



7 myths about the Challenger shuttle disaster

It didn't explode, the crew didn't die instantly and it wasn't inevitable

By James Oberg

NBC News space analyst

Special to MSNBC

Updated: 11:25 a.m. ET Jan. 27, 2006

HOUSTON - Twenty years ago, millions of television viewers were horrified to witness the live broadcast of the space shuttle Challenger exploding 73 seconds into flight, ending the lives of the seven astronauts on board. And they were equally horrified to learn in the aftermath of the disaster that the faulty design had been chosen by NASA to satisfy powerful politicians who had demanded the mission be launched, even under unsafe conditions. Meanwhile, a major factor in the disaster was that NASA had been ordered to use a weaker sealant for environmental reasons. Finally, NASA consoled itself and the nation with the realization that all frontiers are dangerous and to a certain extent, such a disaster should be accepted as inevitable.

At least, that seems to be how many people remember it, in whole or in part. That's how the story of the Challenger is often retold, in oral tradition and broadcast news, in public speeches and in private conversations and all around the Internet. But spaceflight historians believe that each element of the opening paragraph is factually untrue or at best extremely dubious. They are myths, undeserving of popular belief and unworthy of being repeated at every anniversary of the disaster.

The flight, and the lost crewmembers, deserve proper recognition and authentic commemoration. Historians, reporters, and every citizen need to take the time this week to remember what really happened, and especially to make sure their memories are as close as humanly possible to what really did happen.

If that happens, here's the way the mission may be remembered:

- Few people actually saw the Challenger tragedy unfold live on television.
- The shuttle did not explode in the common definition of that word.
- The flight, and the astronauts' lives, did not end at that point, 73 seconds after launch.
- The design of the booster, while possessing flaws subject to improvement, was neither especially dangerous if operated properly, nor the result of political interference.
- Replacement of the original asbestos-bearing putty in the booster seals was unrelated to the failure.
- There were pressures on the flight schedule, but none of any recognizable political origin.
- Claims that the disaster was the unavoidable price to be paid for pioneering a new frontier were self-serving rationalizations on the part of those responsible for incompetent engineering management — the disaster should have been avoidable.

Myth #1: A nation watched as tragedy unfolded

Few people actually saw what happened live on television. The flight occurred during the early years of cable news, and although CNN was indeed carrying the launch when the shuttle was destroyed, all major broadcast stations had cut away — only to quickly return with taped relays. With Christa McAuliffe set to be the first teacher in space, NASA had arranged a satellite broadcast of the full mission into television sets in many schools, but the general public did not have access to this unless they were one of the then-few people with satellite dishes. What most people recall

as a "live broadcast" was actually the taped replay broadcast soon after the event.

Myth #2: Challenger exploded

The shuttle did not explode in the common definition of that word. There was no shock wave, no detonation, no "bang" — viewers on the ground just heard the roar of the engines stop as the shuttle's fuel tank tore apart, spilling liquid oxygen and hydrogen which formed a huge fireball at an altitude of 46,000 ft. (Some television documentaries later added the sound of an explosion to these images.) But both solid-fuel strap-on boosters climbed up out of the cloud, still firing and unharmed by any explosion. Challenger itself was torn apart as it was flung free of the other rocket components and turned broadside into the Mach 2 airstream. Individual propellant tanks were seen exploding — but by then, the spacecraft was already in pieces.

Myth #3: The crew died instantly

The flight, and the astronauts' lives, did not end at that point, 73 seconds after launch. After Challenger was torn apart, the pieces continued upward from their own momentum, reaching a peak altitude of 65,000 ft before arching back down into the water. The cabin hit the surface 2 minutes and 45 seconds after breakup, and all investigations indicate the crew was still alive until then.

What's less clear is whether they were conscious. If the cabin depressurized (as seems likely), the crew would have had difficulty breathing. In the words of the final report by fellow astronauts, the crew "possibly but not certainly lost consciousness", even though a few of the emergency air bottles (designed for escape from a smoking vehicle on the ground) had been activated.

