Photo: NASA

Episode 5: Disaster Strikes

This transcript is based on the fifth episode of *Moonstruck*, a podcast about humans in space, produced by *DraftHouse Media* and featuring analysis from the *Center for Strategic and International Studies' Aerospace Security Project*. Listen to the full episode on **iTunes**, **Spotify**, or on our **website**.

BY Thomas González Roberts // PUBLISHED September 19, 2018

IN JULY 1969, as three astronauts were barreling through outer space at over 30,000 miles per hour, the late President Kennedy's promise to the American people was being fulfilled. Back on Earth, the White House speechwriters' office quietly sent a memo to President Richard Nixon's chief of staff to be tucked away in a desk drawer. Its title: "In Event of Moon Disaster."[1]

So far on the show, we've heard stories from the history of human spaceflight that have ended well. American astronauts and Soviet cosmonauts spent the race to the Moon escaping tragedy in outer space. But after years of remarkable success, their luck ran out.

This is Moonstruck, a podcast about humans in space.

I'm Thomas González Roberts.

The high chance of death in outer space was not lost on its earliest pioneers. Astronauts and engineers knew the risks of their work. The first mission to land a man on the Moon took these risks to the next level. For Apollo 11 astronauts Neil Armstrong and Buzz Aldrin, walking on the Moon was the easy part. The riskiest stage of their mission was the short trip from the surface of the Moon back to the command module that was parked in lunar

Thomas González Roberts is the host and executive producer of **Moonstruck**, *and a space policy researcher at the* **CSIS Aerospace Security Project**.

orbit ready to take them home. They had about a 50-50 chance of success and only one shot to get it right.[2]

If the ascent engine failed, the two astronauts would be stranded on the dusty surface of the Moon, where they'd soon run out of oxygen and succumb to their choice of suffocation or suicide. Michael Collins—the third member of the crew—would be left in orbit above their heads, with no way to retrieve them. NASA and the crew members had already agreed that in case of failure, Collins would save himself and return to Earth on his own. He would become the only survivor of the human race's first—and maybe last—visit to another world.

And if Michael Collins trekked back to Earth solo, there'd be no parade waiting for him at home. With the Moon shrinking into the distance, President Nixon would address the public; reading the words from the memo in his desk drawer.

> Fate has ordained that the men who went to the Moon to explore in peace will stay on the Moon to rest in peace… These brave men, Neil Armstrong and Edwin Aldrin, know that there is no hope for their recovery. But they also know that there is hope for mankind in their sacrifice.

But Neil Armstrong and Buzz Aldrin weren't stranded on the Moon and President Nixon never read that memo to the American people. Two more lucky astronauts survived their mission.

CNN Newscast: *They are counting, the ice is cleared away and Challenger should be going away very soon. Let's go down to the Kennedy Space Center and take a look at Challenger sitting on the pad as they continue the countdown...*[3]

The cold morning of January 28, 1986, started like every launch that came before it. At the time, NASA had been flying astronauts for five years using the Space Shuttle, a new launch vehicle designed to carry up to seven astronauts into low Earth orbit.

The seven crew members waved to the crowd in their pale blue flight suits as they approached the rocket on the launch pad. This crew was one of the most diverse groups of astronauts ever assembled: an African American man, an Asian American man, and two women, including a schoolteacher flying to space as part of NASA's new *Teacher in Space Project*. Sealed inside the crew cabin, they awaited lift off.

Mission Control: *T-minus 2 minutes, 44 seconds...*[4]

Confident in the Shuttle's success, NASA instructed schoolchildren from across the country to watch the launch on TV. But it was this launch in 1986, the last flight of the Shuttle named *Challenger*, that would result in the first American death in space—almost two decades after the Apollo Program ended.

CNN: *T-minus 10, 9, 8, 7, 6, we have main engine start, 4, 3, 2, 1, and lift off. Lift off of the 25th Space Shuttle mission and it has cleared the tower!*

The Shuttle climbed off the launch pad; drawing a thick bright column into the cloudless sky. But 73 seconds after launch, something went wrong. The Space Shuttle broke apart in the sky, disintegrating into gray smoke.

The live TV cameras turned away from the sky and towards the bleachers on the ground where spectators were watching the Shuttle launch from a safe distance. The camera operator then panned over to the portion of the stands where the astronauts' families were seated. The shot was zoomed in close enough to identify individual faces, some of them family members of those onboard, all twisted in horror as they watched their loved ones disappear into the dark mark above their heads.

All seven crew members were killed in the Challenger disaster. The Space Shuttle program was immediately put on hold and that night's State of the Union Address by U.S. President Ronald Reagan was postponed. A few days later, without an official conclusion for what caused the disaster, the President gave the remarks his

predecessors had been fortunate enough to keep filed away in a desk drawer.

