Constellations Podcast

Episode 132 – Investing in Dual-Use Technologies, Finding Quality Space Talent and working with the U.S. Space Force

Speaker: Jordan Noone, General Partner and Co-Founder, Embedded Ventures – 28 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy and I'll be your moderator. Today, we're going to talk about a fairly young venture capital firm investing in dual-use space startups beyond launch. With me today is Jordan Noone, Co-founder of Embedded Ventures. Jordan, how's the weather in Los Angeles today?

Jordan Noone: Oh, it's very good today.

John Gilroy: It's always good, kind of typical LA type of day. Well, let's jump right in here. Your business model involves venture capital investing in technology. So when it comes to space technology, what are the most sought after technologies and why?

Jordan Noone: That's a great question. As a VC firm, we're looking for space technology and our word for that is 'beyond launch'. When we say beyond launch, there's been this amazing uptick. I rode the wave of it as a startup founder, as an early employee in the space industry, working on commercial rocket launch. 20 years ago, commercial rocket launch would be perceived as a joke. Anyone working on it had either failed or was laughed out of the room.

Jordan Noone: Fast forward to where we are now, there's a commercial rocket launch every day. There's a commercial rocket landing almost every day. That's the future very few people would've predicted 20 years ago. So when we say beyond launch, it's really looking at what's going to be the highlight in the news in 10 or even 20 years, where rockets launching and landing is boring. It's kind of weird to think about but I used to watch SpaceX webcasts every day. Every time a rocket was going up, I'd watch them, and now it's just another day.

John Gilroy: But on the east coast here, I know reporters from the Washington Post who would go to Florida just to see a launch. It was like a life thing, once in lifetime to do it. You hit the nail in the head. It's like, "oh yeah, another launch."

Jordan Noone: It's changed so much, and of course launch costs have came down as well. To your question as far as what's the most exciting for us, it's pretty broad. It's things that come after rocket launch. What happens in space that's enabled as costs come down? What have people tried before and have failed because it

was too expensive that could use a revigoration? It's a very exciting future. Some commercial, some defense, some in between where we see sectors, some of which have been tried, some of which are getting reinvented, and some of which have never existed before, all being enabled by that rapid drop in rocket launch costs.

John Gilroy: I'm looking at the last 20 years of the space industry, and I think about the advice I gave my daughter when she had my grandson. I said, “the days go by slow, but the years go by fast”. So I can remember 20 years ago, but wow. All of a sudden commercial space launches aren't big news, and we have a whole different set of problems now than when you were 17 years old at USC, trying to launch that first rocket aren’t there?

Jordan Noone: No, it's very different. Talking on my time immediately after college, I went to SpaceX immediately after USC and I started there in 2014. I was an intern on the in-space propulsion team. So working the propulsion system first for Cargo Dragon, then the paddleboard vehicle to test the aboard system for crew, and then the crew vehicle itself. In 2014, Falcon 9 was flying once a year or so.

Jordan Noone: We were working on dragon qualification for flying on version 1.1, the upgraded Falcon 9 that flew, I think was flight six, and then the first dragon flight was on flight seven on 1.1. So that was my first project as an intern, qualifying the first upgrade of Falcon 9 in 2014. And to think here we are, it's only what, eight years later? Barely eight years later from when I started at SpaceX that there's multiple dragons flying at once. There's crews on the space station, there's civilian crews, there's Falcon 9s flying more often than we can count and landing more frequently than we can count. It's only been eight years. It's crazy to think about.

John Gilroy: So when it comes to startups, I know you and your founding partner have pretty good ESP on a good startup, a bad startup, and what to invest in. So which companies out there are doing stuff that is really mind blowing?

Jordan Noone: There’s a lot. There are lot that are doing really interesting things, and when Jenna, my co-founder here at Embedded, and I set out with Embedded in 2020, we wanted to build a little bit different of a venture capital fund than we'd seen before. She came as a partner from the hard tech and the deep tech ecosystem here in Los Angeles. And myself, I came from being a founder of a space unicorn with Relativity. But that was my first exposure, with Relativity, that was my first exposure to venture capital. And you hear about venture capital, you see it, you see all the personalities on Twitter and YouTube, as far as them knowing everything, wanting to lean into everything, and being these thought leaders in every space possible.

