



## Episode 200 – Standards, Spectrum and Seamless Connectivity for D2D Services

Speaker: Jacques Leduc, CEO of Terrestar Solutions, Treasurer of MSSA – 27 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy and I'll be your moderator. Direct-to-device satellite connectivity is being touted as a way to bridge terrestrial connectivity gaps, and the inclusion of D2D standards in the 3GPP's 5G NTN standard has solidified the key role that D2D will play in 5G networks. Several non-terrestrial network providers, Yahsat, now Space42, Viasat, TerreStar Solutions, Ligado Networks, and Omnispace recognized this important role last year and joined forces to create the Mobile Satellite Services Association. MSSA's mission is to accelerate the adoption of 5G D2D and 5G IoT technologies over existing satellite networks, aiming to extend 5G coverage worldwide. The association now has 17 members, including major telecommunication suppliers like Ericsson and Qualcomm, and has announced a collaboration with GSMA, the industry body representing mobile network operators. Our guest today is Jacques Leduc, CEO of TerreStar Solutions, one of the founders of the MSSA, and currently acts as the treasurer of the MSSA board. Jacques, welcome.

Jacques Leduc: It's a pleasure to be with you today.

John Gilroy: Great, great, great. Let's just start the obvious here, let's start off by talking about the collaboration with the GSMA. How does this align with the MSSA's mandate and goals?

Jacques Leduc: Well, I think that the MSSA goal was essentially a group of satellite operators who own, I will, say license, being the S-band or L-band. In today's environment, there's an opportunity to go mass market whereby the satellite operator, like the group of funders, are looking to enter into what we call the mass market, which is reaching all consumer who today have a cellular device. The intent is, really, to have the satellite becoming an access point to your cell phone, and as such, having satellite already in place, then we decided to integrate the cellular ecosystem whereby new device chipset and all the value chain will be able to support these access points coming from satellite. In the same way that, like in the 2010 period, we had the Internet becoming an access point for our cellular device through a WiFi hotspot either at home and hotel, and others. Today, the cost structures allow to make it feasible, and joining the cellular ecosystem allow us to leverage this ecosystem and integrate our band of spectrum into that ecosystem and then launch service with the initial phase of NTN, which is NB-IoT.

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John Gilroy: Jacques, shortly before the MSSA announced its collaboration with the GSMA, Ericsson announced that it would join the association, making it the sole telco member of MSSA. Are there plans to bring more mobile suppliers or operators on board?

Jacques Leduc: Yes, we have more than Ericsson. I mean, we have Qualcomm. I mean, different party into the value chain. You have satellite manufacturer, chipset manufacturer, handset manufacturer, mobile network operator, so Ericsson is part of the MSSA as well as Mavenir, another company developing base stations and core network, Qualcomm to the chipset manufacturer. We are in discussions with many others that have interest to join the MSSA associations. Given that the association is there to develop standard, that will be a compliment of what the 3GPP is doing, because 3GPP is also developing standard, but given that the satellite is quite different than base stations, which is fixed locations on land, the satellites fly over. Given that, there's different aspect of standardizations that will be required in order to have multiple players into the value chains to participate and make sure that, when integrated with the mobile network operator, it will work on a seamless way.

The real intent is to be a compliment of the mobile network operator access point to better serve their customer, knowing that, I would say, most to not say all of mobile network operators have certain all into their own coverage, and they don't cover all the countries. I mean, there's places where there's no coverage, and that's where the satellite as an access point will become a party of, and that will require collaborations of everybody into the value chain. That's where the MSSA welcomes everybody into the value chain that could make S and L licensee to provide a better service to the end user. There's also today being an announcement from the MSSA, whereby the 5G associations of the car automobile industry join collaborations with the MSSA, whereby we know that, in many instance, our cell phones, being used in a car, will drive outside cellular coverage, or in and out. The intent is to have the industry automobiles to adapt antenna and system that will always keep the car connected, and the satellite will play a bigger role into providing that access.

John Gilroy: Sounds like breaking news on Constellations, huh? Just today, the press release. That's interesting. Jacques, can you share with us the difference between how the MSSA plans to deliver D2D services compared to organizations like AST SpaceMobile and SpaceX, and why?

