

Written Transcript On The Line Episode 3.4 “Drones”

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Charlie Palmer: Welcome back to On The Line, a podcast for today's wild land firefighters. These devices have the capability of being a complete game changer and not only how we attempt to suppress fires, but also prescribed fire work and a whole bunch of other duties that were called upon to perform. And yet they have been referred to by some as a love hate relationship that they have with this specific piece of technology. And so if you haven't figured it out already, of course I'm talking about drones or more accurately termed unmanned aircraft systems or UAS. So on the podcast today, we have from the University of Montana's national center for landscape fire analysis. Dr. Carl Seielstad. Carl was on with Lloyd last year, right? (Yes) Smart and smarter. Great episode. If you haven't listened to it already, by all means tune into that one. And then we are without Lloyd today, but in place of Lloyd is Tim Wallace. Tim is a virgin, so to speak, on the podcast. Tim, welcome. (Thank you Charlie.) All right, glad to have you here. Tim's a former naval special warfare warfighter. Uh, also a former smoke jumper. And now your position title is image analyst at the National Center for landscape fire analysis, all that's correct. (Yep, Yep, that's correct.) All right, glad to have you here gentlemen. Welcome to the show.

Carl Seielstad: Thank you Charlie.

Charlie Palmer: So Carl, if you could just bring us up to speed on the history that you folks have with drone work. How did you end up using drones in some of the, uh, things that you're doing at the center?

Carl Seielstad: Well, Tim and I and others have been involved in 3d characterization of forests and fuels for 20 years now. We've used laser scanners on aircraft. We've used terrestrial laser scanners, mounted on tripods, and a variety of satellite based remote sensing techniques to understand how materials are arranged in the forest and how fire interacts with them. And the advancement in drone technology has allowed us to make a lot of the measurements that were very difficult to make previously, easily. And so three years ago, myself and some others at the university were awarded a, a grant through the Montana Research and economic development initiative, really focused on bringing drones into the kind of work that we did. And one requirement of that grant was to work substantially with the private sector in Montana. And so that effort three years ago really kicked off our kind of heavy duty engagement with drones in the state

and the region and allowed us to meet a lot of people in the private sector and in the agencies at a time when drones are really emerging.

Charlie Palmer: A great grant to have, Huh?

Carl Seielstad: Yes, it's fantastic. It was perfectly timed and it really fit right into what we were doing anyway, if it right into the research that we were conducting anyway, it was ideal.

Charlie Palmer: Cool. Tim, how about from your side? How has your involvement been?

Tim Wallace: So my deal was one point in time, Carl pulls me into another guy's office and he said, hey, we got this grant coming. We think, oh, we banged it out. I think in like three days. You guys wrote up a proposal and he's like, think this drone thing's going to happen you two have your pilot's license are you in? And my first thought was like, I was like, drones are dumb, but whatever. Let's roll. Let's see what happens. So we dive into it and like two battery cycles into flying one, I'd just completely 180. Yeah, there's no zealot, like a convert. And I went from zero to a hundred and just every day we were out doing something with them and we spent a full year just concentrating on every aspect we could.

Charlie Palmer: So I'm interested in that then why do you think that was your initial impulse that drones are dumb? Because I don't think that's uncommon.

Tim Wallace: No. Well, what I'd heard up to that point, you know, they were kind of these toys, you know, you always hear the, the urban legend, uh, somebody spying on their neighbor with it playing in the backyard. And I wouldn't doubt that happens, but I don't know why. My initial perception was that other than, you know, we were going to do something involving fire and all I could think was you've got all these drones flying around a fire and they're going to get in the way of the tankers and they're going to have to ground everything and it's just going to be this, you know, and what for what, what, what, what's the benefit to them? That was my initial thought was like, okay, well we're going to do this, but you know, it's going to be a steep hill to get up because, you know, fire folks don't need more gadgetry. They don't need more, um, layers of responsibility. And so you start throwing this into the mix. They make a hard job even harder. So that was kind of my initial impression was I don't know how much traction we're going to get with this stuff, but it's certainly changed.

Charlie Palmer: Yeah. And when you say two battery cycles, that's not very long. So what happened in that short amount of time that made you such a proponent for them?