Jordan Noone: And myself, as an engineer that had never taken a business class, never taken a finance class, but wanted to do these new things, these new kind of groundbreaking things within the space industry, we started going to them to pitch Relativity. And all of a sudden you told them about this new kind of company that had never existed before with this technology that had never been applied at the scale that we wanted to develop it, and they wouldn't be interested in even hearing it. It was all very confusing. They were like, "oh, that doesn't match our thesis." And I was like, I thought that was the point of venture, to lean into new areas, and they'd say, "oh, it doesn't pattern match." Or, "oh, there hasn't been a previous success with that model." They thought they couldn't do something that's the first of it's kind.

Jordan Noone: It was a very confusing reception, and a lot of it is for a variety of reasons. But venture capital is really tricky at leaning into new areas because they are very strong at pattern matching. They tend to not have the technical talent, the regulatory talent, or the timing talent, when it comes into evaluating the space sector. It's one of the hardest sectors in the world to evaluate on an investment side because it's so capital intensive, it's so regulated. Then some ideas are very difficult to diligence as far as are they real? Are they possible? Is this the right team to build this? Can this team of founders hire people? Can they grow fast enough themselves? And that's when me and Jenna really started to get to know each other and talking about what we would have wanted to see different, myself at Relativity, herself at her former fund within the venture capital ecosystem.

Jordan Noone: And that led to a multi-year conversation where she asked me if I wanted to come on full time to a fund that she had started, Embedded Ventures, as an advisor. Eventually she recruited me to be full-time as a co-founder and GP. But to your question on what do we evaluate, how do we look at these companies in those sectors? Then it's a reliance on a combination of my background and the technical operation side, having built a space unicorn before. And then herself very much on the people side. You're banking bets on very young founders. For me with Relativity, I was 22.

Jordan Noone: When we started, Tim was a couple of years older than me. And starting that young is tricky because of a lack in experience. They haven't managed, you know? Are these the type of people to make a once in a lifetime bet on? And that really takes a lot of people, judgment skills that I have learned step by step, never to doubt Jenna because she comes from a very stringent recruiting background where her intuition on a people side has been stronger than anything. So combine those backgrounds together and I can elaborate more on it, but combine those together and we have a very unique perspective and a very patient perspective that we build up on with a lot of companies out there.

John Gilroy: I'm in the Washington DC area, you're in LA. When you said the word regulatory is like, oh, regulatory, that's the phrase that pays. And I read your background. I

mean, you were 19 years old negotiating with the FAA about sending rockets into space. How many people do you run into that have that kind of a technical and regulatory background? It's really setting you up for exactly what you're doing now. I mean, it was almost like an unintended good background, isn't it?

Jordan Noone: Yeah, no, it was. I have jokingly said before that I winged it through my aerospace degree. I even went to aerospace originally in college, it was one of the degrees that had the highest likelihood of getting a scholarship through ROTC, which was my original intent going into college. And that was something that was by chance. I had applied to ROTC and I had applied for college degrees that had a high likelihood of ROTC scholarship. I don't come from a background that would be able to easily cover tuition, especially a USC tuition. And on top of that, my academics in high school were not strong. I struggled very much in a traditional academic environment, making me less likely to get a strong scholarship for college.

Jordan Noone: And so I went the ROTC route, and the summer before college started my appendix blew. Very, very aggressive blow, not a nice through the belly button removal. And so I was not in a good physical condition to enter the ROTC program. That chance led me to a spot where I had all this time. And when the USC rocket lab came into my intro to aerospace course, I was sitting there thinking I'd work on planes my whole career, never thinking about rockets. And they walk in with this 12 foot long carbon fiber beautiful rocket that had flown three times. That one was a super early one of theirs that only flew 20,000 feet. But they're saying how they wanted this to be first student group to fly a rock in space.

Jordan Noone: And my inner rebellion, the part of me that doesn't like structure, doesn't like other people's goals, and doesn't like a traditional academic environment, basically what I struggled with in high school, and earlier than that. I became super excited by this opportunity of self-set goals, this program that was out of the supervision of the normal curriculum. And we were going to try to do something super exciting. I ended up taking over that group as a junior, leading it for two years, and trying to become the first student group to fly a rocket to space. That was an amazing start to what's been my career so far.

John Gilroy: You know, Jordan, you've mentioned your interest in investing in hard tech. So what does that mean to you? What kind of hard tech are you investing in that relates to space?

