

UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

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Investigation of: *

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DRONE SHOW ACCIDENT IN ORLANDO, *

FLORIDA ON DECEMBER 21, 2024 *

Accident No.: DCA25LA065

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Interview of: KENNETH SEALOCK, Remote Pilot in Command
Sky Elements

Monday,
January 13, 2025

APPEARANCES:

KURT GIBSON, Aviation Accident Investigator
National Transportation Safety Board

ARIEL RIVERA, Aviation Safety Inspector
Federal Aviation Administration

JAVIER CANTU, Assistant Chief Pilot
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I N T E R V I E W

(2:05 p.m.)

MR. GIBSON: With that I'll get started. Today is January 13th, 2025 at 2:05 p.m. I'm talking to Kanick (ph.) Sealock, Ariel Riveera (ph.) -- Ariel Rivera, sorry, not Riveera, and Javier Cantu, did I pronounce everybody's name right?

MR. SEALOCK: Actually, it's Kenneth, K-e-n-n-e-t-h.

MR. GIBSON: Oh, okay. Somebody gave me Kanick, I don't know why. So Kenneth, all right.

MR. SEALOCK: I got the e-mail, though, I got the really interesting spelling.

MR. GIBSON: Yeah. Somebody gave that to me, I don't know who gave it to me, but I was like okay, that's an interesting -- but all right, so I'll fix that. All right. And do you prefer going by K.C. or do you prefer Kenneth?

MR. SEALOCK: I use Kenneth on all my official documents and so pretty much everyone knows me as K.C.

MR. GIBSON: Okay. I'll stick with Kenneth.

MR. SEALOCK: I've been called much worse.

MR. GIBSON: All right, I'll stick with Kenneth, then. Just to give you a little bit of background on the NTSB, I know I kind of spelled some of this out in the e-mail, but just to give it to you again, the NTSB is purely a safety organization, we only do safety investigations, we don't do any enforcement against any individuals or anything like that. With that being said, again,

1 if you want somebody with you during the interview, you're well
2 within your rights. And then -- so I guess we'll just get
3 started.

4 INTERVIEW OF KENNETH SEALOCK

5 BY MR. GIBSON:

6 Q. So first, I kind of just want to get a little bit of
7 background on you, so if you wouldn't mind providing me just kind
8 of your experience, your education experience, where you got your
9 training dealing with UASs, previous jobs, how many of these drone
10 shows you've done, and any other type of UAS operations you've
11 done. And it doesn't have to be exact, just kind of estimates are
12 perfectly fine.

13 A. How many drone shows is a rough one, we do a lot.

14 Q. Yeah. No, it's -- yeah, you don't need to know exact, I
15 don't need to know exact numbers, just a rough estimate is
16 perfectly fine.

17 A. Sure. So my name is Kenneth Sealock, I grew up an Army brat
18 living all over the world, went to school at Troy University in
19 Alabama, got a degree in broadcast journalism and, as a hobby, my
20 father was an Army helicopter pilot, so I've always liked RC
21 equipment and things that fly. About the time multi-rotors came
22 about, about 20 years ago, I started playing around with toy
23 versions and building up and I worked with RC Cars when I was
24 younger, so understanding, you know, swapping motors and tires and
25 components to make better equipment, I immediately jumped into the

1 multi-rotor side of things, doing that. I'm one of the lucky
2 people in this world, where I've been able to take a hobby that
3 became a quick passion and developed it into a career. I've been
4 working in the UAS space, if you would put my hobby time, probably
5 about 15, 20 years and as far as actual commercial work, probably
6 about 10, 15 years.

7 And it's been a whirlwind, I worked for the U.S. government
8 for a while, did a bunch of that kind of stuff and then when I
9 actually started with UAS and drones, I worked for a retail shop
10 out of Jacksonville, Florida and we both sold retail equipment as
11 well as building custom aircraft for people's television,
12 videography projects, things like that, mapping and all that.

13 I worked for them for about two years, went to work for a
14 contractor out of Arizona called AUV Flight Services and the
15 contract was to work with BNSF railroad's drone program, did a lot
16 of mapping, surveying, inspection work with BNSF railroad, worked
17 with NTSB on a couple of inspections or investigations there where
18 things had gone wrong on the railroad, not aviation issues but
19 railroad issues, and we were helping with mapping sites and
20 dealing with accidents and things like that.

21 I worked for them for about three years, three and a half,
22 and they downsized the program in general. At that point, I went
23 to go work for Amazon Premier, worked with them on their drone
24 delivery program for a year, was not super impressed with what I
25 found there, so left after a year and went to work for a company

1 that does power lines and power poles, transmission line systems
2 out of Nebraska and we did a lot of inspection of transmission
3 towers, details on bolts and rivets and joints and solder joints
4 and welds and all sorts of things on towers. After working with
5 them for about a year, I actually got an opportunity to go down
6 and work with Lone Star UAS out of Corpus Christi, Texas, they are
7 an FAA test site doing -- one of the six original FAA tests here
8 in the U.S.

9 I worked with them for about a year and at that point got a
10 call-up from another drone light show company. I had actually
11 done some 1099 work for Intel and their drone light show company
12 back in 2000 with their Walmart tour and did a bunch of shows with
13 them. Got an offer from this company, in which I had set out as
14 just a part-time basis, "Say guys, I'd love to, but I can't do a
15 part-time job," they said, "No, no, no, we need you to come on
16 full time."

17 So I went and did a year with Pixis out of Virginia
18 -- Alexandria, Virginia, and after about a year there, having
19 dealt with Sky Elements back and forth, off and on, they said,
20 "Hey, would you like to come work with us?" and I've been with Sky
21 Elements for the last two, almost two and a half years. So it's a
22 -- it's been a -- it's been a whirlwind and it's interesting in
23 this industry, as small as it is, and a startup and the process of
24 how everything goes, the number of companies I've been to, but a
25 lot of it has been, you know, are we in the right direction or how

1 are we handling operations, how are we handling our process and
2 seeing opportunities to progress both my career and, you know, the
3 status of the industry as we move forward.

4 Q. Okay. And then about approximately how many drone shows
5 total have you done? I know you said a lot, but --

6 A. Oh.

7 Q. -- just kind of a rough estimate just to kind of have an
8 idea.

9 A. I don't know, Javier, what do you think? I'm guessing around
10 like easily over a hundred.

11 MR. CANTU: Yeah, probably more. Yeah, probably -- you're
12 probably upwards of almost 300, if you look at your year with
13 Pixis and then your two years with us.

14 MR. SEALOCK: And then that's been everything, we've done
15 small shows of, you know, a hundred to -- you know, a hundred and
16 50 to large shows of a thousand plus and then lots of, you know,
17 events in between, back and forth there, too.

18 BY MR. GIBSON:

19 Q. Okay. With that, I want to get right into the day of the
20 accident, so if you wouldn't mind just kind of going through your
21 day and then through the show itself, and then the accident and
22 immediately afterwards, just kind of what you recall from that
23 day.

24 A. Sure. And it's been a little while so, I mean, my statement
25 stands as it is with that information and I'll try and recount it

1 as best as possible. In the state of, you know, doing a show with
2 everything going on live -- live entertainment is a fickle beast,
3 I think, we go through and there are a lot of things that change,
4 a lot of things that happen as we're running through. But
5 essentially, I mean, our standard process from start to finish for
6 a show, call time for that day, I believe, was between 12 and 1
7 o'clock.

