

Colorado Global Connections - Ep 1 - SPACE

clip: [00:00:00] Roger Zero-G and I feel fine. Capsule is turning around. I feel like a million dollars. This is the greatest experience I've, I've ever-

Eric Singer: That was the sound of some of the first humans ever to experience weightlessness, early NASA astronauts. And this is the sound of me and a dozen other lucky civilians experiencing zero gravity for the first time aboard an aircraft called G-FORCE One.

I'm Eric Singer, and this is Colorado Global Connections, a show about how the Centennial State plugs into the rest of the world. In our debut episode, we're going above and beyond global. We're taking you on a journey into orbit and beyond to cover Colorado's space economy, because there's a lot going on here.

Dan Caruso : Let's talk about Colorado.

Chris Pearson: There's a real nucleus here. It's actually where I began my career. There's a lot of US Air Force and Space Force assets.

Matt Wiggins: [00:01:00] Lockheed Martin.

Chris Pearson: A huge site down in South Denver.

Ball Aerospace.

Matt Wiggins: BAE Systems.

Chris Pearson: Raytheon.

Audrey Kiefer: Axiom.

Chris Pearson: Blue Origin. Sierra Space as well.

Dan Caruso : And there's Lunar Outpost.

Kirby Runyon: Boom Aerospace.

Dan Caruso : Ursa Major's here.

Matt Wiggins: Northrop Grumman.

Dan Caruso : Voyager Space just went public. Advanced Space growing significantly.

Robert "Surf" Beletic: Leading role in space.

Dan Caruso : There's a number of examples of companies like Agile-

Robert "Surf" Beletic: A full-spectrum aerospace economy ...

Dan Caruso : that were born here, are scaling here.

Robert "Surf" Beletic: Rockets, satellites, manned spacecraft.

Dan Caruso : In many cases, are becoming worth hundreds of millions and-

Robert "Surf" Beletic: Space stations

Dan Caruso : over a billion dollars.

Robert "Surf" Beletic: Building everything.

Dan Caruso : So there's no ambiguity about the role Colorado plays.

Eric Singer: The other reason to cover space in this episode was, frankly, because it gave me an excuse to go play astronaut for the day. So buckle up. You're coming with me to ride what the astronauts call the vomit comet.

Before we go weightless, let's find out what's going on closer to home. I asked Matt Wiggins of the Boulder Economic Council.

Matt Wiggins: Boulder MSA has an unusually deep aerospace workforce for a region of its size. Roughly 6,800 aerospace-related jobs, 80% [00:02:00] more than the national average, which sits around 3,900.

Eric Singer: But Matt's bigger point isn't the head count. It's how close all these pieces are to each other.

Matt Wiggins: The region's advantage is not simply the number of aerospace companies that we have. It's the density of the connections between research, talent, and industry. It's obvious that Boulder has the talent. It's a research powerhouse.

It's its ability to move aerospace research from the lab into actual missions and commercial applications.

Eric Singer: Zooming out to the state more broadly.

Robert "Surf" Beletic: Colorado plays a leading role in space. We have a full-spectrum aerospace economy building everything from ground stations, propulsion systems, rockets, satellites, manned space-

Eric Singer: That's retired fighter pilot and Air Force General Robert "Surf" Beletic.

He heads up aerospace for the State Office of Economic Development and International Trade, or OEDIT as it's known.

Robert "Surf" Beletic: 50% of the Space Force is here in Colorado, and the Space Force budget is projected to increase by 31 billion next year

Eric Singer: The more people you talk to in the industry, the more [00:03:00] OEDIT comes up.

Another name that keeps coming up is Dan Caruso. He's an entrepreneur, author, podcaster, music festival founder, and possibly the most interesting man in the world.

Dan Caruso : And you, you know my broader background, right?

Eric Singer: You've got your fingers into every damn thing that I'm interested in.

Caruso Ventures is a leading investor in a ridiculous number of our most exciting space companies.

