## Knobbe IP PODCAST

## Using Technology and Empowering Communities to Mitigate Wildfire Risk – The Story of FlameMapper

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**MAU** Welcome to this episode of the Knobbe IP+ podcast. I'm your host of today's episode, Mauricio Uribe, a partner at the intellectual property law firm, Knobbe Martens. Today I have the pleasure of speaking with Shea Broussard, Oliver Curtis, and Jim Kniss from FlameMapper.

The risks and devastation associated with wildfires are all too evident in our communities. We're certainly all aware of the loss of life and property in states such as Hawaii, California, the Carolinas, Washington, Texas, a list that is far too large.

FlameMapper bridges the gap between hardware and software providing AI processed information that enables safety personnel with regard to tactical placement of protective assets and assessment of wildfire risk. We'll be discussing FlameMapper's personal innovation story to bring this critical technology to market, and how they formulated and executed their intellectual property strategy to help support their efforts. We'll explore how FlameMapper has and will continue to make differences in our community. It is my pleasure to introduce Shea, Oliver, and Jim. Gentlemen, how are you today?

- JK Fine.
- SB Good.
- **OC** Great, thank you.
- **JK** Thank you for having us.
- **MAU** Perfect. It's my pleasure to have you here, and I look forward to hearing your story. As we always start our podcasts, I'd like to start with a little bit of letting the audience know something about yourselves. And so maybe Shea, if you wouldn't mind let's start with you just a little bit of your background in terms of kind of what brings you to FlameMapper.

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- **SB** Perfect. We talked about education. I graduated from UCLA, master's degree in geographic information systems and sciences. I guess for me, I've always had a personal connection with wildfires since I was eight years old, kind of as I dug through the charred, burned remains of what was left of my childhood home. That kind of drove my passion, first to become a firefighter. First I was a junior firefighter, and then I went on to become an actual firefighter with L.A. County Fire. But then I had this really magical something magical happened. I had a sudden change in trajectory when I was basically awarded a full ride at UCLA. I resigned as a firefighter and began my quest to acquire the skills to build a company that ultimately could limit families from going through the same thing that I went through when I was a child, which obviously you can imagine was pretty devastating and kind of had to make me grow up pretty quickly. So with that I guess I'll pass it back over to one of the other members.
- MAU Sure, Oliver?
- **OC** Yeah, my fire journey started in 2013 on a trip to Northern Arizona which happened to coincide with a really devastating fire in Yarnell Hill, and it just became apparent to me, having grown up on the East Coast, that this was a growing threat. This was something that not everyone is aware of. And I was struck by how this affected the community, as I was speaking to people on a daily basis who knew these people. So that really changed my understanding of the world, and as I later on went on to pursue a master's degree in energy systems and mapping at the Graduate School of Design at Harvard, I kind of took the experiences and learning more about wildfire to heart and have just been applying that to my career ever since.
- **MAU** How about you, Jim?
- JK Okay so, I started my mapping career in 1980 with Ventura County and progressed and in '95, I went over to manage the fire department's first GIS Department that they had. And we just happened to be fortunate, we developed some really cool tools that were used across the country for incident mapping. In 2008, I started my own business doing infrared mapping during wildfires. So in a helicopter looking for hotspots, creating maps. What this did is it gave me a really unique perspective. So initially I was creating these maps that all the folks were using on a fire, and then as I'm flying over them doing the infrared step, I'm watching them put this together. So it's kind of these moments that all actually fed together into where we are today.
- **MAU** Perfect. And I think our audience can tell what I really like about this story is each of you come with incredible technical background that facilitates some of the technology we're going to talk here, but you all come from a personal story as well. And I think that's fantastic and will come out in the answers you have.

Now that we have learned a little about you as individuals, let's learn a little bit more about FlameMapper. So Oliver, maybe I can direct this one to you, tell us a little bit about who FlameMapper is and how you would describe it.

**OC** FlameMapper is a small company, but we've been around for quite a few years now, and we really build data and tools to help reduce catastrophic wildfire outcomes. And



that comes in the form of combining human and machine intelligence to address and support decision makers so that they can build more resilient communities.