President Ronald Reagan: *Thank you for allowing me to delay my address until this evening. We pause together to mourn and honor the valor of our seven Challenger heroes. And I hope that we are now ready to do what they would want us to do. Go forward, America, and reach for the stars.*[5]

Several months later, a commissioned report confirmed the cause of the accident. The cold temperatures during the Shuttle's launch damaged the seals on one of the two solid rocket boosters strapped on either side of the Challenger's external fuel tank, causing burning gas to escape into the open air.[6]

The disaster grounded the Shuttle Program for over two years. The U.S. human launch rate has still never recovered. To this day, 1985 remains the greatest year for human space launch.[7]

After the Shuttle program got back on its feet following the Challenger disaster, NASA constructed a replacement spacecraft to fill the Challenger's spot within the Space Shuttle fleet. By 1992, the program was flying seven or eight missions per year. But ten years later, in 2003, tragedy again struck the American space program.

Sean O'Keefe: *The Challenger incident that occurred in 1986 was a catastrophe of the highest order. It was a loss of seven crew members on lift-off. That was the one and only fatality event—or as the case were, we lost the entirety of the Shuttle—in the course of its history up until February 1, 2003, on reentry coming back from space is when Space Shuttle Columbia was destroyed.*

That's Sean O'Keefe. He was NASA's Administrator—the agency's most senior official—in 2003, when the Space Shuttle program lost its second Space Shuttle: the Columbia.

SO: *So, it was not the same kind of cataclysmic moment that was captured at Challenger—that was on lift off when it exploded. This is one that kind of unfolded over time.*

The Columbia wasn't lost on launch like the Challenger seventeen years earlier. Instead it had a successful mission in space; with its crew working around the clock for 16 days, orbiting the Earth more than 250 times.

When it's time to return to Earth, the Space Shuttle reenters the atmosphere and lands like a typical airplane on a runway on the ground. To be honest, the landing is probably the least glamorous part of a space mission. There's no fire and smoke like a launch; no microgravity or protective spacesuits like on orbit during a spacewalk.

On February 1, 2003, Sean was waiting on the runway to welcome the astronauts back to Earth in person.

SO: *I was there that day along with all the families of the seven crew members and many friends of their families and so forth. And it went from being a moment of great anticipation and elation over the fact that we're coming back after a very successful two-week mission to a stillness recognizing that the time that had been anticipated for the Shuttle to land had passed.*

Mission Control: *Columbia, Houston, comm check.*[8]

That was how NASA learned that something had gone wrong with the Columbia Space Shuttle.

MC: *Columbia, Houston, UHF comm check.*

It missed its landing window. Then, NASA's mission control lost communication with the spacecraft entirely.

Sean O'Keefe: *There was nothing dramatic about the accident itself that you could see. It was the stillness and absence of any evidence and the fact that it did not return to Florida at the appointed time that then alerted everyone there to the fact that there must have been some catastrophic event that had occurred.*

Mission Control: *Columbia, Houston, UHF comm check.*

Sean then thought of the families of the Challenger astronauts, sitting on the bleachers, waiting, unaware of their loved ones' fates. He didn't want the news cameras to turn to the families on the runway in the same way they did in 1986.

Sean O'Keefe: *That was still very much a thought in the mind of a lot of folks that it really—not only intruded on the privacy of the families it also just capitalized on a horrific event; sensationalized a horrific event—that I was committed to be sure that that never would happen in a case like this.*

So he hid them from view.

SO: *The fact that it hadn't returned as it was scheduled was enough to prompt us—me—to instruct our team escort the families back to the crew quarters, until we knew what the consequences were, what had happened, where it was...*

While the families were tucked away in the crew quarters—the room for the astronauts to recover once they step out of the Shuttle—Sean learned of Columbia's fate.

SO: *My worst fears were realized within the hour that we had lost Columbia.*

As the Shuttle was descending through the atmosphere, its heat shield failed, extremely hot air entered the Shuttle's internal structure, and the spacecraft disintegrated. Hundreds of thousands of pieces of debris rained down on eastern Texas and Louisiana. Hours later, U.S. President George W. Bush echoed the words of President Reagan in an announcement to the American public.

