quate surveillance of jungle areas is a persistent problem. "The jungle canopy makes it difficult, if not impossible, to detect the movement and location of the Viet Cong," says an Army limited warfare specialist. Uncertain surveillance not only makes it hard to seek out the enemy but also jeopardizes the security of one's own encampments. Accordingly, studies are under way on new sensing devices, such as magnetic-loop and seismic detection systems, and on more effective defoliant agents.

Other Vietnam requirements also pose a wide array of R & D problems. Improvements in communications, troop mobility, firepower, and resupply systems for remote or besieged encampments—these are among the needs under investigation. Success in Vietnam, if achievable, seems likely to depend in part on whether the United States, with its huge military R & D establishment, can produce the new instrumentalities of war needed to help offset the advantages of climate, terrain, and jungle concealment now benefiting the Communist forces.

—LUTHER J. CARTER

Announcements

Northeastern University has received 20 acres of a former Nike missile site in Nahant, Massachusetts, from the General Services Administration for a **marine science research institute.** Last month the property was placed under control of the Department of Health, Education, and Welfare. It was then transferred without cost to the university. The school will convert a former officers' quarters into research and seminar rooms, offices, and a "wet" laboratory. Plans call for facilities for study in marine geology and biology, wave action, hydrology, corrosion, and harbor pollution.

A **Korean Institute of Industrial Technology and Applied Science** was established recently in Seoul. A U.S.–Korean agreement provides for a $750,000 U.S. development grant to help finance management guidance and technical advisory services during the institute's early years. The Korean government will provide Won-350 million ($1½ million) for the first year's operating expenses, and the two countries will meet later in the year to determine additional financial requirements for the institute's first 5 years.

The institute will operate as an autonomous foundation, governed by an 11-member board of trustees. It will, according to Korean president, Park Chung-Hee, "serve private and public owned enterprises alike. It will have access to many disciplines in science, technology, and engineering economics to carry out feasibility studies, to import and adapt foreign technology to Korea's needs and to conduct laboratory investigations." It will also provide opportunities for Korean scientists and engineers to conduct studies in their own fields.

Choi Hyung-Sup, head of the Korean Atomic Energy Research Institute, was named president of the new foundation.

Spain and the U.S. will cooperate in experiments to measure **wind, temperature, and pressure at altitudes of 18 to 36 miles**, under an agreement made in January. NAA and the Spanish Comi-

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REPORT FROM EUROPE

Transatlantic Cooperation on Research: New U.S. Moves

London. An apparent increase in U.S. government interest in transatlantic collaboration on some big-science programs is attracting attention in Europe.

A flurry of visits by high-level American officials concerned with science and technology has begun. Proposals for collaboration on some ambitious projects in space have gained new significance because of the British government's eagerness to withdraw from the European program to develop large space launchers, and because the curtailment of budgets for the unmanned exploration of space has focused new attention on American space-research aims for the 1970's.

European speculation about the U.S. interest begins with the meeting in late December between President Johnson and West German Chancellor Ludwig Erhard. At that meeting President Johnson gave considerable prominence to his suggestion that the United States and the German Federal Republic work together on such projects as sending a rocket to the neighborhood of Jupiter. Also discussed were joint work on air and water pollution and intensified collaboration on developing fast breeder reactors.

In January, presidential science advisor Donald Hornig visited several European countries. In Paris he attended a meeting of science ministers sponsored by the Organization for Economic Cooperation and Development. In Germany he visited Bonn and Berlin, the Battelle Memorial Institute laboratory in Frankfurt am Main, the reactor development center in Karlsruhe, and the Technical University of Munich.

At the Paris meeting, Hornig told American reporters that the U.S. was ready to consider expanded technical collaboration with Europe if there were progress toward such goals as international monetary reform, an advantageous trade agreement between the United States and the Common Market, and continued integration of the Common Market. While giving no details, Hornig did say that the proposed cooperation with the German Federal Republic was an example of what might be possible.

American representatives at the Paris meeting also put it this way: they hoped that, as Europe embarked on further multinational projects whose size required complex cooperation, the U.S. would be permitted to take part. An example is the plan for significant participation by U.S. scientists in experiments with clashing beams at the European Center for Nuclear Research. Construction of the storage rings for these experiments is scheduled to begin this year.

The most dramatic of the suggestions made recently is that of sending

an "artificial comet" spacecraft toward Jupiter or close to the sun, or to use such a spacecraft to investigate the belt of asteroids between Jupiter and Mars.

This idea has been discussed in Europe for some time. German representatives talked to reporters about it as long ago as May 1964 at a meeting of the Committee on Space Research in Florence. French scientists apparently have also studied the project. But the French are said to have considered their possible $30-million share of an estimated total cost of $300 million to be too expensive.

