

SPACE

## U.S. Racing USSR in Space

► UNITED STATES SPACE efforts are on the way to major achievements with the future possibility of equaling and surpassing the Russian manned orbit flights.

But the decisions were made some years ago that accented missiles for defense rather than man-carrying space flights.

Big boosters to send men into space are now being developed in the United States.

The space programs succeeding today have been in the making two to five years.

It is not possible to jump ahead suddenly in space merely by pouring more money or manpower into new projects or those already under way. A certain amount of "lead time" from when a project is begun until a device has been tested completely is necessary.

A good example of the painstaking efforts that go into such projects is the Atlas, scheduled to carry the first orbiting U.S. astronaut three times around the earth.

The Atlas missile has persistently given trouble. Last time when fired in May it malfunctioned and had to be destroyed shortly after launch. After such a failure all the information recorded by the telemetering equipment must be studied painstakingly to pinpoint the cause of trouble.

Solving engineering and scientific problems takes highly skilled experts who must have the required time to do research and development work on a device.

The U.S. public, as well as many scientists and Congressmen, question why the U.S. is behind in space technology today and who is responsible. The responsibility is divided among boards of advising scientists, budget specialists and Congress.

The U.S. is far ahead of Russia in scientific satellites giving information about weather conditions, problems of the space environment and re-entry, as well as of the composition of space itself.

Russia has been invited to share U.S. satellite information as have other countries of the world. After the weather satellite Tiros III was recently launched, 100 countries, including Russia, were invited to participate in an exchange of weather information. So far Russia has not accepted as she did not when Tiros II went aloft and a similar invitation was made.

To follow the second Russian cosmonaut, Maj. Gherman S. Titov, who circled the earth 17 times in an orbit 110.5 to 160 miles away Aug. 6 and 7, the Russians plan orbiting several men around the earth in about two months. The moon is the next step. The U.S. plans to orbit a man before the end of the year, send three men in orbit in 1965 and is shooting for a moon orbit in 1967 at the earliest.

Maj. Titov traveled about 435,000 miles in 25 hours and 18 minutes in his 10,430-pound craft at 17,750 miles an hour, proving effectively that man can endure weightlessness over long periods. This is one of the prime aims of orbital test space flights of U.S. astronauts.

Whether the U.S. will soon catch up

with Russia in large booster production may depend on this country's present and future planning. President Kennedy has recommended that as much research as possible be carried on in several programs trying for success at the same time, instead of first one approach, then another being explored.

He suggested that the National Aeronautics and Space Administration might carry on research with liquid rocket fuels for the big boosters necessary for deep space flights while the Air Force experiments with solid rocket fuels.

The Nova rocket scheduled at this time for the moon trip will consist of a cluster of eight F-1 liquid fuel rockets with a combined 12,000,000 pounds thrust. Twenty to 24,000,000 pounds of thrust would be necessary in a similar booster using solid rocket fuel because the solid fuel has a shorter burning time.

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### Motor Clears Way For Big Boosters

► A SOLID FUEL rocket motor that clears the way for the production of single rockets with up to three million pounds thrust has been tested. By clustering such motors, a booster vehicle could achieve thrusts up to 25 million pounds.

United Technology Corporation, Sunnyvale, Calif., tested the motor for 80 seconds, in which time 40 tons of fuel were burned up in the motor's three segments. The



ROCKET MOTOR FIRED

motor developed up to 250,000 pounds of thrust.

The segmented engine, 26 and one-half feet long, is the first of its kind fired in a lightweight steel casing. Previously, only heavy-walled test casings unsuitable for flight have been used.

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### Women Found to Stand Hot Space Trip Better

► IT WOULD be easier for women to stand high temperatures inside a spacecraft in flight than it would be for men, Dr. D. R. Kenshalo of Florida State University, Tallahassee, Fla., maintains.

He said experiments show men should be comfortable in space if their skin temperature does not exceed 97 degrees Fahrenheit, which requires a spacecraft temperature of 104 degrees. Women, however, should be comfortable with maximum skin temperatures of 102 to 104 degrees, requiring a spacecraft temperature ranging from 120 to 130 degrees Fahrenheit.

Dr. Kenshalo and his associates tested 15 men and 15 women under controlled changes in temperatures and humidity, measuring alterations in human temperatures with thermodes attached to the skin surface of the arm. Their research will continue under a recent \$21,510 grant from the National Aeronautics and Space Administration.

If ways can be found to enable man to tolerate higher temperatures, Dr. Kenshalo pointed out, it would be possible to eliminate "a ton or so of instrumentation" now thought necessary for human comfort on a long space flight.

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### Space Race Effort Called "Science at Its Worst"

► THE ATTEMPT to beat the Russians to the moon is termed "science at its worst" by a Cleveland, Ohio, physician.

Dr. Irvine H. Page of the Cleveland Clinic, Cleveland, calls using scientific research to win political races "prostituting one of man's most valued functions." He states that science is being used "to develop a war image" and that politicians, not scientists, have made outer space synonymous with war.

Writing in *Modern Medicine*, July 10, 1961, which he edits, Dr. Page tabs the space race "utterly pointless." People in underdeveloped countries who "can't read, have no radios, and haven't enough to eat" are more concerned with their own survival than with outer space research and the news of the latest astronaut or cosmonaut.

Western appeal to the world, he suggests, should be based on "our magnificent contributions in medicine and science." As part of this "rich heritage," he cited development of important drugs, vaccines, surgical methods and research programs on disease.

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