

Sidedoor Season 4, Episode 12: Apollo 12's Really Close Call

[MUSIC]

Lizzie Peabody: This is Sidedoor, a podcast from the Smithsonian with support from PRX. I'm Lizzie Peabody.

[MUSIC]

Radio of the Apollo Saturn Launch: This is Apollo Saturn Launch control. We are now at T-minus 8 hours 58 mins and counting. We have a new weather forecast, just came in. There will be a 30% chance of light showers at launch time.

Lizzie Peabody: Conditions on the morning of November 14, 1969 were not ideal for a rocket launch.

Nick Partridge: It was a dark and stormy day, (laughter) which I know, it feels like kind of a cliched way to start a story, but it was a very important part of this story.

Lizzie Peabody: "This story" is about Apollo 12: America's second manned mission to the moon. Nick Partridge, a spokesperson for the Smithsonian's National Air and Space Museum, popped over to help me kick it off.

[MUSIC]

Radio of the Apollo Saturn Launch: The front which began passing through here late yesterday is not expected to now move through by launch time; however, this is not going to be a constraint to launch as presently viewed.

Nick Partridge: You know, it's still kind of gloomy, still kind of raining, but the lightning strikes were far enough away. They weren't within the zone, where you would worry about it hitting the rocket or anything and they were gonna go.

[MUSIC]

Lizzie Peabody: Crowds sheltered under ponchos and umbrellas at Kennedy Space Center in Cape Canaveral, FL. President Nixon was there.

[MUSIC]

Voice Over the News Radio: President Nixon to be the first President to watch a launch while in office.

Lizzie Peabody: Everybody waiting.

[MUSIC]

Nick Partridge: So, countdown comes.

Radio of the Apollo Saturn Launch: Ten, nine, eight, seven, six, five, ignition four, three, two, one...

Nick Partridge: They get to, you know, three, two, one, zero. The rocket comes to life and...

Radio of the Apollo Saturn Launch: Liftoff. Liftoff.

Nick Partridge: Can't overstate the size and power and complexity and danger associated with this rocket. It was the biggest, most complex machine by some measures ever built.

Lizzie Peabody: Ever.

Nick Partridge: Right.

Pete Conrad on Radio of the Apollo Saturn Launch: This baby is really going.

Nick Partridge: Lift off goes without a hitch.

Pete Conrad on Radio of the Apollo Saturn Launch: That's a lovely liftoff. That's not bad at all! Everything is lookin' great, skies getting lighter.

Nick Partridge: Everybody's good for a few seconds.

Pete Conrad on Radio of the Apollo Saturn Launch: 30 seconds - looks good.

Nick Partridge: 36 seconds into the flight...

Pete Conrad on Radio of the Apollo Saturn Launch: What the hell was that?

Nick Partridge: Something happens.

Lizzie Peabody: What happens?

Radio of the Apollo Saturn Launch: I just lost the platform.

Pete Conrad on Radio of the Apollo Saturn Launch: Ok, we just lost the platform. Yeah, I don't know what happened here. We had everything in the world drop out.

Nick Partridge: All of the systems go down. All of their indicators go haywire. All of the warning lights come on at once.

Pete Conrad on Radio of the Apollo Saturn Launch: I've got three fuel cell lights...
(inaudible radio feedback.)

[MUSIC]

Lizzie Peabody: A mile in the air and approaching the speed of sound, the crew was riding an almost dead spacecraft atop a 36-story rocket toward space with no idea what was wrong.

[MUSIC]

Lizzie Peabody: So, this time on Sidedoor, we commemorate that story for the 50th anniversary of the Apollo 12 launch, after a quick break.

[MUSIC]

Lizzie Peabody: Let's back up. If you don't know much about the Apollo 12 mission, you're not alone. I knew nothing about it before beginning research on this episode. And that's partly because it's sandwiched between two very famous missions: Apollo 11...

Neil Armstrong: "That's one small step for man, one giant leap for mankind."

Lizzie Peabody: ...and Apollo 13.

Jack Swigert: "Uh, Houston, we've had a problem."

Lizzie Peabody: It kind of gets overshadowed by its siblings.

Nick Partridge: Yeah. 12 - a middle child certainly, but a high achieving one. Charming one. The reliable one. The funny one.

Lizzie Peabody: Jan Brady.

Nick Partridge: Yeah. Yeah.