So I wanted to know the deeper why he's focused so heavily on space.

Dan Caruso : I was born in 1963, and that was the year that JFK was assassinated, but it was after JFK declared we were going to the moon.

clip: We choose to go to the moon in this decade and do the other things.

Dan Caruso : So certainly like every kid of my era had the jaw-dropping of seeing, you know, the space program kind of play out.

clip: That's one small step for man.

Dan Caruso : Up to and including the landings on the moon.

clip: One giant leap for mankind.

Dan Caruso : But my real interest wasn't science fiction and wasn't space per se. It was a book I picked up and it was called God and the New Physics by [00:04:00] Paul Davis. But it wasn't about religion, it was around physics, theoretical physics, and physics answers to the most fundamental questions.

Where did the universe come from? Where do we come from? When will the universe end? And that led me down a path of staying very current with the cutting edge of theoretical physics. So I

was studying quantum way before 30 years ago. 35 years ago is when we didn't even know if quantum was real or not real back then.

There is a lot of opportunity to invest in really interesting companies. Here in Colorado, space is as much of a new frontier as quantum is, and as AI is. Those three kind of feed off each other and the space economy is diverse and broad in nature, and it's here right now.

Eric Singer: Here's Dan talking about GPS on his own podcast with Chris Pearson, the CEO of Durango's Agile Space Industries.

Dan Caruso : The space economy is just gonna be a gigantic economic engine.

Chris Pearson: GPS for me is the best example.

clip: Start navigation.

Chris Pearson: It was actually turned down [00:05:00] by DOD. They didn't want it, didn't see the use case for it.

clip: Changing route.

Chris Pearson: And then through the '90s they began to incorporate a navigation software and the rest of it.

That is now a trillion dollar industry.

clip: You have arrived.

Chris Pearson: Cell phones, banking transactions, they wouldn't work without that. We wouldn't be able to navigate on our phones. You know, people think, oh, it's Apple, or it's-

Dan Caruso : Yeah ...

Chris Pearson: it's Google. It's not.

Dan Caruso : Like the software just sits in the phone.

Chris Pearson: It's, it's GPS-

Dan Caruso : Yeah

Chris Pearson: which is up there. There was a study done by RAND Corporation a few years ago of what it would cost the US economy if GPS went down It was billions of dollars a day. What's that next application which is gonna come out? There'll be another GPS.

Eric Singer: So what's the new GPS?

Dan Caruso : There's a whole category that's called QPS, where Q is quantum, quantum positioning systems.

The combination of GPS and QPS is gonna create a whole wave of technologies, and it's already happening.

Eric Singer: I asked Bob Cone, president of Aerospace Colorado.

Bob Cone: Bob Cone, I'm the president of a nonprofit organization called Aerospace [00:06:00] Colorado, which is advocating for a better business climate in Colorado for aerospace companies.

Eric Singer: He also, during his day job, works at-

Bob Cone: Advanced Space, one of the leading companies developing space navigation and mission design technologies that will enable further exploration of the moon and the rest of the solar system.

Eric Singer: Advanced Space has right now a quantum class timing system in operation in orbit around the moon.

Bob Cone: Advanced Space is very proud of our first space mission, which was developing the Cislunar Autonomous Positioning System, so think GPS except at the moon. As we explore, settle, and develop the moon, we need some way to know exactly where we are on the surface of the moon to identify and document resources to extract or to define where facilities will be located or where other countries' facilities will be located on the moon.

Eric Singer: So lots of the same use cases as GPS back here on [00:07:00] Earth.

Bob Cone: Colorado has the capital of GPS. Lockheed Martin Space in Waterton Canyon has built most of the GPS satellites that are in Earth orbit today, and Lockheed is developing all kinds of other, uh, systems and technologies for lunar exploration to allow astronauts to live and work on the surface of the moon for long periods of time.

