The Space Capital Podcast
Season 1, episode 19 – The GPS Playbook

In today's world, when we think about venture-backed companies and entrepreneurs, nobody really gives credit to a lot of the space-based technology that we see, use, everyday of our lives.

Welcome to The Space Capital Podcast. I'm your host, Chad Anderson, managing partner at Space Capital - an early stage venture capital firm investing in the space economy, specifically focused on unlocking their value in space technology stacks like GPS, geospatial intelligence, and communications. You can find us on social media at Space Capital. Space-based technologies are the building blocks of innovation, and in this podcast we explore what's happening at the cutting edge of this new entrepreneurial space age and speak to the founders and innovators at the forefront. Today we have a very special episode. Together with Silicon Valley Bank, the bank of the world's most innovative companies and their investors, Space Capital has co-authored a report which looks at how a space-based technology generated trillions of dollars in economic value and some of the largest venture outcomes in history. And today, we're talking with Ann Kim, managing director and sector head of Frontier Technology at SVB. Ann, it's great to have you on the show.

Ann:
Chad, thanks so much for having me here. Very excited to connect with you and talk about our new report.

Chad:
Okay. We have a lot of great material to cover today, but first we would love to hear a little bit more about you and your role at SVB. From a sector perspective, how is SVB set up? And when, and how, did your team and the focus on Frontier Tech come about?

Ann:
Yeah. So, Silicon Valley Bank. We are a public financial institution, but we pride ourselves on having a little more of an understanding in the different sectors. At Frontier Tech there's consumer Internet, there's enterprise software. So how we're different is that, you know, we dig deeper into the different industry trends. Frontier Tech also focused on not only aerospace, but aviation, vehicle technology, micro-mobility, semiconductors - everything that is really at the forefront right now that's powering a lot of the, you know, innovation that we see. So, we work with over half of all venture-backed companies in the United States, and then we have teams across the world that are also focused on these innovation ecosystems. That includes China, Israel, the UK. Definitely all the hotspots and we're continuing to grow. So, yeah. Most of our emphasis is on companies that start from maybe two people in a garage, right when they get incorporated, all the way through public companies. And we're really focusing on those here today, you know, that have seen more venture funding and then have grown on to return investments back to the investors.

Chad:
Great. And as head of this team, what's your role? What are you focused on day-to-day?

Ann:
Yeah. So, we're trying to figure out, you know, number one, to stay on top of all of the industry trends. But number two, how do we help our clients become more successful? Whether that is providing insights into the fundraising landscape and identifying the right partners that can help them grow, or just educating the customers. Right? A lot of times, we'll see large corporates who are a couple of years away or behind from, you know, startup technology. So many times, we're trying to bridge the gap so that our clients, a lot of these entrepreneurs that have massive amounts of experience coming from government, from universities, we're trying to help them, again, navigate through this venture ecosystem.

Chad:
Interesting. And so, how did you find yourself in this role? What's your background and how did you get here?

Ann:
Yeah. So, you know, my background, I was actually a premed student in college, and I did a lot of research. Graduated and I went into consulting, and I realized that I really enjoyed solving hard problems. So, after a couple years of consulting, you know, I found myself at Silicon Valley Bank. I thought that working with startups that are at the forefront of innovation, there were a lot of challenges that they also faced. So, using my consulting background, I was able to identify which areas we can move the needle for these entrepreneurs. So, you know, Finance 101, it's something that is not always taught for a lot of these technologists that are building great companies. So, you know, again, it's always been bridging the gap with them. Figuring out how to- How do I use SVB's resources, whether it's in the form of debt financing, whether it's introducing entrepreneurs to different sources of capital, that was really the start. And then I realized over time that, you know, it's a very technical- You know, a lot of these entrepreneurs have a very technical background and they want to talk to partners that can talk the talk. And so given that I also had a little bit more technical expertise, did more research during my college years, I think it was easier for me to read through white papers, kind of understand where the problems lied, as a opposed to just asking entrepreneurs for hardcore financial projections. Kind of understanding that, for a startup, most times their first set of financials that they forecast will not actually come to fruition. So, understanding the nuances, knowing where to kind of guide entrepreneurs, you know, to raise another successful equity round was really key here.

