

Michigan State Police

Voiceover

00:00

Welcome to *The Beat*—a podcast series from the COPS Office at the Department of Justice. Featuring interviews with experts from a varied field of disciplines, *The Beat* provides law enforcement with the latest developments and trending topics in community policing.

Today's interview is on-location at the COPS Office sponsored PERF-hosted Forum on Unmanned Aircraft Systems.

Jennifer Donelan

00:24

Hello, I'm your host, Jennifer Donelan. Michigan's State Police's Aviation Unit works closely with all Michigan law enforcement agencies, as well as the Michigan National Guard and the United States Coast Guard air stations. Since February 2015, this has included an Unmanned Aircraft Systems program, or UAS, commonly known as drones. Today we are happy to have with us Sergeant Matt Rogers, one of the program's four drone operators. Also with us is Lieutenant Colonel Chris Kelenske, commander of the Michigan State Police's Specialized Services Bureau. Welcome, gentlemen, to *The Beat*.

To start off, tell us briefly about the Michigan State Police's UAS Program. Why did you begin using Drones in 2015, what were you interested in achieving that you could not with Troopers or helicopters?

Lieutenant Colonel Chris Kelenske

01:16

Back in 2011–2012 we saw this as an emerging technology. And at the time I was overseeing the aviation unit. And we saw that this was a possibility to, to help us with some of our missions just because of the cost of using a helicopter for everything. This might be a way to offset some of those. And clearly, with it being an emerging technology, we saw some of the potential benefits. Some that kind of surprised us because what we thought we were going to use it for really kind of flipped and we haven't been using it for some of those missions. And I'll let Sergeant Rogers kind of explain a little bit more on the early stages because I left and really handed it off to him and he took control of it.

Sergeant Matt Rogers

02:02

Yes. So early on in our program, because of the FAA, the FAA's regulations on you had to be a manned aircraft pilot, I was actually brought in to the unit to kind of start this program off because of my previous experience as a manned aircraft pilot.

Early on there were a lot of challenges especially for us as a state police agency because we were asking for an entire state to operate in. The FAA had yet to grant an approval of an entire state for law enforcement's operation, so we had a lot of back and forth with the FAA.

It took us over seven months to actually get that approval from the FAA. And it included a two-day visit from the FAA where they day one sat through and looked at all of our documentation and policies and procedures and things like that. And then day two we had to do actual demonstration flights for them, scenario-based flights, to just show our level of competency. So think—looking back at 2014-2015, this was the landscape that the UAS program was in. Not to mention we certainly had a lot of challenges with the general public at that time too.

Donelan

03:22

Challenges with the general public, ok. Colonel, can you expand on that? Any other challenges?

Kelenske

03:28

So, early on in this program when—before we've even had our first UAS—and it's important to know that we refer to it as a UAS and not a drone. We haven't referred to it as a drone just because of the negative connotation that it carried with it. Because drones were being used overseas at the time, so we wanted to make sure that we were using the terminology that was more appropriate for continental U.S. use.

But the overarching concern was the privacy rights. So we made sure that we brought in the ACLU and had discussions with them and sat down to make sure that we were addressing any of their concerns that they may have. Because that was going to start us off on the right foot, as well as to develop those relationships with those advocates who will bring to our attention some things that we may not have thought of.

And then the other overarching piece we had concerns with was obviously safety. We needed to make sure that all the residents were safe, as well as, you know, any commercial vehicles or anyone flying a manned aircraft was safe.

Donelan

04:36

You've talked about the fact that you are the first state agency to work with the FAA on a statewide UAS program, and that what you thought would be the primary uses have turned out to be something else. Tell us more about that, Sergeant Rogers.

Rogers

04:51

Sure. Well, initially, very early on, we thought that search and rescue would be a primary role for the UAS. Our UAS program is housed within our aviation unit. So we have five helicopters, two fixed-wing aircraft, and then we have five UAS systems currently as well. Very early on we suspected that UAS would be used for that search and rescue piece. And what we actually found was once we started deploying the technology, we realized that the UAS was really limited by the field of view of the camera. So a manned helicopter over that same scene is able to clear that area much faster than what a UAS could.

