Deloitte TECHTalks | EPISODE 14 | Drones and Counter UAS Tech
With Jared Salazar, Managing Director, Deloitte Consulting LLP

Raquel Buscaino: Welcome to Deloitte TECHTalks. I'm your host Raquel Buscaino and I lead the Deloitte US Novel and Exponential Technologies team where we sense and make sense of emerging tech.

On today's show, I'm excited to be joined by Jared Salazar, Managing Director at Deloitte Consulting LLP, who has deep knowledge on drones and counter UAS technology, so UAS stands for unmanned aerial systems, so counter-UAS refers to how we assess and manage the risk that drones and other UAS tech can pose.

On this episode, we'll explore the rise of drones and UAS tech, the cross-industry impact of these technologies and how we can best navigate the challenges and risks they pose in our ever-changing world. So, Jared, welcome to the podcast, it is so great to have you on board.

Jared Salazar: Thank you, Raquel, it's my pleasure.

Raquel Buscaino: Shall we dive right in? I mean, you obviously have a lot of experience in this space, but maybe you could start off by walking us through what's the history of drones and how did we get to where we are right now?

Jared Salazar: Wow, that's a big question. So, the history of drones. Well, I guess I can go back to where it started, as a military idea. Drones were basically what we called state-sponsored threats. They fell into what's considered the electronic warfare realm, they were large and mostly used for surveillance and that kind of thing. As things moved on in the early wars in the Gulf, the drone started to be used actually for more than surveillance and started carrying kinetic loads and things.

Then we came into what we call the smaller drone, or the recreational drones became available soon after that. That was probably in about 2014. So, industry had categories created at that time, 1 through 5. Groups 1 and 2 are what we consider your small drones. You're up to 55 pounds is Group 2 and below. These were considered toys. I mean, it's what you got under the Christmas tree. We started seeing little, small drones being pulled out of the trunk of somebody's car and sent flying over. Group 3 is a very broad spectrum; it goes from 55 pounds all the way up to over 1,300 pounds. And then we have what we call groups 4 and 5, which are your large scale, typically state-sponsored drones, and those type of drones.

Raquel Buscaino: It sounds like we started with surveillance, then we moved to kinetic drones, right, as one dimension on the spectrum. And then there's also this other dimension of democratized access where that used to be just military, and now everyone who wants a drone can really have one because there's so much access. And then a third dimension to this is, they come in all different sizes and shapes on that scale of 1 to 5. It could be very small, or it could be really large drones. And so, talk to me a little bit about the different types of threats that drones can pose, and the different types of ways that you can react to that threat.

Jared Salazar: Right now, the cost to get into this market is very minimum. Organizations have found that for a couple of hundred dollars you can have a great surveillance program put in place.

The way US forces learned all this was during these conflicts that we've been in, we found that some organizations actually, they didn't have a lot of money, but they were able to purchase small drones, couple of hundred dollars, that had a camera on them that works, and they were able to fly these out and get information, they were building TTPs – tactics, techniques and procedures. You could actually go up to a base and kick in the gate, or just make noise at the front gate while you're flying a little $200-$300 drone in midair, and then you can actually time how long it takes security to get to that gate. Then I would know "Well, I got 48 seconds, then I can get through that gate and get in and do this."

The use of these inexpensive "toys" was becoming very advanced and sophisticated in the ways they were doing this. So, it changed the way that we had to think about how we look at these "toys" and what we're going to do with them. And it turns out the threat itself was more difficult than we ever thought. They're small, they're slow, and they can pop up anywhere at any time.

Raquel Buscaino: Well, so how do you know whether a drone is just a surveillance drone, or whether it's actually carrying a harmful payload?

Jared Salazar: Yeah. That's a big part of the challenge; drones are being used for great things also, all over the world, they're being used for blue uses, or even green uses where it's positive in the climate and other things that we're using them for. But how do you tell the difference between that or a drone that you know some young man or young girl picked out of the underneath the Christmas tree, and they're out-front flying now. And they just didn't pay attention that they live next to a military base, or, you know, even a power company and it looks like they're doing something nefarious. But how can you tell the difference? It's almost impossible to just do it by looking and what the forces have done, to include federal, local agencies is to try to come up with what we call "a system of systems." There is no one-silver bullet to answer this problem.

Radars were meant to see things far away, pick them up over a certain amount of time and speed, and the signal bounces back and that's how we detect those. As US Forces work with these small, low-slow flyers, they found that when you tune the radars down so much to see these, you get a lot of false detects, and you can't tell the difference of a bird, even a tumbleweed, a car going by, you really can't tell.

So they went with RF Systems that do detection of signals in the air and looking for any emissions coming from the drones. They built library-based systems off of the things that they know, well some of them don't emit. You can actually have a drone fly now in a direct route without any emissions. So now what do you do? It would better get some cameras in place and see if where they're located and find them. Well, you either look out into a clear blue sky or a clouded sky, and try to see a bird, you know, 500 meters away, it's very difficult to tell what it is and where it is, and by the time you realize what it is, typically, it's on top of you and it's too late.

So, as you hear that, you can understand. This is not an easy problem to solve. We're not trying to find a needle in a haystack, we're trying to find a needle in a stack of needles.

