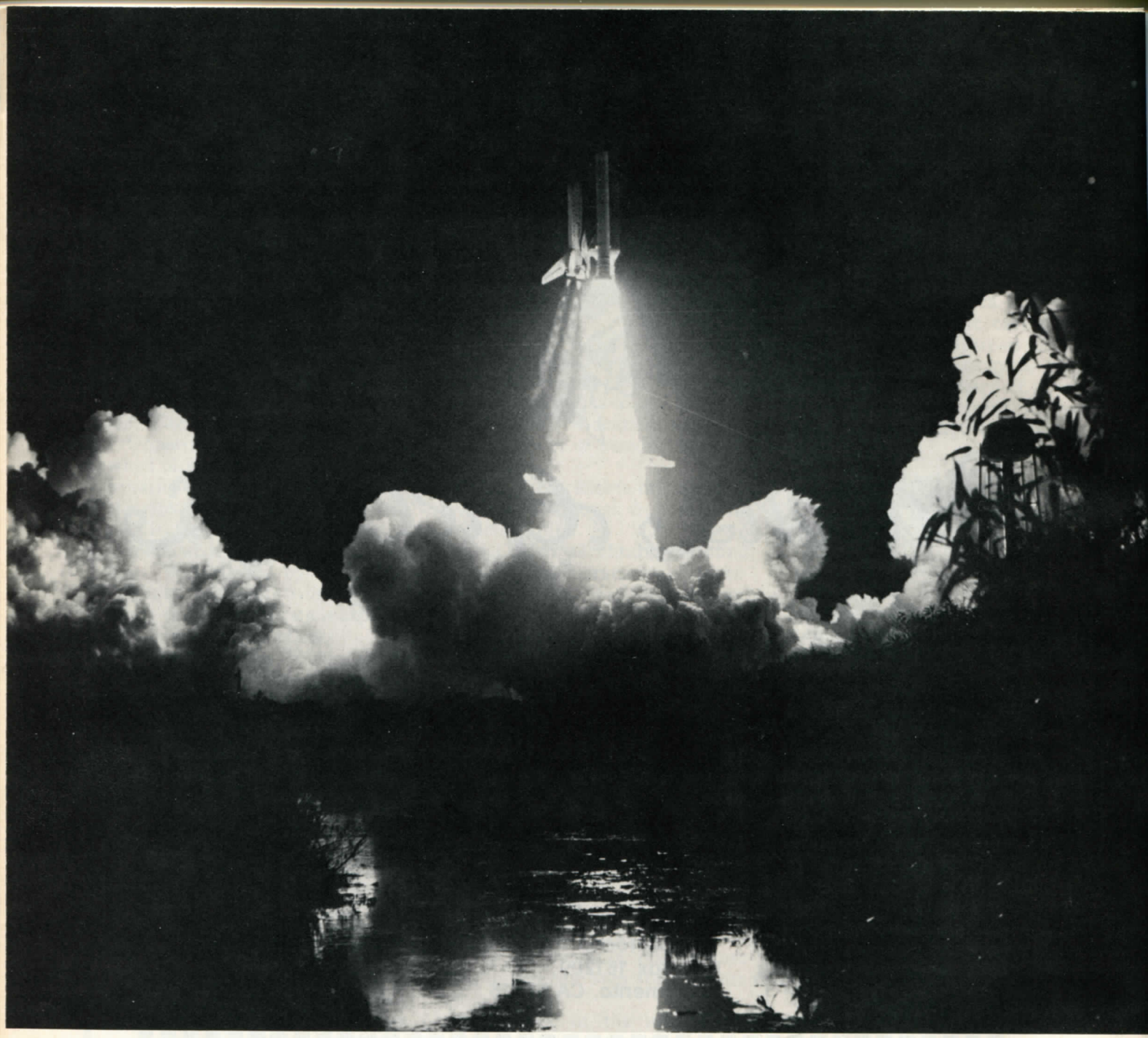

The U.S. Space Program: Rising to New Heights

Written by CHP Officer Phil Konstantin, I.D. 11643

Photos Courtesy National Aeronautics and Space Administration

United States Air Force Col. Richard Covey was the last person to talk with the crew of the ill-fated space shuttle Challenger. On that day, January 28, 1986, Col. Covey was the "Capcom" — capsule communicator — and, as such, he was the person who maintained direct contact with the Challenger's crew. He knew what had happened almost immediately. His grief, his horror was also instantaneous and soon was shared by an entire country, an entire brotherhood of humanity that bridged all economic, cultural and spiritual gaps.