- **MAU** Perfect. And so one of the things, and again I've had the pleasure of working with you, how is that embodied in terms of what's in the field there what's that product name? And maybe Shea, I could direct you to that. I think it's called Beacon Box but tell us a little bit more about what that is or how it's embodied in the field.
- **SB** Great. Sure. So Beacon Box kind of is a combination of a lot of things that we do at FlameMapper. But it all came to fruition during the probably the most significant event at the time for L.A. County history which was the 2018 Woolsey fire. At the time that was the fire that was in the Santa Monica Mountains, basically just north of Malibu and then ended up burning through Malibu. My personal home was impacted. And of course, with my firefighter training, I stayed behind. I was fortunate enough to be able to save the house which was great because that's where my kids are currently being raised. So that was really fortunate. However, during the process I learned a lot.

I was fortunate enough to get a couple of engines that helped me potentially save most of the neighborhood – we lost a couple of structures. But in that process, I had an engine that was a local engine, then I had an engine that was from out of the area. And what I noticed was I expected the engine from out of the area not to have any maps or intel on what was happening during the fire, but I was kind of surprised to learn that basically the local engine pulled out a 2004, bounded Atlas book that only provided street names, at best. So I guess with no internet connection and you know no cell phone connection, I mean all this makes sense, it was just a little surprising. So what dawned on me at the time, based on the questions they were asking, what was really interesting is what it came down to was they weren't comfortable in the neighborhood without this information. They weren't comfortable to engage without knowing "Can I turn my fire truck around?" or like "What's up that street – like how narrow is it? Is it safe?"

And so based on the questions and how I was answering them, I was learning that I was helping them feel more comfortable in the neighborhood. They were more willing to engage and ultimately led them to do an incredible job to actually save a lot of houses that potentially would have been lost, if I wasn't there to give that information. But obviously as you can imagine I'm not always going to be there for all these communities – you know I can't replicate myself – so in this regard that's when I went back to the drawing tables with the team and said, "We've got to do something. There's something here that we can figure out. This is a problem that we can solve." So I'll hand it over to Oliver and let him kind of chime in on that.

**OC** Yeah, it was a really interesting scenario and kind of an information gap as we would describe it. So we looked at the different suite of technologies and products that we've created for municipalities, insurance clients, and tried to figure out what could we incorporate that we were building, not necessarily during an incident, but could be built before the incident that would really help people understand the community that they found themselves in better.



And so we looked at one of our products – a structure risk probability which is a machine learning dataset – we looked at the advanced imaging techniques that we were using to identify features within a neighborhood or an area of interest, and analysis on the kind of intrinsic and extrinsic factors that influence fire behavior and data aggregation. And then lastly, you know, wanted to understand how to visualize this information and use proper visualization communication techniques so that it was both interpretable and digestible in a pressure situation, which is what these folks find themselves in. So it was really about enhancing and making people more comfortable when they found themselves in a situation where they maybe didn't have a local knowledge.

- **MAU** Wow, that's an amazing story because it really comes down to you were in the middle of this, right? That recognition of defending your own home and helping your neighbors and so what a great story and development process. And maybe let's continue down that path. Jim, talk to us a little bit about these Beacon Boxes. How are they deployed? How do they benefit firefighting personnel or other safety personnel that encounter one of these in the field?
- JK Okay. So, maybe just a quick description on actually what the Beacon Box looks like. The box itself is a bright red box, says FIRE DEPARTMENT on it. It is about the size of a carry-on that you'd use to get on an airplane. It's stuck on a pole so this, as the firefighter's running through the neighborhood, we strategically place these boxes at the entrance to neighborhoods that have a unique road network, if you will. And these guys have written some great scripts so that we connect the roads, the parcels, all this kind of stuff, as we're developing the product.

