Constellations Podcast

Episode 144 – Satellites integrated with Telcos, 5G and a Converging World

Speaker: Yesmean Luk, Senior Consultant, STL Partners – 24 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy, and I will be your moderator. Today, we welcome Yesmean Luk, Senior Consultant at STL Partners. Now most listeners have heard about 5G and know something about it. I think we all know that 5G is the fifth-generation technology standard for broadband cellular networks. 5G networks are predicted to have more than 1.2 billion connections and cover one-third of the world's population just a couple years in 2025. The impact on the mobile industry and its customers will be profound, especially with the recent inclusion of satellites into the standard. This offers new opportunities for satellites to integrate with terrestrial networks to manage connectivity to cars, ships, planes, and other IoT devices in remote and rural areas.

Will this satellite and telco industry convergence be a revolution or an evolution? To share some research and interest in this question we have with us today Yesmean Luk, Senior Consultant at STL Partners. She has led and managed client projects with both operators and technology companies and across a number of domains, including private networks, telco cloud, network slicing, edge computing, and IoT. Yesmean, we're going to jump right in here. Do you see 5G and the convergence of satellite and telecom networks as a revolution or evolution? Tell us the truth.

Yesmean Luk: Well, the way I think about it is I see it very much as an evolution. Reason being is that collaborations between the satellite world or the non-terrestrial networks and terrestrial networks aren't new. They've existed for a long time now and they will continue to exist.

What I think really is the fact that 3GPP standards have highlighted the role of non-terrestrial networks in 5G, and that's probably brought about the role of satellite networks to a bit more of the forefront, if you will. But again, that relationship has always been there. It will continue to be there. Again, very much an evolution for me.

John Gilroy: Now here in America, it's the end of the year here. You can't just get away from this Elon Musk guy. He seems to be everywhere. Maybe he's outside my house right now. He's everywhere. What role do you see high profile, new entrants such as SpaceX and Amazon playing in this communication ecosystem?

Yesmean Luk: I would say it is almost about a threefold. One is around visibility. As you mentioned, what we've seen is that the likes of SpaceX and Amazon with Project Kuiper have really brought a lot more visibility and attention to the satellite industry which has been, I think, good in many ways.

Two, I would see it as well as partnerships, opportunity to partnerships. We've already seen a number of announcements with SpaceX launching satellites on behalf of OneWeb and Intelsat and Eutelsat, and so on and so forth. But I think the third one, which is more important, it's the sense of competition, but also the opportunity for greater innovation.

I mean, just not too long ago we saw Amazon using AWS on a satellite in orbit and leveraging that data analytics and being able to address a bottleneck that has always been there in terms of being able to have that data storage and that compute and communications.

I think I'm excited about the opportunity that enables fundamentally, even just from a satellite operator perspective and being able to have access to more real-time insight and not having to wait for that data to be processed very far away and then sent all the way back.

John Gilroy: I have friends who are software developers, and that's really what you described was really an agile, flexible approach. It's like, okay, we're going to flex what and do this. It's not on the whiteboard. We'll just figure this out. It's making it up as you go. It's really the mark, I think, of a lot of flexible software development. New technology advancements such as LEO constellations and software-defined payloads. They've made satellites more interesting to the telecom industry. So, why?

Yesmean Luk: Well, maybe I'll start with the software-defined payloads, or even this concept of software-defined satellites. If we think about some of the traditional, I would say, GEO satellites, they have, let's say, specific purposes or missions. Really once they're in orbit, it was always traditionally quite challenging to change or to be able to configure certain elements. That's an issue if we think about with GEO satellites. Their lifetime, they're up in orbit for what, 10, 15, 20 years? A lot can change within that period. If you think about the purpose of their missions, that's not going to stay consistent for that duration of the lifetime. What I think, let's say that advancement to more software-defined networking or software-defined satellites means that you are effectively disaggregating that hardware from the software.

