

MWC 2024 Las Vegas: Connected Aviation Summit

Session 1 -

The Future of Flight: Exploring the Importance of Connected Aviation

Speaker: Norman Fekrat, Managing Director, Imagine Wireless

Samuel Ingalls:

Well our next speaker is Norman Fekrat. He is the CEO of Imagine Wireless. If I can get my information up here... You know, and I have to say Norman was one of the ones that worked - We worked together to really put this Connected Aviation Summit together. So Norman, thanks for all of your work. He brings 30 years of experience in the telecommunications industry as a managing partner of Accenture and a VP at IBM. We won't hold that against you, Norman! Yeah. He currently serves as a managing partner at Imagine Wireless. Under his leadership, Imagine Wireless embraces innovative technologies to develop value-driven transformation programs across various industry verticals. And you'll hear about his thoughts in the aviation industry and about this enterprise spectrum. Played a pivotal role in defining Private 5G as a strategic infrastructure platform. So Norman - over to you!

Norman Fekrat:

Thank you, Samuel. Appreciate it!

All right. I'm not going to do a Grammy thing here, but there are a couple people to thank: I want to thank GSMA, first of all, for putting their trust in us about a year ago. We said we wanted to bring the aviation industry to telecom and we did. And thanks for taking your, putting your trust in us on that. Jason Bolden, Mike Boingo: I to thank both you guys for stepping up and sponsoring us here. We know you guys are great solution providers in this industry and aviation. And a special thanks to Samuel Ingalls! You know, he kind of single-handedly brought the aviation industry here. So I know all the hours and emails that took, so Samuel, thank you for that!

So let's get into it a little bit. What we're going to talk about today is I think something hopefully that you've never really heard or been discussed very much. But we're going to put a valuation on CBRS spectrum. Everybody knows what CBRS spectrum is: It's what enterprises are using for private mobile networks. We're going to talk about all the value that's created on that spectrum and kind of change this model of the way that we value spectrum. And someone may think that enterprises could generate a lot of value on top of the spectrum, but we'll see. And I think the aviation industry is doing an awful lot of that. So we're going to do something that's a little different and talk about the value side of what you put on these networks and the value that enterprises really get out of it.

So there's a couple of things that I wanted to say before I get into that. Mobile network operators have the coverage in the macro network, right? Everybody knows that. You look at your phone, working. Indoors, you have DAS. That's really good for passengers, for their phone connectivity. There's Wi-Fi. That's good for passengers also to use that. And then you have these wired networks that you're competing with, and it costs a lot of money to put wired networks everywhere. So you have this new technology that's just wireless, and that's what kind of drives this new innovation.

So here are a couple of things that I'd like to just talk about and walk through. If you look at the left side here, it's operator spectrum. On the right side, we call it enterprise spectrum. And if you walk through this a little bit, as an operator spectrum, you got traditional operator models, right? This is owning the spectrum, using the spectrum for the consumers that are out there. And on the enterprise side, you have this new thing - which is innovative - which is called shared spectrum. So that's one thing that's different. The auctions are long-term, over 10 years. On the enterprise side, it's free to low cost and it's getting global momentum. So you can hear all these countries in the world now are allocating shared spectrum for enterprise use. The carriers have all had barriers of entry, right? The phones have been locked, the spectrum was all theirs. You had to build a whole big backhaul network to get to the internet.

On the enterprise side, we really call it stranded value. There's value that they haven't been able to unlock because they haven't had the network technology to unlock that value. And that's really what we're going to talk about. Global market saturation on the operator side. It's hard to grow when everybody's already got connectivity. On the enterprise side, it's digital transformation, whatever number you want to call it. We call it Airport 2.0. We call it Smart Airport 2.0. We call it Airport X. We're coming up with what this global initiative is going to be.

And the traditional model of measuring spectrum has been "cost per megahertz per pop," right? So when the carriers buy spectrum, that's how it's valued, right? So when they buy it, it's a "cost per megahertz per population." On the enterprise side, what we really want to introduce today is a new economic metric for measuring shared spectrum. And it's really - you have to think about it as the "value per megahertz pop per connected device." So if you connect a device to the spectrum, what value does it create?