So inside of the box, first the box has two locks on it. One is just a regular lock up on top, and that has a wire lock at the bottom. Every fire engine has a pair of bolt cutters. They pop that thing off. They open the door. So inside there are a series of maps. Hard copy maps. One set is 11" x 17" – typical for just a single user to use that's got all the unique information that the local agencies have but incoming engines do not have. What the road network looks like, where are the structures, where are the pools. The pool stuff is important – if your engine can suck water out of a pool – now you know where those things are. And there's a little information box that's on each of the maps, and for me that is like one of the critical things because it's telling me what's happening in the neighborhood. So there's 1,000 structures. Well that means there may be about 3,000 people. So if I need to get into the evacuation process, there's a good number for me. And we show the hydrants, all this kind of stuff.

So we have these paper products. So we have the 11" x 17", then we have a larger 22" x 34" you can put over the hood of your engine, do your analysis in a group. In addition, we have a row of USB drives that are in the front of the box, and we use a product called Avenza that all the emergency operations folks use across the country. They can plug that device into their iPad, iPhone, whatever that might be. Boom – they have a moving map. What's unique about it – you have a bunch of regular USB's and then there's one that's got four connectors on it. So regardless if you've got the two iPhone type, or if you have an Android, or just a regular USB, you can get that data. Also in the



box is a QR code so they can, if they do have internet access, they don't have to go through the USB drive – none of that. They take a picture of the QR code and they're ready to rock and roll.

- **MAU** Great thanks Jim, that's a great amount of detail. Really appreciate that discussion. I want to go back to something Shea, you mentioned your previous experience with information was the 2004 paper map. You were using very dated so what makes the information that Beacon Box that FlameMapper is providing what makes it different?
- SB Well, I think what's really unique is sure we're a technology company, machine learning, you know artificial intelligence. We can do really fancy scripts to do all these really exciting things. But then, at the end of the day, is how useful is that on the actual incident? And what that particular incident taught me is I got a chance to talk to engine captain after engine captain and just asking them questions. As days progressed in that event, you have a lot of people that are around that are basically waiting for them to kind of put this fire out, and they're not necessarily as busy as they were in the initial day. So I took the liberty to ask questions and talk to captains and you know and find out why they did or didn't engage in the fire and what were the limitations.

Surprisingly, the number one answer I got back – which was kind of surprising at the time – was "I didn't know if I could turn my fire truck around. Why am I going to go up this hill in Malibu if I'm then going to have to back down? It's smoky, there's no visibility – that's putting my crew at risk." "I don't want to drive off the side of a cliff by mistake. That's not smart." "I've got to bring these guys home." So every firefighter I've ever met always want to engage and do a great job, but there is that caveat they want to do a great job as long as they can come home.

So learning that information really kind of solidified the importance of potentially getting this information, but not only getting the information but using all the great technology, the machine learning and all the different scripts we can write, to potentially understand how do we get this information and then put it strategically in the right locations? So these guys have to drive by it. They don't have a choice. So as they are making a decision, "Do I go up this street or not?" that box is right there in their face. And it's indisputable. It's like, "Okay, well let's open and take a look," and they can make an educated decision instead of just an instinctual decision, because now we have more information. I've never met a firefighter who doesn't want more information, especially if it's in a format that they can consume quickly.

So I think what's different about us is potentially not just bringing the technology aspect – you know understanding the actual needs, talking with lots of firefighters, getting a lot of firefighters to review our maps and provide feedback, which we've done time and time again, trying to make these as best as we possibly can. And also, when they need to be used, they're in a digestible format, so they can just hit the ground running and just start having an impact.

**MAU** That's great and kind of going back to the earlier comment, you really are at that intersection of the physical, right – the placement of these boxes, the placement of the



USB drives, the QR code, the physical maps – with the machine learning aspects. And I think that's what just makes your story so great.

Oliver, I want to close the first part of our program, one thing that you had mentioned before is maybe, perhaps, limited availability of internet during these kinds of situations and what kind of impact that made on the product?

