Goldman Sachs Talks
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Keller Rinaudo Clifton: And that means that you have to get pretty comfortable with failure. Because basically, if you're trying to do something really hard, you might spend a month or you might spend a year just trying again and again and again and failing again and again and again and again. You have to derive the fulfillment from the process, not from the success.

Ryan Nolan: Good afternoon, everyone. Thank you for coming. And it's my pleasure and my honor to introduce my friend, Keller Rinaudo Clifton. And just for some background for everyone, Keller is the co-founder and CEO of Zipline, the world's largest autonomous logistics and delivery system. Every day, Zipline's fleet of self-flying drones is delivering critical products and materials to healthcare providers, businesses, and governments in seven different countries and counting. From powering Rwanda's national blood delivery network to enabling medical providers to bring care directly to US homes, Zipline is reimagining logistics and solving some of the

world's most intractable problems.

Keller, we're thrilled to have you here. I think the place that I would love to start is you describing what Zipline is for us today and the mission that you founded this company on for the background.

Keller Rinaudo Clifton: Yeah. I mean, Zipline is trying to build a new logistics system for Earth that approximates teleportation. So we use small, light, fast electric autonomous vehicles to deliver things in a way that is ten times as fast as traditional logistics, half the cost, and fully zero emission.

When we started building the company, our backgrounds were in robotics, software, and autonomy. And the more we learned about logistics, the more we got focused on healthcare logistics because five and a half million kids lose their lives every year due to lack of access to basic medical products. And we've been pretending for 100 years like that's somehow unavoidable or excusable. And we felt like it was neither of those things.

So we were pretty determined. We felt like if there was a chance to build a radically new kind of logistics system for Earth, we wanted to build the first logistics system that would serve all people equally.

Ryan Nolan: I want to start with addressing what are some common misconceptions about drone delivery

because I've seen your product. I've been on your factory floor. And there's something really tangible about what you all are doing in the real world that I think most of us, if we just consume the headlines, don't fully understand. Talk about what Zipline is being used for today and why it makes drone delivery a real thing as of now as opposed to in the future.

Keller Rinaudo Clifton: Well, we started building the first version of our product in 2013, and then we launched in the real world in 2016. And our first customer was the government of Rwanda. They were the only ones who were crazy enough to bet on this team of 20 nerds who had literally no credibility and also no idea what we were doing. And it was interesting, it was the minister of health at that time, who was smart enough to tell us what to do. Because I was saying, “Oh, we'll deliver all medical products to every hospital and health facility in the country.” And she looked at me and was like, “Keller, shut up. Just do blood.” And as she was explaining it to me, she was like, “Look, blood's really important. 50% of transfusions are going toward moms with post partem hemorrhaging. 30% are going toward kids. This is a really tricky product from a logistics perspective because you have platelets, cryoprecipitates,

plasma, packed red blood cells. They each have different storage requirements and shelve lives. And you also have AB, A, B, and O, positive and negative Rh factors. It's a really hard thing to get to the right place at the right time, but it's super important for family health."

And so we initially agreed to deliver just blood to 21 different hospitals, and that's what we did for the first few years of the company. Since then, we've expanded to 400 hospitals and health facilities across Rwanda. Today, we serve 4,500 hospitals and health facilities in seven countries. We'll be at 10,000 by the end of this year, just based on contracts that Zipline has already signed. We've delivered 2 million doses of COVID-19 vaccine, 6 million doses of traditional vaccine. We deliver 75% of the national blood supply of Rwanda, for example, fully autonomously outside the capital city.

So we just passed 40 million commercial autonomous miles. Which to put that into perspective, yeah, well, it's the largest commercial autonomous system on Earth.

Ryan Nolan: You compare and contrast drone delivery of anything and everything to anyone in the world of instant

burritos, instant food, but, more importantly, you changed that focus to the power of delivering blood in a place in the world that has very poor logistics. Talk about what the power of that mission does for you as a company.

