Vago: Robert, absolutely a fascinating program. First, give us a sense on how you ended up with what is in 2012 history setting Bertrand Picard helped develop the aircraft to do the first solar flight around the world, had a 36-hour endurance. It's not particularly fast, but it is solar powered. Give us a sense on how you ended up with ownership of the aircraft and the intellectual property rights. But before we get to the point about you guys trying to make it unmanned and a reconnaissance platform that can stay up not just days, but weeks, and perhaps even months.

Robert: Well, I saw the need in some conversations with the U S military and DARPA, the need for a platform that could carry significant payload, so more than 300 pounds, provide significant power, more than two kilowatts. And I was lucky enough to be introduced to Bertrand Picard and André Borschberg, who flew the Solar Impulse. It does hold the longest solar flight of any aircraft of any kind, so it flew for five decades from Japan to Hawaii with one pilot. And in September of 2019, with my business partner JD Parks and some help from some bankers, we were able to raise the money and purchase the Solar Impulse II aircraft on intellectual property associated with it.

Vago: I think the story is pretty incredible that You know, DARPA had a requirement. And so, you went around the world to try to find an aircraft that could satisfy the requirement because the helicopter, you know, was sort of best suited for it, but unfortunately lacked the kind of endurance that was needed. What's the hole in the global surveillance market that you see? That you guys are trying to address, right? I mean, because there are a lot of systems out there. General atomics is one of our sponsors. Obviously, you've got the predator family, but there are other guys around the world who are sort of trying to get a 24-hour, 36-hour kind of reconnaissance capability aloft, if not longer, what's the sweet spot you guys are shooting at and how big do you think that market is?

Robert: I think that market is very large. We're talking about an aircraft that flies for days instead of hours. Okay. So, the total endurance is measuring weeks and months instead of just hours or nautical miles. I mean, imagine an aircraft that you can fly from San Diego all the way to the Spratlys does surveillance there for 3 or 4 weeks and flies all the way back. There is a gap right now in that capability, especially if you look beyond, say, a thousand nautical miles from a forward operating base, that there is really nothing out there that can cover that, except maybe the Navy Triton or the Air Force Global Hawk. It becomes very unaffordable to try to do surveillance at those longer ranges.

Robert: And a lot of places in the world right now, when you think about the Pacific Ocean, the Western Pacific, the distances are huge. It's 2000 nautical miles from Guam to the Spratlys and think about Hawaii to the Spratlys. So, there's a huge gap there. Also, when you think about the Sahel, you know, we've had problems. We've lost special forces people because the lack of ISR coverage in Africa, and there just aren't a lot of foreign operating bases there. I mean, the coup in Niger is putting our base at Agadez at risk, so there's a huge gap right now. And this ability to project very long-range ISR.

Vago: And roughly what altitude and what speed are we talking about, right. Because it's not necessarily the fastest aircraft in the world. As you said, it took five days to get across the Pacific.

Robert: So, our max altitude with this version of the aircraft will be about 40, 45,000 feet. And then like all solar powered aircraft, you go up and down during the day. And so, at night, you'll go down. And we'll go down to approximately 10, 000 feet at night. Okay. And we fly at 25 knots sea level, so we don't fly very fast, but if you're below 25 degrees latitude, so plus or minus 25 degrees latitude around the world, you'll find that our ability to station keep over particular point on the globe is very, very high.

Vago: And, you know, you have talked about all the changes you made to the system, right? I mean, it used to be push rod operated and the like, right? I mean, you're making changes to the original aircraft. Obviously, it's something that you want to put in production. What does the productionized version of the aircraft look like? And when are we likely to see it? Because you guys, congratulations. You guys also had your first unmanned flight from Stennis, if I'm not mistaken.

Robert: Yes, so we conducted our first unmanned flight out of Stennis, Mississippi. We've been doing optionally piloted autonomous flights, so basically human cargo flights. And then we were able to work all the necessary paperwork that once we brought the aircraft here to Stennis, Mississippi. That we were able to fly completely without anybody in the, in the cockpit. So, it's completely uncrewed now. It's a completely unmanned aircraft now.

