token improvements, and they have attacked the practice which leads investigating teams to notify the hospitals before they are to be visited. In his recent speech Quigley emphasized once more that the department means business, but the civil rights groups are skeptical. More Potemkin villages would not surprise them.—ELINOR LANGER

Space: MOL to Give Military First Chance at Manned Flight; Soviet Reaction Unpredictable

President Johnson's recent announcement that in 1968 the Air Force will launch its first Manned Orbiting Laboratory (MOL) was a departure down an obscurely marked road. Five MOL flights are planned; a Titan III rocket will place in orbit a Gemini capsule attached to a 42-foot (13-m) long canister serving as a military laboratory for the two astronauts for up to 30 days; at the end of the mission, the astronauts will descend to earth in the capsule, leaving the canister in space. Some proponents of MOL believe that, as insurance against "technological surprise" and as a test of improved methods of intelligence gathering, the project will lead to greater stability in relations between the United States and the Communist world. But skeptics fear that MOL will carry the arms race into space. Despite a long hunger, the Air Force has never before been permitted a role in manned space flight, a function heretofore reserved exclusively for the National Aeronautics and Space Administration.

Approval of MOL is a heady success virtually certain to stir still grander Air Force ambitions. Air Force generals and aerospace industry officials have, for example, often talked of maneuverable spacecraft capable of inspecting potentially hostile enemy vehicles and, if necessary, destroying them; whether such an armed U.S. spacecraft ever materializes will depend upon a welter of influences and circumstances, including the political leverage of the Air Force and its allies, the state of the cold war, and how the Soviet Union —which has Air Force generals of its own—reacts to MOL. Although MOL will not be an operational weapon system but a laboratory intended chiefly to test man's endurance in space and his ability to play a useful intelligence-gathering role there, the remarks of the first Russian to comment on it were predictably unencouraging. "Now the Pentagon wants to use space laboratories not only for espionage but also to accomplish direct combat tasks," said Col. Gen. Vladimir Tolubko, Deputy Commander of the Soviet Union's rocket troops. He derided President Johnson for his "hypocritical" words about extending the rule of law to outer space, and even suggested that MOL would become a nuclear weapons carrier, although many defense scientists ridicule the notion of using highly vulnerable vehicles in fixed orbits as a nuclear delivery system.

But if the Soviets do suspect the MOL of offensive capabilities and move to counter it, an arms race in space will be the prospect. If, on the other hand, the Soviets respond by launching MOL's of their own, the Soviet Union and the United States might each feel more secure as the result of better knowledge of the other's military activities; this assumes, of course, that the manned spacecraft proves even more effective as an intelligence gatherer than the unmanned reconnaissance satellites now in use by both countries. Conceivably, the MOL could contribute to further efforts at arms control, which has not advanced since 1963, the year of the "hot line," the partial test ban treaty, and the United Nations resolution against the orbiting of weapons of mass destruction. In any event, given the ambitiousness and technological strength of the Soviet space program, the possibility that the Russians would have launched a MOL, regardless of what the U.S. did, cannot be dismissed; and they may yet be the first to put a manned laboratory into orbit.

The Air Force's hopes for a manned space-flight role once rested largely on the Dyna-Soar, a space glider designed to manuever to a landing upon re-entering the earth's atmosphere. In December 1963, Secretary of Defense Robert S. McNamara canceled Dyna-Soar, saying that what was needed was a program to determine man's utility in space rather than one limited to finding a way to control his return from space. At the same time, McNamara announced the program to develop MOL, which to more cynical observers suggested that MOL might be hush-money to stifle Air Force outcries over the loss of Dyna-Soar.

As it turned out, a firm decision to proceed with MOL was still nearly 2 years away, pending the completion of extensive studies and a review by the National Aeronautics and Space Council and by the President. MOL had to pass rigorous review from defense officials who wanted the project better defined in relation to military needs. Air Force rhetoric, warning of peril to the nation unless manned military spacecraft were developed, no longer sufficed; the generals faced the necessity of specifying tasks that man might perform and tests of his ability to do them.

The talents of industry and of defense scientists and engineers were enlisted, and as the MOL program finally emerged, great emphasis was placed on intelligence gathering. In fact, before MOL was approved, the Air Force, overlooking no arguments for the project, is understood to have assigned someone to work specifically on its arms-control potentialities.

The project advanced slowly, and by summer some congressmen were showing impatience. The House Subcommittee on Military Operations, chaired by Rep. Chet Holifield of California, indicated in a report in June that the Pentagon was off in its sense of timing. "The orbital space station was technologically right for development at least a year ago," the subcommittee said. It concluded that beyond doubt the MOL should be defense-oriented and run by the military rather than be entrusted to the civilian space agency, although there was no likelihood that NASA might take over the project.

The Soviet Union's military space program was "substantially ahead" of that of the United States, the subcommittee said, noting that the Voskhod launched in October 1964 carried three astronauts who were not confined to space suits and could conduct experiments in their shirtsleeves. "A decision for full-scale development of the military MOL does not mean that NASA is preempted from future space station experiments under its own management," the report added.

