Past Event: 2022 NCSBN Leadership and Public Policy Conference - Leadership Lessons from Mission Control Video Transcript

Event
2022 NCSBN Leadership and Public Policy Conference

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Presenter
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- [Ginger] Thank you so much and thank you for bringing me out of the gross, humid, disgusting weather we have in Houston to here. And you may think it's humid here, but come to Houston once and you'll enjoy it. And the water's actually blue.

Who knew? But I wanted to thank you today for inviting me here. There's at least one member of the audience who has seen me before at a previous talk. And I appreciated his recommendation as well. But my job here today, you know, after talking to the organizers, I was like, "What can I do for you? You know, what are folks going to want to hear about?"

And, you know, you have a pretty exciting timeline. It sounds like you had a lot of great sessions already. You're going to meet one of my friends tomorrow, I think, Astronaut Don Thomas. He and I spent some time working together out in Russia. And so it'll be a joy to hear from him. And what I'd like to offer you, as he stated, is the perspective from mission control. And I take a different approach to talking to you about leadership and leadership lessons.

I can come up here and I can lecture and we can talk about all of the elements of leadership, or I can tell you all of the fun stories that I have had the privilege of participating in and leading and tie those back to some leadership conference. Because ultimately, my goal here today is to, one, entertain you, but two, provide you tools and examples of how to use those tools so that you can use back in your industry.

So, to start off with, I know that there were some objectives that I had to submit to make sure we're covering them so you can get credit for this class. So, class, these are my objectives. We're going to talk about these concepts, but we're going to talk about them in the context of storytelling.

So I am a huge student of leadership and I am also very interested in the human psyche. I have learned as I have pursued my career, through NASA, and now in the private sector, that understanding people is probably the most important thing you can do as leaders.

And those of us that grew up as med scientists, rocket scientists at NASA don't always put that in the forefront of their learning. But I have always studied these books and then tried to figure out how can I take the information that's in there and apply them to make me a better leader at NASA. So I'll be talking to you about those today.

And we're going to start off with one. I don't know if you've heard about this before. Arbinger's Outward Mindset. If you haven't I'm going to simplify it for you. If you think about everything bad that is happening in the world today, wars, political divides, cancel culture, people being offended by other groups, people being prejudiced toward other groups, you can simplify that by understanding this concept.

And it's basically, those are all reflections of people having an inward mindset. I'm focused on me, me, me, me, me, me, and I have goals to achieve. And you aren't like me, so I don't like you. And you're getting in the way. That is an inward mindset. Outward mindset is how can we work together to achieve our goals.

How can we collaborate? How can we better understand all of the diverse opinions or seek out diverse opinions? That is an outward mindset. So my first story deals with this. So when I first started working at NASA, early on, I got assigned to be an instructor for the astronauts. And one of my first assignments was to get assigned to the first crew that was going to fly on board the International Space Station.

Today, we are on crew number 68. So this was way back, early years, 1997. And when I got assigned to them, there was one American and two Russians. And the American is the gentleman in the middle. His name is Captain William Shepherd. Ex-Navy SEAL. Zero social skills.

And oh my gosh, he was making everybody angry, in the U.S. and in Russia. "Why is it designed this way? Why are you teaching me like that? What kind of material is that? Why don't you use common sets of icons and graphics and colors?" And everybody was just like, Bah, I can't take it anymore. So meanwhile, our Russian counterparts, we had Yuri Gidzenko who was on the left, and Sergei Krikalev, hero of Russia.

Sergei flew on the Mir space station and actually got stuck up there when the Soviet Union collapsed because there was no one left to bring him home. He's like, "Hello, anyone?" So he wound up being up there for like 13 months, bless him. But he was kind of like, Shep. Wasn't a Navy SEAL, but he was an engineer and he had a low tolerance for people that didn't think like him. So he was also making everybody angry.

So my boss says, "Hey, I know what would be good. I'm going to assign you to these two and I'm going to send you to Russia and you got to fix those Russians because they don't know what they're doing." You know, the first people to actually send a man into space, but they don't know what they're doing. They don't know what they're doing. And they're making our crews angry and they're operating as if it's, you know, back in the '60s and '70s during the Apollo–Soyuz programs.

And you just got to go fix them and make sure that they get on board because we're doing everything right." So totally program me with an outward mindset. I am not programmable, however. So I go out there and I make friends because I knew... I was 27 years old at the time.

I'd been working at NASA for what, maybe four years. I didn't know anything. I go over here and I meet these people and I met... You know, have you ever heard of the dog Laika that the Russians flew? I met

the man who owns Laika's, great, great, great, great, great, great grand dog. So I got to meet little tiny Laika, you know, junior of the fourth or fifth, sixth, seventh, or whatever she is.

So these people, one of them knew Yuri Gagarin, the first cosmonaut that was in space. So what I realized when I went over there is inward mindset is not going to work. These guys know what they're doing. They're experienced. But my boss had also warned me, they're not going to want to deal with you because you're a woman and they hate Americans. So talk about setting me up for failure.

