



Photo: NASA

Episode 3: Space Germs

This transcript is based on the third 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 April 25, 2018

PRESIDENT JOHN F. KENNEDY: *I therefore ask the Congress, above and beyond the increases I have earlier requested for space activities, to provide the funds which are needed to meet the following national goals.*

In May 1961, less than a month after NASA launched the first American astronaut to space, President John F. Kennedy approached the United States Congress with a special announcement:

JFK: *I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth.*

With only one human spaceflight under its belt, NASA

was publicly challenged—across TV screens and radio boxes—to achieve the greatest feat in human space exploration, landing a man on the Moon and bringing him home safely. And with a deadline.

Going to the Moon was a significant change from the work NASA had been doing in the first human space program, Project Mercury. Astronaut Alan Shepard, the first American in space, only flew for a few minutes.¹ A trip around the Moon takes over three days. When

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operating a spacecraft in orbit around the Earth, astronauts are only a few hundred miles from the surface, but astronauts on a mission to the Moon would travel almost 250,000 miles away from home. Project Apollo, the NASA mission to the Moon, would take us farther than we'd ever gone before.

But this week's episode of *Moonstruck* is not the story of three American astronauts landing on the Moon. It's about the moment they splashed down in the Atlantic Ocean, and the 21 days that followed. After the relentless, deadline-driven, almost impossible moonshot mission was complete, the next three weeks would be all about *waiting*.

Sometimes, it's the tiniest stories in the history of human spaceflight—not the ones on the pages of history textbooks or popular movie screens—that teach us the most about ourselves and remind us why we went to space in the first place. You're listening to *Moonstruck*, a podcast about humans in space. I'm Thomas González Roberts.

NASA designed its Apollo spacecraft to return to Earth with a big splash in the ocean; a soft option compared to the Kazakh highlands the Soviets used to land their spacecraft.

After barreling through the atmosphere at more than 15,000 miles per hour, the Apollo command module, with its three astronauts squeezed on board, deployed three parachutes at 24,000 feet above the Earth's surface, landing in the northern Pacific Ocean. If everything went according to plan, an aircraft carrier anchored nearby would swiftly retrieve the crew and bring them back to shore.²

Prior to Apollo 11, astronauts returning to Earth from space had never visited another celestial body; just the inside of their spacecrafts and occasionally small stints in open space during space walks. Touching down on the Moon meant exposing astronauts to the unknown environment on the Moon's surface.

This kind of thing makes me think back to the earliest years of aviation, when pilots and flight engineers, not always knowing where they would land, had to pack for the worst case scenarios. When early air flight power couple Charles and Anne Lindbergh planned their trip around the world in 1933 they had to be ready for anything Earth might throw at them. I always mention Anne's travel preparations whenever I give my tour of the Smithsonian National Air and Space Museum as a docent:

TGR: *And right behind me now is Anne and Charles Lindbergh's dual-cockpit Lockheed Sirius monoplane. And what I like so much about this tiny plane is how much Anne could fit inside it during their trips. In their famous 1933 transatlantic trip, Anne packed snow shoes, ice crampons, an 18-inch machete, and a 12-foot sled into this little storage compartment here.³ That's totally incredible. She didn't know where she'd have to land this of course, in the case of an emergency, but she wanted to be ready for anything.*

When Americans went to space for the first time during Project Mercury, astronauts were required to fly with a knife, a self-inflating life raft, ocean dye, and shark repellent, just in case they splashed down in the wrong spot in the ocean and needed the fend for themselves.⁴

But unlike the tundra of Greenland or the shark-infested waters of the northwest Atlantic, humans didn't fully know what they'd find on Moon—it was a true frontier.

So just like Anne Morrow Lindbergh, the scientists from the Apollo program wanted to prepare for anything.

John C. Stonesifer: *The National Academy of Science suggested to NASA that they establish a quarantine program to ensure sure that the Earth and its ecology would be protected from any possible hazard associated with the return of lunar material.*

That's John C. Stonesifer. He served as the NASA team leader aboard the U.S.S. Hornet, the Naval ship in charge of recovering the Apollo 11 spacecraft and quarantining its crew. The astronauts had to be contained, locked

away from the rest of the world, just in case they contracted a disease on the Moon that we wouldn't be able to treat here on Earth.

I had the chance to ask him about his time working on this critical juncture in human spaceflight history; the moments after the Apollo 11 landed back on Earth and the 21 days of quarantine that followed. He remembered his work on the project with incredible detail, despite it having been almost 50 years since the first Apollo astronauts returned from the Moon.

So what was the primary concern of the National Academies that required such an extensive quarantine process for the Apollo 11 astronauts?

