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Inside the Future of 5G Live Production with Neutral Wireless

Matt Stagg in conversation with Dr Dani Anderson, Programme Director, Neutral Wireless

IAMT Studio Visual Podcast Series

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Hi, and welcome back to the IAMT podcast with me, Matt Stagg. Now, this is great for me because our next guest is not only a colleague but also a friend, and I know what you're going to say: "I'll be the judge of that." So we've got Dr Dani Anderson, Programme Director at Neutral Wireless, who is going to talk us through another world's first from the team right here at NAB. Dani, can you go into what you've been up to?

Yeah, definitely. Thanks very much for having me. So we're here in Las Vegas this year, and we're doing something a little bit different from what we've done in our previous years. We have the world's first deployment over a live station of ATSC 3.0 combined with 5G broadcast. So this is a standards-compliant, regulation-compliant way of getting content and data out of low-power TV transmitter stations.

Well, the question everybody asks... Because I've worked in 5G broadcast and I've gone through LTE. I mean, we were part of the LTE Broadcast Alliance we founded with Verizon. The big thing is: where's the UE?

So at Neutral Wireless, we've developed, on the network side, the modulator platform, the gateways. We also built the UE, the user devices. So everything that we do is always at the latest, best level of the 3GPP standard. So everything that we're doing this week is at 3GPP Release 19. So we built that in our modulator platform, and we've got that with our custom software-defined radio-based UE at Release 19, the latest, out this year.

Yeah. And, you know, we really have to give it to the team. But what you... I know what you thrive on is when someone says, "That's not going to be done." And everyone was in there. But they really did. You know, we had some, we won't say, but big players in this business, you know, multimillion pound corporations saying we won't be able to do it.

Yeah. I mean, the story starts actually at NAB last year, and we met our partners at Castanet 5G. We were in the Futures Park at NAB, and we were actually showing off a very early prototype of, effectively, a software-defined UE. And the team at Castanet came over and said, "Well, that's great. That's not what we're looking for. Could you do this?" And we said, "We don't know if anybody can do it. Well, we'll give it a try." And here we are, almost a year exactly, and we are doing it live over the air. We've got the demo running this week, and it's all much, much smaller, much lighter and working, and in a commercial workflow environment.

Yeah. I mean, that in itself is amazing technology, but I do want to dig into some of the things that you and the team have been looking at around, you know, private 5G for broadcasting. That's, I would say, what you're best known for. I mean, you guys did the world's first live-to-air

video stream for MotoGP. It'd never been done before with BT Sport. Can you go back over a little bit of the history and how we've got here? Because if people don't know who Neutral Wireless is, you really do need to listen to the sort of pedigree of things, and you'll go, "Well, they can't do all of that." So can you give a sort of potted history of Neutral Wireless?

Yeah, definitely. So we've done a lot of work with the BBC in the UK as elements of R&D, and through those relationships, they invited us to do some 5G tests at Silverstone. And this was using, at the time, this was using a 5G standalone network. It was one of the earliest implementations of 5G standalone in the UK, maybe even in the world. And we were able to go live to air from cameras around the Silverstone racetrack at MotoGP. From that, we did some work with the IBC, the International Broadcasting Convention, and we were demonstrating portable private 5G networks around the world. So we did three deployments in three different countries in three months: in Ireland, in Kenya, in New Zealand. And we were also covering the Highland Games, a Highland Games event.

Pitlochry.

Pitlochry, in Scotland. And that was the same weekend as the IBC show in Amsterdam, and it was... That weekend was when Her Majesty Queen Elizabeth had passed away.

Yeah, I remember when we were all out at IBC.

And because of the work that we had been doing with a partner company called QTV, they were scheduled to be covering the Pitlochry Games. They also had been brought in to do the production of Her Majesty's funeral or, specifically, the transportation from Edinburgh Airport to London. And we were actually brought in to help with some of the coverage of that. So on very, very short notice, a few days, we managed to organise that from absolutely nothing. That really kind of opened the door to, "Well, let's use it again. Let's do it on a bigger scale." And again, working with the BBC, working with LiveU, we built at the time the world's largest private 5G network for live events production.

It was on the Mall, is that right?

Yeah, so this was to cover the coronation of His Majesty King Charles. And we covered basically from Buckingham Palace up to Admiralty Arch, so heading up towards Trafalgar Square. And then we had multiple cells, and we had complete coverage over that whole area, and we had a number of international broadcasters there, and they could just put some of our SIM cards in for our private network, and whenever they wanted or needed to go live to air, they had the confidence to just put that on, start pushing the content out because they know that they've got that dedicated infrastructure there that's going to give them the quality of service that they need.

And that's one of the big things, because you talk to broadcasters and, you know, there's been bonded 4G, bonded 5G. And the big difference with private 5G and the work you do is, as an industry, not only, if you're at an event, so is everybody else, so your bandwidth is gone. But we also need uplink, and all mobile networks for obvious reasons are biased towards downlink because people are streaming.

