



Episode 140 – Satellite Networks, Mobile Network Operators and Cell Service from Space

Speaker: Chris Quilty, Partner, Quilty Analytics – 26 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name's John Gilroy and I'll be your moderator. Today we welcome Chris Quilty, Partner in Quilty Analytics. Cooperation between the private sector and the government has expanded in recent years, especially in the areas such as satellite launch, Earth observation and RF monitoring. But recent announcements about direct satellite to cell phone connectivity looks to put that cooperation into high gear. To discuss the broader financial, technical and regulatory implications of direct satellite to cell phone connectivity, we are joined by Chris Quilty, partner in Quilty Analytics an integrated strategic and financial services boutique focused on the satellite and space industry. This is Chris's second visit to Constellations. Welcome back Chris.

Chris Quilty: Thanks for having me.

John Gilroy: Chris, how long did it take you to recover from the first interview we had?

Chris Quilty: I am still recovering, but I'm ready to give it another try.

John Gilroy: Well Chris, SpaceX, T-Mobile, Globalstar, Apple, Iridium along with startups AST Space Mobile and Lynk Global have all announced plans to develop constellations that connect directly to unmodified cell phones. Could this be a game changer for both industries?

Chris Quilty: Well, yeah, I think it actually could be. One of the curses of the space industry is that it has always been a low volume industry. If you look at traditional SATCOM deals, winning a couple hundred gas stations with a VSAT solution was considered a press releasable event. These are good satellite implementations, but they're just not scalable. And that's been one of the big challenges even if you look at exciting markets like in-flight connectivity, maybe it's going to add a billion dollars of revenue in the next five or 10 years.

When you look at where could the industry scale to the types of volumes and units, the consumer broadband was one of the markets that the industry thought. Didn't happen in the first go around with Viasat and SpaceX, but you're seeing certainly SpaceX make a run at it with a consumer model. But this is an area in the direct to device that is by its very nature a scale business. So if the

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industry can figure a way to tap into the billions of handset users out there that have smartphones in their hands and make even a little bit of money off those customers, it's big news for the space industry.

John Gilroy:

That low volume phrase really resonates with me. I had a friend who worked in the technical area for British Petroleum, and when they would get some, it was a big deal. Friday night having a happy hour to have a bunch of gas stations connected, and it really has changed drastically over the years. It's grown so much, even the last few years since we've been doing this podcast. So, the inclusion of satellite in a 3GPP scope, which I guess is the defining standard for 5G, has been touted as the primary catalyst for this market. So explain to our listeners what all this means.

Chris Quilty:

Well, I think from a big picture perspective, what you have to understand is that the space industry is a forest of stovepipes. In other words, yes, there are standards that exist like the DVB-S2 or S2X standards that a lot of the VSAT modem providers use, but the reality is you just can't take a network from one provider and easily connect it together with another hardware provider because there's just so many unique and proprietary extensions and capabilities that have been layered on these standards. So this has been another reason the space industry has had challenges growing is because customers are locked into these vendor relationships. One of the things that these new 3GPP standards hold out as a promise is the ability to see much more standardization in the industry. Standardization as we know it's good and it's bad.

If you have a nice little proprietary monopoly, it may not last forever. But on the flip side, there's two good things about the move to the standard. One is it gives the satellite and industry, again, a way to tap into the much larger trillion-dollar telecom industry, whether it's through cellular back haul or low latency transport over a LEO network. The fact that the standards exist now, give reason for the MNOs and other telecoms to actually give a crap about space and how they're going to integrate space into their environment. The other thing that it will almost inevitably do is if you are trying to stay 3GPP compliant and you want to play with the big boys, what it means is it's going to really diminish the ability of companies to add those proprietary hooks to remain their own little stovepipes. So, I think what we're going to see happen over the course of the next five or 10 years is lots of stove pipes coming down.

John Gilroy:

Well, I'm glad you brought up the topic of MNO. I think that's a mobile network operator. So do I find a whiteboard here and make a couple big circles and I'd say, there's one business model using a mobile network operator, MNO, existing spectrum like Starlink or T-Mobile or something spectrum assigned to a mobile satellite services. Are these the approaches and there are positives and negatives to each one of these approaches?