German interest in the idea, however, is still high. Both the German foreign ministry and the Washington embassy worked hard to have the topic of transatlantic research efforts included in the agenda of the Johnson-Erhard talks. As soon as the talks were over, the Germans picked up the ball and ran. Science minister Gerhard Stoltenberg named a special study group headed by Max Mayer, the ministry's section chief for space. Erno and Bölkow, the two German firms most concerned with building components for the multinational European Launcher Development Organization (ELDO) project, whose future is in doubt, announced that they were studying the Jupiter rocket idea. Initial plans, representing work that has been under way for some time, were published early in January.

James E. Webb, administrator of the National Aeronautics and Space Administration, is expected in Bonn soon to discuss details. He will also visit other European nations, for it has been made clear that the U.S. is not thinking necessarily in terms of bilateral collaboration with individual countries, of the sort exemplified by current U.S. launching of satellites for Britain, Italy, and France. (The U.S. will launch a German satellite in 1968.)

Where it can, the U.S. prefers to work with multinational European organizations, such as the European Atomic Energy Community (Euratom) or the European Space Research Organization (ESRO), for which it will launch two small satellites in 1967–68.

The proposed collaboration with Germany might involve the spending of U.S. money in Germany or of German funds in the United States. This would be something of an innovation because the U.S. normally seeks to have each participant in cooperative research spend its own currency in its own territory. It should be noted that Germany undertakes to offset much of the foreign exchange cost to the United States of maintaining U.S. troops in Germany by purchasing military and other goods in the United States.

To prepare the way for Webb's visit, a group of high NASA officials traveled to Europe in February. The officials were Homer Newell, assistant administrator; George Mueller, director of manned space flight; Arnold Frutkin, director of international affairs; and John Townsend, assistant director of the Goddard Space Flight Center. The NASA officials visited Bonn, London, and Rome and met in Paris with representatives of several European countries, under the auspices of ESRO, which has its headquarters in Paris. Thus, the officials were touching base not only with an international organization but also with the individual nations which give it major support. These same nations will have to realign their space programs if, as is expected, Britain tells a ministerial meeting in Paris at the end of March that it wishes to withdraw from the ELDO rocket program.

To start the joint effort on air and water pollution, the German Health minister, Elisabeth Schwarzhaupt, has visited the United States. Secretary of the Interior Stuart Udall visited Bonn in March.

Collaboration between the United States and Europe on fast reactors already exists, and Germany plays a major role in it.

There is, for example, the project for the Southwest Experimental Fast Oxide Reactor (SEFOR). Participating in SEFOR are the several utilities which have formed Southwest Atomic Energy Associates; the General Electric Company; the U.S. Atomic Energy Commission; Euratom; and the nonprofit private corporation Gesellschaft für Kernforschung, which operates the nuclear research center at Karlsruhe.

The contract for SEFOR was signed in 1964, and construction of the reactor, which will produce 20 thermal megawatts, began in late 1965. Completion is scheduled for early 1968.

Euratom and German participation in the project grows out of work done in the six Common Market nations on fast reactors. This work, which is less advanced than that of the Soviet Union, the United Kingdom, or the United States, is centered at Karlsruhe and at Cadarache in the south of France. Both centers are supported by Euratom's fast-reactor program. Each center has small reactors, critical assemblies, and other devices for studying experimentally how a breeder power reactor would behave in operation.

At Cadarache, the Rapsodie reactor (20 thermal megawatts) is nearing completion.

Such research requires large amounts of enriched uranium and plutonium. Euratom is obtaining what it needs from the United Kingdom and the United States.

The Euratom research will not lead for some years to construction of a large prototype breeder power reactor. Neither will similar research in the United States. The Soviet Union is building a breeder reactor to produce 350 megawatts of electricity, and the United Kingdom has just announced plans to have a 250-megawatt breeder power station operating by about 1971, but the AEC attitude is that characteristic American eagerness to rush ahead with construction of large power reactor prototypes should be resisted in the case of the breeder program.

This attitude was expressed forcefully to the Joint Committee on Atomic Energy on 17 February by Milton Shaw, AEC's director of reactor development. The SEFOR project fits in well with this attitude. The reactor will not produce power. It will be used most notably for studies of the Doppler effect arising from changes produced by high temperature in the absorption of neutrons by uranium and plutonium. This work is important because of the high temperatures at which breeder power stations are likely to operate.

In the hope of intensifying such collaboration, AEC Chairman Glenn Seaborg went to Bonn on 10 March to talk to science minister Stoltenberg and others, and to address the German Atomic Forum.

On the eve of Seaborg's departure a small legal cloud over SEFOR was removed. The AEC ruled that the participation of the Gesellschaft für Kernforschung in the project did not constitute the kind of foreign control over a reactor on U.S. soil which is forbidden by U.S. law. An AEC hearing board, considering whether to issue a construction license, had recommended that the license be held up until the legal question had been resolved. The AEC stayed this ruling so that construction could continue, and handed down its final decision on 8 March.

—VICTOR K. MCELHENY