

FLIERS EMERGE ELATED

Crippen Says That Nation Is 'Back in the Space Business to Stay'

By **JOHN NOBLE WILFORD**

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EDWARDS AIR FORCE BASE, Calif., April 14 — The space shuttle Columbia rocketed out of orbit and glided to a safe landing on the desert here today to conclude the successful first demonstration of a bold new approach to extraterrestrial travel, the re-usable winged spaceship.

Heralding its triumphant return with a sharp double sonic boom, one of technology's fanfares, the 122-foot-long Columbia appeared in the clear blue sky, soared over the base, looped back and touched its wheels down in the wash of a mirage on the hard-packed clay of a dry lake bed. Touchdown came at 1:21 P.M., Eastern standard time.

"Welcome home, Columbia!" was the simple message from Joseph Allen in Mission Control.

215 Miles an Hour

Capt. Robert L. Crippen of the Navy and John W. Young brought the 80-ton gliding vehicle with its stubby delta wings to a smooth landing at a speed of 215 miles an hour, about twice the velocity of a jetliner landing.

Never before had a space vehicle returned to the earth in such a way so that it could be flown again. The Columbia and its three sister ships now under construction are each designed for as many as 100 flights to and from the space frontier.

"It was really a tremendous mission from start to finish," said Mr. Young, the commander, in a brief post-landing appearance before officials of the National Aeronautics and Space Administration.

Right on Course in Approach

Moments earlier, the Columbia had come over the California coast, and Mission Control reassured the astronauts that "we've got good data, looking good."

At 1:09, the astronauts were advised, "You've got perfect energy, perfect ground track," meaning that they were on target and slowing for the kind of landing they had practiced so many times.

"What a way to come to California!" Captain Crippen exclaimed.

The Columbia was launched Sunday morning at the Kennedy Space Center in Florida and orbited the earth 36 times over a period of 54 hours and 22 minutes. It was the first orbital test of the shuttle and the first time American astronauts had ventured into space in nearly six years.

"I think we're back in the space business to stay," Captain Crippen said.

The development of the shuttle, a hybrid spacecraft-airplane, has cost almost \$10 billion since the project was initiated

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Columbia Returns to the Earth, Opening a New Era of Space Flight

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in January 1972. A fleet of four and perhaps five shuttles is expected to be in operation by the mid-1980's if the Columbia's next three test flights are equally successful. The shuttles, replacing the throwaway rockets and spacecraft of the past, will be used to carry satellites, manned scientific laboratories and other payloads into space.

Declaring that the Columbia had opened the "gateway" to many opportunities for space travel, Dr. Alan M. Lovelace, acting NASA Administrator, said, "I think this epic flight of Columbia proves once again that the United States is No. 1."

After a preliminary inspection of the Columbia, Donald K. Slayton, the orbital flight test manager, reported that the condition of the spaceship appeared to be "pretty good." None of the almost 31,000 heat-shielding tiles that coated the Columbia was lost in re-entry. The delicate silica tiles gave developers some of their biggest headaches, and several were damaged in launching.

In about a week, after undergoing a post-flight inspection at NASA's Dryden Flight Research Center here, the Columbia is to be ferried atop a modified Boeing 747 jumbo jet back to the Kennedy Space Center. There it will be more thoroughly checked out and refurbished and then sent back to the launching pad for another test flight in about six months.

At Cape Canaveral, Fla., meanwhile, NASA officials said that the two solid-fuel rocket boosters used to lift the Columbia into orbit were less damaged than originally thought and were fully re-usable.

Mr. Young and Captain Crippen awoke at about 3:30 A.M. to begin preparations for their return to earth. They were in their 30th orbit, cruising upside down at 17,500 miles an hour.

The astronauts' official wakeup call from Mission Control, raucous music followed by a bugle call, came 30 minutes later.

Crippen's First Space Trip

Captain Crippen, 43 years old, was on his first space journey after years as an astronaut-in-waiting. It was the fifth trip for the Mr. Young, 50, whose last one was a journey to the moon on Apollo 16 in 1972.

