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TWO- MAN SPACE CABIN

THE WORLD'S smallest efficiency apartment—a space capsule to simulate living conditions on man's first extended trip to outer space—has been delivered to the USAF Aerospace Medical Center's School of Aviation Medicine at Brooks Air Force Base, Texas.

Designed for research use by the School's Astroecology Section, the Space Cabin Simulator will be used to test the mental and physical stresses on men in space.

The capsule is designed for occupancy by two astronauts for a period of up to 30 days, simulating as closely as possible conditions that would actually be encountered on a 30-day venture into space.

Information obtained from research with this capsule is expected to pave the way for the design of living and working accommodations in future extended-trip space vehicles.

Built at Minneapolis-Honeywell's Aeronautical Division plant in Minneapolis, Minn., the manned satellite simulator is an elliptical steel tank eight feet high and twelve feet long. Ingeniously condensed within these

confines are most of the comforts of home and a complex maze of scientific equipment.

Air Force personnel selected for the first month-long simulated space flight will find their space home equipped with comfortable chairs, a bed, sanitary facilities, food, and cooking facilities.

However, along with these comforts, the astronauts will also find that they are completely isolated from the world as they know it, just as they would be on a space flight.

Every effort has been made to simulate the isolation of space. The space men will be unable to see out of their capsule. Their only means of communication will be by radio, and atmospheric noise and disturbance will be superimposed on their radio circuit.

The new cabin is a vast improvement over the School's one-man simulator that made world headlines last year when A/IC Donald G. Farrell made a seven-day "moon trip" inside it. The old cabin is still yielding valuable information to School researchers, however, and will continue to be

used after the arrival of the two-man cabin.

It was over 10 years ago that Dr. Hubertus Strughold organized the unique Department of Space Medicine at the School to lay the groundwork for man's exploration of space. It was also Dr. Strughold, an internationally known German born physician-scientist, who sketched the original plans for the sealed cabin in which Farrell made his fantastic voyage.

Specifications for the new two-man capsule were developed jointly by Minneapolis-Honeywell Corp. and School of Aviation Medicine specialists.

J. R. Nelson, Honeywell's project engineer on the simulated space cabin, said, "We have very carefully disguised or obscured any part of this cabin that might remind an occupant that he is still on the ground."

Closed circuit television cameras used to keep the occupants under constant observation are concealed behind the control panel and will peer through inconspicuous openings. Observation ports on the side of the cabin contain one-way glass which is opaque from the inside.

The door of the capsule contains an airlock so that biological specimens can be passed out without appreciably changing pressurization and without direct contact between the astronauts and research scientists outside.

In designing the space capsule, Honeywell engineers started with a list of human requirements for a 30-day period, ranging from air to breathe to recorded music and a place for cigarette ashes.

The next step was to design reliable and compact equipment to serve all of these needs, squeeze it into the capsule, and still leave sufficient living and working area for occupancy by two men.

Starting with man's most basic need, pure breathing air, Honeywell designed and built an atmosphere con-

trol system with delicate sensing equipment to measure oxygen, carbon dioxide, nitrogen, and carbon monoxide.

A complex system of controls automatically pumps in oxygen when needed, reduces carbon dioxide through the use of chemical absorption beds, pumps in nitrogen if required, and catalytically filters carbon monoxide.

Provision was even made for astronauts who might enjoy a smoke. The system includes a high voltage electrostatic filter to ionize and trap dust and smoke particles.

The space capsule is provided with heating and cooling elements for temperature control and a humidity control device that can pull moisture from the air and store it along with the water supply.

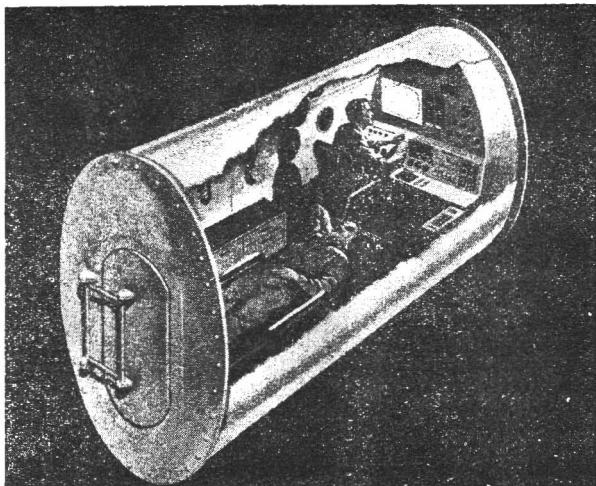
Food for the simulated trip will be non-perishable so refrigeration is not required, but a heating element will be provided to warm up soup and coffee.

The space capsule includes a panel with instruments which record environmental conditions, and controls to alter these conditions. Also included are simulated space navigational controls for "flying" the capsule.

Information from the space capsule is piped outside to a highly instrumented console which will precisely record environmental conditions and occupant reaction for study by space medical researchers at Brooks Air Force Base.

Atmospheric controls for the cabin are designed so that either the occupants or researchers at the outside console can vary the pressurization, oxygen, carbon dioxide, temperature or humidity. Final control is in the hands of outside monitors. Cabin pressurization, for example, can be varied within a range of sea level to 28,000 feet.

For their daily needs the space travelers will be allotted two quarts of water and 3000 calories of food.



*This artist's conception shows the living quarters and control panel of the Space Cabin simulator. The capsule is designed for occupancy by two subjects for a period of 30 days, simulating as closely as possible conditions that would actually be encountered on a month long venture into space. The simulator will not reproduce weightlessness to be encountered in actual space flight, nor will subjects in the simulator be exposed to cosmic radiation or the heavy G-forces of blastoff and re-entry into the Earth's atmosphere. Readers of this magazine will, we are certain, remember Harry Harrison's prophetic *TRAINEE FOR MARS*.*

They will have two cubic feet of space, about the size of an overnight bag, to store their clothes, and about two cubic feet of storage space for personal belongings.

The subjects will be able to tell whether it is night or day only by clocks. Simulated flight conditions and problems will be presented to them on a television screen. The men will use controls on their panel to solve the problems.

Describing conditions in the space cabin simulator, Dr. B. E. Welch,

Chief of the School's Astroecology Section, said:

"The men who enter the cabin will be completely sealed off from the world to which they have grown so accustomed. Time will weigh heavily on their minds, and boredom will become their constant companion. The familiar day-night cycle they live by will be lost. Though they will be able to stand erect and move about a bit in the cabin, they will still be greatly cramped during the thirty days. And thirty days can be a very long time."