Luckily, I don't listen to my bosses a lot. So I went over there and they loved me. I was an oddity because they were all male. And I asked lots of questions and I started learning stuff about things that I didn't know anything about, technically. And then I started learning about them as people.

And in the Russian culture, when you start to learn about them as people and they start inviting you over to their house and you meet their families, that's when you make real progress in your collaborations, in your business dealings because they see you as one of them.

And because I did that, it really, really, really enabled me to accomplish a lot of great things out there. So I set aside the inward mindset, totally embraced that outward, and we were able to work together to make Sergei and Shep reasonably happy and make changes to how we were doing things in the U.S. system and how we were doing things in the Russian system.

And they finally launched. And that was on October 31st, 2000. So just yesterday, November 2nd, 2000 marked 22 years of continuous human presence on board the Space Station. We have never had a moment where there wasn't somebody in space.

And I tell my stepdaughter this, who is just now 22, and I'm like, "Wow, the whole time you've been alive there's been somebody in space." And that's quite an accomplishment to say. So we got them launched. And they finally made it up into orbit and had a wonderful time.

And we got them back home safely. So this was all because, just to revisit this, I was able to embrace the outward mindset. And it wasn't just about getting the work done. This was back in 1997, Space Station is still going.

One of my goals back then was to make real life-long relationships because I knew that it wasn't just the launch of this first crew. I was going to need these relationships to launch the second, the third, and keep going. And it worked. So if you look in the middle picture, one of the challenges that I've had to face in my life was when I was 11 years old, I watched my dad die right in front of me.

And my mom never remarried. So I always knew that if I ever did get married, I wasn't going to have anybody to walk me down the aisle. And the relationship that I built with Shep, this cantankerous old Navy SEAL, he told me way back then, you know, "I like you, and I know you don't have a dad." You know, they don't know how to...

It's very awkward, this whole conversation. "Yeah, I know you don't have a dad, but you know, if one day you decide to, you know, punch your ticket, I would gladly walk you down the aisle." And that was in 1998 when he said that. And so I called him up once I got engaged and I'm like, "Dude, I'm calling it in." He's like, "Can I wear my New Balance tennis shoes?"

"Oh my God, if you wear your New Balance, I'm going to smack you over the head with them. No, full tux." So he shows up and he walks me down the aisle and he did my father-daughter dance. Because it was during COVID, Sergei and Yuri couldn't come. So this was a picture of us from a previous celebration we'd had in 2018. But I video-livestreamed it and they were able to watch it from their houses in Russia.

So those are the types of things that make great leaders. You genuinely care about people. You nurture the relationships. And I have called Sergei repeatedly. There was one time there was an explosion of a Russian rocket that was delivering supplies to the U.S., and the Russian leadership was not communicating with the NASA leadership team about what happened and if there was any commonality in that supply ship rocket and the cruise ship rocket.

They could not get anything out of it. And I called Sergei, and I said it just like this. I was like, "Dude, what's the deal? How come you're not saying anything to us?" And he is like, "It is the Russian way." And I'm like, "No, no, that's not going to work with me. And I'm in charge of safety and I need to know what happened." "Okay, I will tell you."

And so, you know, I got all the info and was able to relay it to everybody. But it's all because of relationships. So don't underestimate the power of having really good relationships with the people that you work with. So I did that job once I got them in the orbit, got them safely home. I had a very unique skill set because being assigned to that crew, I went everywhere with them. If they were in this company called Energia in Moscow, Russia, where they manufacture the hardware that was going to be built to fly up on the Space Station, I was there.

If they were in Orlando as they were prepping the laboratory module and our node module to go into space, I was there. Huntsville, Alabama to look at the experiments. So for four years of my life, wherever that crew was, I was there. And I learned about the design of the Space Station, the operations of the Space Station. Not only what the crew would do, but what the ground would do.

I worked in Russian mission control for a little while until they landed, came back home, and my boss says, "I have a job opportunity for you. Would you like to be a CapCom?" Which is short for capsule communicator. And it's the person in mission control that talks to the crew. So, you know, if you've ever seen the movie "Apollo 13," "Houston, we have a problem."

The person on the ground that says, "Hey, what's your problem?" Something like that. The person on the ground that responds, that talks to the crew is called the CapCom. And so up until that point in NASA's history, that position had always been staffed by an astronaut. So when my boss told me this, I thought, "I can't do this."

I thought that was only astronauts. And he said, "Well, do you know why it's always been astronauts?" I said no. And he explained to me that historically, the people in space wanted to talk to somebody on the ground that understood the vehicle design, that understood the operations of the vehicle, both the crew and mission control.

And this was a brand-new space station. There were no other astronauts out there with us. It was me and this crew. And so he says, "You've got all the qualifications, you just need to get in there." So I thought, okay. So I did it. And I was scared.

Oh my God, I was scared to be the first to do this, and I didn't want to screw this up, but I did it and I enjoyed it and I was good at it because I knew the technical subject matter and I knew these crews. When we were training the first crew, the first five crews were out there with us. So I knew these folks. I knew what they thought, I knew when they were feeling sad, I knew how to joke with them, I knew their families.

