Constellations Podcast

Episode 19 – Dish, Phased Array and Now-Isotropic Antennas

Speaker: David Geen, Chief Operating Officer, Isotropic Systems– 22 minutes

John Gilroy: Welcome to Constellations, the podcast from Kratos. My name is John Gilroy. I'll be your moderator today. Our guest today is Dr. David Geen, Chief Operating Officer from Isotropic. David, how are you?

David Geen: Very good, thank you. Thanks for having me.

John Gilroy: I've got a real silly opening, so you have to just play around with this opening a little bit here.

David Geen: Okay.

John Gilroy: Years and years ago, there was this movie called Star Wars. There's this scene where Obi-Wan Kenobi was in the Millennium Falcon, and he turned to the people and he said, "You know, there's a disturbance in The Force." As I walk around the show here, the 2018 Satellite Show, I say, "There's been a disturbance in The Force and all kinds of changes in the last few years in the industry," and that's why I want to have someone like you come in and talk about these changes, and where does Isotropic fit in and where does your technical background fit in and adapt into these changes?

I'll just paint a broad picture here. I think everyone listening knows that there's been a fall in bandwidth prices. At the same time, there's been an increase in cost to provide these services. So, you get a push and pull, get a disturbance in the force. I want to find out where Isotropic fits in, where you fit in. First of all, tell us about your background a little bit please.

David Geen: Okay. Well, I've been in the satellite business for about 20 years now. The first 10 of that was really doing antenna-based product development. I got my PhD from Newcastle, England in my mid 20's, and then went on to work in the US, first of all, for General Dynamics down in Texas and learned a lot of information there about antennas. And then after about 10 years of doing that, I went into more business-oriented roles, business development, business management and looked to try and exploit that technical background for commercial success.

John Gilroy: So, you got a business background and technical background. You're perfect for Satellite 2018, aren't you? Let's say we walk around the show here. We just grab a satellite operator. What do you think the biggest challenges will be facing a typical satellite operator here at Satellite 2018?

David Geen: Well, I mean we heard from the CEOs at the panel yesterday. One of the biggest challenges is to make sure that they've got the right bandwidth in the right places in the world. It's not a case of just trying to crack this nut with a sledgehammer and deliver as much bandwidth as possible. It's got to be the right bandwidth, a secure bandwidth, a ubiquitous bandwidth in the right places and, of course it's got to be at the right prices. They're the kind of challenges that the big guns are trying to solve right now, and they talked a lot of detail about that yesterday at the-

John Gilroy: At the breakfast meeting, I was there with the six CEOs. A guy from France was there with Telesat, and I thought what was fascinating about it was that you looked at it from really a global perspective, and each person on the panel approaches it from video or from security or from the European perspective, and big and small. I thought it was a real good way to get a good grasp on what's going on here.

David Geen: It was. I think one of the main things there listening to Mark Dankberg from Viasat was that bandwidth really is a commodity, and it's not a case of just reducing the cost of the bandwidth, but it's a case of delivering more bandwidth at the same price. I think that was his really important point.

John Gilroy: When I close my eyes and think of that panel, I think of, what happened to neck ties? Neck tie manufacturers going out of business. Kind of casual, more casual in the years gone by.

David Geen: Yeah.

John Gilroy: So, I know you've got a technical background. Let's talk about profit and profitability. How can satellite operators confront this challenge of long-term profitability with this drastically changing market?

David Geen: I think it's really all about… you've got to close the business case for the end user and somehow, for example, folks now are completely used to having internet at the house and on a daily basis and being able to interact like that with the rest of the world. Somehow, the satellite guys and the whole industry, quite frankly, has got to be able to deliver that kind of service in every kind of environment, whether you're mobile, whether you're in the air, whether you're in a boat, whatever kind of boat it is. And so the industry as a whole faces that challenge, and everyone has a part to play in being able to deliver that.