Jordan Noone: Our overall thesis is dual-use space technology beyond launch. Now, I'll break that down. When we talk about dual-use, technology that has applications both in the commercial sector and in the government sector, we not only find the space sector to be essentially impossible to not work with in its ecosystem, but also something that people in this country are very proud of, very proud of the innovation we've been able to have, the liberties to pursue and the flexibility

and freedoms of this country. My entire career is built on that. And we find that's something that us, as investors, have an obligation to help build up. The national security community is sometimes, and awkwardly now, viewed as taboo for the investment sector.

Jordan Noone: And that's something that unfortunately is forgotten, or that sector forgets that Silicon Valley was built on national security innovation during the Cold War. And that's something that I think is going to be very damaging for the country as we continue to grow, if that perspective grows or continues at its current strength. The other parts of the thesis is on space tech. I think that side's pretty obvious, and we've talked about that. Beyond launch is technology moving beyond rockets, it's what happens next. There's enough investments happening today in the rocket sector that we don't have to add into that. You see mainstream investors moving into rockets, but you don't see mainstream investors moving beyond rockets. And that's really what we need to inspire if we're going to see both the technological success, but also a national security success, as you move beyond commercial rocket launch. That Is the primary investment focus.

John Gilroy: National security and government. Well, I've got to move into some of the areas that are popular in the Washington DC area. Recently your company has signed a cooperative research and development agreement with the U.S. Space Force space works organization. So, as a VC firm, what attracted you to develop a relationship with the U.S. Space Force?

Jordan Noone: That's a great question. Part of it is the dual-use thesis, which predated that agreement. With dual-use, it's necessary when you're operating in space, you can't be lacking a government relationship. Whether it's contractual growth, or the regulatory side, you're working with your government or foreign government significantly as you grow your company. On top of this, there's just a significant government presence in space. In some of those sectors, as we talk about the difficulty of investing, and especially investment timing in our sector, we see many areas that are at a tipping point of commercialization. For an example, I use rocket launch with NASA, commercial crew, and commercial cargo. If you think of the commercial rocket launch sector, or even the success of SpaceX, if it wasn't for NASA's commercial crew and cargo, that program and investment from the government ended up being a one time and extended program, but also a one off program that ended up tipping the entire commercial rocket launch industry into self-sufficiency.

Jordan Noone: If NASA and DoD were not customers of the commercial rocket launch sector, the commercial rocket launch sector would still be successful. And that's an example that I think is not highlighted enough within the US government circles, where it shows the power of tipping an industry into long term commercial success. And there's other areas in space with national security need right now that could turn into a commercially viable ecosystem with the right sort of influence from the U.S. government. And that's really where we see the role of

government in these sectors, it's tipping them to long term commercial success where the government doesn't need to continue spending every year into them. They still might, but they don't need to in order to see continued viability.

Jordan Noone: Pursuing that, especially within space works and hand in hand with a CRADA where there's no financial relationship. The intent is really opening the door to see how the moves that the government makes influence private capital. How do the moves that private capital makes influence government decisions? Because we work hand in hand in a way that is, unfortunately, often chicken and egg. The commercial investors are waiting for there to be a bucket of money, which means there'll be a future contract that gives just that glimmer of what is the right company to build in a sector that could hit the pot of gold in five years. And that's how the venture investors are making their bets on who could become that moonshot in five years. But no one's going to appropriate that bucket of money until there's enough commercial success that shows this is going to be a worthwhile effort. No one's funding those companies until there's money in signs of indication. So the balance between those is very slow and the CRADA opens the door between those.

John Gilroy: Jordan, thousands of people from all over the world have listened to this podcast. Go to Google and type in "Constellations Podcast" to get to our show notes page. Here, you can get transcripts for all 100 plus interviews. Also, you can sign up for free email notifications for future episodes. What is really fascinating is that inside the belt, we're here. I mean, we have In-Q-Tel, we have SBAR and SCTRs, we have vehicles for public private partnerships here, but the Space Force is looking at this guy in Los Angeles who has a track record of really understanding what that technology's all about and partnering with you. I think it's a great story to tell. More people in town should understand exactly what you're doing. What you're doing is telling them which horse to bet on due to the experience you've had there. I mean, it's really what you're doing. You're just saving the government money.