Chad:
Yeah. Early financials are a little bit more of an art project than a science project, I'd say. So, thanks, awesome. That is helpful context and a very broad background that you bring to this conversation, so thanks. So, we wrote a report together called The GPS Playbook, which is really a first of its kind look at how- how space technology has had such a huge impact. And again, it's generated trillions of dollars in economic value and some of the venture outcomes in history. Some big claims for GPS. So, for you, you know, can we start kind of high level, what did you take away from this exercise, diving into the research, understanding a bit more, you know, the past, present, and future of GPS?

Ann:

You know, I think it's fascinating because, you know, in today's world when we think about venture-backed companies and entrepreneurs, nobody really gives credit to a lot of the space-based technology that we- we see, use, every day of our lives. I don't think that anybody understands that GPS did not exist for many generations ahead of us. It's really over the past several decades that it's really, exponentially, grown in popularity. So, I really was fascinated by reading the history, and understanding that this was an evolution that really stemmed from government activity and then became available, right, to the public. So, it's a story that really is able to connect the dots and really describes how, you know, the different - as we've mentioned - the pillars of innovation. There was the infrastructure, the distribution, and the application that really allowed us to make this GPS universal and available to everyone.

Chad:
So, we start off the report, the first section is titled, "GPS: The Space-Based Signal We Can't Live Without." And really, the idea here is that the importance of this space-based GPS signal can't be understated and is now universal in our everyday lives through applications, like Uber, Yelp, Niantic, again, some of the largest venture outcomes in history. Just, you know, to hit on a couple of the highlights and the stats from this report, a total of one-hundred-and-thirty-seven companies generated an exit for investors with a combined exit value of 170 billion. The top twenty-five exits generated an average exit multiple for early investors of 690X, and three companies were amongst the top ten venture exits of the past decade, these being Uber, Lyft, and Snap. So, you are very active and involved in space. You go to a lot of these conferences, you speak at a lot of these conferences - Well, you did pre-pandemic. We're all kind of staying at home now. So, you're very involved in the community and in the industry and what's going on. At these things, I hear people talking a lot about launch vehicles, small satellites, maybe, ground stations. But it seems like GPS is mostly ignored. And you kind of, you know, hinted at this earlier Or at least, you know, taken for granted. Has that been your experience as well?

Ann:
Absolutely. So, I think a lot of times, again, VCs, a lot the modern entrepreneurs, I think that they are focused on the data and the insights, but they don't credit it to GPS. Right? So, they categorize a lot of our technology that we see as hardware versus software. And so, when we talk about these launch vehicles and constellation of micro-satellites, that is the hardware side. But, you know, the software side has always been a big opportunity but, again, it's just taken for granted because we have already been utilizing it for the past several decades. And so, I do think that now coming back, analyzing, and understanding where it actually came from - from satellite technology - is a really crucial kind of idea to set the framework of how we really have to credit that foundation to the development, right, of all these other companies that you talked about, like Uber, Lyft, and Snap, that have really changed the way that, you know, modern day consumers behave.

Chad:
To your point, we've had GPS as a government military signal for decades, but it wasn't used as ubiquitous utility, as it is now, until really recently. The iPhone 3G, launched by Steve Jobs in just 2008, is what put GPS into the hands of everyone for the first time, and gave birth to location-based services. Location-based services is ten years old, you know? So, fair enough that everyone's talking about infrastructure because that has gone through a renaissance over the last

ten years. You know, has gone from really government and, you know, government contractor game, defense industry game, for decades. And now, SpaceX has- has removed the barriers for new entrance and we have all these new companies and tens of billions of dollars of investment. So fair enough that people are focused on that. But it's really interesting to me to see how location-based services is really also in its infancy, and also only ten years old, and really is kind of on a similar timeline. So, yeah, I mean, I would just second your point and say, you know, without a doubt it is based on a- on a space-based signal. We wouldn't have location-based services without those satellites.