8 We went in and we got set up, got our equipment out, the team
9 meets and we have a preflight discussion about this is what the
10 show is going to look like, this is what we're working on, this is
11 where we're moving towards, these are the key players today, here
12 is -- you know, who's responsible for work during the process. We
13 -- you know, I have a chat with my crew leads, I have a chat with
14 my ground crew and we move forward from there.

15 As usual, you know, we got to our site, we unloaded the truck
16 and from there our normal process of un-boxing all aircraft to be
17 used that day, a visual and physical inspection of all aircraft,
18 checking propellers, motors, anything sticky, missing, broken,
19 rattly, loose, you name it, we're going to fix it right there on
20 site and if it's not usable, then set it to the side, get it out
21 of the way and mark it and tag it for repair once it gets back to
22 the shop if it's something we can't deal with on site. Once we
23 completed that, we go into our show layout, our show site is set
24 up, everything is based on the ammeter's (ph.) designs, from how a
25 show is set up down to the meter and how everything is broken out

1 in the grid because with these shows, and I'm not sure how
2 familiar you guys are with, you know, the actual drone light show
3 process, but everything in these shows, from when a pilot gets
4 everything ready and organizes the set and launches the show, it's
5 from the takeoff point through the whole process and everything in
6 there right back to that same takeoff point, all automated,
7 preprogrammed and set in the system.

8 So we laid out the grid, which in this case was -- normally,
9 if we're in a wide-open area, it's a very specific square grid.
10 This was a little bit of a design grid to put on a peninsula of
11 land we were on, we've done many shows that way before, where the
12 location is just kind of not a perfect square and so we set
13 everything in that design. So laid everything out, did a couple
14 of safety checks at that point, even had the client trim a branch
15 or two that we thought might be an issue and might be a concern
16 for the grid as it lifted up, and got everything cleared and set
17 out.

18 Once we set up our network and put all of our access points
19 together, basically, again, not knowing exactly how much you guys
20 know about the drone show processes, we have -- we say redundant
21 radio systems, but basically it's two systems working together
22 just to make sure that the other one doesn't have a problem. So
23 we have one right on Wi-Fi at five gigahertz on Ubiquiti Wi-Fi
24 systems, the second is we run a 915 telemetry radio, just straight
25 RF instead of a Wi-Fi duplex back and forth. So as we set up that

1 network, we were pushing through. In urban areas that we're in,
2 occasionally we'll see a little bit of lag here, a little bit of
3 glitch there, it's something we can fix, we normally -- you know,
4 a reboot the system or changing out cables, that's our normal
5 troubleshooting process to go through and make sure that all of
6 the equipment is operating at peak and optimum capabilities.

7 We went through all of that and determined that everything
8 looked solid, everything was connected, we were able to hook up
9 all the drones, see all the drones, send information back and
10 forth, did some test flashes and a few -- we pushed a couple paths
11 just to make sure that it was working and then we shut the whole
12 system down at that point, as is normal. Prior to show, we plug
13 in about 45 minutes to an hour before show. Our biggest
14 limitation, honestly, with drone light shows is the battery life
15 of these drones.

16 So when you're dealing with, you know, 20 to 30 minutes of
17 straight-out drone power, we're keeping our shows down to about 12
18 minutes, 12 to 15 in most cases, because that way we're able to
19 not push batteries to extreme limits and stay within tolerances at
20 that point. So at that point, we plugged in the entire network,
21 got all of the drones up and running and I had one or two that
22 would disconnect and reconnect, again, not unheard of in an urban
23 environment with a lot of information. So we played back and
24 forth, did our troubleshooting steps, turning a few off, getting,
25 you know, GPS signals to connect, moving some out of position and

1 replacing with other drones that have, you know, stronger
2 connection, working through that to where we were happy with the
3 grid and how it was set up. That process took a little bit longer
4 than we expected just because of some of that network lag we saw
5 which, again, is not unusual but was present that day. As we went
6 through, at the very end I was like okay, we're going to do a
7 reboot, everything's going to be fine and we had two shows that
8 day, one at 6:30 and one scheduled for 8:00 p.m. and to meet that
9 8:30 timeline, we were -- I'll say scrambling, it wasn't outside
10 the parameters of what we normally do for a show, it's -- you
11 know, there is a little bit of lag there where you're waiting,
12 normally you'll have 15, 20 minutes before head end, but we have
13 that time just in case there is a problem and we need to
14 troubleshoot it.

15 When we got to the end of getting everything set up, I said
16 I'm going to push these parameters and get them ready, I pushed
17 and network lag hung up and it waited longer than it should be.
18 In speaking with our show callers and saying okay, we're close,
19 I'm ready, I need one reboot just to make sure that everything is
20 happy and everything's on the network and everything is ready to
21 go, I pushed that reboot, it rebooted, I had two drones that were
22 not happy with the signals they had been given, so rather than put
23 them in that position, I deselected them from the fleet so the --
24 instead of flying 400 drones, it would be 398 and at that point, I
25 set up and said hey, here we go, we're going to launch and

1 everyone be aware that two drones are not going up. We had green
2 lights on the screen, I said go, it launched, and as soon as it
3 launched, when the system comes up, there is a system that we call
4 path parameters. So the drones will take off to their takeoff
5 altitude and then spread out to the show. With path parameters,
6 we can do a lot of -- a lot of information to the drones on how
7 they take off, when they take off, we do it in what we call layers
8 where there are different rows of them that take off for maximum
9 separation, things like that.

10 But even on takeoff, with the single meter, there is enough
11 space for them to lift up and do what they need to do. When they
12 started taking off and I realized they were not taking off in the
13 perfect rows that we normally see, I realized that with everything
14 else going on, path parameters had not been pushed and that was
15 part of the reason that they were as close as they were.

16 Once that happened and they came up, I said it should be
17 fine, you know, we've had shows go up without path parameters
18 before, it hasn't been an issue, we've been able to fly and it
19 just goes. When the first collision happened, unfortunately, it
20 ended up being kind of a -- as you can see in the videos that are
21 online, kind of a pinball effect, one gets hit, gets clipped, it
22 moves out, it clips another one, it clips another one and we ended
23 up with the situation you saw. That being said, the kind of
24 runaway that we saw that launched it far out at a higher rate of
25 speed, that is not something we see on a regular basis or even as

1 a usual thing. As much as I've worked with drones and as many
2 drone shows that we've done, this is probably about the only
3 example I can cite of where I've seen that happen and it was -- it
4 was absolutely mind-blowing to see it. I was at command and
5 continued to monitor systems and monitor the aircraft, at which
6 point we kind of said, you know, once the initial collision that
7 had happened caused the chain reaction that it did, everything
8 else remained stable, wind conditions were solid and I was still
9 getting solid readings from the ground station of the remaining
10 aircraft.

11 We have had discussions within the company of if something
12 goes bad, which we've never kind of looked to something of this
13 magnitude just because we never expected anything like this to
14 happen, when we have seen, you know, instances of a drone fell out
15 or there was a minor collision, it's been determined that it's
16 safer and simpler to allow the fleet to continue that flight.

17 They're all preprogrammed, they all know where they're at and
18 if they're not exhibiting any behaviors outside of what we'd
19 expect to see, we do expect them to continue that flight and do
20 exactly what they're -- what they're programmed to do and come
21 back and land, which is what we saw in the end. Unfortunately, we
22 did lose several aircraft at the beginning, we did have the two
23 that launched out and hit the hard fence and dropped out farther
24 than we would've liked them to, in any case. But at the end of
25 that, once the drones came back and landed, we were actually in

1 the process of setting up and organizing to be able to push the
2 second show when it was determined that the second show would not
3 happen.

