Constellations Podcast

Episode 35 – China's Long March Rocket Family, its Belt and Road Space Initiative and the "Elon Musk" Factor

Speaker: Blaine Curcio, Founder, Orbital Gateway Consulting – 32 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy and I'll be your moderator today. Our guest today is Blaine Curcio. He's the founder of Orbital Gateway Consulting. China has been in the news a lot lately, mostly about trade tariffs and their expansion in the South China Sea. But in addition to the country's growing economic power and international influence, it has also made some very impressive strides in terms of its space program. This includes the development of the Long March rocket family, the deployment of the first space station, and the Chinese lunar exploration program.

Today we have Blaine Curcio with us, who will bring us up to date on the emergence of a space industry in China, comparison of U.S. and Chinese space programs, and whether Chinese space industry has its own larger-than-life Elon Musk. Blaine is the founder of Orbital Gateway Consulting, a commercial space and satellite consulting company, and was previously principal analyst at Northern Sky Research. His consulting experience also includes having conducted a market entry strategy project for SGS International aiding their entry into Mainland China. Blaine speaks English, Chinese, Italian, Spanish. Blaine is based in Hong Kong. Blaine, can we do this interview in English?

Blaine Curcio: English is perfect, yes. Sounds good.

John Gilroy: I'll be limited to one language here because that's all I got going. Let's jump right in here. I don't want to begin our conversation here with being politically incorrect, but let's face it, buddy. You're an Italian kid from Chicago. What in the world? How did you become a recognized subject matter expert in China's emerging space industry? That's a story in and of itself.

Blaine Curcio: That's a fair question, and I'll try to keep it pretty brief in my response because I could go on for a long time about this. My first experience in China was an exchange program at the University of Hong Kong during my undergraduate. Given that I still live in Hong Kong eight years later, you could probably say that I never left. Following my undergraduate, I moved back to China to work for a barbecue manufacturing company for one year. After that one year, I went over to Northern Sky Research, which is a pretty well-known satellite and space market research and consulting firm.

During my time at Northern Sky Research, I spent a couple of years living in China, although it wasn't until about 18 months ago that I really started focusing on the China space and satellite market specifically. Prior to that at NSR, I was looking at more global satellite telecoms market. About eight months ago, I

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started my own practice focusing pretty exclusively on China. I've recently partnered up with a guy called Chen Yu Len in Beijing whom you mentioned on your podcast a while ago as being a Chinese guy that approached U.S. satellites talking about the Chinese space industry.

He's up in Beijing, so he and I work together on the Chinese industry. It's been my full-time focus now for about the last year, which would've been my last part of my time at NSR and now since having started my own firm here.

John Gilroy: Well, I got up early this morning and went to your Twitter feed. You write a lot of articles as well, and in a recent article you wrote for Space News you stated that the space race of old was between governments. But we may be on the brink of a 21st century private space race on an international scale. Can you explain what that means and what are the implications of this change?

Blaine Curcio: Sure. Not to veer away from China at the very beginning, but I guess when talking about the private space industry, the first country that we have to talk about is the U.S. The U.S. has a really dynamic private space industry. We've all heard of SpaceX, most of us have heard of Blue Origin, and there's a lot of increase towards privatization of the United States and that's leading to a lot of innovative things that are going on.

China, starting in around 2014, they started to deregulate the space industry. So prior to 2014, pretty much anything to do with space in China was government-run companies. They've been deregulating the industry for about four or five years, and we're starting to see over the last probably two years or even 18 months a lot of new companies that are emerging. There are a few specific areas that are quite popular in China, so a lot of launch companies, a lot of smallsat manufacturing companies, and I think that there's a real emergence of a private space industry here in China.

I think that more generally, if we talk about a private space race, I think companies are starting to see space as a high growth industry. There's a lot of dynamism in space, there's a lot of uncertainty, but there's a lot of potential growth. And I think there's going to be some pretty significant implications. I think moving forward, we're really only going to see the U.S. and China and maybe the European Union if they can get their act together on their space program in terms of a unified policy, I think these are going to be the only real space powers moving forward.