So I loved it. So while I was doing this job, I wound up having to have an experience that I wish I didn't have to have. An exercise in critical communications. So most of you should be familiar with the Columbia tragedy that we had in 2003. In mission control, when there's a shuttle flying there are actually two mission controls.

There's a shuttle mission control and there is a Space Station mission control. I was in Space Station mission control. The scene you see here at the bottom is shuttle mission control. But in this particular crew, historically, the shuttles had docked with the Space Station because we were constructing the Space Station around this time.

This was a science mission. So this crew did not dock to the Space Station, but they had talked to my crew, the day before because we had arranged for a ship-to-ship communication because I just thought it was neat that we had one crew out in space and another crew out in a different part of space. Hey, let's have them talk over dinner.

So we scheduled a com over dinner. And they loved that. So my Space Station crew knew the shuttle crew was supposed to be landing that day. But I'm in mission control. And this picture on "CNN" is how we found out what happened. All we knew in the shuttle room was that they were not answering our calls. Then we turn on the TV and there it is.

As soon as I put that up on my screen and I'm looking at the flight director who's in charge of mission control, we're like, oh my God, our crew calls down, "Hey Ginger, according to my watch it shows the shuttle should have landed by now. How are things going?" And I looked at the flight director and she just shook her head. And so I just took a deep breath and I said, "Hey, SOCs.

[SP] Yeah, it's been really busy down here today, gimme a quick sec and I'm going to go double-check." That afforded me an opportunity to privatize the communication link because normally, all of that communications is livestreame everywhere. You can tune in if you know how, and the whole world can hear it.

And I did not want the world to hear his reaction to what I was about to tell him. So, you know, communication in a crisis is one of the things you're talking about here. So I privatized the com and then I called up and I explained to him that there was not going to be a landing today. That there'd been a horrible accident. And he was still lingering in the hope phase with, "No, but we have the parachutes and we have the beacons, and surely you're going to find someone."

And I said, "Not at the mock speed that they were traveling. No." I said, "I'm looking at CNN right now. If you allow me to, I can pipe up this television feed to you so you can see what I'm seeing and understand for yourself. And he paused and he said, "Ginger, I'm not ready to see that right now. Can you please just tell me what you're seeing?"

I said okay. So for the next, I don't know, 35, it felt like forever, 40 minutes, I relayed to him everything that I was seeing on that television screen and everything that I was hearing on the loops in mission

control which did include so and so has found, so and so's helmet out in the field. So I relayed that up to him just very matter of factly, no emotion.

And then eventually, we had a break in the communications link and I was able, after that, composed myself, came back and we uplinked the television feed. But the reason I talk about this is it has to deal with another concept from one of those books that I mentioned to you.

And that is emotional intelligence and the ability to regulate your own emotions for the benefit of executing the mission, for the benefit of those around you. My natural response, because these people were my friends, was to start bawling uncontrollably and lose it and run out of the room. You are not allowed to do that in mission control.

And I was not about to do that to him. So I was very aware of my emotional response and I chose to regulate that for his benefit and the benefit of everybody in the room because the leadership, your employees, or your customers will reflect your emotional state. And if you can remain calm, they will remain calm.

So this is again, one of the key skills... And people, I put this word up here deliberately, power skills. I'm trying to remember the gentleman's name. I did a talk with the Project Management Institute, and Ashwini Bakshi, I think was his name, but he and I were chatting about it and he uses this in an article to describe what people call soft skills.

And I hate the term soft skills because that implies that, you know, they're just the fluffy stuff and that doesn't really matter. The technical skills are the skills you need to go after. I use the term power skills because these skills are the hardest to master. They are not soft.

And if you can master them, your ability to lead increases exponentially. And so I say they make you all-powerful. So these are powerful skills to have. So we walked through that. And I'm talking about this right now in the context of my emotional response in a very extreme scenario. But there are other applications to this emotional intelligence concept.

So once we recovered emotionally from this experience, the next thing was what caused this? How can we fix it? We can't let this happen again. So we started looking, and all indicators showed led to foam falling off of the external tank and hitting the shuttle.

So NASA, of course, decides, all right, all hands on deck, we're going to go take a look at this foam. What are we using? Is there a different material we can use? Is there a different way of adhering it so that we can get no foam at all coming off? So they made some changes to what the foam was made out of, how they applied the foam. And foam still fell off.

So now we said, all right, if it's going to fall off the least we can do to minimize the risk, we got to have our eyes on it. We got to figure out where this foam is hitting the shuttle. We have to figure out whether or not it has caused damage and then be able to repair it. So, one of the first ideas that someone came up with, and I remember watching the manager's reaction to this, and it was, he comes in, he's like, I know, you know, the shuttle, when it's going to the Space Station, the Space Station has a window, and the crew members could look down and take pictures, but normally, the shuttle flies in just as I was showing you, I'll show it again, with the top part.

