

Spring has sprung at JSC



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Incredible flying machine

Launching the first shuttle

by Christopher Kraft

The launch of STS-1 was unquestionably a tense and exciting experience. During the last few months before the launch, all levels of the management team, both government and contractor, were subjected to intense reviews by both NASA management and several outside review committees.

These committees were made up of some of the nation's foremost experts. The space shuttle main engine, the orbiter automatic control and thermal protection systems received vigorous and extremely thorough examinations. Other critical systems such as the auxiliary power unit, fuel cells, environmental control systems and the payload bay door operation came under similar attention.

Although there were some dissenters, almost everyone involved agreed to proceed with the first flight. One dissenter made the dire prediction that the tiles on the underside of the orbiter would fall off after the maximum heating period. This despite the fact that all of the tests that had been suggested regarding this concern had been successfully accomplished.

As the time of launch approached, the best word to describe the NASA team is that we were anticipatory. The final Flight Readiness Review gave the "GO" for launch and the countdown started. I recall being asked at the time how we made such a complex and awesome decision, to which I responded: "We have examined every aspect of the Space Transportation System and found there is nothing left to do and so it is time to fly." Frankly, my biggest concern was the paucity of reliable aerodynamic data in the Mach number range of 8 to 2. We had done an exhaustive study using a very wide range of each aerodynamic parameter and employing a Monte-Carlo process, but the fact that the machine was basically unstable in this flight regime did give me pause.

After the first launch attempt was scrubbed, the STS-1 launch went off well. To say it was thrilling would be a gross understatement. The powered flight phase has always made me apprehensive, but this one was almost overwhelming. The fire and steam and the high acceleration were impressive.

The entire flight went off with almost perfect precision. There were a few anomalies, but John Young's comment that "it is a beautiful flying machine" certainly described everyone's emotions. The entry and landing were particularly gratifying because of the tremendous effort that had been required to reach that point in the program. Again I was asked for a comment. I said "we had just become infinitely smarter." I would not say it any differently today.

The first launch of the Crew Exploration Vehicle will be equally trying. The engineers working on this challenging program will have similar emotions, but they too will find tremendous satisfaction from having accomplished the task. It will require the Herculean support of every person involved to reach the moon again in the next decade. However, I am confident that the management team and the young talent now being assembled will do it well.



Launch view of the Space Shuttle Columbia for the STS-1 mission, April 12, 1981.

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Celebrating 25 years

The following was compiled from stories that ran in the Space Center Roundup on April 14, 1981 and April 12, 1991.

Space shuttle hailed as 'incredible flying machine'

Spaceship *Columbia* roared into orbit April 12, 1981 from Florida's Kennedy Space Center.

Maneuvering through space and circling Earth 36 times, astronauts John Young and Robert Crippen tested its systems then landed like an airplane on schedule: two days, six hours, 20 minutes and 52 seconds later.

The world hailed *Columbia* as the first true spaceship—an incredible flying machine. It heralded the beginning of the era of crewed round-trip travel from Earth.

The launch preceded with a message nine minutes before liftoff from President Ronald Reagan. It was read by George Page, shuttle launch director:

"You go forward this morning in a daring enterprise, and you take the hopes and prayers of all Americans with you," said the president's message.

"As you hurtle from Earth in a craft unlike any other ever constructed, you will do so in a feat of American technology and American will."

Rising on a throne of 6.6 million pounds of thrust, *Columbia* at first flew steeper than programmed, its three main hydrogen-powered engines and two solid rocket motors driving skyward.

Columbia made a 100-degree roll to the right, heading for its imaginary target. Two

minutes and 12 seconds later, the solid rocket boosters were jettisoned, to be recovered later 151 miles downrange.

Eight minutes and 34 seconds later, the main engines cut off. The speed was 25,670 feet per second. The external tank was jettisoned and broke up over the Indian Ocean, debris landing as programmed 21,000 miles downrange from Kennedy Space Center.

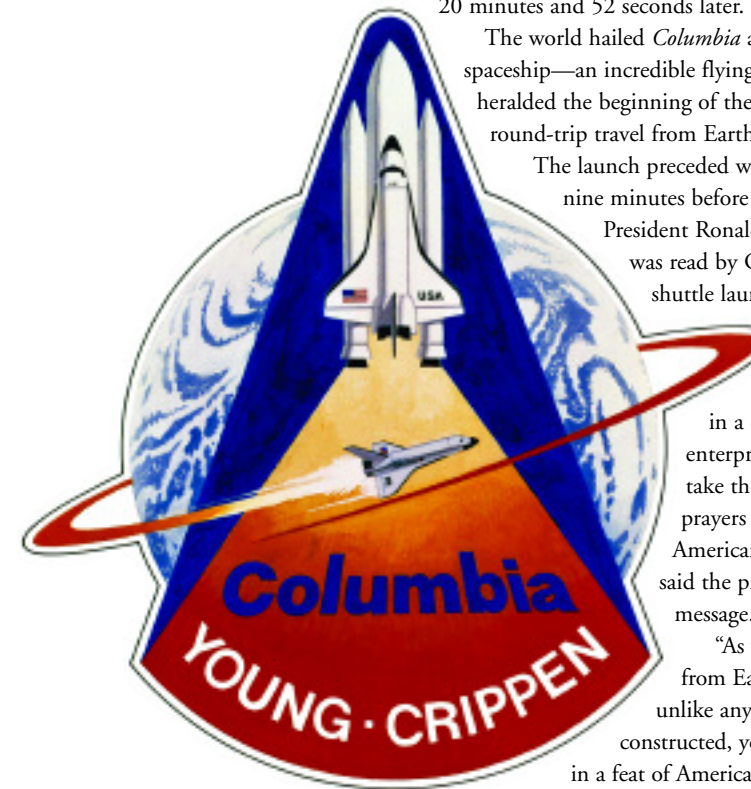
Columbia's orbital maneuvering system (OMS) took over at 10 minutes, firing for one minute and 27 seconds, to establish an orbit of 132-by-57 nautical miles. A second OMS burn achieved a 130-mile circular orbit. A third OMS burn at six hours, 20 minutes set the orbit at 148-by-131.7 nautical miles and a fourth added 30 feet per second to set the circular orbit at 149.3-by-147.6 nautical miles.

The morning of Day 3 arrived and astronauts Young and Crippen readied for the crucial test of a winged Earth entry and wheels-down landing. Previous spacecraft returned to Earth with parachutes and splashdown.

A quarter of a million people were on the (California) lakebed that morning, which was awash in a sea of Winnebagos, blue bunting, U.S. flags and network anchors, but most of the half-million eyes were trained on the sky.

Although they couldn't see the spacecraft just yet—*Columbia* was still far out over the Pacific—they had been able to hear the exchanges between Mission Control and the two astronauts thanks to loudspeakers out on the desert floor. "Okay, understand. Go for the deorbit burn," Commander John Young had said when the time came to fall out of orbit. "Thank you now."

Earth entry lasted about 31 minutes, as the spacecraft *Columbia* entered the atmosphere



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