Ann:
Yeah. You're absolutely correct. I think that, you know, for a lot of the technology that even Google and Apple have built on top of these signals, and just the foundational technology, it's been huge. When you talked about the infrastructure, the hardware infrastructure, so there's not enough room for actual, you know, software technology. Things that are utilized in the data coming from satellites, the geospatial and the comms that we will talk about in a little bit. I think that there is room for thousands of businesses to be built on top of this tech. So, again, it's a different way of thinking about who is laying the groundwork but what can be built on top of that? And again, the software, the insights, data analytics, there is room for massive amounts of businesses to be born.

Chad:
The next section of our report talks about the three pillars of innovation. And you touched on these earlier, with infrastructure being the key one and really where a lot of the emphasis has been. Distribution. Distribution of the GPS signal in this case. Trimble and Magellan, Garmin, TomTom in Europe. And the applications, then, that are built on top of that increased access to the signals through- through distribution. And so it's really interesting to see all of the infrastructure investment, primarily government. And we've got some stats in the report there. You know, 20- 30-billion dollars of investment into those distribution companies. And then, really, the distribution of GPS has resulted in kind of like this Cambrian explosion of applications that are built on top of this signal and- and are extracting a ton of value, and building on top of this signal and generating a lot of value. We're seeing it play out in space, we're seeing it play out in GPS, now we're seeing it play out in Earth observation. Are you seeing this type of thing playing out throughout your portfolio?

Ann:
Yes. Absolutely. So, I think over the past couple decades, we've seen the large corporates, right? The Qualcomms of the world are really able to create and, you know, they have the massive amounts of capital. They have the supply chains to actually do a lot of the heavy lifting for multiple industries. And where we're seeing a lot of the new entrepreneurial activity and development is really on the application side. But we can say that about, you know, others such as, autonomous vehicle technology, within robotics. You know, really, we're viewing it less of, again, less of hardware versus software, it's really the full spec. So, you're looking at pretty much everything that is hardware is the sensor technology. It's ingesting a lot of information and then it outputs data. And with that data, that's really where the value is, right? So, the data can be cut in different ways, it can create insights, it can create software algorithms to actually make the

quality of data even better. So, again, a lot of the different industries that are seeing innovation right now, really, are following the same level of infrastructure, distribution, application.

Chad:
So now we've had, you know, the- the majority of us have carried around this signal and we've had the GPS signal with us for the past ten years or so. Thinking about, you know, competing technologies that are coming online, have been coming online for the last few years, to get even more precise. The GPS III satellites, that are third generation satellites, that are going up now are supposed to take us from, you know, ten-meter accuracy down to three meter accuracy, one to three meters. Which is great, but it doesn't really give us the precision that we need for a lot of these types of applications that, you know, we're expecting in the future, autonomous vehicles, that sort of thing. And in particular, where you get into urban canyons, places between buildings and cities. You know, for example, in New York City or San Francisco where you are. Uber and Lyft are putting a ton of- of time and energy and resource into trying to solve this issue of the urban canyons and how you lose signal. But I think everyone experiences this if you take, you know, if you use these applications, you'll open up the app and you'll get a circle that covers, you know, five city blocks. And that's not really helpful for when you're trying to get someone to come and pick you up on a specific street. So, we've seen companies building reference stations, so hardware that you put on, you know, city corners and telephone poles, for example, that act as a relay to help augment and further the system like a WiFi hotspot would do. Lidar, which is actually a NASA technology that they used to map the Moon originally, but of course, this is getting smaller and more affordable but it's still quite expensive. And you've seen, you know, probably one of the most outspoken here is Tesla, saying that Lidar is not the way to go, and they're focused on computer vision to deliver their autonomous capabilities. So three competing technologies here. And I'm interested to get your take, because I know SVB is really in tune with what's happening in micro-mobility. And so, you know, kind of just curious on your thoughts on how these technologies are playing out.