For their part, the space committees of the House and the Senate also favored MOL, and their principal concern has been to see that maximum advantage is taken of what NASA as well as the Defense Department can contribute, and thus to avoid needless duplication of facilities and equipment. MOL seems to have stirred little apprehension of

Metric System Counted Out in House

The House Rules Committee last week deferred action on a bill (H.R. 10329) to provide $2.5 million for a study of U.S. conversion to the metric system.

The Committee, which schedules the flow of legislation for consideration by the full House, was urged to act favorably on the bill by Rep. George P. Miller (D-Calif.), chairman of the Science and Astronautics Committee. Miller, according to the Associated Press, pointed out that Great Britain had begun a 10-year conversion to the metric system. "We'll be one island, isolated, using a system that has little rhyme or reason," he said.

Rules Committee Chairman Howard W. Smith (D-Va.) who is 82 years old, replied: "I got my education in a one-room red school house. We took our degrees in the three R's. Just to make an honest confession, I don't know what the metric system is."

Miller explained that by metric measure, actress Gina Lollobrigida's measurements would be 93-71-89.

"Are you talking about meters or inches?" Smith asked.

"Centimeters," Miller replied.

"Oh, we haven't come to that yet," Smith said.

With the long session now drawing to a close, Miller decided to put the issue aside until next January.—D.S.G.

the sort expressed at a mid-1962 hearing by Sen. Robert Kerr of Oklahoma, who was chairman of the Senate Aeronautical and Space Sciences Committee until his death a short time later. Kerr suggested that the Defense Department's policy of developing technological "building blocks" against the day when new military space systems might be needed could lead to wholesale encroachments on NASA's preserves. His committee's legislative jurisdiction extended only to NASA; for him to express such concerns was not surprising.

When MOL was taken up by the National Aeronautics and Space Council in July, its approval already was virtually assured. It had the support of Administrator James E. Webb of NASA, as well as that of Secretary McNamara. Although managed by Defense, MOL would make use of NASA's Gemini spacecraft and perhaps of a modified Apollo life-support system for the laboratory; moreover, some scientific experiments were to be conducted for NASA.

In March, in one of his first speeches as chairman of the Space Council, Vice President Hubert H. Humphrey had indicated his support of the MOL. "We are a peace-loving people, but we would ignore the real interests of the free world if we diminished our military efforts in space," he said. "That is why, even today, four great companies in the United States are competing in the design for a manned orbiting laboratory."

Humphrey, long associated with arms-control causes, was careful to look at MOL from the standpoint of the United States commitment to the peaceful use of outer space. The members of the Council, which in addition to its chairman is made up of the heads of NASA, the Defense Department, the Atomic Energy Commission, and the State Department, were asked to provide the answers to 21 questions; at least some of these questions were concerned with the broad political implications of MOL overseas and were considered by specialists in the State Department and the Arms Control and Disarmament Agency.

Some NASA tracking stations are located in neutral countries, but MOL will rely on Defense Department facilities and thus is not expected to compromise NASA's reputation for openly conducted space exploration for scientific rather than military purposes. It seems unavoidable, however, that by undertaking the highly secret MOL program the United States will arouse fears abroad that it has pushed the arms race into space; the initial reaction in the foreign press already indicates as much. The Space Council had, in fact, to consider whether MOL promised enough advantages to make it worthwhile to establish the precedent of sending a manned military system into space.

Just how these questions were weighed and decided has not been revealed; but it is obvious the Council believed the MOL would demonstrate that a manned satellite is a more efficient intelligence gatherer than even the highly successful unmanned satellite Samos, which already has lifted somewhat the veil of morbid secrecy drawn over the Soviet Union's closed society. Samos, which officially doesn't exist, has taken thousands of pictures and shown that effective photoreconnaissance need not depend upon vulnerable U-2 spy planes. Samos cannot exercise the selectivity that a trained human observer might, however.

The five MOL flights not only will test man's efficiency as a reconnaissance observer, but will try his tolerance for the prolonged space flights probably necessary if MOL is to advance economically from an experimental to an operational system. The MOL astronauts must be fit to perform many duties, which will include repairing equipment, assembling a large antenna, and investigating natural phenomena of military interest, as well as conducting experiments in photoreconnaissance.

There is the hope, at least, that by indicating the futility of trying to avoid surveillance, MOL (or successor systems) will encourage Soviet acceptance of such arms-control proposals as those currently offered by the United States at Geneva. The U.S. has urged, for example, that the Atlantic alliance and the Soviet bloc explore the possibility of a "verified freeze" on the number and characteristics of strategic nuclear offensive and defensive weapons.