So that's not the part we're interested in because the foam had hit the underside. But normally, when the shuttle flies in, it flies in like this. So some engineer says, "Oh, I know. Well, yeah, it'll still fly like that, but then we'll have it pause here and we'll have it do this backflip so that crew members can take pictures while they're looking out of the window."

And if you are a physicist, you freeze the moment someone says that because the Space Station is traveling 17,500 miles an hour. This is coming in at 17,500 miles an hour. And now, the window is probably about, you know, yay big.

To line up exactly where the shuttle should be, positionally, rotationally, and the velocity, park it there, and do a flip is about the most absurd thing I have ever heard in my life. But we didn't react that way.

The leadership team did not react that way. They were like, "Okay, that would get us the photos. Tell me more. How might that work?" So part of emotional intelligence, and you know you've done this with your employees or your spouse, and they come up with this idea and you're like, that'll never work.

Oh my gosh. You know, we've tried that before. Or we don't have money for that. You know, how long it's going to take to do that? As soon as you do that stop because you are not creating psychological safety for innovation. And it is emotional intelligence because it is a natural reaction, but it is not going to get the best out of your team.

So do your best to regulate it. And I was so proud of the NASA leadership team, but at that point, we'd had such a horrible thing happen where we never thought foam could hit, and if foam could hit it we never thought foam could damage it. It's the equivalent of taking a styrofoam cup and having it hit a CorningWare dish and causing damage. It didn't make sense to us.

So what else didn't make sense to us? So this suggestion didn't, but by all means, apparently, my makes-sense meter isn't working very well, so let me just listen to everything. So that was key. And when we did that, then all the ideas started flowing. So, one of the other ideas, the particular shuttle that I was talking about, Columbia, didn't go to the space station.

So there would be no one there to take pictures if they did this backflip. So how else are we going to know, for those shuttles that don't go, how would we do it? And then another engineer comes up, "Oh, I know. You know, the shuttle robotic arm that we have, we can use that." Well, no you can't because it's too short and you wouldn't be able to see your underbelly. It has like T-Rex arms, you wouldn't be able to go and see anything underneath there.

And they go, "Oh no, we'll build an extension boom, and then we'll put a really sensitive instrumentation at the end with lasers and infrared and high-definition camera. And this thing will be a100 feet long. Whee. And so, you know, the structural engineer, you know, in me goes, no, but we didn't know what he said that. And we're like, "Okay, what do you need?"

And they came up with this wonderful way of scanning the belly. And we used that as an additional way of ensuring that we could see everything, even for those that went to the Space Station. And then we're like, all right, but say you find something, then what? It's not like we can go to the Home Depot and get some caulk and try to repair it. Oh, I shouldn't have said that.

So yeah. So somebody was like, "Oh yeah, yeah, we could do that." And I'm like, "How can you do that?" Well, we figured it out. We need a special gun, a special type of caulk that will work in the vacuum of space. You're like, all right, fine. Okay.

But they figured this out. And it was all because we created an environment where it was safe to come up with these crazy ideas. And these crazy ideas led to some brilliant engineering solutions. So don't eliminate the idea just because you think it's crazy because truth be told, what do you know? Things change all the time.

I know I didn't know everything. And so it's good to enable those things, ideas, and come up with these great solutions. I was at a talk in France for the International Space University, and this person who owns these websites came in with these little coasters. And I think I have one.

Yeah, they came in with these little coasters, and I ordered 400 of them because I'd be in a meeting and somebody or somebody would come up with this idea and one of my employees would shoot it down. And I would take this card and I would call a red card and I throw it out in the table, red card, and they're like, oh man.

I said, "Flip it over." So they flip it over. And I said, "What did you mean to say instead of, yes, but, or instead of that will never work." "All right, I meant to say, tell me more. Let's test it." And so this is a fun way of getting your employees to embrace this kind of idea. I just thought it was great.

So I thought I would share that with you guys. So eventually, we got all these engineering solutions in place and we were able to ref-fly the shuttle about two years later. And it was a success. And we continued to fly them for the next two years. But shortly after that return-to-flight mission is when I applied for and became a flight director. At that point in time, I was NASA's 60th flight director.

And I was so happy. The concept of the flight director, the person in charge of mission control, if you've ever seen the movie "Apollo 13," the dude with the buzz cut and the vest that was in charge of mission control. So I added a little fashion to it. Yeah, no.

So I became a flight director and I loved it. I worked there eight years. I had a lot of experiences. I'm going to tell you one of those stories next. I was the last flight director to certify on the shuttle. So I got to fly not only the Space Station, but I got to fly three shuttle missions, which I thought was awesome. And I love this job.

You have the responsibility for the lives of the crew in your hands. Any decision you make on-console in mission control or off-console could impact the lives of the crew. And I embrace that. That job is not for everyone. And you have all-consuming authority in mission control. And I give this example.

The president of the United States could walk into your mission control room, walk over to your console in the flight director console, provide you direction to do something, and you have the authority to override them and throw them out of your room. That is power. And it's designed that way because the lives of the crew are in our hands and there is no manager or outside entity that knows better than the flight director on console that day.

