

## AirSpace Season 1, Episode 6

### Gastro-naut

Nick Partridge:

When I say space food, you say-

Speaker 2:

Ice cream.

Speaker 3:

Moon pie. Moon pie.

Speaker 4:

Neapolitan. Neapolitan.

Speaker 5:

Orange.

Speaker 6:

Dried stuff. Something dry.

Speaker 5:

Just an orange.

Speaker 7:

Dry food, I guess. Yeah.

Speaker 8:

Astronaut ice cream.

Speaker 9:

Dry food, or dry ice cream, or something that they eat like that.

Speaker 10:

Something light, so that it's easy while you're flying.

Speaker 11:

Ice cream.

Speaker 12:

Astronaut ice cream.

Speaker 13:

Ice cream.

Speaker 14:

Potato.

Matt Shindell:

The space potato.

Nick Partridge:

Those were real voices from the streets of Washington DC, outside the museum. It was an appealing answer.

Emily Martin:

It was a good... That shouldn't have taken me that long.

Nick Partridge:

Welcome to AirSpace, a podcast from the Smithsonian's National Air and Space Museum. We are your hosts.

Matt Shindell:

I'm Matt Shindell.

Emily Martin:

I'm Emily Martin.

Nick Partridge:

And I'm Nick Partridge.

Emily Martin:

This episode is all about space food.

Matt Shindell:

Imagine if we could grow plants in space, without water or soil.

Emily Martin:

Or print it, like in the Jetsons.

Nick Partridge:

Turns out that's already happening.

Matt Shindell:

And we'll talk about it.

Emily Martin:

And Matt goes behind the scenes with the National Air and Space Museum's curator of the space food collection. Valerie Neal tells us about some menu favorites.

Valerie Neal:

You could choose anything from crawfish etouffee, that you might find in New Orleans, to tofu with hot mustard sauce.

Matt Shindell:

We all learn a little something about space currency.

Harrison Schmitt:

The bacon squares were highly coveted, very good trading material, as a matter of fact.

Matt Shindell:

Astronaut Harrison Schmitt shares this and other important lessons he learned during the Apollo 17 Mission to the moon.

Emily Martin:

That's coming up next on AirSpace from the Smithsonian's National Air and Space Museum, with help from PRX.

Matt Shindell:

So Nick, word on the street is that you've never tried astronaut ice cream, even though you work here in this museum.

Emily Martin:

Why? Who are you? Were you never a seven year old kid at a museum on a field trip?

Nick Partridge:

So here's a secret, I'm not actually a huge ice cream person.

Matt Shindell:

But today we're going to change that. We've got a little experiment for you.

Nick Partridge:

What is this?

Emily Martin:

There's lots of crinkling.

Matt Shindell:

Do you have sensitive teeth?

Nick Partridge:

No.

Emily Martin:

Tell me that you like gelato or sorbet or something?

Nick Partridge:

Gelato is great. I mean, contextually, I'm not going to-

Emily Martin:

Contextually?

Nick Partridge:

I'm not going to conspicuously not eat ice cream. It's so thick and it just-

Emily Martin:

Wow. You have no good excuse.

Matt Shindell:

It's so rich, and creamy, and sweet, and perfect.

Nick Partridge:

Yeah. Perfection makes me uncomfortable. Ice cream gives me an existential crisis. Nothing could be that good. Right? But I don't intend to find out.

Emily Martin:

Hold on. I'm going to open this. Okay. Left or right?

Nick Partridge:

Left.

Emily Martin:

Get ready for an astronaut ice cream sandwich.

Nick Partridge:

The ice cream part is oddly insubstantial.

Emily Martin:

What do you mean? Insubstantial. That sounds-

Nick Partridge:

Well, it kind of just disappears.

Emily Martin:

It's got a melty quality to it, like ice cream, but it's like a warm melt.

Matt Shindell:

Kind of like cotton candy melty.

Emily Martin:

Yeah, like cotton candy.