If we're searching for a missing person, time is of the essence obviously. We, you know, we want to get that asset deployed on the scene as quickly as possible. And you know, if you just imagine an open field during the day or even at night, the UAS is limited by the field of view of the camera. Where during the day a helicopter could fly over that same open field and clear it within a matter of minutes, where it would take a UAS at least a half hour or so to clear that same field.

So thinking that search and rescue was going to be one of the first things we would use it for, that has kind of dropped to the bottom of the list. One thing that emerged as we started the program was fire scenes. So we have arson investigators within the state police. So they are called to any suspicious fire. Actually our very first deployment for the UAS is for a fire scene, and that is our number one call for service today. So we've done a little over 650 missions with three unmanned aircraft to this point and the—I would say, yeah, the number one call for that service is for that fire scene.

So the imagery that we're able to give the fire investigators is something that they've never been able to get before unless they had a fire engine with a ladder truck and a camera that they could climb up the ladder and take some photos with. So the detail that we're able to provide them certainly aids in their investigation when it comes to determining these fires that they're investigating.

Donelan

07:10

So you have three units for the whole state?

Rogers

07:14

Correct, there are three units. We just got—received grant funding for two more. So we're just waiting to deploy those into the field.

Donelan

07:21

Are they dispersed geographically within the state of Michigan or are they located in a central location?

Rogers

07:28

They're dispersed geographically around the state, yes. We have seven districts in the state. So, you know, the ultimate goal for the Michigan State Police is to put one of these systems in every single district initially, and then we'll maybe drill down to, you know, post-level UAS systems.

Donelan

07:47

To continue with Sergeant Rogers, Search and Rescue is not a primary use of your UAS program. So, how are they used? Tactical? Response? Surveillance?

Rogers

07:58

Yes. So search and rescue, we really don't use much the UAS for. That's still a manned aircraft job, mission in, in our opinion. We do use it to assist our emergency support team on calls. We've used it successfully in locating a suspect who fled into a cornfield. We located him within minutes with a FLIR camera. I mean having that asset on the station at that time certainly proved beneficial to, to clear that cornfield and, and locate the suspect.

Ah, surveillance. So, that's a great, great question. We, we are fortunate in the state of Michigan to have a legislature that supports our endeavors. And they have not restricted law enforcement in any way with this technology partly because I think we have taken it upon ourselves to regulate ourselves and really provide a common sense approach as to when we deploy this technology and when we don't.

The first thing that comes to mind is privacy rights. That's the first question we ask ourselves is, are we in the Fourth Amendment here to put this UAS over the scene of somebody's house? No. There's no case law that says we can. There's no case law that says we can't.

Right? However, in, in that instance, if it's—if we—if any agency requests our services with the UAS and it is a surveillance-based mission, we will require a search warrant.

Donelan

09:38

Colonel Kelenske. What would you like to add to that?

Kelenske

09:41

You know, we've also, you know, we have flooding in Michigan. Out of all the disasters or emergencies, flooding seems to be the biggest issue we deal with. And the Michigan State Police oversees the Emergency Management and Homeland Security in Michigan, as well as our law enforcement duties.

And what we recently have been doing is utilizing not only our rotary aircraft but the UAS to help us with damage assessments.

There's areas where areas will be flooded, streets will be flooded and we might have to wait over a week sometimes to get into that area to do damage assessments or put boats in. We can take the UAS, fly it down a street either real-time or take images out of those homes to get the information. And we can clear, you know, a whole block and do the damage assessments and get the information needed so we can start the community to recover. So, for those agencies that have those responsibilities, it's a great tool to have when you're doing damage assessments during natural disasters in addition to some of the fire scenes that we've dealt with.

Donelan

10:47

So Colonel, the program is Michigan State Police owned and operated, but beneficial throughout the state in broad and yet to be identified ways?

Kelenske

10:58

Yes. And like many of our specialty resources, we have a lot of jurisdictions and communities that may not have the funding to not only purchase the equipment but you also have the maintenance, the training, the upkeep, the personnel. We utilize our GIS folks to assist and there's many agencies that don't have that capability. So we bring a lot of tools to the table and we're there to support our local partners in any way we can with those resources.