And we have rules. And just like with your boards, we have rules and authority and you have to certify to be a flight director. And there's very specific criteria and exams that you need to take. So there are

some similarities to what we do in mission control and your industry as well. But I want to tell you a story.

So when the shuttle just started to, actually, right after Columbia, the picture on the left is what the Space Station looked like. And if you've seen pictures of our Space Station today, it looks absolutely nothing like that. And it wasn't intended to look like that. It was just a way that we were staging the construction. What we wanted to do was create this truss structure and build it out so that we could have two sets of solar arrays at the very end.

So if you see the picture on the right, that is the progress we made between 2005 and 2007. We'd built out this truss structure and we were now going to place these solar arrays at the edges. But the one that is on the left, the one that was on top, right before the mission I'm about to tell you about, we folded it up. It's pretty cool how they design these.

They fold up like an accordion style and fit into a box this big, but when you unfold them, it's a football field long. So we had just folded this so we could move it to the other side. So here's a picture of how it was supposed to accordion-style fold and go out. So I was a flight director on this mission, but not your typical flight director.

So in mission control, you normally have three shifts. Three nine-hour shifts that each hand over to one another. And then you have a fourth flight director that leads what's called team four. And basically, the premise is you hang out in mission control, wait around eating all the good snacks and wait for something to go wrong.

So I was the team four flight director on this one, and we're probably day four, and I'm looking at what I'm going to go get for lunch for the team. And they had just moved the solar array out to the side and they start to unfold it. Everything happened in slow motion. So we're watching it unfold and you see two of the solar cells stick together and it starts to rip.

And there's a slight delay between what happens in here and hitting the big red stop button and then having that signal go up to the space station to do it. And by the time we did that, we had this tear and a couple of other areas too. And we just froze because we weren't done extending it all the way.

And what we did know is we had extended it quite a bit, but if we weren't fully retracted or fully extended, you can't undock the shuttle. You're stuck. And so structurally, the solar array would break. So we knew we had to do one of these two things but we weren't sure how to fix it.

So my team four, as soon as I saw that, I'm like, and we're all getting together. So I called a meeting and I said, "I need your ideas. You know, who's got ideas of how we could fix this?" So I'm going to pull something else out of my magic bag. But I had one individual, a young man, 26 years old, run into my meeting and say, "I know what we can do. I know what we can do. The crew can make this and we can fix the solar array."

So if you've ever seen the movie "Apollo 13" where they dump stuff on the table, that was my "Apollo 13" moment, except I am looking at him like he's nuts. So I channel my inner emotional intelligence and I say, "Well, what is that?" "Oh, it's a cuff link." "Okay, a cuff link. And how might that work?"

And he shows me this diagram and he's like, "Well, I've talked to the structural engineers and we would have to take a series of these, but if we install these links at these specific locations, they can assure us

that the solar array will be structurally sound and then we continue expanding it so that the shuttle can undock."

"Okay. Only the tear is really, really high up. How do you propose that we'll get the astronauts there to install these cufflinks?" "Oh, don't worry about that. I've already talked to the robotics guys." And so then they showed me this picture and they said, "Oh yeah, remember when we had Columbia and those guys design that 100-foot boom, we're just going to use that, and instead we'll take the sensor package off that we use to scan the belly and we'll put this foot holder in it, and then we'll stick our tallest crew member at the edge of this thing."

And by now I am breaking out in a profuse sweat. And I thought, "Okay, is that structurally sound?" "Oh, now that I don't know. We're going to have to go analyze that." "And does it have to be our tallest crew member?" "Yeah, we have to put Scott Parazynski in there."

And he was like 6'4 or something. He got disqualified for fitting into the Soyuz, the Russian vehicle because he was too tall. And actually, they named him Too Tall when he got disqualified. And I'm like, "All right, we'll put Too Tall at the end of the big stick. Okay, that sounds like a wonderful idea." So we did like 24 hours a day for almost 3 days, all this analysis, and lo and behold, there he is, Too Tall at the edge of the thing.

And they installed all these cufflinks and it worked. And we were able to continue to expand that solar array out where it was supposed to be. But I would never have believed any of this to be possible, nor would it have been possible had I shut down, you know, crazy idea number 47. And so it was a great feeling.

We got everything set up. And the other thing that was key about doing this, it wasn't just to let the shuttle undock. This is an international space station, and we had plans to grow out, the Space Station to include a Japanese module and a European module and we needed the power from the solar array to do that.

So we would not have met our international commitment had this not happened. But it was a huge success story. I'm glad to have been a part of it. And I still keep this. And the young man that did this eventually became a flight director. And he's still a flight director today. So I thought that was good.

So we were able to finally complete construction of the Space Station. And then we were directed by our president to end the shuttle program. And this became a problem because we have a commitment to the Space Station for a number of years. We were using the shuttle and the Russian Soyuz vehicle to get crews up and down but when we grounded the shuttle, we were like, "All right, what are we going to use to launch our crews from U.S. Soil? Oh, nothing. Okay."