Ann:
Yeah. So, you know, I think that debate still exists and there's not one right answer. They all have their advantages and disadvantages. But, you know, what we have to consider is the best technology does not always win in the beginning. Right? So what we have to do is step back and really understand the, you know, consumer perception, any regulatory hurdles, and user adoption through the future. So, I think what we've seen is, you know, as you talked about Lidar, it is- it has been around, it's very expensive, we've seen a lot of companies utilize it. But then their devices, or whatever they're building, is too expensive. They rely on too many parts, it's- there's a lot going on. And so, a lot of companies have reverted back to just cheap cameras, right? Sensors. And that's where a lot of, you know, consumer behavior now comes into play. Because if you think about all the different companies you talked about, like Snap and what not, they're using mobile devices that have cameras attached. So, I think, you know, the first wave is going to favor those with more of the low-cost camera technology. Then that gets overlaid with computer vision. I mean, the future Lidar will also help. But, again, it's not a which one will win, I think it's at what point in time will consumers be able to understand what's happening, collect and contribute more of their own data into a database. And then how will developers be able to look at that data and start to-

Chad:
Make use of it.

Ann:
Yeah.

Chad:
Yeah. So, onto one of my favorite parts of the report is a section that we call, "The Future Will Be Augmented." And this is really looking at where we're going and, you know, what's happening now, and how it's leading to our inevitable future, in my opinion. I mean, GPS is converging with compute vision, and in a lot of applications we're seeing that as the technology that's being adopted. And it's really ushering in a new era of precise positioning that, you know, will unlock millions of new applications never before possible. One of which is augmented reality. So, this is one of my favorite parts of the report. Would love to hear, you know, what you're thinking. It ties into a lot of the stuff, I'm sure. Micro-mobility is just one, but a lot of the stuff that you touch and that you see in your portfolio. And also, I think a lot of people, you know, when they don't make the connection between augmented reality and space, maybe. This has been a long time coming. So yeah, kind of curious to get your take on and thoughts on where this going.

Ann:
Yeah. No, it's fascinating. Because if we were to rewind five years ago, AR, VR, they were the- the two kind of buzzwords, right? Everybody wanted to understand and have a piece in augmented reality or virtual reality. But those are very separate concepts, and I think it's great that here we're emphasizing AR. Because when entrepreneurs were trying to combine AR and VR, it was a lot of the headset technology and then, at times, they would kind of take that headset off and try to look for other ways to make that VR experience tied to AR. Here, in this case, as we think about just the evolution of GPS technology birthing all these different business models, and then be able to allow consumers to overlay. As consumers we're able to experience AR. It's been fascinating to see. Because now there's actual user behavior that's being developed. People are becoming accustomed to seeing advertisements pop up as they're trying to play Pokémon Go, or as they're trying to test out different driving methods that are being sponsored by like insurance companies, as they're being sponsored by all these different businesses that can actually monetize off of these AR experiences. So I'm really excited because consumers will have to see the value in their real world in order to increase user adoption, and then be able to produce any sort of financial gain for those that are developing this technology. So yeah, I think it's fascinating because it can go to gaming, it can go to personal shopping, it can go to, you know, just for commercial applications. Whether it's safety, whether it's outdoor adventures, there's so many opportunities for AR to be applied.

Chad:
Yeah. Without a doubt there is so many applications. And, you know, we can tap into our imagination and try to come up with a few, you know, a few use cases. But there's- What's really exciting is it's like it's all the stuff that you can't think of once this capability is unleashed. I mentioned the Cambrian explosion of mobile location-based services and the entrepreneurial activity earlier, and like that was all- all that hinged on ubiquitous highly precise positioning, the

presence of developer tools, and a- a platform that resonated with customers. That platform being the iPhone. AR- So, the iPhone and the developer tools being the app marketplace and so on, right? And so, AR has strikingly similar prerequisites. And it's just really interesting to see like all of the pieces starting to come into place and starting to line up, and it just seems like we're nearly there. And now AR is really just sort of waiting for its iPhone moment. The Google Glass rollout didn't go so well. So, what peripheral will there be? Like what hardware will enable us to connect the offline and online worlds? And that's- that, for me, is super interesting.

