

Apollo milestone at last

Lunar program picks up momentum with all-up spacecraft ground tests

The spacecraft fire that killed three Apollo astronauts and rocked the space agency a year and a half ago is still being felt. There have been so many milestones to pass in getting the moon landing back on the track that program head Maj. Gen. Samuel C. Phillips thinks they should be called inchstones.

Last week, after a series of delays ranging from instrumentation trouble to sinus trouble, a major milestone was finally reached: the first manned tests of an Apollo spacecraft to include all the new equipment and safeguards incorporated since the fire.

The tests had been planned for March, but a previous test series last fall, designed to check the new fire-proofing provisions, necessitated enough changes that the date for the new tests slipped. When everything was finally ready, it was discovered that John S. Bull, one of the two astronauts scheduled for the exercise, had a sinus difficulty so severe that he had to be replaced; it may remove him completely from space flight status.

Bull's replacement was Test Pilot Gerald Gibbons from Grumman Aircraft Engineering Corp. on Long Island, maker of the Apollo Lunar Module. On Monday of last week, after several minor technical difficulties had been overcome, Gibbons and Astronaut James Irwin climbed into a Lunar Module in test chamber B at the National Aeronautics and Space Administration's Manned Spacecraft Center in



NASA

Astronaut James Irwin enters the Apollo Lunar Module in its test chamber.

Houston for the first of four 12-hour stints.

The series of tests, scheduled to end late this week, is intended to see how the module's life support and electrical systems will perform in the heat, cold and vacuum of space. With the test chamber providing the vacuum, huge carbon-arc lamps provide sunlike heating, while panels containing liquid nitrogen produce the chill of dark space. In the course of a manned lunar mission, the module is expected to face a temperature range of some 300 degrees, ranging from 150 degrees below zero F. to 150 above.

The first test (which was held up for three hours at the last minute by troubles with an umbilical cable carrying data from the spacecraft) generally covered the time that the module will be in orbit around the moon, including a simulated firing (without ignition) of the engine that will lower it to the lunar surface. The second test was to include the possibility of having to abort the mission and climb back up to lunar orbit without ever touching down. The third test was to be a general check of all of the spacecraft's environmental systems, while the final stint is a complicated mission designed to simulate the second manned Apollo flight, which will in turn be a simulation, in earth orbit, of the module's activity around the moon.

Meanwhile, next door in huge test chamber A (120 feet high, 60 feet in

diameter), an Apollo command module and service module are set for a similar, but even more exhaustive, checkout later this month. With Astronauts Joseph Kerwin, Vance Brand and Joe Engle aboard, the spacecraft will be put through a test lasting seven and a half days, the length of an entire lunar round-trip mission. While the lunar module test is vital to the second manned Apollo flight early next year, the command-and-service module test is necessary before any Apollo astronauts get off the ground.

This first manned flight, with Astronauts Walter Schirra, Donn Eisele and Walter Cunningham, is now set for some time after Oct. 1. There will be no lunar module, however, until the following mission, with Astronauts James McDivitt, David Scott and Russell Schweickart.

In the lunar module the astronauts breathe pure oxygen pressurized at about 5.8 pounds per square inch, just as they will in space. In the command module, they will use the two-gas atmosphere (60 percent oxygen, 40 percent nitrogen) designed for the capsule after the fire. The fire took place in pure oxygen at more than 16 pounds per square inch, which meant that the cabin atmosphere contained about five times as much fire-feeding oxygen as normal air.

All of the tests are being run with every possible piece of flight equipment and instrumentation in place, right

down to the logbooks and emergency life rafts. This is to ensure that the life-support and electrical systems face the same loads they will find on the actual mission. This detailed simulation, however, requires so many people to help with the lunar module tests that the command and service modules cannot be tested at the same time, even in different chambers. Almost 800 people, says the space agency, are directly connected with the test series.

The lunar module tests are well underway, but that does not mean that the

mooncraft program is at last headache-free. A five-man board of inquiry last week was still investigating the strange crash of a flying test vehicle designed to teach astronauts how to fly the lunar module when they go looking for a landing site on the moon. After 21 successful flights, Gemini 8 veteran Neil Armstrong escaped only by using his ejection seat, when the vehicle suddenly and unaccountably began to tilt. Armstrong walked away unscathed, but the craft was reduced to a pile of rubble. ◇

Much of the unhappiness relates to research in the social sciences, and the Foreign Relations Committee asked why defense was worried about the culture, habits of thought and social organization of foreign peoples. Senator Fulbright bluntly remarked: "Everything in a country could be said to be of some significance if you intend to occupy it, couldn't it?"

