Space Shuttle Challenger Disaster - A NASA Tragedy

From Nick Greene,
Your Guide to Space / Astronomy.
http://space.about.com/cs/challenger/a/challenger.htm

Part 1: The Launch and Disaster

It was a NASA tragedy.

NASA's Shuttle program was begun in the 1970s, to create reusable craft for transporting cargo into space. Previous space craft could only be used once, then were discarded. The first shuttle, Columbia was launched in 1981. One year later, the Challenger rolled off the assembly line as the second shuttle of the US fleet. They were followed by Discovery in 1983 and Atlantis in 1985.

The Challenger flew nine successful missions before that fateful day of the disaster in 1986.

Shuttle mission 51L was much like most other missions.

The Challenger was scheduled to carry some cargo, the Tracking Data Relay Satellite-2 (TDRS-2), as well as fly the Shuttle-Pointed Tool for Astronomy (SPARTAN-203)/Halley's Comet Experiment Deployable, a free-flying module designed to observe tail and coma of Halleys comet with two ultraviolet spectrometers and two cameras.

One thing made this mission unique. It was scheduled to be the first flight of a new program called TISP, the Teacher In Space Program. The Challenger was scheduled to carry Sharon Christa McAuliffe, the first teacher to fly in space.

Selected from among more than 11,000 applicants from the education profession for entrance into the astronaut ranks, McAuliffe was very excited about the opportunity to participate in the space program. "I watched the Space Age being born and I would like to participate."

Besides McAuliffe, the Challenger crew consisted of mission commander Francis R. Scobee; pilot Michael J. Smith; mission specialists Ronald E. McNair, Ellison S. Onizuka, and Judith A. Resnik; and payload specialists Gregory B. Jarvis. Christa was also listed as a payload specialist.

From the beginning, though, Shuttle Mission STS-51L was plagued by problems. Liftoff was initally scheduled from at 3:43 p.m. EST on January 22, 1986. It slipped to Jan. 23, then Jan. 24, due to delays in mission 61-C and finally reset for Jan. 25 because of bad

weather at transoceanic abort landing (TAL) site in Dakar, Senegal. The launch was again postponed for one day when launch processing was unable to meet new morning liftoff time. Predicted bad weather at Kennedy Space Center (KSC) caused the launch to be rescheduled for 9:37 a.m. EST, Jan. 27, but it was delayed another 24 hours when ground servicing equipment hatch closing fixture could not be removed from orbiter hatch.

The fixture was sawed off and an attaching bolt drilled out before closeout completed. During this delay, the cross winds exceeded limits at KSC's Shuttle Landing Facility. There as a final delay of two hours when a hardware interface module in the launch processing system, which monitors fire detection system, failed during liquid hydrogen tanking procedures. The Challenger finally lifted off at 11:38:00 a.m. EST.

Seventy three seconds into the mission, the Challenger exploded, killing the entire crew.

The reaction was immediate, from the crowds of family and friends gathered to watch the launch of the Space Shuttle Challenger, to the millions tuned in worldwide, most people were stunned. In a speech later that day, President Ronald Reagan expressed the feelings of many who were grieving.

"Today is a day for mourning and remembering," he said. "Nancy and I are pained to the core over the tragedy of the shuttle Challenger. We know we share this pain with all of the people of our country.

This is truly a national loss. Nineteen years ago, almost to the day, we lost three astronauts in a terrible accident on the ground. But we've never lost an astronaut in flight. We've never had a tragedy like this. And, perhaps, we've forgotten the courage it took for the crew of the shuttle. But the Challenger Seven were aware of the dangers and overcame them and did their job brilliantly. We mourn seven heroes."

Afterwards, a special commission to investigate the cause of the Space Shuttle Challenger accident was appointed by President Reagan. Headed by former secretary of state William Rogers the commission included former astronaut Neil Armstrong and former test pilot Chuck Yeager.

The commission's report cited the cause of the disaster as a the failure of an “O-ring” seal in the solid-fuel rocket on the Space Shuttle Challenger's right side. The faulty design of the seal coupled with the unusually cold weather, let hot gases to leak through the joint. Booster rocket flames were able to pass through the failed seal enlarging the small hole. These flames then burned through the Space Shuttle Challenger's external fuel tank and through one of the supports that attached the booster to the side of the tank. That booster broke loose and collided with the tank, piercing the tank's side. Liquid hydrogen and liquid oxygen fuels from the tank and booster mixed and ignited, causing the Space Shuttle Challenger to tear apart.

The commission not only found fault with a failed sealant ring but also with the officials at the National Aeronautics and Space Administration (NASA) who allowed the shuttle launch to take place despite concerns voiced by NASA engineers.

The entire space shuttle program was grounded during the Space Shuttle Challenger Commission's investigation and did not resume flying until shuttle designers made several technical modifications and NASA management implemented stricter regulations regarding quality control and safety. Shuttle missions resumed on September 28, 1988, with the flight of the shuttle Discovery.

In 1991, the shuttle Endeavour joined the fleet to replace the Challenger, again bringing the number of ships to four.

Over the next few months and years, the family members of the crew of shuttle Challenger flight 51L dealt with their grief. With the support of family and friends, as well as people worldwide who joined in the grieving process, they lived day to day, and though they will never forget, they managed to continue with their lives.

As a tribute to the memories of their loved ones, the families helped form the Challenger Organization, which provide resources for students, teachers, and parents for educational purposes.

Included in these resources are 42 Learning Centers in 26 states, Canada, and the UK which offer a two-room simulator, consisting of a space station, complete with communications, medical, life, and computer science equipment, and a mission control room patterned after NASA's Johnson Space Center and a space lab ready for exploration.

For many, the Challenger disaster was a kind of life-altering event, as the assassination of President Kennedy was for an older generation. Many of us will always remember where we were and what we were doing when we witnessed or heard about the explosion. Most of us consider the lost crewmembers to be heroes.

The evening of the explosion, President Reagan said it well, "The crew of the space shuttle Challenger honored us in the way in which they lived their lives. We'll never forget them nor the last time we saw them this morning as they prepared for their journey and waved goodbye and slipped the surly bounds of Earth and touched the face of God."

Part 4 - The Challenger Center

So, what is the Challenger Center?

"Challenger Center is an international, not-for-profit education organization that was founded by the families of the astronauts from Challenger Space Shuttle mission 51-L."

How does the Challenger Center work?

"Challenger Center for Space Science Education uses students' natural enthusiasm for space to create innovative learning experiences for imaginative young minds. By transforming the way teachers teach and students learn, Challenger Center is creating a new generation of explorers."

Where can I find a Challenger Learning Center?

"There are more than 50 Challenger Learning Centers Throughout the United States, Canada and Great Britain with more opening every year."

Learn more about the Challenger Center at their website.

* Quotes are from the Challenger Center website.