The implications for that are pretty significant. If we look at other industries that have become very big very fast, for example, looking at big internet companies, there's only two countries really that have world-class internet companies. Those are the U.S. and China. There's not really any European world-class

internet companies because the U.S. internet companies have just taken all the market share. Google has 95% market share in Germany, for example.

If space ends up being this very high-growth, this very strategic industry, I think we're going to really see just a couple of countries control the whole industry because there's really only a couple of countries now that are going for it. From that perspective, I think those are the implications of this private space race, and I think China's still playing catch-up a little bit because they've been privatizing a little bit more slowly and that's caused some not so fast innovation, but yeah, I think it's going to be a pretty significant development, this private space race.

John Gilroy: Well, I'm here in Washington, D.C. About 10 miles up the road is this thing called the Pentagon, and the Pentagon certainly knows what's going on in China. How would you contrast the Chinese and American space programs?

Blaine Curcio: The American space program, a little bit like the United States economy more generally, is quite meritocratic, so the best company tends to win, or the company with the best products tends to win. The example that I would point to is when Elon Musk started SpaceX, he kind of relished in the fact that he was making the incumbents look bad, even though the incumbents at times were U.S. government. It was NASA, or sometimes it was Boeing or Lockheed, but basically it's a very meritocratic industry in the United States. Basically, the company with the best technology or the best product wins.

In China, there's another layer of complexity because the incumbents in China are massive state-owned companies that have a massive amount of political clout. That means that you really can't have private companies making them look incompetent in the way that Elon Musk has done in the United States with some of the incumbents there. I think to a certain extent that limits the Chinese space industry, but I think that is starting to change.

In terms of other differences or similarities between these two space programs, certainly the Chinese space program has a much more long-term orientation. They have very well-thought-out and well-designed long-term plans. They have their five-year plans; they have their 10-year plans. These are all very public and very well-structured. In the United States, at least in terms of the government side of things, it's much less clear what the five- or 10-year plan is. From that perspective, I think China has some advantage there.

But I think these are two very different strategies, and they're starting to converge to a certain extent as China starts to open up a little bit, but those are two main differences that I would point to, again, the meritocracy of the U.S. versus the more incumbent advantage in China, and then the longer-term

orientation of a lot of the Chinese space policy versus the United States being a little bit more volatile from that perspective.

John Gilroy: I'm a big fan of taking data and trying to understand it visually. I know some of the founders of Tableau, but my limitation normally is like a pie chart. When I look at the United States, the distribution of what's going on in the space are, I think commercial and military distribution, it looks like here it's about 70% commercial, 20% military, and maybe 10% universities and public organizations, so 70, 20, 10. How does that compare with China?

Blaine Curcio: In China, it's a little bit hard to break it up across those three areas, because ultimately the Chinese space industry as it stands today in terms of companies that are actually active and making money, it's pretty much all government-owned in some way or another. A lot of these startups, they have a lot of funding, they're doing a lot of things in terms of development, but they're not actually revenue generating yet.

If we look at China today, I guess looking at the space industry there's a few main parts that we can break it up into, but it all comes back to the government. There's the big state-owned companies. The two biggest ones are CASC and CASIC. Underneath those two companies, CASC and CASIC, there's a bunch of subsidiary companies that do things like manufacture launchers, or there's ChinaSatCom, which is a satellite operator. But again, this is all under these big state-owned companies. That's probably, let's say, about 70%, 80% of the space industry in China would be under this state-owned umbrella of state-owned companies.

John Gilroy: It's the opposite of here, huh? Flipped?

Blaine Curcio: Yeah, pretty much. The rest would be, there's a lot of big research institutes from which they're becoming some private companies. One example, there's an Earth observation company that's pretty big. Their total funding is about 150 million U.S. dollars. They're based out of Jilin in Northeast China, called Charming Globe is their English name. But they got spun out of a massive research institute that's devoted to high-powered cameras. Basically, the research institute realized that they could probably use some of the technology to do Earth observation type stuff, and so they spun out this company which is nominally private, but it's really underneath this state-owned research institute. There are a lot of these types of organizations that are the academy of this or that that are probably the other 20 or 25%.