Matt Shindell:

It was like a dense cotton candy.

Emily Martin:

Yeah, I mean-

Nick Partridge:

Yeah, like calcified cotton candy.

Emily Martin:

Astronaut ice cream has never made it into space. It's always been purely commercial.

Matt Shindell:

Too crumbly. It would get in all of the instruments.

Nick Partridge:

Do I have to eat the rest of it?

Emily Martin:

You do not.

Matt Shindell:

So guys, real talk. There's a lot of stuff that you can and can't take into space for food, because it can cause problems. Right?

Nick Partridge:

Example?

Matt Shindell:

Example, if you were to bring bread or maybe crunchy potato chips, there's potential problems with crumbs getting out and into the ventilation.

Nick Partridge:

I guess you could even breathe them in.

Matt Shindell:

You could breathe them in. That could be tough, if you started choking all of a sudden in your sleep. I don't know.

Emily Martin:

In think-

Nick Partridge:

Nowhere is safe, Matt Shindell...

Matt Shindell:

If you're just sleeping at home, only in space is bread the silent killer.

Valerie Neal:

Only in space!

Nick Partridge:

How are you keeping bread in your home that gravity is the only thing keeping you safe?

Emily Martin:

Okay. Actually, astronauts eat bread. It's just often in the form of tortillas, to reduce the potential for crumbs. They've been known to put all sorts of toppings on those tortillas.

Nick Partridge:

I'd like to see what they can do with olives.

Matt Shindell:

Like a nice tapenade?

Nick Partridge:

Yeah.

Matt Shindell:

Anything spreadable is good on the space station, I think.

Nick Partridge:

They preserve well.

Emily Martin:

I like that pepper and salt are in liquid form. You can't just sprinkle that on when you're in zero gravity, because it won't fall onto the food, so you get little droppers of the stuff in a solution.

Matt Shindell:

In the early days of space exploration, food was part of the exploration. The astronauts eating there were part of the experiment. Over time, as trips became more frequent and durations of trips were extended, the food, its preparation, transportation, and longevity evolved too.

Dr. Valerie Neal is chair of the space history department in the National Air and Space Museum, and she's responsible for the space food collection. Some of it is on display, but a lot of it is kept in a special temperature-controlled area, under lock and key, and offsite. Valerie invited me to visit the collection. She walked me through some of its highlights.

Valerie Neal:

Well, we have a series of cabinets with large drawers in them.

Matt Shindell:

The space food is in here with a lot of other artifacts from the space program, space suits and space gear. On our right, we have metal racks of spacesuit helmets. It's kind of a cool, strange room to be in.

Valerie Neal:

The cabinets don't necessarily say what food is in which cabinet. They're just packed with samples, going back to the Mercury Missions in the early 1960s and continuing all the way to the present, with the food from the international space station menu.

Matt Shindell:

In the Mercury Mission, they really didn't know how space flight was going to affect digestion. Is that right? So they were really experimenting with food?

Valerie Neal:

Yeah, exactly. This was something brand new and nobody knew quite the effect of micro gravity would be. We had some fundamental questions like, "Can you really swallow and will the food properly go through your digestive system?" So that was actually one of the experiments that John Glenn performed.

Matt Shindell:

And he ate Apple sauce, is that right?

Valerie Neal:

Apple sauce, right. It was packed into a toothpaste tube, basically, so it was very simple way of eating. Just pop the top off the tube and squeeze some into your mouth. He reported no problem at all swallowing. He also didn't have any problems with indigestion. And ingestion's actually a concern, because in space, your food, as you digest, it tends to float near the top of your stomach, rather than the bottom of your stomach. So, some people have difficulty with burping or feeling like things just aren't going down well, but physiologically there's no problem, because your body itself squeezes the food through the system.

Matt Shindell:

Well, why don't we open one of these cabinets and see what's inside?

Valerie Neal:

Sure. Let's just see. Personal hygiene. Food. Here's one that simply says food. We'll open this cabinet. Can you unlock it there?

