

**Evan:** Hey everybody another Monday I apologize for that but we're going to have a great discussion here with Macy from Blu Wireless a real innovator in the 5G space and beyond.

**Evan:** Macy, how are you?

**Macy:** Hi, good morning and doing great thank you.

**Evan:** Well thanks for being here, really intrigued by what your team is doing and fascinated by the 5G roadmap towards the future. Before we dive into that maybe introduce yourself and your team

**Macy:** Yes, I'm Macy Summers. I'm the President of Blu Wireless Inc which is a wholly owned subsidiary of a UK company, Blu Wireless Limited. Blu Wireless is based in Bristol in the UK so one of the high-tech centers in the UK.

**Evan:** Yeah, beautiful country

**Macy:** I manage the US business which is centered mainly around defense, but we have some commercial activities in the rail sector as well

**Evan:** Fantastic, well rail is another personal hobby of mine but introduce briefly Blu Wireless's Mission and its sort of founding story if you would.

**Macy:** Blu Wireless was founded in 2009. So, we're still in sort of a startup mode but we have approximately 70 employees. Our business is fundamentally around Transportation, as I mentioned rail, but we also do Motorsport. One of our big Partners is McLaren. (We) just recently announced something where we're focused on NASCAR and Formula 1. That's the current, that's the main business of Blu

Wireless but we also have 5G Smart City kind of backhaul/fronthaul radios that we provide into a number of carriers, primarily the private networking kind of carriers and then the defense sector, which is the newest business for Blu Wireless, which is focused around millimeter wave. The company is an innovator in millimeter wave, and we have a System-on-Chip that we developed in the late teens with roughly 800 million gates and 17 processors... (a) very, very powerful chip that manages the entire network around our Solutions.

**Evan:** Yeah, that's impressive. We've heard many of the stories around what the DoD is doing in in 5G. Looks super interesting but, so what unique sort of value prop do you bring to the defense industry? What is your engagement there exactly from what you could talk about? We know working with three letter agencies...

**Macy:** It's a quite simple proposition and that is essentially Low Probability of Detection. So, when we were having conflicts in the Middle East, for example, where essentially it was Asymmetric Warfare, meaning our adversaries were using a different technology than us, we could use our radios and our networking equipment At Will. Once we started to consider, and we've always considered this it just hadn't been at the top of our design philosophy in the US, once we got back to near-peer considerations, meaning China, Russia, Iran, then you have to consider their electronic warfare capabilities, which are very, very good and so if we're going to have any element of surprise in a conflict somewhere we need to make sure that our Communications are secure they're impossible, or very, very difficult to detect and that you can move with surety once you're near the adversary. So, Blu Wireless has a millimeter wave solution that is very,

very low probability of detection and that gives any of our forces the ability to maintain surprise.

**Evan:** Wow, well you said it's so simply I'm sure there's a lot more to it than that and your product line, so it's Hardware, Software, Silicon. How far up the stack do you guys go? How do you work with customers?

**Macy:** Well fortunately because we have the System-on-Chip it's the basis... it's essentially the modem, so it's the basis for the network. It relies on IEEE 5G standard so that it's very similar to what you can see in your in your home router except this is now at millimeter wave. So instead of 5 GHz, 2.4 GHz even 6 GHz, this is millimeter wave, so 60 Gigahertz and that allows for three and a half gigabit transmissions and the beauty of that is that once you start putting together networks it looks a little bit like your home, if you will, if you have a Mesh network in your home with multiple routers, that's the way our terminals look. Our products look like Mesh nodes and we're up the stack there, meaning that we have implemented a proprietary version of Mesh networking. We use OLSR version 2 that allows for very, very rapid connection time, so less than 100 milliseconds for example.

**Evan:** Wow.

**Macy:** And you can have hundreds and hundreds of nodes and it can expand to thousands and even tens of thousands of nodes, and these can all be on the move, and this is one of the basic differences between Wi-Fi as we know today. Wi-Fi is not good for On-the-Move and we have proven this for example in the UK and now in California on CalTrain. These are vehicles that are running at hundreds of kilometers per hour,

over 100 miles per hour, and Wi-Fi is working perfectly there at gigabit speeds.

**Evan:** That, that's phenomenal and so you touched on defense obviously the application there is quite compelling. Talk about some of these other use cases. Rail, you do mention things like Vehicle-to-Vehicle communications applications, Public Safety, Maritime. I guess the world's your oyster!

**Macy:** Well, it is certainly if it's mobility and it's 5G, IEEE 5G. We are, we consider ourselves the leader in that field. We don't really compete against 3GPP 5G. In other words, your cellular standards... they don't operate in our bands. They operate in much lower bands, so mostly sub six-GHz and that is not a good application for tactical military. It's great for in-Garrison and for activities such as supply chain and HR and many of those sorts of back-office activities but when you get to Tactical Communications there are some very, very unique requirements that militaries have to have and one of them is Private Networking... and IEEE does Private Networking better than anybody... and when you're a cellular network you bring along a lot of software that just not needed in a Private Network. For example, billing and home registers and visitor, all that kind of stuff. It's not needed in Private Networking. So how do you reduce a very complex system to a simple system and still yet provide mesh network connectivity, because mesh is absolutely critical in these tactical environments?

**Evan:** That's so intriguing and you also talk about drones getting involved in UAVs, UGVs, RCVs, lots of three-letter acronyms but what's the big idea around drone connectivity. Drone Warfare of course is all

in the news these days sadly, but what's going on with drones and 5G gigabit?