Jordan Noone: That truly is the intent from a couple perspectives. And Jenna was the one that originally brainstormed the idea behind CRADA. With CRADA, the collaborative R&D agreement was something that became because we wanted to have an open door relationship where we can talk to them and tell them things we're seeing. Or, if they're launching a program, whether it's the SIBRs, the STTRs, the variety of programs that all of the government innovation entities, AFWERX, SOFWERX, and SPACEWERX now. There's a ton of them. They're launching these programs and the question we ask is, what if these programs miss the mark? What if the appropriators that have enabled these programs, enable to spend? Do we have time for a couple cycles of practicing on innovation editing? Those cycles can take 10 to 15 years to reset after issues.

Jordan Noone: And you can see that with In-Q-Tel. With In-Q-Tel, it went through ebbs and flows of congressional backlash that took 10 years to overcome. And that's

something we ask space works. Do we have 10 years to practice on working with the innovation community? And I would say no. There's a decent chance that we don't have 10 years to practice getting innovation into national security. That we have to hit the mark right and we can't risk congressional oversight looking at these programs and saying, hey, did you get venture to follow on? Did this 25 million dollar tax buy stratify all of these different forms of entities that are making very good progress? If they're not perfect, there's an Achilles heel for the entire strength of the national security ecosystem getting short up by innovation from startups, and that's too much risk for the country to take without us at least leaning in and seeing how we can help.

John Gilroy: What's fascinating is that this innovation comes from Jenna's brother who's in the military, and she sincerely wants to improve his and his colleagues' situation. And it's just bringing a fresh look to innovation and satellites and space for the federal government from many different perspectives. So let's talk a little bit more about this relationship thing here. Now obviously you and your partner have had conversations with the DoD on how startups can develop better relationships. So even the guys on the beltway, the large primes, are having difficulty with this DoD relationship. What do you tell the government about how this should work?

Jordan Noone: The perspective that I've used is looking at it from a global economic policy perspective. Zoom out all the way and the challenge we have in the U.S., and this has been something that's been highlighted over the last couple decades and I'd say is migrating worse, we're competing on a world stage where our competition has direct control of their innovation. We have to incentivize innovation in national security. We have to encourage investment in national security through capitalism. We're influencing individual decision makers, when in other countries, every company is a dual-use tech company. And that's the biggest challenge, which is going to set the stage for the entire century essentially is can we, through capitalism, incentivize national security innovation more than the direct control of our competition?

Jordan Noone: And that's the question I ask the White House, the question I ask everyone in DC, which is what are we doing to encourage that? Are we disincentivizing that in various ways? And it's actually a very tricky time politically where space used to be apolitical, national security more political than not, but at least there was lean in the right direction, I'd say, as far as the value of innovation there. And now there's such a negative attitude towards innovation incentives and what the biggest innovation incentive is. It's a tax break, but you say tax break in the current political ecosystem, and you're viewed as someone completely against the values of the administration. And that's led to certain, I'd say, slips on a national security incentivization side for the commercial ecosystem where you can get a target on your back if you're encouraging innovation through economic policy.

John Gilroy: What it really seems that you want is venture capital to play a bigger part in shaping this innovation, because the venture capital are trying to find the best answers to these solutions and you have a perspective on that. I mean, it seems like it's from a non-political perspective, it's a great answer, we don't talk about the other aspect, but that can make for difficulty, doesn't it?

Jordan Noone: Yeah. It's a complicated ecosystem to be trying to encourage that innovation in. And a part of the perspective that we have is if you win over the investors that are not like Jenna, Jenna has her personal tie to it. Jenna has her brother on an aircraft carrier in the south China sea, she understands the global conflict at hand, she feels that personally while most venture investors do not. They look at their spreadsheets, they look at their returns, and you can see videos of them on YouTube where they do lectures on how to make money off of the regime change that's happening globally. And I watch those videos in horror that those are the lessons being taught on YouTube University, it's how they make money as the U.S. loses global influence. Written by, directed by, and narrated by U.S. billionaires. They're like, this is how we made the money in the U.S., and now, as the U.S. falls, this is how we're going to make it off of change in the world. It's an interesting abstraction where it's almost scary how disconnected it is.

John Gilroy: Well, let's lighten up this conversation here and talk about something even more difficult, finding human beings that have capabilities. I mean, recruiting is pretty difficult in this landscape, especially for people in technical fields. So what techniques are out there to hire and retain the right kind of people in the space sector? And is it that different from, let's say, the cloud computing world rather than the space world?