Lizzie Peabody: The Jan Brady of Apollo missions had an ambitious goal. Just four months earlier, Apollo 11, which we talked about in an episode just a few months ago, successfully landed on the moon, but missed their targeted landing site by about four miles. In the words of this 1969 ABC broadcast:

News Coverage: If man is to really explore, he has be able to land exactly where he wants to.

Lizzie Peabody: This time, Apollo 12 would try to nail a "pinpoint landing." The plan was to land right next to a lunar probe called Surveyor 3, that had been sent to the moon 2 years earlier.

Nick Partridge: So, they thought the easiest way to demonstrate a pinpoint landing was to say we're going to land at the Surveyor Three landing site and potentially retrieve parts of the lander to bring back to Earth along with all of the moon rocks.

Lizzie Peabody: If they managed to bring those parts back, scientists could study how their equipment aged on the moon.

Radio: They have to land within 3,000 feet, or they won't have enough oxygen to safely get to Surveyor and make it back.

Lizzie Peabody: That was the goal, but what really set Apollo 12 apart from any mission that came before it was the crew.

[MUSIC]

Nick Partridge: They were best friends.

[MUSIC]

News Coverage: Apollo 11 is a tough act to follow, but no astronauts were ever better picked for a mission than Pete Conrad, Dick Gordon, and Alan Bean - all navy commanders and all old friends.

[MUSIC]

Nancy Conrad: They were besties.

Lizzie Peabody: None of Apollo 12's crew is still living, so we talked to Nancy Conrad. Her husband, Pete Conrad, was Commander of Apollo 12.

[MUSIC]

Lizzie Peabody: So, what qualities made their friendship special? How would you describe their friendship?

Nancy Conrad: What wove them together was the ability to just be who they were without strutting. Does that make sense?

[MUSIC]

Lizzie Peabody: Yeah!

Nancy Conrad: There was huge respect, and each of them had extraordinary capabilities and they each made room for each other's extraordinary capabilities.

[MUSIC]

Lizzie Peabody: The tone of any mission is set by its Commander, but Pete Conrad was far from the strait-laced, typical NASA Commander.

News Coverage: Spacecraft Commander Conrad, 39, veteran of Gemini 5 and 11 is funny, friendly, outspoken, and hard as nails when he has to be.

Lizzie Peabody: He liked to swear, crack jokes, and he hummed as he worked. At five foot six and a half inches, he was one of the shortest astronauts at NASA, but he had a super-size personality.

Nancy Conrad: (Laughs) Well, he was a wiry, high energy piece of work. (Laughs) And he was fun. Really just fun. I mean if, if you ever wanted to have a dinner party and make sure that everyone had a great time, you would invite Pete Conrad.

Lizzie Peabody: (Laughs).

Nick Partridge: He was known to be the most fun loving of them all while still being a really capable aviator.

[MUSIC]

Lizzie Peabody: Pete Conrad first met his command module pilot, Dick Gordon or to Pete...

Nancy Conrad: Dicky-Dicky, as we called him.

Lizzie Peabody: ...in the Navy, at test pilot training school. They were both ambitious, competitive pranksters, and they hit it off. After they both joined NASA, they spent three cramped days together in orbit on an earlier mission.

[MUSIC]

Nick Partridge: I guess there's really no other crucible that will forge a bond quite like that, right?

Lizzie Peabody: I guess not.

[MUSIC]

Lizzie Peabody: But if Pete Conrad and Dick Gordon liked to be seen and heard, the third member of their crew definitely stood apart. That was Al Bean.

[MUSIC]

Nancy Conrad: Al Bean was just one of the dearest human beings I've ever known.

Nick Partridge: He was a bit quieter. While some of other guys were doing traditional astronaut adventure stuff: drinking or racing cars, he took painting lessons. He was a really capable pilot, but he wasn't known to be a self-promoter.

[MUSIC]

Lizzie Peabody: Pete Conrad had been Al's flight instructor in the Navy, and it was Pete who encouraged Al to apply to the astronaut program. He noticed that Al wasn't the most naturally gifted pilot, but he was definitely the hardest worker. He was a details guy.

[MUSIC]

Lizzie Peabody: At NASA, Pete was tapped to lead an Apollo mission, but Al's quiet, hard-working demeanor landed him at a desk, playing a support role, without any real hope of going to the moon. That is, until Apollo 12's assigned lunar module pilot, C.C. Williams, died in an accident. And Pete came looking for his old student from flight school.