Col. Covey is a veteran astronaut, having received his master's degree in aeronautics and astronautics from Purdue University in 1969. He was selected as an astronaut candidate by NASA in 1978 and piloted a mission in space shuttle Discovery in 1985. The colonel's mission was acknowledged as the most successful space shuttle mission up to that time. With the completion of that flight, Covey had logged over 170 hours in space.

The colonel is currently assigned as the pilot on the crew for space shuttle mission STS-26, the first flight to be scheduled since the Challenger disaster. Col. Covey will again pilot the space shuttle Discovery next June if all preparations continue as expected.

Richard Covey knew each member of Challenger's courageous crew. They were his friends, his co-workers, his fellow astronauts. In this small fraternity of space pioneers, each member is an integral part of the family. This loss of life has had an immeasurable effect on the people who remain involved in the space program. And the accident has had a very measurable effect on the program itself.

Progress in the space program, which in effect means the continuation of manned space flights, was put on hold until a presidential commission completed its investigation into the cause(s) of the Challenger accident as well as recommendations for future manned flights.

Col. Covey feels the commission did a commendable job in their laborious work. Their recommendations are broken down into four basic parts.

1) Top of the list of recommendations is the redesign of the solid rocket boosters (SRBs). An SRB is 150 feet long and delivers 2.5 million pounds of thrust, what Col. Covey calls "a lot of explosive power."

Because of the length, there is no way an SRB can be made in a single long piece. The SRBs in the space shuttle program were designed as four equal segments that were assembled at the Kennedy Space Center. The problem with the Challenger was the way in which these segments were joined together, which allowed gases to escape through these joints. This caused the SRB failure which caused the accident.

A completely new design would take many years to complete, including manufacture, test, redesign, retest, etc. Covey says this would take too much time and certainly impede the manned space flight program.

Currently, NASA and its contractors are testing the "redesigned" SRB in ways never tested before. Col. Covey feels good about these test results. "I feel really comfortable with the new designs. Rather than requiring pressure from the inside to keep the seals intact, the new design has a seal that requires no internal pressure to keep it in place. We still have lots of testing to perform on these new designs. That's what is taking us so long."

2) The second recommendation by the presidential commission was to review all the other critical items in the shuttle that may have been overlooked before. Lawrence Mulloy, former NASA solid rocket manager, says there are approxi-

Astronaut Richard Covey appears to be sitting on an invisible chair near the galley area on Discovery's mid-deck during his 1985 mission aboard the space shuttle. The mid-deck stowage lockers bear some personal snapshots and other memorabilia carried onboard by the five crewmembers.

Opposite page: At the Kennedy Space Center, Discovery's dawn launch marked the 20th successful beginning of a Space Transportation System (STS) flight. Col. Covey piloted this mission on Aug. 27, 1985, which carried three communications satellites for in-space deployment and hopes for returning an errant one to operating condition.

Col. Covey, pilot aboard the 1985 Discovery mission, "borrows" the commander's seat during onboard mission activity.

mately 800 critical non-redundant items in the shuttle. Failure of any one of these systems could end the mission.

According to Col. Covey, there have been over 150 modifications to the Discovery since he last piloted that craft in 1985. These changes range from improving the brakes (the shuttle stopped landing at Cape Canaveral because the brakes were not good enough to land on the short runway there) to improving the front-wheel steering. Another major modification was made in the valve controls that feed liquid fuel from the large central external tank into the shuttle motors.

Once these changes have been completed, the Discovery will be "powered up" in its hangar. Because many of these modifications have been electrical, Discovery has had no power. However, NASA soon will begin internal procedures in Discovery in preparation of its June 1988 flight date.

3) Designing a Crew Escape System was the third recommendation. "The astronauts have always asked the shuttle designers for as much help as possible in giving us escape capabilities if we have a problem in the shuttle," said Col. Covey.

Under the current design there was no escape for the Challenger crew. The bail-out escape system consisted of a handle that a crew member would pull to blow a hatch and the entire crew would use their parachutes and jump out. However, this system works only if the shuttle is in a controlled gliding flight. It would work if the shuttle failed to achieve orbit and the crew could not get to a landing site.