"Yes, sir; everything," replied Dr. John S. Foster Jr., director of defense research and engineering. "But I did not consider occupation and I doubt that the study [of witchcraft in the Congo] was based on such a very unlikely subject."

An Institute for Defense Analyses report on Tonkin Gulf incidents, which the department would not release because the writer had not had all the facts, prompted Senator Karl E. Mundt (R-S.D.) to ask: "Do you have a fictional section in this outfit where they say, 'Write me . . . a Buck Rogers story about it?'" and "Are we . . . giving contracts to people to write about things they know nothing about?"

Empire building by the department also has its critics on the Republican side. Senator Margaret Chase Smith (R-Me.) in an Armed Services Committee hearing took a shot at the Air Force's Manned Orbiting Laboratory program, inquiring whether it didn't duplicate efforts by NASA. Dr. Foster maintained in reply, as he did to similar questions from the Foreign Relations Committee, that there was no duplication. Conflicts are avoided, he says, by interdepartmental consultation.

In the same hearing Senator Stuart Symington (D-Mo.) quoted an Air Force officer on the subject of the Falcon airborne missile, about which the Senate has heard "much favorable over the years" and on which "a good many hundred million dollars" have been spent:

"You see that blankety-blank?" said the officer. "It nearly killed me twice. I wouldn't have it on my ship, ever again, and nobody in the squadron is allowed to touch it."

Senator Symington is afraid we are "going gadget crazy as against getting something in production to fight with."

So far the department, in spite of broadsides from both parties, shows no sign of striking its colors. Dr. Foster's next scheduled appearance is before the Subcommittee on the Department of Defense of the Senate Appropriations Committee. It is expected sometime this week, and Dr. Foster will go prepared to defend the President's budget as originally presented. The cuts that the Senate made in passing the authorization bill are, the department hopes, reversible.

BUDGET

Defense research takes its lumps

For years the Department of Defense could count on a sympathetic hearing in Congress for its research activities. This year it has run into trouble: Senators and Representatives question not merely the expansion of some programs but their very existence.

The occasion for airing the discontents is the department's budget, now navigating through Congress. At first, criticism seemed loudest in the Administration's own party, with Senator J. W. Fulbright (D-Ark.) leading complaints that the department's research and development program was imperialistic, moving into territory where it had no right to be. But early last week the Republican Coordinating Committee attacked from the other direction with a statement that defense research was failing in its primary mission of providing new weapons systems.

By the time fiscal 1968 ends the Defense Department will have spent an estimated \$7.8 billion dollars on research and development out of a total estimated Federal expenditure of \$17.4 billion.

The fiscal 1969 budget, now in mid-passage, asks slightly more than \$8 billion for research, development and related items. It is embodied in two bills, authorization and appropriation. The appropriation bill is now in the appropriations committees of both Houses. The authorization has been passed by the Senate—with cuts.

Cuts were expected, especially this year; what salted the department's wounds was the way they were done. When the bill came to the floor from the Committee on Armed Services, it authorized expenditure of about \$22 billion for military procurement, research and development. Of this, R&D represented about \$7.75 billion, having been trimmed by a quarter-billion in committee.

The bill was greeted by a barrage of floor amendments in which individual Senators sought to limit or excise spe-

cific items. Most of these failed, but at the end of the debate the Senators decided that since they all wanted to cut, they would impose a general cut of \$660 million in addition to what the committee had already trimmed, which the Administration could apply as it liked.

One specific amendment that did pass forbids the department to spend any money on the F-111 jet.

The F-111, which has suffered eight crashes, was also made a specific example by the Republican Coordinating Committee in its charge that defense research had failed to provide the nation with new weapons.

"Until the 1960's we sought clear-cut American superiority," say the Republicans. "In contrast current policies appear to accept, if not seek, parity with the U.S.S.R." They charge that the Administration has failed in the last seven years to push an aggressive program of developing new weapons. They see our present defense capacity as largely a legacy of the Eisenhower Administration.

Meanwhile Senator Fulbright was charging the Defense Department with using its lavish budget to move in on research areas that should belong to other departments.

The primary concern of Senator Fulbright and his Foreign Relations Committee was the State Department, and they aimed their artillery at defense's research projects abroad, especially its hiring of foreign academic personnel and its involvement in social science research. On the way various Senators dropped a round here and there on defense projects that they thought should really belong to the National Science Foundation, the National Aeronautics and Space Administration, the Department of Health, Education and Welfare or even the Department of Agriculture.

The department's relations with academics both here and abroad have deteriorated seriously in the last year.