aerospace

Rethinking on shuttle concepts

The National Aeronautics and Space Administration believes that its future depends on the development of the shuttle (SN: 11/14/70, p. 381), which ideally would be a fully reusable two-stage vehicle (orbiter and booster). The Air Force also wants the shuttle developed (a fact that gets the shuttle money-votes in Congress) but is letting NASA foot the bill.

Two recent decisions made by NASA regarding the program may have long-range consequences. The first, to divide shuttle responsibility between three of NASA's 10 field centers, will keep the three alive after the 1973 manned Skylab flights. The Manned Spacecraft Center was given responsibility for development of the orbiter, Marshall Space Flight Center for the booster and engines, and Kennedy Center for launch and recovery facilities.

The other decision may also have some interesting consequences. Originally, NASA wanted to develop the booster and orbiter simultaneously to be operational by the end of the 1970's. Now Dr. James C. Fletcher, NASA Administrator, has announced contract extensions to seven major aerospace industries for $9.8 million to "study the advantages and disadvantages of the phased approach"—developing the orbiter first and using interim expendable boosters for three years until enough funding and backing can be found to build the reusable booster.

ATS satellite for health and education

A joint proposal by the Department of Health, Education and Welfare and the Corporation for Public Broadcasting for use of the Applications Technology Satellite (ATS-F) will probably be approved, in some form, by NASA. From September 1973 to May 1974, HEW and CPB propose to explore the technical economic and educational practicality of regular television transmissions to low-cost ground receivers in remote areas of the United States.

Educational and health programming would be transmitted to ground receivers, located in schools and public institutions, distributed in the Rocky Mountain region and Alaska. Appalachia is another potential region. ATS-F will be launched in May 1973.

Military tests NASA's supercritical wing

For several years now Dr. Richard T. Whitcomb of NASA's Langley Research Center in Hampton, Va., has been testing his concept of a better aircraft wing in wind tunnels (SN: 3/20/71, p. 196). The tunnel tests of the supercritical wing, as it is called, have indicated that it would allow efficient subsonic cruise at speeds considerably faster than today's military and civilian aircraft with no increase in fuel consumption. They also show it would allow moderate subsonic cruise speeds with much thicker wings, thereby providing structural or payload improvements. The wing has a relatively flat top and a rounded bottom, which delays the rise in aerodynamic drag until the aircraft is flying at a high speed.

The first flight tests of a thin swept-wing version of the wing have now been completed. The wing was attached to a Navy F-8 fighter. NASA says only that the "new airfoil appears to confirm wind tunnel tests." A thicker straight-wing version of NASA's wing was flight-tested last year for the Navy on a T2-C (Buckeye). (NASA provided $500,000 for the test.) According to Jim Taylor, a Navy Pentagon official, the wing does what it is supposed to do. But he says exact results—such as increased payload capability or decreased fuel consumption—are classified. He says this information could be of use to "the enemy."

Now the Air Force has issued a $12.9 million contract to the General Dynamics Corp. to design and make a supercritical wing to be flight tested on a modified F-111. It will be a variable swing-wing.

Interpretation of lunar conductivity data

By comparing data from the Apollo 12 magnetometer and the magnetometer on Explorer 35, Dr. Charles P. Sonett of NASA's Ames Research Center reported earlier this year his deductions about the electrical conductivity of the moon. He deduced an increase in electrical conductivity from about 10^{-5} mho per meter at the surface to 6×10^{-3} mho per meter at a depth of 250 kilometers. Then there was a sharp fall to about 10^{-5} mho per meter in the next 100 kilometers and a gradual rise toward the moon's center. He proposed one explanation of the results: a layered structure for the moon with an olivine-rich core (1,400 kilometers radius), a transition zone of 100 kilometers and a basaltic mantle.

In the June 21 NATURE, D. A. Wright of the University of Durham Science Laboratories suggests that the variations in electrical conductivity obtained by Sonett could be explained as the combined effect of the variations in temperatures and oxygen content of lunar materials instead of radial variations of bulk rock composition. Loss of oxygen in the surface material would have resulted from prolonged existence in high vacuum with temperatures rising at least up to 150 degrees C.

Mariner 9 drinks too much gas

A circuit design error in the electronics of the Mariner 9 spacecraft's attitude control system is causing the craft to use more nitrogen gas than predicted. The gas supply will be depleted nearly nine months after Mariner goes into orbit around Mars. This will make impossible the full nine-month extended mission, but Mariner 9 will be able to accomplish the basic 90-day scientific mission, plus almost six months of the extended.

Scientists and Venus missions

This month NASA sent invitations to space scientists asking them to help define a proposed series of Explorer-class (unmanned) spacecraft missions to the planet Venus. Two years ago NASA made a policy change in order to get scientific participation early in program studies, and the invitations this month are a continuation of this shift. Scientific involvement at the engineering planning stages should ensure a match, NASA hopes, between mission or spacecraft capability and scientific requirements—something that doesn't happen accidentally.

The planetary explorers, if approved by Congress, would be low-cost, multipurpose spacecraft that could be either orbiters or probes into the atmosphere. They would be launched by Thor-Delta rockets.

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