Tim Wallace: Well, the first one I, I played a lot of video games when I was younger, you know, like a couple of those pay off kids. It does pay off. So I played a bunch of games and to be honest, the drone was like, it was the same thing and we even changed the controls. We mapped the controls on the drone to mimic the same

ones that call of duty. And then it was, I mean, you know, I got like thousands hours on that so you know, then we were flying all over the place and we were just trials. Thousands, I'm 45 man, I still play. So I love it. I had mentioned this earlier and this was kind of the selling point for me is this stuff we were looking at with the drone. I've looked at hundreds of times, but seeing it from that perspective really kind of opened up the window to like what you really can do with them.

Tim Wallace: I mean like we're talking about trees before I've cut down hundreds and hundreds of trees, you know, we've been in the woods for days, weeks, months, that sort of thing. But getting that perspective from the drone, something as simple as the drone looking at a tree from that way that you know if you climb, you get to see that occasionally if you're not like Koala'd the bowl of the tree. But like it was just that, that notion that I'm seeing the same things I've seen over and over, but this completely different perspective. What else can I do with this? And the fact that in those initial flights, those were easy. We got into more difficult things as it came along, but the first hit was free.

Carl Seielstad: Wow.

Charlie Palmer: So to kind of continue with that question though, what do you think the average or the typical firefighter who probably doesn't know that much about him, you know, knows this probably love hate piece of it a little bit because they've heard what you've heard about, you know, the amateur operator that's interrupting airspace around a fire and causing them problems. That's the hate part I think. And the love part is I think part of what you expressed, which is holy crap, these things have immense capabilities that we're just beginning to scratch the surface with. Um, what's the typical firefighter need to know about these things?

Tim Wallace: I would say they're not as easy as you might think in your environment. They're easy in the backyard, out at the park, right? You get out to Iowa some place like that that's flat there easy relatively. You get them in the mountains and wind with tall trees in the fire environment, it's a whole different story. So while they are easy to fly, they are difficult to master.

Carl Seielstad: Yeah. And I would agree with that. They have become quite affordable and the performance that you can acquire with a relatively small investment is amazing. The things you can do in terms of collecting imagery and flying to places that you probably shouldn't fly. And looking at things from various perspectives and creating three dimensional point clouds and maps. I mean that's all now available to somebody sitting at home. Yeah. And so they're remarkably powerful and they're remarkably easy to get into. But once you get into them and start trying to put them to work, there are a lot of complications. I think that's probably the biggest lesson that we've learned over the last three years is that it's not as easy as you might think, but I mean, I guess my advice to firefighters is that you have to get involved in them and get started with them to see what they can do and to start learning how you might use them. Yeah, I

think there's a, there's a tendency for people to look at the technology as being too complicated, too much overhead to get into, and I don't think that that's true.

Tim Wallace: Yeah, I would agree. And I think with them, for sure, we'll probably get into this later. You can make them as complicated as you want to with the expected results, to be honest.

Charlie Palmer: It probably makes sense then to just get a little clarification on the types or the classification, just cause it's not very specific just to say drone. Right. I mean it's such a huge category of different airframes that are gonna fit within that. So what do you have on that just to help somebody understand that when you say drone, that could mean a lot of different things or a UAS?

Tim Wallace: Yeah, for sure. I think I'd break it down into three categories to start out with. Um, whether it's a multi copter and that's that little buzz drone that you see everywhere. The typically it's a little white one. It's probably like a fan four or something like that. There are different configurations of that, but it's some type of like multirotor platform. Then you have fixed wings. Um, just like in standard aviation, rotary wings and fixed wings, you might see those out at the park or you know, there might be a mapping drone like that, but typically just a flying wing is what a majority of them are. And then you've got your hybrids after that. These are all just the aerial stuff. They've got like rovers, drones, they've got submarines, they've got everything. But the flying things, you've got multirotor, multicom fixed wing and that a v Tall, just typically a quad plane or some sort of hybrid tilt rotor.

Tim Wallace: Like, think about, you know, a 22 osprey type thing, which is becoming more prevalent and more effective in the mountains between those three types. Then you break it down into size classes and I'll just go from basically what the DOI Department of Interior has kind of laid out with their stuff and that there's four classes type one through four, same idea in fire, right type ones, the great big ones. And that'll be like your scan eagle. It's made by Boeing. They're big fixed wings, you know, they got like a catapult launch that, you know, there's a big trailer, a, their ground control stations are like, you know, more powerful than what launched a man to the moon, that type of thing. Probably some sort of like military development in the past that they're using right now. Um, Bridger aerospace has got, uh, some type on ships. Uh, type two, probably more, not as capable, won't fly as far as high sensors aren't as, as good, but still a pretty good sized platform. Right. And we're talking like, you know, 10 feet wingspan, that sort of thing. Um, and then you get down to the type threes and that's kind of what you would expect to see it in RC field. A really nice like hobbyist platform, six feet wingspan, uh, maybe some multi rotors at that point. And then your type fours are, yeah, the hobbyist stuff down to half a pound, multi copter, 20 minute lifespan, that kind of thing.