Jacques Leduc: Well, first, maybe we need to clarify a little bit, I will say, the role and the missions of the MSSA. The MSSA is there to foster innovations and evolutions in the satellite to device communications by developing standard and advocates for regulatory support as service evolve. Our goal is to provide an additional access to our cell phone, an IoT service aligned with the 3GPP standard, and the MSSA capabilities. We're more in the standardization of the service. It's like the 3GPP or the GSMA doesn't provide service, so they're there to support the

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industry. That's what the MSSA is doing. Obviously, the funding members, our service provider of mobile satellite service and the intent of the funders are really to develop a constellations where such constellations will be able to provide service, and I will say, provide a competitive offering to the one of the Starlink, AST, and others.

The main difference is that the current S and L licensee have already a spectrum that doesn't require the mobile network operator to sacrifice spectrum. Such spectrum has been designated as primary spectrum, okay? That's why it's become a compliment. We're looking to have it interoperable with the mobile network operator, which mean that you will go in and out of the cellular coverage and you will keep your connectivity. In the same way as today, as the access point of the internet or WiFi at home, we initiate a call in home, we move into our car, we stay connected and we move, and the same when we come back. That's where the MSSA, working on those standardizations, working with the 3GPP, that's where evolutions come in. This service with release seven teams allow existing geo-satellite operators having S or L-band to enter into the dance.

We're not behind, we're in the race to provide that service everywhere in each country where we own a geo N, S, or L license. This is a big advantage that we have as well, to work in collaborations with the mobile network operator, and the MSSA as well, defining the standard that will complement the one of the 3GPP, will assure really seamless connectivity and, at the same time, a faster evolutions over time. The fact that we have large quantity of spectrums and we're capable of working with all MNOs, whereby, if you look for example in the US right now, Starlink is dealing with a five-plus-five with T-Mobile. TerreStar in Canada, we have 40 megahertz of spectrums and we intend to work with all the mobile operator in Canada, which provide, I would say, a better service to all and be able to evolve as the standard with the 3GPP will evolve to broadband service accessible to your device, but later on, will provide you the same or quasi same service as what you get from infrastructure on the ground.

John Gilroy: Jacques, I'm going to shake things up here and maybe play the role of the devil's advocate here. One of the arguments against the MSSA's approach is the fact that it won't work with existing handsets, and that fact will slow down the momentum around D2D. What's your response to that when you get in these little debates?

Jacques Leduc: Well, again, it's like what I'd say, that the internet access would've slowed down the use of that service, and today, after maybe four or five years, we look into that and say, "Well, it's fully used everywhere," okay? It's just a normal evolution of service. The beauty of it is that it's a value chain, and we've already seen, about three years ago, Apple get into the race, should I say, and came first with SOS last year, they come with SMS, and now we see Samsung and Google entering into the race, which will also support that. The ecosystem and the

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value chain are moving toward that ID and concept of the MSSA. It's true that, in any new technology, you need to update your device in order to have it work with the new technology, but device life cycle is about four years, which mean that, in four years from now, everybody will have a device that will work with all the satellite constellations.

On the flip side, again, is that we have a spectrum. Today, yes, the Starlink work, but they don't have spectrum and they don't have the right to use such spectrums in all the countries right now. As a matter of fact, only the US market has allowed the use of terrestrial spectrums for satellite purpose, and Canada, it has not been yet granted. Even if there's a Starlink satellite up in the sky, it cannot be currently used in Canada. We have seen as well other countries where they ban the use of Starlink service. It's not because it doesn't have all the new device already into the market, that preclude us to our fit to all device. As an example, at TerreStar, we develop what we call the companion, which is essentially a little tool that connects your legacy device with WiFi, and that communicates directly to the existing GEO satellite of TerreStar, and then anybody could have access to connectivity outside cellular network using such a tool.

There is different ways, I will say, in terms of business model, to reach everyday device, to reach every customer. It's essentially a different business model, where Starlink, KST, and Lynx come with a technology, whereby we come with spectrum, satellite, integrations with the cellular ecosystems to evolve, to make it seamless and interconnected with our existing infrastructure on the ground.