Doing that, of course, requires power, requires food, requires habitat, all the things we have here on Earth, but getting those things together on the moon is a lot more complicated effort, and Lockheed is leading the way on a lot of those technologies.

Chad Vorthmann: Colorado is really known worldwide for its robust end-to-end aerospace ecosystem.

Eric Singer: This is Chad Vorthmann from Lockheed Martin.

Chad Vorthmann: Recently, Colorado was named as one of seven NASA hubs nationwide. That designation will expand pathways to good paying aerospace careers, including many that do not require a four-year degree. GPS backs space-based weather sensing capabilities and

will [00:08:00] continue transforming the data from space assets to new areas like helping better fight wild land fires.

And we're gonna be building new frontiers for a lunar economy through human exploration on future Artemis missions to the moon, and then on to Mars.

Eric Singer: Before we get to Mars, I wanna back up to something Chad just mentioned.

Chad Vorthmann: Fight wild land fires.

Eric Singer: This is Thomas Grüber.

Thomas Grüber: We provide forest fire monitoring from space.

Co-founder and CEO of OroraTech USA. We aggregate all the satellite data which is out there, but this is not enough, so we launched our own fleet of satellites. We operate at the moment 19 satellites in space for fire monitoring. We have chosen Colorado as our home base, not only because we have two daily flights to our headquarter in Munich, but also because of the very warm welcome of the German American Chamber of Commerce.

Eric Singer: Hey, [00:09:00] speaking of the German American Chamber, I want to extend a huge thanks to one of their members, the Lance Law Group. They're also members of the Global Chamber, another one of our distribution partners. Telling audio stories like this is, dare I say, out of this world expensive, and we couldn't do it without the support of underwriters like Lance Law.

They provide comprehensive, culturally informed legal support for domestic and international businesses to expand in Colorado and the US more broadly. You'll find a link to them and info about how you can support this program at our website, globalconnections.show. Economics and gravity, two forces we can't escape. Or can we?

Cherish Edwards: We've created a microgravity laboratory that allows companies to test their products in the microgravity environment. It's a small cassette. It looks like a pizza shape, and within [00:10:00] that pizza are six slices, and those go up in a sounding rocket.

Eric Singer: Narravity is planning to build that in Colorado, but not in the Denver-Boulder metro, where you might expect, thanks to OEDIT.

Cherish Edwards: Our focus is to build our facility in Colorado. We got a jumpstart from the Colorado Office of Economic Development. We have selected Fremont County as our home base.

Eric Singer: Well, at six-foot-six, I was gonna have a hard time fitting into that pizza box, so my own route to zero gravity needed a slightly larger form factor.

Gregory Melon: Microgravity flights are essentially flown by flying a series of aerobatic maneuvers called parabolas. Right, so-

Eric Singer: Gregory Melon has spent the last couple decades running marketing for companies selling things most people can't explain, from national security tech to zero gravity flights. When we met, he was the VP of marketing at Zero G, the company that operates the magical aircraft you heard in the intro to the show.

Gregory Melon: [00:11:00] Yeah, I got to do just north of 1,200 parabolas and 10.1 hours of microgravity. So it's really fun 'cause it means I get to say things like I've experienced more microgravity than 99.9% of Earth's population. In your mind, picture a bell curve essentially. The plane will start at a cruising altitude of 24,000 feet, and then it goes 45 degrees nose up relative to the horizon, and it climbs up to 32,000 feet, and then it goes 30 degrees nose low and dives back down to 24,000 feet.

So if you're picturing that bell curve in your mind, that top portion of it where you see the curve where it's ascending, rounding out, and then descending again, that's where the microgravity or the zero gravity portion happens. And for each one of those parabolas that we fly, everyone and everything in the back of the plane experiences between 25 to 30 seconds of weightlessness.

If it's a public flight, we'll do about 15 of those. That's essentially just a joyride for anybody who wants to [00:12:00] fulfill a lifelong dream of experiencing weightlessness, like you got to come and experience with us. For our scientific research clients, we'll fly 30, sometimes even 45, because they need more time to collect data for how their hardware is performing in zero gravity, Martian gravity, lunar gravity.

