Constellations Podcast

Episode 204 – Mega-Constellations, Gaining Competitive Advantage and Software-Ground

Speaker: Lluc Palerm, Research Director, Space and Satellite, Analysys Mason – 16 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy, and I'll be your moderator. The satellite industry has experienced massive disruption with the emergence of mega-constellations such as Starlink. How do traditional satellite operators and service providers compete effectively in this new environment? Here to provide some answers to this question is Lluc Palerm, Research Director for Analysys Mason. He is going to share some insights from a recently published white paper on this topic entitled Meeting the Challenge of Starlink and the Mega-Constellations with Software Ground. For interested listeners, a complimentary copy of the white paper can be downloaded at sat.com/softground, or go to the show notes at Constellations podcast. Lluc, with the emergence of Starlink and other mega-constellations, what impact has that had on the satellite industry?

Lluc Palerm: Hi, John. Hi, everyone. Good to be here. Yeah. That's an excellent question. Obviously, it's undeniable that Starlink has had a major impact in the satellite and space industry. If we look into the position in some of the verticals they are active now, it's quite dominant, I would say even monopolistic. We look into some verticals like consumer broadband, maritime, they have now more subscribers than the rest of the industry combined. They have had a major impact on the satellite industry for sure. They are very aggressive on pricing. They're launching a lot of capacity. They have a massive capacity to manufacture terminals. Yeah. Generally they have a very powerful position now in many verticals. But I think it's also there are some also some positive notes for the rest of the industry. They showed that it's possible to grow the addressable market. Not all the subscribers that are now part of the Starlink constellation are from cannibalizing traditional players. They also expanded the market, so I think there are some positive notes for the rest of the industry as well here.

John Gilroy: If we look at Starlink, we know it's dominant. We know that. However, if you look at the whole industry in general, what we're seeing is that many satellite operators and service providers are moving towards more virtual and orchestrated ground systems. How can this type of a ground system provide a competitive advantage?

Lluc Palerm: Right. I think that that's one of the key strategies for traditional players to compete with these mega constellation. Going this route, going to virtualize the

ground segment, to orchestrate your ground segment is going to be key in many points of view. First, there is a clear trend now towards multi orbit, towards software-defined satellites. To really take the advantage of all these new architectures, you really need a virtualized ground segment. That's a clear step in this journey. Then virtualizing your ground segment is critical for getting some cost advantages like transitioning your ground segment to the cloud, leveraging all the new advantages in compute power, opening new verticals in connected cars, and all these trend towards telco integration. That's one of the key advantages of moving into a virtual network is that you would be able to seamlessly integrate with the telco ecosystem as well. Obviously when we discuss the integration with telcos, it's going to be critical the adoption of 5G and eventually 6G standards. Virtualizing your ground segment provides a clear path towards adoption of all these critical standards.

John Gilroy: Lluc, software-defined satellites and multi-orbit strategies can offer traditional players a competitive advantage. Why is software-defined ground so important to unleashing these capabilities?

Lluc Palerm: I think it goes with the very definition of these technologies. Software-defined satellite, that means that the satellite will be able to adapt the configuration, adapt the beams, the power, the spectrum to the demand conditions. It's going to continually change and evolve with the demand. Same for multi-orbit constellation. We'll have a terminal that connects to a GEO satellite and the next second connects to LEO satellite because of latency requirements from the user or because of the density of supply for the different constellations. To manage all these dynamism in the networks, all these very rapid changes, you really need a virtualized ground segment and software-based ground segment that can match the pace of change in the network on the space side.

John Gilroy: Yes. This whole pace of change is just so rapid. Software-defined satellites would require something to be software defined in the ground in order to take advantage of all that. I can see that happening as well. Lluc, we talk about mega-constellations. Mega-constellations have used a vertically integrated and proprietary approach to build their systems. Can this approach also be a potential limiting factor when you consider the advantage of open standards?

Lluc Palerm: Yes. Absolutely, and I think we can apply that proverb here that if you want to go fast, go alone. If you want to go far, go together. I think that's very pertinent here. Obviously Starlink is moving superfast, and it's disrupting the satellite ecosystem. But I'm still confident in the opportunities for the traditional players as they adopt the 5G, well, 3GPP standards in general, and they create some scale through adoption of these standard and they unlock new market opportunities through the utilization of these standards. I see some verticals where the end user will be demanding the adoption of these standards. I don't see, for example, on the connected car, I don't see any automotive

manufacturer adopting the satellite connectivity if it's not through a 3GPP based standard.

They are very risk averse and they don't want to fall under the vendor locking effect, so it's very critical for them to jump into these kind of standards. We see the same for other verticals. In flat connectivity, for example, they are now fine using vertically integrated players, but I see a future where they demand the adoption of these standards. Direct-to-device is another key example there, for sure. In the future, all the direct-to-device players will adopt the 3GPP standards, the 5G and the 6G NTN kind of a standard. That makes us think that adopting these open standards is going to be critical in the coming years, and they will definitely play a key role in unlocking new opportunities for the satellite industry.