"But we're going to start a new program. We'll start asking around." As if you can, you know, snap your fingers and catch an Uber and have it ready. So we were all worried at NASA because you don't end a program before you have a new program in place. So while all these companies expressed an interest in 2011, that was awesome sauce, but it left us at a point where we were completely reliant on our Russian counterparts for getting our crews up and down.

And they are great business people. So, initially, you know, the price was 20 million and then, I don't even know what it is now. Eighty million? They eventually got lots of money. So as the years went on

where these commercial folks weren't ready yet, we're having to pay lots of money to get these seats on these rockets. 2014, NASA down-selects from those original seven to these two.

It's going to be Boeing or SpaceX. So we thought, all right, we're getting closer. Three years in. And they promised to have their vehicles done in 2016. Well, 2016 rolls around, they didn't have their stuff done. But I get a new job. And in my job, now the leadership approach I want to talk to you about is influence leadership because while I can tell my NASA people what to do all day long, this was a new paradigm.

These were our commercial industry partners. We're supposed to give them requirements and they go be innovative and figure out how they want to do it. So I had to figure out if I'm responsible from the NASA side for launch, landing, recovery, how do I go and influence these two companies to do what I want them to do, to share my experience with them?

They are brand new to human space flight and they may be really innovative in other areas, but you've got to balance innovation with protecting our astronauts' lives. So I did that job and did my best to try to get Boeing and SpaceX ready to go. SpaceX was the first out of the shoot. 2019, they fly their first uncrewed test flight. So the way it works at NASA, you don't just, ooh, here's a brand-new vehicle, let's put a crew member in there.

Whee. You build the brand-new vehicle, you do an uncrewed test flight, you analyze all that data and you're like, okay, I think this is okay. I'm going to put a crew member in there and we're going to do a test flight of that crew member. We're going to check out some more things. And then after that, I'll say, all right, yay, verily, you are ready to go and provide this service. So SpaceX, first step, successful, uncrewed.

Let's check on Boeing, shall we? Oh, so Boeing launched, and then due to a software issue that missed match what time the thrusters should fire to get it into an orbit that would intercept the Space Station, it had a thruster firing that put it into a different orbit that would now crash and burn into the ocean.

So our folks helped them out by putting up some manual commands and we were able to successfully get that vehicle back because they were going to reuse this later. So we helped them and we were like, all right, you guys go stand over there and go figure out why that software glitch happened.

We're going to focus on SpaceX because they had the successful uncrewed mission. We're going to get them ready for the first crewed mission. Only... So then COVID hits and we're like two months away from the launch of this mission. So I called my SpaceX counterparts and I'm like, "All right, we got to figure out what to do." And my crew members don't want to travel.

I can get you a dedicated plane, I can put them on a NASA plane, I can get them to you. Now, what can you do from there? All right, well, we're going to have dedicated cars and we'll get these cars and we'll drive them up to the facility. And we've reorganized things so you can get the six-foot spatial distancing and we'll have everybody masked and we'll do this and we'll do that. So we figured out how to do the last two months of training, which is normally the most complex phase of training, worked with SpaceX to figure out how to do this.

And lo and behold, we launched them during the pandemic. And we got them docked to the Space Station and they had a grand old time and stayed up there for a few months. And then one of my biggest worry was making sure we got them back safely. And that worked too. So all of these things happened,

but it took a lot of collaboration and building coalitions, and influence leadership on my part and the part of a lot of the NASA managers to make this happen.

So they were able to have their successful flight. And right around that time, I get another new job, like it happens every four years or so. So, there was an opportunity for me, I had been focusing on low-earth orbit and the International Space Station, and all these commercial providers, and now someone's like, "Hey, you want to go to the moon?"

"Yeah, I want to go to the moon." So I start working with this program and I get to work with the Artemis program, NASA's return to the moon that is going to enable a pathway one day for us to go to Mars. If anybody tells you we can go to Mars right now, no, no, no, no. Not and keep the crew alive. So we got to go practice on the moon first. So that's what the Artemis program is.

And I was able to be in a huge position of influence here up the NASA leadership chain to build new partnerships with industry and try to get different people across NASA and across all of our commercial companies to collaborate with one another in a different way. So we're coming up on the uncrewed test flight. I am flying down there.

I've already flown down there twice and it didn't go. I am flying back there on the 14th of November. I mean, and hopefully, it'll launch some wee hours in the morning, like 12:30 in the morning or something, on November. And it's going to be our uncrewed test flight. So Snoopy is going to be hanging from the rearview mirror like a pair of dice, and we use him as our zero-gravity indicator.

Which basically means when you see Snoopy floating, you're in space. And then we'll have three crew members. We're going to have Commander Moonikin Campos. So NASA had a competition to name this highly-instrumented smart dummy. And Moonikin Campos won.

So Mr. Campos was actually, an individual that played a very critical role in the famous Apollo 13 mission. He was an electrical engineer that helped figure out how to get our crews home safely. So they named after him. And then you're going to have two sidekicks named Helga and Zohar, again, winners from somewhere. Little 95-centimeter half-female people, because we want to understand the radiation.