Charlie Palmer: Okay. And a firefighter could potentially see or experience anything in those types?

Tim Wallace: Yup. You'll see a type four, for sure you'll see a three. I think they might have one or two other platforms out there. And then the type three is a, it's a tilt rotor. It's a v Tall. As far as I know, there's only three platforms that are sanctioned by the DOI at this point. They're looking at more and then they'll see the type ones. There's four call, we needed contracts out and I think they had seven more on the way. They might seem overhead, but they're usually night missions.

Charlie Palmer: Okay. So if you were to use a call when needed, UAS, what are those folks doing? What are they using them for?

Tim Wallace: Um, what I saw here recently, typically they're flying at night and the TFR is down and they're trying to map hotspots. So whether they're doing sort of a higher ops type mission and they might patrol a part of the line during the day or something like that, that is, you know, they, they've moved past that division, they just want to keep an eye on it. And then I think they're starting to get into some sort of mapping for the burned area, emergency response, the bear teams after the fire, what do we got to work with? That sort of thing.

Charlie Palmer: Okay. And you mentioned Carl, that you can just end up making these things as complicated possible. And so what does that look like?

Carl Seielstad: Well, I mean I guess we should back up a little bit. I mean the entry point probably for firefighters in terms of really nuts and bolts is going to be the simple, the quad copters the electric powered aircraft because they can provide you individually with situational awareness with intelligence that probably more easily in some cases than you could get on the ground. Tim and I have long been advocates of keeping things simple and it's a great tool and it's a great place to start. But when you apply those simple systems to, for example, fly far away where you're looking at features on the landscape that are miles away from where you are immediately becomes more complicated because you have to deal with battery life and if you're going to recover your aircraft and maintaining line of sight. And so there's a lot of complications that you can introduce just by having an application that isn't really well suited to your platform.

Carl Seielstad: And then we get into complexity on the scientific side when we start adding multiple sensors and trying to do sensor integration and then the processing to produce and you know, research product that we're after in terms of fire progression, you know, spatially explicit fire progression data and three-dimensional fuels and stuff can become quite complex. But I think that when we start thinking about like the Scan Eagle, I've worked with the partners on research projects before that had a scan eagle and it really requires a team. It's a very expensive operation that requires a team of people and very complex equipment and very sizeable equipment. It's a big operation when you move up into the type two type one aircraft, you're looking at operations that resemble operations for manned aircraft. Okay. And price points to go with that. And so I really think that, you know, fire fighters are going to interact with those type one and type two drones in a way similar to how will they interact with type one

and type two aircraft now or there's something that's flying overhead way up there that is doing some complex mission that you might receive a product from or the map and the shift plan.

Carl Seielstad: The next day might be based on what they produce, but at least over for the next few years, that's probably going to be the extent of involvement by firefighters.

Charlie Palmer: Okay. But a type three or a type 4 a smaller one, it might be the more immediate future as far as how a firefighter might interface with one in terms of use.

Carl Seielstad: They have some control over what the, what the aircraft is actually doing.

Charlie Palmer: And what do you see that looking like? How do you think that is gonna play out?

Tim Wallace: My take is the, the type one ships are a strategic asset and the type three and fours are kind of essay from my perspective, the type to the high end type three and the, and the type two stuff is kind of open country, you know, and that's a tough tactical sort of resource that eventually in time you'll develop probably agency teams to the three people run in some type of platform at that level that has the staying power and the endurance to actually kind of contribute more of a tactical advantage and a perspective. That would be my take.