John Gilroy: It's not just true here in the United States. About two hours ago, we had a gentleman from China walk up to the booth here, and he said, "I listen to your podcast in China." I said, "Great! Great!"

David Geen: Wow.

John Gilroy: And then he talked about your company, heard about Isotropic as well, and he said, "In China, we don't read newspapers anymore. We don't read computer screens anymore. We just look at information on our handheld devices, our phones." I said, "Sounds like two miles from here, not 8,000 miles away." So, it's a common problem all throughout the world, isn't it?

David Geen: Right. Absolutely. Again, it just goes back to that point where that's the level of expectation, that level of connectivity, and the satellite industry needs to be a part of that story; otherwise, we'll get left behind.

John Gilroy: A common term in the marketing world is user groups, and there are different user groups that are gaining broadband access. Can you give me an example of how some of these user groups can leverage connectivity to enhance their business to make money?

David Geen: Well, a great example actually is in the fishing business, for example. Right now, sure enough, the big large high-end fishing fleets, for example, they do provide connectivity to their vessels. The reason why that's important not just for an operation standpoint, but from a crew welfare standpoint as well, you want to keep hold of your crew. You want to encourage them to come and work for you, and therefore you need to deliver these capabilities on board a ship that could be anywhere.

Now, that's all well and good for the high-end fishing fleets that have got large vessels and they can afford to put these services onto their boats, but there's a huge number of, let's say, commercial fishing fleets, smaller fishing fleets, particularly in the Asian regions, where they want to be able to deliver that same capability, but they don't necessarily have the upfront investment to be able to do it. So, the challenge for us is to deliver those services onto those types of vessels, larger volumes, smaller vessels, but without the barrier to entry of expensive terminals, for example.

John Gilroy: Earlier I talked about my image of that panel discussion in the morning yesterday, and if I walk around the show here, I see different shapes and sizes of antennas that I may not have imagined five or six years ago. Let's talk about low-profile antennas. What are the biggest opportunities? What could be the vertical market that would be good for low-profile antennas like you provide?

David Geen: Well, that's a great question. First of all, I think any mobility platform is going to benefit from a low-profile antenna. Obviously, the less low-profile it is, if I can use that phrase, then the more problematic it's going to be from a mobility perspective. Of course, if you're in an airplane traveling at 600 miles an hour,

you've got to be aerodynamic. If you're on a train or a car or any kind of moving vehicle, you really need to be aerodynamic. You can't afford to have a large footprint made that's going to provide the wind problems or drag and fuel problems.

So, first of all, I think it's important that aero., maritime, land mobile applications, that's one side, but what's come about more recently, I think, where the low-profile scanning antennas are going to really come into their own is the LEO and MEO platforms because really it's all about where you've got relative movement between the end user and the satellite, that's where you need these technologies, and certainly, of course, with LEO and MEO, that's exactly what you've got.

John Gilroy: Right, and if you try to forecast what's going to happen in the next couple years, there's going to be a lot of signals coming down to the planet here. Someone's going to have to receive them somehow, and possibly offering from Isotropic or other low-profile vendor would be a good solution for some of these issues.

David Geen: That's right. So, what we're banking on, and we'll talk it about perhaps a little bit later, but it's one of the reasons why John Finney founded the company, was to try and address this need.

John Gilroy: Oh, by the way, when the guy from China walked up to the booth, he said, "Yeah, we know John Finney in China."

David Geen: Right.

John Gilroy: He's very well-known all over the place. Yeah.

David Geen: He is very well-known. He has a high profile.

John Gilroy: Why did he form the company?

David Geen: Well, I think it's important to state that John saw some of these applications coming, and he realized that the industry wasn't necessarily solving or closing the business case in certain cases. John approached this from a market need first. It wasn't a technology push. It was a market pull. So, one of the rationales for why John set up this company was because he saw these new opportunities coming in terms of LEO and MEO and these needs and these economics that are associated with those applications, and he didn't think that there was the technology was already out there in the industry to address them.