Nancy Conrad: Pete liked the big broad-brush strokes, the overview, the 30,000-foot visionary pieces. He was a vision person, not a process person. That's why he asked Al bean to join the crew because Al was a process person. Pete knew what he could do.

Lizzie Peabody: The "NASA brass" was skeptical. Al was not their first choice, but Pete Conrad insisted and Al joined the mission.

Nick Partridge: So, you end up with three people who all knew each other from the Navy. They were close like no other crew.

[MUSIC]

Nick Partridge: They had matching gold Corvettes...

[MUSIC]

Lizzie Peabody: (Laughs).

Nick Partridge: ...that they would race up and down the causeways and Cape Canaveral! And they actually had like their mission assignments painted on the side. They had "Commander" and "Command Module Pilot" and "Lunar Module Pilot" on the side and they would just go everywhere in these matching cars. Matching cars! Can you imagine?

Lizzie Peabody: (Laughs).

[MUSIC]

Nick Partridge: As far as I know, there was no mission quite like Apollo 12, where everyone was just so close and so great. And it was gonna be a great mission, but they're also going to have the time of their lives flying it.

[MUSIC]

Lizzie Peabody: So, on the rainy morning of November 14, 1969, this dream team set off on their dream mission, which, a few seconds in, looked more like a nightmare. We'll get back to the moment everything changed, after the break.

[MUSIC]

Pete Conrad on Radio of the Apollo Saturn Launch: That's a lovely liftoff, that's not bad at all! Everything's lookin' great, skies getting lighter.

[MUSIC]

Gerry Griffin: It was a very nice liftoff, you know. My thought was this is going to be a piece of cake... um, didn't last very long.

[MUSIC]

Lizzie Peabody: On the morning of the launch, Apollo 12's flight director, Gerry Griffin, was on the ground at mission control: the room crammed full of guys in white shirts and black ties behind computers, making sure everything went according to plan. He was 34 years old, and for the first time in his life, he was in charge.

[MUSIC]

Gerry Griffin: This was the first time that I had been a lead Flight Director, and it was the first time I had been part of a Saturn launch.

[MUSIC]

Lizzie Peabody: "Saturn V" is the rocket designed to support NASA's Apollo program. It was flashy new technology at the time, and it's still the largest, most powerful American launch rocket ever built.

[MUSIC]

Lizzie Peabody: What is the job of the Flight Director?

[MUSIC]

Gerry Griffin: Well, a Flight Director was like the um, conductor of a symphony. You didn't play any of the instruments, but uh, you had to make sure it all came out sounding right!

[MUSIC]

Lizzie Peabody: So, when the whole orchestra's instruments simultaneously went silent, 36 seconds into the piece...

[MUSIC]

[HARD RADIO STATIC]

Lizzie Peabody: ...it was Gerry's problem.

Gerry Griffin: I heard some static, just a hard static.

[HARD RADIO STATIC]

Gerry Griffin: And then I heard Pete Conrad say something like, "What was that?"

[HARD RADIO STATIC]

Pete Conrad: What the hell was that?

Gerry Griffin: Conrad started reading off all these caution and warning lights.

Pete Conrad: I got 3 fuel cell lights, (inaudible radio chatter)

Gerry Griffin: And my first thought was, "Uh-oh, we're going to have to abort. I'm going to have to be the first guy that calls an abort of a Saturn launch and it's my first time."

[MUSIC]

Lizzie Peabody: On top of being totally unprecedented, Gerry Griffin knew that aborting this early in the flight would be risky. The rocket was traveling at more than 600 mph and accelerating, but it was still only about a mile in the air, lower than commercial airplanes fly. Aborting would mean that the command module, the little gumdrop on top of the rocket where the crew was sitting, would need to propel off the rocket.

[MUSIC]

Gerry Griffin: It's a very violent ride, very sudden, high G forces, and supposedly the rocket would get you up high enough for the chutes to deploy in time to soften your landing in the water. But um, in that violent kind of situation, you never know whether

that's gonna work exactly right. So, the higher you can get, you just have more time for the systems to work.

[MUSIC]

Lizzie Peabody: So, the longer he could delay the call to abort the mission, the better.

[MUSIC]

Gerry Griffin: You gotta kind of swallow, swallow the panic. That's the secret is don't let the fear or the panic take control of you.

[MUSIC]

Lizzie Peabody: Griffin took a deep breath and assessed the situation. Something had disabled the electrical systems in the command module, leaving the crew in the dark, without any way of knowing where in space they were heading.

