The Moonbird

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the helium would have to be stored as a gas, in much heavier tanks. Result of the innovation (created by Douglas engineers): 800 extra pounds of available payload.

One of the few things that NASA is certain about in its efforts to plan future space programs is that existing hardware must be used as much as possible. At least half the cost of the Apollo program is simply that of research and development.

Certainly the biggest piece of hardware around is the Saturn V, so it is a natural choice for as many applications as possible. One, again suggested by Douglas, would be to make experimental space stations out of the empty fuel tanks of spent Saturn V third states, of which as many as 46 may have been launched within the next 10 years. Each tank would provide 10,000 cubic feet of enclosed, airless space to experiment in, and the necessary modifications could be made by two astronauts with hand tools. A 65-inch-diameter airlock, producible in quantity for $200,000 apiece, could be installed with no changes in the present design. At a present cost of a million dollars per tank, such double usage could well be worthwhile. NASA thinks so too, and gave Douglas $50,000 to investigate the matter.

Taller Than Gemini

A Gemini spacecraft, atop its Titan booster, stands 109 feet high. The first part of its flight is controlled by preprogrammed computers (which work so well that Gemini 9 went up flawlessly despite a malfunction in one computer which prevented it from receiving the most up-to-the-minute launch data). Saturn V, however, stands well over three times as high as a Gemini stack. As a result, there could be a much greater effect from wind buffeting. Just to be on the safe side, NASA told three of its engineers to find out whether an astronaut, sitting in a spacecraft on top of the rocket, could actually fly the Saturn V "from the ground up," compensating for the effects of wind, fuel sloshing (which affects the center of gravity), and even bending of the rocket itself (since making a Saturn V completely rigid would mean making it so heavy that it would never get off the ground).

Not only would the idea work, the team concluded, but pilot control in "emergency modes" could make the difference between completion of the flight and failure. Nevertheless, it is quite unlikely that NASA will decide that such a safeguard is necessary. Weather experts at Cape Kennedy give accurate enough warnings to prevent a launch during severe winds.

Despite all the investigation into modifications, future uses, uprating techniques and alternate control systems, no Saturn V has yet been launched, and it will be months before the first one is fired. When that day comes, unless the entire population of Florida is inside glued to its television set, observers 50 miles or more from the Cape may look up and cry, "It's a bird! It's a plane! It's the Moonbird!"

Nature Note

Jewel Wasp

➤ THE HEAD and thorax of the male jewel wasp are emerald green, while those of the female have a deep blue-black iridescence. These bright colors on the tiny wasps have given them their name.

The jewel wasp, *Mormoniella vitripennis*, is exceptionally useful as an experimental animal for scientists. Many have been used in studies of animal behavior, ecology, physiology and genetics.

For instance, the female wasp is a master of physiological economy. She uses the same tube at the tip of her tail for drilling, procuring her food and laying eggs—and she does not sting. She drills through the hard pupa case of a fly in order to suck the larva's blood, or to lay her eggs. As the baby jewel wasps grow and develop, they feed on the fly until it is completely destroyed. Scientists once hoped that the jewel wasp could be used to destroy blowflies, houseflies, and blue bottles in great quantities. But unfortunately many fly maggots turn into pupae too deep in the soil for the jewel wasps to reach.

The female wasp is about three millimeters long, somewhat larger than the male, with well-developed wings. The male's wings are so small they are useless for flight, though they are used in courtship and other activities.

The jewel wasp is found in many parts of the world—Australia, India, England, the United States and Chile.

Do You Know?

When the *China Clipper* flew from San Francisco across the Pacific to Manila in 1935, a flight that now takes 16 hours, it took almost 60 hours flying time.

A new law prohibits *dolphin* fishing in the USSR.

Nitric oxide, an air pollutant that reacts in the presence of sunlight and other common air contaminants to form ozone, may make people feel unaccountably tired.

When a Japanese research professor reaches *retirement* age at 63, it is customary for his laboratory to be closed and research discontinued, no matter what stage it had reached.