Matt Shindell:

We're looking at a drawer that is filled with these small plastic, almost Tupperware style containers, about 10 by 10 in the drawer. So there's about 100 I think with sort of dried-on gunk on the bottom. It doesn't really look very appetizing. Does it?

Valerie Neal:

No, not really. I'm sure it did when it was fresh, but as things age, they tend to go brown.

Matt Shindell:

And each of the little containers looks mostly empty. Is that because the food is dehydrated?

Valerie Neal:

Exactly. So this little square container becomes like a bowl, and there's a little port here in the corner, where the astronaut would put this up to the galley in the space shuttle. There's a spigot for hot water or cold water, and you poke the needle in here and each little container of food tells you how many ounces of hot or cold water to use. And then you will have something tasty. In this case, orange juice. Doesn't look at all like orange juice right now.

Matt Shindell:

No. Not at all.

Valerie Neal:

It looks kind of like prune juice. Caked prune juice. You'll notice that, on these paper labels that describe the contents of the food, there's also a little yellow sticky dot, and that indicates which crew members food this is. By the 1990s, NASA gave up these rigid plastic Tupperwares and went to vacuum sealed pouches, a sturdy vinyl baggie with the port at the top. You would squirt the hot or cold water in, and then mush with your hands, and get your food reconstituted. Here's another type of... It's in a can. A pop top can. Can you see what it says?

Matt Shindell:

Ham salad spread.

Valerie Neal:

Ham salad spread. All right.

Matt Shindell:

Now I've read that on at least one of the Apollo missions, they brought ham sandwiches with them.

Valerie Neal:



Not ham sandwiches. A corned beef sandwich. Gemini 3, I think it was. John Young sneaked one aboard for Gus Grissom. They got into trouble for that. There was actually a congressional hearing. Health is an issue. Anytime you have people in a closed environment, they're re-breathing the same air. They're recycling their water. There's real concern about any kind of bacteria getting loose. Part of the reason that the foods are prepared the way they are is to sterilize them. We talked about the dehydrated food, but thermo-stabilized food, like the puddings and a lot of the entrees, let's say chicken a la king or something, will have been thermo-stabilized, which is a fancy word for canning.

Matt Shindell:

That's really an ancient technology of canning, heating things up and storing them.

Valerie Neal:

Then, the third way is irradiation. They do that on meat products, like steak or hamburger. Let's see what this is. Here's an example, rhubarb applesauce. Now, this would be thermo-stabilized. This is more contemporary. You can see it has a barcode on it. I believe it has both Russian and English. There might be one little suitcase that is pouch, pouch, pouch, pouch, pouch, like that of applesauce. Another might be a whole row of cherry cobbler, apple cobbler, that sort of thing. On the International Space Station, instead of having a menu set for you in it, you just go and pull from the meat you want, from the vegetable container, whatever vegetable you want.

Matt Shindell:

So you can make a different decision every day-

Valerie Neal:

Every day.

Matt Shindell:

... instead of having to have everything planned.

Valerie Neal:

Right. There is Chinese food or Japanese food on the Space Station. There's now vegan and vegetarian food. There's low sodium food and low fat food, if you have dietary issues. But if you look at the menu, you could choose anything from crawfish etouffee, that you might find in New Orleans or East Texas and Louisiana, to tofu with hot mustard sauce. For the holidays, the astronauts do like to have a holiday meal together that's very traditional. Let's look in another drawer and see what we have here. Cherry dessert. Ooh, yum.

Matt Shindell:

Are those M&M's?

Valerie Neal:

Well, it says mint M&M's. They're green and brown. These are great for playing with your food in space, because astronauts will take a handful, toss them up in the air, and then everybody becomes a guppy, floating around and snapping at M&M's.

Matt Shindell:

The same food eaten on earth will taste different in space, is that right?

Valerie Neal:

Yeah, and why do you think that is?

Matt Shindell:

Well, I've heard that it's because, without gravity, a lot of your sinus fluids just build up in your head, right? Is that what it is?