So those are going to be instrumented highly with radiation. Mr. Campos will have radiation, but also vibration and pressure sensors so we can understand what happens to the human body in these seats. So we're going to learn a lot from that.

And then ESA, our European Space agency was like, "Don't forget about us." And they are throwing Shaun the Sheep in there because they were one of the contributors to what's called the service module that's part of the Orion vehicle. So I can't wait to see all these kids launch. We're not going to have physics 101 right now. This is basically to show you the trajectory.

We're going to launch. We're going to do a loop de loop around the moon, get as close to 60 miles above the surface, do a loop de loop, come back. And it'll take about three weeks. And then we'll be ready for Artemis 2, in which we will put two people in there. They, too, will do loop de loops and wish they could go down. And then we'll bring them back home.

And one of these people will be on that mission. And one of these people will be on Artemis 3 when we finally get back to the surface of the moon. Artemis 3 is projected to occur sometime in 2025. It'll

probably be 2026, given the delays that we've had with the Artemis 1 mission. But this is the vehicle that they will use when they go to Artemis 3.

Look at the teeny tiny people at the bottom. So SpaceX won a competition with this rocket, which you may think is a little bit overkill for the moon, compared to previous ones, but this is the vehicle that they are hoping will take us to Mars, and since we're using moon as a test bed, they wanted to see if we could land on the moon with this rocket.

So best of luck to that. And it has an elevator too. Anyway. And then eventually, we're going to have an orbiting laboratory around the moon that our crew members can go to as a safe haven if something were to happen on the surface. We're going to have all these lunar terrain vehicles that are going to be built by commercial companies, pressurized rovers that'll be built by commercial companies, and eventually, an Artemis base camp.

And the reason I'm going through this, I just kind of want to give you a feel. I want to leave some time for questions, but this is part of NASA's leadership now is evolving to be the leader in human space flight to helping enable human space flight across all of these different commercial industries.

And it is a mindset change at NASA. Now that I am on the commercial side with Barrios Technology and I understand both the NASA side and the commercial side, I can help bridge that gap. What processes need to change at NASA to make it easier to do business with commercial, what can commercial do? What assets can they use of NASA to help move them on? So I'm really excited about what I'm doing now.

So, I hope that you have found my stories entertaining. I hope that you are able to take some of these leadership lessons that were on here and using my stories, relate them to scenarios that you could use in your industry. And I want to thank you for your time and just open it up to any questions that you might have. Come on, everybody has a question.

Oh, there we go.

- [Man] I really enjoyed the presentation. In your example, going to Russia and understanding the kind of Russian psyche as part of that, certainly, in my own experiences of negotiating with the Chinese, understanding that psyche is really important.

In your new endeavors, the difference between the business sector and the federal government sector, what are some of the cultural learnings that come out of that?

- So, oh gosh, that's an excellent question. So historically, NASA has dealt with large procurement contracts. And they will put out an RFP and there'll be page upon page upon page of things you need to fill out. And then they have this competition, and then maybe two years later, they'll select somebody.

In today's industry, if you don't make a move on a piece of technology today, two years from now, that's going to be obsolete. And so what NASA is trying to do is take a look at these processes that have served them well historically for the mission they were given at that time, and figure out how to keep with the pace of technology advancement in the commercial industry.

How do we make it easier to do business with NASA for these customers? And I'm seeing little snippets of goodness and change in there for the major contracts. That's still the way to do it, but there's got to be

some innovation in that area too. But like right now, they'll do small competitions or they'll do what's called a BAA, or a Space Act agreement, which is a lot quicker to get through.

So I'm seeing progress, but there's a lot more to be made in that area. Good question.

- [Woman] First of all, thank you. Great presentation and thank you for your service to our country.

- Oh, thank you.

- We appreciate it. Many people in this room are dependent on state funds in order to operate. And I know you were obviously dependent on federal funds working at NASA. Did you have any hints as to ways to ge t more money to do your job, and you know, what were successful ways to do that, and then maybe how to utilize the resources you were given in different ways, in more creative ways?

- So I'm going to answer that one a little bit differently using another job that I have that I didn't tell you about, that's directly related to state funds. So I am on the board of regents for Texas Tech University System. We have five universities under our purview. And when you look at the state funding that's available to a university, historically, we would get 30% of what a student would need to have a successful year in college.

Thirty percent of that would be provided by the state. Every year that dwindles, I think we are down to 23%. And so what we are doing at the university level, we try to get more state funding here and there, but you know how that is, because of the different budget pockets that we have to compete with because we are discretionary.

So what I'm encouraging them to do, because of my experience with NASA and commercial industry, is to explore partnerships with industry. Is there a way that you can tie, for example, the research going on at a particular university, which when I did it was just for research sake itself to a company's need?

You know, maybe if you partner the research faculty and the students with a corporation who's needing to innovate, needing to come up with new ideas to find solutions to reduce, you know, the cost of what they're making or make it faster, that might be an avenue.