With that being said, there's a lot of funding right now going into private companies. If I had to put a number on the total amount of investment going into private companies in China in space today, it's getting close to a billion

dollars. Again, most of these companies are not yet commercially operational, but there's almost a billion dollars of funding into, again, mostly launch companies, smallsat companies, some geo satellite operator type companies, and then Earth observation.

But getting back to your original breaking it up into a pie chart, it is probably still 70, 75% purely state-owned companies and then 20, 25, 30% these research institutes, and then there are a handful of private companies that are varying shades of private because, again, in China there's not really such thing as a really, really purely private company in space. But those companies are, for the most part, still kind of in startup mode.

John Gilroy: Let's go down the road of venture capital again. About a month ago, we were at SmallSat Utah, and there's a big upswing in venture capital investment in small satellites, manufacturer launch, or even satellite operators. You didn't mention smallsats there. Is there a private investment in China's space industry in smallsats?

Blaine Curcio: Yes, there is. If I were to break up the private space industry in China into several key sub industries, I would say the biggest one is launchers. There's about 600 million U.S. dollars being invested into about five big launch companies right now. But then there are about 10 or 12 smallsat companies, each of which would have funding in the high single digit U.S. dollar million or up to like 25, 30 million U.S. dollars of funding.

If we look at the VC pie in China and we look at it by sub industry, it would be predominantly launch, maybe 70% launch, but there are a larger number of smallsat companies and several of them have some pretty high profile investors. For example, there's a smallsat company called Spacety, and they recently finished a $22 million round of funding where the lead VC company within that round of funding was Legend Holdings, which is the VC arm of Lenovo, which is probably a household name in the U.S. You know Lenovo, I assume, right?

John Gilroy: Yes.

Blaine Curcio: So you're getting some high profile companies that are investing in smallsats, but again, the biggest piece of the market on the private side in terms of fundraising is still launching. I think part of it is due to the sexiness of launch and also part of it is, I think, the Elon Musk factor. Chinese people see Elon Musk as this very strong entrepreneurial guy, and they say, "Well, we need to have the Chinese version of Elon Musk." So there's about five companies in China that are all trying to brand themselves as the Chinese SpaceX, the one with the most entertaining name being ExPace.

John Gilroy: You know, I look at Asia, I read the article Asia's Rising Space Ambition, talking about China and Indonesia. In this article, they talk about Pride Sat. Maybe that should be a hashtag. This is a lot of pride involved in these launches, isn't there?

Blaine Curcio: Oh, yes. Yeah, certainly. I mean, there's a lot of pride involved in the Chinese space industry more generally. I think there's a question later on here about, I guess, the difference in culture with these two industries, but yeah, there's a lot of national pride involved in the Chinese space industry. Again, I think with launchers there's a certain degree of coolness or sexiness or whatever you want to call it that's really catching people's attention here.

John Gilroy: Earlier we talked about commercial organizations and then governmental organizations, and I think it's pretty obvious that in China the government plays a much bigger role than the United States. This has started to change too a little bit in the space industry. I think the government opened up the industry to partial privatization a couple years back. What role does the Chinese government still play, and what role does the private sector play, and how is that changing?

Blaine Curcio: As you just mentioned, the government did start to open up the space industry in 2014. I believe that the main driver behind that is, again, this idea that the big state-owned incumbents are well-capitalized, they have some interesting technologies that they're working on, but in general they're not so innovative just because they're big, bureaucratic, state-owned companies. So the government has started to open it up to a little bit more competition and a little bit more private sector involvement, just to encourage more innovation.

Right now, the government still does play quite a big role in the sense that, if you are a private space company in China, you would not really be able to get anything done without the implicit approval of the government. A lot of these private space companies in China, most or part of their funding would come from VCs but also a lot of the funding would come from potentially government research institutions, as I mentioned earlier or potentially government VCs or local governments.

There's also, for example, a couple of these launch startups, they've made deals with local governments where the local government gives them some very generous tax incentive or some free land or a free industrial area just to do some manufacturing or some kind of research and development. As an example, there's a city in China called Wuhan, which is in South Central China. It's a probably second-tier city, and as part of the government's effort to develop these second-tier cities, they're pushing Wuhan as a space city.

