

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4
5 SZ DJI TECHNOLOGY CO., LTD.,

6 Petitioner,

7 v.

8 AUTEL ROBOTICS USA LLC,

9 Patent Owner.

10
11 Case IPR2019-00846

12 Patent 9,260,184

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15 The deposition of CHARLES F. REINHOLTZ,
16 PH.D., called for examination, taken pursuant to the
17 provisions of the Code of Civil Procedure and the
18 Rules of the Supreme Court of the State of Illinois
19 pertaining to the taking of depositions for the
20 purpose of discovery, taken before DINA G. MANCILLAS,
21 a Certified Shorthand Reporter within and for the
22 State of Illinois, CSR No. 84-3400 of said State, via
23 remote video teleconference, on June 16, 2020, at
24 8:30 a.m. CST.

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24 CSR No. 84-3400

25 APPEARING REMOTELY FROM DUPAGE COUNTY, ILLINOIS

1

I N D E X

2

WITNESS

EXAMINATION

3

CHARLES FREDERICK REINHOLTZ, PH.D.

4

By Mr. Peters

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5

6

E X H I B I T S R E F E R E N C E D

7

NUMBER

PAGE

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Deposition Exhibit 1001, United States

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Patent No. 9,260,184.

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Deposition Exhibit 1003, Declaration of

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11

Dr. Alfred Ducharme.

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Deposition Exhibit 1017, United States

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Patent No. 2,470,517.

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Deposition Exhibit 1018, European Patent

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Application 0921067.

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Deposition Exhibit 1026, United States

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Patent No. 6,929,226.

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Deposition Exhibit 1027, Deposition

81

19

transcript of Dr. Reinholtz, dated

20

April 3rd, 2020.

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Deposition Exhibit 2001, Declaration of

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Dr. Charles F. Reinholtz.

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Deposition Exhibit 2007, Second Declaration

24

of Dr. Charles F. Reinholtz.

25

I N D E X (Continued)

| D O C U M E N T | R E F E R E N C E D |
|-----------------|---------------------|
| N U M B E R | P A G E |

| | |
|---|--|
| Patent Trial and Appeal Board's final | |
| written decision in IPR2019-00343 against | |
| Claims 1, 2, 5 through 9, and 11 of the | |
| '184 patent. | |

*** ALL ABOVE-REFERENCED DOCUMENTS WERE RETAINED BY
COUNSEL AND ARE NOT ATTACHED HEREIN. ***

1 THE COURT REPORTER: The attorneys
2 participating in this deposition acknowledge
3 that I am not physically present in the
4 deposition room and that I will be reporting
5 this deposition remotely. They further
6 acknowledge that in lieu of an oath
7 administered in person, the witness will
8 verbally declare his testimony in this matter
9 is under penalty of perjury.

10 The parties and their counsel
11 consent to this arrangement and waive any
12 objections to this manner of reporting.

13 Please indicate your agreement by
14 stating your name and your agreement on the
15 record.

16 MR. PETERS: This is Steven Peters from
17 King & Spalding on behalf of petitioner. We
18 agree.

19 MR. ABRAMIC: John Abramic on behalf of
20 patent owner. We agree.

21 (The witness was duly sworn.)
22
23
24
25

1 CHARLES FREDERICK REINHOLTZ, PH.D.,
2 called as a witness herein, having been first duly
3 sworn, was examined and testified as follows:

4 EXAMINATION

5 BY MR. PETERS:

6 Q. Good morning. Could you please state
7 your full name for the record?

8 A. Yes. Charles Frederick Reinholtz.

9 Q. Welcome, Dr. Reinholtz.
10 Have you been deposed before?

11 A. I have.

12 Q. Do you know about how many times?

13 A. Probably about 25 times.

14 Q. So I'm going to ask you questions in
15 this deposition.

16 If, at any time, my question is not
17 clear, either because of a technological issue or
18 you just don't understand the question, just let
19 me know. I will try to repeat or reframe the
20 question for you.

21 Does that sound okay?

22 A. Yes. That's fine.

23 Q. We can take a break every 60 to 90
24 minutes. Let me know if you need a break earlier
25 than that. We can finish a line of questioning

1 and take a break.

2 Does that sound all right?

3 A. That's fine. Thank you.

4 Q. Have you ever been deposed remotely?

5 A. Yes, I have.

6 Q. How many times have you been deposed
7 remotely?

8 A. Twice.

9 Q. Including this one or twice before this
10 one?

11 A. Twice before this one. There was the
12 earlier deposition in the same '184 IPR. I was
13 deposed remotely.

14 Q. And what was the other case that you
15 were deposed remotely in?

16 A. It was a case involving Caterpillar and
17 mechanisms in heavy road construction equipment.

18 Q. Is that the Wirtgen case?

19 A. Yes. That's correct, a follow-on to a
20 case I worked on earlier.

21 Q. Where are you located right now?

22 A. I am in New Smyrna Beach, Florida.

23 Q. At your house?

24 A. That's correct, at my house.

25 THE WITNESS: And if I may interrupt

1 for a second. I'm sorry, Steven. The
2 instructions that I received said I would be
3 asked to show a government ID. I don't want
4 to overlook that if that's an important part
5 of the deposition.

6 Do we need to do that?

7 MR. PETERS: I'll defer to the court
8 reporter, Dina.

9 THE COURT REPORTER: Let me just go off
10 the record for a second.

11 (Discussion was had off the
12 record.)

13 MR. ABRAMIC: This is John Abramic on
14 behalf of patent owner. We are agreeing to
15 waive the requirement that the witness show
16 the government ID and that the witness is,
17 indeed, Charles Reinholtz.

18 MR. PETERS: And we'll agree to that as
19 well.

20 BY MR. PETERS:

21 Q. Continuing the questioning, is there
22 anyone else in the room with you, Dr. Reinholtz?

23 A. No.

24 Q. If, for some reason at any point during
25 today's deposition, while we're on the record, if

1 you need to move out of the frame of your video
2 camera, would you please describe for the record
3 what you're doing?

4 A. Yes. I'll try to remember to do that.

5 Q. Is there any reason that you cannot
6 testify truthfully today?

7 A. No.

8 Q. Do you understand that you're here
9 today to testify regarding a declaration you
10 submitted to the United States Patent and
11 Trademark Office Inter Parties Review Proceeding,
12 IPR2019-00864 of U.S. Patent No. 9,260,184?

13 A. Yes, I do understand.

14 Q. And for this deposition, is it okay if
15 we refer to that patent as the '184 patent?

16 A. Yes. That's fine.

17 Q. Did you do anything to prepare for
18 today's deposition?

19 A. Yes. I did some preparation.

20 Q. When preparing for today's deposition,
21 did you discuss the case with anyone other than
22 counsel?

23 A. No, I have not.

24 Q. Now, I'm going to be providing you with
25 some exhibits using the chat feature. I am -- so

1 we're going to have a little experiment here, but
2 I'm now using the chat feature to give you
3 Exhibit 2007 to this proceeding.

4 Please let me know when you have that
5 open and you're ready to discuss.

6 A. Okay. I have it open. I have the
7 first page.

8 Q. Can you turn to Paragraph 14, please?

9 A. Okay. I'm there.

10 Q. In preparation for today's deposition,
11 did you review any documents that are not listed
12 in Paragraph 14?

13 A. The only thing I can think of is, I did
14 review, in the last few days, the most recent PTAB
15 decision that was issued on May 21st, I believe,
16 on the earlier '184 IPR.

17 Q. And this is a similar question, but did
18 you -- do you recall if you reviewed any documents
19 that are not cited in Exhibit 2007, which is your
20 second declaration, in preparation for today's
21 deposition?

22 A. Nothing comes to mind because that
23 encompasses documents cited in my first
24 declaration, the documents cited herein.

25 So I don't think I've reviewed anything

1 other than the documents cited here, but we may
2 come across something that I did review that isn't
3 listed. I intended to list everything here.

4 Q. So what did you do to prepare for
5 today's deposition?

6 A. I reviewed the '184 patent again. I
7 reviewed the declaration that you sent to me in
8 the chat, the Exhibit 2007 declaration. I
9 reviewed the prior art that is discussed in that
10 2007 declaration.

11 I reviewed the PTAB decision that I
12 just mentioned as an additional document. I
13 reviewed some of Dr. Ducharme's declaration in the
14 same proceeding.

15 Q. How much time did you spend preparing
16 for the deposition?

17 A. Perhaps ten hours total.

18 Q. And did you meet with counsel in
19 preparation for the deposition?

20 A. Yes. We had a phone discussion, not a
21 live meeting.

22 Q. Did you review your first declaration
23 in this case, which is Exhibit 2001, in
24 preparation for the deposition?

25 A. Yes, I did.

1 Q. And did you review your declaration
2 from IPR2019-00343, which is Exhibit 2009 in this
3 case?

4 A. I may have reviewed parts of it. I
5 don't believe I reviewed the whole thing. I
6 certainly opened it. I was scanning through
7 documents.

8 Q. Did you review the revised motion to
9 amend?

10 A. Yes, I did.

11 Q. Can you turn to the last page of your
12 CV, which is given the Bates stamp of Page 50 in
13 Exhibit 2007.

14 A. Okay. I'm there.

15 Q. So it looks like -- I'm sorry.

16 On this page here, you provide a table
17 of Ph.D. students that you have advised, is that
18 right?

19 A. That's correct.

20 Q. And this covers two different
21 universities that you've worked at?

22 A. That's correct.

23 And to be clear, these are students --
24 Ph.D. students that -- whose committee I chaired.

25 And so I've been on many other

1 committees in an advisory capacity. Usually, a
2 Ph.D. student has five advisors, but one primary
3 advisor.

4 So these are students listed where I
5 was the primary advisor.

6 Q. What are the responsibilities of a
7 primary advisor to a Ph.D. student?

8 A. To guide the student, advise that
9 student in what coursework to take; to work with
10 the Ph.D. student in finding a research topic; in
11 many cases, pursuing external funding for that
12 student's research; and then, of course, reviewing
13 the work as it progresses and providing feedback
14 and ultimately signing off on the Ph.D.
15 dissertation as being approved along with the rest
16 of the advisory committee.

17 Q. Do you publish articles with Ph.D.
18 students in your role as primary advisor?

19 A. I'm sorry, Steven. I didn't quite
20 understand.

21 Did you say did I publish articles?

22 Q. Do you publish articles with students
23 in your role as primary advisor?

24 A. Yes.

25 Q. Now, from the table on Page 50, it

1 looks like between 1988 and 2002, you graduated 12
2 Ph.D. students as primary advisor, is that right?

3 A. That's correct.

4 Q. And between 2003 and 2015, you were not
5 primary advisor to any Ph.D. students, or at least
6 none of the students that you were primary advisor
7 to graduated between 2003 and 2015, is that right?

8 A. That's correct.

9 Q. Why were there no students graduating
10 between 2003 and 2015?

11 A. Because I took on the role -- I took on
12 more administrative duties. So I was -- from 2007
13 to 2017, I was department chair. I was starting a
14 new mechanical engineering program at Embry-Riddle
15 Aeronautical University. And even before that at
16 Virginia Tech, I had duties as an assistant
17 department head and as alumni distinguished
18 faculty member.

19 So my roles changed as I went through
20 the faculty ranks. I published and worked for
21 graduate students heavily, as most young faculty
22 are at least encouraged to do. And then I took on
23 more of an advisory role to other faculty in an
24 administrative role.

25 Q. So you took on that more advisory role

1 around the 2003 time frame?

2 A. Probably before then. I'd have to look
3 at my own resumé when I started as the assistant
4 department head at Virginia Tech. I believe it
5 preceded that.

6 And I also was in charge of
7 accreditation review, which, again, is a major
8 administrative responsibility.

9 So, prior to that, but I had students
10 that were continuing. And so I graduated Ph.D.
11 students even after I took on more of an
12 administrative role.

13 Q. Now, a student that you --

14 A. I --

15 Q. Go ahead.

16 A. I should also note that at Embry-Riddle
17 Aeronautical University, I lived there in 2007 to
18 take the job as department chair, and there were
19 no Ph.D. programs at the time.

20 So that was -- part of my
21 administrative responsibility was to develop a
22 Master's program and a Ph.D. program, which I did
23 in the time that I was there.

24 So there was no possibility of having a
25 Ph.D. student for much of the period we're talking

1 about.

2 Q. And the student that graduated in 2016,
3 his name is Snorri Gudmundsson who had a
4 dissertation titled "A Biomimetic,
5 Energy-Harvesting, Obstacle-Avoiding,
6 Path-Planning Algorithm for UAVs."

7 Can you tell us what Dr. Gudmundsson's
8 Ph.D. work involved, aside from the title?

9 A. The title is pretty long and
10 descriptive, and so the biomimetic part is trying
11 to emulate biological systems. That's something
12 we do in robotics.

13 Frequently, we look to biological
14 systems to see how they perform the task or how
15 they find success in particular aspects of their
16 operation.

17 Energy harvesting has to do with
18 recovering or gaining energy. So if you're
19 familiar with hang gliders or glider pilots in
20 general, they look for thermals. That's
21 atmospheric energy.

22 The air is upwelling due to sometimes
23 the earth being heated. And if you can find one
24 of those thermals, you can rise up with it and
25 acquire energy, increase your energy state, and

1 fly for much longer. So that's the energy
2 harvesting part.

3 Obstacle avoiding is pretty
4 self-explanatory. That means the vehicle has
5 onboard sensors and is able to negotiate
6 obstacles.

7 And then path planning had to do with
8 creating the most efficient paths. For example,
9 flying along the ridge of a mountain might be --
10 at some time of the day, give you the ability to
11 harvest energy. So you might plan a path along a
12 ledge that has an upload there.

13 At other times of the day or along the
14 flight, you may have to replan that to create the
15 most efficient flight plan. So that's the path
16 planning part of it.

17 Q. So is Dr. Gudmundsson's work entirely
18 mathematical?

19 A. No. Dr. Gudmundsson is a very applied
20 individual. And so he was testing a number of the
21 aspects of his work in addition to doing the
22 theoretical part.

23 Although that wasn't -- the testing was
24 not a major part of his written Ph.D.
25 dissertation, but he did do quite a bit of

1 testing.

2 Q. So Dr. Gudmundsson did testing on a
3 UAV?

4 A. That's correct.

5 Q. Was that an off-the-shelf UAV?

6 A. I was not with him during the testing,
7 and I don't recall. I'm sure I knew, at the time
8 he was doing the work, what platforms he was
9 flying.