So, he saw that opportunity and started to explore which technology did he think would be able to crack that nut. Isotropic's been going for three years

now, although we've only just launched this year at the show. In that period, we've, I guess, investigated different technologies and now come down firmly on this particular technology called transformational optics, which we'll talk about perhaps later, but that's the technology that is going to address these needs.

John Gilroy: I've been watching the LinkedIn feed from your company during the show here. During the show, what we see is announcement after announcement, all kinds of partnerships. It's like you're going around from booth to booth and grabbing people and making them sign contracts. I mean, you're partnering with a lot of people just within a preview here at the show, aren't you?

David Geen: Well, yeah. A lot of that's down to John and his experience in the industry and his relationships in the industry, and sure enough, one of the things that's really strong for Isotropic is that the demand is being created with these partners that we're working with. One of the things that makes Isotropic a really attractive company, in my opinion, is that they've got that, the demand creation is already there. The technology has been, let's say, offered up for these applications, and the significant players in the industry have said, "Yep, that's exactly what we need," and so that's why they're partnering with us.

John Gilroy: If you look at antennas, flat panel antenna technology or phased array antennas have been around for a few years now, but what's happened is they've become more expensive than people expected. So, what have been the major obstacles here inhibiting the wide acceptance of this established technology?

David Geen: Well, it's various different things. Obviously, cost is one. Power consumption is another. Everyone agrees that a flat panel antenna with the ability to scan and a low form factor is an attractive thing, but being able to deliver that in a package that is low cost, low power consumption, very reliable, and in a manner that works with the rest of the industry, like the modems, for example, in a fully integrated package that serves the needs and meets the business case needs, more than just the technical needs, that's been the key.

John Gilroy: Changing the whole landscape of the antenna industry, isn't it?

David Geen: It needed to change. Let's face it. These opportunities are there, and somebody needs to come along and fulfill that need.

John Gilroy: Yeah. You can't have an antenna without a signal. So, let's talk about HTS, which is a high growth area in the industry here. What exactly makes HTS satellites different and maybe explain from your perspective where you think this industry is going with this next generation technology?

David Geen: Well, I think HTS provides the means to deliver against the expectation that now all the users have, which is they want to have the same experience when they're out and about away from the house and on the move, potentially, as they do at home. HTS allows that. It provides better economics in that and provides better capabilities in terms of that. I think on the whole, those additional throughputs, like I said earlier on, people expect that bandwidth is a commodity and they just don't expect it to be limited. They don't expect to come up against a hard stop when they're trying to do something, when they're out on the road, and so HTS is a vehicle to be able to deliver that, I think.

John Gilroy: So, how optimistic are you that HTS is really going to become a central part of the global broadband infrastructure? Optimistic or not?

David Geen: I think it's absolutely essential. HTS and even further than that, VHTS and beyond. I'm going to paraphrase Mark Dankberg again. In the years to come, nobody will be even talking about bandwidth. It's just like megapixels on your camera. Nobody talks about that anymore, or your processor speed in your computer. Nobody talks about that anymore.

John Gilroy: No one talks about, "Oh, your phone has a camera built in. Isn't that different?"

David Geen: Everybody has it. Nobody questions it, and it's just expectation, and that's the same thing with bandwidth.

John Gilroy: That's what he said at that breakfast. I remember him saying that. It's like turning a tap, like turning the lights on. Of course, everyone has it. Of course, you have a handheld device anywhere in the world, anytime to look up a soccer score.

David Geen: Yeah.

John Gilroy: That's what's expected.

David Geen: I think the HTS is just one part of the story, and it's going to be delivered in different ways with GEO, MEO, LEO, and then each of their parts will play and their pluses and minuses.

John Gilroy: Well, David, I'm asking you to put on your technical hat now. Take off your business hat, put on your technical hat. So, talk about the origins of the technology that Isotropic is offering here. Is it an application of optics or what exactly is new?