[MUSIC]

Gerry Griffin: They didn't have anything that was working as a command module. So, they really were flying blind.

[MUSIC]

Lizzie Peabody: Griffin had to figure out what was wrong fast. He got on the radio.

[MUSIC]

Gerry Griffin: And I said, "EECom, what do you see?"

[MUSIC]

John Aaron: My call sign was EECom and what that stood for was electrical, environmental and communications.

Lizzie Peabody: John Aaron, the 24-year-old EECom, sat across the room at mission control. And what he saw was this.

John Aaron: All of the sudden, my console warning lights, probably 85% of that hundred lights, lit up like a Christmas tree. Bam! It went from being perfect to a can of worms in a second. My responsibility was to come up with some kind of recommendation of what to do.

Lizzie Peabody: Aaron's monitors froze.

John Aaron: But the values that they froze at was this nonsensical, random kind of numbers. And I thought, what is that?

Lizzie Peabody: And then he remembered, a year earlier, he was watching a ground test in Houston when the monitor did something very similar. Nobody knew what to do at the time, but John Aaron took the data home and studied it. He realized the problem could be fixed by flipping a tiny switch on the control panel (the SCE switch). By flipping it from the normal power source to auxiliary (or backup) power source, they could get their data back. At the time, he just thought, "Huh. Interesting."

John Aaron: I then forgot about it.

Lizzie Peabody: Fast forward one year...

John Aaron: And lo and behold, there it was! That pattern was there.

Lizzie Peabody: So, when Gerry Griffin asked John Aaron...

Gerry Griffin: "EECom what do you see?"

John Aaron: I said, "Try SCE to Aux."

[MUSIC]

Gerry Griffin: And I looked at him and I scrunched up my face. I didn't say it on the loop, but I said, "What?" I'd never heard of the switch. SCE to Aux.

[MUSIC]

John Aaron: Yeah, I guess I said it so matter of factly, that he didn't even question it. He just said, "Capcom."

[MUSIC]

Gerry Griffin: I turned to the Capcom...

[MUSIC]

John Aaron: Capcom is the single point in the mission control center that's authorized to talk to the crew in those days.

Gerry Griffin: And I said uh, "Capcom, tell him SCE to aux." And he (laughs) kind of said, "What?"

[MUSIC]

John Aaron: You know, "SCE to aux. Auxiliary." So that got radioed up.

[RADIO FEEDBACK and CHATTER]

Pete Conrad on Radio: "Try NCE to auxiliary. Over."

[RADIO FEEDBACK and CHATTER]

Gerry Griffin: Conrad repeated it. He said, "NCE to aux." And then he said...

Pete Conrad on Radio: "What the hell is that?"

Gerry Griffin: "What the hell is that?"

John Aaron: "Huh? What the hell's that?"

Lizzie Peabody: (Laughs).

[MUSIC]

Gerry Griffin: It was a switch that none of us had ever used in a simulation. There were hundreds of switches in that cockpit, but Al Bean...

John Aaron: He says, "I know where that is."

Gerry Griffin: He knew where it was.

John Aaron: Now, thank God Al Bean knew where that was.

Gerry Griffin: And he got it and went to auxiliary and when he did, we got our data back.

[MUSIC]

Lizzie Peabody: Al Bean, the details guy, knew exactly where that switch was. With the data back at mission control, they could see that some kind of charge had knocked the fuel cells offline, but the rocket was still flying on course. Miraculously, whatever had disrupted the electrical system in the command module hadn't thrown off the navigational system in the Saturn V rocket. Pete Conrad had a theory about what might have done it.

Pete Conrad on Radio: I'm not sure we didn't get hit by lightning.

Gerry Griffin: He said, I'm not too sure we didn't get hit by lightning. And he was right. We found out later there were two lightning strikes.

[MUSIC]

Lizzie Peabody: They say lightning doesn't strike the same place twice, but it turns out Apollo 12 wasn't just struck by lightning. It created its own lightning, twice. How wild is that? Jan Brady, meet Zeus.

[MUSIC]

Gerry Griffin: You can think of it like this: when the Saturn lifts off, you've got seven and a half million pounds of thrust and you've got a fire trailing behind it. It's extremely long. It ionized all of that heat below the rocket and took the potential electric field that existed in those clouds and it actually created a short to the ground.

Lizzie Peabody: In other words, those clouds were primed for lightning and Apollo 12 acted as a kind of spark.