President George W. Bush: *At nine o'clock this morning, Mission Control in Houston lost contact with our Space Shuttle Columbia. A short time later, debris was seen falling from the skies above Texas. The Columbia is lost. There are no survivors.*[9]

Just like the Challenger, the Columbia Space Shuttle was at full capacity on its final flight, carrying six American astronauts and the first Israeli astronaut to space. But unlike the first Shuttle tragedy, the second happened over land instead of the ocean. The debris from Columbia fell in backyards, public parks, school playgrounds, and swimming holes. Minutes after mission control lost communication with the spacecraft, NASA began its recovery process, sending resources to the Barksdale Air Force Base in Shreveport, Louisiana.[10]

Hidden in this horrible tragedy was a rare opportunity. For the first time, the American space program was not hidden behind a TV screen or caution tape. With the Columbia in shambles—dripping toxic fuel and singed with fire—NASA had never been more exposed. The agency released a statement asking for the public's help to identify pieces of debris.[11]

And the American public responded in force.

Thousands of volunteer debris hunters joined the efforts of over 60 government agencies to collect as much of the Columbia as possible in the months after its final flight.[12] Eight-four thousand pieces of the Shuttle were recovered and returned to NASA. That’s about 40 percent of the spacecraft. But volunteers found more than just burnt metal. Remains of each of the seven crew members were also recovered and returned to their families.

Whenever I show guests around the Smithsonian National Air and Space Museum, the Space Shuttle program is always the last stop. And to me it makes sense—it was the last rocket to carry astronauts to space from American soil. But despite its flight record of 130 total launches, the Space Shuttle is mostly remembered for its darkest chapters.

But when he spoke to the families of the Columbia astronauts, NASA Administrator Sean O'Keefe was reminded that it was because of this tragic accident, not in spite of it, that the United States must continue its pursuit of space travel.

Sean O'Keefe: *On the day of the accident, the family members of the crew—as absolutely distraught as they were, having suffered this horrific tragedy on that day, and coming to grips with the fact that their lives would never be the same—nonetheless, were driven to tell me within that first few hours that our job, my job, was to go find out what happened, make absolutely certain that we do what's necessary to correct it so it wouldn't happen again, and then to return to doing what those seven remarkable people had given their lives to do. And it was a motivator, to the largest order you can imagine.*

When the Space Shuttle retired in 2011, NASA had no replacement rocket available to launch astronauts to space from the United States. The next time a human is launched from Cape Canaveral, it will be at the helm of a private space company.

Jim Bridenstine: *Now here's what's exciting about today. For the first time since 2011, we are on the brink of launching American astronauts, on American rockets, from American soil.*[13]

Earlier this summer, the current NASA Administrator announced the names of nine astronauts selected to fly in the agency's *Commercial Crew Program*, a new human spaceflight program in collaboration with private companies Boeing and SpaceX to launch humans from the United States before 2020.

JB: *And now it's time to meet the brave Americans who will be flying on these spacecraft developed right here in the United States.*

As the nine newly assigned astronauts grinned and waved at the crowd, a new question hung in the air. What happens if a private company—and not the U.S. government—were to kill an astronaut during spaceflight?

The truth is, it's not very clear. Some argue the laws in the U.S. surrounding participants traveling aboard a private company's space vehicle are underdeveloped, behind the times, and potentially catastrophic to the fast-growing commercial space industry.[14] The principal agreements governing the use of space and the treatment of astronauts is from the earliest age of space history, well before commercial companies stepped onto the scene.

By some interpretations, when it comes to a private astronaut being injured or killed aboard a company's spacecraft, the U.S. government leaves it up the states to figure out who's to blame and how the party responsible will be held liable for the accident. That means the ramifications for a spaceflight injury or death in one state could look very different from those in another.

In an attempt to attract private spaceflight companies to their states, some state governments have offered immunity to space companies for astronaut deaths and injuries resulting from the inherent risk for spaceflight. Texas, in particular, goes even further—offering a blanket immunity to companies for injury, death, emotional distress, damage to property, and a laundry list of potential damages.[15]

While some may consider these state-by-state laws a race to the bottom for astronaut safety, others argue that limiting liability is the only way to protect the growing space travel industry; one that may one day lead to a faster alternative to traditional commercial air travel.

But this conversation about private companies endangering astronauts is not entirely hypothetical. In 2014, a private company lost a pilot during a test of its new spaceplane. The company later proved that it was pilot error—and not spacecraft malfunction—that was the principal cause of the accident.[16] Despite an employee getting killed on the job, the company still operates today and plans to give paying passengers an opportunity to experience the sensation of spaceflight when it's back up and running.

Sean O'Keefe: *People feel a sense of pain, sorrow, and tragedy when things like this occur. Organizations don't.*

For the Space Shuttle program, it took the deepest troughs of failure to remind us of what we knew all along. Spaceflight is dangerous. Getting it right is hard. It's up to the next chapter of American spaceflight to prove that that lesson has been learned.

Notes

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