

SPACE

# New Space Firsts Achieved

Gemini 3 put the first Americans into space in 22 months, but the first man to actually step into space was a Russian —By Jonathan Eberhart

## See Front Cover

► WHEN ASTRONAUT GUS GRISSOM flew the Molly Brown spacecraft (March 23) from one orbit to another, and then performed a manual landing, he began the "Age of Spacemen" and ended the "Age of Space Guinea Pigs."

Except for some computations and landing maneuvers, both the Mercury astronauts and the Soviet cosmonauts served primarily as scientific experiments during their 460 collective hours in space.

As space voyages get longer, pre-programmed maneuvers will become less and less common, leaving the astronauts to "fly" their own craft. Later Gemini flights will serve as rehearsals for the Apollo manned lunar landing by attempting to join in space with an Agena target vehicle. Almost all of that spectacular and delicate feat will be performed "by hand."

The actual trip to the moon would be completely impossible without making use of the astronauts' flying talents.

The first critical point will come almost as soon as Apollo has left its earth orbit on a course for the moon. While the lunar excursion module (LEM) remains attached to the Saturn IVB booster rocket, the command and service modules must detach, turn around 180 degrees, and rejoin the LEM by "backing in."

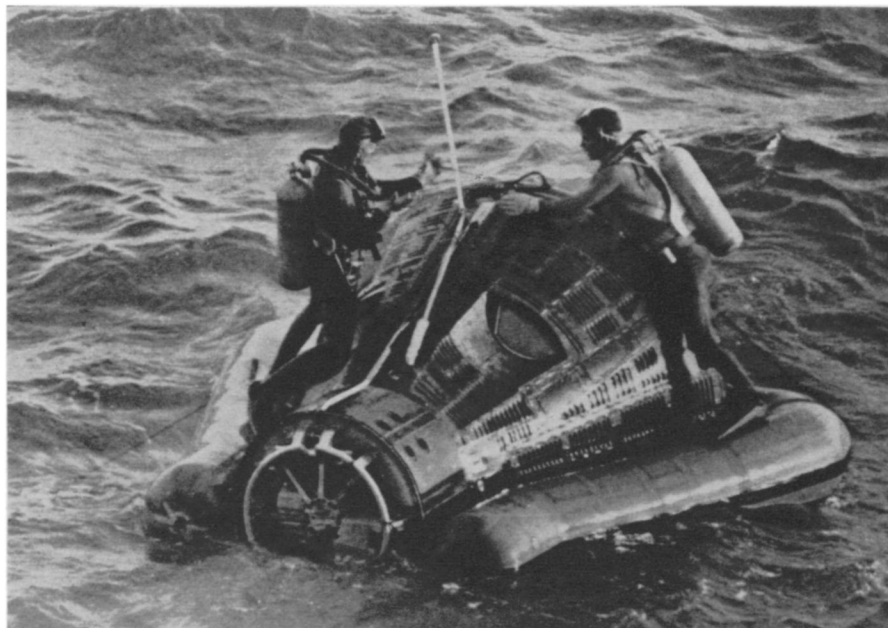
Three midcourse corrections will be made manually during the trip, at least one of them involving a complete turn-around in space.

For the lunar landing, the two-man crew of the LEM will separate the vehicle from the command and service modules, which will remain in orbit around the moon. The landing of the LEM, the takeoff and reunion in space, and the landing maneuvers on earth all will be flown using techniques to be demonstrated in the Gemini program.

The slightly off-course landing of the Molly Brown, while it illustrates the sort of error that can arise from depending on men instead of computers, also opens up new horizons in space arising from the flexibility of a "hand-flown" space flight.

Gus Grissom and co-pilot John Young have finally made the man as important as the machine to activity in outer space. Two other U.S. vehicles were in space at the same time the Gemini made its historic flight. They are seen on this week's front cover with Gemini, Ranger 9 on the left and Mariner on the right.

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UPI Telephoto

**SPLASHDOWN**—Navy frogmen, standing on Gemini's flotation collar, prepare to open the capsule containing Astronauts Grissom and Young just after it splashed down into the Atlantic Ocean after three earth orbits.



UPI

**RUSSIAN SPECTACULAR**—Cosmonaut Alexei Leonov floats on a safety line after emerging from his spacecraft on March 18 in an unprecedented experiment. Lt. Col. Leonov moved 16.4 feet from his craft while in orbit at 17,500 miles per hour.

## ENGINEERING

### Spacecraft Device Helps Show Which Way Is Up

► A NEW RADIATION sensing instrument uses space-scanning mirrors to help a spacecraft determine which way is up.

The device, which may be useful for weather and communications satellites as well as spacecraft, is expected to operate several hundred thousand miles from a planet.

The Mariner spacecraft could use such a sensor to fix its position by scanning the horizon of the planet Mars, in order to aim its cameras.

The device is sensitive to the large difference in infrared radiation in space and to that emitted by a planet or the moon. Radiation gathered by the mechanically driven system of mirrors is focused onto four germanium lenses, each containing an electrical resistor called a thermister, which is sensitive to infrared.

When the scanning mirror crosses the horizon of a planet, the increase or decrease registers on the thermister. This creates an electronic signal that can be processed through a series of special circuits to stabilize the craft.

Arthur L. Newcomb Jr., Nelson J. Groom and Norman M. Hatcher, all of the National Aeronautics and Space Administration's Langley Research Center, Hampton, Va., described their device at the Institute of Electrical and Electronics Engineers meeting in New York.

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