And that's what we're going to really talk about today. And I'm not going to go into like some calculus or anything like that. I'm going to keep it pretty high level. But how is spectrum enabled? So if you look at it specifically from any enterprise, really, you can look at it this way. But you're talking about strategic infrastructure. So all enterprises are treating CBRS in the US as strategic infrastructure for securing the enterprise - for enabling of things that they couldn't enable before. But it's really treated as strategic and

they're putting mission critical applications on there. That's not just browsing for the Internet. These are mission critical applications on the strategic infrastructure that are enabling new use cases, right? I'm on number three - new use cases. And those are use cases that couldn't be done on wired networks because it costs too much, right? It's a million dollars per kilometer to put conduit in the ground.

Can you imagine going around a 50 square kilometer airport? It's \$50 million to run wired infrastructure there. It's a non-starter. And WiFi just couldn't do. It wasn't good enough. It wasn't built for that purpose. So you have these new use cases that are enabled that creates all this value for automation and things that you couldn't do before. And then once you connect these devices to the network, you take back that data, you put it in a data lake, and then you can run all your analytic models, and then you really get the value out of it.

So it's not just about putting in a network, it's about the things you connect to it, the data you get out of it, and then the value on top of that. And when you look at the airport industry and aviation, here's some categories or groupings of value. So if you're doing a business case for an airport on how can you like spend \$5 million to deploy a private cellular network, you've got to quantify the value. And the way you quantify the value is in these categories. You can reduce telecom expenses. And I know some of the airports later today will talk about that. You can look at airport operations and improvement, monetization. So they're going to monetize the network within the airport, sell it to tenants. And then there's all kinds of other benefits, security, sustainability is a big one, and regulatory political ones, actually. So we would look at all the value you could create on this network by looking at these categories and running business cases on it.

So what does it look like? Right. So a network - You know, you can say a network will cost about \$3 to \$4 million dollars. This is just average numbers. That's a five-year run deal for a private 4G/5G network. It's in that ballpark. It's only one-tenth of the overall cost structure of doing a digital transformation. So if you really think about it, the network's a little tiny little line item in what you're trying to accomplish. You know, we should keep it in that perspective. If you look at the whole program on top of that, so if you wanted to deploy all the use cases, all the devices, the video cameras, we got Synaptic here, we'll talk about all the use cases later that are going to go on this private 5G network. Maybe it's a \$30-\$40 million dollar cost program over the next five years. The network's just 1/10th of that.

So, you know, let's get on with it, right? And the value, if you really look at it and know - don't hold me to these numbers, we're working through them - but you know, I've been around long enough to know that this is directionally correct and where it is in back of the napkin, but there's \$60 to \$80 million dollars of value that could be

obtained by a \$30 to \$40 million dollar investment. And that \$80 million is annualized value. And that's the stranded value that we heard before. So if you really look at this and you said, if 100 airports just in the US took GAA spectrum - which is free - and implemented this, they all had \$80 million dollars of value on average, it's an \$8 billion dollar value proposition just for the aviation industry in the United States.

And then if you said, okay, if you look at the total addressable market for CBRS and private mobile networks, airports is a small industry vertical. Sorry for the airports in the audience - but you have industrial manufacturing, you have warehouse logistics, you have huge other industrial verticals. And if you look at that and you kind of calculate the value on top of the networks, you're going to get \$8 billion aviation, 20 billion manufacturing, \$18 billion of warehouse - You get up to \$58 - \$60 billion dollar range just by looking at the top three or four airports. And if you look at that, I mean, that's significant numbers that enterprises are creating on this free spectrum band. So it's strategic infrastructure. They're putting mission critical applications on it, and they're creating huge value on top of that.

So let's do a little fun exercise here. So - and I didn't really finish the math, so there's little - you have to come back and hear the presentation next year. But if you really looked at it and you unwound that \$80 million dollars of value, it's about \$2,000 "per megahertz per connected device" of value. Look, it's averaged out on how much bandwidth it consumes. It's averaged out on how much value that use case provides. But for every device you connect to a private cellular network, you're basically generating \$2,000 dollars of recurring annual value. And if you look at that on "cost per gigabit," "cost of megahertz POP," you know, those auctions are around a dollar. C-Band was auctioned out at 80 cents to a dollar "per megahertz per POP."

So we're creating a lot of value. And I think that's what we want to hear the rest of the day. And we'd love to talk more about this. And if you guys think there's a better metric to quantify the value that a private cellular network brings, we'd love to have that conversation. So - appreciate it very much! Thank you.

Samuel Ingalls:

Thank you! Thank you very much, Norman. So you're probably going to scratch your head and ponder that one a little bit and think about that value. And maybe you'll be able to give Norman a couple of thoughts on how to think a little differently about that metric. But I think he's really onto something.