

# aerospace

## U.S. entry probes and orbiter to Venus

NASA plans to send twin spacecraft to the planet Venus in 1978 if funds are approved by the Administration. These will be the first U.S. spacecraft to orbit and enter the dense Venusian atmosphere. (NASA has sent two spacecraft by Venus, so far, and a third, the Venus-Mercury flyby is scheduled for launch Nov. 3, 1973.) The Soviet Union, on the other hand, has sent at least four probes into the planet's atmosphere with varying degrees of success (SN: 9/16/72, p. 180).

This month NASA announced the selection of 22 scientists to provide the experiments for one of the 1978 spacecraft. The first Venus spacecraft will carry four probes, each to be sent through the atmosphere. The largest probe will take one and a half hours to descend. Three smaller probes will free fall to the surface, each taking about 75 minutes to land. Then the spacecraft, or bus, itself will enter the atmosphere and transmit data to earth until it is destroyed by the heat from atmospheric friction. Scientists hope to find out more about the composition and structure of the Venusian atmosphere down to the surface, the nature and composition of the clouds, the circulation pattern of the atmosphere and the radiation field in the lower atmosphere.

The second spacecraft, an orbiter, will be launched about three months later, but both ships will arrive at Venus within a few weeks of each other in December 1978.

## ERTS on fire alert in California

Each year brush and forest fires destroy thousands of acres in states such as California. Now NASA and the California Division of Forestry (CDF) have teamed to attack the situation by monitoring conditions that lead to fires. Sensors to measure wind velocity and direction, air temperature, relative humidity and fuel moisture content (a measure of flammability of forest floor litter) have been placed in an unmanned experimental station in a fire area near Sunol, Calif.

The measurements are beamed twice daily to the Earth Resources Technology Satellite (ERTS). ERTS then relays the information to a NASA tracking station which passes it along electronically to the Goddard Space Flight Center where the coded data are sorted out by computer. From there the information goes to NASA's Ames Research Center in California and then to the forestry headquarters in Sacramento. The whole process—from the ERTS pass to CDF—can take less than an hour.

## Waterfront STOL ports recommended

Short-take-off and landing aircraft (STOL) are considered by many the answer to the nation's travel needs for short-haul routes between metropolitan city centers. But many cities have been hard pressed to find the space for landing places within the city.

Now Lockheed-Georgia Co. has suggested to the House Subcommittee on Transportation a two-year demonstration of an amphibian short-take-off and landing airliner. The amphibian plan would avoid high priced downtown property and would use waterways such as New York's East River, Boston Harbor, the Potomac River and Biscayne Bay. The water also serves to attenuate aircraft noise. Lockheed suggested using the L-100 Hercules. The aircraft would taxi into and out of the water on standard Hercules landing gear, loading and unloading passengers on dry land and refueling on a terminal ramp. The waterport itself would use much less area than dry land ports—only 10.7 acres.

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# biomedical sciences

*From our reporter at the meeting of the American Institute of Biological Sciences in Amherst, Mass., last week*

## Bird migration down the Atlantic

Birds are known to migrate in the autumn from New England down to Central and South America, but even with banding and radar studies, the routes the birds take have not been known. At the meeting, Timothy and Janet Williams of Woods Hole Oceanographic Institution, and their colleagues, reported evidence for three possible routes. They are: down the eastern coast of Florida, then into the Caribbean; straight south over the Atlantic Ocean to the Caribbean; from New England to Bermuda and then westward into the Caribbean.

The Woods Hole, Mass., biologists and their team based their hypothesis on evidence collected from 1970 to 1972. They set up radar stations in Cape Cod, Virginia, Bermuda and Antigua and followed bird migration each autumn.

The results also indicate that the birds' migration is largely determined by wind patterns. For example, clipper ships used to sail from New England to Bermuda on their way to Africa. Evidence reported by Sidney Gauthreaux of Clemson University reinforces this possibility. "Wind," the South Carolina biologist asserts, "is a beautiful indicator of whether birds migrate and what direction they will go in."

## Moths give blue jays the hind wing

People may thumb their noses, but the genus of moth known as *Catocala* apparently gives predator birds the hind wing, Theodore D. Sargent of the University of Massachusetts reported.

The Amherst, Mass., biologist put some of the moths in the presence of blue jays to see how the blue jays attacked the moths. He also collected moths that had been attacked by birds in nature, but had gotten away. He found that the moths were nearly always attacked on the hind wing and hardly ever on the fore wing. All sorts of chunks were taken out of hind wings, and the imprints of bird beaks on hind wings were apparent. If the moths lost their fore wings, they rarely survived, but if they lost their hind wings and escaped, they could still fly.

The hind wings are usually colored or are a startling black and white. The fore wings are usually a somber brown. Sargent believes the hind wings serve as deflectors and help the moths escape and survive.

## Sunlight and the hardwood forest

One of the most important elements within a hardwood forest is sunlight. Sunlight influences the moisture of a forest's soil and is vital to plants and animals living in the forest. William E. Reifsnyder of Yale University reported new insights into the quality and quantity of sunlight that reaches the floor of the hardwood forests.

Generally, the denser the canopy of the forest, the less sunlight comes through because the leaves are arranged in horizontal layers. This is not the case with evergreen forests where needles haphazardly block light. A brief fleck of sunlight that reaches the floor of a hardwood forest contains only 1 to 7 percent of the energy in the sunbeam. But a fleck that lasts 10 minutes delivers over 90 percent.

Although opening the canopy increases the energy that reaches the forest floor, cutting trees lets in far more light. Eliminating only one large sugar maple, the New Haven, Conn., forester asserts, can drastically change the amount and kind of sunlight reaching the forest floor.

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