The cabin hit the water at a speed greater than 200 mph, resulting in a force of about 200 G's — crushing the structure and destroying everything inside. If the crew did lose consciousness (and the cabin may have been sufficiently intact to hold enough air long enough to prevent this), it's unknown if they would have regained it as the air thickened during the last seconds of the fall. Official NASA commemorations of "Challenger's 73-second flight" subtly deflect attention from what was happened in the almost three minutes of flight (and life) remaining AFTER the breakup.

Myth #4: Dangerous booster flaws result of meddling

The side-mounted booster rockets, which help propel the shuttle at launch then drop off during ascent, did possess flaws subject to improvement. But these flaws were neither especially dangerous if operated properly, nor the result of political interference.

Each of the pair of solid-fuel boosters was made from four separate segments that bolted end-to-end-to-end together, and flame escaping from one of the interfaces was what destroyed the shuttle. Although the obvious solution of making the boosters of one long segment (instead of four short ones) was later suggested, long solid fuel boosters have problems with safe propellant loading, with transport, and with stacking for launch — and multi-segment solids had had a good track record with the Titan-3 military satellite program. The winning contractor was located in Utah, the home state of a powerful Republican senator, but the company also had the strengths the NASA selection board was looking for. The segment interface was tricky and engineers kept tweaking the design to respond to flight anomalies, but when operated within tested environmental conditions, the equipment had been performing adequately.

Myth #5: Environmental ban led to weaker sealant

A favorite of the Internet, this myth states that a major factor in the disaster was that NASA had been ordered by regulatory agencies to abandon a working pressure sealant because it contained too much asbestos, and use a weaker replacement. But the replacement of the seal was unrelated to the disaster — and occurred prior to any environmental ban.

Even the original putty had persistent sealing problems, and after it was replaced by another putty

that also contained asbestos, the higher level of breaches was connected not to the putty itself, but to a new test procedure being used. "We discovered that it was this leak check which was a likely cause of the dangerous bubbles in the putty that I had heard about," [wrote physicist Richard Feynman](#), a member of the Challenger investigation board.

And the bubble effect was unconnected with the actual seal violation that would ultimately doom Challenger and its crew. The cause was an inadequate low-temperature performance of the O-ring seal itself, which had not been replaced.

Myth #6: Political pressure forced the launch

There were pressures on the flight schedule, but none of any recognizable political origin. Launch officials clearly felt pressure to get the mission off after repeated delays, and they were embarrassed by repeated mockery on the television news of previous scrubs, but the driving factor in their minds seems to have been two shuttle-launched planetary probes. The first ever probes of this kind, they had an unmovable launch window just four months in the future. The persistent rumor that the White House had ordered the flight to proceed in order to spice up President Reagan's scheduled State of the Union address seems based on political motivations, not any direct testimony or other first-hand evidence. Feynman personally checked out the rumor and never found any substantiation. If Challenger's flight had gone according to plan, the crew would have been asleep at the time of Reagan's speech, and no communications links had been set up.

Myth #7: An unavoidable price for progress

Claims that the disaster was the unavoidable price to be paid for pioneering a new frontier were self-serving rationalizations on the part of those responsible for incompetent engineering management — the disaster should have been avoidable. NASA managers made a bad call for the launch decision, and engineers who had qualms about the O-rings were bullied or bamboozled into acquiescence. The skeptics' argument that launching with record cold temperatures is valid, but it probably was not argued as persuasively as it might have been, in hindsight. If launched on a warmer day, with gentler high-altitude winds, there's every reason to suppose the flight would have been successful and the troublesome seal design (which already had the attention of designers) would have been modified at a pace that turned out to have been far too leisurely. The disaster need never have happened if managers and workers had clung to known principles of safely operating on the edge of extreme hazards — nothing was learned by the disaster that [hadn't already been learned](#), and then forgotten.

NBC News space analyst James Oberger spent 22 years at NASA's Johnson Space Center as a Mission Control operator and an orbital designer.

© 2006 MSNBC Interactive

© 2006 MSNBC.com

URL: <http://www.msnbc.msn.com/id/11031097/>