Donelan

11:28

So if you're talking with another state or even municipal entity about starting a drone program, what are the things you would tell them are critically important to focus on? Colonel?

Kelenske

11:39

I think from where I sit as a lieutenant colonel, the privacy rights have to be upfront. You have to be transparent with your communities. You have to make sure that you're doing everything possible to ensure, real or perceived, that those privacy rights are not being violated and that you have a safe program. Because it's only going to take one incident to really, really hurt that trust, like a lot of different areas in public safety.

Donelan

12:06

Sergeant Rogers, anything to add?

Rogers

12:09

Yeah. And one thing to add to that, you know, as you start a program, you kind of have to look down the road at the endgame. So if you're going to deploy a UAS over a scene, you need to ask yourself is—am I going to be defensible in court if I need to submit this imagery or am I going to be potentially creating bad case law for law enforcement across the country?

There's case law back from 1989. *Florida v. Riley* was the actual case. And it was a deputy in Florida. He had a tip of somebody growing some marijuana plants in a backyard. Well, he goes to the scene; there's a six-foot privacy fence. They had a helicopter. I believe the sheriff's department did. He gets in the helicopter. He testifies that he flies over the property, Riley's property, at 400 feet above the ground with the helicopter. They see the marijuana plants. They send in the cavalry. They seize the plants while Mr. Riley contested the search.

It goes all the way through the Florida Supreme Court. The Florida Supreme Court reverses and says it was a bad search. It was illegal. It goes to the U.S. Supreme Court. The U.S. Supreme Court reverses that and says any manned aircraft can be at 400 feet above the ground legally and see the same exact thing the deputy saw; therefore, it was a legal search.

That's really the most recent case law we have on the books for law enforcement putting an aircraft over a property. And the case is based off 1989 when the U.S. Supreme Court certainly didn't imagine today's technology when they made that decision

So it's important for law enforcement, because we have that latitude right now with our manned aircraft units, that we're careful when we deploy a UAS because the UAS, per FAA rules and regulations, has to be at 400 feet or below. So there's certainly a slight gray area there. I just think we're asking for trouble by putting that technology over a property without a search warrant.

Donelan

14:36

So what I'm hearing is to think critically. First about how you are going to use it, then what is the most appropriate use depending on federal, state and local guidelines, and then actually design a program that fits within that framework. Is that accurate?

Kelenske and Rogers

14:49

Yup. Yes. Yes.

Donelan

14:51

So, Colonel Kelenske, what are the benefits of having your UAS team work with your agency's Geographic Information Systems, or GIS, team?

Kelenske

15:00

So when we were first getting into this, one of the questions that we had is who's going to process all data from the scenes. A lot of people think of this as it's just video or we're just taking a couple of images. But the scenes that we shoot, you could have forty images, you could have hundreds of images and the GIS team in Michigan, they work in the state police's Emergency Management and Homeland Security Division, they process that data. Once they fly the—once our pilots fly the scene, they're equipped with the computers that can handle the extra load of all the UAS data processing.

And when you look at the different skillsets that are needed, they, they can analyze all that remotely-sensed data collected by the UAS. And we typically have three products whether it's an orthomosaic, a point cloud, or digital surface models. But what this allows them to do is they're the subject matter experts and they can create these, these products for us where now we have a 3-D image that can be rotated. We can take simple measurements if we have to such as height or distance for that matter. Or because of that integration with our GIS individuals, and we have real-time kinematic GPS and using ground control points, we can do crime scenes that are accurate to about half, half of an inch. And it's just, it's a game changer in the capabilities.

It's important to understand the UAS is more than just something to capture video. There's a lot more capabilities to it, you just have to bring the right people in. And sometimes those people are outside our normal circles of, of law enforcement. The reason we have it is because Emergency Management is part of our agency. But most municipalities, counties have a GIS person. It just might not always be in their police department. It may be part of the municipality.

And that's been very beneficial to us. And also if we do have to go to court as Sergeant. Rogers said about, you know, being defensible, the GIS personnel they're the experts. They understand GPS and they understand how these, these systems work and can explain what an orthomosaic is and point cloud much, much better than at least myself or Sgt. Rogers.