David Geen: The very genesis of the technology that we're offering, Isotropic, comes from what's called transformational optics. What that is, is although it was originally

applied to optical situations, it's equally applicable to RF. So, if you apply the same theories to an RF situation like we have in the antenna in our satellite antenna world right now, then you can do exactly the same thing. What it basically allows us to do is to create a low-profile hybrid technology approach that delivers on many of the technical areas that have been traditionally a challenge for the rest of the industry.

John Gilroy: Transformative, huh. Change.

David Geen: Transformative. Yeah. That's what it is.

John Gilroy: There's a lot of change that took place back in ancient history back in the Renaissance, and I'm a historian. I read about the Renaissance, and if you look at innovation and change, it's almost like in spurts or like peaks and valleys. I think right now we have kind of a peak with innovation in the satellite industry. So, what do you think about the innovation in the industry right now? Do you think it just slowly, slowly grows, or is it just a bunch of factors have come together at the same time to produce this new growth?

David Geen: Let's talk about it from two different sides. One is on the space side, and we've already talked about LEO and MEO constellations. They're obviously going to make a significant difference to how we can deliver our services across the planet. That's on the space side. On the ground side, we've been talking about various different terminal types and antenna types that contribute into the terminals for a long, long time now, and we've been talking about flat panels for a long, long time now, but I think from an audience perspective, they might be saying, "Well, yeah, we've been talking about it for a long time, but where's the products? Where are they?"

In this hybrid approach that Isotropic have taken, we really have, and hopefully if you come by our booth, you'll see that we've now been able to demonstrate that this is within reach. We're going to have products available for our partners by the end of next year, certainly pre-production units. We have retired a lot of the risk with regards to the technology, and we think that this is now the time.

John Gilroy: Interesting. I was just over at your booth earlier. It's very crowded. In fact, they're announcing all kinds of partnerships here. When I read about advances in technology, I see stuff on the horizon with wearable and flexible textile systems, all kinds of new things. So, what kind of new types of antenna technologies have you seen that might be game-changers in this industry?

David Geen: Okay. It's really the technologies that are…, I hate to go back to the business case, but it's those technologies that are meeting the business needs. It's not just the antenna technologies either. It's really about how the antenna

technology is packaged with the rest of the system. So, we could probably identify certain antennas technologies that are innovative, but it's not just that. It's about how do you work with the modem providers, for example. How do you actually connect to the network? And it's not just the antenna that does that. It's working with the, in our case, the modem providers like iDirect and others and making sure the package that you deliver is innovative.

It's not just an antenna thing. It's a terminal thing, and you really need to kind of step back a little bit and think about how are we going to provide something to a user that's really easy? For example, easy installation, that's another real key area where there's been innovation, and flat panel antennas or certainly steerable solutions with integrated modems, let's call it that. They offer the means, for example, just literally pulling out an antenna or a terminal out of a box, putting it flat on your roof of your house, and the installation is completely automatic and very, very simple. It's like a self-installation.

John Gilroy: I heard that word, self-installation, and I said "No way," but that's, in your press releases you talk about self-installing antennas. It's just really fascinating, brought all of it together make it much easier.

David Geen: Well, it makes it easier. It makes it better for the satellite operator because he knows that his antenna is pointing in the right place, so he's not diluting the efficiency of his network. It also reduces the cost ... let's say the overall cost of ownership because the service provider doesn't have to pay for a truck roll to get the guy to install the antenna. So all in all, that's a really compelling thing and it's something the industry's been looking for, for a long time. With the Isotropic solution, we think we've cracked the economics of that because the terminal price is low enough that it allows you to do that.

John Gilroy: I read a biography of Steven Jobs, and his goal with the iPhone was to make it so easy you wouldn't need a manual, so easy it would be self-installed. I see a lot of parallels here between maybe the futuristic thinking that John Finney has come up and Isotropic has, as far as self-installing things are just really hard to believe. So, what kind of companies do you think are best positioned to develop these types of cutting edge technologies? Is it engineering background companies or what kind of companies?