10 (Discussion was had off the
11 record.)

12 BY THE WITNESS:

13 A. Dr. Gudmundsson had multiple UAVs, owns
14 multiple UAVs and operates them, and I wasn't
15 present for the testing that he did, but I believe
16 he used at least two different UAVs to test
17 certain aspects of his work.

18 BY MR. PETERS:

19 Q. So Dr. Gudmundsson used his own
20 personal UAVs to test his work?

21 A. To my recollection, yes.

22 Q. You have been deposed in this case
23 before, correct?

24 A. That's correct.

25 Q. And you've been deposed in other cases

1 relating to the '184 patent?

2 A. That's correct.

3 Q. Do you recall how many times you've
4 been deposed in total in relation to the '184
5 patent?

6 A. I think four times. Some of the
7 earlier depositions involved other patents as
8 well.

9 Q. You also provided live testimony in
10 relation to the '184 patent, is that right?

11 A. That's correct.

12 Q. And was that just the one time at the
13 International Trade Commission?

14 A. That's correct. At the ITC hearing.

15 Q. And do you know how much Autel has paid
16 you since you -- I'm sorry. I skipped a question.

17 Do you know when Autel first engaged
18 you as an expert in relation to the '184 patent?

19 A. I don't have an exact date. Sometime
20 in early 2019, if I recall correctly, but that's
21 approximate. I have records. I would be happy to
22 check if you'd like.

23 Q. And do you recall how much Autel has
24 paid you since early 2019?

25 A. What the dollar amount is?

1 Q. That's right.

2 A. I don't have a figure in front of me.

3 I don't know. I'd have to tally it up.

4 Q. Would it be more than a hundred
5 thousand?

6 A. Probably, yes.

7 Q. So looking at your CV, on some of
8 the -- not your CV, your declaration,
9 Exhibit 2007, of which your CV is a part, some
10 pages have two different page numbers on them.

11 So to avoid confusion, let's agree to
12 refer to the number in the bottom center of the
13 page, at least for purposes of the declaration,
14 and not the Bates stamp number on the bottom
15 right.

16 Is that okay?

17 A. Yes. That's fine.

18 Q. So if you could please turn to Page 25
19 of Exhibit 2007.

20 A. Okay. I'm there.

21 Q. Is this your signature on Page 25?

22 A. Yes, it is.

23 Q. And did you write this declaration?

24 A. Yes, I did.

25 Q. How much time did you spend working on

1 it?

2 A. I do not have that number tallied.

3 Q. Is it more than ten hours?

4 A. Yes.

5 Q. Was it more than 50 hours?

6 A. Almost certainly not.

7 Q. Dr. Reinholtz, have you ever designed a
8 UAV yourself?

9 A. Yes.

10 Q. Can you tell me about that experience?

11 A. Well, I have been involved in the
12 design of quite a few different UAV systems. I
13 typically work with students and don't, for
14 example, do the CAD work. I oversee students
15 doing the analysis, but I've supervised many
16 different platforms.

17 We've done single-rotor craft, what we
18 call monocothers, that we've made by a variety of
19 techniques, including 3D printing.

20 We've made an elliptical wing aircraft
21 that we designed from scratch and developed the
22 design process under contract with Boeing. I've
23 been involved in the design of a number of
24 multi-rotor UAVs.

25 Typically, like most things, you don't

1 start with nothing. You have some kind of a base
2 idea, and you use off-the-shelf components
3 wherever possible. That's usually a good design.

4 So a lot of times, designing means
5 specifying components, but we also design airfoil
6 shapes and fuselage shapes and structural
7 elements.

8 Q. My question is specifically about what
9 you have personally done, setting aside what
10 you've overseen your students doing. So with that
11 in mind, I'm going to re-ask the question.

12 Have you ever personally designed a
13 UAV?

14 A. Yes, but not in isolation.

15 THE COURT REPORTER: I'm sorry.
16 Steven, I'm having a hard time hearing you.
17 Would you repeat your question?

18 MR. PETERS: It could be the headset.

19 MS. GORDON: Yeah. It may be the
20 headset.

21 MR. PETERS: Let's go off the record.

22 (Discussion was had off the
23 record.)

24 BY MR. PETERS:

25 Q. So my last question was -- in your

1 previous answer, you stated -- you used the term
2 "in isolation," and I was wondering what that
3 means, "in isolation."

4 A. In design of a system like a UAV, I
5 would -- I think I would always be working, to
6 some extent, with other people.

7 And so I may be the lead person in
8 designing, and I've done that a few times. I may
9 be supervising.

10 I don't really draw much of a
11 distinction there. Engineers tend to work in
12 teams, not in isolation.

13 Q. Let's talk about one of those roles
14 where you were the lead designer of a UAV.

15 Were any of those UAVs quadrotor UAVs?

16 A. Let me say that when I serve as an
17 advisor to student teams and graduate students, I
18 consider myself to be the lead designer, even
19 though much of the work may be executed by
20 students.

21 So, yes, and many of them were
22 quadrotor UAVs.

23 Q. So let's talk about what your personal
24 involvement was in those projects.

25 Can you remember the earliest UAV that

1 you were the design lead on? I'm sorry. Let me
2 change that question. The earliest quadrotor UAV
3 that you were the design lead on.

4 A. Probably sometime around 2007.

5 Q. And what was your role?

6 A. I supervised, and I did lead students'
7 work in design projects to design and fabricate
8 the vehicles.

9 Q. Do you recall which students were
10 working with you on that project?

11 A. Some names, I certainly recall from the
12 early days of working on UAVs. Yes, I do have
13 some names in mind, but there's a lot of
14 continuity from project to project where students
15 will work on one with me and then work on another.

16 So it's easy to conflate which students
17 worked on which particular projects.

18 Q. What are the names that you remember on
19 the projects?

20 A. Chris Hockley, Randy Breingen, Mike
21 Bakula. There may be earlier ones. Those are
22 some of the first students I worked on that we
23 designed rotorcraft.

24 Q. And we're talking about a quadrotor
25 UAV, correct?

1 A. Yes. There were quadrotor UAVs that we
2 developed in that time period.

3 Q. That's -- let me be clear.

4 That's the project we're talking about
5 right now with Hockley, Breingen, and Bakula is
6 the quadrotor UAV?

7 A. Right. So we don't put students in
8 boxes and say, "You have to design this
9 quadrotor." That's typically not the way the
10 design process works. We're designing towards
11 tasks, and we're looking at how many rotors should
12 we have; does it need four or six, or should it be
13 a fixed-wing UAV.

14 And there are various stages in the
15 design process. That part would be the conceptual
16 design process. And so I can tell you that
17 quadrotor UAVs were developed, prototyped, flown
18 later in competition.

19 I can't tell you that those students
20 worked exclusively on a quadrotor UAV.

21 Q. Well, I'm not asking if they worked
22 exclusively on it, but did they work on a
23 quadrotor UAV?

24 A. Generally, yes. I cannot remember
25 what -- from that time period, what task each

1 student had at any particular time. And so one of
2 those students may have been focused on fixed-wing
3 aircraft more.

4 The students generally worked together.
5 Again, engineering is a collaborative activity.
6 And so one student may take the lead in specifying
7 components and creating a system design, and I and
8 other students may oversee that or provide
9 feedback along the way. And so I consider the
10 feedback and the support and testing as all part
11 of the design process.

12 So I think all those students worked on
13 quadrotors, but I can't tell you particularly what
14 their focal tasks were.

15 Q. Can you tell me what your focal task
16 was, or multiple, if you had multiple?

17 A. My job generally is, first and
18 foremost, to ensure safety, to make sure that the
19 systems we design are as safe as they can be.
20 These are inherently devices that are potentially
21 dangerous.

22 And so designing with safety in mind is
23 probably the highest priority, making sure that
24 we're focused on the requirements of the system.
25 Usually design is based on not an idea coming from

1 a vacuum, but a set of requirements for what the
2 vehicle has to be able to do.

3 So my job is always to make sure that
4 the focus is correctly on the requirements that we
5 are operating in a safe way. And then my job is
6 always -- it always includes the approving and
7 purchasing components along the way.

8 Q. What sorts of components were you
9 approving and purchasing for the approximately
10 2007 project we're discussing?

11 A. I would be approving purchases of
12 material, machine shop fabrication costs, motors,
13 components sometimes taken from either other
14 complete systems, using parts of another complete
15 system or off-the-shelf components designed to be
16 used in a similar system; for example, skids or
17 legs. We may fabricate those or we may use those
18 off of other systems.

19 So in some cases, we would buy a
20 complete system, a quadrotor, for example, not to
21 use it directly, but to use components off of it,
22 motors or other components.

23 Q. So you mentioned motors.

24 If you were purchasing and approving
25 the purchase of motors back in 2007, who was

1 deciding which motors to purchase?

2 A. Ultimately, I would approve or
3 disapprove. Usually, I wouldn't say it that way.
4 I would go to the student and work with them.

5 I would usually get a request from the
6 student saying, "This is what we think we need,"
7 and I try to evaluate whether that motor has the
8 capacity that we need. Usually, motors are not
9 selected in isolation, of course. There's a
10 matching of the motor and the propeller. There's
11 a matching of the motor and the battery, power
12 supply system. There's a consideration of
13 weight -- designed weight of the aircraft.

14 And so all these things, I would
15 review, do review. And ultimately, I approve or I
16 go back and try to work with the students to
17 generate a better design or make a better
18 selection.

19 Q. So in that analysis of matching the
20 motor to the propeller and to the battery, the
21 student would do that first and then come to you
22 with the proposal, informal or not, of what parts
23 to buy, and then you would review that sort of
24 proposal and give the student feedback, is that
25 right?

1 A. I think that is a reasonable -- one
2 reasonable way that it happens. Many times, I
3 would be in the lab working side by side with the
4 students.

5 And so it wasn't as if I was in a tower
6 and they had to come find me with their proposal
7 or send me the proposal. We would sit together
8 and discuss the design and what their calculations
9 maybe showed and how they should do that
10 differently.

11 Q. Have you ever personally attached a
12 propeller to a motor on a quadrotor UAV?

13 A. Yes.

14 Q. When was that?

15 A. That's not something that I would
16 catalog in my memory. That's a routine part of
17 the operation of a quadrotor.

18 So I'm sure I did it in the 2007 time
19 frame, and up through very recently, I've done
20 that.

21 Q. So are you saying approximately the
22 first time you personally attached a propeller to
23 a motor on a quadrotor UAV was 2007?

24 A. That's probably a good ballpark
25 estimate. I may have done it well before then. I

1 knew people that flew quadrotors before then. I
2 may have attached one. I may have helped to
3 attach the propeller blades, but 2007 is a
4 ballpark, sure.

5 Q. 2007, is that when you joined
6 Embry-Riddle?

7 A. That's correct.

8 Q. So all of this work is at Embry-Riddle,
9 right?

10 A. Well, what do you mean when you say
11 "all of this work"?

12 Q. I apologize for that question.
13 I mean the work that we've been
14 discussing that happened around 2007 with the
15 students that you've named.

16 A. Well, in 2007, I was in transition. I
17 had advised teams at Virginia Tech, working in two
18 aerial vehicle competitions for at least a few
19 years, three or four years before I moved to
20 Embry-Riddle.

21 And so we were routinely flying some
22 rotorcraft there. And I can't remember the focus
23 being quadrotors, but I know we had quadrotors and
24 flew them before 2007.

25 Q. I'm sorry I didn't catch it, but was

1 the work that we've been talking about in 2007
2 with the students that you named, was that at
3 Embry-Riddle, or was that Virginia Tech?

4 A. Well, again, I have trouble parsing
5 into those two pockets. I continued through 2007
6 to advise graduate students that completed their
7 Master's degrees at Virginia Tech at the end of
8 2007 and maybe even into 2008.

9 I continued to be the advisor for the
10 unmanned aerial systems competition team at
11 Virginia Tech and the student unmanned aerial
12 systems competition at Virginia Tech.

13 And I did that through the summer of
14 2007, and I actually had some students working
15 together on those projects; but, again, the work
16 at Virginia Tech tended not to be primarily
17 quadrotors, but we considered -- I'm sure we
18 considered those and evaluated quadrotors in the
19 design process.

20 So I can't separate the work out, is
21 what I'm saying.

22 Q. But you named three students, right?

23 Do you remember naming Hockley as one
24 of your students that worked on this project?

25 A. I do, yes.

1 Q. Was that student at Virginia Tech or
2 Embry-Riddle?

3 A. He was a student at Embry-Riddle.

4 Q. And you named Breingen. Was Breingen a
5 student at Virginia Tech or Embry-Riddle?

6 A. At Embry-Riddle.

7 Q. And Bakula, was he also at
8 Embry-Riddle?

9 A. That's correct.

10 Q. So you mentioned quadcopters before
11 2007 -- that you had quadcopters before 2007.

12 Can you describe what those quadcopters
13 were?

14 A. No. My memory is vague on the
15 quadcopters we evaluated in that time period. I
16 can't tell you which ones they were.

17 Q. Now, when you first -- to the best of
18 your recollection, when you first personally
19 attached a propeller to a motor on the quadrotor
20 UAV in 2007, do you recall what type of mechanism
21 was used to attach the propeller to the motor?

22 A. No.

23 Q. And the UAV was a custom one that your
24 team had built, is that right?

25 A. Again, I'm not talking about a single

1 system. We have a continuous program of designing
2 and evaluating different UAVs for different
3 purposes, different -- to meet different
4 requirements.

5 And in many cases, the evaluation
6 includes development of quadrotors, maybe through
7 a conceptual design stage. So I'm not talking
8 about a single system here.

9 Q. But it was something that your team
10 designed; it was not something that was
11 commercially available, is that right?

12 A. There were many things that the team
13 designed. That's correct.

14 Q. Did you have commercially available
15 UAVs, quadrotor UAVs, that you personally attached
16 the propeller to the motor to in 2007?

17 A. My memory on that is just not that
18 distinct.

19 Q. Have you ever personally flown a
20 quadrotor UAV?

21 A. I have.

22 Q. When was that?

23 A. Well, I've done quite a lot of it over
24 the years. I've flown -- I owned my own DJI
25 Phantom. I've flown other people's DJI

1 quadrotors. I've flown some of the earlier
2 systems with assistance, not -- I was learning at
3 the time, and the early quadrotors were more
4 difficult to fly.