John Gilroy: Jacques, will the industry eventually need to settle on a single way of doing D2D, or is there a way for these various approaches to coexist? You're talking about coexistence, I think.

Jacques Leduc: Yeah. I think there's lesson to learn here, and it reminds me back in the early '90s when, in Canada, we bring in North America the first GSM network. I could tell you, in those years, there was a lot of questions to us when we get out and finance the company, and even bring the company public of why we choose GSM in a C of CDMA environment, okay? Our response to that was that, with GSM, this is the standards being used the most around the globe, and given that our expectations is that innovations and developments will come there first, then the cost structures will be the best.

I believe that integrating this ecosystem of cellular today and having a standardized way to provide service where every player's in the value chain of the cellular ecosystem will participate, this is where we'll see innovations, this is where we'll see the structures, this is where we'll see the benefit whereby a device will be set and designed to connect with a satellite, versus try to have proprietary type of technology and use device and chipset that are not being designed for a satellite service. On the flip side, I have to say that these

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additional competitions coming to the market is good. This is what make innovations move forward, this is what makes every participant into the industry to find ways to compete, to evolve, and I think it's in the best interest of all. We welcome, I will say, competitions, we welcome different business model. At the end, it's just the questions of time and hope that the model that we select will be the one that will be the best positioned to grab, I will say, the real opportunity and deliver the best service.

**John Gilroy:** Release 17, this is Release 17 of the 3GPP 5G standards, have proven to be a key starting point for the rollout of DDD services. How do you anticipate Release 18 continuing this momentum?

**Jacques Leduc:** Of course, I mean, Release 17 is... At, TerreStar, with our shareholders, we're working for many years to integrate the cellular ecosystem. Obviously, it's not something that it's done by just making a phone call. I mean, it's a number of years to get there, but the beauty of it is that, with Release 17, the doors opened. This is what we have done and I know many of the operator having S and L-band have upgraded their infrastructure to the new standard, allowing us to offer SMS SOS and even, I will say, the expectations to offer voice service with the Release 17 over NB-IoT standard. Release 18 is just another evolution of the potential service offering, where we'll see the opportunity to have more broadband type of service using satellite at the lower altitude, so LEO-type of constellations, which will work seamlessly with the operators on the ground under different models.

Roaming, open network, all that will facilitate these infrastructures from space to share service with the mobile network operator and see the adoptions of this additional connectivity to become an integral part of all devices and for how users, if ever they go into situations where their existing cellular network falls to operate, either because there's a hole, because they're not developed throughout the country, or just because natural disaster make them inoperable for a certain period of time.

**John Gilroy:** Jacques, you've seen a lot of changes over the years, so how do you see the D2D market evolving as the 5G market evolves? What will be the timeline to look like as D2D moves from narrowband emergency services to full broadband?

**Jacques Leduc:** Well, I've already started. I mean, we've seen a lot of companies that are working on LEO constellations, looking at 5G and R standard, so for me, just the natural pace and evolutions of our industry in the same way as we have seen 2G, 3G, 4G, now 5G coming into the industry. I expect that, by 2028, we will have numerous new constellations up and running that will provide service similar to the one on the ground with new device coming to the market, and we'll see as well the GEO satellite with the first generations NB-IoT continuing to offer service to those who have purchased device in 2025, 2026, 2027. They will be able to continue to get that service from, I will say, the first generation, in the

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same way as we have seen analog to stay many years after digital came in. We will see a surge of partnerships of operator, because LEO constellations obviously required a license in each country.

It's not everybody who has a license in all the countries around the globe, so that will require partnerships. It will be like a network-sharing infrastructure whereby, when it will fly over your country, like Canada, where we own a license, we will then be able to serve people in Canada, and then this satellite will fly over another country and serve another operator. This is the opportunity for all the industry and all the mobile operator, and at the end, for all the customers to get a better service. As we know, that our cellular device today is like our lifeline. I mean, we don't go anywhere without it. We stay connected to the ones who are close to us, we stay connected to our business relationship and it provides us tremendous level of information. It's part of the digital era, where mobile, more than half percents of the digital traffic, is on a mobile device.