Donelan

17:30

One of the things you said earlier is that you have seven districts within the state and you ideally want a UAS in each district. My question for you, Sergeant Rogers, is how do you deploy them? What's the typical process for getting one in the air when a need is identified?

Rogers

17:44

Ah, Great question. So any law enforcement agency in Michigan could call for our services to include any fire department, for that matter, when it comes to the UAS or, or the—our aviation unit. So the call would initially come in to, to either myself or the chief pilot and we would vet that that call. We would determine what the request for service is and then also what the best asset, aviation asset is for that specific call. A lot of times it is the UAS, but there are some times when, when someone will call for

either the, the helicopter and we'll say actually the UAS is a better tool for that job or vice-versa. We're there to deploy the best resource to provide the best service we can to that requesting agency.

If the UAS is chosen as, as the tool to deploy to that, my initial reaction, my initial thing that I do is certainly check the current weather in the area where we're going to be going and then also forecasted weather to make sure that there's nothing inclement that's going to come into the scene. Certainly in Michigan we deal with all four seasons. In the middle of summer, we can deal with all four seasons. So weather is certainly very important for us to check in Michigan right out of the gate.

After that is done and we feel that we have the weather minimums that are set by the FAA, we'll file a notice to airmen. What that is, is it's a contact to an aviation briefer. And we would tell them where we're going to be operating, what time we're going to be operating, and what altitude we're going to be operating at. And what happens then is it will show up on an aviation map. It will show actually where we're going to be operating. It will be a purple circle on a sectional chart for the manned aircraft aviators out there. It will show up where we're going to be operating and when. All of that is it just provides another layer of safety. It lets manned aircraft know where we're going to be and when we're going to be there. So that's the very—those are the very first two steps, and then it's drive time.

So, you know, the call could be ten minutes away, it could be seven or eight hours away depending on, depending on where we're going, you know. I live in Grand Rapids. I could be going to the Upper Peninsula. It could take me six or seven hours to get there. So it's just kind of the nature of the beast that we, that we deal with being in Michigan.

You know, most calls are within an hour or two drive time at most. So at that point it's drive time to the scene. Also while I'm driving I'm contacting an observer. Our corps requires us to have at least one observer on scene, a trained observer. They have to have a medical that's done every two years to show their competency in their vision and things like that. That's per the FAA regulations. So we'll contact those observers. We have observers trained throughout the state.

We've actually trained up our fire investigators. Because they call us a lot, so we've trained them to be observers. They're already on the scene. They're calling for our services. We can just utilize them at the scene. We've trained our accident reconstructionist and then also our bomb squad personnel because they too are scattered around the state. So it just makes that response time that easier, that much easier.

And getting that observer on the scene is, in my opinion, is critical to the operation of our unmanned aircraft. And we've had incidents where we've had unmanned aircraft come in to our scenes that were trying to document and the observers picked them up right away where the operator of the aircraft may be buried into the video feed, or something like that, making sure that the imagery is being taken properly. So having that observer on the scene is critical to the safe operation in my opinion.

You know, we get on the scene. We determine what the requestor is looking for. Are they looking for video? Are they looking for, as Colonel Kelenske said, an orthomosaic? So that's a straight-down image of the entire scene that we can scale to within half inch accuracy. So we, we determine, you know, what

the request is, what they would—what the finished product they're looking for. And then, you know, we will fly to the scene at that point. You're locating a safe landing zone, take-off zone that's away from people and things like that.

If video streaming is necessary for the scene—maybe it's a dynamic scene, maybe it's assisting our emergency support team on a barricaded suspect or something like that—we've got monitors that we can deploy and allow those people involved with the call to be able to observe that video from a location away from us so—which is, which is obviously quite important. And then it's just a matter of flying on the scene, whatever the mission set is at the time.

Donelan

22:54

We are speaking with Lieutenant Colonel Chris Kelenske and Sergeant Matt Rogers from the Michigan State Police.

One of the things that I hear when I listen to you, Sergeant Rogers, is your understanding of the aviation issues related to operating a drone, and your background of having a pilot's license from what I presume, is your prior work in the air program of MSP. Does one need to have experience pilots to implement an unmanned aircraft program, or at least seriously consider it?

