



JOHNNIE RAY ACQUITTED—A court policeman, left and jury forewoman Rose V. Draginda, right, help blues singer Johnnie Ray to his feet after he collapsed upon hearing the jury forewoman give a "not guilty" verdict in his trial on a morals charge. Ray's manager, Bernie Lang, is in background. (UPI Telephoto)

Moon Satellite Expected To Be Hard Job for Rocketeers

Washington (Science Service)—Dropping a satellite into orbit around the moon will be a hard job for America's rocket experts.

It will challenge rocket guidance systems, because the U. S. does not yet have a rocket strong enough to carry the best guidance system. A guidance triumph, like Russia's "round-the-moon" feat with powerful Lunik III, will be hard to achieve.

In order to go into orbit around the moon, the satellite not only must be moving along the right path but also at the right speed.

To Determine Corrections

It is the job of the guidance system to figure out where the rocket is in space as it hurtles toward its destination, to determine what corrections are needed, and to cause little "vernier" rockets or a reverse thrust rocket to fire just at the right time to bring the satellite in at the proper speed and angle.

For jobs like this and for shots to Mars and Venus, terminal guidance systems will play a big role. The moon, Mars and Venus all present moving targets for the satellite, and to complicate matters—distances to Mars, Venus and other planets are known to an accuracy of only 50,000 miles or so. Terminal guidance would therefore become a critical factor in the success of the mission.

Although military rockets are known to have terminal guidance for high accuracy, no scientific space experiment has carried more than initial and mid-course guidance systems.

Mid Course Guidance

Pioneers I and II and Paddewheel satellites all had mid-course guidance. But either these speed-adjusting vernier rockets failed to work, or, as in the case of Paddewheel, they were not needed.

Paddewheel's guidance was the most sophisticated. A radio beam was shot from earth to the rocket, where it was modified and transmitted back to earth. This enabled a big computer on earth to calculate Paddewheel's precise position and orbit. But the initial guidance system had done so well that no corrections were deemed necessary. Had corrections been added, a combination of four pairs of vernier rockets could have been fired to make minor adjustments.

Relief Seen From Flood Conditions

Washington (Science Service)—A trend towards relief from the flood conditions inundating the far Pacific Northwest recently is foreseen by Weather Bureau officials here. Drier weather is expected there during the next few days.

However, a follow-up in the weather pattern that brought the disastrous Washington State floods is expected to bring a return of wintry blasts to the Midwest and East Coast sections of the country more severe than the mid-November storms.

The upper air pressure patterns are now strongly twisted into a north-south direction that will allow cold air from Canada to pour southward. It also brings warm, moist air northward from the Gulf. Where these two conflicting air masses clash, violent weather occurs.

The unseasonably cold blasts are expected to push at least as far south as Texas.

The Eskimos, like the first Indians, are believed to have reached North America from across the Bering Strait.

Ideally a space vehicle should be equipped with guidance in all of its stages, a National Aeronautics and Space Administration guidance expert said.

Most Accurate System

John R. Scull said the most accurate system would be in the first stage and would set the basic trajectory. Less accurate systems would be in the other stages. Just before each stage is jettisoned, its guidance system would "re-set" the next guidance system scheduled to take over the flight at that point.

Two types of guidance systems have been tried. The first is a radio-inertial combination, in which radio signals from the earth are used to tell the rocket how to correct its course. The second is an all-inertial system, the heart of which is small gyroscope wheels made of a heavy alloy that spin 12,000 or 24,000 times a minute.

The radio system is lighter but vulnerable to jamming in war. In scientific applications, it has the further drawback that the ground transmitter must be able to "see" the space vehicle when time comes for a command. At such a time, however, the rockets might be on the opposite side of the earth and no correction could be made.

Recent improvements in inertial systems have yielded accuracies about equal to those of the radio systems. Inertial systems now appear to be preferred for space jobs deeper than 500 miles.

The big problem now awaiting a solution is the shrinking of guidance components so they will fit in small packages and not weigh too much. For deep space probes, such as to Mars or Venus, guidance systems must have a high reliability and be able to work 24 hours a day for periods up to a year.



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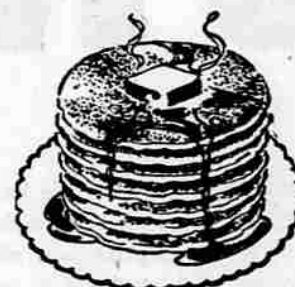
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