John Gilroy:

Well, Jacques, here we are. First quarter of 2025, everyone's making predictions, all kinds of predictions of what's going to happen this year, so let's focus on you. There's all sorts of predictions out there for the revenue opportunity for D2D. For example, Analysys Mason is forecasting that satellite D2D could generate \$137 billion in cumulative service revenue between 2022 and 2032. What use cases do you see being the killer apps for D2D to unlock this revenue?

Jacques Leduc:

Well, the killer app, I don't know if it's a killer app or it just... For me, it's more the integrations with the cellular ecosystem. I mean, satellite has always been more a niche market, expensive device, but today, you have a device that provides you service, so essentially for me, the killer app is the connectivity access from a satellite, because after that, you will be able to, in terms of use case, as I said, in Europe, in Canada, in US, all the country, cellular users have experienced a connectivity that falls, you get into a hole. That will cover all the whole of, I will say, the mobile network operator. It will also provide service outside the cellular network, it will provide service when the network goes down because of a forest fire, because of flooding. I mean, we've seen it. We've seen as well in countries where there's wars, where all infrastructures are destroyed, and communications, as I said, is your lifeline, so you need to stay connected.

This is where the biggest benefit will be, as well connecting with cars. I mean, the cars are the one which are part of when we get into the holes or when we get outside the cellular coverage, we're in a car, so having a car connected will also be something very important, meaning changing the antenna that's sitting on the roof to make sure it has access to the satellite. We have to think as well about the IoT that can be supported as well as the connectivity with the satellite. There's many verticals. I mean, farmlands, pipelines, gas, asset



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tracking, alarm system, I mean, camera that we have at our lake house. There will be a lot of benefit, and that's why, being part of the cellular ecosystem and having the satellite as an access point for our cellular device, that's where the biggest benefit is, and that's why, when we look at that, it remembers me in the 2005, 2008 timeframe.

I was discussing with people like Analysys Mason that has some predictability about the usage of data on a cellular device, and I can tell you that, after five years, their predictions were surpassed by three to four times what they had predicted at that time.

John Gilroy: Wow, wow.

Jacques Leduc: Look back in history, and in history, global, the predictability of how a cellular device will be used by a single user and what it will do with it, okay? In today's environment, as I said, I believe that connectivity... Especially for the youth. I mean, my daughter of 25, I remember that, when we were going somewhere and they didn't have connectivity, for them, it was the end of life. They want to stay connected to their world, so providing that additional coverage, fulfilling the hole, people will use it.

Jacques Leduc: There will be a lot of usage. You might even see mobile network operator where they spend a lot of money over the last 10 years to expand their network, that when will be times to refurbish those infrastructures, the arbitrage will be done. Shall we just drop that tower sitting on a mountain that is very expensive and use the satellite to provide the service instead? That is not factored into Analysys Mason situation, the hole in the coverage is not factored into the Analysys Mason. They just look at, "What's outside cellular coverage? Is there really people there? Will they use it?" But it's more than that.

John Gilroy: Jacques, what are your predictions for the D2D market here in 2025? What partnerships, maybe mergers, or maybe even progress in devices do you expect to be talking about one year from now?

Jacques Leduc: Well, we will see more and more device and chipset supporting satellite access to everyday device. We'll see more and more GEO satellite providing service to those devices or an intermediate in-between for all other device, and we'll see the beginning of testing of new LEO constellations from S and L-band players to then enter into global constellations and different type of partnership. Meaning that we will have the opportunity somewhere in 2028 to have new satellite LEO that will complement GEO satellite and offer first and second generation of service to the benefit of all citizens. That will be just the beginning.

John Gilroy: Jacques, I think what you've given our audience is a really good understanding of what the Mobile Satellite Services Association is all about. I would like to

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thank our guest, Jacques Leduc. He is CEO of TerreStar Solutions, he's one of the founders of the MSSA, and currently acts as the treasurer on the MSSA board. Jacques, thank you very much.

Jacques Leduc: It's a pleasure and have a good day.

Direct-to-Device satellite connectivity is being touted as a way to bridge terrestrial connectivity gaps, and the past year has seen major developments in the D2D space. Jacques Leduc, CEO of Terrestrial Solutions and a founding member of the Mobile Satellite Services Association discusses how 3GPP 5G standards, access to spectrum and partnerships will drive the D2D market going forward.