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Chris Quilty:

So, a good place to start with this direct to device market is to understand we're talking about spectrum. Now look, if you want to build an imaging satellite just about anybody can acquire a camera mounted into a bus, and yeah, you can get a NOAA license and boom, you're in the satellite imagery business. Direct to device or anything in communications is different because the discussion starts and ends with spectrum. If you're talking about something other than spectrum, if you're talking about the bus design or how many satellites, you're talking about the wrong thing.

Now, to your point, there are two very discrete approaches that companies are taking with the spectrum. In the one camp, the high-profile announcements by companies like AST Space Mobile, Lynk. And I forgot SpaceX and T-Mobile. These efforts are saying, "Well, look, hey, we as the satellite operator. Yeah. We really don't own any spectrum, but we don't need it because we're just going to use the existing terrestrial MNOs spectrum." That's great. Somebody owns spectrum. That spectrum is already incorporated into the handset. There's not much to do here except for the fact that that spectrum was never intended to be transmitted from space. So this is the fundamental challenges companies like SpaceX, T-Mobile, AT&T, AST, need to convince the regulators, that being the FCC, that it's okay to transmit this stuff from space in a coordinated fashion that isn't going to cause interference.

Chris Quilty:

That is a technical as well as a regulatory issue that these companies have to deal with. So that's one approach. And the great part about that approach is for somebody like AST or Link or SpaceX, they don't have to have Spectrum. It's somebody else's spectrum. And the second thing is the device needs no modification. The device is the device is the device. Now the problem is you got to somehow figure out how to connect to it from space. Now, let's flip over. There's another camp, which is the traditional MSS companies, a term that's fallen out of favor in the industry in years. But the mobile satellite services, these were spectrum bands that were freed up in the 1990s and grabbed by companies like Globalstar and Iridium, which own chunks of the S and L band spectrum respectively. They have deployed MSS services, again as defined by those 1990 auctions, and they've got deployments in hundreds of countries around the world.

Chris Quilty:

Now that's great because it means they don't need an FCC approval to do it anything, right? They're already approved to transmit in these spectrums. The problem is that those spectrums are not intrinsic to the smartphones that are deployed. Your Google and your Android and Apple iPhones, they don't have an iridium compatible chip or a Globalstar compatible chip. They don't have antennas that have been modified to work with the satellites. So therein, the challenge is how do you get this hardware upgrade forklift done to the mobile market? And I think what we've seen with certainly Apple is they're starting to do that in the background working with Qualcomm on the chip side and perhaps Apple itself and in their Foxconn factories doing some modifications to antennas

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to improve. So there's advantages to disadvantages of both models, and I think there's probably room for success for both models.

John Gilroy: Chris, when I read about companies like Lynk, the word that pops up is coverage in remote areas, and that's great. Rural Canada, rural Africa, that's great. But with my little bit of business knowledge, I don't know if they can be very profitable. So I'm asking you to put on your CFO hat, dig it out of the dust there and put on your chief financial officer hat. So how do both parties make money? Where's the money in either of these perspectives?

Chris Quilty: Yeah, so today, companies in the satellite industry do provide cellular back haul solutions and do it profitably. And these are in countries where the monthly ARPU is \$3 a month, not as attractive as what I'm paying on my cell bill, right?

Chris Quilty: But the point is, you can drive a stake in a ground, put a VSAT antenna and a modem, buy capacity, distribute to a local village or city and do it profitably using today's existing satellite system. Now, these systems that are being built by SpaceX and AST and others are purpose built systems for this type of connectivity. And presumably the operators there have looked at the capital costs of their LEO constellations and the size of the market and feel like they can hit those price points. Now, let's flip it around. You're an MNO and you've got universal service obligation requirements to deploy to these rural locations.

And what we've seen is satellite enabled cellular back haul has been a big growth market in the last five to 10 years. In part because the cost of bandwidth has come down so much with high throughput satellites, and it is way cheaper for Vodafone to just do a 50/50 revenue share and deploy no capital to reach these USO individuals working with an AST than it is for them to build out a string of microwave towers to try to reach these remote locations. So the point I'm making is it can be a win-win for both the MNO, this is a cheaper way to reach people and for the satellite operator, which has access to a very large install base of customers.

John Gilroy: So I guess this satellites device, it won't cannibalize current back haul revenues then. That's the way you presented, it shouldn't be a problem.