JCS: *They were worried about the possibility of lunar pathogens being brought to Earth. Therefore, they asked NASA to protect the public's health, agriculture, and other living resources, also to protect the integrity of the lunar samples and the scientific experiments. That's a given any time you're conducting science. Protect the integrity of the sample and that was very important in this program. And also to ensure that the operational aspects of the program were least compromised.*

The astronauts weren't the only precious cargo aboard the command module. Astronauts Neil Armstrong and Buzz Aldrin had collected more than 45 pounds of lunar samples while on their two-hour mission on the lunar surface.⁵ The world's scientific community couldn't wait to get their hands on those Moon rocks.

But John's first priority was getting the astronauts to safety inside the quarantine facility.

First, a team of divers were deployed to meet the spacecraft in the water. The divers had to install a flotation collar around the spacecraft to keep it steady and give the astronauts a platform as they climbed out back onto Earth, and into the open air.

JCS: *So, another swimmer went down, he was called our isolation swimmer. He's dressed in a biological isolation*

garment, best description, might be similar to these hazmat suits that people wear to clean up an area that might be hazardous. It's a full suit with mask, filters. He opens the door and passes in three isolation garments for the astronauts to wear.

Once the astronauts slipped on their hazmat suits onboard the spacecraft, it was the isolation swimmer's job to hose them down with water.

JCS: *They're now supposedly clean of any lunar pathogens. They're picked up by the helicopter.*

When the astronauts arrived on the flight deck, they needed to immediately enter a quarantined environment. The traditional sick bay on board the U.S.S. Hornet couldn't offer the shipmen onboard total protection from the astronauts, so NASA depended on a mobile quarantine facility to seal off the Apollo astronauts from the rest of the world.

To me, this mobile quarantine facility, or MQF as they called it, is one of the most interesting objects in the history of human spaceflight. If you didn't know any better, you might say it looks identical to a standard Airstream trailer, with a big NASA sticker slapped on the outside. Shiny, aerodynamic—perfectly fitting for both the 1960s and the first trip to the Moon.

But inside, it was far from a regular trailer. Six years before the Moon landing, NASA contracted the Airstream Company to build four MQFs for the Apollo program for \$250,000; that's over \$2 million today.⁶ Although the resulting facility used the famous Airstream silhouette and skeleton, the inside was entirely new; tailor-made for this precise purpose.

JCS: *They completely modified the interior...they had to mount it on a platform that would meet the aircraft requirements, things that are loaded on the aircraft at that time had to withstand a 9g loading. So it was quite a rack underneath.*

When Neil Armstrong, Buzz Aldrin and Michael Collins exited the helicopter and entered the MQF, they didn't go alone. Two volunteers—an engineer and a doctor—joined them in quarantine, risking their lives should the astronauts have indeed been infected with a lunar disease.

John and his team communicated to the astronauts and the volunteers through a microphone and speaker system wired through the MQF and a bay window on the end of the trailer.

JCS: *The interior had communications, so we that could communicate with them from the ship's communication. And also communications such that the VIPs that were on board could conduct questions and congratulations and could be heard by people inside and also on the outside of the MQF.*

The astronauts didn't spend their entire 21-day quarantine period on the aircraft carrier—just the short trip to Hawaii, at which point the MQF was to be transported back to Houston. But before the ship made it to shore, it had a very special visitor.

JCS: *To brief the president was the highlight of my journey, except for the fact that everything worked well. To brief the president on the procedures and what was going to happen was, well I'll never forget it.*

President Richard Nixon: *I'd like you to know that I think that I'm the luckiest man in the world. And I say that not only because I have the honor to be President of the United States but particularly because I have the privilege of speaking to so many and welcoming you back to Earth.*

John worked closely with the Secret Service leaders to ensure that quarantine wasn't broken while the President was on the ship.

JCS: *I kept him eyeball to eyeball almost, the whole time—because I would have to tell him to get the president off the ship immediately. If we brok isolation, violated procedures*

dramatically, and we didn't get the president off, that ship with everybody on it, would have to stay at sea for 21 days.

Of course, quarantine wasn't broken, and President Nixon was never trapped on board the USS Hornet. Instead, the astronauts arrived to Hawaii two days later, were transported to the Lunar Receiving Laboratory in Houston, and remained healthy through the remaining 19 days of quarantine and beyond. It was later confirmed that the Moon was completely void of life and had no capacity to host any lunar pathogens. The quarantine process was deemed no longer necessary after the successful landing of Apollo 14, the last crew to use the facility.

As I was writing this episode, hyper-focused on these 21 days, I found myself reflecting a lot on what it must have felt like for the astronauts locked away in that trailer. They had just survived a trip to the Moon—a miracle of sorts—packed aboard a tiny spacecraft, thousands of miles away from everything and everyone they had ever known. But before they could enjoy their celebrity and reunite with their loved ones back in the warm sunlight on Earth, they were shut away again and isolated in another man made, metal box. With the fate of our world potentially on the line, their friends and families—as well as the adoring worldwide audience—had to wait.

Almost half a century later, we're still thinking about disease and contamination in space, but not in the way John's team practiced in 1969.