Rogers

23:26

That's a great question. You know that it certainly never hurts the more knowledge you can have. I mean in aviation, anybody who's a manned aircraft pilot understands the complexity of manned aircraft. It's, you know, from somebody who has no experience with it and you start to dive into the FAA rules and regulations, you can get overwhelmed extremely quickly. So and that's I think that's part of some agencies maybe being a little apprehensive on deploying this technology because they dove into the FAA rules and regulations one time and were overwhelmed in a matter of minutes and walked away from it and said it's not for me.

So since 2016 the FAA has certainly created a new avenue for law enforcement agencies who have no aviation background to actually be competent operators in unmanned aircraft. And that's the Part 107 ruling that came out. So an unmanned aircraft operator now simply needs to take a test that's provided by the FAA. So the FAA has said these are the standards and procedures that we need our unmanned aircraft operators to be able to competently achieve. And they determine that through the testing that they do. So if you become an unmanned aircraft operator, I think you've scratched the surface on being a competent UAS operator in law enforcement. So you're at the first step certainly.

Donelan

25:06

As we begin to wrap up, what are the things that I have not asked you that you think is important in implementing and operating an unmanned aircraft system? Sergeant Rogers?

Rogers

25:16

So one of the things when we started our program is there's a ton of marketing when it comes to UAS out there in law enforcement. And this is 2014–2015. If you listened to the UAS marketers out there, they were telling law enforcement that you can clear a crash scene in ten minutes and have that freeway open back up within a matter of minutes. Just by taking a series of photographs from our drone, you can open up that roadway. And to a degree, we kind of bought into that a little bit because it's got GPS on it.

You buy the software program called Pix4D and you seam the photos together and, voila, you've got a great image of the scene.

Well, you do have a fantastic image of the scene. The problem is you can't take one measurement from it with any sort of accuracy. So—and we learned that very early on. I remember there was a scene that we did with one of our reconstructionists. And he said I trust the UAS. I said I wouldn't do that. I would take my ground measurements if I was you. So he ended up doing that. Fortunately he did because we got the scene processed. We went, you know, we go into the whole process and we were off by like 15 feet over a 200-foot span. That is not something that is defensible in court, as we go back to the previous comment I made.

Be careful with the marketing piece out there. There's a lot of agencies that have already paved the way here and all you have to do is reach out to those agencies. I have not met one agency that wasn't willing to share their pitfalls and their successes with their UAS program. So I would encourage law enforcement to reach out to their partners to get clarification on some of those things.

Donelan

27:07

Colonel Kelenske, anything to add?

Kelenske

27:09

And if I could just reiterate that last point, because you have a balance of those trying to sell the equipment and then the officers that are out there. And, as Sergeant Rogers said, I mean, a lot of the work has already been done. I mean, there's a lot of agencies that were out there that painstakingly had gone through this process, crashed these UASs and gotten the measurements and found out what

those, you know, what the errors were and why things were happening so—especially with measurements.

We've learned a tremendous amount from where we started from and knowing now that we have these RTK-GPS antennas throughout our state. Last I checked there's 33 states that have these permanent stations throughout their state that they can, you know, utilize. That's usually run by their Department of Transportation. There's a lot of law enforcement agencies that are not even aware of that. But if you were to ask somebody that does GIS work, they're very aware of it.

So reach out to those agencies and don't be afraid to ask them any questions. Because while you may think you want a UAS program, once you start asking questions, you know, you might say, yeah, this is a great tool but we're just not in a position to do it. But that's where maybe your state agency or county agencies can assist.

Donelan

28:35

That's a great segue to my final question. If someone wanted to get more information from you about unmanned aircraft systems and the Michigan State Police's program, how should they contact you Sergeant Rogers?

Rogers

28:46

They can simply send, they can send me an email. I mean that's easy enough. It's rogersm11@michigan.gov. R-O-G-E-R-S-M-1-1-at-MICHIGAN-dot-GOV spelled out.

Donelan

29:01

We've been listening to Lieutenant Colonel Chris Kelenske and Sergeant Matt Rogers discussing the unmanned aircraft system, or UAS program of the Michigan State Police. Thank you for joining us on *The Beat*.

Voiceover: *The Beat* Exit

29:15

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Voiceover: Disclaimer

30:14

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