Jordan Noone: The space world's a little trickier, just because it touches so many more areas at once. It's a challenge of the space sector, whether it's hardware, software, regulatory, or the economic side of it. Everything is extreme, and that's something that the cloud computing world is different from. There's some things that are extreme, but I'd say it's significantly less severe in magnitude. So if you're looking for even higher top performers, the actual needs of the company, or the bets that you're making, someone making a mistake in a space company and not getting caught or having the talent to catch it can implode a company years later. All of the work, billions of dollars, all because of one person's mistake. And that's something that is very tricky to recruit for. And for us, we're very lucky as a fund. Jenna comes from a tech recruiting background so her original foray into the tech industry was going from doing fashion design at Auburn.

Jordan Noone: And she wanted to be a hip hop dancer. She loved fashion, she was doing clothing design, and cutting out designs in AutoCAD, a technical skill. And she ended up getting a job, haphazardly, in Los Angeles as a tech recruiter. And that led to a foundation of her recruiting top engineers, first engineers, early executives for startups here in the LA tech ecosystem 10 years ago. And when

you're making those first recruiting bets on companies, those decisions are so impactful. And for her, she was recruiting on contingent equity. If that person left, she wouldn't get the equity, she wouldn't get option grants. And so they were very high and impactful decisions. Her intuition there grew very strong, and that ability to not only find talent, but also find founders, made investment decisions on which founders will grow the right teams, which founders will learn the recruiting skills, which founders will get a venture capital check and get confused on what it means to be valued at 50 million by a venture capital investor making a bet versus actually being valued at 50 million.

Jordan Noone: And there's two very different things between a venture capital bet that you may be worth more than in the future versus actually being valued at that at kind of the inherent level. And that can cause a lot of founders to create personalities, kind of like the God complex which grows a little too quickly in the venture world. And that can implode organizations. We've seen that happen to companies going to zero because the founder lets their ego go to their head and then they make some silly mistake, they do something that implodes in public and the company and investors lose confidence. But that's happened more times than you can count where it's an actual personality issue there.

John Gilroy: I want to go back to your college days. You, no doubt, studied physics back at USC. I love to quote this physicist named Niels Bohr, and you probably know the quote, but the quote is that, "prediction is very difficult, especially about the future." So Jordan, I'm going to have you make a prediction here and tell me the next five to seven years where you see this whole public private partnership working, as well as some predictions about the space industry.

Jordan Noone: That's a great set of questions and a great quote as well. Let's start with the space industry as a whole. Our bet is that a rocket launch will be boring. That's the biggest thesis for us is that there's going to be all of these new areas. You see things like Virgin Orbit and Blue Origin in the news, flying astronauts, and then you see SpaceX in the news every day for the progress they're making on Starship, Starlink, and Falcon 9. But it's something where it's about what is going to be in the future in five to seven years? And it's not going to be rocket launch. People don't realize that SpaceX is a 20 year old company, Blue Origin's a 21 year old company.

Jordan Noone: These efforts have been underway for a long, long time. They may be mainstream news today, but they weren't mainstream news two years ago and that was barely two years ago. So it tends to creep up, as far as the rate of innovation, the progress, and where these companies are going. I think the areas to be highlighted in five to seven years is in space manufacturing, like next generation telecom systems. It's what's the future of GPS is. Will GPS remain a government owned system forever? There's trillions of dollars of value locked up in that which could be commercial innovation, that same pot of gold. Who's going to win GPS four? Who's going to commercialize a GPS and lunar

ecosystem? I think for both national security reasons and economic. For national security, I think it'll end up being a driver there then on an innovation front is the U.S. is not going to fall shy of a moon competition, but I don't think they're going to lean in first.

Jordan Noone: They're chasing a little bit right now on a lunar innovation side, but that's going to become more and more relevant. Who is going to be the first country that points something down at us from the moon? That'll be a big scare for the U.S., and I hope it's something that wakes up a greater community onto what other people are trying to do in space. But overall, I think it's going to be a lot of innovation in areas against some are old, like telecoms, new players, new entrants. Some are rapidly being commercialized or attempted to like GPS and next generation PNT, pointing navigation timing technology. And then really cool stuff in space research and space manufacturing in space tourism. Then a ton of activities that have are happening in space are going to happen in space at a scale never before seen.

John Gilroy: Well, Jordan, we're running out of time here. We began the conversation talking about unicorns and dragons and wound up at the end talking about hard tech, dual-use and public private partnerships. It's been a great interview. I'd like to thank our guest Jordan Noone, co-founder of Embedded Ventures. Thanks, Jordan.

Jordan Noone: Thank you.