Vago: So, what are we going to see in the future?

Robert: We're going to continue to add redundancy to our fly by wire system. And it's a full fly by wire system. No revision. Man rated, obviously, because we're flying with man in it. And we'll see that going from dual redundancy all the way to quad redundancy. We're going to see better batteries, better solar

cells, there's a few, I would say, next generation manufacturing technologies with composites that you'll see, and all that will increase the performance of the aircraft.

Robert: So, the aircraft works now, it's a great product, but you're going to see as batteries and solar cells over the next 5, 10 years get better. And we continue to see some improvements in aerospace composites, that this aircraft, the performance is really going to step up.

Vago: And what does a supercharged solar impulse look like from a performance standpoint?

Robert: Well, a supercharged sky dweller looks pretty similar to what it is today. Okay. Except that it's going to be able to operate at higher latitude, say plus or minus 30 degrees latitude, 365 days a year, carrying those 800 pounds of payload and two plus kilowatts of power continuously.

Vago: Let me ask you, uh, one other question, right? I mean, price is an important quotient to this in order to have a solar powered aircraft, you're generally looking for something that's even lighter than the engineering for a regular airplane, you know, there were some people who are going to say, look, I mean, some of these things are really boutique, very delicate products, uh, as we saw, for example, from the Voyager and, and other aircraft, how do you guys get that balance of robustness? You know, and folks are going to shoot at it, right? I mean, that presumably when it comes to any reconnaissance system, so replaceability is another thing. How are you working the cost side of the equation as well as the robustness and reliability? And what are you learning in the course of flight tests? That'll make subsequent versions more durable and work down the cost curve –

Robert: – a couple of things to unpack in that question, though. So, the first thing is, we're a robust aircraft. We pass the part 23 gust load requirements that you'd see for any aircraft. Additionally, we have over 1300 flight hours in what I would call the solar aircraft death zone, a perfect safety record in that death zone where you're going to hit the most turbulence when you're flying an aircraft. And that's the same death zone that has killed the Helios, Zephyr, uh, all the Google and Facebook failed attempts, you know. This isn't our first or second or third time to this rodeo. We've worked on a lot of large UAVs. My team has an extensive background, and we're not there to build a science project, we're there to build an operational system.

Robert: So, when we designed this system, we're designing it to handle the corner conditions, because if you're going to fly for millions of hours. Bad stuff happens, and so you got to deal with that because making the aircraft fly autonomously is not necessarily the hardest thing. It's making it fly when not one, but two, or three things go wrong, and it comes home and land safely. So, from that perspective, you know, we're working a truly robust operational system and from a cost perspective, you buy aircraft by the pound. You can plot all aircraft, maximum takeoff weight with the price, and you'll see there's a nice curve there. We think we will be very competitive. And then additionally, it's the operational costs that is really going to be a huge change here. You got to think of it instead of maintenance hours per flight hour, you're going to have flight hours per maintenance hour,

Vago: just one last thing about the tests and upcoming tests, right? You've done your first one. What does the testing schedule look like? And roughly, when do you think you're going to be able to bring an operational capability online?

Robert: I think by the end of the summer, we'll be able to bring an operational capability online. That should be in the late summer. We're going to see now a gradual ramp up in the performance of the aircraft. So, the number of hours that it flies and we're going to be achieving multi day flight this summer over the Gulf of Mexico.

Vago: And any customers yet lining up for the service?

Robert: We are under contract with the U. S. Military, the U. S. Navy. We do have a J. C. T. D. I can't yet announce some things, but we do have contracts with some western allies as well, and we'll be able to announce more information about that in the future.

Vago: Robert, all the best to you and your team. I've been tracking you guys for some time. I thought the solar impulse was just one of the most incredible aircraft in history. It's, it's great to see it being put to good use. I'm surprised the Smithsonian didn't get its hooks into the program before you guys were able to take it over. But hopefully, uh, one of these days, eventually it'll end up, you know, making even more history and being enshrined in a different way. All the best of luck to you and your team.

Robert: Thank you.

Vago: And I do hope to see it one day in the Smithsonian as well.