Gerry Griffin: Who'd have ever thought of that? It was a complete surprise to me!

Lizzie Peabody: (Laughs). It was a surprise to everyone! And it was a heck of a lesson to learn the hard way. Because of it, NASA made a rule: from then on, they'd measure the electrical potential in the atmosphere before any launch, even under blue skies. But back aboard Apollo 12, only 2 minutes and 22 seconds into the adventure of a lifetime, the crew was relieved.

Pete Conrad on Radio: I think we need to do a little more all-weather testing.

Capcom on Radio: Amen.

Mission Control on Radio: We had a couple of cardiac arrests down here too, Pete.

Pete Conrad on Radio: God darn almighty. (Laughs).

[RADIO CHATTER]

Gerry Griffin: They started to feel more comfortable. And we could tell that because they were making jokes and giggling.

Lizzie Peabody: (Laughs).

Gerry Griffin: They were giggling between each other.

[RADIO FEEDBACK]

Pete Conrad on Radio: That was something else. God darn almighty! (Giggles).

Other on Radio: (Laughs).

Pete Conrad on Radio: There were so many lights I couldn't read them all! (Laughs).

Gerry Griffin: And then he got, he got tickled.

Nancy Conrad: When Pete was afraid, he would giggle.

John Aaron: And he literally laughed all the way into orbit.

[Giggles and Laughs over Radio]

Lizzie Peabody: Gerry Griffin cleared Apollo 12 to continue to the moon, and the crew hunkered down for the voyage, radioing, "Well Houston, we've settled into a normal routine."

[MUSIC]

Lizzie Peabody: They listened to Elvis as Earth got smaller and smaller in the command module window.

[MUSIC – "Suspicious Minds," by Elvis Presley]

Gerry Griffin: Apollo 12, after that call, was one of the cleanest missions we had in the whole program.

Lizzie Peabody: Five days later, Pete Conrad steered the final descent to the surface of the moon, with Al Bean assisting him.

Al Bean on Radio: There it is. There it is! Oh my God! Right down the middle of the road! Outstanding, man!

Lizzie Peabody: And they stuck that pinpoint landing. From the lunar lander, Pete Conrad radioed, "Boys, you'll never believe it."

Pete Conrad on Radio: Boys, you'll never believe it. Look what I see sittin on the side of the crater!

Al Bean on Radio: The real Surveyor, right?

Pete Conrad on Radio: The old Surveyor. Yes sir! (Laughs). Does that look neat? It can't be any further than 600 feet from here!

Lizzie Peabody: Exactly as they planned. They'd landed close enough to Surveyor 3 to just walk right over to it. And when Pete Conrad, the third man to walk on the moon, stepped down from the lander, the first thing he said was, "Whoopee!"

Nancy Conrad: Whoopee!

Nick Partridge: Whoopee!

Pete Conrad on Radio: Whoopee!

Lizzie Peabody: Then, in true Pete Conrad fashion, he cracked a joke about his short legs.

Pete Conrad on Radio: That may have been a small one for Neil, but that's a long one for me.

Lizzie Peabody: "That may have been a small one for Neil, but that's a long one for me."

[MUSIC]

Lizzie Peabody: During their 31 hours and 40 minutes on the moon, Pete Conrad and Al Bean gathered moon rocks, installed seismometers and conducted other experiments. And they had so much fun doing it that one Missourian griped to NASA in a letter, "Astronaut Conrad gives the impression that he is on a joyride of no significance whatsoever."

Pete Conrad on Radio: Hey Al?

Al Bean on Radio: Yep?

Pete Conrad on Radio: You could work out here all day! Take your time. Dum-dee-dum dum. Dum de dum.

Nancy Conrad: Yeah, he was a Hummer. Oh God. He used to sing and he had a terrible voice. (Laughs).

[MUSIC]

Lizzie Peabody: Before returning to Earth, Pete and Al moonwalked over to Surveyor 3 and cut a camera off of it; physical proof of the precision landing. Scientists back home were eager to investigate how solar radiation had aged it on surface on the moon. And today, non-scientists, like me, can check it out, too.

Matt Shindell: So, you're looking at the camera. It's a television camera from the Surveyor 3 Lander.

Lizzie Peabody: I visited the camera with Matt Shindell, Space Historian and Curator of Planetary Science at the Smithsonian's National Air and Space Museum.

Lizzie Peabody: I guess I'm going to try to describe it...