So it benefits the company, it benefits the student. You could get the company to fork over some money to pay the student stipend. So there may be opportunities for you to explore mutually-beneficial relationships between private industry and your organization and not solely rely on the state funding.

At the NASA level, you know, the federal level doesn't work the same way as the state level. I could go up there and petition for more money and they go, "Oh, you're so cute. No." So it is all very politically motivated.

And if you can find the right congressman to get in your corner to go and sell something, that's how we saved the human landing system. The huge thing that we needed money to give to SpaceX upfront. They were going to kill that. And we got one of the congressmen to help us. So if you want to increase your state funds, make friends in the political realm, but I would sincerely encourage you to explore partnerships with industry in ways that you haven't partnered before.

Any other questions? Oh, we got somebody.

- [Shay] Shay Montgomery. Thank you. What are some of the partnerships that you have and how much did politics play in the upcoming 2026 Artemis?

- That our company has?

- Mm-hmm.

- Or NASA with Artemis?

- NASA and Artemis. Yes.

- Okay. So, for NASA, just to be clear, I've been out of the NASA realm for a year now, but I can tell you who they're partnering with. So a lot of them are the standard companies that you hear about today. So like SpaceX and Lockheed and Boeing, Northrop Grumman. But there are also other companies that they're trying to get in the game with other competitions.

Like, for example, there's a company called Dynetics that is currently competing for the second wave of the human landing system. The one I showed you from SpaceX is only going to fly on the third mission. So there's a brand-new competition. That'll be the first time we set foot on the moon.

But for Artemis 4 and subs, it could be different contractors. There's a company called Firefly that NASA and Intuitive Machines that NASA has partnered with to fly... It's called Commercial Lunar Payload Services. Big picture, these little companies build a small spacecraft, ran a rocket from SpaceX, and you send this spacecraft to the moon to, like, preposition supplies that our astronauts could use.

That one is going to be happening pretty soon. Intuitive Machines should be launching in March of '23. And that one shows a lot of promise because you can make a profit off of doing that. Part of the challenge of getting more people involved or more of the smaller companies involved is how do you make it profitable for them.

How do you create a business case for low-earth orbit or cislunar activities? Any other? Come on, we got three minutes. No one even asked how to go to the bathroom in space.

- [Yvonne] Thank you for your talk. I'm Yvonne. I'm from Washington State. So I know Boeing, but that's about it. So, I guess my question is more about the astronauts and the environment. And I mean, obviously, you have to have each other's backs up there.

I mean, there's no question about it. And when you have conflict in that team, in your job, how did you assess that and have them work through that?

- Okay, so I've been on two selection committees for our astronauts. So I know what we look for when we pick them. So I'll talk a little bit about that. So part of the selection process is to weed that out early. And what we'll do is we'll put these candidates in individual scenarios and in team scenarios and then we have the entire interview panel watching them.

So we get 12 different perspectives. We have also hired a professional psychologist that watches them as well. Because people can look awesome on paper and then you bring them into that environment and you're like, oh my goodness, I thought you looked impressive and now I'm concerned for your employer. So we can learn a lot through that process and weed them out upfront.

And then they go through about a two-year timeframe where it's called AsCan or Astronaut Candidate training. So now they're not real astronauts. We'll call them little baby astronauts. We call them astronaut candidates until they graduate from this program. And during that time, the instructors spend a lot more time with them one on one.

We get to see where their strengths and weaknesses are. We get to try and build them up. And you get to learn more about their personality types so that when the chief of the astronaut office who is in charge of putting crews together, he has all this data. So then we'll put a crew together and then they go through flight-specific training. And we get to watch that again.

But from the flight director office, we weigh in as soon as they get assigned to a particular mission because that's our mission. We're in charge, we're the boss of you. So we get to watch them and understand the dynamic and try to regulate it, work with the chief of the astronaut office as much as we can to try and address it. And then we won't launch them unless we are 100% satisfied.

But there have been scenarios where... There was this one guy and I'm like, "All right, you have a tendency to act like," I'm not going to use the word I used, "act like a jerk." And I know you're going to do it on orbit. It's going to happen and when you do it, I'm going to privatize the communication, I'm going to call up and I'm going to tell you you're acting like a jerk.

Deal?" "Deal." And "Oh, I'm not going to do it. It'll be great. I'm going to be so happy when I get there." I'm like, "Mm-hmm." So he flies. It's like, "Let's set a timer." Sure enough, within the first three days, here it comes. And I'm like, "GC flight, please privatize the com."

And GC's like, "Oh no, he's going to get it." And so I privatize and I said, "Do not make me come up there. I swear to God." And he's like, "Am I doing it?" And I'm like, "You don't even know you're doing it, ugh." And so that's how we handle that. And then after the mission, they go through this commission to talk about how the mission went and we get to weigh in on whether or not these individuals get reassigned.

So there's a process from beginning to end. He never flew again. So we do our best because it is important. You've got to pick the right people. You don't want to have to Duct Tape anybody to a wall up there. So not that that's ever happened.

All right. All right. Well, thank you very much for your time today. I hope you guys enjoyed it.