4 Q. Okay. Talking about the hard fence and the soft fence, do
5 you remember what parameters you set for those? Or is it --

6 A. So the fences are the standard setting in our system, the
7 pilots don't really change those other than the actual shape of
8 the fence itself. So we have -- inside the system there are
9 actually -- really, it's kind of three fences that we look at.

10 So there is kind of the show footprint, which is the area
11 that we expect drones to be in at all times and on our system,
12 that is kind of a light blue line and during the show, because
13 drones are not just in a flat line, they're moving in three-
14 dimensional shapes and all, you'll get this polygon shape of
15 basically whatever the show's going to be. If there are flat
16 objects that rotate, you'll get kind of a wider rectangle kind of
17 look.

18 If there are circular elements or single elements that point
19 out, you'll get it very jagged. So that design is always
20 different every show. When the pilot shows up and sets that up,
21 we do set our containment fences, which are the two fences we're
22 talking about here, that would be the soft fence, which on our
23 system shows up as an orange line and that is dedicated as a
24 return to land system. If a drone wanders slowly and hits that
25 orange line, it's an immediate process and its programming, you

1 know, our company, to turn around, come back and land within the
2 grid at its point and not continue its show because at that point
3 it's wandered far enough out of process that we don't want it to
4 continue moving. If for whatever reason, okay, in this instance
5 where we had drones that breached that soft fence and were going
6 fast enough that they did not recover to do a return to land, so
7 if they're going fast enough, they go through and then hit the
8 hard fence, which -- Javier, do you remember what the actual
9 measurement is between the soft and the hard fence with our
10 current system? Is it one meter or five?

11 MR. CANTU: So it is -- we used to run it at five meters to
12 allow drones to have time to return back and then we thought it
13 would be safer to have the hard fence as close as possible to kind
14 of make that fallout area much smaller, so we did reduce that to
15 one meter.

16 MR. SEALOCK: Okay. And at that one meter, once it hits
17 that, that red hard fence, it is actually imbued with a disarm
18 code which basically, it will shut off the motors and physics
19 still exist, so with the parabolic curve that it's following and
20 the speed that it's going when it stops those motors, it will drop
21 and the exclusion zone, which is outside of that, is what is
22 calculated in order to actually list that safety zone. So
23 basically, that's the area that we do not expect drones to extend
24 beyond even after hitting the hard fence and disarming motors for
25 a drop.

1 BY MR. GIBSON:

2 Q. Okay. And with that -- and you might not know this because
3 this might be more of a technical thing. For that hard fence
4 disarm code, is that built into the drones that they've -- they
5 know it before the show starts or is it something that the laptop
6 sees that it's out of bounds and so it sends the code then, or is
7 it already built into the drone so if you lose connection
8 entirely, the drones still do it?

9 A. It is built into the drone. One of the things that we do in
10 our process is upload fences. So once we show up and we have the
11 footprint of the shows we're going to do, we build the polygon of
12 that external fence around that as close as we can to maximize
13 that exclusion zone and maximize the safety of that show. The
14 system will tell us if it's too close to the show footprint, it
15 will actually tell us to expand it a little bit just so that there
16 is enough space that it doesn't accidentally trigger it.

17 But then we basically snug it up as close as possible and
18 then we upload those fences designed for that show, in that
19 moment, to the drones that are being flown for that show. So the
20 computer is monitoring it, but the drones have that on board and
21 if their GPS hits those parameters, it will say I've gone too far,
22 cut motors and they go.

23 Q. And so you said the -- so you program into the software where
24 the audience is going to be and then the software automatically
25 warns you if it thinks your parameters are too close or did I hear

1 that wrong?

2 A. No, sir, other way around, we have -- we put in the show,
3 itself, and upload those paths to the drones, they know where
4 they're going to be. Then we design the fence around the show, so
5 it's --

6 Q. Oh.

7 A. -- inside out instead outside in.

8 Q. Got you.

9 A. If that makes sense.

10 Q. So as you said, the kind of -- the thinking process with the
11 company was if an issue was to happen, just to continue the show
12 as long as the rest of the drones were acting like they were --
13 they have all the proper parameters and everything and are
14 operating normally. What are the exact -- is there a higher risk
15 of collisions on bringing them back, is there an -- is there an
16 issue with that or is it a little bit more complicated on getting
17 them back and that's why it's kind of more decided to just keep it
18 with what the programming is?

19 A. Yes, sir, it is. Honestly, the only way really to bring them
20 back, there is a return to home function, it is known as a smart
21 return to home function, and so when that command goes out, all
22 drones begin returning to base. If there's anything in the way,
23 including other drones, there may be additional collisions. The
24 show, itself, in its design, has acceptable separation between the
25 drones throughout the whole show and then the return is also done

1 in ways to do that. So the only other way to cause and bring the
2 show back, we can literally hit a hold function which puts the
3 whole show in pause. Once that's done, there is no option to
4 return to the show state. So hold is a complete hold, it's not a
5 pause and play type situation. Once that's returned, if you do
6 want to bring them back in a -- the safest manner we determined is
7 the pilot then has to sort every drone in the fleet by altitude
8 and you grab sections of that fleet by altitude.

9 So you may say okay, for all drones, you know, I see there's
10 20 drones between a hundred feet and a hundred and 50 feet, bring
11 back those drones. So they start coming back, everything else
12 stays hovered and in position waiting for their turn to come back
13 or their command to come back, as you're having to do it in
14 segments, which takes much longer and is also subject to -- the
15 longer a drone sits there, you know, the battery is, you know,
16 depleting, things along those lines. So allowing it to fly the
17 show that we know it's been calibrated for is a much safer process
18 than trying to do that in -- you know, manually in small segments.

19 Q. Okay. And then kind of talking about the laptop and putting
20 in all the parameters, is it pretty user friendly or is it kind of
21 archaic or how user friendly is the software that you use to put
22 all these parameters in?

23 A. It's relatively user friendly, it's different from -- I
24 wouldn't say it's DGI (ph.) friendly, that's for sure, I mean just
25 the process that a consumer off-the-shelf unit has that would

1 allow you to just pick up, you know, order on Amazon in your
2 underwear and have it at the house next day and be flying as soon
3 as it shows up, it is definitely not that. We do do training
4 sessions with our pilots, we do run through that. In training at
5 the previous companies I've been with, they were impressed at how
6 quickly I picked up on it, but a lot of that is because this runs
7 on a lot of the same principles and protocols as some of the
8 mapping software that I had used like with BNSF and Amazon and
9 things like that. So running less user friendly programs like
10 Mission Planner and QGroundControl and things like that, there are
11 a lot of parallels between the drones and the software we use and
12 those, and so it's -- it's not difficult.

13 Honestly, I can probably train you -- you know, we could
14 train you in the basics on a drone show in an hour or less, but
15 understanding the processes of why we do it and how we do it and
16 then seeing just the small little hiccups that come about on
17 occasion would take much longer because it's harder to replicate
18 those in a training environment, whereas out in the field where
19 you're, you know, flying in different locations -- and different
20 environmental attributes can change how that flight goes and
21 that's what the pilots learn over time with flying. So in
22 general, the system is not super difficult, it's a lot of -- it's
23 definitely a graphical interface, there is no, like, coding or
24 programming really that we're doing, it's information that we are
25 getting from our coders and programmers that we are uploading and

1 then a process that we're going through and how that information
2 is fed and what information is read to the drones.