Ann:
Yeah. No, I agree. I think that a lot of times, technology and, again, it's the user perception. Right? Those have to line up. So, the first mover is not always the mover. I think, in general, there's been studies that it's generally the second mover that might be set up for more success. Because, again, the- the first mover has to spend time educating the market, they have to fine-tune their technology. A lot of times it's a rough prototype. And not to say that Google Glass was a rough prototype, but I don't think users were accustomed to wearing Google Glass for the majority of their waking hours. It didn't look and feel slick. But, you know, fast forward, there's different ways to actually insert technologies into more accepted, wearable technology. You know, consumers are even thinking about implanting different technologies into their own bodies. I think we've come a long way. But, again, I have to give Google credit that, you know, they made bold statements and they never shy away from at least trying. So, it's going to be the transition from, maybe, a little rough form factor turning into just very simple seamless technology that can be integrated into existing devices that we have today.

Chad:
Yeah. It can be difficult to go first. A bit of a first mover disadvantage.

Ann:
Mhmm. That's right.

Chad:
Okay. So, the fun stuff. Looking forward. In this report we make a really big claim. It's in the name, GPS provides us with a playbook for how space-based technologies will create new investment opportunities. And our big prediction in the end is that using GPS as an analogy, we believe that space-based communications and geospatial intelligence segments have the potential to generate over a trillion dollars in equity value over the next decade. So, here's the big question for you. What do you think is coming next and, you know, what are you excited about?

Ann:
So, I- I do think that the global connectivity is huge. It's really going to allow a lot of innovation in different markets where we've never seen it before. Right? So, as we think about for space, it's always been, you know, US, the UK. There's been different hotspots that have been active. Now we're seeing so much activity in China, India, Africa. It's very inspiring to see. So, I think, while I don't know which technologies will win, I think that the exponential growth with everyone having a smart phone, everyone have data they're collecting and pushing back to these companies that are building businesses, it'll be huge. So, I'm just so excited to see this foundational technology really spinning off to new geographies. But I'm curious about yourself

as well. I mean, the whole idea that we decided to a report together is that you guys were everywhere. Right? I know for Space Capital, I think that you're tracking every single company that's ever been relevant to this sort of space ecosystem. So, I'm curious about your thoughts as well.

Chad:
We're, you know, on similar tracks here. So, we're, you know, really interested in the three main satellite sectors that are generating value now. So, positioning, navigation, and timing in GPS is a key one. And that's what we've been talking about today, and it's really about like getting that signal from space, getting more precise positioning, and then the applications that come off of that. I think there's a ton of untapped opportunity there. Again, we're only ten years into location-based services, so there's still a lot of runway there and a lot of new applications that we're gonna see coming online in the next five and ten years. The next is earth observation. We're really- that's one that we're extremely bullish on, and that's happening right now. We have, with the increased access to space, we have all these new satellites, small satellites that are generating incredible amount of data about our planet. And this is really incredibly valuable data for basically, you know, every trillion dollar industry you can think of. And we're starting to see early demand signals from agriculture, oil and gas, energy, shipping, maritime. These really big industries are really interested in this data. Retail supply chains, grocery chains are interested in this data to monitor their supply chains and their facilities. And we're actually seeing, due to this pandemic, we're actually seeing an increase in demand for that as people want to get a better handle on what's happening. So, it's kind of a counter cyclical. You know, it's good in up times and in down times. And it's developing in a way that's very, very similar to GPS, and we're right at the distribution stage right now. We're seeing, you know, and we're funding the first companies that are acting as a marketplace in bringing all of this data onto their platform and making it really easily accessible through and API. And just like in GPS, you know, when we saw the success of these companies, Trimble, and Magellan, Garmin, and others. That's- It's when you connect the aerospace community to the tech community. Where the tech community doesn't have to know anything about space. They don't even have to know that it's a space signal, they just have to know what it provides for them, what it gives them. It's capability and what it's able to do, and it needs to be easily accessible. And that API allows them to do that. So we're just starting to see the applications come off that. So, we're really, you know, earth observation and geospatial intelligence is a really key area of focus for us right now. And like you said, I mean, communications. There's a lot of opportunity in satellite-based communications with regards to 5G, Internet of things, and tracking things on a global scale from space and a number of other applications. So, you know, those are kind of like the key areas that we're- we're focused on. I'm curious if you have, you know, any areas of the space economy that are most overhyped or underappreciated, in your opinion?