Yesmean Luk: You're moving to be, obviously as we mentioned, being more software-defined, and you're essentially enabling more of the intelligence to be in that software. Which means you're enabling satellites to be more programmable. If we think about software-defined payload side of things, it means that you can move to a

more dynamic means of reconfiguring the antenna beam based on where you need that. I think what that means is it makes it more interesting because you start to think about some of the challenges in the past in terms of how, let's say non-terrestrial networks have collaborated or worked with terrestrial networks. One thing that's been a challenge is that ease of collaboration, if you will. Even, for example, that lack of interoperability between some of the vertically integrated stacks that have been deployed with, let's say that traditional hardware that's tied to the software.

In the past, we've heard this from multiple players in the satellite industry, that that's really been a barrier to unlocking that revenue growth. That's where the work on standards has been important. Proprietary technologies preventing that end-to-end orchestration as well. Being able to move away from this notion of, let's say terrestrial operators seeing the satellite industry or satellite networks as a bit of a black box. If you are able to open that up, become more modular, become more programmable, more disaggregated, I think that has certain implications on even just that service continuity, which is important for the end customer. Thinking about how you integrate non-terrestrial networks with terrestrial networks, so on and so forth.

John Gilroy: Everyone gets locked in a box. They have certain proprietary considerations, they want to stay on that, but telcos do too. But telco's looking at all this innovation, I wonder if their prejudice is changing. Telcos have historically viewed satellites as a transport of last resort. So, why's that been?

Yesmean Luk: Yeah, and it even comes down to, I would say sometimes there's some sort of this thinking that it's almost what share of the pie that you get really, and that's what we've seen for many years. Even from a discussion point of view, we were speaking to a satellite operator just the other day, and they were saying, "Well, traditionally cellular and satellites have never really been in that same discussion." He even mentioned the fact that, in many cases, they speak different languages. Some of the terminology in the satellite world is quite foreign to the mobile network operators and vice versa, and that's challenging, and that's almost a deterrent in a way to that collaboration. But what I think that we've found as well is the way that operators or mobile network operators are thinking about things at the moment is, and going back to this idea of coordination age, it's really thinking about, "Well, what are all the tools in your arsenal that enable you to address certain enterprise or consumer requirements or pain points or outcomes that enable them to do what they do or what they want to do better?"

Yesmean Luk: I think a lot of the discussion at the moment, particularly with the 3GPP standards with Release 17 for example, in bringing or bridging that gap between the non-terrestrial world and the terrestrial world has really changed it more to a discussion of, okay, well how do we together expand the pie? How do we both, as different worlds if you will, collectively work together, be able to

address new types of use cases almost, and be able to figure out, okay, well, rather than us doing it ourselves, how do we really move towards much more of a greater sort of ecosystem centric world, and where terrestrial operators and non-terrestrial operators and a host of different companies as well work together to enable certain outcomes?

John Gilroy: We have listeners all over the place. Many of our listeners are satellite service providers to keep up with what's new in the technology, so let's just speak to them. What recommendations would you make to satellite service providers to enable them to work more seamlessly with telcos to take full advantage of this 5G opportunity?

Yesmean Luk: I think it's a few things. What we found is that in many cases there is this reputation, obviously as trusted providers of backhaul connectivity, providing connectivity to underserved areas, hard to reach areas. I think in many ways as well, this has historically been a challenging area for telcos to address. We've seen increasingly as well, there are opportunities around private cellular networks in being able to reach or connect mines and ports and certain oil and gas rigs and fields.

I think that's often an example of figuring out where and how satellite operators can use that reputation as a starting point to refine and expand that proposition and the value add, if you will, as 5G standards develop. There is also this notion of, let's say global supply chain or supply chains becoming a lot more globalized, being able to provide that end-to-end visibility from across the entire lifecycle.