- **OC** Yes, so during these events, what ends up happening is you've got folks that are coming in from brought in from all sorts of areas, all throughout the country that are brought in to help and assist local communities. And so there's not necessarily internet access because you're in a rugged and remote terrain where maybe there wasn't cellphone access to begin with. And so some of the conveniences and things that we assume would be available during an event, aren't necessarily there. So one of the main issues that we're trying to solve is to provide this information ahead of time in such a format and location where it could essentially be used by anyone during an event.
- **MAU** A reminder, listeners my name is Mauricio Uribe, and we're here talking with Shea Broussard, Oliver Curtis, and Jim Kniss from FlameMapper, an innovator in wildfire risk mitigation. Just before the break, we talked a little bit about the development story, the recognition of the problem, and I want to kind of continue that conversation. And Shea, I'll direct this one to you. What were some of the technical challenges? What were some of the failures that maybe you experienced as you went from recognition of the problem to development of the solution?
- **SB** Great question. As in all our products, you kind of good idea and you kind of hit the ground a couple times. "Okay, maybe we need to pivot and adjust." And so we had a lot of that, and the biggest hurdle I think for this particular product was, and the reason why this probably hasn't been done before, is that everybody on the planet wants to put a Knox Box lock and key on this. But what people don't necessarily connect the dots on is that every department has a Knox Box key. That's that little red box that you see outside of commercial areas and gates, that potentially the fire department has a little key to open up, they can get them into those locations. However, each of those keys are uniquely keyed to that geographic location. Therefore, if I'm in Napa County and I have a fire in Sonoma County, my Napa County Knox Box lock won't work in Sonoma County. So therefore, as you can see, there's a problem and I can't put a and there's 800 fire departments in the mutual aid program so I can't put 800 keys on a single ring and give that to every fire department. So that's obviously not going to work.

But with my past firefighter experience, especially as a junior firefighter with the LA County Fire, I know when we rolled up the middle night to a commercial area, we pulled out the universal key, which is that, big giant bolt cutters and we cut those locks open and, and went to putting out that fire in that commercial area. So at that point I realized, well every fire department got the universal key – they have the bolt cutter. They're already installed. I also learned many police officers also carry the giant lock cutters. So once we got past that big hurdle, I think this problem got solvable. And from there, once we were able to cut the locks off, then from there, we just worked on the design



aspects, what the construction type was - do we have to make it fully fireproof, or do we not make it fully fireproof? So we went back and forth on a couple different things, and we kind of honed-in on what we currently have today. And I think that was pretty much the summary of the main challenges we have. I think everything's been pretty smooth sailing, other than the fact that we've had to work to get buy-in different departments, and get sign-offs and getting their feedback and trying to incorporate that. But other than that, it's been a pretty smooth trajectory so far.

- **MAU** Thank you, Shea. Great answer on the technical challenges and failures. And Jim, we'll close out this line, and tell us from your perspective, how do you get people to use this, to adopt it, to get this deployed, so it serves this wonderful purpose, which it's intended for?
- JK Yes, that's the million-dollar question right there. The tactic that we're using is, we've got a couple communities that have bought into the boxes. Malibu is an example they have 45 or so boxes within the community. And what we have been unfortunately waiting for is for an event to happen and then the boxes are going to be there. And that happened this last year, and we've actually seen that five of the boxes were accessed. We're not sure how that all happened. We're trying to figure that thing out.

But what I'm trying to do is bring that to the communities that we see as vital to have these boxes to make their access to their communities better. So I reach out to HOA organizations, Fire Safe Councils, which are unique to California. They basically do fire education. And what my gut feeling is, as these boxes actually get deployed, that's when the magic is going to happen. Because those firefighters are going to go back to their agencies and say, "Hey I ran into this incredible box, look at these maps." Because that's what we discovered is, the boxes are empty. So they – and there's quite a few sets of maps in there – so they just used them, and maybe they're taking them back to their agencies. So that is our push, is to get with these different groups and hopefully install the Beacon Boxes so that they can start using them.