5 So, many times, there's a second RC
6 controller and, like, a buddy -- they call a buddy
7 box where you can take control, but maybe you
8 don't do the critical landing and takeoff type
9 aspects.

10 So I was working with students and
11 taking controls, I'm sure, back around that 2007
12 time frame, but I don't have a distinct memory of
13 exactly when or what system.

14 Q. So the approximate year that you first
15 piloted a quadrotor UAV would be 2007?

16 A. What do you mean when you say
17 "piloted"?

18 Q. Do you have an understanding of what it
19 means to pilot a quadrotor UAV?

20 A. I think there can be different
21 interpretations of that. There are some technical
22 ones, perhaps, and then some that would be
23 colloquial.

24 Q. So what's one of the colloquial ones?

25 A. Well, I think, for example, maybe a

1 more common experience is, you have a friend that
2 has a fixed-wing Cessna manned aircraft, and you
3 get up in the air, and you take over the sticks
4 for a period of time.

5 I think some people would say, "I'm
6 piloting the aircraft," and in a sense, that
7 certainly is true, but it's not taking the
8 aircraft through full flight operations. You're
9 not certified to do it.

10 Today, in flying UAVs, the FAA requires
11 a pilot in command, but other people can assist
12 with flying. And so there could be different
13 definitions of that.

14 I've probably flew as -- in support, I
15 took the controls, not taking off and landing, but
16 probably in that 2007 time frame.

17 Q. Have you ever piloted a UAV under a
18 more technical definition of piloting the
19 quadrotor UAV?

20 A. And when you say "a more technical
21 definition," what are you referring to?

22 Q. Well, that was the term that you used.
23 So maybe we should explore that a little.

24 What are the more technical definitions
25 of piloting a quadrotor UAV?

1 A. Well, I think you could talk about a
2 person who is certified to fly a -- somebody that
3 holds an FAA remote pilot certificate certainly
4 would have the ability to oversee and personally
5 conduct full flight operations.

6 That would be one definition, but you
7 don't have to have that to take a UAV, take the
8 controls and fly it, especially today. The UAVs
9 are pretty automated.

10 And so flying could just be pushing the
11 "go" button and letting it take off and land
12 again.

13 Q. So when you talk about the FAA remote
14 pilot certification, is that the same thing as the
15 pilot in command?

16 A. No, not exactly.

17 So a pilot in command, in certain
18 situations, the law requires that the pilot in
19 command hold an FAA remote pilot certificate.
20 That is not required today for hobby fliers. It's
21 only required for people that fly professionally;
22 in other words, that earn money from flying and
23 maybe certain other situations.

24 I'm not completely abreast of the law
25 today, but generally, that outlines the

1 requirements for somebody to be allowed to fly.

2 Q. Do you have an FAA remote pilot
3 certificate?

4 A. No, I don't. I've studied for the
5 certificate, but I have not taken the exam or
6 applied for certification.

7 Q. Do you have any other pilot
8 certificates, or are you a pilot for any other
9 type of aircraft?

10 A. No. I do not hold any FAA pilot
11 certificates.

12 Q. Have you ever been a pilot in command
13 of a UAV?

14 A. Yes.

15 Q. Was that a quadrotor UAV?

16 A. I have been in command of a quadrotor,
17 yes.

18 Q. So earlier you mentioned that your
19 research group had created a 3D-printed air frame
20 for a small fixed-wing UAV.

21 Do you recall that?

22 A. I do. I was thinking of one particular
23 project, but yes, I do.

24 Q. But for that project that you're
25 thinking of, was your team able to get that

1 3D-printed UAV to fly and land successfully?

2 A. No. We were not allowed to. It was a
3 safety -- the sponsor was Boeing, and Boeing would
4 not even allow us to glide it off of a balcony to
5 test glide characteristics. They had corporate
6 safety concerns. You can understand that from
7 Boeing.

8 We were prepared to fly and had at one
9 point made arrangements to go to a site to fly,
10 but that never happened. So it never flew at all.

11 Q. Do you recall the approximate year that
12 you first witnessed a quadrotor UAV in operation?

13 A. No.

14 Q. Was it before 2007?

15 A. Oh, yes.

16 Q. Do you recall the approximate year that
17 you first obtained a quadrotor UAV for your
18 personal use?

19 A. I purchased a DJI Phantom probably
20 around -- I probably have records of this. So I'm
21 going to take a guess. Around 2015 maybe.

22 MR. PETERS: We've been going for
23 almost an hour. I think now is a good time
24 for a break.

25 Does sound all right? Let's do

1 ten minutes. Does that work, Dr. Reinholtz?

2 THE WITNESS: Yes. That's fine. Thank
3 you.

4 MR. PETERS: We'll meet back here at
5 10:07.

6 THE WITNESS: Okay. Thanks.

7 (A recess was had from
8 8:55 a.m. until 9:08 a.m.)

9 BY MR. PETERS:

10 Q. Dr. Reinholtz, I'm now using the chat
11 feature to provide you with Exhibit 2001 in this
12 proceeding, which is your first declaration in
13 this case.

14 And please open it up, and let me know
15 when you're ready.

16 A. Okay. I have it open.

17 Q. Can you turn to Paragraph 42?

18 A. Okay. I'm there.

19 Q. Paragraph 42, you state, "Claim 1 of
20 the '184 patent requires that the clockwise rotor
21 blade is engageable only with the clockwise lock
22 mechanism and cannot be engaged in the
23 counterclockwise lock mechanism, and the
24 counterclockwise rotor blade is engageable only
25 with the counterclockwise lock mechanism and

1 cannot be engaged in the clockwise lock
2 mechanism."

3 Do you see that?

4 A. I do, yes.

5 Q. Can we refer to that limitation as the
6 "engagement limitation"?

7 A. Yes. That's fine.

8 Q. Now, turning to Paragraph 43, you
9 state, "I will refer to the above limitation as
10 the 'engagement limitation.' This limitation
11 means that a clockwise rotor blade cannot be
12 attached to a counterclockwise driveshaft and vice
13 versa."

14 Do you see that?

15 A. I do.

16 Q. Did you apply that interpretation of
17 the engagement limitation when drafting your
18 second declaration in this case?

19 A. Yes, I did.

20 Q. Do you still agree with that
21 interpretation of the engagement limitation?

22 A. Yes. I think that's correct.

23 Q. Are you aware that the Patent Trial and
24 Appeal Board has rendered a final written decision
25 relating to Claim 1 of the '184 patent?

1 A. Yes, I think I understand that.

2 Q. What is your understanding of that
3 decision?

4 A. Well, I don't know the legal
5 ramifications of the finality or the process. The
6 Patent Board found the claims that were being --
7 the petitioners' -- the claims that the
8 petitioners said were invalid, the Patent Board
9 agreed with petitioners on that, is my
10 understanding broadly.

11 Q. Do you understand that the board made
12 determinations of claim construction?

13 A. I do.

14 Q. I'm now using the chat feature to give
15 you the board's final written decision in
16 IPR2019-00343 against Claims 1, 2, 5 through 9,
17 and 11 of the '184 patent.

18 Please let me know when you're ready
19 and when you have it open.

20 A. Okay. I have it open. Paper 40, is
21 that correct?

22 Q. That's right. It was Paper 40 of that
23 proceeding.

24 A. Okay. I have it.

25 Q. Please turn to Page 17.

1 A. Okay. I'm there.

2 Q. You previously stated that you had
3 reviewed this document in preparation for today's
4 deposition, is that right?

5 A. That's correct.

6 Q. Did you review this section of the
7 board's decision?

8 A. I read the entire document. So, yes.

9 Q. Okay. So in the middle of Page 17, the
10 board states, "We agree with petitioner that the
11 claim recitation that the rotor blade cannot be
12 engaged in the incorrect lock mechanism does not
13 mean that the rotor blade cannot be improperly
14 attached; i.e., simply mounted to the incorrect
15 motor as implicated by patent owner's arguments."

16 Do you see that?

17 A. I do, yes.

18 Q. So based on that sentence and your
19 previous review of this document, what is your
20 understanding of the board's construction of the
21 engagement limitation?

22 A. I don't completely understand the
23 board's decision here. It seems still to me to be
24 confusing. It seems to me to be confusing. I
25 take -- at their word, they say that the --

1 "cannot be engaged in the incorrect lock mechanism
2 does not mean that the rotor blade cannot be
3 improperly attached," but then they say, "i.e.,
4 simply mounted to the incorrect rotor."

5 Q. Is it your understanding that the
6 board's construction of the engagement limitation
7 conflicts with your construction of the engagement
8 limitation in this case?

9 A. Well, certain points or application of
10 their construction I think conflict.

11 Q. Have you expressed an opinion in this
12 case as to whether the prior art discloses the
13 engagement limitation under the board's
14 construction?

15 A. Yes, I have. Under the board's
16 construction? Well, I certainly provided an
17 opinion on this quoted construction, "cannot be
18 engaged in the incorrect lock mechanism."

19 So I've provided opinions on this
20 limitation. I haven't used the words "simply
21 mounted" to mean something other than attached and
22 constraining the six degrees of freedom.

23 Q. So you have expressed an opinion about
24 whether the prior art discloses the engagement
25 limitation under the board's construction in

1 this --

2 A. I'm not quite clear I yet understand
3 what the board's construction is or how they're
4 applying that construction.

5 Q. So if you are not quite clear on the
6 board's construction, then you haven't expressed
7 an opinion as to whether the prior art discloses
8 the engagement limitation under that construction,
9 is that right?

10 A. I don't necessarily think that's true.
11 I'm pretty confident in the construction that I
12 provided.

13 And so maybe I have -- maybe my
14 opinions have encompassed the board's
15 construction, and there are points of disagreement
16 elsewhere. I can't say for sure.

17 Q. You stated earlier that there were
18 certain points of conflict between your
19 construction and the board's construction.

20 What are those points of conflict?

21 A. Well, the difference may be more in the
22 application of the construction and looking at the
23 microdrones referenced, and the board concluded
24 that that anticipated Claim 1. And I have trouble
25 seeing how they applied their construction to

1 arrive at that result.

2 Q. Let's go back to Exhibit 2007, and if
3 you could turn to Paragraph 3 and let me know when
4 you're ready.

5 A. Okay. I'm in Paragraph 3.

6 Q. Paragraph 3, you state that you
7 understand Autel is filing a revised motion to
8 amend with a revised Substitute Claims 12 and 13.

9 What is your understanding of the
10 revision of Substitute Claim 12 relative to the
11 original Substitute Claim 12?

12 A. The editing shows and this paragraph
13 shows the changes. What has been added is
14 underlined, and what has been deleted is shown
15 with a strike-through.

16 Q. It's your opinion that the changes
17 between revised Substitute Claim 12 and original
18 Substitute Claim 12 are shown by the underlining
19 and strike-through in this paragraph?

20 A. I think this shows the change over the
21 original claim.

22 Q. Claims 3 and 4, correct, or Claim 3?

23 A. Claim 3. I believe so.

24 Q. Right. So my question is, what's your
25 understanding of the revision of Substitute

1 Claim 12 relative to the original Substitute

2 Claim 12?

3 A. My understanding is, it's been
4 clarified. There's some clarification; that the
5 general context of the claim hasn't changed, but
6 there's some wording that clarifies what's being
7 engaged, if I remember correctly.

8 Q. So which portion of revised Substitute
9 Claim 12 performs that clarification that you're
10 referring to?

11 A. I have not been asked to provide an
12 opinion on the differences between the revised --
13 the substitute claim and then the revised
14 substitute claim.

15 So I think the point is engaging the
16 shaft lock portion of the lock mechanism.

17 Q. Are you done? I'm sorry. I couldn't
18 tell.

19 A. Yes, I am.

20 Q. Now, that language, which is "engage
21 with the shaft lock portion of the clockwise lock
22 mechanism," was done to clarify the claim and not
23 change its scope? Is that your opinion?

24 A. I haven't provided an opinion on that.

25 Q. Well, earlier when I asked you what

1 your understanding of the revision of Substitute
2 Claim 12 was, you said, "My understanding is, it's
3 been clarified. There's some clarification that
4 the general context of the claim hasn't changed."

5 So I'm asking about that. So my
6 question is, is that language that you cited,
7 "engage with the shaft lock portion of the
8 clockwise lock mechanism" -- is that what you were
9 referring to when you talked about the changes
10 clarifying, but the general context of the claim
11 hasn't changed?

12 A. I'm not even sure at this point I
13 understand.

14 Are you asking me about Claim 3 versus
15 the Claim 12 that is in the declaration we're
16 looking at now? I want to be sure I'm answering
17 the right question.

18 I'm not sure what you're asking.

19 Q. My entire line of questions is about
20 revised Claim 12 versus the Claim 12 that you gave
21 testimony on in your first declaration in this
22 case and the differences between those two claims.

23 A. Okay.

24 Q. So going back to your previous
25 testimony that the revision of Claim 12 was to

1 make a clarification and to keep the general
2 context the same, was that testimony in reference
3 to the language that you later cited in revised
4 Claim 12 about the shaft lock portion of the
5 clockwise lock mechanism?

6 MR. ABRAMIC: Objection to form.

7 BY THE WITNESS:

8 A. Right. And so I have not tried to
9 analyze the differences in these claims. I have
10 not been asked to do that.

11 I was only asked to provide an opinion
12 on the validity of the claims as they're written.
13 So I may need to think about it a little bit more.

14 BY MR. PETERS:

15 Q. How much time will you need to think
16 about it?

17 A. Well, I could start with a few minutes
18 and tell you if I can talk more about the
19 differences in those two claims or not. I'd have
20 to maybe pull up the older version of the claim to
21 look at.

22 Q. So when you said earlier that the
23 revision was for clarification and not to change
24 the general context of the claim, are you
25 retracting that statement?

1 A. No. I'm just telling you I don't have
2 a clear understanding of the exact words that were
3 changed. I'd have to look at the two claims. You
4 asked me my general understanding. And I said
5 that I thought it was for clarification, and there
6 were some words that were added to the newest
7 version of the claim.

8 Beyond that, I'll have to think more
9 about what specifically was added and how that
10 clarifies -- my understanding of how that
11 clarifies the most recent version of the claim
12 compared to the previous revision.