Keller Rinaudo Clifton: I think there were so many reasons that this wasn't going to work. And in fact, it would probably be helpful to point out, like, we were talking to experts in global public health when we started building this, and we were told by every single one this idea was completely stupid. There was zero percent chance it was going to work. We would never be able to build the technology. The aircraft would never fly reliably. Even if they did fly reliably, we'd never be able to manufacture them at scale. No one would ever pay us money to do it. No one was going to give us regulatory permission. And even if we got all those things, it wouldn't be helpful anyway.

And we probably would have listened to those experts if it weren't for the fact that we were also talking to the people who were actually running these health systems, like the ministers of health. And it was the people, it was the doctors and the ministers of health who said this would be

useful. Like, let's take a chance. Let's try something new because what we're doing right now isn't working that well.

And just a month ago -- or just a couple months ago, the University of Pennsylvania, they did this big study across all these hospitals that Zipline serves and showed that Zipline has been able to reduce maternal mortality by 88% at those hospitals. I think the reality is that the mission, it wasn't just the right thing to do. It was probably the only way that this technology could have really started at scale. It was easy for regulators to grasp why this really had to exist because we were able to say to a regulator, yes, this is new technology so, yes, of course there is some risk. But if we don't do these deliveries, for sure these people are going to not receive care or are going to lose their lives.

And so I think the risk-to-reward ratio was incredibly balanced in our favor because of the importance of these deliveries. It also I just think, from a mission perspective, both from hiring and fundraising, Zipline's mission has been our secret weapon.

I think the reality is that the best engineers in the world, the best operators in the world, the best finance people in

the world, they want to work on a mission that is deeply inspiring and impactful for the world. And as a little startup, you can't compete with Google and Facebook on cash bonuses, you know? But we can compete on mission. And that's played a big role in the team that we've been able to build.

Ryan Nolan: Take us back to being in Rwanda and launching some of the first trials of this. Any anecdotes, stories, harrowing tales that you would share with us just of being on the ground and what that was like?

Keller Rinaudo Clifton: Yeah, it turns out a lot of things can go wrong. You know, I saw this flag in a gymnasium a couple weeks ago that I thought was so powerful. It was, like, a big flag, like an inspirational message basically. And it said, “We do this not because it is easy but because we thought that it would be easy.” This is a perfect expression of how Zipline was created.

We definitely had no idea what we were signing up for when we launched. So many of the assumptions we had made were incorrect. And in fact, I think a little known thing is that we had signed up to deliver blood to 21

hospitals, but for the first nine months we only served one. And the government was very patient. They were really patient partners. They were like, “No, we get it. Like, get it working for the one before you try to expand more broadly.”

And during those nine months, I mean, it was so painful. Like, nothing was working correctly. There were so many things -- auxiliary and integrating systems that we did not know we needed to build until we actually launched. And I think one good example -- by the way, during that time, I mean, the operations and engineering teams were pulling constant all nighters, which I think is, again, the importance of mission because who would put up with that crap if it wasn't --

Ryan Nolan: Yeah, totally.

Keller Rinaudo Clifton: -- like, so important that you're definitely going to wake up in the middle of the night and pulling constant all nighters to try to get things to work at all. And I remember one night being woken up by Gladys, one of our fulfillment leads. And she was, like, “Keller, we have a problem.” I was like, “Okay, great.” You know, it's 3:00 a.m. And I was like, “Well, what happened?” And she

said, “Well, we delivered blood onto the roof of one of the hospitals.” And this is, like, so bad. I mean, this is a precious product. It's an urgent situation. The life is hanging in the balance, and we had guaranteed we were always going to deliver blood to a specific spot. We call it their mailbox. It's like two parking spaces outside.

And so I was like, “That's terrible. How could that have happened? We were so far off from where we thought we were delivering it.” So I woke up a bunch of members of the guidance navigation controls team. Basically worked for multiple hours looking through flight logs. Figured out what we thought had gone wrong. We started making hot fixes. And we were, like, okay, turn the system back on. We think we fixed it.