Carl Seielstad: Yeah, I would, I would agree with that. Tim and I've talked a lot because we interact with the fire community on the subject of drones frequently that there's a lot of applicability with the real low cost drones to firefighting. Um, and we don't see a lot of use yet in the field. But I'd be sad if drones were particularly the type for drones found their way into such level of specialization that you, you weren't able as a firefighter to employ them on an incident to collect information that you needed. Um, and I don't know that that's the direction we're headed. I know, I mean the forest service is getting into drones sort of carefully. DOI has been a little bit more aggressive and everybody's trying to figure out where drones fit. But I think drones fit at some level with individual resources like hot shot crews or could fit in engines where with a capable operator a lot of intelligence could be gathered, fires could be managed more efficiently. And I would like to see fire open up a little bit to let firefighters innovate with the technology and that might happen.

Tim Wallace: Yeah, there's a lot of sort of inhibitors in the way, whether it's you're not carded or it just the requirements of staying under 107 rules to a certain degree is, is almost a restrictive where they'd be most effective. Those type fours and type threes is with initial attack and extended attack. And so like Carl had mentioned, you know, you throw that in the back of a, of a soup rig or you, you know, strap it to some cargo and para cargo it into the Bros. You're gonna have an asset that needs that essay. They're able to fly it, you know, onsite. They're not going to have to bring in a separate resource and they're able to get real time

intelligence and do some of the other stuff. The mapping and things like that that you kind of come to expect from type three organizations in the fire community. That's where the biggest impacts going to come. As soon as the sort of the restrictions come off a little bit and then the animation is going to be, you're going to see a lot of cool stuff come out of folks.

Charlie Palmer: So you're talking about different assets. Maybe it'd be a hot shot crew or a jumpers or engines or whoever. And then they've got some folks that are capable and trained and they've obviously got a platform that they can use. And then you talked about some of the different things that they might get from that or what sorts of information they might find. What else on that? How do you see those folks when we get to that spot of how are they going to use that instrument?

Tim Wallace: Immediate feedback. The first one we talked about, you put it on the back of a type six engine. They're driving along trying to find the fire. They just stop. Five minutes later they've got an eye in the sky, 400 feet up. They can see where the smoke sat, the best route of approach. They can scout everything out, goes back in the truck. I mean that's immediate. Um, you extend it out, you know, maybe a division, not the division themselves, but somebody on the division flies a division for them. They've got an air asset that is sort of contained in their, and it can give them immediate information that they're otherwise going to have to hike the entire line. Look at, they're still gonna hike the line. Right. You're just looking out people out there. You're not completely sitting back and watching a monitor. But the ability to change perspective and prioritize what you want to look at with that. I mean, you take it off from the ground, you see your immediate division, you can see the burnout that's going on, division, Echo, that sort of thing. All these sorts of immediate response essay that you can gain. That's where it's really gonna take hold and be embraced by the community as an asset.

Carl Seielstad: But getting firefighters trained up on that. It's not a simple problem. I mean, one of the things we've learned is the drone operator really operates the drone. It's hard to fly a drone and have collateral duties. The division supervisor's not going to fly the drone. They've got other stuff to worry about. We've had these issues. I mean, we've developed a series of checklists and that sort of thing because the drone operator really needs a sterile cockpit. It sounds silly, you know that somebody's on the sticks playing call of duty out in the woods collecting NSA needs a sterile cockpit, but one Tim's flying something and I'm talking to him and there's something else going on. There's just bad stuff that happens. And so, you know, it isn't a simple problem of it'll hot shot crews or carry drones because somebody on that crew needs to be responsible and solely focused on that. So it isn't like with drones or we're going to pop the drone out of the back of the type six and you know, everybody's gonna take turns flying it around. There's going to have to be, and you know the, the agencies are working on that. It's just, you know, there, it's a slow process to figure out where they fit.

Charlie Palmer: Yeah. It's not analogous to spin in the weather where give somebody the kit, anybody's going to do a, 20 minutes later they're going to come back and have some info for you, and then they're going to go back to being a digger on the engine or whatever. It's like you're more talking about a specialist and still they're going to be a firefighter, right? They're going to be carded and they're going to be operational and they're going to be able to do everything else that carded firefighter can do. But it sounds like what you're describing is really probably primarily if we have drone duties, you're the drone pilot.

Carl Seielstad: I think it will. It'll, it'll have to be that way. If there are drone duties then there is a person that is responsible for that activity. Yeah, exclusively.

Charlie Palmer: So you guys have kind of described the future a little bit. How do we just start the process of someday getting to that reality?