David Geen: I think those companies that aren't trying to push a particular technology. It's the companies that are really looking at the industry and saying, "What is it that's missing? What's not right? What would change the game, like self-install antennas, for example? Let's face it. It's all about the user experience and it's not necessarily about the cost or even how cool the technology is. It's about, are we solving a problem? So, I wouldn't want to identify any companies by name, but it's those companies that really look at the problems facing the end users, what they're trying to do, and the market sectors, and addresses those issues.

John Gilroy: I'll be in the classroom tomorrow night talking about marketing and sales growth, and I always talk about hockey stick curves and growth curves and growth of the iPhone goes up, but an interesting one is the growth of the digital camera. It was placed to start. It went up and up and up, and all of a sudden, it's flat and gone down, and so what happened was the innovation from Steve Jobs had an impact on other industries. I think innovation in antenna technologies can also have an impact on other industries as well, and we danced around that earlier, but we may see out of these hundreds and hundreds of companies here at Satellite 2018, the innovation from your little booth down there could impact some of these vendors.

David Geen: We hope it does. We want to talk to these guys, the service providers and some of the integrators and the operators. We want to talk to them and want to make sure that we're looking at this from a holistic perspective when we're delivering solutions that address the need and not just some intermediate solutions. The other thing is, but it's not just the satellite industry that can benefit from this. There's a lot of talk now about how satellite plays a role in 5G or even maybe not just ground systems, perhaps space systems as well. The technology is transferrable across the boundaries of the satellite industry, I think.

John Gilroy: I can tell by your accent you may not have ever been to Missouri, but in Missouri they have a model there. It's the "Show Me State, Show me. Show me what's going on." and so if I we're to press you and say, "Okay, ask the Missouri question here." So, when are these new technologies' going to become a reality?

David Geen: Okay. It's good question. We're at TRL level 5 right now with Isotropic solutions, which means we've retired much of the technical risk associated with the design approach itself. We've actually created test pieces, had them in anechoic chambers, done measurements, verified that the performance is as we'd expect, and so we're happy with that.

What we are now doing is working with people at the show, with customers, with service providers, with operators to understand exactly what their needs are, so we can productize that technology. The next stage for us is just to do that, whether it be aero, maritime, land, whatever it happens to be, productize those things, and we expect that by the end of next year we'll have a pre-production units in the hands of our partners to be able to do, do the initial testing.

John Gilroy: 2019. Wow.

David Geen: Yeah.

John Gilroy: That's good. In American football, we have a thing called a two-minute drill. So, I'm going to give you a two-minute drill here. At the session yesterday morning, they talked about 20 startups they're going to recognize here. Some of the startup are floating around the floor here. So, if you were to grab one of these startups and give them some advice, give them some PhD, Dr. David Geen, PhD advice for a startup, what would it be?

David Geen: That's a good question.

John Gilroy: Hire me?

David Geen: No. I'm comfortable where I am, thanks.

John Gilroy: Hire someone smart with a technical background. Yeah.

David Geen: For the startups, you've likely identified a piece of technology you think has relevance in the industry, but the really key thing is to go out there, talk to your customer base and generate some kind of demand creation. Get some interest and acceptance from the market and some support from them. So, it's not just about the technology piece. It's actually going out there as early as you can in the process, and it's a fine balance because you need to kind of convince people that you've got something that they're going to be interested in buying. Probably an element of retiring some of the risk of the technology but then quickly getting out there into the industry and making sure you've got their support.

It's absolutely key because ultimately a startup is all about investment, and you need to demonstrate to your investors that you've got people interested in what you're doing. John Finney, in this case in terms of Isotropic, is doing an absolutely stellar job in that respect.

John Gilroy: Wow. Yeah.

David Geen: And the press releases this week testify to that.

John Gilroy: Oh, all kinds. Well, David, unfortunately we are running out of time here. I'd like to thank our guest, Dr. David Geen, Chief Operating Officer, Isotropic. Thanks, David.