- **MAU** Perfect. I'd like to then turn for the remainder of our conversation, and Oliver to you. Let's talk a little bit about intellectual property. Because in addition to the great amount of time and resources you've committed to developing the Beacon Box, and the tech behind it, you've also taken the time to develop intellectual property to coincide. So let's start with the basic question. As an emerging tech company, how did you first learn about intellectual property and what strategies you could employ?
- **OC** Yeah, FlameMapper had actually pursued patents in the past. And so this was not the first opportunity we've taken to look to protect some of the information that we've developed. And so this was although we did learn from that experience this was a unique opportunity for us because we had built some really interesting data products and techniques that we felt were imminently useful to different organizations and different types of industries. But at the same time, we were still looking for a way to effectively fix that technology in a physical product. And so, what we what we learned through the process as we approached you guys, is that this was a really incredible opportunity because we were able to take some of the most advanced things that we



had developed and were able to fix that to a physical product and look for a utility patent. And so that became something that was fundamental, frankly, to our business strategy, is that learning, building additional information, developing that, putting that in the information in maps, putting that into effectively a system that was physical. Public safety infrastructure was something that is core to kind of how we're pursuing with this particular product.

- **MAU** And then Oliver, I'll follow up with you then, similar to your tech development, the development of intellectual property requires an investment of financial resources. But more than that, it's your individual efforts, your time. You've all contributed heavily to the development of those intellectual property assets that you have. So how do you factor those requirements in that balance of decisions of, to pursue intellectual property protection, in addition to all the business goals and the tech goals that you have?
- **OC** Yeah, that's I mean, that's just something that we prioritized as a company. We knew that this was something that was important to pursue because this was an opportunity for us to not only change the industry, but also to protect a lot of that work that we'd done over the many years. And so this Beacon Box, this particular again, what we consider public safety infrastructure, was just one way that we were going to prioritize taking a lot of the things that we developed for cities and other industries, and manifesting that in something that was ultimately something that we want to keep doing over time. And so the process, the time, the commitment, the energy that we put into this is essential. We see this as an important facet to our operations and how we want to continue growing as a company.
- **MAU** Thank you for that. And we'll close out our questioning today. Shea, to you, have there been scenarios that you've encountered where intellectual property, your strategy has played some type of pivotal role in in your business transactions?
- SB Yes, I think what it comes down to is, I think when you're an up-and-coming company, and you're doing great stuff, you're leading on that burning edge, or bleeding edge of technology innovation, what we learned is a lot of companies lean in to see what we're doing and try to meet what we're doing. So in that regard, that really has bumped up our priority in terms of understanding potentially why we need to try to protect our intellectual property because we want to keep doing great things instead of transitioning our great things off to other companies. We want to keep it in-house and keep it for us.

I think the Beacon Box is really a unique opportunity because it really is a combination of all the things we're doing. Like, during these Palisades fires, unfortunately the Beacon Box, at the bottom of my parents' house, a childhood home that I lost when I was 8, was used. However, I still lost my childhood home again. So, it's not the end all, be all, and fix all. It's not going to save all the houses, but it did help save some houses. And I think that's the important part here: it's not going to save all the houses, not the end-all solution, but it's just one of many solutions that are really important that we need to keep innovating, keep pushing and keep driving, and work towards increased adoption, increase usage. Because at the end of the day, this wildfire problem, it's a



very big problem and there is no silver bullet. It's going to take a lot of different solutions to solve it. And I think that we're going to work across boundaries and work with people, and we're going to collaborate on different things, but we also want to do that in a way where both companies that are collaborating are moving forward. I think that's where intellectual property really helps us kind of stick that and make sure that potentially our intellectual property is moving with us forward. So I will leave it at that.

**MAU** Perfect. And gentlemen, I wish you well in that goal. It's such an admirable one. That wraps up today's episode. Big thanks to Shea, Oliver, and Jim, not only for joining us today and sharing this great story, but for the work you do for this incredibly critical technology. Be sure to visit Knobbe.com to listen, to view the transcript of this episode, or any other episode of Knobbe IP+. Until next time this is Mauricio Uribe saying, thanks so much for joining us.