And then at the very end, I was like, “Gladys, by the way, what happened to the blood?” And she was like, “Well, what do you mean?” I was like, “Well, the blood that we delivered onto the roof?” She was like, “Oh, like, a guy got a ladder and shimmied up onto the roof and got it and they transfused it into the patient five minutes later.”

Ryan Nolan: Amazing.

Keller Rinaudo Clifton: And I was like, okay, that's, like, a powerful realization. If you're working on a problem that's important enough, even when you screw up, like, the customer will meet you halfway, you know? Even though we had not done what we had promised, like, the fact that we had gotten it close, like, there was someone at that hospital who was willing to, like, you know, risk life and limb and shimmy up there and get it so that they could transfuse it into the person who's depending on it.

I think that's -- yeah, so many things went wrong during those nine months. Really, we owe a lot to the government of Rwanda and to those hospitals and doctors for working with us. And the neat thing was, after nine months, the clouds really started to clear. And we expanded to 21, then 400, then 4,500.

Ryan Nolan: Other examples that you have of partnering with countries sounds like actually a really important ingredient to your success in terms of the government support. I think one of the other common misconceptions is that this type of experience for customers does not exist in the US. Talk about your experience working with

governments around the world and how US compares both on the positive side and where we lack.

Keller Rinaudo Clifton: Yeah. I mean, for the first five years, Zipline operated commercially entirely in Africa. And in many ways, it was a blessing. We were able to move quite fast. There were governments that were super innovative and willing to explore new regulatory precedents with us to prove how this technology could be safe and how it could save tens of thousands of lives.

The good news is the FAA doesn't want -- I mean, the US government and the FAA does not want the US to fall behind in a core area of technology where there are going to be trillions of dollars of value created and hundreds of thousands of jobs created. So the FAA has been moving really quickly. We launched in the US two years ago. I think it's natural that the US is not going to lead when it comes to these sorts of things. I think small, innovative, fast-moving countries are likely to lead.

The good news here is the US is being a fast follower, and I think that's a good place to be. The FAA has moved pretty quickly. We launched with a couple different healthcare

partners. Today, Zipline works with many different hospital systems throughout the US. Partners like Inner Mountain, Multicare, Michigan Medicine, Navant Healthcare, Cardinal. And then our biggest partner in the US is Walmart today.

So if you live in Pearidge, a little town outside of Bentonville, Arkansas, we're likely delivering to your home day in and day out. We started with Walmart with the idea of delivering just health and wellness and prescription products. But, like, the scope rapidly blew up to basically everything. We now deliver 24,000 of the 29,000 SKUs that are in that store, fully instantly. And the average home is ordering about three times per month, which is more than people use Amazon Prime.

Ryan Nolan: Given that it's here in the US now and that people are actually experiencing this product and presumably loving it because they're doing it three times more than a Prime membership, etc., talk about where this naturally leads to our just daily lives in the world. Are we going to see thousands of these in the sky? And is that a utopian experience for us? Or is that a dystopia, right? Is that a noise and a distraction level that we're not used to

today? How do we think about our lives interacting with this technology as it improves and expands?

Keller Rinaudo Clifton: Well, yeah. Six weeks ago, we finally publicly announced what we've been building for the last four years, and that is Zipline's home delivery service. And so what we've been operating for the last seven years has been really focused on enterprise customers, delivering to hospitals and health facilities. It's been obvious working with every hospital system in the world, whether it's the government of Rwanda or it's Inner Mountain or Multicare, really what everybody wants is the ability to teleport things directly to homes. It's really important for healthcare systems because you can do healthcare at home. You can support home healthcare nurses. You can deliver products to people where and when they need them.

It's really important, also, for quick commence. And there are four billion instant deliveries that will happen in the US this year, and we are using a 3,000- to 4,000-pound gas combustion vehicle driven by a human to deliver something to your house that weighs, on average, five pounds. Like, if aliens were to land on the planet and look at the way we're solving that problem, it would conclude there's no

intelligent life on Earth. So it's surprisingly slow, it's extremely expensive, and it's terrible for the environment. So we think that it's actually inevitable that, if humans really want instant delivery, which clearly we do, like, we shouldn't be using tech -- we're fundamentally using technology that's 100 years old to solve that problem. And we should be using technology that is actually built to solve that problem, and we think it's inevitable there's going to be a big transformation in logistics towards light, electric, autonomous systems.