Chris Quilty: Well, so I think there's schools of thoughts here. If you can just talk remotely on your iPhone anywhere, do you need an Iridium satellite phone? And the answer is, yeah, probably. We're talking about different people. The folks who use those satellite phones need something that has a long battery life. Maybe the fact that it's IP 54 related and can work in certain weather conditions or a ruggedized device. I think it's really a different market when you look at the dedicated satellite phone user. Those devices also have things like push to talk capability that are unique. Now, is this bad news? If you are a satellite operator and you're selling tons of capacity to cellular back haul sites, could the fact that people now

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can just connect directly with their phone take away from that opportunity? I think that is a possibility. But again, it'll depend on the price point of those two solutions and there may be room for both to survive and prosper on a go forward basis.

John Gilroy: Well, Chris, we're going to have to lighten up the discussion here. This is a part of the podcast where I quote a luminary in the satellite and space community, and you tell me who said this phrase. Are you ready for this one? Here is the phrase. Disruption everywhere. Who is luminary who said that?

Chris Quilty: I think that was me.

John Gilroy: That was you. Exactly. It was, "Whoa." Here's a guy who's an analyst, been in the industry for decades, and he says, "I'm on an edge, stop the world. I want to get off." There's so much change. This is hard to keep up with all these different options, isn't it?

Chris Quilty: It is. It's the reason I haven't read a book in too long.

John Gilroy: Well, we have to assign some for you before the next interview, and that's for sure. So let's bring up a company you mentioned earlier, VSAT. So what about VSAT? As a focus to satellite to device services are focused on coverage rather than throughput, do these services pose a threat to the VSAT services then?

Chris Quilty: No, I think again, like our prior discussion about does direct to device present a direct risk to things like satellite phones? Again, I think direct to device is offering something different. It's a narrow band connectivity capability, whereas VSAT services often you would think of these as being on an oil rig or supporting remote mining. These tend to be very high bandwidth deployment. They probably have an SLA or a service level agreement, and they're very high capacity streaming video. So a little bit of a different market. And again, I think there is ongoing good growth in that traditional VSAT market.

John Gilroy: What we have to talk about bumping into each other and issues here, there have been documented spectrum issues between satellite operators and cell phone operators. So will the merging of these services compound the issues or ameliorate them or what's going to happen with this merger?

Chris Quilty: Well, yes and no. I think everyone is looking out for themselves in these very unique situations. So over the past several years, they've been ongoing debates about Ligado and its impact on either GPS devices or Iridium. And I think the players in that market, regardless of 3GPP or any other factors, they're going to continue to duke out that battle on its merits and on the business impact that those companies are facing. More broadly, when we look at the direct to device market, it is interesting. At first it was largely AST and the MNOs. They had

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teamed with fighting against everyone else. And there's a little bit of a unique situation here.

AT&T had signed an exclusive with AST in the United States, and that meant that potentially Verizon and T-Mobile were on the outside looking in. Well, now that T-Mobile has come up with its own direct to device solution with SpaceX, now it's Verizon on the outside looking in and arguing why this should not be done. But increasingly you're seeing a lot more carriers and MNOs that are saying, "Hey, I'm along for the ride on this." And that tends to tip the balance of the regulators. If the preponderance of MNOs are saying, "Hey, this is a good thing and we want to use this service," you're much more likely to get a favorable outcome from the FCC and other regulators.

John Gilroy:

So Chris, put your chief financial officer hat back on, a little baseball hat in the corner there. So, estimates of the satellite direct to cellphone market potential range up to 60 billion dollars in 10-year cumulative revenues. Do these projections take into account initially direct satellite to device services or only deliver slow data rates, enable simple text messages and calls. So it's really slow at the beginning, isn't it?

Chris Quilty:

Yeah, it is. Look, these are really big numbers. As I started the discussion earlier on, these are not numbers that satellite operators normally deal with in the billions of potential users. So look, I've had fundamental disagreements with analysts, investors around how big this market potential should be or could be. I personally know that I travel, my wife was actually out with her family, her brothers and sisters in the Grand Canyon last week, and I couldn't track her. I couldn't contact her for pretty much the entire day while they were out in the parks. That is a real phenomenon. Now the question is what's it worth? If my wife could have clicked a box on her bill and said, "Hey, for the next 30 days I want this service and it'll cost me 15 bucks a month," she wouldn't have thought twice about paying that extra 15 bucks to have the connectivity.