Eric Singer: Dr. Brad McLain, a former NASA social scientist and University of Colorado researcher, invited me to join him on a Zero G flight as a lab for something harder to measure: what an extraordinary experience does to the person having it.

Brad McLain: A transformative experience is unlike any other experience that we have in our lives because it is a learning experience that results in an identity impact.

That is, it changes our sense of self, who we think we are or who we want to become. I had the wonderful privilege of working for NASA on the space shuttle program when I was just starting [00:13:00] out

Eric Singer: It is very early in the morning at Denver International Airport. I've been too excited to have slept much for the last few days, but I've never been more excited to board a plane.

clip: Good morning. Welcome to United 2188 service to Fort Lauderdale.

Eric Singer: And this flight isn't even the one I'm most excited about. This is just your run-of-the-mill United nonstop to Fort Lauderdale. That's where I'll be getting on a very different flight this time tomorrow. Brad and I are joined at the hotel by another executive in the creative industry, Rodrigo Londoño.

He's the Colombian-born founder of Catapult 13, a branding agency headquartered in Miami.

Rodrigo Londoño.: Newton with the tree and the apple falling. That picture just came to mind. I'm like, "This thing is real, right?"

Eric Singer: As microgravity and space become less government-only, the people using it stop [00:14:00] being just astronauts and agencies.

They become customers. Audrey Kiefer consulted with ZeroG on their customer experience. She's worked across private aviation and human space flight. She thinks the commercial opportunity gets much bigger when space makes room for more than just science and government missions. But when the payload is a person, the definition of success changes.

Audrey Kiefer: Eventually, the market is going to open up and we're going to see things like hotels and casinos and different types of entertainment options in lower orbit. And at that point, it's stewardship and customer service and customer experience that are gonna set those companies apart.

Eric Singer: Which brings me back to something you can't put in a balance sheet- wonder.

Let's get to the main event.

clip: You guys ready to do some flying today? Yeah.

Eric Singer: So we're walking out onto the tarmac. We're gonna head west over Florida, and the FAA has assigned us a box, as they call it, over the Gulf, [00:15:00] where we'll have this space of 10,000 feet of up and down travel and however much distance it takes to cover 15 parabolas.

clip: Welcome aboard, Eric.

Eric Singer: Thank you, sir. I got the middle seat yet again, but hey, I'd rather have the extra leg room. And at the moment, I've got about 40 feet of extra leg room. This is the most spacious airplane seat I've ever had.

Brad McLain: They are revving up the engines. All the flyers are seated at the back of the plane.

We just got our safety briefing. And as the, uh, engines rise, so does the excitement.

Eric Singer: First passes are a preview. Mars gravity, then lunar gravity. After that, the floor stops being the floor.

Brad McLain: And here goes the push. We're experiencing a big climb, and we're feeling almost two Gs of force. Our bodies are being pressed down into the mat.

If you turn your [00:16:00] head from side to side, you get the vestibular illusion. And now we're pushing over. And there we are, Mars gravity.

The lunar parabolas are one-sixth gravity. So this is where we get to bounce around like Neil Armstrong and Buzz Aldrin.

Eric Singer: Amazing.

Brad McLain: The hamster wheel. Hamster wheel. And then you come up. Yeah, you literally crawl around the fuselage like Spider-Man, basically. It's a ton of fun.

Eric Singer: And now going into high G. Holy

I've never sat down that fast. Go. As we begin our zero gravity parabolas, I quickly realize that I'm failing in my mission here. I've been asked to document the experience of weightlessness through talking. One of our fellow flyers sums it up.

clip: There are no good words for this. [00:17:00] I'll lay down. wasn't built for this.

