

SPACE

First Hydrogen Rocket

► THE FIRST U.S. rocket using high-energy hydrogen fuel is being launched from Cape Canaveral, Fla.

The Centaur vehicle is capable of sending 8,500 pounds into a low earth orbit. It could speed 2,300 pounds on the way to the moon and about 1,300 pounds to the planets Venus and Mars, the National Aeronautics and Space Administration reported.

The upper stage of the Centaur space vehicle is powered by two RL-10 liquid hydrogen-oxygen engines, designed to develop 30,000 pounds of thrust. This is 40% more thrust per pound of propellant flow per second than kerosene now used in liquid rockets achieve.

On its first 15-minute journey the Centaur is scheduled to travel about 1,175 miles and reach a height of 300 miles. The 105-foot Centaur vehicle weighs about 300,000 pounds at liftoff. A record 540 channels send back information from the rocket during the flight. The first known TV pictures showing the inside functions of the rocket are sent back to earth.

An important objective of the flight is to study how liquid hydrogen "behaves" under weightless conditions. The self-contained guidance system, the auto-pilot and mechanisms which separate the two stages are tested. The two RL-10 engines are put through a "start cycle" to test the Centaur's ability to start up in space.

Shortly after the two rocket stages separate, after five minutes flight, the second rocket stage orients itself so the sun does not shine directly on the end where the hydrogen tanks are located. Hydrogen must be kept at minus 423 degrees Fahrenheit to

remain liquid. If heated above this temperature, the chemical "boils" off.

During the intense heating of the first stage flight the hydrogen tank of the second stage is insulated by four panels to reduce the amount of boiloff. These and a nose cone fairing, which would protect a payload from the heat, are cast off before the two rocket stages separate.

After six minutes of coasting the second stage begins reorienting for the firing of the engines and reentry. The engines burn for about 25 seconds while the vehicle descends toward earth.

The booster stage for the Centaur is a modified Atlas D rocket similar to the one that sent Astronaut John H. Glenn Jr. on his three-orbit trip around the earth.

The pointed nose of the Atlas has been eliminated to accommodate the second stage. The forward conical section of the liquid oxygen tank has been enlarged to a ten-foot diameter. The Atlas stage is powered by two booster engines and one sustainer using liquid oxygen and kerosene. The Atlas stage has a thrust of 367,000 pounds.

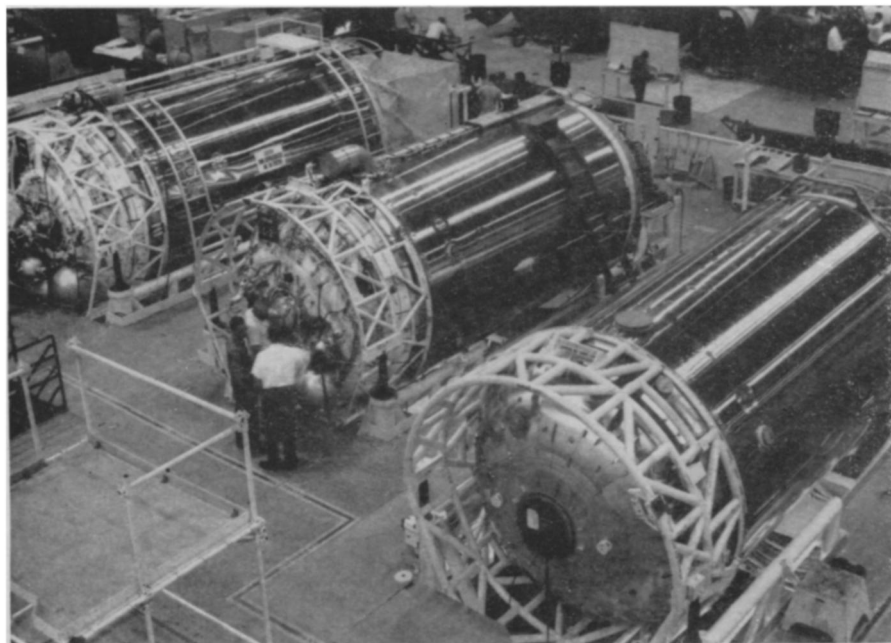
Six RL-10 hydrogen engines will be used for the second stage of the Saturn C-1 space vehicle that will send men to the moon.

• Science News Letter, 81:245 April 21, 1962

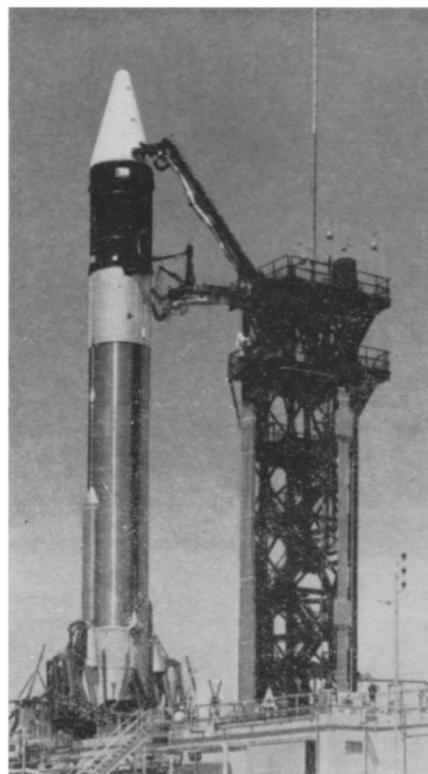
GEOLOGY

World Study to Explore Earth's Crust Progresses

► A WORLDWIDE STUDY to probe the earth's crust and underlying layers is now gathering momentum.



CENTAUR STAGES—Three second stages of the Centaur space vehicle are being assembled at General Dynamics/Astronautics, San Diego, Calif.



READY FOR LAUNCH—The Centaur space vehicle stands ready for its initial flight test on a new launching pad at Cape Canaveral.

Groundwork for the study was laid by an international scientific group meeting in Paris. Twenty-six scientists from eight countries, including the United States, Russia, Japan and the Union of South Africa, attended the meeting.

Scientists will probe the deep ocean layers, drill through the earth's crust and map profiles of the earth's layers. They hope to learn how continents formed, what wrinkled the earth layers into mountain ranges and what caused the magnetic field.

The United States has already taken the lead with the Project Mohole, an attempt to drill through the earth's crust to the underlying mantle. A preliminary probe into the ocean bottom was successfully completed last year.

The U.S. delegation to the meeting was headed by Dr. Frank Press, seismologist at the California Institute of Technology, Pasadena, Calif.

Scientists attending the meeting proposed an international exchange of scientists so that they could extend their research across national boundaries.

The United States, in addition to Project Mohole, will run comprehensive geophysical surveys across huge sections of the country, increase laboratory studies of crustal rocks and promote studies of earthquake waves. The geophysical surveys will cross the Appalachian Mountains and span the continent from Kansas to the Pacific Coast.

The Russians are expected to drill five holes six to nine miles deep. There is some speculation that one hole has already been drilled.

• Science News Letter, 81:245 April 21, 1962