Again, there are folks that I talk with that bring up the point that you made earlier, that in a lot of the countries in the world where there is no connectivity, you're going to be the first line of connectivity. These are really low GDP countries and low per capita income, and can that possibly be an attractive market? And I don't know. What I've seen in years past are our junk iPhones that I just throw out, they get bought for \$3 or \$5 dollars in the developed world and people figure out how to scabble together a buck or two a month to pay for this.

And the incremental cost to the carrier and to the satellite operator of adding these new subscribers is zero. So my sense is, I think when we ran the numbers on AST, and just given the fact that currently their MNO partners currently have a billion eight subscribers. Those are subscribers. Those are not unconnected people within their service area. That's just the subscribers. If you could get a

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couple percent of those people to pay a dollar or two a month, you get the billions of dollars of revenue a year.

John Gilroy: Yeah. When we talk about billions, I think of consumers, billions and billions of hamburgers and billions and billions of this and all kinds of things. And generally speaking with that marketing community, they have to manage customer expectations. And I think that's going to happen with a lot of the electric automobiles I see around have to manage expectations there. So, these cellphone users we're talking about here, they're accustomed to broadband speeds, video and streaming, none of which will be available for a couple years here. So is there a risk that users might expect more than a service can initially deliver and start complaining and moaning millions of complaints?

Chris Quilty: Yeah, I think you're right there. It is important to set expectations. And look, there's precedent for this. It was before my time, but you read the stories about Iridium and their service launch, and at least from the stories that I read, it sounds like Motorola did not properly condition people that their satellite phone wouldn't work inside. There was a lot of misperception around the product's features. And so look, I think this is a great service. I can't wait until it's available where just with my phone I can connect everywhere.

But that you have to communicate to people that you're not going to be able to stream Netflix. You shouldn't expect to being able to do basic connectivity, hopefully something better than what Apple and Globalstar laid out as a service. That is the absolute bare minimum. I don't think SpaceX or AST need to get to 5G speeds for this to be a successful product. Basic texting, the ability to do a phone call. If I can't do streaming video, well, look, we're all conditioned that these things don't work as advertised.

John Gilroy: Yeah. Well right now the World Series is going on in Las Vegas and everywhere they're talking about the winners and losers and people are betting on horses and Bryce Harper and who's going to do what in the World Series. So let's look at winners and losers in this discussion we're having right now. If we look at the satellite to phone service, it's going to enable satellite operators to reach millions of new subscribers, and the cost will be lowered by eliminating the need for receiving equipment. So are the satellite operators going to be the big winners in this current World Series?

Chris Quilty: Well, certainly an operator, whether it's a SpaceX or an AST or a Lynk or whoever, could be Globalstar, could be Iridium, that finds what is really an entirely new revenue source. This market does not exist today. If you can tap into that and it turns out to be an exceptionally large, incremental, new opportunity, then yeah, there is a pot of gold to be had here. But to your point, we don't know which of these services are going to be successful. There may be some that don't work or don't work well, and we don't know what the adoption rates will look like. I feel somewhat optimistic that as described, you do nothing

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to your phone, a message pops up and says, "Hey, will you pay five bucks for your phone to work off the grid today?" I tend to think people will use that service and I think it'll be successful.

John Gilroy: You just said that a lot of these markets don't exist today. So we know the market's in its infancy and we got to look at three things. We have to look at technical, regulatory, and financial challenges ahead. So which of those do you see as the biggest hurdle that they have to overcome?

Chris Quilty: Oh my God, they're all hurdles and none of them we're dismissing out of hand. The financial one is, let's say, more challenging just given the market environment with equities down for the year, with venture capital fundraising down for the year, with private equity market activity slowing. But for good ideas, good ideas get funded. So I'll say that's maybe the one that I think is most able to be overcome here in the next six to 12 months.

The regulatory stuff is binary, and I hate to say it, but there is always some element of politics that can overrule the sensible. I tend to think, again, because of the compelling nature of these services, I think the regulators will play nice because they want to see more people connected. Doesn't absolve them of the responsibility of making sure that these services don't cause massive interference. But I think the regulatory issues are again, probably solvable here within the next year.

John Gilroy: Oh, that's pretty optimistic. Chris, I think you've given our listeners a real good reality check on some of this newer technologies that we talked about. I'd like to thank our guest, Chris Quilty, partner in Quilty Analytics. Thank you, Chris.

Chris Quilty: Well thanks I had fun again and I'll get over my anxiety much quicker after this one.