Yesmean Luk: For example, if a car is manufactured in Country X, that doesn't necessarily mean it's going to stay there. But for different parties within that value chain, they want to have that visibility and that's where, let's say traditional MNOs have had challenges because they're restricted to certain national boundaries. Is there something that satellite operators can enable and use an effective rhetoric to be able to engage telcos and figure out, okay, well how can terrestrial operators see the satellite industry or satellite networks as a tool in the box that they can use? And being able to align that value to the pain points that a lot of the traditional MNOs are trying to address today.

John Gilroy: Yeah, and the satellite service pros have to get out of their box too. Maybe one area they can get out of their box is looking at new applications. It's my guess that new applications will enable 5G for satellite service. There's got to be a connection there, isn't there?

Yesmean Luk: Yeah, absolutely, absolutely. I know there's been a lot of work done, particularly on the V2X space, and that will only continue really. We know that there is, again, there are certain industries that require that end-to-end visibility as well,

and we'll only see that continue. There is also this, again, we know satellite backhaul is that's going to continue, that's not going to go away.

But again, I think it is this sense that there are use cases where the satellite can help mobile and then mobile can enable the satellite industry to create this seamless combination, if you will. It's not necessarily that it's one or the other. Sometimes we found in certain discussions that sometimes they see it as alternatives, but really in our point of view, we see them as complementary almost.

If we think about, let's say industries such as agriculture or utilities, especially through, or as we mentioned as well, mines or ports where you do have mission critical applications and sometimes it may not necessarily make sense for, let's say traditional MNOs to build out that infrastructure to reach those.

Or, you might find that when you're moving or certain assets or things or vehicles for example, are moving from more urban areas to more rural areas, how can you maintain that ubiquity and coverage, if you will. Ubiquity in that service that you're providing to the end customer

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Now Yesmean, I'm taking notes as you're speaking. I'm trying to summarize this first 15 minutes and I write down this word "collaboration." It's like get your head out of the sand. It's collaboration, collaboration. This is the new way things are being done and you can't get locked in your old ways. Let's talk about market opportunities with all this collaboration. What kind of market opportunities do you think will spur collaborations between telecom service providers and satellite operators?

Yesmean Luk: Well, it's interesting because I think we've been seeing a number of different developments as well. Obviously, there's a big focus on just rolling out 5G and I think a lot of... And naturally so. Understandably, there is a lot of emphasis on standards and that rollout and so on and so forth. But I think sometimes when you think about, from the traditional MNO point of view, there are all these sorts of priorities, all sorts of different things that you have that you're juggling.

Perhaps in many cases, that integration with non-terrestrial networks may not be necessarily top of mind. But what is sometimes is, or not necessarily having to wait for 5G, is private networks. We know that is an incredibly hot topic and

area for not just traditional MNOs, but new emerging players across the entire ecosystem in deploying dedicated on-premise private networks for a host of different enterprise customers.

John Gilroy: Yeah. Yeah, you're right. If it's cheaper, why not do it? That's what they're saying, isn't it?

Yesmean Luk: Exactly, and also yeah, if it makes economic sense, because if you're building out to an underground mine, it's super expensive to build out. It's not feasible, the Wi-Fi is going to be problematic. But at the same time, I think it's also the sense that you have mission critical applications, you have things that need to be connected. You can't afford to have network interruptions, and I think that's where, let's say, not too long ago or earlier this year, we saw a partnership between Intelsat and Microsoft on private networks.

I think there are really interesting opportunities there in figuring out, okay, well, how do traditional MNOs and satellite operators and that wider vendor ecosystem, or even some of these specialist players that have emerged as well, how can they work together to enable this private network's opportunity? Which is, it's going to be significant and there is a need now. Customers have that pain point today. It doesn't have to wait for 5G, for example.

John Gilroy: Yesmean, I want to bounce back to satellite operators. It seems to me that the satellite operators today have a very small share of the overall telecom market. If they want to start to work more synergistically, to use a fancy word, with telcos, how much more market share could they capture you think?

