

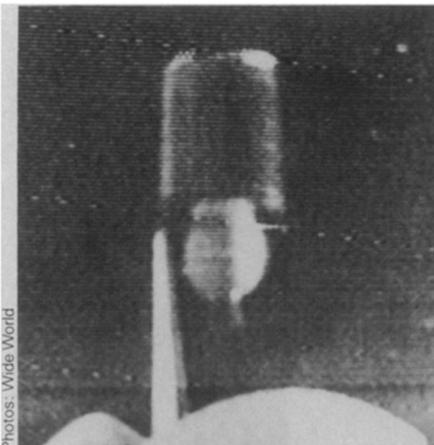
# The Space Shuttle Gets Into Business

On Thursday, Nov. 11, a commercial delivery van named Columbia took off on its first money-making business run. Even with four test flights behind it, the space shuttle had not been put through anything like all of its paces, but now it would have to live up to a new job description—that of an “operational” vehicle. With a job to do.

The commerce to be conducted on the shuttle's fifth mission was the launching of a pair of satellites. Not research probes funded by the National Aeronautics and Space Administration for astronomy or magnetic-field studies, but workaday communications satellites for a burgeoning field that is very much a part of the world's business. One would be SBS-3, to be launched for (and marketed by) Virginia-based Satellite Business Systems, whose previous satellites had all been launched by the one-shot, “expendable” rockets that the reusable shuttle is designed to replace. The other, Anik C-3, would be orbited for Telesat Canada, as part of what NASA says will be “the most powerful domestic [communications] satellites in commercial service until the latter half of the decade.” The two paying customers together would pay NASA about \$18 million for the service (considerably less than for doing the same thing with expendable rockets, though also considerably less than NASA's actual costs for the flight). But although such launchings are to be a major part of the shuttle's future role, none were tried during the test flights.

The shuttle's transition to operational status also saw the enlargement of its crew. Designed ultimately to house as many as seven people at a time, Columbia had never carried more than two. Besides astronauts Vance Brand and Robert Overmyer, the fifth mission also included “mission specialists” William B. Lenoir and Joseph Allen, first of a new breed of space specialists (though both joined the astronaut corps in 1967) being trained for the specific tasks of individual shuttle flights.

The satellite deployments went just as planned. “Completely nominal,” the crew radioed to controllers at Johnson Space Center in Houston. “No residuals, no anomalies of any kind.” The deployment process was akin to combining a lazy-susan with an ejection seat. Launched from the shuttle's huge payload bay about a day apart, the two satellites were first set spinning, to stabilize them once they were on their own, and then shoved free by releasing powerful springs. Once clear of the shuttle itself (which was flown to a safe distance), each satellite then fired a small rocket motor to stretch its orbit into an extended ellipse, after which a second motor



Canada's Anik C-3 communications satellite heads on its way after being deployed by springs from the shuttle's payload bay.

brought the orbit's low point up to match, leaving the payload in a high, “geosynchronous” position over a preselected, fixed longitude.

As a business proposition (at least from a technological standpoint — economic and policy questions are still controversial), the shuttle was off to a good start. Virtually the whole flight, in fact, was deemed “absolutely outstanding” by NASA officials, right down to its gentle landing on a paved runway in California's Mojave Desert (rain had muddied up the bare desert floor that was to have been the landing strip)—with one significant exception: scheduled for the flight had been the first spacewalk by U.S. astronauts since two members of the last Skylab crew went outside in 1974 to retrieve some film canisters. Wearing the shuttle's newly designed spacesuits, Lenoir and Allen were to have exited into Columbia's open payload bay and tried out their maneuverability around the craft, as well as practicing repair procedures planned for use on a later flight in servicing the ailing Solar Maximum Mission satellite. But it was not to be.

As has happened with some astronauts in the past (including half of those who have flown the shuttle), Lenoir and Allen experienced some “space-sickness,” with Lenoir's lasting long enough that the planned spacewalk was delayed by a day. Even with Lenoir healthy, however, problems with the backpacks of both spacesuits caused NASA officials to scrap the “extra-vehicular activity” completely. The backpacks were designed for maneuvering in space as well as life-support, but Allen's suffered a balky circulation fan, while a valve in Lenoir's pressurized his suit at a lower-than-intended level. In a pinch, said NASA, such as the need for going outside to close the payload-bay doors by hand,



Largest U.S. space crew ever includes astronaut Joe Allen, Robert Overmyer, William Lenoir (left, bottom to top) and Vance Brand.

Lenoir and his suit could have done the job, but conservatism prevailed. For the future, however, the EVA remains a high-priority item, with anticipated tasks ranging from repairs to film-changes to major endeavors such as the construction of large space stations in orbit.

Meanwhile, a host of other activities were part of Columbia's five-day flight. As on its past missions, the shuttle carried a variety of instruments to monitor its own environment for data to aid the designers of future payloads such as telescopes and other sensitive equipment. Several of the past flights had revealed an unexpected glow around parts of the shuttle's structure, for example, and although initial reports from the latest crew suggested that the glow had not been visible to their naked eyes, they took pictures with specially equipped cameras in hopes of recording its spectrum. Other studies were included to investigate the previously identified loss of mass from several shuttle materials, such as paints and Kapton film.

The astronauts also activated three experiments developed by high school students to study the effects of weightlessness on sponge growth, crystal growth and surface-tension convection. In addition, Columbia also carried one of NASA's low-cost “Getaway Specials,” this one provided by the German Ministry of Research and Technology and housing an X-ray device to study microgravity effects in liquid metals just before they solidify.

Columbia's fifth flight was its last for what could be a year, while it is modified for additional crew capacity and other changes. The next shuttle launch, however, is tentatively scheduled for January, when another shuttle orbiter, Challenger, will make its maiden trip into space.

— J. Eberhart