an atmosphere of hydrogen clouds similar to those found outside it, and it is with this atmosphere that the colliding clouds—if they are colliding—would interact.

As long as the intruding cloud was more than 3,000 light years above the central plane of the galaxy, nothing would happen. Below this level shock waves would have formed.

Because of the high ratio of collision velocity to the speed of sound in the gas—100 to one—two strong shock waves are postulated, one propagating through the galactic gas ahead of the boundary of the intruding gas, the other propagating back through the intruding gas. The forward shock wave should ionize the galactic gas it passes through, raising its temperature from about 100 degrees above absolute zero to about 1.5 million degrees.

Such a gas should radiate light and radio waves strongly, so strongly in fact that though it starts to recombine behind the wave its own radiation immediately dissociates it again and, as long as there is an input of ionized gas from the wave, ionization persists

between it and the intruding gas.

This ionization is not seen in the present observations, but the Leiden astronomers are so sure of their model that they believe they are looking at a later stage. When the shock wave reaches thick enough galactic gas, it slows down and stops ionizing. The gas behind it then cools and recombines—in a 10,000-year astronomical blink of an eye. The Leiden astronomers believe they are seeing radiation from this cooled gas, which, by the calculations should be between 900 and 1,500 light years above the galactic plane. But they have yet to convince those who disagree.

HEALTH COSTS

Not one city or community . . .

A Senate subcommittee, alarmed by predictions that there will be a 140 percent increase in the cost of health care in the 1970's, is calling more hearings early this summer to seek practical plans to avoid pricing medical care out of the reach of the average patient.

At the close of its April hearings Senator Abraham A. Ribicoff (D-Conn.), chairman of the subcommittee on executive reorganization, reported that not one city or community in the entire country has a model plan for action necessary to reduce costs.

Not only the poor segment of the population, but people with incomes going into five figures—including the Senators themselves — are getting scared.

For example, it would cost more than a billion dollars to provide pacemakers to all the heart patients whose lives would be lengthened by these devices. It costs \$12,000 a year to prolong the life of one person suffering from a severe kidney disease through the use of an artificial kidney; 100,000 need this help. Organ transplant costs are overwhelming.

The American Medical Association is emphasizing the need for paramedical training of health helpers, pediatric nurses, for example, as a way to reduce costs. Group practice among physicians has been suggested as another way that medical fees could be cut.

Studies of hospitals indicate that joint purchases of supplies and joint ownership of costly equipment would make significant inroads on cost.

But without corrective action, "by 1975, when the cost of living will rise 20 percent, the cost of health care will be 140 percent higher," says Senator Ribicoff. For example, "Our national hospital bill, which was \$9 billion in 1965, will be \$32 billion in 1975. And our national doctor bill,

which also was \$9 billion three years ago, will be \$24 billion in 1975."

He poses questions such as: Why is it that a person can have five different types of health and medical insurance and still not be fully covered? Is any American, with the exception of the wealthy few, safe from the crushing cost of a catastrophic illness?

Two men who testified before the Senator's subcommittee, New York Gov. Nelson A. Rockefeller and Walter P. Reuther, president of the United Auto Workers, had some suggestions on systems that would guarantee that no one is priced out of necessary care. They also proposed controls over hospital costs.

Of his state administration's current Health Security Act, Governor Rockefeller said an objective should be to insure protection to virtually all of the state's population under 65 years of age. Another should be to make the hospital's "reimbursement rate conditional on its management efficiency."

Among Reuther's proposals was closing nursing homes if they cannot meet minimum accreditation standards. He also proposed "the amendment of Hill-Burton legislation and provision for other measures to foster efforts to build and operate urgently needed nonprofit facilities for convalescent and chronically ill cases."

He says UAW has long given support to both legislative and voluntary activities that would seek to place the "splendid achievements of medical science within the reach and at the service of all people."

The Department of Health, Education and Welfare, Acting Secretary Wilbur J. Cohen testified, "is establishing a National Center for Health Services Research that is expected to begin operations in May." He says the budget request for fiscal 1969 for the center is \$30 million. Its ultimate goal is to aid practitioners and institutions involved in health services to improve the distribution and quality of services. Physicians, group practices, hospitals, clinics, health professional schools, governmental and voluntary health agencies and health insurance firms are involved.

The Acting Secretary endorses even stronger support of planning through state law.

Cohen's testimony concluded with a statement on the Federal Government's responsibility to "uphold the right to high quality health care for all its citizens, regardless of . . . any factor except medical need."

The exercise of this responsibility, however, is more likely to be along the lines of support for state and private programs, rather than the imposition of Federal standards and regulation.