3 Q. Okay. And kind of talking about the training, what type of
4 training did you go through for Sky Elements?

5 A. For Sky Elements, it was quite a bit. Essentially, in coming
6 from another company, I've always been very forward on, you know,
7 I've flown a lot of stuff in the 15 years that I've been working
8 with drones, from tiny little, you know, micro-hobby drones to
9 large, almost military grade aircraft.

10 Every time I go to a new company, I expect to go through some
11 sort of training and some sort of a ride-along check-off process,
12 it doesn't matter how many times I've flown that aircraft with
13 another company or what have you, and when I came to Sky Elements,
14 that's exactly what happened, I ended up with Preston Ward, who is
15 our -- one of our owners and our general counsel, he is also one
16 of our pilots and my first, probably, five to ten shows with the
17 company were sitting right alongside Preston and saying okay,
18 here's this, here's that, this is what I'm doing, him watching and
19 making sure that my process was correct and then us both sharing
20 things that we had learned using the software, both over about a
21 year of having worked with that software.

22 Q. Okay. And also, then, with the shows, I know you have -- I
23 think there is what, three visual observers or is it how many, how
24 many visual observers?

25 A. So it --

1 (Crosstalk.)

2 BY MR. GIBSON:

3 Q. Or are they official -- yeah. Are they even officially
4 visual observers?

5 A. Official visual observers. Essentially, with our crews, when
6 we're out working, we normally have -- and it's changed over the
7 past three years the company has existed, but depending on the
8 show, depending on the size of the show, we normally have -- what
9 is it for crew, Javier, like one ground crew per every 25 to 50
10 drones, roughly?

11 MR. CANTU: Our waiver requires us to have one visual
12 observer for every 250 drones.

13 MR. SEALOCK: Right, so -- and that goes to the official,
14 there's one visual observer for every 250 drones, but as we get
15 there we have a discussion with all of our ground crew, that the
16 minute that their job is over as far as setting out the drones and
17 that sort of thing and the show is ready to start, everyone is
18 given a briefing on how this works.

19 We have videos that are sent out prior to people coming to
20 work with us, where they get to see videos and see, you know, what
21 will be involved, what they're expected to do, and while we have
22 the official number of visual observers per the waiver as that one
23 to 250, everyone on the ground understands that they become a
24 visual observer during that time, but we have at least three who
25 have gone through an official "sign a piece of paper" thing, "I

1 have done this training with the company, I understand," you know,
2 "what I'm looking for and what is expected of me." So in any
3 given show, I would say the number of actual visual observers is
4 probably no less than six for any given show, but the official
5 number would be that one per 250. So that's where that number of
6 three came out in the report, in that we had three people who had
7 gone through the full training with the full sign-off, but we had
8 no less than six to nine people at that show actually watching
9 drones and observing what was going on.

10 BY MR. GIBSON:

11 Q. Okay. And did any of them alert you -- did you notice the
12 issue first or was it one of the visual observers noticed
13 something first and let you know?

14 A. It was myself, it was myself. Yes, sir.

15 Q. And then also deal with the software, do any of the visual --
16 the official visual observers kind of, over -- help, kind of
17 double check anything on the software program things or anything
18 like that or is that pretty much all along just one remote PIC?

19 A. That tends to be on the remote PIC themselves. Sometimes,
20 especially with much larger shows, we will have multiple pilots.
21 After this incident, we have discussed having multiple 107 -- you
22 know, a PIC and a copilot, if you will, at each show for that
23 reminder checkup and review. So yeah, that's a -- that is -- all
24 of this has caused us to go back and relook at our processes, our
25 checklists, and our method of operation or operational parameters.

1 MR. GIBSON: Okay. I think that's all the questions I have
2 specific to the accident, there's a few more questions I have
3 about kind of -- we kind of like to get a 72-hour history and
4 everything, but that can wait.

5 MR. SEALOCK: Yes, sir.

6 MR. GIBSON: I wanted to see if Ariel or Javier had any
7 questions for you.

8 (Crosstalk.)

9 BY MR. RIVERA:

10 Q. Okay. I've got a couple questions regarding human factors
11 for you, Ken.

12 A. Yes, sir.

13 Q. Okay.

14 MR. GIBSON: Ariel, let's save any -- right now let's just do
15 questions on the accident part. So some of the questions I have
16 later on are human factors.

17 MR. RIVERA: Okay, human factors, sorry.

18 BY MR. RIVERA:

19 Q. So for accident-wise, with the equipment, do you have at that
20 time any loss of links that you noted or --

21 A. No, sir. I mean, all the aircraft reported all of their
22 telemetry right to, you know, the point of hitting the ground and
23 disconnecting at that point. Obviously, once the aircraft hits,
24 if the battery stays connected, we continue to have data. If it
25 hits and the battery becomes disconnected, data turns off at that

1 point, but then flight logs are included as to, you know, at what
2 point that disruption happened.

3 Q. Okay. And then you didn't have, as well, any loss of GPS
4 from takeoff time to the --

5 A. No, sir.

6 Q. Okay.

7 A. No, sir.

8 Q. And then flyaway, how many you can say that you had flyaway
9 drones when it started? Roughly.

10 A. So the number of crashed drones, we totaled out at 43.

11 Q. Um-hum.

12 A. But as far as an actual flyaway, so most of those, the
13 majority of that, honestly, was like when on a collision and if a
14 propeller got knocked loose or chipped and --

15 Q. Um-hum.

16 A. -- you know, aircraft failure, dropped straight down on the
17 ground in our exclusion zone. As far as actual flyaway, it was,
18 like, took off running --

19 Q. Yeah.

20 A. -- two drones out of the entire grid.

21 Q. Okay, two flyaways, all right.

22 A. And not that -- we've seen to a lesser extent where, you
23 know, on a collision, if the GPS gets scrambled or the signal
24 gets, you know, like an IMU --

25 Q. Um-hum.

1 A. -- so basically a balance calibration freaks out and it
2 doesn't understand the right side up or upside or sideways, just a
3 hard impact of that IMU can cause it to, you know, glitch and
4 drop. But like I said, these B-line flyaways are a relatively new
5 occurrence to us.

6 Q. Okay. Then when you noticed the malfunction, you left it fly
7 in automation or you initiated any manual flight procedures during
8 the liftoff or when you started noticing any issues?

9 A. Right. At that point, trying to monitor that many aircraft
10 moving at the same time --

11 Q. Um-hum.

12 A. -- and the collisions, I was watching to see how they were
13 responding. The two that took off, I saw them go, I was relying
14 on the exclusion zones to contain that, thinking that that was,
15 you know, within -- within the parameters. And again, like we
16 said, in a lot of cases we found -- and this may end up going
17 towards the human factors, as well, we found that the more you add
18 a single pilot to -- trying to change what's going on in the
19 moment, that it becomes more dangerous or more critical to
20 aircraft and/or the crowd, in that you may cause more problems
21 than what it's trying to settle out itself.

22 The technology that's come about from the first, you know,
23 one copter that I built that was made with towel rack arms welded
24 together and, you know, all homemade custom equipment put on it,
25 to the aircraft now that know how to fly themselves way better

1 than any human will ever be able to fly it, is mind-blowing, so --
2 and again, a lot of that, we'll look to the aircraft and the
3 programming that's involved with it to handle the majority of that
4 situation because really, the only other option would be hit a
5 single button, disarm everything and have it all drop out of the
6 sky, which also, we don't know what the exact -- I mean, that's
7 literally never been done. So knowing what would happen or what
8 the consequences of that would be, it's much safer to allow that
9 preprogrammed flight to continue with the aircraft as they have
10 settled at that point.

