

# SCIENCE NEWS OF THE WEEK

## Shuttle 2: Glitches and Goodies

Astronauts Joe Engle and Richard Truly called their used spaceship "great," "fantastic" and "a real solid bird," and National Aeronautics and Space Administration officials declared that the space shuttle Columbia had achieved 90 to 95 percent of the goals of its second flight. Still, it had its problems, one of which—a "glitch" hardly of the technological teething-pain variety that might be more understandable in a less familiar component—cost the mission 70 of its planned 124 hours in space.

The Nov. 12 launching was a thundering classic, even if it did take place only after an eight-day delay caused by contaminated lubricants in one of the craft's auxiliary power units. Only hours into the flight, however, the crewmen reported erratic behavior from one of the shuttle orbiter's three fuel cells, which provide electricity to power a wide variety of on-board devices. Fuel cells have been a trusted and reliable part of manned space flights since their earlier days. "If we were to write a list of the major subsystems and ask ourselves which one we are likely to have problems with," said program manager Glynn Lunney, "we all probably would have put fuel cells at the bottom of the list." The cell's unexpected malfunction prompted flight officials to order it shut off. Although most of the vehicle's essential functions could be conducted perfectly well with even one of the three cells, NASA wanted to be sure that two cells would be available during the descent and landing, when extra power might be needed for instruments

providing critical data on the shuttle's performance. The landing, like that of the first mission in April, was a gentle gem, even with Engle putting the craft through a series of maneuvers designed to improve knowledge of its operating limitations.

"Really," said Johnson Space Center Director Christopher Kraft Jr., "what we have missed is time on the machine." Omitted from the truncated schedule, for example, were several "sunbathing" maneuvers, in which the shuttlecraft would have been held with various surfaces facing the sun for several hours in order to measure its thermal responses.

Several key activities, however, were successfully carried out even with the limited time. Engineers were "elated" at the first tests of the shuttle's 50-foot-long, remote-control maneuvering arm, designed for deploying satellites and other devices from the shuttle's payload bay and for retrieving others from space. The tests were only preliminary muscle-flexings, but more elaborate exercises are planned for future missions. Also aboard was "OSTA-1," a package of instruments designed for various earth-related studies (SN: 5/9/81, p. 292). A synthetic-aperture radar, able to operate day and night, filled 99 percent of its data-recording capacity, and even the day-limited sensors appeared to fare well, though the reduced fuel-cell power meant that some could not be operated simultaneously.

The next shuttle flight—the third of four before the vehicle is supposed to be de-

clared "operational"—has been tentatively scheduled for March of 1982, and NASA officials maintain that the date is still realistic despite the malfunctions associated with last week's mission. Though the crew has not been formally announced, agency sources indicate it might include astronauts Jack Lousma, a veteran of the second Skylab crew in 1973 and the 1975 U.S.-Soviet Apollo-Soyuz mission, and Charles Fullerton, who participated in the shuttle's air-dropped approach and landing tests over the Mojave Desert.

Riding in the orbiter's payload bay during the mission will be OSS-1 (named for NASA's Office of Space Sciences, though the office has recently been merged into the Office of Space Science and Applications), a collection of experiments concerned with astronomy and space physics. In addition, of course, there will be more tests of the orbiter itself, its maneuvering arm and other systems. In fact, says Orbital Flight Test Manager Donald Slayton, "We'll be doing flight tests up through flight 10, in our current planning."

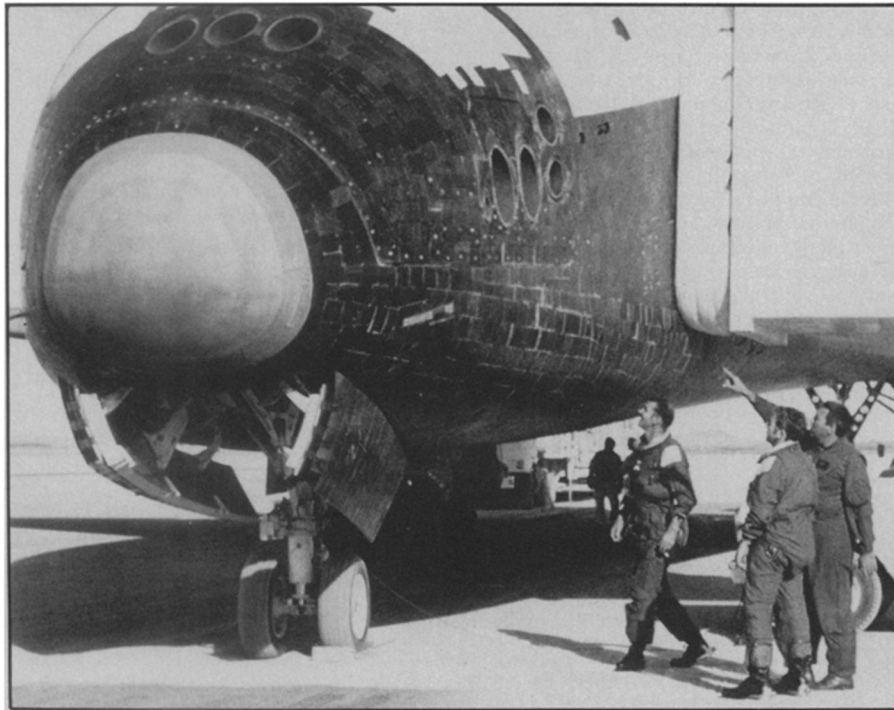
Flight 4, the last in the formal test series, is now loosely targeted for next June. This would represent a progressive shortening of the interval between shuttle launchings, with about seven months separating the first and second flights, four months to the scheduled third and three months to number four.

Major changes are also likely to take place in the way shuttle flight operations are conducted, possibly even to the point of omitting the guiding role of NASA's Johnson Space Center in Houston, which has served as the control center for America's manned space flights since they began. An Oct. 8 internal NASA planning document from deputy administrator Hans Mark states, "No matter how the matter of Shuttle Operations is finally decided, the Johnson Space Center should phase out of the operational mission during the next three years. It is very unlikely that it will be possible to control costs of operations if the developmental attitudes that prevail at [JSC] dominate after the Space Shuttle becomes operational. The operations of the Space Shuttle, both launch as well as mission control, should be handled by the Kennedy Space Center and by Vandenberg Air Force Base once the West Coast launch facility is complete."

Even at the Florida spaceport itself, the space agency is making plans to radically revise its own involvement. On Oct. 21, NASA announced that it was inviting potential private contractors to study the refurbishment activities and other preparations between the second and third flights, in order to help them prepare bids for taking over such tasks. "NASA," said KSC director Richard G. Smith, "is prepared to alter its traditional role of involvement in day-to-day shuttle operations and redirect its resources to other activities more in keeping with the NASA research and development mission."

—J. Eberhart

Astronauts Engle (left) and Truly (center) inspect shuttle after Nov. 14 landing.



Wide World