Raquel Buscaino: Hearing you walk through all the different steps in this process for evaluate “threat” or “not threat” or how to respond is pretty remarkable. Well, so that is interesting you mentioned about the RF Detection signals, and that some drones don't even emit any signals themselves. Can you talk to the role that autonomous drones are playing in this space? Because I feel like autonomous drones limit the amount of actions that you can then take to prevent these events from happening.

Jared Salazar: That's exactly right. As this tech continues to expand and things like AI and ML, keep it growing and expanding, we're finding that the drones just get more advanced, more technical, harder to follow, harder to keep up with.

So, you take a drone that typically emits a signal, even if it's just GPS, and it's using that to fly a route that you gave it. What we have now today is ways of either flying cellular, where you don't ping anything until you get to a tower and then we have drones that you can actually just type in a location, and they will go there.

Funny enough, the agricultural community actually is one of the leaders in non-GPS flying and doing things in that arena. But what we have now is basically a low-slow, flying missile. In the past, the air defense would use missiles or bullets to shoot down, you know, missiles, and what we're doing is kinetically killing these things. Well, you have to have targetable data in order to do that. Going after these drones, it's very difficult to get targetable data, and especially when we start talking cost. You're chasing a $300 to $500 item with a system that may cost a billion dollars to build, where it's hundreds of millions of dollars to kill a $400 item. That is not going to work. And those costs don't add up or equal out as we go in long term. So how do we stop those threats? That's where we are today, we're trying to create the “system of systems” that can go after and do these things in multiple fashions. The phenomenologies have to be brought together in order to come up with a true counter-UAS program and system.

Raquel Buscaino: One thing that you said that I really thought was interesting was that the agriculture industry is one of the biggest adopters of drones. Can you speak to what those opportunity areas are in Ag [Agriculture]?

Jared Salazar: It is. The agricultural community has been doing a lot of work with drones for years now, and what they actually do is instead of having aircraft, or people drive around in trucks, they've used drones to fly around and do the maintenance, upkeep of the agricultural areas. Also, it maps out where they're growing, what they're doing. They could have different payloads on board, they could use it for a spraying and doing those kinds of things. As the drones fly around, they know the agricultural shape that they're actually working on, the geography, it may have to spray a certain area, then stop, go to the next area and it doesn't need spraying, so it's going to just continue over there. So, they've done a lot of research and advancement in that area.

Raquel Buscaino: I do like the example of agriculture, because I think for all of the military applications we've talked about too, there's so many great commercial applications and one of the interesting use cases that I was reading about was in disaster relief. I mean, talk about a more impactful use of technology than that, where you know, you're talking about things that can be dangerous, hard to get

to, and where there's a clear necessity for it, I mean that, in times like this, in those use cases where I think, wow, thank goodness, we have this technology to be able to help.

Jared Salazar: It really is. When you have a major disaster, say a hurricane or a tsunami, there is no roads. There are no communications anymore. There's nothing there. So now, what do we do? Instead of everybody lining up and trying to crawl through and dig through and get in there, we can fly drones over right away before it even ends. We can have drones in the air, identifying where people are. If there are folks that need attention or anything, we could fly over and see that. We could also see "Is there fire?" Are there other threats of emergency? Is there electric cables that may be hanging and are a threat, before you send emergency groups into a building? All these things can be picked up on and laid out before the crews even get out of their vehicles and start to advance. We can have all that information laid out for them to speed up the processes and make it more efficient.

Raquel Buscaino: Well, as we look to the future. Where do you see this future of drones, anti-UAS technology heading? Let's say the year is now, is not 2024, let's say it's 2034. What does that future look like to you in an ideal world?

Jared Salazar: Well, looking at this today. Drones are not going away. Autonomy is not going away. In this case I would say autonomy is the connector, and what we've changed now in fact, it's going to continue to grow, and every day we find something new that's out there. Whether it's delivering packages or, you know, imagine the perfect cargo ship. It doesn't have any flaws when it starts to maneuver improperly, it takes over and make sure it doesn't get stuck in the Panama Canal, or wherever these things are. Imagine a supply chain that automatically checks for every single piece on a motherboard or on something can tell you right away where it came from, if it's legal, if it's not legal, what the depths are, all those things. This is the future and it's not going to stop.

The same thing with the positive uses of those drones as we talked about earlier, whether you're in insurance, whether you're at a ball game, no matter what you're doing, you're going to have some touch with autonomy in the future.

What I would like to see in my utopia society here would be a great linkage in use of what people can do, and how drones or unmanned systems can enhance that, not take it over, but enhance what we do today. And we can actually learn from each other and enhance those capabilities.

Buscaino, Raquel: Yeah, well, it's an ever-changing landscape, and it's not something where reactivity will be suitable, proactivity is the name of the game. And so, even just hearing you talk through, the history of drones, where we're at currently, the scope and the magnitude of threat detection and assessment. I mean, all of this, Jared, I think, is even helpful in bringing awareness to the conversation that way we can continue to make sure that drones and UAS Technology work in service of humanity and not against it. So thank you so much for walking us through this today.

Jared Salazar: Thank you again, Raquel. It was my pleasure to be here.

Raquel Buscaino: It was great. To all our tech savvy listeners out there. If you enjoy this episode, please share and subscribe. And if you'd like to learn more about drones, counter-UAS tech, you can follow

myself and Jared to stay up to date. Our socials are listed in the episode description. Thanks for tuning in, and I'll see you on our next episode. Until then. Stay Savvy.