11 Q. Okay.

12 A. So basically, about the time we got -- we got a grasp of what
13 was happening --

14 Q. Um-hum.

15 A. -- the collisions of the flyaways had stopped.

16 Q. Okay, but just to --

17 A. Even with that initial first -- yeah.

18 Q. Just to clarify that there was no manual intervention, just
19 let it -- you got the malfunction, you let the automation run it,
20 run the show pretty much and continue on, you didn't intervene in
21 any manual --

22 A. Yes, sir.

23 Q. -- flight procedures. Okay. Aviation, no, I see that one.
24 How far were your -- your start and your takeoff position from the
25 spectators, pretty much, roughly, that you can --

1 A. Oh. I'd have to go back and I don't know the exact distance
2 on that, the measurements are all -- they should be in the
3 documents that have been submitted. Let me see if I have that and
4 I don't know that I got a copy of what was sent in. Actually,
5 from Google Maps, I should be able to get a basic --

6 Q. Or, I mean, I don't know if you can screen share it or --
7 just to have a rough estimate, because once -- the operation
8 details that I got, 43 -- it doesn't say anything.

9 A. Sure. So from where we were taking off right here, the
10 distance, roughly 250 feet.

11 Q. Two hundred and 50 feet from spectators.

12 A. Yes, sir. If not farther. They've got the absolute closest
13 they were about to be. And I can see, give me one second here, if
14 I share here. There we go. So are you able to see that, sir?
15 This peninsula here is where the grid was. Closest audience
16 members were over here on this banked area and then continued
17 further south and around this side of the park. And this area
18 from about here to here, I believe, is where the police had
19 cordoned off.

20 Q. Okay. So that was my next question, is -- let me see if I
21 can --

22 A. And then the majority of the show was expected to take off
23 from here and come out over the water, so at no point was it to
24 move closer to the audience, it was actually further out into the
25 water.

1 Q. Okay. So pretty much north of there, where you got the
2 peninsula right there, that sidewalk was cordoned, the one closest
3 to you?

4 A. All of this was closed off, yes, sir. No one allowed in and
5 we had both park employees, as well as Orlando Police Department
6 in that area keeping people out on the edges.

7 Q. Okay. All right. Let me see, I think you gave me the
8 distance. And then how many drones total when -- because they put
9 500 here on the --

10 A. Um-hum.

11 Q. -- on the report, but takeoff, the actual -- without counting
12 the ones that had a malfunction or something, how many drones
13 total you got at takeoff?

14 A. So it was 500 total and then 43 that were involved in the
15 drop.

16 Q. Okay, so 500 take off, okay.

17 A. Yes, sir.

18 MR. GIBSON: Well, it would've been 498, right? You took two
19 out, right?

20 MR. CANTU: We had two on the ground.

21 MR. SEALOCK: Oh, you're correct, I did leave the two on the
22 ground when I did it. Yes, thank you.

23 BY MR. RIVERA:

24 Q. Okay, that's why I got confused before, 498 total and 43
25 mishaps. And did you get to recover all 43 or some of them were

1 unrecoverable because they fell in the water?

2 A. Some were unrecoverable from the water, I believe that was
3 either -- I think that was five that went into the lake itself and
4 then one that we were unable to recover only because it was with
5 the police department and we have not received that back.

6 MR. RIVERA: Okay, five at the lake and one at police, okay,
7 the Orlando police. Okay, I think I got all the questions, Kurt,
8 from my side.

9 BY MR. GIBSON:

10 Q. Okay. Well, I do have one more quick question about the
11 accident because that kind of reminded me. The ones that just
12 kind of fell down, were they -- and they were -- didn't go in the
13 lake, were they right there on the peninsula or where were they?

14 A. Yes, sir.

15 Q. Okay.

16 A. Yeah, right on it, I mean literally fell straight down.

17 Q. Okay. So let's see. So you said two of them kind of
18 launched, made a B-line, one of them I'm assuming is the one that
19 the police have. Do you know if one of the ones you recovered was
20 the other one that made a beeline or was that one maybe in the
21 water and you can't tell from the data that you currently --

22 A. We did recover that one, as well, it actually went behind us
23 and landed in the park area just behind us, by the flag poles.

24 Q. Okay. Do you happen to know the aircraft, did you mark down
25 which aircraft number that was? I'm just trying to -- I know

1 they're going to go through the 43 SD cards and I'm trying to --
2 (Crosstalk.)

3 MR. SEALOCK: And that's where the problem is normally when
4 it's one or two issues, but if we have an issue it's marked and
5 tagged. With that, it was so -- there was so much chaos and so
6 much confusion, it was get those and quarantine the ones we had a
7 problem with. The one that actually went out, I don't know that
8 we have the actual number of that, but in looking at the flight
9 logs on those, it should show the beeline it went.

10 Normally, in our process, if we do have a problem like that,
11 we go through those flight logs and track those to say okay, this
12 one was this one, this one was this one and document those and
13 save them somewhere. We were told -- we got ready to start our
14 investigation and we were told by our higher-ups that it was
15 discussed not to pull information, not to pull SD cards, that you
16 guys wanted to do that, so we, at that point, had not tracked it,
17 unfortunately.

18 BY MR. GIBSON:

19 Q. Okay. No, that's fine, I was just going to try to , for our
20 recorders lab, but --

21 A. Sure.

22 Q. -- they'll have to earn their paycheck, so --

23 A. I mean, unfortunately, they are kind of short flight paths,
24 so it shouldn't take a whole lot of time.

25 Q. All right, so now I'm going to go into kind of a few other

1 just kind of human factors and if somebody comes up with another
2 question about the actual accident itself, we can revisit it.

3 A. Yes, sir.

4 Q. Just to give you a heads up, some of these questions, don't
5 take offense to them, they're just standard NTSB questions that I
6 got to ask and all, kind of, stuff like that.

7 A. Sure.

8 Q. But first, kind of -- I want to kind of get a 72-hour kind of
9 work history and kind of how your -- the previous three days went,
10 so I kind of want to know if you had any work in the previous
11 three days and what that involved, kind of, hours, I'm mostly
12 looking for the hours and whatnot. What type of activities
13 outside of work, were you getting enough rest, were you getting
14 enough to eat and that kind of thing. So if you wouldn't mind
15 just kind of going through --

16 A. Sure.

17 Q. -- the previous three days.

18 A. Yes, sir. So the previous three days I was actually doing
19 additional shows for the company, we had been doing shows -- we do
20 shows almost nightly here in Orlando as an install for a vendor
21 and so working with my crews to make those shows happen, about
22 eight to ten hours a day for work on that. Definitely periods for
23 break, we eat as a crew, we talk as a crew, we go through a lot of
24 CRM discussions about food and rest. My kids are sick and tired
25 of hearing me talk about it, but -- then when this came about, I

1 said look, you know, it can happen, it is a problem and, you know,
2 you need to make sure that that stuff is taken care of so you can
3 get to an actual root problem, you don't want to have to be able
4 to blame it on, you know, I didn't sleep for three days or I was
5 at a party the night before, anything like that, it was hey, we've
6 got shows, let's be rested, let's be ready, let's make sure we got
7 food.