Carl Seielstad: Well, I mean I guess if I was king and tyrant I would train up some smokejumpers and maybe the great base in Alaska where Alaska probably would be the ideal place because so much of the jump country up there is flat and remote and fires are large, fires are large and they tend to have few people on them and you have more fires in Alaska that don't have a lot of hardware up overhead all the time. And so there's a test bed and the jumper community would be a phenomenal test bed to put some of these drones out on fires and see what they get used for. Yeah, I mean the smokejumpers are remarkably innovative group of people. I think that drones will get used in those environments. Probably in some ways that would be disapproved of. But for the most part, I think that you would see utility really, really fast or you would see the absence of utility where over a course of a season or two they'd come back and say, you know, these are more trouble than they're worth. Or these could be useful if x, Y and Z x, Y and z were done. And so again, I mean that's just my sort of vision would be to see a group of people turn loose with the technology and some with some sidebars that see what they do with it.

Charlie Palmer: Yeah. And then real careful debriefing to find out what worked and what,

Carl Seielstad: what needs adjustment. And there are people now starting to explore how to use drones, not, I'm not talking about like rogue operations in Alaska, that sort of thing. But if you don't like Tim, Tim and I were up with the Montana Department of natural resources last week at Libbrecht with their engine academy and we flew drones and they're interested in what can we do with these, we know they're coming, how do we get people involved and we're interested in assisting with providing opinion and advice and data on how to do it best. Lots of fire is trying to figure out what and where it fits, where it fits and how to use it. And then there's also operational stuff. I mean we talked earlier about the fire use module and Colorado. That was a couple of weeks ago, the point of drone on a remote fire that they were dropping ping pong balls at night to complete burnout operations and it was very effective. It isn't like fire management is sitting by, ideally the technology is finding its way in certain places into operational use. Yeah.

Tim Wallace: Carl, you actually might be more king and tyrant you thought so Alaska, has a, they've got a program going. There are a bunch of Bros, like k guys and some folks in Boise. Strout I know has been really instrumental in getting the drone program and I would expand even a little bit outside if I were king and tyrant to the jumper community with the notion that they have a standardization across the basis right there. There's, you know, doctrine and the procedures are the same and things like that. And that would help bring a drone program into fire. That would be the same everywhere you go that has the same operating procedures, the same checklists, things like that. So on Carl's point, I would expand to the forest service basis as well, or the helicopter programs, right? They've got the same thing going on engines, you know, people that would have a standardized operating procedure for these drones. That's where it's really gonna take hold, I think is that everybody's on the same page and we're flying these things the same way when we share our innovations are that hazards we run into. Everybody has the same benefit from that.

Charlie Palmer: Yeah. So if we could put our magic hats on and flash forward in time, let's say 50 years, we're still fighting fire. That hasn't gone away. But we've got the benefit now of 50 years of technology. What would you guys think that we see in terms of UAS?

Carl Seielstad: I think we're going to see in 50 years a lot of the traditionally manned aircraft activities replaced by unmanned systems. It's inevitable, I think. I mean there's just so, so many advantages to flying aircraft in risky situations without people on them. And I'm certain that it's going to happen. There's a group in Colorado that's been flying at k Max, uh, with a bucket with no pilot. You know, a UAS. It's a conventional helicopter with electronics to allow it to be flown without a person in it. But, and it hasn't been unleashed operationally yet, but that's the direction that we're headed. And I think we'll see it in other parts of life too. I mean, I know that the hurdle of like taking your family to Europe on an aircraft that doesn't have a pilot is kind of a scary concept. But I think that's probably coming to, yeah.

Tim Wallace: you know, you guys are certainly a generation ahead of, when I started, when I started, we weren't doing a whole lot of fighting fire at night and you guys did and it seemed like it was pretty effective in an initial attack I would think to 50 years ahead or maybe even 10 or 15 a lot of the opportunity where we're not doing stuff is where the, the unmanned assets might come in. You can't fly at night, but it's the best time to fight fire. One of the best times if you could have a k Max or some sort of platform, just pound in a fire with water or you know, something, keeping stuff in check, doing work at night. That I think is going to be the best benefit when we can't fly anyways, bringing the drones low risk, high gain on that.

Carl Seielstad: Yeah. And I think that's how we'll segue into more widespread use of drones on wildfires will be the night activities.

Charlie Palmer: Because when you start talking about, we'll get to a point where manned or staffed aviation elements are now done autonomously or with a drone. You're talking about a helitack crew that is on a helicopter with no pilot. You're talking about smokejumpers that are flying on an air frame with no pilots. You're, you're talking about lead planes and air tankers that don't have anybody.