And I think the really exciting thing about that, yeah, sometimes people are like, “Oh, but that's a scary thing because drones are loud or they're going to, like, darken the sky.” The reality is that there are ways of designing these systems to be completely silent, and that's what we announced six weeks ago. And I think the beauty of this is actually, like, giving space back to humans. Actually, I think a lot of logistics can happen in a way that is much more pleasant and less intrusive for humans.

Ryan Nolan: When you think about the way you are impacting the economy and my life as a consumer, you are touching so many other places that I experience already,

existing providers. Whether or not that's in logistics, technology, you really are going up against some of the largest companies in the world who are tackling or attempting to think about these logistics problems. Talk about what it means to be a disruptor, a private entrepreneurial company that's looking to be fundamentally a new approach to this entire system. Like, what does that mean for you team? What does that mean for your approach to technology and how you lead that company?

Keller Rinaudo Clifton: Yeah. I think it's quite profound that some of the richest companies in the world have been trying to do this for a long time and spending billions of dollars. But I think it -- I mean, I guess the only thing you can conclude is money is really not the right limiting factor. And it is definitely not sufficient for success. There are other things that are required.

I think Zipline didn't spend really any time thinking about the competition. We spent all of our time totally obsessing on these customer problems that were right in front of our faces and super clear. And we insisted on getting our product and our team onto the ground. We talk about

rolling around in the dirt. It is unfancy, scrappy. I mean, I have been, at 1:00 a.m., desperately trying to fix a launcher that isn't working correctly. Skyping back to our engineering team in the US saying, like, we've got to fix this launcher by 9:00 a.m. because the president of the country is coming to inaugurate this distribution center. And they're like, “Well, what do you have to fix it?” And we're like, “We have duct tape and, like, a screwdriver.”

I think the things that Zipline did is we were willing -- A) we were desperate. And I think desperation is, like, a necessary -- it's like a necessary ingredient. I think the reason a lot of great products don't come out of corporate incubators is they're never desperate. They're just like, “Oh, there will be more money next year.” There was no more money for Zipline. Like, we were going to die if it didn't work, you know? Like, there was no option. We had to make it work. We were willing to get into the real world. We shipped a product that we didn't have time to perfect it. We had to perfect it by serving customers.

And in reality, that was a very powerful way of building a really good product because we spent no time worrying about things that wound up being irrelevant. We spent all

of our time focusing on the things that our customers clearly wanted to be improved about, to be better about the system.

Ryan Nolan: I want to talk a little bit about you and your background and how it's impacting and shaped Zipline's path. I think of the story that you started out as a professional rock climber, living out of a van. Walk me through from being that person to when the light bulb goes off and says, “I have a vision. I have a product. I have an idea. I'm going to go raise money and build a company.”

Keller Rinaudo Clifton: I mean, it's way less fancy, right? Yeah, so when I graduated from college, I was rock climbing full time for a couple years. I got to travel the world, see a lot of different ways of living. And one of the interesting things about climbing is that the most beautiful rock faces are the most blank. So beauty is kind of like tied to difficulty in the sport. Like, the more impossible it looks, the more inspiring it is. And you're just, like, wow, like, it's so cool that a human can do that.

And that means that you have to get pretty comfortable with failure because basically, if you're trying to do

something really hard, you might spend a month or you might spend a year just trying again and again and again and failing again and again and again and again. And then you will succeed once and then usually not go back to that face ever again. So it really has to be more about, like, the process. You have to derive the fulfillment from the process, not from the success.