Yesmean Luk: Ooh, that is a tricky one and I would say, I mean I wouldn't want to answer it in terms of, well, is this something that they can get a larger slice of the pie of? Because as we talked about earlier, it is important to think of this as how do we address new opportunities that expand the pie?

I would say, historically it's always been, let's say about a relatively small percentage of that market. But again, I think that requires, or that's inherently assumed under the fact that it's one or the other. I would say, there are different opportunities that we've seen. Again, whether it's around connected car or V2X, or whether it's around, as we mentioned as well, this global supply chain processing logistics as well, value chain.

It's hard to say what that market share exactly is in numerical terms, but there are a number of different opportunities that are significant potentially, as we mentioned, potentially in the billions. We've done a lot of work in forecasting what the new opportunities would be and we've gotten to that level of magnitude. But again, I think dependent on the ability to address those opportunities,

John Gilroy: A lot of our listeners keep up with the news. I'm sure you do, and if you just even casually see what's going on, there've been a number of partnerships and collaborations announced between satellite and telecom players. Do you see other announcements in strategic areas coming up down the horizon?

Yesmean Luk: Yeah, we do. I think more and more there will be more and more announcements particularly, I would say, with the satellite operators and other, I guess players that have been very active in the terrestrial world, if you will. I mentioned as well earlier between, let's say Intelsat and Microsoft. We are seeing other announcements as well in being able to, whether it's around edge computing, for example, in satellite operators working with edge.

Whether it's platform providers or solution providers to bring certain services as well to their customers. Or whether it's around SD-WAN and bringing, again, a host of different connectivity services to their enterprise customers. I think what we will find is as things mature a little bit more around some of these up and coming 5G use cases, we will see as they start to conduct more pilots and trials and proof of concepts, especially with Release 17 as well, some of those that the integration being a little bit more clear, a little bit more clarity on how this will work with practice?

We know with Release 18, that'll only improve in terms of, again, I think it's VMR, vehicle mounted relay with connected via satellite or different types of services there to ensure that service continuity. Not just from terrestrial networks to non-terrestrial networks, but the other way around, from non-terrestrial networks to terrestrial networks.

I think we will see more and more of that collaboration there come in. I think as well, the interesting thing that we've seen too is also consolidation within the non-terrestrial world. Again, it will be interesting to see how that plays out?

John Gilroy: Final question is a five by five question and here it comes. How do you see 5G changing the telecommunications landscape in the next five years?

Yesmean Luk: I guess in many ways, part of me thinks that 5G won't be the be all and end all and there is a lot of hype around it and it's understandable. But I think what we're seeing is, and this is enabled in many ways with 5G, 5G being cloud native by design, the advent of edge computing as well. Some of these standards as we mentioned multiple times in terms of the role of non-terrestrial networks and 5G. It's really the sense that the relationship between, whether it's enterprise or consumer applications and the network piece, particularly around the hype around 5G and interest around 5G, is changing. I think what that means is there will be more interest in applications interfacing with the networks they run over, whether that be terrestrial networks, non-terrestrial networks, Wi-Fi fixed, so on and so forth.

Yesmean Luk: I think that really is an opportunity for the entire telecoms industry, and by that I also mean the satellite industry too, to be able to work together to figure out how they can enable more of that visibility and more of that ubiquity across different types of networks. Stitching together a very heterogeneous environment to make it easier fundamentally for the customer. Whether that customer is an enterprise or a consumer, or whether the customer is a developer. I think that will be really important. Excited to see as well, more as we mentioned, I know we keep going back to that, collaborations with multiple different players. Not just within the terrestrial world, within the non-terrestrial world too, to figure out how they can truly work together in an open ecosystem to deliver some of those outcomes?

John Gilroy: Yeah, it's a converged world out there now. I think, Yesmean you've actually given our listeners an ability to think about making a transformation from the Information Age to the Coordination Age, huh?

Yesmean Luk: Yeah.

John Gilroy: I'd like to thank our guest, Yesmean Luk, Senior Consultant, STL Partners.