"They are now looking at tractor rockets," said the colonel, "that would pull us out of a chute in a side hatch so we wouldn't hit the wing or the tail of the shuttle when we bailed out. Then you would probably be floating in a one-person raft in the ocean about a thousand miles from land and the main problem would be for the rescue people to find you."

4) The fourth major commission recommendation was a change in NASA management. Astronauts are now in some major NASA management positions, unlike prior to the Challenger disaster. And some astronauts who were managers in name only are now truly involved in management decisions.

Says Col. Covey: "Many of the previous programs were geared toward "industrial safety" — would the workers around the shuttle be injured during manufacturing or testing? Now we have programs to see how a design would affect the

A smiling Dick Covey will be one of five veteran astronauts to man the first space shuttle flight since the Challenger disaster. NASA feels the most important part of this June 1988 mission will be to go up and come back safely.

crew while it's flying. This program is growing; it's still not as good as the Air Force's or the Navy's or an airline company's, but it is getting better."

There are various other tests that have been implemented and some other major redesigns that were planned *before* the Challenger accident. A failure of any of these systems could delay the scheduled launch of Discovery this coming June. However, at the time of this writing, all systems are on or near schedule.

Next summer's space shuttle flight will last four days and will have five crew members. Commander Richard Hauck has been on two previous flights and George "Pinky" Nelson will be the mission specialist. Nelson has been on two previous flights, including the one in which he piloted the manned maneuvering unit (MMU) for the first "untethered" flight in history. The other two crew members, besides Col. Covey, are Mike Lounge and Dave Hilmers, both veterans of one previous space flight.

This will be the first "all veteran" flight since Apollo 11. "I think NASA is doing this because of the importance of the mission," said Covey, "and the crew needs to be able to concentrate more on the changes in the vehicle than on their own orientation to spaceflight."

Discovery's payload will consist of an inertial upper-stage booster with a tracking data relay satellite. NASA has determined that this is their most important payload so far. It weighs about 40,000 pounds and takes up the entire cargo bay, so it is the only payload on this flight. This satellite is an exact replica of the one aboard the Challenger and, Covey says, it is just as important now as it was then. This satellite will support space shuttle operations and is particularly important to future Department of Defense flights.

"The most important part of this mission will be to go up and come back safely," says Col. Covey. "We will show that the new SRBs work, the new on-board modifications are functioning properly, and that NASA can fly the space shuttle again." Besides this June flight, there are two more shuttle missions scheduled in 1988 and seven in 1989.

The five-member flight crew of the next space shuttle mission, STS-26, are, left to right: Mission Specialist David Hilmers, Pilot Richard Covey, Mike Lounge, Commander Frederick "Rick" Hauck, and George "Pinky" Nelson.

According to Richard Covey, prospective shuttle pilots should repeat what others (including himself) have done: become a test pilot first. Since 1978, all pilot astronauts have been graduates of military test pilot schools. All but three (of the approximately 35) have been active-duty military pilots who flew high-performance experimental aircraft. The other three pilots were former military pilots flying experimental aircraft for NASA as test pilots.

The other method for obtaining a seat on the shuttle is as a mission specialist. Covey recommends that you be the best at what you do. Although a person's area of specialization may vary, it is a person's standing in that field that seems to impress NASA officials.

Covey's own motivation to be an astronaut is an extension of his education, his career in the military and his love of flying. "Flying the shuttle is one of the ultimate pleasures for any flying enthusiast. Where else can you fly faster and higher?" muses the colonel.

Col. Richard Covey is optimistic about the future of America's manned spaceflights. Though he admits 1986 was a bad year for the U.S. space program, with the Challenger disaster and the failures of the Delta and Atlas-Centaur rockets, he sees great improvements and therefore an even greater future.

Comparing the Russian space program with the United States' program, Covey says, "The USSR trucks along at a slow pace while the U.S. goes along in big spurts. Even though the USSR already has a space station, it's nothing like the space station the U.S. has on the drawing boards.

"The bottom line," says Col. Covey, "is that we are back. We will have a safer, more reliable space shuttle system when we do fly. And we won't fly until we are ready. We astronauts don't want anyone to think they have to hurry up for us. We understand it is important that they do their job right to get it ready to fly and to fly safely. That is going to pay off for us in the fact that we are going to fly more missions safely later on.

"There are about 80 astronauts now, and they all volunteered," says Col. Covey. "I'm proud to go." STOP


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