Late last year, NASA posted an open position on its online jobs portal: planetary protection officer. Who knew that being a superhero—protecting our planet from diseased aliens—would be an open application process. The internet loved it.

Even a 9-year-old submitted an application laying out why he should our planet's guardian. At least that's what he thought the job entailed. He thought maybe because he was young, he could learn to think like an alien and predict their next steps before a regular adult could. But

since we're not actually talking about caped crusaders, what did NASA have in mind here?

The quarantine process that John administered for the Apollo astronauts is one of the earliest examples of *planetary protection* in practice. This particular scenario—protecting Earth and its inhabitants from extraterrestrial samples—protected our planet from what is known *backward* contamination.⁷

Now, as NASA and commercial space companies turn to deeper space exploration (back to the Moon and beyond) it must take steps to protect other planets, too. That means avoiding *forward* contamination, or “the biological contamination of [the] solar system bodies” we find through space exploration.⁸ Preventing our own pathogens from latching aboard our spacecraft and making a new home on Mars, asteroids, or other foreign bodies, is a cornerstone of what's known as planetary protection policy.

Planetary protection is just that: planetary. It's something we have to all deal with collectively, rather than just leave it up to just a few countries. That's where the Outer Space Treaty comes into play.

United Nation Press Conference: *Refer to number six: No party will place any nuclear or other weapons of mass destruction in outer space or on a celestial body. And number five: the Moon and other celestial bodies shall be used exclusively for peaceful purposes. This is an arms control measure.*

An international treaty was signed in 1967 outlining how we should behave in space. That includes proper procedures for planetary protection.

What's so incredible to me about the Outer Space Treaty is how hopeful it is. Written at a time when only two countries on Earth could even attempt to travel to other worlds, it so vividly describes a peaceful future for how humans must act in the final frontier. Besides the part about planetary protection it also includes an article about how to treat astronauts if one lands in your

country unexpectedly and another about not placing weapons of mass destruction in orbit. Over 100 nations signed the document, perhaps hoping that one day, in the distant future, they too would be fortunate enough to travel to other worlds.⁹

Even though it was signed before the U.S. landed on the Moon, the Outer Space Treaty still holds up today when it comes to planetary protection.

Since our planet is the only home that most of us will ever know, we have to do everything in our power to protect it from foreign substances. While yes, it's certainly possible that an asteroid with alien bacteria makes it through our atmosphere and hits the ground, it's *human* space exploration poses the greatest threat to this kind of contamination.

A great deal of effort goes into searching our solar system for signs of life. It would be a true, potentially multi-billion dollar shame if scientists spent months or even years analyzing a foreign sample only to find organic matter from Earth that inadvertently traveled to another planet, hosted itself inside a sample, and traveled hundreds of thousands of miles back just to be found under a microscope, mere miles from its earthly point of origin.

The precautions established in the Outer Space Treaty and practiced by John Stonesifer were put in place to protect the integrity of space science, any neighbors we may have on other celestial bodies, and—most importantly of all—all life on Earth. Protecting planets is serious business.

Speaker John Boehner: *We will present a gold medal on behalf of the United States Congress to honorable John Glenn; Neil Armstrong, the first human to walk on the moon; Michael Collins, the pilot of the Apollo 11's command module; Dr. Buzz Aldrin...*

In November 2011, the Apollo 11 astronauts were each awarded the Congressional Gold Medal, the highest civilian honor, in a ceremony at the United States Capitol

Rotunda. And for good reason—Neil Armstrong, Buzz Aldrin, and Michael Collins are names forever written into the history of our human race.

JCS: *Nobody can compare to Neil Armstrong. I mean, that man was so brilliant, so down to Earth, so friendly. I mean just—everything you'd ask in an astronaut, in a pilot. Just such an amazing man.*

The astronauts were each allowed to invite someone to join them as an honored guest at the ceremony. One of those special guests was none other than John Stonesifer.

JCS: *It was an exciting life, and one of the best jobs a person could have. 🌟*

Notes

1. "Alan Shepard Completes His Mission," NASA, March 2, 2015, https://www.nasa.gov/multimedia/imagegallery/image_feature_1344.html.
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3. "Sheath, Machete, Lockheed Sirius 'Tingmissartoq', Lindbergh," National Air and Space Museum, March 23, 2018, <https://airandspace.si.edu/collection-objects/sheath-machete-lockheed-sirius-tingmissartoq-lindbergh>.
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5. "Apollo 11 Mission," Lunar and Planetary Institute, accessed April 25, 2018, https://www.lpi.usra.edu/lunar/missions/apollo/apollo_11/surface_opp/.
6. Owen Edwards, "Splendid Isolation," Smithsonian Magazine, July 2004, <https://www.smithsonianmag.com/science-nature/splendid-isolation-2482597/>.
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8. Ibid.
9. UN Office of Outer Space Affairs, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies." <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>.