Flight controllers announced early in the morning that, after a review of spacecraft and photographic data of Columbia's heat-shielding tiles, there was "no basis for altering our plans for the landing." Several tiles on the two pods housing the orbital maneuvering rockets were lost or damaged in the launching, but this had never been considered a serious problem by project officials.

Before they took out time for breakfast, the astronauts checked flight systems and realigned the guidance and navigation instruments. They tested once again the 44 reaction control thrusters they would depend on for controlling their re-entry.

Only two problems caused much comment between the crew and their flight controllers: a temporary failure of an auxiliary power unit, and a malfunction of a flight recorder. Two, or only one, of the power units would have been sufficient to power the hydraulics for the Columbia's control surfaces: the elevons, rudder and body flaps.

A few minutes after 11:50 A.M., the astronauts were given a "final go" for firing their de-orbiting rockets by Don Puddy, the flight director.

To get in position for the re-entry rocket firing, Mr. Young pushed computer buttons to fire the small thrusters and turn the ship around 180 degrees so that the aft rockets pointed forward.

The two orbiting maneuvering rockets fired on computer command at 12:22 P.M., while the Columbia was 169 miles

over the Indian Ocean and out of contact with any tracking stations.

When the Yaragadee tracking station in Western Australia established contact, Mr. Young reported that the firing had been nominal, which is the space-engineering synonym for normal.

The next time the astronauts were heard from, at 12:42, in range of the Guam station, they reported that "the doors are plus." That meant the cargo bay doors, which had been open for most of the mission to allow radiators on them to cool the spaceship, were securely closed. The Columbia had also turned back around to face forward for re-entry.

Mr. Allen, an astronaut acting as the Mission Control communicator, told the crew, "Everything looks perfect going over the hill," which means out of radio contact.

Mr. Young's only reply coming through the radio noise was, "I mark."

Then, at about 12:48, over Wake Island, Columbia pitched up to an angle of 40 degrees, exposing the black tiles of its underbelly to the maximum thermal stresses, and plunged into the upper reaches of the atmosphere at an altitude of about 400,000 feet. A 16-minute communications blackout followed, the result of an expected buildup of electrified gases around the craft that blocked out all radio signals.

The spaceship glowed red hot, with some temperatures on its exterior reaching more than 2,700 degrees Fahrenheit.

After the Columbia crossed the California coast; it proceeded southeast across the coastal mountains, the San Joaquin Valley south of Bakersfield and the Tehachapi Mountains. Then it was over Ed-

wards, down to subsonic velocity, which was when the sonic booms could be heard by the thousands of people who waited along the roads and runways.

"Right on the money, right on the money," Mr. Allen reported from Mission Control, talking the crew home.

Telescopic cameras had already detected the bright reflection of sunlight off Columbia. Mr. Young, who had been guiding the ship for several minutes, having taken over from the computers, banked Columbia after it passed over Edwards, made a U turn and approached the desert landing strip from the southwest. The Columbia was clearly visible to the unaided eye.

After it rolled to a full stop, a 21-vehicle motorized convoy raced across the desert, leaving a wake of dust, and helicopters flew in.

After more than 150 technicians moved in to secure the craft, it was about an hour before Mr. Young stepped down from the ladder. After a few handshakes, he did what every test pilot would do. He walked around the ship, examining the fuselage, and squatted to look at the landing gear. Captain Crippen came out a few minutes later and the two of them were driven in a van to a reception attended by their wives and Government officials.

When they returned to Ellington Air Force near Houston this evening, they were greeted by the cheers of almost 1,500 people. They were also met by top NASA officials and James A. Baker 3d, the White House chief of staff, who read a message from President Reagan and invited the astronauts and their families to the White House to visit Mr. Reagan "when his schedule permits."

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The space shuttle Columbia as it landed yesterday at Edwards Air Force Base in California

Associated Press