**Macy:** Well, I was recently in London at the Defense, it's called DSEI, it's almost the size of Consumer Electronics Show, CES, just an amazing event, and it was staggering how much activity is going on in the Drone field in Europe. And not just in Europe but especially in Europe because of Ukraine and the conflict there. What we found is that, as I mentioned before, some of the activities, some of the communication paths (for) using drones are very simple to intercept, they're simple to jam, and they're very... you can send a drone on a mission, and it doesn't return, and you don't really need communications with it. But for many activities in the military, you need to have a persistent communication with it and that persistent communication is not easily done with 2.4 GHz IEEE Wi-Fi or 5 GHz because it's so easy to jam and it's also very congested, 2.4 GHz especially, so drones, a lot of drones, at least in the military side, are looking towards new frequencies to control these and to have that persistent connection, and we've been successful in landing activities around that sort of solution.

**Evan:** Amazing, well done. So, what does the future look like at Blu Wireless? Obviously, you have your hands full as an early-stage company, but you have your eyes on Technologies a couple years out. You're looking at things like satellite hybrid communication... 6G probably too early but what's next for wireless?

**Macy:** That's a great question. I think wireless, it never slows down... it just keeps going and going and going and that the next Standard, or the ensuing Standard, if you will, that IEEE has is 802.11ay. We currently operate on 802.11ad and ay basically is going to take the ad standard and

allow it to be even much faster. You can aggregate channels. You can essentially go from 3.5 Gbit pipes to 40 Gbit pipes. So yeah, 6G is really important...it's the next silicon implementation. The standard is just now being finalized if it's not already finalized. It'll be a few years before you see silicon. I think from Blu Wireless, the company standpoint, we're really trying to expand beyond Europe and the US so there's a lot of work going on in Asia, Asia-Pacific, Australia, and the Middle East. So, it's an exciting time at Blu Wireless

**Evan:** Yeah, indeed. Now you work closely with DOD and other kind of agencies. Do you think we're innovating fast enough? I mean do you think we're embracing the latest technologies? As you've been in the defense area a long time (at the) the cutting edge there are many people out there helping, people like yourself and **Anduril Technologies**, Luckey Palmer's startup. But how can the defense industry move faster, better, cheaper and protect us in the next decades?

**Macy:** Well, that's a, that's always been the real question about how does our military and defense activities, you know, innovate faster and there, is a lot of innovation going on at the Defense Department in the US, and not just the US, in the UK, and France and other places...Japan for example.

**Evan:** China, there it's they...

**Macy:** China, and Russia as well, they have essentially been able to Leap Frog the United States in many areas and for example I mentioned earlier, you know, Electronic Warfare... they have capabilities that are very, very powerful. So how do we counter that?... and that's from the Army, the US Army standpoint, they have essentially policies around what does the network look

like in 2030. So, Army 2030 is really what their focus is on. The Army is very large and so they have to think of it in a big picture and so even though they are Plodders, if you will, p l o d, they do take the proper amount of time... because it's when you're looking at Divisions and Corps and the large number of vehicles and nodes that have to connect... it's non-trivial. The easier one for the US Defense Department is the Marine Corps, because the Marine Corps generally, and Special Forces because they're smaller groups, they're... they can easily add Innovation. But I will say that the DoD in terms of innovation and network side is, ... they're no slouch. They really understand and they are adopting, and they've done a number of experiments with 3GPP 5G. So, when they can use 3GPP 5G they will, and I think it's a great thing for our forces because everybody has a phone, everybody, and so connecting that phone to the node that is near you, with Bluetooth or whatever, is going to change the nature of warfare. We're going to go from not being connected to having a commander in a Jeep, or some kind of tactical vehicle, that has a Pad that he can look at and he sees, or she whatever, they see this Common Operating Picture of where's the enemy, where are my forces, do I need to call for support? Do I need more ammunition? All of that is now going to be digitized and that is very, very special in my opinion.

**Evan:** Yeah, it's an incredible opportunity... Force multiplier. Now we just have to get soldiers to keep Tik Tock off their phones and we we'll be all set! But I digress... so you're in beautiful Pensacola, Florida I believe. Is that just, is that just coincidental (that) you happen to be near a giant military base?

**Macy:** There is a... actually, the Sound of Freedom right next door here which is our

wonderful Blue Angels. I'm an ex-Navy Submariner so the Navy has a very large facility here and it's one of the reasons why I'm located next door.

**Evan:** It just happens the beaches are beautiful. Well thanks so much for being here. What are you looking forward to most this year as you get out and about in the marketplace? Any events or trips coming up you want to touch on?

**Macy:** Well, for me, Modern Day Marine which is going to be in Washington area in the first, maybe the second quarter. A lot of activity as you mentioned around drones but not only drones, in the aerial sense, but Uncrewed Vehicles is what the Marine Corps calls them and the army they call them Robotic Combat Vehicles... where they can send them as a Scout in front of a tactical formation. So, you send it out and they have a way, using millimeter wave, to connect to those vehicles because they'll generally, want to have a persistent connection... a millimeter wave connection so that they can see what's going on. They can have targeting information off that. They can have a bunch of reconnaissance kinds of sensors and you know, to make that persistent connection is non-trivial, especially if you want it to be undetected.

**Evan:** Amazing, well thanks so much for the invaluable work you and the team are doing. Keep up the great job. Thanks for spending some quality time here and thanks everyone for watching. I hope lots of folks in the military, DOD reach out to Blu Wireless (if) you have projects or opportunities to collaborate, give them a look, thanks. Thank you take care everyone, have a good week, bye.

**Macy:** Bye