Valerie Neal:

Fluids that are normally pulled down into your legs and feet kind of migrate up into your torso and all the way up into your head. You know how when you have a cold, your taste buds are affected and everything tastes bland?

Matt Shindell:

Yeah.

Valerie Neal:

That's what it's like for them. And as a result, the number one most favorite food in space is shrimp cocktail. Shrimp cocktail with horseradish sauce, to get that spiciness. And if you look carefully at pictures of the dining area on the International Space Station, in the Russian component, you'll see behind an elastic band, against one of the cabinets, sriracha sauce, taco sauce, Tabasco sauce. All these hot spicy sauces.

Matt Shindell:

Yeah. All the spiciest sauces you can get, I guess. Yeah.

Valerie Neal:

Exactly. I haven't heard of anybody putting sriracha sauce on their dessert yet, but it's conceivable.

Nick Partridge:

We've discussed how I'm not the biggest ice cream person in the world, but if you wanted to add hot sauce to ice cream, I would give it a go.

Emily Martin:

I mean, that's maybe taken this sweet, salty thing a little far for me.

Nick Partridge:

My wife, Liz, once made me a birthday cake that was a chocolate chili cake.

Emily Martin:

That sounds delicious.

Nick Partridge:

It was a chocolate chili, chocolate birthday cake with chocolate cinnamon frosting.

Emily Martin:

I mean, I can see the whole-

Nick Partridge:

It was really, really something.

Emily Martin:

... chocolate chili situation.

Nick Partridge:

Yeah. I'm totally down with astronauts on the hot sauce.

Matt Shindell:

Now, if it was possible, would either of you, Nick or Emily, volunteer to be a food tester in the space food lab?

Emily Martin:

Yes. I did hear that in order for space food to pass the test to actually become something that's a menu item, it needs to make it through at least three flights on what is called the vomit comet, which is essentially this plane that flies up and down, and up and down, and up and down, and on the downs, it essentially gives you a sense of weightlessness or a zero G. So apparently, any space food that becomes space worthy has to be able to make it through at least three of these trips. And I think those trips are used to actually test the delivery methods for these different foods, to actually make sure that they aren't super crumbly, and that all the things that they've done are what they're expecting the food to do.

Matt Shindell:

It's not about whether the food becomes vomit in the comet.

Emily Martin:

Correct. When you fly on the vomit comet, they actually put hack sacks in your sleeves and inside your jumpsuit, so that just in case you're trying to be a hero, they don't want you throwing up everywhere.

Matt Shindell:

We've just upped the ante of what it means to be a space food taste tester.

Emily Martin:

Yeah. The Apollo 17 mission was the Apollo mission that spent the most time on the surface of the moon. Harrison Schmitt was one of the astronauts on that mission. So that means he would have consumed a lot of moon meals.

Matt Shindell:

His frequent diner card was fully punched.

Emily Martin:

He got his 10th meal for free.

Matt Shindell:

He got his 10th meal for free.

Nick Partridge:

The taxpayers paid though.

Matt Shindell:

Yeah. I actually asked him to talk with me about eating in space. It turns out, he had quite a number of food adventures. More on that after the break. Astronaut Harrison Schmitt traveled to space in December, 1972 on the Apollo 17 mission. He was the lunar module pilot. His crew mates were commander Eugene Cernan and command module pilot, Ronald Evans.

Emily Martin:

And didn't Harrison Schmitt take the famous blue marble photo of the earth? The image that shows nearly the entire sphere of the earth visible against the dark sky?

Matt Shindell:

That's right. He did, and I asked him about that photo.

Harrison Schmitt:

It turned out to be one of the most popular photographs that's ever been taken. I think NASA still says that it is the most requested photograph from their archives.

Matt Shindell:

The photo is pretty iconic. When I look at that photograph, I sort of picture him on the other side of the camera. And for the purposes of this episode, let's say I imagine him eating space food, 1000s of miles away from home. When we talked, he explained that sometimes it's not easy to want to eat space food in space, but not for the reasons I thought he might mention.