And I do think there is very powerful comparison to entrepreneurship which is, like, you know, nine out of ten things we do on any given day fail. Like, we're just constantly failing is how it feels from the inside. But then for an investor from the outside, they're like, “Oh, wow, like, Zipline does one fundamentally new innovative thing every day. Like, this is one of the fastest moving companies we've ever seen.” But then from the inside, the team feels totally depressed because we're like nine out of ten things we tried today were total disasters. So I do think you kind of have to be comfortable with failure. And that's actually something I think that the modern educational system basically tries to totally beat out of us for, like, completely psychologically wire us to avoid actual failure. And then when you graduate from school, suddenly, like, the world's totally different and no one cares how many

times you fail. All people care is, like, if you succeed once.

Ryan Nolan: So Keller is a rock climber. Has an idea to build a company. You go out to raise money. Tell us some war stories of what it's like to raise money for a hardware company that wants to compete against some of the biggest companies in the world on a mission --

Keller Rinaudo Clifton: And launch in Africa.

Ryan Nolan: Yeah.

Keller Rinaudo Clifton: I mean, yeah. You know, investors generally I think thought the idea was preposterous. There was -- it was really hard to raise money for the company. I don't think there was any good, like, comparable company that we could point to to be like, "Oh, but look at that." And I don't think -- I think a lot of folks thought it would be impossible to build a really valuable company starting in Africa first and then coming to the US second.

But it was incredibly painful. I mean, there were multiple -- there were definitely many times when the company

almost died. I remember a moment where an investor called me to say he was -- and I was like -- he was investing I think $100,000. But, like, I knew that this other investor was only going to invest if he invested. You know, it's like a domino effect. And he said -- he called and I was like, “Okay, what did you decide?” And he said, “I decided I'm going to invest $100,000.” I was like, “Cool, thanks. I got to go. Bye.” And I hung up because I had started to cry.

Like, that is -- you know? That --

Ryan Nolan: Amazing.

Keller Rinaudo Clifton: I'm not a crier, okay?

Ryan Nolan: Yeah, I love that story.

Keller Rinaudo Clifton: But, like, you just realize, like, you are so freaking ragged and tired and all these people depend on you. And by the way, it was, like, the worst year of my life. Like, that year when we were really starting to -- that first year of raising money for Zipline was basically the worst year of my life. And, yeah, it's really scary and hard.

And I think we were very lucky that there where a few investors who kind of believed in the long-term vision and were willing to take a bet on this crazy idea.

And then once we launched in Rwanda everything got way easier because then I think people could say, well, like, the technology is definitely saving lives. And people could play it out one or two steps into the future and think about what it would mean if you could build a logistics system that was ten times as fast and half the cost of delivery today.

But it wasn't easy. And my hope is that, you know, maybe Zipline can be a little bit of a paradigm shift that will make starting other companies like this easier in the future. I do think that investors are starting to realize that, although SAAS companies might be able to grow faster and might require less CapEx, I just think it's inevitable that a lot of the most impactful and valuable companies that are going to be built on Earth over the next ten years are going to be hardware companies. They're going to be building real things in the real world. Like, unfancy infrastructure. Whether it's nuclear fission or nuclear fusion or water access or healthcare, like, all of these things require us to

build real things in the real world. And the reason that that inspires me is, like, I think we should hand a world to our kids that is fundamentally better.

I do not want to hand a world that's like, you know, here's the crumbling infrastructure that our grandparents built for us. Don't we want to live in a future where we can build -- even build wonders again? Isn't that kind of crazy to think? Like, these civilizations that were fundamentally a thousand times poorer than we were built wonders over the course of hundreds of years. I guess, like, maybe the space station would be the best example of a wonder that we built today, but I think we should build more wonders. And we should get back to, like, building real things in the real world so that we can hand our kids a better version of the planet.

Ryan Nolan: Yeah, that's incredible. Well, on behalf of all of Goldman Sachs, this has been extraordinary. I'm glad to count you as a friend. I have such admiration for what you're building. We hope to have you back again soon. And I'll just say, on behalf of everyone, this has been amazing. Thank you.

Keller Rinaudo Clifton: Thanks, Ryan.