They have a thing called the Wuhan National Space Industry Base. Basically, they're trying to push a number of different space companies to set up shop in Wuhan. The biggest of these companies are government-owned or government-funded companies, and the assumption is that if you can get some really big government-owned companies there, you're going to get some smaller private companies that are providing support services for these government companies or potentially doing some other business with the government companies.

Space is becoming a little bit more open, but ultimately the government still has a fairly high degree of control over a lot of the industry. I guess beyond that, the four major launch sites in China are all government-owned launch sites. Actually, just earlier today was the first time that a Chinese launch company, a company called iSpace, launched from a government-owned launch site. That was at a good timing. It'd be early September, September 5th. That was interesting.

John Gilroy: Earlier in the conversation, you talked about launchers. Now, does the Chinese space industry, is it just for China, or what impact on markets outside of China is this going to have? Is this going to change in the future, you think?

Blaine Curcio: It's a big question, and up to this point there's already been a pretty significant impact on markets outside of China in terms of China manufacturing satellites for other countries. China Great Wall Industry Corporation, it's a big state-owned company, and it's the only company that's allowed to sell satellite services to foreign customers. They've manufactured, I think it's nine or possibly 10 satellites up to this point for mostly foreign governments or some foreign private public partnership type companies. This is having an impact in that it's adding excess capacity over some various regions. And this is pretty wide ranging. I mean, it's going from places like Nigeria to Sri Lanka to Bolivia. All of these countries have procured geostationary communication satellites to China. From that perspective, there's already been a pretty significant impact by China in markets outside of China in the space industry.

Moving forward, I think that Chinese companies are likely to play an even more active role in other countries. We've seen a few smallsat companies that have announced the intention for global, or at least regional, LEO constellations for things like IoT or even broadband connectivity, that kind of thing. The China, their BeiDou GPS constellation, that's going to be available across all Belt and Road countries by the end of this year, and it's going to be available globally by the end of 2020, so you're going to have a Chinese answer to GPS available globally by 2020. Then we've also seen a couple of different companies that have talked about launching a mobility-focused geo satellite across the Belt and Road regions, for example.

Finally, we've seen some Chinese space companies going and buying or investing in companies in other countries. Probably the strangest example that I can think of is there's a company called Tatwah Smartech based over in Zhongshan, although they have another office in Beijing. They recently bought three orbital slots from Cyprus, and then they took one of those orbital slots and $31 million and traded it to Supreme Sat, which is a Sri Lankan satellite operator, in exchange for a 49% equity stake. So you have a publicly-traded Chinese company traded on the Shenzhen stock market that is now a 49% owner of the National Satellite Operator of Sri Lanka.

John Gilroy: Wow.

Blaine Curcio: Yeah, so it's kind of strange times.

John Gilroy: When you're right in the middle of this action over there, and you just tossed out a phrase and used it a couple times called the Belt and Road Initiative. Here in Washington, D.C., September 1st, I pick up the Washington Post, Rick Novak, he writes an article about the Belt and Road Initiative, about trains going from China into Germany. Now we see all kinds of things like Made in China 2025, China's 13th five-year plan. They're talking about the new Silk Road in space. Maybe you could reframe these things for our listeners so we understand what this BRI and Made in China's all about.

Blaine Curcio: Sure. The Belt and Road Initiative is a very big, very nebulous topic. Basically, just about any Chinese company today doing anything in Eurasia is branding it as Belt and Road. It's a little bit overarching in that regard. But I think if we look at the Belt and Road Initiative from a macro level, what is it? What is China trying to accomplish? It's an initiative by China to upgrade its industry at home, to develop some of its less developed provinces, to export some of its excess industrial capacity, and also to export Chinese standards for things like 5G, high-speed railways, GPS, etc.