Yeah, and that makes complete sense for the, you know, the business cases there. And I think it's that capacity and uplink challenge, especially in high-demand, high-density environments, that is really important. So when you're at an event like the coronation, for example, and you've

got thousands of people lining the street, it's going to be very difficult to get those kind of data rates. Or, for example, if you were at the opening ceremony of Paris 2024, and you have tens of thousands of people.

And this is... I mean, I wasn't with you guys. Obviously we've worked together for many, many years, and I now work more with you. But how does a small company based in Glasgow, in Scotland, in the UK, get taken on and start to do something the size of the Paris Games?

A lot of it has come from... Well, first of all, the fantastic team that we have at Neutral Wireless. I mean, the folks that we work with, that we're fortunate to have, you know, everybody's really passionate about the work. Everybody's excited. Nobody's scared to try new things and to push the envelope. We also have great partners that we've worked with over a number of years. So the Paris opportunity in particular came through a relationship that we had been building with Cisco in the UK. And we were part of a consortium including Haivision, one of the video encoding platform companies.

Yeah, yeah. They're here on the floor.

And we put that consortium together, and we won the contract. It was a competition. And we won that based on the performance and the capability of the end-to-end solution that we put through. So between some of the, you know, the advanced networking things that Cisco are able to provide, the video capability of Haivision, and the networking capabilities of Neutral Wireless, we were able to take that to, you know, one of the biggest sporting events in the world. And we were working on multiple use cases as part of that, so it was a real challenge. It was probably one of the most challenging things I think we've ever managed to deliver on. So we had networks that were there supporting the opening ceremony. We had networks that were supporting 4K cameras in stadiums, like the Stade de France and Bercy. And we also had some 5G at sea, so we were covering the sailing events out at Marseille.

And this is another one, because I know there were lots of people there, again, big companies, that said, "You won't be able to do it. You can't put an antenna on a boat."

Yeah. Well, you can't have a 5G network on a boat. And then, you know, what are you going to connect with all this? So the way that we designed it, again, working with our amazing partners, lots of field trials, or not field trials, sea trials. We had three networks running on catamarans spread out around the field of play, and we had handsets mounted on the competitors' boats that were streaming back, so they were able to get the content, the video from the competitors' boats. But also what's really interesting, for the first time, they were also getting audio from the competitors' boats, so you can hear them shouting at each other. You can hear the wind whipping. You can hear the waves. You get a much more immersive experience of it.

Yeah, and this is it. We're all sports fans, or most people are, and in any sport, the closer you can get to being there... Everybody wants to be there, and you're not going to be. And the next one is how immersive can we make it? And it just goes to show, you know, things like audio are so important.

Yeah, and private 5G, in particular when combined with handset-based production, opens up a lot of new opportunities for kind of new forms of content. The flagship handsets of today are, you know, HD plus quality cameras. They're native 5G transmitters, and they've got the raw

processing power to do the video encoding. So these are just ultra-portable little production units. And with private 5G, when you combine that, you get the quality of service that you need, you have the coverage exactly where you need it, and you can control everything for your workflow end to end.

I mean, we'll obviously carry on this chat, because we're all going to the IBC party. But one thing that I have to cover, because if you were at IBC last year, or at MWC: what's the plane all about?

So the plane is almost the final evolution of what-

Land, sea, and air

Land, sea, and air. The last turn of that is: well, we put private 5G on a boat, and with the scale and the form factor of the solution we've got, we are so small and so lightweight that it opens up options for putting this in the sky. So we had demonstrations that were done in Italy where we were looking at using tethered drones basically to pop up and elevate that to give big coverage. We did some handset-based productions at the Henley Festival, but the marquee one from the project is when we had the airborne private 5G networks. We put the network as the payload in an ultra light aircraft, and we were able to fly the network connecting devices on the ground. And we were using that to cover a cycling race in France. And again, it's one of these things of, "Oh, you'll never be able to do that.

You won't get the regulations to do that." You have to get the payload right. Nobody knows if the performance is going to be good enough because nobody's done it before. So all of these kind of challenges, the logistics, the spectrum, the technical, all of that has to be resolved. And we were doing that work as part of the IBC accelerator program working with France TV, and they were really happy with the results that they got as part of the coverage of that race.

And I think the final thought from me is: private 5G, they're putting them in ports, they're putting them in airports, but the thing is how much you understand about the broadcasting. We come from broadcasting and I think have a look, get in contact with Dani or the Neutral Wireless website, because we've got lots of great things coming up and we can work with you whether land, sea, or air. Whatever your sports stadium, come and have a chat with us and we'll see what we can do together. It's the last one of the day. I'll be back with you tomorrow. Thank you, Dr Dani Anderson.

Thank you very much.

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