Carl Seielstad: When I just look at how technology has evolved and how practices evolved over my 50 years, my 52 years, the amount of change is staggering. And so when you, when you look out 50 years ahead to what we're going to be doing in fire, I think that it's going to be transformed. There are a lot of challenges that we're going to have to overcome. I've heard people say that they don't want to fly a commercial flight without a pilot cause they want somebody that's responsible for the aircraft to have some skin in the game. And I understand that sentiment. I mean there are all these issues that we have to overcome that there. And I do think that, you know, when you're looking at a tablet with joysticks and find something off away from you that your perception of risk and your risk profile and stuff is different. I don't know what it would be like to have those joysticks and fly a drone somewhere that somebody was on. I think, you know, if you had a human on that drone that you were flying, I don't know, it would be different for sure. But I don't, I mean

Tim Wallace: yeah, that's actually, now that I think about it, this kind of disturbing seems like a lot more responsibility than just be in the pilot. Last year I got the opportunity to now fly some stuff for the flooding for the county and we did some things for the army corps engineers. So I have a fandom for pro of my own. And what is that again? What is, it's a little a, it's a little multi copter. Um, it's about a foot in diameter that I, you know, just kind of your typical, when you see a drone on TV, chances are good. That's what it is. We also have some at the university and so I was fine as a university employee for the county and Army Corp engineers had this bridge cause you go to placid lake, there was a, a cavity in the road and someone put a cone over it and they were trying to figure out what was going on with this bridge.

Tim Wallace: Was it, you know, breaching behind the retaining wall, what was going on? They looked under, they couldn't see anything. It was dark. The water was, you know, rushing by a really fast, they couldn't get in the water and they looked at the other side of the bank. Nothing. Hey Drone Guy, you think you could put that drone underneath that bridge and get us a picture? I don't. Sure. Well yeah, let's try it out. Let's see what happens. So I went and bought a pool noodle, like cut off some re cut off some strips, put it on the skid. So if I dumped it in the water, I could at least recover it. And I flew it under the bridge and we took a picture under the bridge. It's like two feet clearance. What I have done that with my own, not a chance. So the, the amount of risk you're willing to take as also to the point of how much you're going to be covered by it.

Tim Wallace: And I think that kind of comes back to the federal idea too, is that, you know, if I've got my own stuff out there, if I'm driving my own car to a fire, I'm probably going to take it up that road. But if I have a vehicle that I can use to get the job

done that I know I'm going to be supported and I'm gonna, you know, have the, the maintenance and, and I'm not gonna tear it up. I needed to do this job. And the drones are going to be the same way that when you have the backing and you're going to be able to take those risks, not haphazard, but if you're able to take risks with uh, you know, some kind of a security net, you can do some really cool stuff.

Carl Seielstad: That flooding is a good example too of kind of where we're at with drones and, and utility. The county wanted to want it to know if drones, I mean they had all these things they wanted to know, like what are the power lines doing out on Kelly island, you know, or can you see under this bridge? And we don't, we didn't know the answers to those questions. And so that whole, that whole process of involving the drones was can you do this? I don't know. Let's see if we can, and that's where the innovation comes in is having drone people working directly with people who have ideas but don't know how to do them. And so a lot of knowledge was learned from that flooding deployment because it was a whole series of, well, can you do this? Can you do that? Can you do this and that other thing. And some of the things we discovered were easier to do than other things. And so that if the fires in the same boat where we need drones on fires with people saying, Hey, well can you do this? Yes, we can let, well we don't know, we'll try it. And then that's, that's why I would like to, I mean that's where the innovation is going to happen is by actually getting drones out.

Charlie Palmer: Yeah. But not enough discussion. Yeah.

Carl Seielstad: Environment and then some discussion and then some follow up, you know, repeated use, focusing on what works and what doesn't work. And I think we're doing that on in kind of an ad hoc way collectively. And fire management. Yeah.

Charlie Palmer: If I'm a firefighter and I'm interested in this and I'd like to fly a drone and somehow tied into what I do as a firefighter, what do they need to do? What makes sense for their development to, to become a drone pilot?