Within the Belt and Road Initiative, there is a pretty significant space component. They call it the Belt and Road Spatial Information Corridor. There was a really interesting presentation given by a representative from the China National Space Agency, the CNSA. He gave a talk at the UN Office for Outer Space Affairs; UNOOSA I think is the abbreviation. He talks about this Belt and Road Spatial Information Corridor, and it includes GPS, it includes ultra large capacity broadband multimedia communication satellite. I quote that directly from the PowerPoint. But basically, the Belt and Road Initiative, the space component of that is an effort by China to export space-related infrastructure and space-related stuff across Eurasia and, to a certain extent, Africa.

Made in China 2025 is an initiative by China to ensure that the company takes the lead in a number of key industries over the coming decade or so. This is another pretty broad initiative, but these industries include things like information technology, aerospace equipment, high-speed rail, this type of thing. So in the context of space, there are a lot of areas like the heavy launch vehicles or satellite telecommunications, this kind of thing, that will be covered by Made in China 2025.

And then the most recent five-year plan which runs from 2016 to 2020, the five-year plan more broadly is this very macro level governmental plan that they release every five years, and it basically says, "Here's what we're going to do over the next five years from the perspective of economic and social development. These are our goals, and here's how we're going to go about doing that." In the most recent five-year plan, they mentioned trying to develop industries like next generation heavy lift launch vehicles, new types of satellite, and other space platforms and pay loads. Again, I quote from the official English translation of that. Beyond that, they also talk about accelerating construction of a national civil space infrastructure involving remote sensing, broadband mobile communications, and their BeiDou, their version of GPS.

In terms of the five-year plan, there's two very clear parts there that are very much related to developing their capabilities as a space nation, and then ultimately exporting those. A lot of those, that exporting will also fall under the Belt and Road Initiative because, again, pretty much any high-end export going to anywhere in Eurasia or Africa can fall under the Belt and Road Initiative. But yeah, I think these are probably the three most important high-level government policies or initiatives as it pertains to space.

John Gilroy: You mentioned heavy lift, and I'm going to switch subjects here, but anyone with just a superficial knowledge of the history of China knows about the Long March. The way this ties in is there's a heavy lift Long March 5 launch system. I think it's going to come online maybe later on this year. It must be part of these bigger initiatives, isn't it?

Blaine Curcio: It is definitely part of these bigger initiatives, yes. I would say that the Long March 5 ... That was the one that they tried to launch it last July and it was a launch failure, so yes, I think they're planning another launch later this year. I think it's important in the sense that it would be a heavy lift vehicle from China that would be a big technological step forward for them, but I think it's not necessarily such a crucial part of these initiatives just because the Chinese space program, it's quite broad. They have a lot of different launchers.

More generally, China has been fairly good at setting and then achieving launch targets and hitting their launch dates. I think that last year's failure of the Long March 5 was, to a certain extent, an anomaly in the sense that I think China has

had a fairly decent track record in terms of launches. It's an important launcher from the perspective of having a heavy lift launcher, but I think it's a piece of a much bigger puzzle, that is, these few different initiatives and then the space program more generally.

John Gilroy: We have a lot of listeners of this podcast, and many of them are non-Chinese companies. So they're listening and they're scratching their head, going, "Hmm, how can they capitalize on all this expansion in the Chinese space industry?" I know there are limitations and restrictions, but are there opportunities for non-Chinese companies to jump in this market?

Blaine Curcio: There most certainly are, yes, and I have a few anecdotes that I will entertain your listeners with. I assume a lot of your listeners have heard of the company SSTL, Surrey Satellite Technology over in the UK. It's a small and medium-sized satellite manufacturer. SSTL has a very long and successful relationship in China. They have sold four Earth observation satellites for a total of around 200 million U.S. dollars to a Beijing-based company called 21st Century Aerospace Technologies. This relationship goes back to 2005.

It's interesting because the way that this works is SSTL, they own the satellites, they have access to all the technology. 21st Century Aerospace Technology does not. But, 21st Century Aerospace Technology gives access to all of the Earth observation data produced by these satellites. So basically, SSTL has found a very interesting workaround here in terms of not violating ITAR, obviously, not violating any other export restrictions, but having a very strong business of, again, $200 million worth of satellites being exported to China over the last 10 years.