Harrison Schmitt:

One of the problems you have is that your appetite is suppressed when you're weightless and you're not working as hard as you do normally, here on earth, just to stand or move around. And so really to keep your energy levels up where they ought to be, you eat more food than you really desire.

Matt Shindell:

So when you designed your own menu for Apollo, what were the things that you chose?

Harrison Schmitt:

We were always looking for something with some flavor to it. And I guess that champion in that respect were the bacon squares. Just like the ads for dogs, we really did go after those bacon squares and try to get as many of them in the menu as we could.

Matt Shindell:

So bacon is popular, even in space. That's good to know.

Harrison Schmitt:

Well, it's salty and it has flavor. We were really looking for things with flavor. The meals changed, somewhat, through the Apollo program. I think they got new ideas. At one point, they added additional potassium to some of the juices and things like that. There was certainly a good rationale for it, but they probably overdid that.

Matt Shindell:

Right. I've heard that it ended up giving some astronauts some bad gas.

Harrison Schmitt:

To say the least, yes.

Matt Shindell:

Which is not what you want when you're in a confined environment?

Harrison Schmitt:

Not at all.

Matt Shindell:

Were there particular times when you just felt very hungry? I mean, after a long day of work on the moon, I'd imagine you would.

Harrison Schmitt:

Yes. The reason you're hungry is that you're in a pressure suit, a suit pressures 3.7 pounds per square inch. Every time you move, you're doing work at that pressure. And even though it's 1/6th gravity, you are indeed using up a significant amount of energy, particular upper body energy, because you're doing things with your arms almost continuously. It's pretty easy to run on the moon. I found that a cross country skiing gate was the best way to run on the moon. Nevertheless, you're working for nine, 10 hours, physically working. That tends to create a pretty healthy appetite.

Each meal, after the excursion, after the hard work, we ate essentially everything that was in that meal and then some. The only food we had to eat while we were in the suit, with a helmet on, was a long fruit stick that was inserted into a holder, that you could just reach with your mouth and your teeth. You had to do it right. You had to remember to pull that out before you took a bite. If you didn't, if you took a bite, then you might never get to that fruit stick again.

Matt Shindell:

So did you and Gene Cernan eat meals together while on the moon?

Harrison Schmitt:

We ate meals together, both in the Apollo spacecraft, as well as in the lunar module challenger. But on the moon, we really only had two meals a day, because most of the time we were outside the spacecraft working, exploring the Valley of Taurus-Littrow. We'd have a breakfast and then a dinner. First time we had a meal on the moon, Cernan reached over and opened up a compartment and it exploded. The packages of food had enough air in them that, in the reduced atmospheric pressure of the spacecraft, food came piling out onto the floor of the Challenger. We took our first meal out of it, and then the food was all connected... Every food pouch was connected to another food pouch by fish line. So we stuffed everything else back in the compartment as best we could.

Matt Shindell:

What was the ambiance like of eating, either in the lunar module or in the command module, when you would have a meal? In the command module, I assume you just remained seated in your seat, but-

Harrison Schmitt:

In the command module, of course you're not seated, because that implies you have gravity. What you do is, you just strap yourself loosely into the seat, just to maintain a little body control. Usually, I think, Ron Evans would be distributing the food, since he knew where it was stored better than we did. As he distributed the food, you'd just pass around the water gun for re-hydration. The water gun, with every trigger pull, would give you about an ounce of water, so you could calibrate how much water you wanted to put in any particular pouch.

And then you'd cut the pouch open and use a spoon. The dominant force that you have in space, once you're weightless, is surface tension. So a spoon works very well, so long as you don't move it too fast, and the food comes out and starts drifting around the cockpit. If you don't catch it in a hurry, it's going to end up in the ventilating fans.

Matt Shindell:

Did you have any runaway food on your mission?