8 It's part of our VO training, you know, we provide snacks to
9 the crew when we're out doing shows for exactly that reason, we
10 don't want you, you know, grumbly tummy, oh, I wasn't looking and
11 I was thinking about going to find the Snickers bar, well, here's
12 some granola bars, here's some fruit snacks, here's whatever,
13 you've got to have that, now let's get to the show and, you know,
14 five, ten minutes before show time, when you are walking out to
15 your visual observer spot you've been designated at, you're
16 focusing on the show and doing nothing but that, so -- but yes,
17 sir.

18 In the 72 hours previous, I think I had one day off, at which
19 point it was just, you know, the chores around the house, mowing
20 the lawn, tidying up, cleaning the house, that kind of thing,
21 resting in between the other shows that we've had. And then the
22 show on the 21st was actually a show I was doing on what was
23 technically a day off for me for the week. It was easily 10 hours
24 after my previous shift and I mean, I had gone back and crashed
25 out on the couch, watching YouTube and gone to bed when I woke up

1 and got up and got ready for the show and was off to the show by
2 noon. So nothing unusual or nothing, you know -- no extenuating
3 circumstances that I can think of that would've, you know, caused
4 any distraction or issues for me.

5 Q. Uh-huh. And that kind of goes in with kind of my next set of
6 questions, kind of. Have you had any major life changes in the
7 past year, new kids, divorce, marriage, anything major?

8 A. God, I hope not. No, nothing of that. Honestly, probably
9 the biggest life change I had was over a year ago and it was some
10 major oral surgery, but other than, you know, we work -- I play
11 with -- like I said, I'm one of the lucky ones, I work with drones
12 at work and then I come home and play with my drones at home, so
13 it's -- everything is, you know, focused around the multi-rotors
14 and what I'm doing there. My own personal projects for, you know
15 -- on fixed wings and on multi-rotors and it ties in perfectly
16 with what I do for work.

17 Q. Okay. Any type of prescription medications you have to take
18 or anything like that?

19 A. No, sir.

20 Q. Do you drink alcohol?

21 A. Not a drop.

22 Q. Not a drop, okay. Use any tobacco?

23 A. No, sir.

24 Q. And let's see, so no medications in the last 72 hours. No
25 allergy meds or anything like that?

1 A. No, sir.

2 Q. Um-hum.

3 A. If anything, maybe some ibuprofen, but I mean -- yeah.

4 Q. Yeah.

5 A. Getting old, creaky joints.

6 Q. I feel your pain, trust me. Let's see. So how was the
7 workload for the day of the accident? This was the first show of
8 the day, correct?

9 A. Yes, sir, it was. I mean, pretty solid. Again, everything
10 -- there was really not a whole lot that went on that was any
11 different than almost any other show we've had. So I mean, moving
12 to that, you know, the set up of the network, the arrangement of
13 the drones, the standard maintenance that we normally go through
14 as far as -- like literally, everyone on the crew, we're out
15 there, we stack every single drone, we view every propeller, view
16 it for cracks, dents, breaks, nicks, dings, chips, swap them out,
17 if need be.

18 If motors were sticking, if arms are loose, we can do some
19 basic tightening on the field and adjusting of those aircraft to
20 get them show-ready, set them aside, if not. Other than that,
21 like I said, slight little lag in the network which, again, not
22 something we haven't seen in other places, but it was enough, I
23 guess, that it was slowing me down and I, you know, was pushing at
24 the last minute there and again, going through those -- the seven
25 attitudes within the 107 testing of, you know, I can do this, I

1 can make this happen, I know I've got the time, I know I can get
2 through there, so the machismo and the -- just the expectation
3 that it's just going to run and I'm going to be fine with it. I
4 have a feeling some of that may have played in, as well, but it's
5 -- yeah, there was nothing to the workload that was really any
6 different than what we've seen at other shows.

7 Q. Okay. And how do you like working for Sky Elements?

8 A. Absolutely love it. It's an amazing opportunity and I think,
9 as we talked before about my history in the drone world, the UAS
10 space, it's been very interesting to me that a lot of people, when
11 they get into the UAS space, they got locked into one faction of
12 it, one facet of it. You got guys that do it because it's part of
13 their GIS program and they're doing just mapping. You've got
14 folks that have gotten into the inspection on the commercial side.
15 You've got the guys that do the -- you know, real estate
16 videography and photography and that's all they get to do.

17 I do a lot of that, I work on video projects and movies and
18 that, but also mapping and inspection, and now with something to
19 this end, this is more of an entertainment job that uses the
20 technology that I have basically dedicated, you know, this
21 significant chunk of my life to at this point, and so being able
22 to use my technical expertise and knowledge to help bring these
23 shows to life and see the response of the crowds and the effect
24 that we have in helping people's events, and the conversations and
25 interactions we have with student groups and, you know, hobby

1 groups and charity groups and companies and that, is just
2 phenomenal. It's just short of a rock star lifestyle, fly across
3 the country, hop out of a plane, get in a rental car and drive, do
4 a show, listen to the crowd cheer, get back in a plane and fly to
5 the next show. It's just absolutely astounding, it really is. I
6 couldn't ask for a better job.

7 Q. That's good to hear. I thought you probably kind of answered
8 this, this question, were you getting any kind of pressure from
9 anybody to get this show up and going, whether or not -- whether
10 it was from somebody like your manager, somebody from the company
11 or from the person that was kind of running the show, that as he
12 paid for the show, was anybody kind of getting in your ear, kind
13 of pressuring you, saying what's the delay here, let's get this
14 thing going?

15 A. I mean, in general, as a 107 pilot, I understand, and it's a
16 running joke that when you take a 107 test, if the question is
17 ever "Is there any responsibility for this?" it always boils down
18 to the RPIC, period. I understand that. Again, going back to the
19 fact that this is an entertainment job and that we did have, you
20 know, show times listed, I would say that pushing myself to make
21 that show time rather than demanding an additional portion of time
22 to make sure that everything was ready, I took the -- you know, on
23 myself that things look good, I think they're ready, I think we're
24 ready to go and I can make this work. And maybe another five, ten
25 minutes of pushback and running through my checklist one more time

1 would've made the difference and unfortunately, now that's
2 something that I've been dealing with, I mean, I feel horrible
3 about it for so many different reasons, but also as part of my job
4 working with Javier and, you know, the rest of our crew in Texas
5 revising our checklists and our procedures to make sure that
6 that's not something that happens to anyone else because I -- as
7 we were saying, you know, again -- you know, we've got a lot of
8 pilots come that are trained and this is now the third drone light
9 show company that I've worked with and gives me a total of about
10 three, three and a half years of drone light show experience,
11 first incident we've ever had like this, the fact that between
12 attitudes and, you know, thought processes and procedures, it can
13 technically happen to anybody.

14 I hate that it happened and I don't want to ever see it
15 happen again, so we're in that process of cleaning up those
16 messages and those processes so it doesn't happen again.

17 Q. Okay. So it's more of kind of an internal pressure that you
18 kind of brought to yourself.

19 A. Yes, sir.

20 Q. It's like I want to get this done type of thing.

21 A. Right. I mean, when you're doing that show and there's music
22 to be played and a crowd waiting and all this kind of stuff,
23 you're rushing yourself a little bit and that should've been even
24 more of a sign to myself to slow down.

25 Q. Okay. For the music that goes on with these shows, are you

1 kind of in control of the music, too, or is it kind of --

2 A. We'll be working with someone --

3 Q. Okay.

4 A. -- and essentially, when we're ready to go, it's three-two-
5 one, they start the music and we start our launch process and then
6 it matches up and it syncs in real time. So it is a coordinated
7 back-and-forth with someone else.

