ASTRONAUTICS

Set New Law Principle

When no nation asked permission to send up satellites and no protests were made, a new law principle was established. Space legislation is now needed, Tove Neville reports.

➤ A NEW PRINCIPLE of international law was established when satellites were sent into space without permission from other nations.

No permission was sought by any nation, none was given and no protests were made about the launchings. Such lack of action proves the new principle, Paul G. Dembling, assistant general counsel to the National Aeronautics and Space Administration, told the American Rocket Society meeting in Washington, D. C.

He said no action has yet been taken to define territorial rights in space, but no legal authority believes that territorial rights should apply to space, not even in Russia.

The main question to be answered is: where does air space end and outer space begin. Three types of proposals have been made:

1. Geophysical limit, which would set the troposphere, the ionosphere or similar division, as the limit.
2. Arbitrary limit, set at a certain altitude.
3. Air-breathing limit, above which aircraft requiring atmosphere cannot fly.

Mr. Dembling said that the law must consider socio-economic as well as the physical problems of space flight.

The legal principles regarding liability for damage from space vehicles of any kind are quite well set already, he said. Responsibility for damage, direct or indirect, would fall on the launching nation. Indirect damage from radioactivity would be included under this classification.

Concerning commercial exploitation of space, an entirely new legal field will be opened, Mr. Dembling said. If commercial firms can launch their own satellites, licensing laws must be made. The rates they can charge for their services must be considered. Provisions for national and international control of such use of space must be made.

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ASTRONAUTICS

"See" Earth Three Ways

➤ THE FIRST ASTRONAUT will have three ways of "looking" at the earth as he orbits around it one hundred miles up. Besides direct vision, he will have a periscope and instruments to "see" by.

The astronaut will be able to see only an edge of the earth and black space beyond it when he looks through the window in front of his head.

He will not be able to see the whole earth at any time, but will have a periscope between his knees that shows him a view of the earth beneath him as a circle the size of a grapefruit. This will represent an area 1,800 miles in diameter from horizon to horizon at this altitude, Dr. Robert Voas of the Space Task Group, National Aeronautics and Space Administration, Langley Field, Va., reported.

Dr. Voas described to the American Rocket Society meeting in Washington, D. C., four tasks the astronaut must face in trying to control his Mercury space capsule.

When the capsule separates from the rocket, it is possible that the capsule will tumble, turning end over end. The astronaut has to stop this motion with his instruments and reorient the capsule so it is level with the earth. Next he has to set his gyros so the capsule remains level, without tumbling as it will have a tendency to do. He also has to keep it from oscillating and, lastly, he must be able to fire retrorockets and change the orbit of the capsule to bring it back to earth.

Dr. Voas said that the astronaut has a number of different systems by which he can carry out his tasks. First of all, he has an automatic pilot that, however, will allow the capsule to move only in the forward direction, with the man aboard flying backwards.

If the astronaut wants to fly forward, or any other way, he must use one of his three manual control systems. These systems have different engineering characteristics, Dr. Voas said.

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Astronauts Man Controls

➤ THE ASTRONAUTS have learned to work the controls in the Mercury space capsule while tested in a centrifuge trainer that simulates the conditions under acceleration up to 8 g's, or eight times the earth's gravitational pull. This force will be experienced by the astronaut from rocket propulsion when leaving and returning to earth.

Dr. Robert Voas of the National Aeronautics and Space Administration, Langley Field, Va., reported to the American Rocket Society meeting in Washington, D. C., that the astronauts were trained in two different types of trainers. One type is fixed and a computer comes up with problems for the astronaut who then has to respond as he would when actually in space.

The other type of trainers move. One is a platform on air bearings. The astronaut controls the platform while it moves. Another moving trainer simulator tumbles on a gimble apparatus. In this the astronauts were turned over and over 50 times per minute, and all were taught to handle controls while moving at this speed.

A third moving trainer is the centrifuge simulator, in which it is very difficult to handle controls, Dr. Voas said. The astronauts are now fully trained to go into space, but they will continue the program until the launch, he said.

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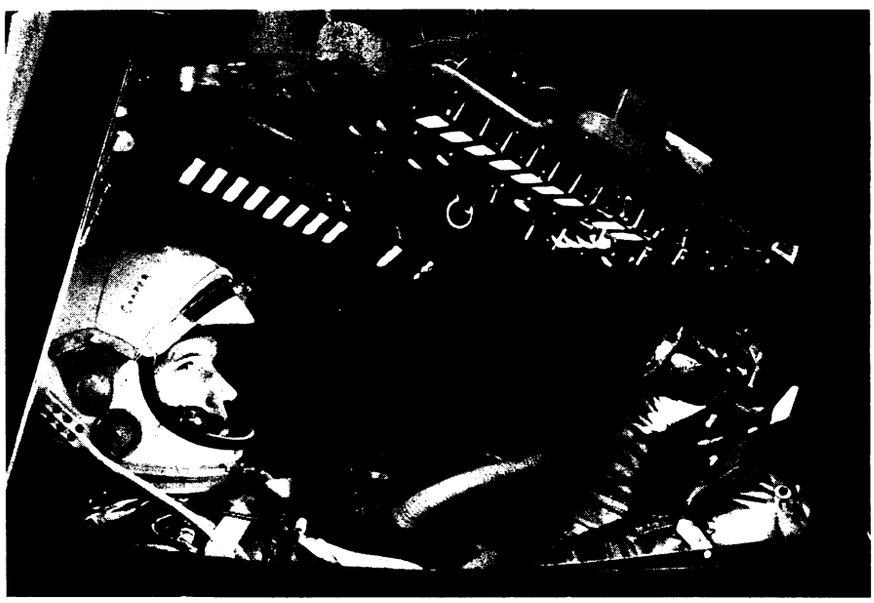
New Rocket Nozzle

➤ MISSILES WILL be lighter and shorter when a new reverse-flow type rocket nozzle



ASTRONAUT COOPER INSIDE THE CENTRIFUGE TRAINER.