13 Q. So let's go to your Exhibit 2001, which
14 you already have, and look at Paragraph 4.

15 A. Okay. I'm there.

16 Q. In this paragraph, you've laid out a
17 claim that's titled "Claim 12," is that right?

18 A. That's correct.

19 Q. Now, can we refer to that claim as the
20 "original Substitute Claim 12"?

21 A. That seems reasonable, yes.

22 Q. I know it's awkward.

23 And can we refer to the claim that you
24 have laid out in Paragraph 3 of Exhibit 2007 as
25 "revised Substitute Claim 12"?

1 A. I think that's reasonable.

2 Q. Now, can you explain the differences in
3 language between revised Substitute Claim 12 and
4 original Substitute Claim 12?

5 A. I can point out one difference. For
6 example, the original Substitute Claim 12 says
7 "when the blade lock portion to the clockwise lock
8 mechanism is configured to engage," and the new
9 Claim 12 -- and I've forgotten what we're calling
10 that -- the revised Substitute Claim 12 says "the
11 apparatus of Claim 1 wherein the blade lock
12 portion of the clockwise lock mechanism is
13 configured to engage with the shaft lock portion
14 of the clockwise lock mechanism" -- so that's an
15 addition -- "by partial counterclockwise
16 rotation."

17 So the "partial counterclockwise
18 rotation" was in the original substitute claim,
19 but the wording about the -- "engage with the
20 shaft lock portion," it just clarifies what the
21 blade lock portion is engaging with.

22 I think it would have already been
23 clear to a person of ordinary skill in the art,
24 but this makes it explicit.

25 Q. So when you say it would have been

1 clear to a person of ordinary skill in the art,
2 it's your understanding that Claim 12 and -- let
3 me try that again.

4 When you say that a person of ordinary
5 skill in the art -- strike that. Third time.

6 When you say, "I think it would have
7 already been clear to a person of ordinary skill
8 in the art," are you saying that original
9 Substitute Claim 12 and revised Substitute
10 Claim 12 have the same scope?

11 A. I believe so. I'd have to think more
12 about it. It's not an analysis I've been asked to
13 do.

14 Q. Are there any other differences between
15 original Substitute Claim 12 and revised
16 Substitute Claim 12, that you're aware of?

17 A. There is another clarification, wording
18 change, where the word "thereof" was originally
19 there, I think, to mean of the clockwise lock
20 mechanism, but the revised substitute claim makes
21 that explicit.

22 I think a person of ordinary skill in
23 the art would have understood that, but the
24 revised claim also clarifies that it's of the
25 clockwise lock mechanism.

1 Q. I am now using the chat feature to give
2 you what has been marked Exhibit 1027 to this
3 proceeding. Please open it up and let me know
4 when you're ready to discuss.

5 And for the record, Exhibit 1027 is the
6 transcript of your first deposition in this
7 proceeding.

8 A. Okay. I have it open.

9 Q. Did you review this document in
10 preparation for today's deposition?

11 A. Yes, I did. I did not read it word for
12 word, but I scanned through it and read some parts
13 of it.

14 Q. Please turn to Page 20.

15 Are you ready?

16 A. No. I'm sorry. I had a little bit of
17 a hang-up paging through the document. I'll be
18 there in a second.

19 Okay. I'm on Page 20.

20 Q. Can you review the question and answer
21 starting at Line 9 of Page 20 and ending at Line 3
22 of Page 21 and let me know when you're ready to
23 discuss that.

24 A. Ending at Line 3 of Page 21, you said?

25 Q. That's right.

1 A. Okay. Okay. I've reviewed it.

2 Q. At the top of Page 21, you mention
3 left-hand threads.

4 What is a left-hand thread?

5 A. Left-hand thread just refers to the
6 direction of the helical thread. It's probably
7 easiest to think of it in terms of a fastener.

8 So a right-hand fastener, a bolt, we
9 would thread in turning it in a clockwise way. We
10 would thread it into a nut or into a threaded
11 hole.

12 A left-hand thread, we would thread
13 into the whole by turning it counterclockwise. So
14 they're threads of the opposite hand.

15 Q. Do you have to use your left hand to
16 thread it?

17 A. Well, that helps some people, but it's
18 not necessary.

19 Q. Is a left-hand thread a mirror image of
20 a right-hand thread?

21 A. It's a mirror image if you look at a
22 side view of it. So it depends on the view that
23 you're taking, what you're mirroring about, but it
24 could be so considered.

25 Q. You previously mentioned a fastener.

1 What is your understanding of a
2 fastener?

3 A. "Fastener" is a broad term that is in
4 the art, device for connecting components
5 together.

6 Q. Does the '184 patent use fasteners to
7 attach blades to driveshafts?

8 A. I don't think the patent uses those
9 words.

10 So probably -- the patent doesn't, as
11 far as I recall, use the word "fastener" in
12 attaching the driveshaft -- the blade to the
13 driveshaft.

14 Q. So the '184 patent does not use
15 fasteners to attach blades to driveshafts?

16 A. I would have to review the patent, but
17 I don't think the patent uses the term
18 "fasteners."

19 Q. But I'm not asking about the term that
20 it uses. I'm asking about the actual device. And
21 I can give you the '184 patent if you need to
22 review that, but my question is, does the '184
23 patent use fasteners?

24 A. I would probably need to look at the
25 '184 patent to see what's described in there.

1 Q. I'm using the chat feature to give you
2 what's been marked as Exhibit 1001 in this
3 proceeding. That's U.S. Patent 9,260,184.

4 Please open it up, and feel free to
5 review it to answer the previous question.

6 A. The patent -- I did -- since I have the
7 electronic version, I did a search of the PDF, and
8 I don't believe the patent uses the word
9 "fastener."

10 Q. Can we look at Figure 6?

11 A. Yes. I'm looking at it. Do you want
12 to pull it up on the screen or --

13 Q. No. It's okay. If you're looking at
14 it and I'm also looking at it, I think we're fine
15 for now.

16 A. Okay.

17 Q. Does Figure 6 show a fastener, as
18 understood by a person of ordinary skill in the
19 art?

20 A. Again, I don't think the patent calls
21 anything that's in Figure 6 a "fastener." It does
22 not call the locking portions of Figure 6 a
23 "fastener." It may include fasteners that connect
24 the shaft lock portion to the motor, but I don't
25 think that's disclosed.

1 Q. Does the patent's lack of the use of
2 the term "fastener" inform your decision or your
3 opinion about whether the patent uses a fastener?

4 A. Sure. I don't see any disclosure in
5 the patent that says a fastener is used for a
6 particular purpose.

7 Q. So would a person of ordinary skill in
8 the art, looking at Figure 6, understand that
9 there's a fastener in this figure?

10 A. I think that you could speculate that
11 fasteners are used to hold the blade lock portion
12 to the motor, and we may be seeing the heads of
13 those fasteners here, but I don't think that's
14 disclosed in the patent.

15 Q. Are you referring to the shaft lock
16 portion?

17 A. Yes. I'm sorry. Did I say "blade lock
18 portion"?

19 Q. Yes.

20 A. Right. I'm sorry. I meant to say the
21 shaft lock portion may show fasteners.

22 Q. Is the shaft lock portion itself a
23 fastener?

24 A. The patent doesn't use that term to
25 describe it.

1 Q. Is the blade lock portion a fastener?

2 A. Again, the patent doesn't use the term
3 "fastener" to describe either of those portions.

4 Q. Do you have an opinion as to whether
5 the blade lock portion is a fastener?

6 A. I don't think I would look at that or a
7 person of ordinary skill in the art would look at
8 that and say, "I'm looking at a fastener."

9 Q. In your opinion, does revised
10 Substitute Claim 12 encompass lock mechanisms that
11 include a fastener?

12 A. I would have to see the mechanism. I
13 don't see that claim as excluding the inclusion of
14 a fastener in what's covered.

15 Q. Is a screw a type of fastener?

16 A. Yes. I think a person of ordinary
17 skill in the art would typically refer to a screw
18 as a fastener.

19 Q. Is a bolt a type of fastener?

20 A. Yes. I think, again, a person of
21 ordinary skill in the art would consider a bolt a
22 portion of a fastener.

23 Q. Do you have an understanding of the
24 term "atomic level process" with respect to
25 attaching two components?

1 A. No, I don't.

2 Q. Do you know what bonding is?

3 A. Generally, yes.

4 Q. What's your understanding of bonding?

5 A. Bonding would be using some --
6 typically some intermediate material, a glue or
7 perhaps could be considered a filler material like
8 a molten metal that could bond two components or
9 surfaces together.

10 Q. In your opinion, does revised
11 Substitute Claim 12 exclude the use of bonding?
12 Let me rephrase that.

13 In your opinion, does revised
14 Substitute Claim 12 exclude the use of bonding in
15 the lock mechanism?

16 A. I would have to see a particular
17 example. It's a hypothetical question. There are
18 requirements in this claim and the Claim 1 from
19 which it depends that require, for example, it to
20 be releasable. The components have to be part of
21 a lock mechanism.

22 So I think -- I can't see an example.
23 I don't think of an example immediately where
24 bonding seems to fit Claim 12, but it's
25 hypothetical. I would need to see something more

1 specific.

2 Q. Does the embodiment in Figure 6 use
3 bonding to attach blades to the driveshafts?

4 A. That's not described in the patent as
5 such.

6 Q. Do you have an opinion on that issue?

7 A. Well, the lock mechanism that's
8 disclosed is not based on a bonding, as I would
9 understand it.

10 There certainly might be bonding in
11 connecting components, bonding components; for
12 example, the various components that make up the
13 shaft lock portion or the blade lock portion could
14 certainly be fabricated using bonding. I don't
15 think that would be excluded.

16 Q. Do you know what diffusion is in terms
17 of attaching two components together?

18 A. No. I'm not sure that I do.

19 Q. Are you familiar with welding?

20 A. Yes, I am.

21 Q. Does the embodiment in Figure 6 use
22 bonding -- or, I'm sorry.

23 Does the embodiment in Figure 6 of the
24 '184 patent use welding to attach blades to the
25 driveshafts?

1 A. There's certainly no disclosure of
2 welding.

3 Q. What's your understanding of welding?

4 A. Welding is a -- typically a fusing of
5 materials by melting. Typically, in welding, we
6 think about the components being welded together
7 as being fused.

8 In other words, they achieve some state
9 of melting that allows intermixing of materials
10 between either the components or -- and/or a
11 filler material, like filler from a welding rod.

12 Q. Do you have an understanding of what
13 integral mechanical attachment is?

14 A. I'm not sure I understand it in the
15 context of what you're asking me.

16 So perhaps you could explain that.

17 Q. Does the '184 patent use integral
18 mechanical attachment to connect blades to the
19 driveshaft?

20 A. Certainly nothing in the disclosure
21 that describes integral mechanical engagement.

22 Q. I'm sorry. The term I'm using is
23 "integral mechanical attachment."

24 Does that change your answer?

25 A. No. I don't think -- I can't recall

1 anything in the patent that talks about integral
2 mechanical anything.

3 Q. Do you have an opinion as to whether
4 Figure 6 of the '184 patent discloses integral
5 mechanical attachments of blades to driveshafts?

6 A. Again, you asked me if I understood the
7 term, and my answer was, I'm not sure I do in the
8 context of the questioning you're asking me.

9 So I think I need more of a definition
10 of what you mean by that term.

11 Q. So in the context of the '184 patent,
12 in Figure 6 of the '184 patent, you don't have an
13 understanding of the term "integral mechanical
14 attachment"?

15 A. I broadly don't understand -- I'm not
16 sure I understand what you are referring to when
17 you say "integral mechanical attachment."

18 I think I know, but I don't want to
19 speculate. It would be better to be clear about
20 it.

21 Q. So what do you think "integral
22 mechanical attachment" means? And we can start
23 there and try to work towards a common
24 understanding.

25 A. Well, the term "integral" implies that

1 they are of one piece. They could be of one piece
2 that's fused together, for example, by bonding or
3 welding or brazing. Some people might call those
4 integral components.

5 It could be something that's cast or
6 injection-molded from one piece or later fused
7 together. I think all of those could be, in some
8 context, considered to be integral mechanical
9 attachment methods.

10 Q. So you're saying bonding or welding can
11 be types of integral mechanical attachment as far
12 as your current understanding of that term?

13 A. The term "integral" implies that the
14 components -- if we're talking about a single
15 component that's made of one material, then
16 there's nothing to attach. So there's no logic in
17 talking about attaching one component that's made
18 of a uniform material.

19 I could have two materials that are --
20 two components that are made of the same material,
21 and if I melted them together and the mix was a --
22 resulted in a single material, then certainly
23 those would be integral.

24 Dissimilar materials might also be
25 considered integral in some context. So I could

1 take two components and weld them together. They
2 may be different materials or the welding material
3 may be different, but in the end, I would think,
4 in some context at least, those components would
5 all be thought of as being integral.

6 Q. Does Figure 6 of the '184 patent
7 mechanically attach a rotor blade to the
8 driveshaft?

9 A. Figure 6 shows components that can be
10 used to make a mechanical attachment. That's
11 correct.

12 Q. Are those components integral with
13 either the blade or the driveshaft?

14 A. Well, we see three components, distinct
15 components in Figure 6. They're not connected in
16 any way in that figure.

17 So, obviously, they're not integral
18 there.

19 Q. Which components are you referring to?

20 A. I'm looking at Figure 6, and I see on
21 the left a clockwise rotating blade, and on the
22 right a counterclockwise rotating blade, and in
23 the center, the shaft lock portion, and I see
24 space between them.

25 They're not touching one another. I

1 would not call any of those three components
2 integral. I don't think anybody would consider
3 those integral with each other in any way.

4 Q. So let me clarify. My question is not
5 whether they're integral with each other.

6 My question is whether the components
7 that attach the blade to the driveshaft are
8 integral to either the blade or the driveshaft.

9 Does that make sense?

10 A. It does, but I don't think the patent
11 gives us that level of specificity. It would be
12 how those pieces are manufactured. I can't recall
13 that being disclosed.

14 Q. So it might be integral; it might not
15 be integral?

16 A. The blade, for example, and the portion
17 of it that is associated with the locking
18 function, those pieces all must be constrained
19 with respect to one another.

20 So at least in some sense, all of those
21 components are integral. They have to be immobile
22 with respect to one another. Whether they're
23 integral because they are made of one piece or
24 whether they're integral because they're bonded or
25 whether even one would consider them integral, I

1 think, is a level of detail that's not described
2 in the patent.