Tim Wallace: First thing, I have a gate. Get your 107 okay. And that is what part 107 it's your small UAS pilot certificate allows you to fly a drone between half a pound and 55 pounds within certain limitations. But it's the, it's a commercial drone pilot license. Anybody that's out there and gets paid to fly drones has a 107 as far as I know currently before you take their remote pilot courses, you have to get your 107 there's no practical tests. There's tons of information, especially on the FAA website on how to do it. Study material. If you already have your pilot's license, it's 37 questions online and test and your, you add that certificates added

Charlie Palmer: to your private pilot's license. So it gets your 107. Okay. And then you say you get your 107 and then the DOI had some course curriculum.

Tim Wallace: They do, they do. There's two courses. Um, we were able to sit in on a little bit of the first one. It's at two weeks. The first one is just your basic general remote pilot. Basically you're your carded for the agency. So you get your one to seven to fly commercially as a civilian. And then you get this added course from the DOI to be able to fly their aircraft and be, um, you know, certified through them that allows anybody to do it, not just fire. So, and something else we need to talk about too, there's beyond fire, there's a lot of applications to drones, but that lets you know, the wildlife biologist fly a drone to look at, you know, sage grouse or whatever else the week after that gets into flying in the fire environment. So, you know, airspace flying or the TFR, you know, the Camo, all those sorts of things, um, that are really specific to, to flying safely, integrating into the airspace over a fire. And then after that, and they've got a ton more courses they're at and they're adding that has, it's an impressive array. There's a lot of thoughtful courses and material that they have. They've done a really good job of, of kind of lining up, getting the training and the certification up to standard that's applicable and useful.

Carl Seielstad: And then I guess I would add to that. Get a drone. Yeah, so I mean I think about like the technology, the transformative technology in my career in fire, probably the most transformative technology was the gps and the reason the gps, the benefits of it not withstanding, the reason it, it found its way into fire so fast was because you could very quickly by a gps at the local sporting goods store that served you when you weren't doing fire. And so everybody, you know, nobody waited around for the agencies to sanction anything because you could just go buy a gps that was better than what you are going to get from the, do you remember the one way when we pulled the gps in and so I don't know that drones are going to be as imminently useful as GPS, although they, they rely heavily on gps to operate, but the lesson learned I think is that for drones to really become ubiquitous and fire, then they kind of need to become ubiquitous and use by the people who are going to be operating them. Yeah. So 107 and get yourself a drone and start flying it.

Tim Wallace: Yeah. And it doesn't have to be, you don't have to dump a grand into it. I said go to radi..., Go to Walmart and pick up a drone that you can fly on your backyard. (You almost said radio shack.) I know, I know. I'm hanging onto the cusp of view. Um, but you know, I mean I, there was a neighborhood dog that I chased off from my yard cause he kept coming over me and all my dog suit and you know, that was, you just do stupid stuff with it and you get good with them that fast.

Carl Seielstad: I had, you know, my son had a toy drone that is now been destroyed through various manipulations and maneuvers. But I, a few years ago I was, he was in high school and I would come home from work and he'd work out in the morning and then he was tired for the rest of the day. And my perception was, is the dad coming home at the end of the day was that he was just lazing around at home all day and I was, I got angry one days like, Jim, you got to do something with yourself. And he's like, well, what should I do? I said, well, how about you take that drone up, fix that drone, which was broken and take it up and check the gutters because my gutters were overflowing and we have a

house, the two story house, it's hard to look in the gutters. I come home from work a couple of days later and he's like, Dad, I checked the gutters.

Carl Seielstad: Here's where you need to fix stuff. I was like, show me. And he had flown that drone above those gutters with that camera about a foot away from the gutters on all the way around the house. Systematically you could see everything. It was, it was unbelievable achievement and from my, for a whole bunch of different reasons. Right. Got Him going on something that was interesting. He had to figure a bunch of stuff out to make it work and he just needed a mission. He came in, he did a mission that he could relate to and he fixed it and he flew the gutters and it was true. I mean that. So there, I mean, you know he's a drone guy too. He likes drones and video games and part of that's because he, he uses them.

Charlie Palmer: If we're going to wrap this up a in, in the little bow, Tim, what do you have?

Tim Wallace: One of the take home messages I always have is everything's a Beta test. So there's a wealth of knowledge out there. It's free, it's in the forums, get spooled up, get educated on every part of it. The platform, the software, the ground control, who's doing what with it because everything at this point, although people say their finished products, it's still a Beta test. Stuff's that new. It changes in six months or less. So if you're interested in it, get your 107, get educated and get a drone.