Ann:
Yeah. So, you know, you made an earlier comment that when we kind of talk about space-based businesses and go to conferences, a lot of times it's on launch, right, and these micro satellite constellations. I think the launch category has kind of come and gone. It's not to say that there's- There's still room for innovation, but there's so many companies. There's over a hundred companies that are focused on the small launch category. So I think that, you know, again, stepping back and thinking about hardware versus software, there is more room for companies

and players to take a piece of the pie and succeed if they can develop more of the software technology that- any sort of data that's been collected from these hardware players. So that's one. And then I think from those that there's still room for improvement. Again, I think, to your point, it is getting that geospatial intelligence, all that data, and then figuring out how to apply it to the real world. You know, many times as you think about the biggest customers for this data, it's hedge funds. Right? It's insurance companies. It's those that are big, kind of, mature industries. That don't think about consumers. That are just focused on weather patterns, right? It's consumers that are focused on, "I need to go shopping." You know, "I want to do it online, but I want to pick a vendor or merchant that is close enough where the delivery will fall into a window that I can trust." So, it's really taking that next level where let's focus on technology that's being ingested by companies that are selling beyond just big players and now trying to sell specific to consumers. So, I think the whole D-to-C, direct to consumer, business models haven't really been explored within the, you know, space-based technologies, but I think there is room for that as well.

Chad:
Awesome. Okay. Two more quick ones for you. On the show, we like to say that there has never been a better time to get involved in space investing. Can you give us your personal perspective on that?

Ann:
Yes. So- [laughs] Yes. There never has been a better time. I think right now, everyone's looking for the next big thing. Right? What is going to drive these returns that are similar to Facebook, to Google, to what-not? But, you know, we're running out of different things to invest in here that are- that fall into the traditional categories of enterprise software, security companies, HR management. It's been built, it's been done. So, people want to see what's next. As I'm thinking about security, well if you can actually have security companies that are utilizing space technology, it could be more secure. Right? Because hackers are not as accustomed to trying to make attacks on, you know, communication signals that are going from Earth to space and back. So, the classic infrastructure software of storage security really are exploring those that utilize signals based in space as well.

Chad:
A lot of wide-open space. Okay. And then so, what's the best way for listeners to learn more about, you know, what your team does at SVB and the market research that you produce?

Ann:
Yeah. So, I think the first thing is just we are a bank. So, we are open for business, just a bank. Any company that is in the innovation ecosystem. You don't have to venture-backed. It really is just if you're an entrepreneur that's creating a technology or working on the tech industries, something that's related to innovation, you know, feel free to work with us as a bank. And then second, if not, if you're already well setup, you know, obviously there's no need to only work with us. There are many players. But they can- they can follow us on - Whether it's Twitter, whether it's just on our website. We do publish reports that we hope are a little bit more specific to different verticals. You know, this report with you guys, with Space Capital, was focused on the evolution of GPS and space-based technology. I think we also cover others that are related to,

again, consumer Internet, enterprise software, what-not. So, by signing up through our website and tracking our different social media channels, you'll see a variety. But I'd say, most of our content really is at the forefront of innovation and trends that we're seeing in the venture ecosystem.

Chad:
Yeah. And they're really well done. I really enjoy reading them. There's a ton of great insight in them. So, just wanted to make sure that people knew how to get there. Thanks. And I think, you know, with that, Ann, it's been great having you on the show today. Thanks very much for your time.

Ann:
Yeah. Thank you so much for having me. Really looking forward to working with you continuously as we see the explosion of more space companies to come.

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