Harrison Schmitt:

We almost lost a bacon square once. That would have been a severe loss. As I indicated earlier, the bacon squares were highly coveted, very good trading material, as a matter of fact. If your colleague had some food that you decided you want, a chocolate bar or something like that, you could almost certainly trade him a bacon square for that particular item.

We made sure that that bacon square didn't get away from us. Matter of fact, that was a big issue with leaving Ron Evans alone in that spacecraft, as we were working on the moon, because Ron really was a chow hound. For some reason, his appetite wasn't diminished by being in space. We were concerned that there would not be much of anything left, by the time we got back to orbit from the moon. And indeed, all the bacon squares that were allocated for our return trip to earth had disappeared by the time we got there.

Matt Shindell:

Well, I think we know what the currency of space is going to be if we ever do become an interplanetary species. I think bacon, it sounds like, is going to be worth more than gold.

Emily Martin:

When I think of bacon squares, I think of that gum that Violet chews in Willy Wonka.

Speaker 19:

This little piece of gum is a three course dinner.

Emily Martin:

So when I think of a bacon square... Because when she first takes that piece of gum, it's like this little brown cube.

Speaker 19:

Holy Toledo, what's happening to your face?

Violet:

Cool it, Dad. Let me finish.

Speaker 19:

Yeah, but your face is turning blue. Violet, you're turning violet, Violet.

Violet:

What are you talking about?

Emily Martin:

Violet. You're turning violet, Violet.

Nick Partridge:

Violet. You're turning violet, Violet.

Emily Martin:

What would you trade your Willy Wonka gum or bacon squares for?

Nick Partridge:

I would trade-

Emily Martin:

Or would you just hoard them?

Nick Partridge:

Maybe.

Matt Shindell:

I'll tell you what I would take. You know what I think would do well in space are those mozzarella cheese sticks that you can buy, like the string cheese strings.

Nick Partridge:

No kidding.

Emily Martin:

I know, but like, you've got bacon squares. Your buddy up there, on the surface of the moon... Maybe you've got two buddies, I don't know. They've got something you want. What is it that they have you want more than that bacon square?

Nick Partridge:

Moon rocks. I was one of the guys in the ship.

Emily Martin:

You guys suck at this game.

Matt Shindell:

Nick, we're supposed to be talking about food, not rocks.

Emily Martin:

You don't get to keep any of the rocks. It's a federal offense.

Nick Partridge:

Tea, Earl Grey. Hot.

Emily Martin:

You guys are killing me.

Matt Shindell:

What I think of, when I think of the future of space food, is the Star Trek replicator, where you can tell the computer what you want and the computer just puts it in front of you, as you order it.

Speaker 21:

Water. Cold.

Matt Shindell:

Now we don't have that technology of making something out of nothing, but I've heard that we have maybe the ability to 3D print some foods.

Emily Martin:

Yeah. It was something that was on display at South by Southwest this year. It's a Japanese company called Open Meals, and they actually sort of fill a 3D printer with little bits of gel that each cube of gel, which counts as a pixel, gets infused with a certain amount of color and a certain amount of flavor of the thing that you're trying to print. And the end result, apparently, is not particularly delicious, but has a very cool 8-bit, super pixelated... Think like, early video games [crosstalk 00:24:44].



Matt Shindell:

So it's like eating inside of Mario Brothers.

Emily Martin:

It's like eating inside of Mario Brothers on your Sega Genesis, but you still can't escape the weight of that food substrate that you have to put up into orbit.

Matt Shindell:

But you're also not stuck with like, "We brought X number of-

Nick Partridge:

Potatoes.

Emily Martin:

Fettuccine Alfredo.

Matt Shindell:

Fettuccine. Yeah, exactly. You can make your decisions as you go.

Nick Partridge:

Delicious, delicious substrate.

Emily Martin:

Delicious, delicious substrate.

Nick Partridge:

But do you think there's going to be an astronaut that gets tired of the printed substrate, and so he's just in the back of the machine, eating the substrate directly out of the pot?