Carl Seielstad: It's quite easy to buy a drone and start flying it without too much trouble. But there's a lot of complications. There's a lot of things that go wrong and, and when you get into drones, you should expect stuff to go wrong. Drones to crash for the software, not to operate the way that it's supposed to operate. And so getting that familiarity with where the weak spots are and what's going to happen. You know what might happen if you upgrade your firmware and you don't test your drone and that sort of thing. You just, you gain that experience by doing and it's built problem solving. I mean, you'd really do have to be a good problem solver to be a drone operator because the environment changes, the drone changes, the software changes that ever. The technology is moving very, very fast and it's a, it's a really cool technological slash applications tool to, to engage with.

Charlie Palmer: Yeah. And to be a problem solver is a darn good skill to have.

Carl Seielstad: It is. It is.

Tim Wallace: adapt and overcome.

Charlie Palmer: Yup. Yup. Carl, how about for you to wrap it up? What do you have?

Carl Seielstad: I mean, I think that's, that's, that's really it. I think, uh, get involved. Don't wait for the agencies for fire management to figure out how drones are gonna fit.

Start figuring out how they're going to fit yourself because nobody really knows how they're gonna fit. I mean, I think that that's why I would like to see drones used more frequently in the kind of this Beta environment that we talked about earlier, for example, in Alaska, is because that's where we're going to figure out that what we learned from those exercises is gonna build up in the organization and it's going to inform how we use drones and sitting back and waiting for, oh, the boss is going to tell us how we're going to use drones. Kind of ensures that we're not going to use them very effectively. Nothing against the boss, but it just, it's just the way of the world.

Charlie Palmer: They've got many other things that they're responsible for in drones is probably not high on their list, yeah,

Carl Seielstad: and we're still in a time when to be honest with you, the best drone people tend to be young people. Yeah. You know they're the gamers. They're the people who have grown up with technology and smartphones. I that's going to change. But right now we're in this period where a US old guys, I mean that's all. It's all new to us and for, for like my son, that's just what he's run up with. Yeah. So that's where the energy needs to come from for how to use these things is from the firefighters.

Charlie Palmer: My daughter got one for Christmas a couple of years ago, you guys have motivated me to blow the dust off of it and get it out of the closet. And she tried to fly it in Minnesota when it was about 15 below cause she got it for Christmas and then its flight time was about 15 seconds before it crashed. So I think there's some repair work to be done. But

Carl Seielstad: you've segwayed off. We kicked this thing off too with a love hate relationship that drones aren't for everybody. I mean we should probably just acknowledge it's a specialized niche. And I understand when people don't like drones, don't like what they do. Don't like the noise, don't like kind of the implications of them. That's just the kind of technology it is. But

Charlie Palmer: yeah. Well I hear you. Cause I mean I have got this limited sample but a couple interactions with them. We were doing some filming on some stuff and the, the photographers, the video guys were all jacked about getting some drone footage and this huge set up and huge logistics and those things flew for about a minute and a half and the batteries died and the things crashed and that was it. And there was no backup. And then, yeah, the other go back to how you did and then we're just shooting it with regular handheld cameras. And then the other example is my daughter's that I just told you, I've, you know, another very brief flight before it crashed and broke rotors off and yeah.

Tim Wallace: And you know, we've, we did crash a lot. We were doing a lot of r and d stuff and once you get one that works, like the one in a hundred things that work and work well, the way they're marketed, it keeps the faith. You still think that there's possibility here in five years, a lot of these things are going to be fixed. We've seen it in three years. A lot of stuff has been fixed, but I'll, I'll quote Carl

on one and say drones are a lot like dogs. You don't really like anybody else's, but yours instead, drones are Kind of the same way. When you're flying it, it's great and when you hear one be kind of should go away.

Charlie Palmer: That's a great note to end it on. Folks, thanks for joining in to this podcast on drones. Tim, Carl, thanks for joining us today, Matt. Yeah, to be here and Mike, Thanks for all your work. Joey, same as well our post production guy, and we will catch you next time.

Speaker 4: You've been listening to On The Line, a podcast for today's wild land firefighter. Our audio engineer is Mike Matthews, production assistant Joey Moore, and I'm your host. Charlie Palmer Thanks for listening and we hope to connect with you again in the future on the line.