It's interesting, I was at a conference at Harbin in Northeast China earlier this year, and the keynote speaker was Sir Martin Sweeting, the founder of SSTL, and he was very well received. He's a hero in China. It was a really interesting ... During a short break in the conference, there was a guy who ... I was sitting next to Sir Martin, I guess you could call him, and a guy came up to Sir Martin with a handwritten note from somebody back in the audience, and I kind of, without really eavesdropping too much, I had a peek at a note and it was like, "Dear Sir Martin, you're such an inspiration to me and I've been following your work for such a long time." SSTL I think is a really good example of a company that's done really well in China.

Another example that I would point to would be some of the launch companies in China have made deals already with non-Chinese companies for launch services. There's a company called GomSpace based in Denmark that recently had an agreement with a Chinese launch company called LandSpace, and that's sort of for launch services. GomSpace, I guess, is getting access to more flexible or cheaper launch services from that perspective.

There are also a number of European companies that sell components for satellites to Chinese companies. There's a company based in the Netherlands called HEAD Aerospace. Actually, it's a Beijing company but they have a very strong presence in the Netherlands, and they have a deep network of European component manufacturers that they then sell these satellite components back into China. So a lot of component manufacturers do quite well from that perspective.

We've also seen, there's an Australian British Israeli company called Sky and Space Global that recently signed a fairly nebulous, but it's a pretty legitimate memorandum of understanding an MOU with a Chinese smallsat company called Comsat, with Sky and Space Global offered to help them develop smallsat technology. There's kind of an implication that Comsat will try to help Sky and Space Global to access the Chinese market. It's definitely a tricky market. There are a lot of restrictions, especially if you're a U.S. company, you may be out of luck. It's going to be a pretty uphill battle, but there's a big world of non-U.S. companies that may find a pretty good market in China. Again, there have been a few examples of that, even dating as far back as 2005 with SSTL.

John Gilroy: We are coming up against the end of the interview. I'm going to ask one more question, and then I'm going to close it out. This is the 500-pound elephant in the room here. Weaponization of space. The DoD down the street here, they're looking at smallsats as defensive measures, and there's GPS communication satellites out there. I mean, is it a foregone conclusion that space will be weaponized? And what are the implications for the United States, China, and Russia, the big three? You're right in the middle of it there.

Blaine Curcio: Yes. I think it's likely that space will continue to be weaponized to the extent that, again, I think space is still quite ... I don't even know if we're at the Wild West stage yet for space in terms of having tons of smallsats and having lots of new launchers coming into the market and having to worry about lots of coordination issues and all of this. So I think that we're not yet at the very, very high growth phase of the space industry just from a more general perspective. And I think that governments understand that.

I think that when we look at, I guess, weaponization of space in a general context, China has already ... Last year they launched what's called a quantum communication satellite which allows them to have, theoretically, I think it's unhackable communications between any two places underneath the satellite. It was really the world's first quantum communication satellite. It cost them over a billion U.S. dollars to put together and then launch this thing.

I think that moving forward, I think we're going to see ... The Chinese are going to probably send astronauts to the moon sometime in the 2020s, and they have ambitions beyond that. I think that really space is going to become a much more

significant stage more generally, and as a result of the extent to which the government still controls the big parts of the space industry in China, I think they're going to try to, I don't know if weaponize is necessarily the word that I would choose, but they're going to basically try to colonize or exploit space to the extend that they can.

From the side of the U.S., NASA is still certainly a very formidable agency, but in the U.S. we're starting to see ... I would be interested in, say, 2025 or 2030 to see who has a better space program, Jeff Bezos or NASA, because it seems like the billionaires in the U.S. are really starting to take the lead in terms of innovation, in terms of investment, and it's going to be interesting to see what are the big players that are trying to exploit the economic opportunities that can be found in space and take the lead there. I think we're at the precipice of a very interesting time from that perspective.

John Gilroy: Unfortunately, Blaine, we are running out of time. This has been a fascinating discussion, not only about the rapid rise of the Chinese space industry, but also for its technical, economic, and defense implications for the future. I'd like to thank our guest here, Blaine Curcio. He's the founder of Orbital Gateway Consulting.