Emily Martin:

Well, he can just make it from his poop.

Nick Partridge:

That's valid. No, that was something we read.

Matt Shindell:

Right. So, it's still not something from nothing, but something that most of us don't want to think about is making food out of our own waste.

Emily Martin:

But there is a group out of Penn State working on this system.

Nick Partridge:

Ew.

Emily Martin:

Keep it together. It's fatty protein goo.

Matt Shindell:

I'll ask you again, do you want to be a taste tester for space food?

Nick Partridge:

I'm just saying, I have heard that this idea is not gaining any more currency with astronauts than it is with us now.

Emily Martin:

But they're already drinking... I mean, on the Space Station, they're already making some of their drinking water out of their urine. I mean, it doesn't feel like that much of a leap.

Nick Partridge:

That doesn't feel like that much of a leap? That is one giant leap for space kind.

Emily Martin:

They did it in *The Martian*. We're going to keep talking about it.

Matt Shindell:

Well, if you think about the way... Right, *The Martian*. Or if you think about...

Nick Partridge:

He was using that as potato substrate.

Matt Shindell:

... the way that we get our food on this planet, right. We grow food, basically, in the waste products of animals, of bacteria.

Nick Partridge:

With a lot of richly harvested nitrogen.

Matt Shindell:

All of those nutrients go back into us, but they go through nature first. This would be sort of taking nature out of the equation and throwing it into a machine, just reforming some form of food.

Nick Partridge:

If any of our listeners are at Penn State and would like to let us know what the dining halls there are like, we would be interested in whether or not the scope of this experiment has expanded.

Matt Shindell:

So, poop food is pretty gross for obvious reasons and I think we should move on to a less disgusting topic. There's a pretty exciting line of research going on, trying to grow food in a different way called aeroponics.

Nick Partridge:

That sounds much more appetizing and a much safer vein of conversation.

Matt Shindell:

Yeah. So imagine a garden where you don't have to get your hands dirty, where you're using just a little bit of water, no soil, and no sunlight.

Emily Martin:

But it actually has a lot of artificial light that they're using to grow the plants, because of course, plants photosynthesize, you can't grow plants without some kind of light. And in Antarctica, actually, where they're doing some of these experiments and testing some of these technologies, they're actually doing this in a shipping container. And you're controlling, essentially, the atmosphere inside the container and essentially, attached with a giant SAD machine, a giant light machine in there that's kind of making sure those plants are growing happy and healthy. So if you think about it-

Matt Shindell:

The vegetables that are being produced with aeroponics actually look pretty good. I don't think they're going to win any 4H fairs anytime soon, but-

Emily Martin:

But why not?

Matt Shindell:

Well, they're not growing the world's biggest pumpkin, but the food looks good.

Nick Partridge:

How big does a pumpkin have to be to hold a record in space though?

Matt Shindell:

Well, true. I don't know if we've flown a pumpkin yet.

Emily Martin:

I'm sure they've flown at least a slice of pumpkin pie for those astronauts who are in their missions during Thanksgiving.

Matt Shindell:

You can throw a pie at someone from like a mile away.

Emily Martin:

I don't think the gravity is that low on Mars.

Nick Partridge:

Reduced gravity food fights.

Matt Shindell:

You don't know how hard I can throw a pie.

Nick Partridge:

And you don't know how light and airy his pies are. AirSpace delivered premixed, no re-hydration required, from the Smithsonian's National Air and Space Museum with help from PRX. The producer of AirSpace is Jocelyn Frank. Our executive producer is Katie Moyer. Special thanks to John Barth and PRX, Jason Orfanan and Tarek Fouda. You can subscribe to AirSpace wherever you get your podcasts. This episode was supported by PRX and the Alfred P. Sloan Foundation, enhancing public understanding of science, technology, and economic performance. More information at [sloan.org](http://sloan.org). Computer. Earl Grey, hot.

Speaker 23:

From PRX.