3 Q. Let's look at Figure 10.

4 Figure 10 shows a clockwise rotor blade
5 installed in the shaft lock portion of a clockwise
6 mechanism, is that right?

7 A. That's correct.

8 Q. Is the installed rotor blade in
9 Figure 10 restricted in motion relative to the
10 driveshaft?

11 A. Yes, it is.

12 Q. So if someone tried to lift the rotor
13 blade up and away from the driveshaft, the shaft
14 lock portion would interfere with that movement,
15 is that right?

16 A. I think that's fair to say. The
17 components would have to move together. The shaft
18 lock portion and the blade lock portion would have
19 to move together.

20 Q. Does the blade lock portion interlock
21 with the shaft lock portion in Figure 10?

22 A. I think Figure 10 shows those two
23 components locked together.

24 Q. So you wouldn't use the term
25 "interlock"?

1 A. I don't recall the term "interlock"
2 being used in the '184 patent. I don't see any
3 need to embellish the word "lock." It seems
4 descriptive.

5 Q. Is there a difference in your
6 understanding between what is shown in Figure 10
7 and an interlock?

8 MR. ABRAMIC: Objection; form.

9 BY THE WITNESS:

10 A. An interlock is a fairly broad term
11 that's used in the mechanical and electrical
12 parts. It could be something quite different than
13 a locking mechanism as is described in the '184
14 patent.

15 BY MR. PETERS:

16 Q. So interlock is broader than the
17 locking mechanism of the '184 patent?

18 A. I'm not sure it's broader. It can be
19 used in other contexts. The '184 patent, to my
20 recollection, uses the word "lock" and not
21 "interlock."

22 MR. PETERS: I've reached a stopping
23 point. So why don't we take another
24 ten-minute break.

25 THE WITNESS: Okay.

1 MR. PETERS: And we'll come back at
2 11:13.

3 THE WITNESS: Okay. Thank you.

4 (A recess was had from
5 10:02 a.m. until 10:13 a.m.)

6 BY MR. PETERS:

7 Q. Dr. Reinholtz, please turn to
8 Paragraph 28 of your second declaration,
9 Exhibit 2007.

10 A. Yes. Paragraph 28, is that correct?

11 Q. That's right. In the fourth line of
12 Paragraph 28, you state, "Positive nonfrictional
13 stops require stop elements that abut radially
14 rather than axially."

15 Do you cite to any evidence that a
16 person of ordinary skill in the art would have
17 known that positive nonfrictional stops require
18 stop elements that abut radially rather than
19 axially?

20 A. I don't provide a citation, but that
21 is, of course, common knowledge. It's common
22 sense, really.

23 Q. So a person of ordinary skill in the
24 art in 2013 would have known this?

25 A. Yes.

1 Q. Are you aware of other ways, in 2013,
2 to prevent overtightening besides radial stops?

3 A. Yeah. Yes. There are other ways.

4 Q. Can you talk about those ways?

5 A. A common way is to use a torque wrench
6 to attach with a pre-defined maximum amount of
7 torque.

8 That would be, for example, if you were
9 installing a component in a machine, you might
10 torque to a certain torque level, and that would
11 prevent overtightening.

12 Q. Any other ways that you can think of?

13 A. Yes. You could also have fasteners
14 that have an element that's designed to shear at a
15 certain torque. And so you turn a component that
16 is being used for fastening until it reaches some
17 torque limit.

18 And at that point, the part that you're
19 turning typically shears off and doesn't allow
20 additional torque to be applied.

21 Q. When the element shears off, does that
22 destroy the part?

23 A. Well, it destroys the part that's being
24 used to apply the torque, typically. This is a
25 fairly common technique in certain fields where

1 you shear off the part that you hold with a tool
2 to prevent you from overtightening it.

3 Q. Any other ways of preventing
4 overtightening that you can think of right now?

5 A. Yes. There are other ways. For
6 example, a connection that is a frictional
7 connection between the part where the torque is
8 being applied to create the fastening at some
9 point slips.

10 So you reach a certain torque, and
11 beyond that, the -- no more torque can be applied
12 because the rotational interface just slips.

13 Q. Any other methods of preventing
14 overtightening that you can think of? I'm sorry.
15 Let me rephrase that question.

16 Are there any other methods of
17 preventing overtightening that you can think of?

18 A. I don't think of any off the top of my
19 head. There are certainly derivatives of the
20 methods that I described, but I think broadly, the
21 categories that I've described are at least what
22 come to mind right now.

23 Q. I am now using the chat feature to give
24 you Exhibit 1026, which is U.S. Patent 6,929,226
25 to Philistine.

1 And let me know when you have that
2 open?

3 A. Okay. I have it open.

4 Q. You reviewed Exhibit 1026 in
5 preparation for your deposition today, right?

6 A. I did. I did not read the entire
7 patent word for word, but I reviewed it.

8 Q. Did you review Figure 1?

9 A. Yes, I did.

10 Q. Does Figure 1 illustrate a lock
11 mechanism?

12 A. I think it's fair to call that a lock
13 mechanism. I think Philistine calls it a
14 twistlock, but it is a lock mechanism, yes.

15 Q. What's your understanding of how the
16 lock mechanism in Figure 1 works?

17 A. Well, it has two basic components. It
18 has the mounting member, which I think is shown as
19 110.

20 And then it has the receiving members
21 on either side of that that are 116, and there is
22 a two-part motion required to create the lock.

23 One is sliding the mounting member into
24 the slots in 116, into the receiving member, and
25 then a rotation of the mounting member to cause

1 the arms to lock into place.

2 Q. What direction is that rotation in
3 Figure 1?

4 A. In Figure 1, I think it's locked by
5 sliding in the -- sliding in the X direction and
6 then rotating -- rotating -- as viewed from above,
7 rotating counterclockwise about the Z direction,
8 if I recall correctly.

9 Q. Is that rotation a partial rotation?

10 A. I believe that's what the patent
11 discloses. I don't think a full rotation or more
12 than a full rotation is described anywhere.

13 So it's a sliding and a rotation.

14 Q. Is the lock mechanism of Figure 1
15 configured to engage lugs and notches?

16 A. I think it is fair to say that there
17 are elements that are lugs and notches.

18 Q. And those lugs and notches are engaged,
19 correct?

20 A. In Figure 1, no.

21 Q. But they're configured to engage,
22 correct?

23 A. I think that's correct, yes. I don't
24 think Philistine calls them lugs and notches.

25 Q. Can you look at Column 4, Line 24.

1 A. Okay. I'm there.

2 Q. And can you read the sentence that
3 starts on that line out loud for the record.

4 A. Sure. It says, "After approximately
5 one quarter turn, lugs 150 or other protrusions
6 will be positioned over recesses 119 and elastic
7 arms 112 will urge the lugs 150 into recesses 119
8 so that they are seated securely."

9 Q. Now, turning back to Figure 1, is the
10 lock mechanism in Figure 1 configured to engage
11 lugs and notches by partial counterclockwise
12 rotation?

13 A. I think that's what a person of
14 ordinary skill in the art would interpret here.
15 I, again, don't think -- Philistine, at least,
16 doesn't call the cutouts notches, but I think
17 those can be considered lugs and notches.

18 Q. And that resulting attachment is a
19 releasable attachment, isn't it?

20 A. It is. That's correct.

21 Q. Which part of Figure 1 would be
22 connected to the device?

23 A. To which device are you referring?

24 Q. If you look at Column 2, Line 35, where
25 it says, "A twistlock mount 100 includes two basic

1 components, a mounting member 110 and is secured
2 to or integrated with a device to be mounted and a
3 receiving member 116 that is secured to or
4 integrated with a mounting surface or support."

5 So does that sentence, combined with
6 Figure 1, mean that the mounting member 110 is
7 connected to the device that is to be mounted?

8 A. Certainly, the discussion here is
9 talking about the device, and in this case being a
10 blower motor in the background description and
11 other parts of the patent.

12 A blower motor would be attached to
13 mounting member 110, and receiving members 116
14 would be attached to a surface, a wall; for
15 example, the wall of a helicopter.

16 But I think a person of ordinary skill
17 in the art would understand that you could
18 probably arrange this either way. They get
19 mounted to each other.

20 Q. Let's turn to Paragraph 40 of your
21 second declaration, Exhibit 2007.

22 A. Okay. I'm there.

23 Q. In the first sentence in the second
24 line, you refer to the combination of Sasaki with
25 any of Philistine EPE067 and Obrist.

1 Do you see that?

2 A. I do.

3 Q. Is it your understanding that the
4 combination of Sasaki with Philistine would result
5 in a threaded-type connection mechanism?

6 A. I think you could think of it that way,
7 depending on what you were combining to attempt to
8 achieve, but I don't think that was the intent of
9 the combination here.

10 Q. So when you refer to "the combination
11 of Sasaki with Philistine" in Paragraph 40, you
12 did not have in mind a threaded-type connection
13 mechanism, is that right?

14 A. Well, if Sasaki uses a threaded
15 connection, that's what's disclosed as -- at least
16 what's being used, the prior art that Sasaki
17 refers to that uses a threaded connection.

18 Q. So let me ask that one more time.
19 When you wrote "the combination of
20 Sasaki with any of Philistine" in Paragraph 40,
21 did you have in mind a combination resulting in a
22 threaded-type connection mechanism?

23 A. Well, I thought about that, and that
24 obviously would not reach the elements, but I also
25 thought about the combination where you would use

1 the mechanism of Philistine somehow with Sasaki
2 and not have a threaded connection.

3 In either case, you achieve the
4 elements of the revised claims.

5 Q. So in Paragraph 40, you're referring to
6 two different combinations of Sasaki with
7 Philistine, one where there's a threaded-type
8 connection mechanism and one where there's not a
9 threaded-type connection mechanism?

10 A. I would say that I don't see a
11 combination. There are other reasons you wouldn't
12 combine, but I don't see a combination that
13 reaches the elements of the revised claim, whether
14 it ends up being threaded or not.

15 Q. So when you're referring to the
16 combination of Sasaki with Philistine, you're
17 referring to all possible combinations of Sasaki
18 and Philistine?

19 A. I don't see a combination -- I don't
20 see any way to combine them that achieves the
21 teachings of the revised claim. That's correct.

22 Q. Four lines up from the bottom of
23 Paragraph 40, you state that, "Even if Sasaki were
24 combined with Philistine, there would still be a
25 lack of a device that has clockwise and

1 counterclockwise lock mechanisms and that prevents
2 the engagement of a clockwise rotor in a
3 counterclockwise lock mechanism and vice versa as
4 required in revised Claims 12 and 13."

5 Do you see that?

6 A. I do.

7 Q. Would the combination of Sasaki and
8 Philistine disclose a device?

9 A. I haven't seen a clear description of
10 how those are combined, but I presume it would be
11 a device of some kind.

12 Q. You haven't seen a description of
13 Sasaki being combined with Philistine?

14 A. To produce a device? I don't think so.

15 Q. But it's your opinion that the
16 combination would produce a device?

17 A. Well, I haven't seen details, to my
18 recollection, that show how those are combined to
19 produce a device. I think they could be, but I
20 haven't seen any details of that.

21 Q. So when you wrote this sentence, was it
22 your opinion that there was -- let me restart.

23 When you wrote this sentence, it was
24 not your opinion that there was -- no. That's --
25 I'll try one more time. We'll strike that.

1 When you wrote this last sentence in
2 Paragraph 40, it's your opinion that the
3 combination you had in mind could disclose a
4 device?

5 A. I don't see any way to combine these to
6 have a device that meets the limitations of the
7 claim.

8 Q. I'm just asking about device.

9 A. Again, I haven't seen any details of
10 what such a device might look like.

11 So I'd have to speculate, but we know
12 that Philistine doesn't teach the
13 clockwise/counterclockwise lock mechanisms.

14 So there wouldn't be a device that
15 meets the limitations of the claim.

16 Q. Does Philistine disclose a
17 counterclockwise lock mechanism?

18 A. Yes. I would say that's correct.

19 Q. Does the combination of --

20 A. I would say --

21 Q. -- Philistine -- go ahead.

22 A. I apologize. Let me add to that answer
23 that Philistine discloses a lock mechanism that
24 slides and rotates to achieve the locking
25 function.

1 Q. Does the combination of Sasaki and
2 Philistine disclose a counterclockwise lock
3 mechanism?

4 A. Well, certainly, Philistine discloses a
5 slide and counterclockwise rotation lock
6 mechanism, yes.

7 And so if the combination were done
8 with using those features of Philistine, then a
9 combination could, but I haven't seen any details
10 of that.

11 Q. Does Sasaki disclose a clockwise lock
12 mechanism?

13 A. Yes, Sasaki discloses or refers to the
14 prior art that uses a threaded connection that can
15 be clockwise or -- or, is and the clockwise
16 rotating rotors and the counterclockwise, you'd
17 use the -- for clockwise and counterclockwise
18 threads. So, yes.

19 Q. And it's your opinion that Sasaki does
20 not prevent the engagements of a clockwise rotor
21 and a counterclockwise lock mechanism, is that
22 right?

23 A. Right. In the embodiment that we see
24 in Sasaki, the incorrect blade can still be
25 threaded onto a drive and engaged.

1 Q. Is your opinion in Paragraph 40 based
2 on an assumption that the attachment mechanism of
3 Philistine is applied with no modifications to
4 each rotor blade in Sasaki?

5 MR. ABRAMIC: Objection to form.

6 BY THE WITNESS:

7 A. To make the combination, you have to
8 have some modifications, I think. I have not seen
9 the details of how that could be done. I think
10 there has to be some modification.

11 BY MR. PETERS:

12 Q. But you don't know what those
13 modifications would be?

14 A. I have not seen any description of
15 how -- any details of how those modifications
16 would occur.

17 Q. But do you know how those modifications
18 would occur?

19 A. I think there are maybe more than one
20 way these references can be combined.

21 So I could envision attempts to modify
22 doing a couple of different things, but I can't
23 see a case where you could combine these and not
24 somehow try to modify.

25 Q. Could one of those ways of modifying in

1 Philistine be to mirror the lock mechanism in
2 Figure 1?

3 A. Even if -- because Philistine doesn't
4 disclose any mirror image. And even if you
5 mirrored it, that doesn't provide any details
6 about how you would implement that in combination
7 with Sasaki.