8 Q. Okay. And then kind of talking about the environmental areas
9 at the exit site, did you have any unusual distractions, anything
10 that was kind of blocking your vision or anything like that or any
11 type of -- was it too loud to really hear you discuss things with
12 the other VOs or anything like that?

13 A. No, sir. And at that point with the VOs, in order to avoid
14 that, because we do -- a lot of our job takes us to places where
15 there is a lot of noise and audio, whether it's a music concert or
16 a sporting event or what have you, so actually our communication
17 between the pilot and VOs is normally done via headsets.

18 Q. Okay.

19 A. If headsets aren't available, a lot of times it's a cell
20 phone, but we do have, you know, vocal communication, not just
21 trying to yell across a field and, you know, do hand signs to make
22 something happen, definitely trying to shore that communication
23 in.

24 Q. Okay. Let's see. And then kind of -- you kind of went over
25 this, do you have any previous aviation accident history or

1 anything like that?

2 A. Absolutely not, so no.

3 Q. Any other -- was this your first kind of -- kind of an
4 emergency situation or anything like that, even if it's not --

5 A. Yes, sir.

6 Q. -- dealing with drone shows, even just dealing with a regular
7 UAS map there or something like that.

8 A. Yeah. I mean, you know, simple stuff, I accidentally clipped
9 a tree and the drone dropped and, you know, broke a prop,
10 something like that, broke an arm that I had to fix. I will say
11 I've participated in FPU racing for a long time, so I've fixed a
12 lot of drones from crashes but those were somewhat intangible so,
13 you know, it is what it is. But as far as an actual, like, emergency
14 event, absolutely, yes, sir, this would be -- this would be the
15 first event.

16 Q. Okay. I kind of meant to ask this earlier with your 72
17 hours, what are your normal hours of work? I'm assuming these
18 drone shows are usually at night, so you're probably more of an
19 evening type of shift.

20 A. Yes, sir. Yes, sir. And so currently, for the last six
21 months or so here in Orlando, like I said, working on, you know,
22 almost nightly shows, the crew here and myself included, were
23 working four tens, so four days a week, 10-hour shifts. That is
24 normally split up where you may have two days on and obviously,
25 you got at least, you know, eight hours of downtime between your

1 shifts to get some rest and nap and get food, whatever you need to
2 do, relax and then, you know, mandated downtime days, as well.

3 Q. Okay. And then speaking of the crew, are you kind of
4 familiar with the crew that you were working with during this one
5 or --

6 A. Yes, sir.

7 Q. Okay.

8 A. Yes, sir, the majority of them. Normally, our crews, we will
9 do a -- we will do a core crew of a pilot, a driver, and a crew
10 lead. If it's a really large show, we may have an additional crew
11 lead and then at that point, depending on where we are, a lot of
12 times we hire a local crew for -- I hate to say grunt work but,
13 essentially, the layout of drones.

14 So the crew leads will, you know, determine where
15 everything's going to go, but then we have locals that we will
16 hire to actually lay them out where the crew leads have designated
17 for the current grids. The great thing about the Orlando area is
18 because we do so much work here, a lot of the folks that we work
19 with are repeat employees. And so even the folks that were not
20 part of my core crew, I've worked with all of them at least once,
21 if not more.

22 MR. GIBSON: I think that's all the questions I've got at the
23 moment.

24 MR. SEALOCK: Okay.

25 MR. GIBSON: Ariel, if you want to ask any questions that I

1 might've missed.

2 BY MR. RIVERA:

3 Q. When you were talking about the headsets, the voice
4 communications, I didn't get -- did you have any issues with those
5 or they were working perfectly at the time for everybody?

6 A. They were working just fine. Yes, sir.

7 Q. Okay.

8 A. Because in fact, when I noticed, I started getting calls on
9 the headset from my VOs saying, you know, collision, be aware,
10 yada, yada, yada. I mean, all of that was operating correctly.

11 Q. Okay. I didn't get it when you were explaining that, but
12 that's okay.

13 A. Yes, I may have skipped over that, I apologize.

14 MR. RIVERA: And human factor-wise, no, I think you covered
15 everything, Kurt, regarding all the questions that I have pretty
16 much for human factors.

17 MR. GIBSON: Javier, you got anything you want to ask? I
18 know you guys probably talk all the time, anyway, so -- but --
19 (Cross-talk.)

20 MR. CANTU: No. No, everything, everything K.C. said is kind
21 of just our normal running procedure.

22 BY MR. GIBSON:

23 Q. Okay. One technical question I kind of wanted to ask and I
24 forgot to ask earlier, dealing with like all the components, the
25 RTK unit, the Wi-Fi access points and the radio, is there any,

1 like, calibration requirements on any of those devices or --

2 A. So we do run -- every time where we get to the site, once
3 everything is set up, the Wi-Fi unit is set out and being able to
4 interact with the grid, so being able to get all lights to flash
5 at the same time via both Wi-Fi and the RF signal, the 915, once
6 we get -- the very first thing we do when we get to the site and
7 get, you know, kind of the layout is to place the RTK base unit,
8 and I always call it cooking, we start cooking the RTK, basically
9 just get it connected and have it run a site survey kind of
10 calibration of its own and we get it to .35 -- is it centimeters
11 or millimeters?

12 MR. CANTU: Meter.

13 MR. SEALOCK: Point three five meters.

14 (Crosstalk.)

15 MR. CANTU: Yeah, .35 meter.

16 MR. SEALOCK: And so it tracks to that to get its actual base
17 location, then the aircraft, based on their GPS and the
18 corrections from that RTK goes. So that would be the actual
19 calibration of that RTK and that's what would actually, you know,
20 be fed to the drones as their corrections.

21 MR. GIBSON: Okay.

22 MR. RIVERA: So it pretty much self-calibrates every time you
23 start a system?

24 MR. SEALOCK: Right, you start it up, we go into it and say
25 hey, you know, here's where you're at, start a survey and it runs

1 a survey. Once it gets enough data points that it feels it's
2 accurate and it's getting enough ping off of enough satellites, it
3 will go green and says okay, I'm ready to use now and then we
4 start.

5 MR. RIVERA: Okay.

6 BY MR. GIBSON:

7 Q. And do all the drones tell you whether or not it's getting
8 the RTK signal, too, or is that more --

9 A. Yes, sir.

10 Q. -- going to the laptop? Okay.

11 A. Yes, sir, everything, everything reads into it. Um-hum.

12 Q. I'm trying to think if there's anything else I meant to ask
13 and I can't think of anything. Oh. No, you said the second show
14 was canceled, correct?

15 A. Yes, sir.

16 Q. Okay.

17 A. Unfortunately.

18 Q. And then the other question I meant, have you -- this
19 particular show that was programmed in, have you ever done that
20 one before or was this first time --

21 A. No, sir.

22 Q. -- this particular show?

23 A. The majority of our shows are the spoke (ph.), so it will be
24 the programmers design the show, it gets fed into the system, it's
25 sent to the pilot, they upload it, they -- you know, check

1 parameters and go. In most systems, you have them run through a
2 simulator to be run, but in most cases most drone companies that I
3 know, even some, you know, of our competitors, I have friends that
4 work at other companies, the majority of them do not fly the show
5 as in like a practice show. If it goes through the simulator and
6 shows that times (ph.) are good, speeds are good, distances are
7 good and separation is solid, it's expected that that is what's
8 going to happen in real life because all of that is based off of
9 true physics.