John Gilroy: Lluc, you and I were both at the Satellite show back in DC, and you and I both heard the phrase 5G a lot. It seemed to be echoing throughout the hallway there. 5G is going to support non-terrestrial networks such as satellite. This offers satellite operators and service providers an opportunity to integrate more seamlessly with the telecom market to compete more effectively. Why is a virtualized ground system critical to enable this big 5G path forward?

Lluc Palerm: Right. Absolutely. I think we can take two point of view here. From a network orchestration point of view, there are many elements of the 5G standard that are, let's say, that require virtualization. 5G core is cloud-based. Some functions of 5G really require virtualization. If you think about network slicing, if you think about flexibility required in the 5G ecosystem, you really need to start thinking about virtualizing your ground segment. Now, there are other elements to consider here. Telcos for sure are going to play a bigger role in the satellite ecosystem in the future, and they want to be able to integrate their network orchestration, their APIs in also with the satellite element. That's going to push also the satellite industry to integrate with the 5G standards and virtualize the ground segment for sure.

John Gilroy: Lluc, during this podcast you have discussed a lot of ways in which satellite operators and service providers can compete more effectively using software-defined ground. In fact, you even referred to something called go far and go fast and everything else. What about just starting instead of going far, going fast? What about just starting? What's your advice on how they should get started down this path?

Lluc Palerm: Right. That's a great question because many times we think a lot about the theoretical application of virtualization, 5G and so on. But, yeah, then where do I get started if I'm a satellite operator? I think the best advice is to start small and start quick. This is something that you need to start thinking now because obviously Starlink is putting a lot of pressure on the different actors in the satellite ecosystem. The pace of innovation of Starlink is superfast. At the end of

the day, you want to match that pace of innovation. You want to start getting involved with all these technologies as quick as possible. Start now. Start small. Think about maybe some key verticals where you're seeing this need for multi-orbit, need for software-defined satellites are going to be higher. I'm thinking for example, in mobility. You have a networking mobility with a lot of aircraft moving between beams with a lot of potential for software-defined satellite for multi-orbit services.

That's exactly where this virtualized ground segment makes a lot of sense. That's where you want to start. Also, you might have some higher requirements for high level of reliability. You also have the advantages of having a bit higher ARPUs, so that allows you to have a bit more margin in terms of how you deploy the networks. Other verticals might be on the military space. In that space, you might want to build networks that are especially resilient. You overlay different networks under the same service, or you might have a GEO with an overlay from another GEO. Different spectrum bands, different network architecture, different orbits. These are the kind of markets that will see the quickest adoptions of virtualized ground segment, so mobility, military. Then once you get some experience in terms of how to deploy these virtualized ground segment, once you have the feedback in terms of the total cost of ownership, obviously what you want to do is scaling these networks, scaling the advantages also to your call services. Not just on these smaller networks, but the call services that you're providing, you want to move them to virtual networks.

John Gilroy: Lluc, we began this conversation talking about mega-constellations. I want to maybe call back and go back to this original discussion. As you look to the future with the growth of even more mega-constellations, how do you see this competition between mega-constellations and traditional satellite operators playing out over the next few years?

Lluc Palerm: Right. I think that's the very key question today for the industry, so how do the traditional players compete with the mega-constellations? I think I'm positive. Obviously there has been a big impact in the short term from Starlink. Kuiper is coming very soon, and we'll probably add more competition to the ecosystem, but then we see the legacy players starting to react. If you think about them, a few years ago, they were very risk-averse. At the satellite show, there were some symptoms of the legacy players starting to take more risk. We saw some investments from SES, Intelsat on D2D for example. We saw more dynamism in how they want to be multi-orbit networks, how they want to engage with this 3GPP ecosystem and be ready to compete with the Starlink. I'm positive in the sense that if they are able to adopt these standards, they will be able to take advantage of all the scale and economies on the ground, on the terrestrial telco ecosystem. That's a way they can accelerate the pace of innovation.

By adopting 5G and 3GPP, you will be able to take advantage of all the progress that is happening on the mainstream telco ecosystem. That's a way that the

traditional satellite industry can accelerate the pace of innovation and start competing with the vertical integrated mega-constellations. Also, again, I think it's going to be key for unlocking some of the new high-growth areas in the satellite industry. Yeah. We see some vertical that offer a lot of growth, D2D, connected cars, mobility in general. Obviously the Starlink has shown how consumer broadband, enterprise, there are still a lot of areas for growth there. Mobility, it's growing very fast as well. I'm positive in the sense that, yes, these mega-constellations are being very aggressive competing with the industry and lowering the cost, launching a lot of supply, putting a lot of pressure on traditional players. But I am positive thinking that there is still an opportunity there with the adoption of 5G, with virtualization, with all the innovations happening in this segment of the market.

John Gilroy: Well, I like a good optimistic ending to this interview. Lluc, you have given our listeners a new flexible approach to software-defined ground and many other aspects of today's satellite communications. I'd like to thank our guest, Lluc Palerm from Analysys Mason. Thank you, Lluc.

Lluc Palerm: Thank you. It's been a pleasure.