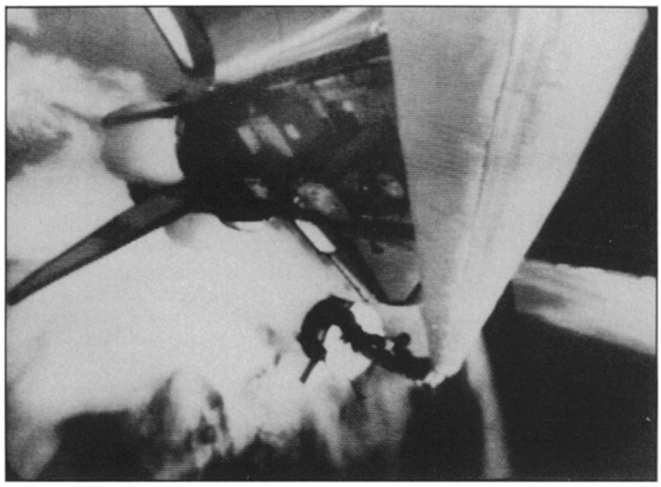
Shuttle 3: Up, Down and In Between

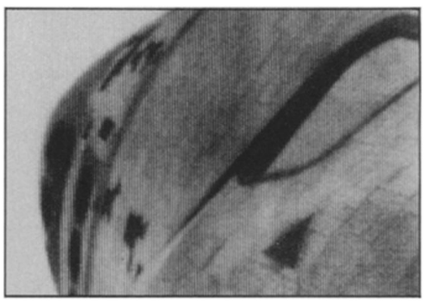
Following the space shuttle's successful maiden voyage last April, the National Aeronautics and Space Administration began focusing on Oct. 9 for the launch of flight #2. With only 17 days to go, however, some spilled propellant oxidizer loosened some of the craft's thermal-protection tiles, necessitating refurbishment that delayed the liftoff until Nov. 12. Then, during the flight, a malfunctioning fuel cell prompted the decision to end the mission after only 54 of its intended 124 hours. Even with the late launching and premature landing, NASA officials declared that the mission had achieved 90 to 95 percent of its objectives, but one key part of the shuttle's operations clearly remained to be demonstrated: the ability to hold to a schedule. Predictability is likely to be an essential selling point for future launch-business customers who may be locked into their own timetables, and NASA was fully aware of the value of showing with the third test flight that "we can launch on the day we say."

It was iffy for a while. The weeks of prelaunch activity were spared major technical problems, but heavy rains over the prime landing site in California's Mojave Desert left the agency with a choice of bringing the astronauts home to a runway surrounded by riskily soft ground, or delaying the launch (in case an early landing should be required), or picking an alternative site. Safety—and the timetable—won. Astronauts Jack R. Lousma and C. Gordon Fullerton rode the shuttle Columbia up from its Florida launchpad, as scheduled, on March 22, bound for seven days of testing and research in orbit and a landing at White Sands Missile Range in New Mexico.

The landing, however, would not prove so predictable. High winds at White Sands began whipping up the desert to such a pitch that the astronauts could see the sandstorm from orbit. Tens of thousands of spectators thronged to the site and huddled in their cars to watch the scheduled March 29 touchdown, but some could not even see the other cars parked beside them. Astronaut John Young, commander of Columbia's first mission, flew regular checks over the site in a jet, waiting for the winds to die down, but finally concluded, "I think we ought to knock this off." The Mojave, meanwhile, was still muddy, and NASA officials even briefly considered rerouting the landing to Florida's Kennedy Space Center (whose single eligible landing strip, bounded by a moat, offered less latitude than NASA wanted for the only-twice-flown craft). The next morning, however, the White Sands wind finally eased, and Columbia glided to a successful, smooth touchdown, after eight days aloft.



Columbia (top right), photographed by a camera on its grappling arm, at whose far end is an electromagnetic-plasma test package. Dark spots (center) show tiles missing from shuttle's nose. Lousma (bottom), with box of insects for flight study.



Photos: Wide World

A number of problems developed during the flight, but NASA has viewed them differently as its shuttle experience has grown. The primary goals of the maiden flight were merely to get safely up and down, and there were so many safety constraints that the mission's pilot, astronaut Robert Crippen, predicted in advance that "the odds are ... that we'll probably come home early." (They didn't.) The latest mission had its "anomalies" — some thermal tiles came off during launch, communications links malfunctioned, there was trouble with the crew's zero-gravity toilet — but coping with them is now presented as a matter of extending the shuttle's flexibility. Barely three minutes after launch, for example, overheating showed up in one of three auxiliary power units (APUs), and the device was simply shut off. "In a developmental program," said flight director Harold Draughon, "you're rather cautious at the onset. [But] after a while, if an APU doesn't work, you'll log it, go on with the full duration of the mission, and when you land some guys will come up and change it out for you."

A key item to be tested on the flight was the shuttle's huge "remote manipulator system," a 50-foot arm that the astronauts can guide to place satellites and other equipment into and out of the shuttle's payload bay. The arm functioned as planned ("I am very impressed," radioed Fullerton), twice serving to hold out a "plasma diagnostics package" that took readings of the electromagnetic environment around the shuttle and beamed test signals to other earth-orbiting satellites. A camera mounted on the arm's "wrist" failed during the flight, causing postponement of a plan to maneuver a contamination-monitoring package around the shuttle, but the arm's overall controllability and responsiveness won praise from astronauts and Houston flight controllers alike. Further tests will follow.

Lousma (and to a lesser extent Fullerton) experienced some nausea early in the mission. This, combined with the extra attention required by various system and equipment problems, prompted ground officials to allow the crew some extra sleep time and a reduced workload on March 23rd (their first full day aloft). This meant switching that day's scheduled tasks to the 24th, but there was still time for a host of scientific experiments (SN: 3/6/82, p. 149), whose results are now being analyzed back on earth. The astronauts also maneuvered Columbia so that its various surfaces were exposed to the sun for hours at a time, to provide data on its response to temperature extremes. Part of this activity had originally been scheduled for the shortened flight #2, as had a zero-gravity plant-growth test that was repeated to full length on flight 3.

—J. Eberhart