8 Q. Would a mirrored image of Figure 1
9 require clockwise rotation to engage lugs and
10 notches?

11 A. Well, if you look at the device in the
12 mirror, it still requires counterclockwise
13 rotation.

14 And so if you made a device that
15 somehow was a mirror image, that might require
16 rotation in the opposite direction.

17 Q. I'm not talking about looking at it in
18 a mirror. I'm talking about making a device.

19 So if we make a device that is a mirror
20 image of what's in Figure 1, it would require
21 clockwise rotation?

22 A. It could. That's not disclosed in
23 Philistine. There's no reason to do it, but yes,
24 it could. And it would still require the sliding
25 operation, presumably.

1 Q. Is the sliding operation excluded from
2 revised Substitute Claim 12?

3 A. I don't think the claim -- and taking
4 it in total, of course, along with Claim 1. I
5 don't think it excludes -- the possibility of
6 sliding, of course, creates mechanical
7 difficulties in trying to implement the
8 combination, but I don't think the claim precludes
9 sliding in this part of the engagement.

10 Q. I'm going to use the chat mechanism to
11 give you Exhibit 1018 to this proceeding, which is
12 European Patent Application 0921067, which has
13 also been referred to as EP067 in this proceeding.

14 Let me know when you have that open.

15 MR. ABRAMIC: Can you say that number
16 again, Steve?

17 MR. PETERS: Yeah. European
18 Application 0921067. Did I get it wrong?

19 MR. ABRAMIC: No. The exhibit number.

20 MR. PETERS: Oh. Exhibit 1018.

21 MR. ABRAMIC: Thank you.

22 BY THE WITNESS:

23 A. Okay. I have the document open.

24 BY MR. PETERS:

25 Q. You reviewed Exhibit 1018 in

1 preparation for your deposition, correct?

2 A. I did, yes.

3 Q. If you look at Column 5, Lines 7
4 through 9.

5 A. Okay. I'm with you.

6 Q. And so starting at Line 7 of Column 5,
7 EP067 states that, "Blade 8 is so rotated until
8 one or both of its projections 12 come to abut a
9 stop 6 both of or the stops 6."

10 And there's a grammatical problem with
11 that sentence, but do you see the passage that I
12 described?

13 A. I do.

14 Q. So, looking back at Figure 1 -- well,
15 it's actually the next page -- two pages.

16 Do you see the stops labeled 6 in
17 Figure 1?

18 A. I do.

19 Q. Stops, labeled 6, are these radial
20 stops?

21 A. Yes. I think it would be fair to call
22 those radial stops.

23 Q. Let's go to Paragraph 8, which is at
24 Column 2, Line 11.

25 A. I'm sorry. I lost you on that. What

1 column and line?

2 Q. Sorry. Column 2, Line 11, and it's
3 also labeled Paragraph 8.

4 A. Okay. I'm with you.

5 Q. Could you read that first sentence out
6 loud in Paragraph 8.

7 A. "For the mounting of a new blade, the
8 base of the new blade is fitted onto the plate so
9 that the claws engage in the cutouts, and the
10 blade is then rotated through a fraction of a full
11 revolution about its radial axis until the claws
12 engage in the groove and the projections engage
13 beneath the claws."

14 Q. So with that in mind and turning to
15 Page 6 of the document, which shows Figures 1
16 through 4 --

17 A. Okay.

18 Q. -- does EP067 disclose a lock
19 mechanism?

20 A. I think it does, yes.

21 Q. Is the lock mechanism of EP067
22 configured to engage lugs and notches?

23 A. Yes.

24 Q. And does it engage lugs and notches by
25 partial clockwise rotation?

1 A. Yes. By partial clockwise rotation of
2 the long axis of the blade.

3 Q. And that results in a releasable
4 attachment of the blade to the hub, is that right?

5 A. That's correct.

6 Q. Let's turn to Paragraph 41 of
7 Exhibit 2007, which is your declaration, your
8 second declaration.

9 A. Okay.

10 Q. In the fourth line down at
11 Paragraph 41, you state that, "EP067 discloses
12 only a single configuration and, thus, even if
13 combined with Sasaki, there would still be a lack
14 of a device that had the clockwise and
15 counterclockwise lock mechanisms and that prevents
16 the engagement of a clockwise rotor in a
17 counterclockwise lock mechanism and vice versa as
18 required in revised Claims 12 and 13."

19 Do you see that?

20 A. I do.

21 Q. Would the combination of Sasaki and
22 EP067 disclose a device?

23 A. It certainly could.

24 Q. Does EP067 disclose a device that has a
25 clockwise lock mechanism?

1 A. Again, here, we're talking about
2 clockwise with respect to the pitch axis of the
3 blade, looking in from the blade tip to the blade
4 root, but it does disclose that.

5 Q. And that is the perspective that's
6 shown in Figure 1, correct?

7 A. I think so, yes.

8 Q. Does Sasaki disclose a device that has
9 a counterclockwise lock mechanism?

10 A. Yes. Sasaki teaches the threaded
11 engagement that allows a misattachment of blades.
12 That's correct.

13 Q. That threaded engagement that you're
14 referring to includes a counterclockwise lock
15 mechanism, is that right?

16 A. That's true, yes.

17 Q. Is your opinion in the sentence that I
18 just read from Paragraph 41 based on an assumption
19 that the attachment mechanism of EP067 is applied
20 with no modifications to each rotor blade in
21 Sasaki?

22 A. Clearly, you have to make modifications
23 to the rotor blade in Sasaki, and other
24 components, but there's no detail of the
25 combination provided, what that might look like.

1 Q. Is one of those modifications you could
2 make to mirror the lock mechanism of EP067?

3 A. Well, again, there's no reason to
4 mirror the lock mechanism disclosed in the '067
5 patent.

6 Q. But you could do it, correct?

7 A. I think a person of ordinary skill in
8 the art, if there was a reason to create a lock
9 mechanism with the other direction of rotation,
10 the counterclockwise, it's possible to do that.
11 It's not necessary in OP [sic].

12 Q. Go ahead.

13 A. It's not useful in EP067. It serves no
14 purpose. It's not disclosed.

15 Q. And if they did mirror the lock
16 mechanism of EP067, it would require
17 counterclockwise rotation, is that right?

18 A. If you built a mirror image mechanism,
19 you could make one that required counterclockwise
20 rotation. That's true.

21 Q. I am now giving you Exhibit 1017 to
22 this proceeding in the chat feature. This is U.S.
23 Patent 2,470,517 to Obrist.

24 Let me know when you have that open?

25 A. Okay. I have it.

1 Q. And you reviewed Exhibit 1017 in
2 preparation for your deposition today, correct?

3 A. I did, yes.

4 Q. Can you review the last paragraph of
5 Column 2, starting at Line 43, and let me know
6 when you're ready to discuss that paragraph.

7 A. How much do you want me to review?
8 From 43 until --

9 Q. The whole paragraph. So, until
10 Column 3, Line 10.

11 A. Okay. Okay. I've finished reading it.

12 Q. Does this paragraph describe a lock
13 mechanism?

14 A. Well, what the paragraph says is -- it
15 describes projections that act as a lock with
16 regard to centrifugal forces.

17 So in that context, it resists a motion
18 that would be caused by centrifugal forces. It
19 locks -- that's the word that the patent uses --
20 against that motion.

21 Q. And there, you're referring to
22 Column 3, Lines 1 through 4?

23 A. Right. It tells us it locks with
24 regard to the centrifugal forces exerted on the
25 correlated blade.

1 Q. Does this paragraph describe engagement
2 of lugs and notches?

3 A. It describes engagement of lugs and
4 what are called here "recesses," but I guess it
5 would be fair to say that that's a notch.

6 Q. Does the paragraph describe engagement
7 of lugs and notches by partial counterclockwise
8 rotation?

9 A. It does describe a 90-degree or so --
10 90-degree rotation. So that's a partial rotation
11 that is controlled by the crank element.

12 Q. Can you look at Figure 5.

13 A. Okay. I'm looking at it.

14 Q. Do you see Element 5 in Figure 5?

15 A. Yes, I do.

16 Q. Is that what's referred to as the
17 "adjusting crank" in Obrist?

18 A. That's correct. 5 is the adjusting
19 crank that controls that rotation.

20 Q. And that's being inserted toward the
21 nose of the hub, is that right?

22 A. Well, the insertion is not -- the
23 sequence is not fully shown. It's a bit
24 complicated because that whole assembly of the
25 blade and the blade hub have to be tilted and then

1 angled and then inserted and then reangled to
2 create the connection.

3 And then the crank 5 has to be
4 controlled to provide the rotation.

5 Q. Do you see the crank 5 in Figure 4?

6 A. I do.

7 Q. And Figure 4 is oriented to the right,
8 correct?

9 A. Yes. To the right of the center of 2.

10 And I'm trying to see what 2 is called
11 in the patent, but it's on the right-hand side of
12 that figure, that's correct, the adjusting crank.

13 Q. In Column 1, Line 44 through 49, Obrist
14 describes that, "Figure 4 shows a plan view of a
15 blade root together with its adjusting crank which
16 forms an integral part thereof, this member being
17 illustrated in the approximate position into which
18 it has to be brought for insertion in the hub when
19 the latter is in the position shown in Figure 3."

20 So my question is, is that portion of
21 Obrist saying that Figure 4 is showing that when
22 the crank is inserted into the hub, it's facing in
23 the right direction relative to the blade root?

24 MR. ABRAMIC: Objection; form.

25

1 BY THE WITNESS:

2 A. Well, Figure 5 is helpful in that
3 regard because it shows -- you're trying to insert
4 something with a complex geometry and made up
5 components like the trunnion and the journal.

6 And so to do that, you have to angle 5
7 down and through the hole and then reangle it back
8 up again, and that's not clearly shown, but
9 generally, they're showing it as angled down and
10 to the right in both Figures 4 and Figure 5.

11 BY MR. PETERS:

12 Q. In Figure 3, the blade -- not the
13 blade, but the adjusting crank 5 is shown facing
14 upwards relative to the blade root, is that right?

15 A. I think your audio didn't do well that
16 time, and I didn't get the full question.

17 MR. PETERS: I apologize. I'm having
18 technical difficulties.

19 Okay. Let me try this one more
20 time. We might need to take a lunch now
21 because my phone is dying. We'll get through
22 this in just a couple of questions here.

23 BY MR. PETERS:

24 Q. But in Figure 3, the crank 5 is shown
25 facing upwards relative to the blade root, is that

1 right?

2 A. No. I'm sorry. It's -- the geometry
3 is more complicated than that. So the blade root
4 is 2.

5 If you look at Figure 1, for example,
6 you see the blade root is what the blade has to be
7 attached to with fasteners it's screwed on to.

8 And that blade root 2 is what carries
9 the crank. I'm sorry. What you said wasn't
10 correct. I kind of lost track, but you said
11 pointed up with respect to the blade root. Maybe
12 we need a little more description of geometry
13 here.

14 Q. Sure. So between Figures 4 and
15 Figure 5, the adjusting crank -- I'm sorry --
16 Figures 4 and Figure 3, the adjusting crank 5 has
17 been rotated counterclockwise 90 degrees, correct?

18 A. That's correct, looking down the axis
19 of the blade relative to the -- the pitch axis --
20 of course, not the lift axis, but the pitch axis
21 of the blade, it's been rotated by 90 degrees.

22 MR. PETERS: I have some more questions
23 along this line, but my phone is going to
24 die. So I think it's a good time to take
25 lunch.

1 Do you have a preference for the
2 length of the lunch, Dr. Reinholtz?

3 THE WITNESS: I am steps away from my
4 kitchen. It won't take me long to eat,
5 but -- and so I don't think I'm the
6 constraint. My guess is everybody is at
7 home.

8 So we could reconvene at 1:00
9 eastern time may be reasonable to keep things
10 moving, but I could take longer if people
11 want -- okay.

12 Is everybody okay with that?

13 MR. PETERS: John?

14 MR. ABRAMIC: That's okay with me.

15 MR. PETERS: Dina, is that all right?

16 We can go off the record now.

17 (WHEREUPON, at 11:09 a.m. CST,
18 the remote video teleconference
19 deposition was recessed until
20 12:00 p.m. CST this date,
21 6-16-2020.)

22 BY MR. PETERS:

23 Q. Welcome back, Dr. Reinholtz.

24 Do you recall before the break, we were
25 discussing Figures 3 and 4 of Obrist?

1 A. Yes.

2 Q. And do you recall we were talking about
3 how the crank is rotated 90 degrees
4 counterclockwise between Figures 4 and Figures 3?

5 A. Yes. Counterclockwise about the pitch
6 axis of the blade. That's correct.

7 Q. So my follow-up question is, does
8 Obrist describe engagement of lugs and notches by
9 partial counterclockwise rotation?

10 A. Yes, I would say so, about the pitch
11 axis of the blade.

12 Q. Now, if you turn to Column 2, Lines 47
13 through 54, and specifically first part of the
14 sentence which talks about engaging in an arcuate
15 seat, a-r-c-u-a-t-e.

16 What is your understanding of an
17 arcuate seat? And correct me if I'm pronouncing
18 it incorrectly.

19 A. Your pronunciation is okay. Let me
20 read through the whole sentence, if I may.

21 Q. Sure.

22 A. So I think there the arcuate seat is
23 just describing the opening into which the
24 projection 6 slide.

25 Q. Is the arcuate seat illustrated in

1 Figure 3?

2 A. There's not a callout to it. So I
3 don't think it's specifically illustrated.

4 Q. Is it illustrated in Figure 1?

5 A. I don't think there's any place where
6 it's explicitly called out or illustrated.

7 Q. So let's turn to Paragraph 42 of
8 Exhibit 2007, which is your second declaration.

9 A. Yes.

10 Q. In the fourth line of Paragraph 42, you
11 state that, "Obrist discloses only a single
12 configuration and, thus, even if combined with
13 Sasaki, there would still be a lack of a device
14 that has clockwise and counterclockwise lock
15 mechanisms and that prevents the engagement of a
16 clockwise rotor in a counterclockwise lock
17 mechanism (and vice versa) as required in revised
18 Claims 12 and 13."

19 Do you see that?

20 A. I do.

21 Q. Does the combination of Sasaki and
22 Obrist disclose a device?

23 A. Again, I haven't seen any details of
24 that combination, but I would presume that the
25 intent is to combine them into a single device.