Eric Singer: We do back flips, front flips, barrel rolls, and hamster wheels. For such a diverse and distinguished group, the reactions are remarkably uniform. Everyone is delighted and kind of in disbelief As we complete our final parabola, we almost instantly transition from disappointment that it's over- I'm really sad that it's over.

Rodrigo Londoño.: Absolutely.

... Yo quería más- muchísimo más.

Eric Singer: To a sense of awe and introspection. .

Brad McLain: reorienting.

Eric Singer: One married couple is holding each other and crying tears of joy. Solo flyers either bond with their new friends over the experience or quietly sit on their own, looking like they'd really like to talk to someone.

Brad McLain: Normal gravity.

Eric Singer: I'm suddenly very grateful that Rodrigo and I are going to have several hours to start to unpack the experience with Brad. [00:18:00]

Brad McLain: The experience in zero-G itself is extraordinary, potentially transformative But the post-experience is where meaning is made, and it begins immediately as they strap themselves back into those seats and fly home.

Eric Singer: Kirby Runyon is a planetary geologist who's flown over 20 zero-G flights as a customer, researcher, and coach, so he's had a lot more time than I've had to find the words.

Kirby Runyon: My name is Kirby Runyon. I'm a research scientist with the Planetary Science Institute. I've had the privilege of training astronauts, and I see hopefully thousands of people getting to fly on suborbital space flights over the next two years.

I can't wait for as many people as possible to see the curvature of Earth from space, to see the thin blue atmosphere beneath them, and to see the inky, black, infinite sky, and of course, to experience weightlessness. There is nothing quite like it. It is pure bliss. It is pure disorientation, and it's total freedom.

Eric Singer: [00:19:00] Once we land back in Fort Lauderdale, we get a tour of the cockpit, which includes checking out one of the most important pieces of equipment on the aircraft, a yellow rubber ducky.

clip: The duck

Pilot: lets us see that.

Eric Singer: As the plane pushes over into zero-gravity parabolas, the ducky is placed in the air between the heads of the captain and first officer, and they adjust the throttle and other controls to keep the duck floating as still as possible.

clip: If the duck is floating backwards, we know that we're too fast, and we need to-

Eric Singer: The weirdest part wasn't coming back down. It was going to bed that night. But every time I start to drift off, my body and my mind are somehow getting convinced that I'm actually drifting off the floor of G-FORCE ONE and going weightless again.

It happens over and over. I'm not even mad. It's the most delightful insomnia I've ever experienced. The point [00:20:00] isn't that everybody needs to get on a zero-G flight. It's that aerospace stops being abstract the moment you touch it. Here in Colorado, that future isn't parked somewhere else. It's in labs and hangars, factories and campuses, startups and giant aerospace companies, and increasingly, in ordinary systems people depend on every day.

So when you hear aerospace, don't just picture rockets. Picture thousands of jobs, research becoming missions, companies fighting through the valley of death, a pizza-shaped microgravity lab, and a bunch of grown adults discovering, 20 seconds at a time, that up was apparently optional all along.

All right. That's a wrap on episode one. Huge thanks to our team here at Coupe Studios, especially Kip Kuepper, who put in the lion's share of the over 100 hours of time for original music, sound design, and editing. [00:21:00] I promise to make it go easier next time. Speaking of next time, we wanna hear from you. What Colorado industries and companies should we cover in future episodes?

Go to our website at globalconnections.show to let us know and to learn more about underwriting opportunities. We'd love for you to subscribe to the show and leave us a review while you're at it. Thanks also to all our guests and our distribution partners.

Samatha Seems: German American Chamber of Commerce, Colorado chapter.

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Global Chamber.

Casey Moher: Denver Council on Foreign Relations.

Boulder Chamber.

Eric Singer: And to Lance Law for sponsoring this episode. Our Global Connections team at Coupe Studios also includes Helen Gover, Taylor Marvin, Helena Mellberg, Greg McRae, and Kyle Miyamoto.

Thanks for listening. We'll see you next time