Matt Shindell: Hmm, mmm.

Lizzie Peabody: But it's hard to describe because I've never seen anything shaped like this before. It's like a, well sort of like a amputated robot arm. You can see frayed wires where Pete and Al used moon-bolt cutters to chop it off the lander. And even today, it's covered in fine grey moon dust. That's why it's sealed in a glass case.

Matt Sindell: Because it is still classified as a lunar sample, so that if NASA wants to take it back and study it again in their, you know, clean facilities, they can do that. But this is the first example, and still the only example of a probe that's been sent to another world where humans have met up with it and brought pieces back from it.

Lizzie Peabody: That's pretty cool.

[MUSIC]

Lizzie Peabody: Apollo 12 was a success. The crew's precise landing proved that future targeted exploration on the moon would be possible. They advanced the work of Apollo 11, spending more time on the surface and completing more experiments, but Matt says that they also ensured that the Apollo program would continue.

[MUSIC]

Matt Shindell: If Apollo 12 had failed, that could have been the end of the Apollo program just because Nixon was very worried that there would be an Apollo failure, and that if there was an Apollo failure, it would happen, you know, during his presidency.

[MUSIC]

Lizzie Peabody: And it almost did fail. Nobody knows that better than Gerry Griffin.

Gerry Griffin: There's no doubt that 12, um, it could've gone either way. It could have an ended up with three fatalities or it could have ended up the way it did.

[MUSIC]

Lizzie Peabody: It ended up going really well. And ultimately, that's the reason people don't talk about it much. After surviving lightning, the crew accomplished a flawless moon landing. And in the end, the crew is what makes Apollo 12 special.

[MUSIC]

Gerry Griffin: They just liked each other and they had fun with each other and you could see it and you could hear it. You know, we had different crews, all the personalities were a little different, but I can tell you, the 12 crew was one of the most fun of all the bunch.

[MUSIC]

Lizzie Peabody: This was a friendship that was by definition, I think, extraordinary because not many best friends get to go to space together.

[MUSIC]

Nancy Conrad: Not exactly. And stay best friends.

[MUSIC]

Lizzie Peabody: Right!

[MUSIC]

Nancy Conrad: Go in best friends, come out best friends. Their entire lives. It's extraordinary.

[MUSIC]

Lizzie Peabody: Today, Pete Conrad, Dick Gordon, and Al Bean are buried close together at Arlington National Cemetery. The three extraordinary astronauts, who fifty years ago, survived near disaster, went to the moon, came back, and had the time of their lives doing it.

[MUSIC]

Lizzie Peabody: You've been listening to Sidedoor, a podcast from the Smithsonian with support from PRX.

[MUSIC]

Lizzie Peabody: If you'd like to see photos of the Surveyor 3 camera the Apollo 12 crew brought back from the moon, it's in our newsletter! Subscribe at si.edu/Sidedoor. There's also a link in our episode notes.

[MUSIC]

Lizzie Peabody: You know what I say every time I see someone left us a review on Apple Podcasts?

Matt Shindell: Whoopee!

Lizzie Peabody: Whoopee!

Pete Conrad on Radio: Whoopee!

Lizzie Peabody: Because reading a lovely review is my version of walking on the moon.

[MUSIC]

Lizzie Peabody: Sidedoor is made possible with help from people like you! Your generous support helps make all the amazing work you hear about at the Smithsonian possible.

[MUSIC]

Lizzie Peabody: Special thanks to Nick Partridge and Matt Shindell of the National Air and Space Museum, who also cohost the podcast, "AirSpace." If you haven't heard it, it's great! Check it out. Thanks as well to Nancy Conrad, John Aaron, and Gerry Griffin. And thanks to Andrew Chaiken, whose book, "A Man on the Moon: The Voyages of the Apollo Astronauts," informed a lot of our research for this episode.

[MUSIC]

Lizzie Peabody: Our podcast team is Justin O'Neill, Jason Orfanon, Michelle Harven, Caitlin Shaffer, Jess Sadeq, Lara Koch, and Sharon Bryant. Episode artwork is by Greg Fisk. Extra support comes from John, Jason and Genevieve at PRX. Our show is mixed by Tarek Fouda. Our theme song and other episode music are by Breakmaster Cylinder.

[MUSIC]

Lizzie Peabody: If you want to sponsor our show, please email sponsorship@prx.org. I'm your host, Lizzie Peabody. Thanks for listening.

[MUSIC]