1 Q. Did you review patent owner's -- I'm
2 sorry.

3 Did you review petitioner's opposition
4 to the first motion to amend in this case?

5 A. Yes, I did.

6 Q. Does Obrist disclose a counterclockwise
7 lock mechanism?

8 A. Obrist describes it, as I cited before,
9 as locking against a centrifugal force. The
10 procedure for creating the lock is to rotate the
11 piece, the blade root, a partial rotation. That's
12 true.

13 MR. PETERS: You'll have to pardon me
14 for a second. We can stay on the record. I
15 have to let my kid into my house. I will be
16 right back.

17 [Brief pause.]

18 MR. PETERS: Okay. I apologize for
19 that.

20 BY MR. PETERS:

21 Q. The partial rotation you referred to is
22 a counterclockwise rotation, correct?

23 A. If you are looking down the pitch axis
24 of the blade, then what's disclosed in Obrist is a
25 counterclockwise rotation of the blade root, yes.

1 Q. So is that a counterclockwise lock
2 mechanism?

3 A. Locking in the context of preventing
4 this -- resisting the centrifugal force. So, yes.

5 Q. Could a person of ordinary skill in the
6 art mirror the lock mechanism of Obrist? And when
7 I say "mirror," I mean create a device that is the
8 mirror image.

9 A. Perhaps so. In these pitch control
10 references, this one and the EP067, there's a lot
11 more to think about than just, can you take the
12 mirror image of the figure, because you have the
13 adjusting crank that has to operate in one
14 direction against the motion to produce the pitch
15 motion of the blade.

16 So it's probably not trivial in either
17 Obrist or EP067 to just reverse the clockwise and
18 make it counterclockwise or vice versa.

19 Q. But if a person -- a skilled artisan
20 did create a device that was a mirror image of the
21 lock mechanism in Obrist, that mechanism would
22 engage using clockwise rotation, is that correct?

23 A. Well, the lock mechanism, of course,
24 includes the crank, adjustment crank 5 and the
25 undisclosed device that actuates that, and that's

1 necessary to create any locking functions.

2 So I don't think you could just say you
3 mirror it.

4 Q. So it's your opinion that a person of
5 ordinary skill in the art could not mirror the
6 locking mechanism of Obrist?

7 A. First, I don't think I've seen any
8 discussion of how to mirror this or the other
9 devices that have additional complexities. It's
10 not just taking a figure and flipping it upside
11 down on the page, you're making a mirror image.

12 If you're trying to make a pitch
13 mechanism in Obrist that operates in the other
14 way, there are the trunnion and journal and the
15 adjustment crank and all of these things that you
16 would have to think about how they would fit
17 together.

18 It's possible that it can be done, but
19 the pitch is in a certain direction, and resisting
20 the pitch has to do with the forces on the blade.
21 And so it may be infeasible to make it in the
22 opposite direction. It may have to be this way.
23 I'm not sure.

24 Q. Let's turn to Paragraph 45 of your
25 declaration, Exhibit 2007.

1 A. Okay. I'm there.

2 Q. In the third sentence of Paragraph 45,
3 you state, "In addition, the revised claims
4 require clockwise and counterclockwise lock
5 mechanisms that prevent the attachment of a blade
6 on the wrong driveshaft."

7 Do you see that?

8 A. I do.

9 Q. In this sentence, are you referring to
10 the engagement limitation?

11 A. I think it refers both to the
12 engagement limitation and to the language of the
13 revised claim. So, yes, the engagement
14 limitation -- I'm sorry. Claim 1 is part of
15 Claim 12.

16 I think it's fair to say that that's
17 referring to an engagement limitation, yes.

18 Q. The engagement limitation of Claim 1,
19 right?

20 A. Right there, I am referring to the
21 engagement limitation in Claim 1, but I think
22 there's additional language in the revised claims
23 that also support that statement.

24 Q. Is there additional language in the
25 revised claims that requires preventing the

1 attachment of a blade to the wrong driveshaft?

2 A. No. That's not in the revised claims,
3 that direct language.

4 Q. So that phrase "prevent the attachment
5 of a blade on the wrong driveshaft" is derived
6 from Claim 12's dependence on Claim 1, is that
7 right?

8 A. Well, the Claims 12 and 13, the revised
9 claims, require clockwise and counterclockwise
10 lock mechanisms.

11 They don't have the "prevent attachment
12 of a blade on the wrong shaft" language directly
13 in there, but they do talk about the clockwise and
14 the counterclockwise mechanism.

15 Q. Let's stay on the same page, but look
16 at the first full sentence on this page, which is
17 technically part of Paragraph 44.

18 A. Yes.

19 Q. And in this sentence, you state, "DJI
20 has recognized that a POSA would have understood
21 the need, since as early as the Sasaki reference,
22 for simpler, faster, and mistake-proof rotor blade
23 attachment mechanisms."

24 And then you say, "Dr. Ducharme
25 agrees." And you cite to his declaration,

1 Exhibit 1003, Paragraph 100.

2 Do you see that?

3 A. I do.

4 Q. I am now using the chat feature, if I
5 can, to give you Exhibit 1003 to this proceeding,
6 which is the declaration of Dr. Ducharme.

7 Please open it and let me know when
8 you're ready.

9 A. Okay. I'm ready.

10 Q. Can you turn to Paragraph 100, which is
11 on Page 54.

12 A. Yes. I'm there.

13 Q. Can you point out to me where in this
14 paragraph Dr. Ducharme agrees that, "A person of
15 ordinary skill in the art would have understood a
16 long-felt need for a simpler, faster, and
17 mistake-proof rotor blade attachment mechanism"?

18 A. Well, the first sentence is a pretty
19 good start. We know that Sasaki teaches away from
20 the threaded design that we've been discussing --
21 in fact, disparages it -- and says it's a problem
22 to have a threaded design. It has all these
23 problems, overtightening being one of them.

24 And so clearly from Sasaki, we see that
25 there is an established need for something better.

1 So that's a start. He says in Sasaki's solution
2 to -- the problematic solution to the threaded
3 screw couplings is not mistake-proof anymore.

4 So, clearly, there's still -- there's
5 still room for improvement. Something like the
6 '184 patent that's quick and easy that a user
7 would recognize as a mistake-proof, fast solution
8 is critically important, and I think there's a
9 need, but it's obvious Sasaki doesn't solve that
10 need completely.

11 And then he goes on to talk about
12 mistake-proofing, which he's talking about not
13 connecting a blade on the wrong driveshaft.

14 Q. Is that it?

15 A. That's a pretty good start.

16 Q. I just didn't want to interrupt you if
17 you were still going.

18 A. No. You can ask another question.
19 Thanks.

20 Q. Now, in this paragraph, you referenced
21 the first sentence.

22 And in the first sentence, Dr. Ducharme
23 is talking about what a person of ordinary skill
24 in the art would recognize about Sasaki.

25 Is that a fair characterization?

1 A. Maybe he's not mentioning everything.

2 It's at least discussing some of what is maybe
3 still not to the level of the '184 patent, the
4 simplicity and the quickness of installing it.

5 So there's still room for improvement,
6 and I think he's recognizing that here.

7 Q. Do you have an understanding as to the
8 time frame that Dr. Ducharme was using to evaluate
9 what a person of ordinary skill in the art would
10 have understood or recognized?

11 A. Well, he certainly would have been
12 thinking about the time frame of the date of the
13 invention of the '184 patent, but this is looking
14 all the way back to Sasaki, as we talked about
15 earlier.

16 Q. Let's look at Page 73 of this
17 declaration.

18 A. Okay.

19 Q. So, here, Dr. Ducharme is saying,
20 "Unless noted otherwise, when I state that
21 something would be known or understood by one
22 skilled in the art or a skilled artisan or a
23 POSITA, I am referring to a person with this level
24 of education and experience in or around
25 May 2013."

1 Do you see that?

2 A. Yes, I do.

3 Q. So, returning to Paragraph 100.

4 A. Okay.

5 Q. The recognition that Dr. Ducharme is
6 talking about in the first sentence relates to
7 what a person of ordinary skill in the art in 2013
8 would have recognized.

9 Is that your understanding?

10 A. Well, he's certainly thinking about
11 what someone would have -- a person of ordinary
12 skill in the art would have known in 2013, but
13 clearly, the same reasoning applies to the time of
14 Sasaki, and that's -- nothing has changed.

15 The same -- a person of ordinary skill
16 in the art -- I'm sure Dr. Ducharme, reading the
17 Sasaki patent, would have seen that there's still
18 problems with the design, the not being
19 mistake-proof.

20 So that's not really timing-dependent.

21 Q. When did you receive your Ph.D.,
22 Dr. Reinholtz?

23 A. 1983.

24 Q. Do you recall approximately what decade
25 you first saw a quadrotor UAV in operation?

1 A. Did you ask what decade?

2 Q. Yes.

3 A. I have seen videos of quadrotors that
4 go back into the early 1900s. I can't recall the
5 exact date, but about 1920 or 1930.

6 When I'd seen one in person would
7 probably -- probably be in the -- I may not have a
8 mental note of that, but sometime in the late
9 1990s probably or maybe the early 2000s.

10 Q. Have you ever met Dr. Ducharme?

11 A. Yes. I know Dr. Ducharme.

12 Q. Is that how you say his name? Am I
13 saying it wrong?

14 A. I think so. I've always pronounced it
15 that way. I have not interacted with him directly
16 in a number of years, but I do know him. He came
17 and visited campus.

18 Q. Do you know when that was?

19 A. Probably in -- well, in the early days
20 of his development at Hoverfly. So I would guess
21 maybe 2008. I may be off by a year or two.

22 Q. Why did he visit -- let me start over.
23 So when you said he visited campus,
24 you're referring to Embry-Riddle?

25 A. That's correct, yes.

1 Q. Do you recall why he was visiting
2 Embry-Riddle?

3 A. There were some specific reasons. We
4 had a lot of interests in interacting. He and I
5 and our groups, his research group at University
6 of Central Florida, and we had requested a
7 donation from the company that he started.

8 I can't remember the exact sequence of
9 events, but in the end, he gave us an early
10 version of an autopilot to try out, which we
11 installed in one of our quadrotors in that time
12 frame and flew for a while.

13 And I think we probably gave him some
14 feedback on the performance of the autopilot.
15 There were other reasons as well, but that's the
16 focal reason that I recall. He came over and
17 brought one of his colleagues that was the actual
18 designer of the -- primary designer of the
19 autopilot, as I understood it.

20 Q. So you mentioned other reasons, and I
21 just wanted to explore what -- what are those
22 other reasons that he came that were maybe not the
23 primary reason?

24 A. I think any time faculty and graduate
25 students meet together, there's thinking about

1 writing proposals together, collaborating, that
2 didn't -- for no reason I can tell you, just some
3 connections don't evolve.

4 We worked maybe a little bit
5 interactive with Dr. Ducharme over a few years.
6 And I've seen him, I think, more recently than
7 that, but it's still been some time ago, but it
8 was probably discussions about research
9 opportunities, how they could help us and how we
10 might be able to help them.

11 Q. Do you recall in what ways Dr. Ducharme
12 would have been able to help you?

13 A. Our primary interest at the time of his
14 visit was implementing their autopilot.

15 As I recall, we were flying -- I can't
16 think of the name of the autopilot we were flying,
17 but there was, at that point in time, still quite
18 a lot of room for improvement in autopilots.

19 And they had developed something that
20 seemed to have potential. And so that was the
21 primary part of his visit, but I know -- I'm sure
22 we discussed research opportunities and other ways
23 we might be able to collaborate.

24 MR. PETERS: I think we should take a
25 little break.

1 That might be all for us for
2 cross-examination, but let me take a
3 five-minute break, and we'll come back at
4 1:34.

5 THE WITNESS: Sounds perfect. Okay.
6 Thanks.

7 MR. PETERS: Thank you.

8 (A recess was had from
9 12:28 p.m. until 12:33 p.m.)

10 BY MR. PETERS:

11 Q. Dr. Reinholtz, during today's
12 deposition, did you, at any time, communicate with
13 anyone about the substance of your testimony?

14 A. No, I did not.

15 MR. PETERS: We have no further
16 questions pending redirect. So I'll pass the
17 witness.

18 MR. ABRAMIC: We have no questions.
19 Thank you.

20 MR. PETERS: Okay. Thank you,
21 Dr. Reinholtz. Thank you, John. Thank you,
22 Dina.

23 THE COURT REPORTER: Thank you,
24 everybody.

25

1 (WHEREUPON, the remote video
2 teleconference deposition was
3 concluded at 12:33 p.m.)

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1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3
4 SZ DJI TECHNOLOGY CO., LTD.,)

5 Petitioner,)

6 v.) Case No.

7 AUTEL ROBOTICS USA LLC,) IPR2019-00846

8 Patent Owner.)

9
10 I hereby certify that I have read the
11 foregoing transcript of my remote video
12 teleconference deposition given at the time and place
13 aforesaid, and I do again subscribe and make oath
14 that the same is a true, correct and complete
15 transcript of my deposition so given as aforesaid,
16 and includes changes, if any, so made by me.
17
18
19
20

21 CHARLES FREDERICK REINHOLTZ, PH.D.

22 SUBSCRIBED AND SWORN TO before me

23 this day of , A.D. 2020.

24
25 NOTARY PUBLIC

1 CERTIFICATE
2 OF
3 SHORTHAND REPORTER
4

5 I, DINA G. MANCILLAS, a Certified
6 Shorthand Reporter of the State of Illinois,
7 CSR License No. 084-003400, do hereby certify:

8 That previous to the commencement of the
9 examination of the aforesaid witness, the witness was
10 duly sworn and/or duly affirmed by me to testify the
11 whole truth concerning matters herein;

12 That the foregoing deposition transcript
13 was stenographically reported remotely by me and was
14 thereafter reduced to typewriting under my personal
15 direction and constitutes a true and accurate record
16 of the testimony given and the proceedings had at the
17 aforesaid deposition;

18 That the said deposition was taken before
19 me at the time and place specified;

20 That I am not a relative or employee or
21 attorney or counsel for any of the parties herein,
22 nor a relative or employee of such attorney or
23 counsel for any of the parties hereto, nor am I
24 interested directly or indirectly in the outcome of
25 this action.