10 Q. Um-hum.

11 A. Most of the time if we run a practice show, it may be for
12 accommodation with another show where we're making sure that,
13 like, music or some other sort of activity that goes on at the
14 same time, that things are centered correctly and they're taking
15 off exactly in the right spot and things like that. If it's a
16 one-off show, it normally does not fly prior to the show itself.

17 Q. Got you. And as far as you're aware, nobody else has run
18 that particular show --

19 A. No, sir.

20 Q. -- for some other event or anything like that? Okay.

21 A. No, sir. No, that was designed specifically for that Orlando
22 show.

23 Q. Okay.

24 MR. CANTU: Each of our shows, unless it's a stock show
25 purchase, which happens the majority of the time, like Fourth of

1 July, I mean, just the holidays and things like that, they'll buy
2 a stock show, which has like a set of like 10 or 15 images, it's
3 the same images and things like that. Most, I would say 95
4 percent of anyone who purchases a drone show, they want custom,
5 something that tells their story or to rebuild their brand, so all
6 drone shows are custom made.

7 BY MR. GIBSON:

8 Q. Okay. And then also deal with the location, have you ever
9 done another -- just a different drone show at that exact same
10 location on that peninsula or --

11 A. Yes, sir.

12 Q. Okay. So you're familiar with that peninsula.

13 A. Yeah.

14 Q. And you didn't have any issues with interference or anything
15 like that in that area?

16 A. No, sir.

17 MR. GIBSON: Okay. That's about all I can think of. Unless
18 anybody else has another question that they thought of. Ariel,
19 last chance.

20 BY MR. RIVERA:

21 Q. Oh, last chance. Just to confirm, it was the first flight of
22 the day, this one, right?

23 A. Yes, sir.

24 Q. Like you said, no -- no practice shows, everything went well
25 in the simulator.

1 A. Um-hum.

2 Q. You did perform shows in this area before, so you were aware
3 of the limitations of the space.

4 A. Yes, sir.

5 Q. And then, like, you didn't have any software issues, any
6 powerplant or airframe issues in the drones, no malfunctions at
7 all, no lost links or GPS lost?

8 A. No, sir.

9 Q. Okay. And I think I got all -- I saw that you guys sent the
10 letter, the communication of the show. You called 15 minutes
11 prior to Orlando executive, the air traffic control tower?

12 A. Yes, sir.

13 Q. Okay.

14 A. Yes, we do.

15 Q. Okay. It was all the way to fly. You said it was
16 approximately -- the show was approximately 12 minutes to last,
17 right?

18 A. Yes, sir.

19 MR. RIVERA: Okay. It was on a Class B airspace below 400.
20 I think I got all of my side, Kurt.

21 MR. GIBSON: Okay.

22 MR. SEALOCK: I'd say we were a little late calling in to
23 them to let them know that operations had ceased for the evening
24 because there was a lot going on.

25 MR. RIVERA: Um-hum.

1 MR. SEALOCK: We also called in and verified with them at the
2 end of the show.

3 MR. RIVERA: Okay.

4 BY MR. GIBSON:

5 Q. I think the last question I had is I just kind of want to
6 verify for when you were programming the laptop to push things
7 out, the only thing you're aware of that didn't get properly
8 pushed in the drones was the paths, correct?

9 A. Yes, sir. Yes, sir. So in our looking, and I discussed this
10 a couple times with our owner, Preston, and he's also our general
11 counsel, so just kind of back and forth with that, the idea that
12 with the path parameters keeping them as close as they were, had
13 it been different, they may have been -- they would've been
14 further separated in that takeoff, that the takeoff from that
15 location, the grid may have been just a little bit off to the
16 sides or as they corrected, that slight wiggle as they came up may
17 have caused a drift that caused the initial collision, we're not
18 sure, but that -- you know, in looking at the video, that is the
19 closest that we can put together as to what may have caused this
20 initial accident.

21 Q. Okay. And does the software give you any warning if
22 something isn't pushed that normally is pushed or anything like
23 that?

24 A. Yes, sir.

25 Q. So would it warn you, give a warning, say the paths weren't

1 pushed or --

2 A. So we get path parameters. A lot of what these path
3 parameters do is to add additional separation from the standard
4 separation of the show. So what it looks like is the show went
5 okay, everything is in its grid, it's a part where it's supposed
6 to be, it's ready to go. The additional path parameters, a lot of
7 times we can use that to do kind of, you know, more almost showy
8 things, different colors on takeoff to make like an American flag
9 as it raises off the ground or different rows or different
10 patterns of takeoff, it can take off in a snake pattern or a
11 vortex going up or a full lift or what have you. So I don't
12 believe that the software actually looks at that and says oh, this
13 is missing, it says oh, you're not using that.

14 MR. CANTU: Yeah, because path parameters are not --

15 (Cross-talk.)

16 MR. SEALOCK: It's not an integral part of that flight path,
17 but it is something that adds to the process.

18 BY MR. GIBSON:

19 Q. Got you. Okay. And does the simulation for this particular
20 show, was it used in the pathing program thing or just the
21 standard no paths programmed in, do you know?

22 A. That, I'm not sure. I would imagine. I know the programmers
23 work on these shows for days at a time, so they're running -- I
24 don't know if they're running individual segments each to make
25 sure that each segment is okay and then the whole thing comes

1 together or if it's run from start to finish. I would have to
2 look up on that and get you back an answer on that one.

3 MR. GIBSON: Okay. No, you don't -- I'll work with Javier to
4 get --

5 MR. SEALOCK: Okay.

6 MR. GIBSON: -- some more of the technical stuff. That's all
7 I can think of. Do you have any questions for me on the NTSB
8 process or anything like that, since you've got me on the line?

9 MR. SEALOCK: I got you. No, sir, I appreciate it. Your
10 e-mail was very straightforward and, you know, I understand that
11 this is all digging to find a way to make this better and I am 100
12 percent for that, I'm happy to, you know, help out in any way I
13 can. If there's any additional information I can get you, please
14 reach out, I'm more than happy to help with that.

15 I do, actually, a lot of volunteer stuff with the FAA, as
16 well, I've been on the FAAST Team for several years now and help
17 out a lot with hobbyists and commercial drone owners, things like
18 that, too. So it's my goal to make this industry as safe and
19 enjoyable as possible for everyone and I love that we're moving
20 towards more standardization across the board because I think
21 that's going to help prevent a lot of this kind of stuff from
22 happening.

23 MR. GIBSON: Excellent. All right. Well, if nobody else has
24 any other questions, Kenneth, I really do appreciate your time and
25 answering all my questions.

1 MR. SEALOCK: Absolutely.

2 MR. GIBSON: If I come up with anything else, I'll reach back
3 out to you. And if you think of some question that you just want
4 to ask me, feel free, or if you think of something that you want
5 to let me know that you just forgot to mention, feel free to reach
6 out to me.

7 MR. SEALOCK: Yes, sir.

8 MR. GIBSON: All my contact information is in the e-mail, and
9 with that, it's 3:14, I'm going to stop the recording.

10 (Whereupon, at 3:14 p.m., the interview concluded.)

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CERTIFICATE

This is to certify that the attached proceeding before the

NATIONAL TRANSPORTATION SAFETY BOARD

IN THE MATTER OF: DRONE SHOW ACCIDENT IN ORLANDO,
 FLORIDA ON DECEMBER 21, 2024
 Interview of Kenneth Sealock

ACCIDENT NO.: DCA25LA065

DATE: January 13, 2025

was held according to the record, and that this is the original,
complete, true and accurate transcript which has been transcribed
to the best of my skill and ability.



David A. Martini
Transcriber