

## Space shuttle 8: 'The cleanest yet'

Beginning and ending in darkness, the eighth space shuttle mission was preceded by thunder, lightning and rain and concluded in the bleak emptiness of a desert. But in between was what National Aeronautics and Space Administration shuttle chief James A. Abrahamson now calls "the cleanest mission we've had yet."

The first night launching of a shuttle was dictated by the timing and positioning of one of the flight's major items of business — deployment of the communications-and-weather satellite INSAT-1B for the government of India. But it was not the lack of daylight that ultimately delayed the liftoff by 17 minutes; rather, it was the weather, which drenched spectators and blanketed Florida's Kennedy Space Center with a low overcast (and even caused officials to wonder about whether they'd make their Aug. 30 date at all). When the shuttlecraft Challenger finally took off, astronaut Richard Truly radioed back that the ascent through the cloud layer made the brightness of the flaming rocket exhaust appear "about 500 times more than I remember" from his previous shuttle flight (#2, last November), which was in daylight. Rookie astronaut Daniel Brandenstein said that it made him feel as if the shuttle were traveling "inside a bonfire."

The Indian satellite was sent on its way from Challenger's cargo bay about 25 hours later, with the operation under the direction of astronaut Guion S. Bluford (the first black American in space). There was "a large bump right on deployment," reported Bluford, "but you can see that the spacecraft deployed very smoothly." The satellite's own "apogee kick motor" then took over to boost INSAT-1B up to a geosynchronous orbit, about 22,300 miles above the earth, in which it would stay over India's longitude. All went as planned, until the satellite's ground controllers in India reported that its array of solar panels had failed to open out completely. By SN's press time, Indian officials were reporting that the problem still existed, but that INSAT-1B was both thermally and electrically stable, with its batteries charging, while possible "fixes" were being studied. (Its predecessor, INSAT-1A, was successfully deployed by a NASA rocket — not the shuttle — in April of 1982, but succumbed to a series of malfunctions several months later.)

Shuttle flight 8's other main goal — perhaps the most important activity of the mission — was to aid in checking out the complex Tracking and Data Relay Satellite (TDRS), vital to the upcoming European Spacelab mission of flight 9. Originally, a pair of TDRS satellites was to have been available to relay the vast amount of data anticipated from Spacelab, but TDRS-1 was delayed and TDRS-2 postponed into

next year by problems with the booster rocket designed to send them up from shuttle altitude to their assigned orbits. There have also been software problems and other difficulties at the TDRS ground control center in New Mexico, and shuttle flight 8 was delayed about 10 days to make sure that everything would be ready for the checkout. To ensure that there would be enough checkout time, in fact, NASA officials even added an extra day to the mission.

There were problems. A hardware failure in the TDRS ground equipment cut off mission control in Houston from contact with Challenger's computers one night while the astronauts slept. The crew was never endangered, and flight controllers did not even wake them up to take immediate remedial action. There were other "glitches" as well, and Abrahamson later said that the mission's "biggest unknowns were running our communications through the TDRS satellite." But, he added, "while there were some bugs in the early part of the flight, we came out of it pretty well."

The Challenger crew also conducted extended tests with the shuttle's 50-foot-long, remote-control "arm," designed for setting objects out into space from the cargo bay and retrieving others, such as ailing satellites. On the mission's third day, for example, astronaut Dale A. Gardner spent more than five hours using the arm to lift and maneuver a nearly four-ton dummy payload, reporting that the robot grapppler "works like a champ." On shuttle flight 11, now targeted for next March, the arm is to be used to retrieve the Solar Maximum Mission satellite from orbit, both to show that it can be done and to allow replacement of some malfunctioning components. Possibly in late 1986, the arm will help in the deployment of the long-



Illustration: Ford Aerospace

INSAT-1B satellite, launched by shuttle

awaited Space Telescope, which would weigh about 16 tons on earth, but even in the near-weightlessness of orbit would have all of a 16-ton object's mass and inertia. To evaluate the arm's strength, during flight 8, Truly several times fired the shuttle's attitude-control jets while the extended arm had the dummy payload in its grasp. "We see some movement, some wiggle," Gardner reported, "but it's not much."

In other tests, Challenger was maneuvered to a lower orbit to subject samples of more than 300 test materials to atomic oxygen in earth's upper atmosphere. The samples will be studied to learn more about various kinds of degradation that have been reported in paints, plastic films and other substances after previous shuttle flights. The astronauts themselves were the subjects of tests by one of their own number, William E. Thornton, a doctor specializing in space-sickness, who used himself as one of his principal guinea pigs in studying brain waves, eye movements and other functions. —J. Eberhart

## Ban is banned on formaldehyde foam

First, the Consumer Product Safety Commission (CPSC) voted four-to-one to ban the use of urea-formaldehyde foam insulation (UFFI) on the grounds that it exudes formaldehyde gas, which "presents an unreasonable risk to consumers." That was well over a year ago (SN: 2/27/82, p. 131). Then, this spring (SN: 4/6/83, p. 247), the U.S. Court of Appeals overruled the ban, finding that the CPSC's scientific and legal evidence against UFFI was inadequate. And now, U.S. Solicitor General Rex Lee has just announced that he will not take the CPSC's case to the Supreme Court, which means, as CPSC chairwoman Nancy Stoerts put it, we're "back to ground zero." The ban is no more.

In the mid-1970s, UFFI appeared to be an attractive solution to the rising cost of home heating; it was relatively inexpensive and could be blown into a house's frame through a small hole in the wall. However, the CPSC was eventually led to

ban its use, Stoerts told SCIENCE NEWS, because homeowners who recently had had UFFI installed began complaining to the commission about headaches, dizziness, respiratory problems and skin irritations. Also, research conducted for the CPSC indicated that formaldehyde gas can induce nasal cancer in laboratory rats.

But though it is now legal once again to manufacture and install UFFI, all parties involved agree that it is unlikely the industry will rise from the ashes. "As a practical matter," Allen Greenberg of the Public Citizen Health Research Group told SCIENCE NEWS, "[Lee's decision] is not going to make that much difference." Furthermore, Stoerts said, "the commission is not going to stand idly by." Soon, the CPSC will decide whether it will require warning labels on UFFI packaging, impose standards on the installation of UFFI, or launch a publicity campaign educating the public about the product's health risks. □