

## SPACE

# Weightlessness Problems

The effects of weightlessness endured during three orbits in space may be the threshold tolerable by man and may prevent longer flights to the moon.

► **WEIGHTLESSNESS** may bar man from flights to the moon and even from flights longer than 24 hours in space, **SCIENCE SERVICE** learned.

The experiences of U. S. Astronauts John H. Glenn Jr. and M. Scott Carpenter, as well as that of Soviet Cosmonaut G. Titov, indicate that three orbits may very well be the threshold of tolerable endurance of weightlessness for man in space.

The stress effects of weightlessness on Astronaut Glenn were not as apparent as those on Astronaut Carpenter, but they are no less significant. Glenn, for example, felt no need to empty his bladder during weightlessness even though it had been nine hours since he had voided. Prolonged delay in voiding can result in damage to health.

Both men were thoroughly exhausted by their rides. According to one medical report, Glenn was limp as a dishrag when he was picked up aboard the recovery ship *Noa*. Television viewers of the Carpenter flight, as well as ground technicians at tracking stations, observed that during the latter part of his flight he was noticeably less responsive both to queries and commands from the ground.

Both men have since minimized their reactions. Both recovered quickly. Glenn told **SCIENCE SERVICE** that he would withstand 24 hours in space with less exhaustion because he could sleep during the flight.

However, weightlessness, in spite of

several hours of sleep, imposed severe physical discomfort on Soviet Cosmonaut G. Titov during his 17-orbit ride. Although he felt better after sleeping, the nausea and other symptoms of space sickness Titov experienced from weightlessness were markedly relieved only after exposure to gravity forces during reentry. Titov also minimized the stress of space flight when queried by **SCIENCE SERVICE** during his visit in the U.S. However, Soviet medical reports on the Titov flight make it clear that he suffered discomfort during much of his ride. Neither Soviet nor U. S. space medical experts discount these effects which may vary from man to man.

Even though the U. S. astronauts are eager to go for longer periods in space, the next United States manned space flight will be limited to three orbits, National Aeronautics and Space Administrator James E. Webb said.

There had been considerable speculation that the next manned space effort, now tentatively scheduled for August, might be extended to six orbits. NASA has two Mercury capsules ready for three-orbit flights and these could have been modified to go six orbits. Administrator Webb believes, however, that we have not had sufficient experience with the shorter excursions in space to justify risking a longer ride yet.

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**SHILLELAGH**—An artist's conception shows the Shillelagh surface-to-surface guided missile system. The missile is being developed by Ford Motor Company's Aeronutronic Division, Newport Beach, California, in cooperation with the U.S. Army. Most details on Shillelagh are still classified.

## SPACE

## Orbiting Systems Will Detect Weapons in Space

► **SPACE SYSTEMS** to inspect satellites in orbit and guard against weapons in space are among the future space developments under study by the Air Force, Gen. Bernard A. Schriever, USAF, Commander Air Force Systems Command, revealed.

"Future space developments will almost certainly include improved systems for attack warning and for nuclear test detection," Gen. Schriever said in an address to the Chamber of Commerce in San Antonio, Texas. Such military developments in space are necessary even if they appear to go against U. S. efforts to restrict space exploration for peaceful objectives, he said. They are essential because of Soviet military developments, announced by Premier Khrushchev, such as the global rocket he boasted could fly around the world in any direction and strike a blow at any set target.

Future military operations will require man in space to operate and navigate these complex systems.

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## AERONAUTICS

## Need Seen for System Of All-Weather Landings

► **THE U. S.** should develop an all-weather landing system to improve the safety and reliability of air flights. Lack of such a system is one of the most important gaps in current aviation practice, safety experts charged in New York.

The Cornell-Guggenheim Aviation Safety Center in its annual report called for research programs on these problems. The areas requiring emphasis also include:

1. Crash fire protection that might save millions of dollars in personnel and equipment if only a single large transport were involved in an accident in which fire was prevented from occurring.

2. Occupant protection by applying available information to guide designers in creating safer seats, floors, attachments and cabins.

3. Weather forecasting improvement, with particular emphasis on conditions close to the ground.

4. Collision avoidance through development of a proximity warning device usable for all types of aircraft.

5. Improvement in the training of private pilots, including providing sensory illusions on the ground so a pilot knows the cause and remedy for disorientation in flight.

Last year approximately 78,000 private and business aircraft suffered 4,650 accidents resulting in 794 fatalities, the report said.

U. S. domestic and international airlines carried more than 58,000,000 passengers with a loss of 124 lives in three fatal accidents, a "considerable improvement" over the 326 fatalities in 12 accidents in 1960.

The Cornell-Guggenheim Aviation Safety Center was established in 1950 to foster improvement of aviation safety.

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