It is argued that such a freeze would impose inspection requirements far less intrusive than those necessary for general disarmament. Even so, it would involve continuing inspections of declared weapons plants and a certain number of other inspections as a safeguard against cheating. From the view of the Soviets, with their aversion to inspection, the U.S. proposal must seem

very intrusive indeed. But if they should know, several years hence, that satellite-borne U.S. observers are gathering a mass of data on the Soviet economy and weapons potential, then the American proposals now tabled at Geneva perhaps will appear less radical.

Should the Soviets perfect their own MOL's, as expected, a situation might develop roughly analogous to that which preceded the partial test ban treaty, when both sides had learned long-range test detection techniques. Each given highly effective orbiting reconnaissance teams, the United States and the Soviet Union might temper their distrust—which appears to be mutual, despite the relative openness of U.S. defense activities—with the knowledge that to some extent arms control treaties have become self-enforcing.

Whether MOL will be more a stabilizer or a spur to the arms race depends partly on what happens here at home. There is some fear, now that the Air Force has its foot in the door, that it will demand—and get—a larger and larger part in the national manned space flight program. Such concern does not appear widespread, however, and perhaps for good reason, although the capabilities that the Air Force develops through MOL will have to be taken into account whenever new space programs are considered.

The National Aeronautics and Space Act of 1958 gave to NASA the responsibility for all space activities except those "peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary . . . for the defense of the United States)." The line of demarcation thus drawn between the civilian and military space programs is somewhat indistinct, but Defense Secretary McNamara and his associates have argued that they have tried to observe it without taking chances with the national security.

In the name of defense, ambitious navigation, communication, weather, ballistic-missile early warning, and reconnaissance satellite programs have been undertaken. Defense officials have indicated that the reason manned military space flight is so long in coming has been the absence of realistic proposals. The total military space program is not small, the budget having run to more than $1.5 billion for each of the past three fiscal years and to $1.7 billion for the current year (including $150 million for MOL, which ultimately is to cost about $1.5 billion or more). The Defense Department gets nearly a fourth of the total space budget.

Much of the spending has not been against known military requirements, but for the development of a broad base of technology as insurance against an uncertain future. For example, development of the Titan III, which as the Air Force's workhorse booster will put MOL into orbit, was begun several years ago even though there was no specific mission for it. Nevertheless, in nearly all cases space systems have not been approved for operational use or deployment unless a military requirement has existed. "This is not the Department of Space," a Defense official reminded an aerospace group a few years ago.

Civilian control of the military space program also can be exercised at higher levels in the administrative structure. Vice President Humphrey, as chairman of the Space Council and at least nominally an important adviser to the President on space matters, is not likely to take a romantic view of Air Force space proposals. Though they favor MOL, the space committees of the Congress, if only out of jurisdictional jealousy, may buck against expansions of the military space program at NASA's expense; some members of the House committee already are watchful for any such tendency. (In this regard, however, the large overlap in membership of the Senate space and armed services committees should be noted.)

The Air Force has allies in the aerospace industry, the trade press, and the Air Force Association who strive to keep before the public visions of outer-space combat. Some members of Congress, including Barry Goldwater, when he was there, have tried to keep these same visions alive, but without much success. A turn for the worse in East-West relations, or a series of Soviet space spectaculars, could make for a more propitious atmosphere in which to propagate fears of eerie celestial conflict, however.

All predictions of what may come in the wake of the MOL program probably are premature. All one can do is to regard it as an important precedent and to hope that from it will flow more good than ill.—LUTHER J. CARTER

Announcements

The **American Society for Engineering Education** has moved from the campus of the University of Illinois, Urbana, to Washington. Its new headquarters is at 1346 Connecticut Avenue, NW, Washington 20036.

The National Institutes of Health has announced that funds of individual research or training grants may not be used to pay travel expenses for scientists to attend the ninth international **cancer congress** in Tokyo next October and this item should not be included in grant application budgets. Instead, NIH will provide travel assistance through contributions to a fund to be administered by the National Academy of Sciences–National Research Council. The decision applies only to this congress and does not imply a precedent that might govern other meetings of this type. Information on travel awards to the congress should be addressed to the U.S.A. National Committee on the International Union Against Cancer, Division of Medical Sciences, NAS–NRC, 2101 Constitution Avenue, NW, Washington 20418.

An **advisory committee for collaborative research** in the immunology of organ transplantation has been formed at the National Institute of Allergy and Infectious Diseases (NIAID). Bernard Amos, professor of immunology at Duke University, is the chairman, and John R. Overman, associate director for collaborative research, NIAID, is executive secretary. The other members include:

K. Frank Austen, Massachusetts General Hospital, Boston;

Walter Bodmer, Stanford;

Felix Milgrom, State University of New York at Buffalo;

Felix Rapaport, N.Y.U. Medical Center;

Robert Schwartz, New England Medical Center, Boston;

Chandler Stetson, Bellevue Medical Center, N.Y.U.;

Roy Walford, U.C.L.A. medical school;

Maurice Landy, NIAID.

The **Kettering Magnetics Laboratory**, formerly located in Dayton, Ohio, has been moved to the campus of Oakland University, Rochester, Michigan. The facility was built with funds from the