1 IN WITNESS WHEREOF, I do hereunto set my
2 hand at Chicago, Illinois, this 19th of June, 2020.

3
4
5 
6
7

8 DINA G. MANCILLAS, CSR, RPR, CRR, CLR
9 CSR LICENSE NO. 084-003400

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| <hr/> 0 <hr/> 067 86:4 0921067 81:12, 18 <hr/> 1 <hr/> 1 39:19 40:25 41:16 44:24 50:11 58:18 70:8,10,16 71:3,4, 14,20 72:9,10,21 73:6 80:2,8,20 81:4 82:14,17 83:15 85:6 87:22 89:13 91:5 94:4 98:14,18,21 99:6 10 65:3,4,9,21,22 66:6 87:10 100 72:25 100:1,10 103:3 1001 55:2 1003 100:1,5 1017 86:21 87:1 1018 81:11,20,25 1026 69:24 70:4 1027 52:2,5 10:02 67:5 10:07 39:5 10:13 67:5 11 41:17 82:24 83:2 110 70:19 73:1,6, 13 112 72:7 116 70:21,24 73:3, 13 119 72:6,7 11:09 92:17 11:13 67:2 | 12 14:1 45:8,10,11, 17,18 46:1,2,9 47:2, 15,20,25 48:4 49:17,20,25 50:3,4, 6,9,10 51:2,9,10,15, 16 57:10 58:11,14, 24 76:4 81:2 82:8 84:18 94:18 98:15 99:8 12's 99:6 12:00 92:20 12:28 107:9 12:33 107:9 13 45:8 76:4 84:18 94:18 99:8 14 10:8,12 150 72:5,7 17 41:25 42:9 184 7:12 9:15 10:16 11:6 19:1,4, 10,18 39:20 40:25 41:17 54:6,14,21, 22,25 59:24 60:17 61:4,11,12 63:6 66:2,13,17,19 101:6 102:3,13 1900s 104:4 1920 104:5 1930 104:5 1983 103:23 1988 14:1 1990s 104:9 1:00 92:8 1:34 107:4 <hr/> 2 <hr/> 2 41:16 72:24 82:24 83:2 87:5 89:9,10 91:4,8 93:12 2,470,517 86:23 | 20 52:14,19,21 2000s 104:9 2001 11:23 39:11 49:13 2002 14:1 2003 14:4,7,10 15:1 2007 10:3,19 11:8, 10 12:13 14:12 15:17 20:9,19 24:4 27:10,25 29:18,23 30:3,5,14,16,24 31:1,5,8,14 32:11, 20 33:16 34:11,15 35:16 38:14 45:2 49:24 67:9 73:21 84:7 94:8 97:25 2008 31:8 104:21 2009 12:2 2013 67:24 68:1 102:25 103:7,12 2015 14:4,7,10 38:21 2016 16:2 2017 14:13 2019 19:20,24 21 52:22,24 53:2 21st 10:15 24 71:25 25 6:13 20:18,21 28 67:8,10,12 <hr/> 3 <hr/> 3 45:3,5,6,22,23 47:14 49:24 52:21, 24 87:10,22 89:19 90:12,24 91:16 92:25 93:4 94:1 35 72:24 3D 21:19 | 3d-printed 37:19 38:1 <hr/> 4 <hr/> 4 45:22 49:14 71:25 83:16 87:22 89:5,7, 14,21 90:10 91:14, 16 92:25 93:4 40 41:20,22 73:20 74:11,20 75:5,23 77:2 79:1 41 84:6,11 85:18 42 39:17,19 94:7, 10 43 40:8 87:5,8 44 89:13 99:17 45 97:24 98:2 47 93:12 49 89:13 <hr/> 5 <hr/> 5 41:16 82:3,6 88:12,14,18 89:3,5 90:2,6,10,13,24 91:15,16 96:24 50 12:12 13:25 21:5 54 93:13 100:11 <hr/> 6 <hr/> 6 55:10,17,21,22 56:8 59:2,21,23 61:4,12 63:6,9,15, 20 82:9,16,19 83:15 93:24 6,929,226 69:24 6-16-2020 92:21 60 6:23 | <hr/> 7 <hr/> 7 82:3,6 73 102:16 <hr/> 8 <hr/> 8 82:7,23 83:3,6 8:55 39:8 <hr/> 9 <hr/> 9 41:16 52:21 82:4 9,260,184 9:12 55:3 90 6:23 91:17,21 93:3 90-degree 88:9, 10 9:08 39:8 <hr/> A <hr/> a-r-c-u-a-t-e 93:15 a.m. 39:8 67:5 92:17 ability 17:10 36:4 Abramic 5:19 8:13 48:6 66:8 79:5 81:15,19,21 89:24 92:14 107:18 abreast 36:24 abut 67:13,18 82:8 accreditation 15:7 achieve 60:8 74:8 75:3 77:24 achieves 75:20 |
|---|--|--|---|--|

| | | | | |
|--|---|--|---|--|
| acknowledge 5:2,6 acquire 16:25 act 87:15 activity 26:5 actual 54:20 105:17 actuates 96:25 add 77:22 added 45:13 49:6, 9 addition 17:21 50:15 98:3 additional 11:12 68:20 97:9 98:22,24 adjusting 88:17, 18 89:12,15 90:13 91:15,16 96:13 adjustment 96:24 97:15 administered 5:7 administrative 14:12,24 15:8,12,21 advise 13:8 31:6 advised 12:17 30:17 advisor 13:3,5,7, 18,23 14:2,5,6 23:17 31:9 advisors 13:2 advisory 13:1,16 14:23,25 aerial 30:18 31:10,11 Aeronautical 14:15 15:17 agree 5:18,20 8:18 20:11 40:20 42:10 agreed 41:9 | agreeing 8:14 agreement 5:13,14 agrees 99:25 100:14 ahead 15:15 77:21 86:12 air 16:22 35:3 37:19 aircraft 21:20 26:3 28:13 35:2,6,8 37:9 airfoil 22:5 Algorithm 16:6 allowed 37:1 38:2 alumni 14:17 amend 12:9 45:8 95:4 amount 19:25 68:6 analysis 21:15 28:19 51:12 analyze 48:9 and/or 60:10 angle 90:6 angled 89:1 90:9 answering 47:16 anticipated 44:24 anymore 101:3 apologize 30:12 77:22 90:17 95:18 apparatus 50:11 Appeal 40:24 application 43:9 44:22 81:12,18 applied 17:19 37:6 44:25 68:20 69:8,11 79:3 85:19 | applies 103:13 apply 40:16 68:24 applying 44:4 approve 28:2,15 approved 13:15 approving 27:6, 9,11,24 approximate 19:21 34:14 38:11, 16 89:17 approximately 27:9 29:21 72:4 103:24 arcuate 93:14,17, 22,25 arguments 42:15 arms 71:1 72:7 arrange 73:18 arrangement 5:11 arrangements 38:9 arrive 45:1 art 11:9 43:12,24 44:7 50:23 51:1,5,8, 23 54:4 55:19 56:8 57:7,17,21 67:16,24 72:14 73:17 74:16 78:14 86:8 96:6 97:5 100:15 101:24 102:9,22 103:7,12, 16 articles 13:17,21, 22 artisan 96:19 102:22 aspects 16:15 17:21 18:17 34:9 assembly 88:24 assist 35:11 assistance 34:2 | assistant 14:16 15:3 assumption 79:2 85:18 atmospheric 16:21 atomic 57:24 attach 30:3 32:21 54:7,15 59:3,24 62:16 63:7 64:7 68:6 attached 29:11, 22 30:2 32:19 33:15 40:12 42:14 43:3,21 73:12,14 91:7 attaching 54:12 57:25 59:17 62:17 attachment 60:13,18,23 61:14, 17,22 62:9,11 63:10 72:18,19 79:2 84:4 85:19 98:5 99:1,4, 11,23 100:17 attachments 61:5 attempt 74:7 attempts 79:21 attorneys 5:1 audio 90:15 Autel 19:15,17,23 45:7 automated 36:9 autopilot 105:10,14,19 106:14,16 autopilots 106:18 avoid 20:11 avoiding 17:3 aware 40:23 51:16 68:1 awkward 49:22 | axially 67:14,19 axis 83:11 84:2 85:2 91:18,19,20 93:6,11 95:23 <hr/> B <hr/> back 27:25 28:16 34:11 39:4 45:2 47:24 67:1 72:9 82:14 90:7 92:23 95:16 102:14 104:4 107:3 background 73:10 Bakula 24:21 25:5 32:7 balcony 38:4 ballpark 29:24 30:4 base 22:1 83:8 based 26:25 42:18 59:8 79:1 85:18 basic 70:17 72:25 Bates 12:12 20:14 battery 28:11,20 Beach 7:22 behalf 5:17,19 8:14 beneath 83:13 biological 16:11,13 biomimetic 16:4,10 bit 17:25 48:13 52:16 88:23 106:4 blade 39:21,24 40:11 42:11,13 43:2 50:7,11,21 54:12 56:11,17 57:1,5 59:13 63:7,13,21,22 64:7,8,16 65:4,8,13, |
|--|---|--|---|--|

| | | | |
|--|---|--|---|
| 18,20 78:24 79:4 82:7 83:7,8,10 84:2, 4 85:3,20,23 87:25 88:25 89:15,23 90:12,13,14,25 91:3,6,8,11,19,21 93:6,11 95:11,24,25 96:15 97:20 98:5 99:1,5,12,22 100:17 101:13 blades 30:3 54:7, 15 59:3,24 60:18 61:5 85:11 blower 73:10,12 board 40:24 41:6, 8,11 42:10 44:23 board's 41:15 42:7,20,23 43:6,13, 15,25 44:3,6,14,19 Boeing 21:22 38:3,7 bolt 53:8 57:19,21 bond 58:8 bonded 64:24 bonding 58:2,4, 5,11,14,24 59:3,8, 10,11,14,22 62:2,10 bottom 20:12,14 75:22 box 34:7 boxes 25:8 brazing 62:3 break 6:23,24 7:1 38:24 66:24 92:24 106:25 107:3 Breingen 24:20 25:5 32:4 broad 54:3 66:10 broader 66:16,18 broadly 41:10 61:15 69:20 brought 89:18 105:17 | buddy 34:6 built 32:24 86:18 button 36:11 buy 27:19 28:23 <hr/> C <hr/> CAD 21:14 calculations 29:8 call 21:18 34:6 55:22 62:3 64:1 70:12 72:16 82:21 called 6:2 88:4 89:10 94:6 calling 50:9 callout 94:2 calls 55:20 70:13 71:24 camera 9:2 campus 104:17, 23 capacity 13:1 28:8 carries 91:8 case 7:14,16,18, 20 9:21 11:23 12:3 18:22 39:13 40:18 43:8,12 47:22 73:9 75:3 79:23 95:4 cases 13:11 18:25 27:19 33:5 cast 62:5 catalog 29:16 catch 30:25 categories 69:21 Caterpillar 7:16 caused 87:18 center 20:12 63:23 89:9 | Central 105:6 centrifugal 87:16,18,24 95:9 96:4 certificate 36:3, 19 37:3,5 certificates 37:8,11 certification 36:14 37:6 certified 35:9 36:2 Cessna 35:2 chair 14:13 15:18 chaired 12:24 change 24:2 45:20 46:23 48:23 51:18 60:24 changed 14:19 46:5 47:4,11 49:3 103:14 characteristics 38:5 characterization 101:25 charge 15:6 Charles 6:1,8 8:17 chat 9:25 10:2 11:8 39:10 41:14 52:1 55:1 69:23 81:10 86:22 100:4 check 19:22 Chris 24:20 citation 67:20 cite 67:15 99:25 cited 10:19,23,24 11:1 47:6 48:3 95:8 claim 39:19 40:25 41:12 42:11 44:24 45:10,11,17,18,21, 22,23 46:1,2,5,9,13, 14,22 47:2,4,10,14, 15,20,25 48:4,20,24 49:7,11,17,19,20, 23,25 50:3,4,6,9,10, 11,18 51:2,9,10,15, 16,20,24 57:10,13 58:11,14,18,24 75:13,21 77:7,15 81:2,3,4,8 98:13,14, 15,18,21 99:6 claims 41:6,7,16 45:8,22 47:22 48:9, 12,19 49:3 75:4 76:4 84:18 94:18 98:3,22,25 99:2,8,9 clarification 46:4,9 47:3 48:1,23 49:5 51:17 clarified 46:4 47:3 clarifies 46:6 49:10,11 50:20 51:24 clarify 46:22 64:4 clarifying 47:10 claws 83:9,11,13 clear 6:17 12:23 25:3 44:2,5 49:2 50:23 51:1,7 61:19 76:9 clockwise 39:20,21 40:1,11 46:21 47:8 48:5 50:7,12,14 51:19,25 53:9 63:21 65:4,5 75:25 76:2 78:11, 15,17,20 80:9,21 83:25 84:1,14,16,25 85:2 94:14,16 96:17,22 98:4 99:9, 13 clockwise/ counterclockw ise 77:13 collaborate 106:23 | collaborating 106:1 collaborative 26:5 colleagues 105:17 colloquial 34:23,24 column 71:25 72:24 82:3,6,24 83:1,2 87:5,10,22 89:13 93:12 combination 73:24 74:4,9,10,19, 21,25 75:11,12,16, 19 76:7,16 77:3,19 78:1,7,9 79:7 80:6 81:8 84:21 85:25 94:21,24 combinations 75:6,17 combine 75:12, 20 77:5 79:23 94:25 combined 73:5 75:24 76:10,13,18 79:20 84:13 94:12 combining 74:7 command 35:11 36:15,17,19 37:12, 16 commercially 33:11,14 Commission 19:13 committee 12:24 13:16 committees 13:1 common 35:1 61:23 67:21 68:5,25 communicate 107:12 company 105:7 |
|--|---|--|---|

| | | | | |
|---|---|--|--|---|
| compared 49:12 competition 25:18 31:10,12 competitions 30:18 complete 27:14, 20 completed 31:6 completely 36:24 42:22 101:10 complex 90:4 complexities 97:9 complicated 88:24 91:3 component 62:15,17 68:9,15 components 22:2,5 26:7 27:7,8, 13,15,21,22 54:4 57:25 58:8,20 59:11,12,17 60:6,10 62:4,14,20 63:1,4,9, 12,14,15,19 64:1,6, 21 65:17,23 70:17 73:1 85:24 90:5 conceptual 25:15 33:7 concerns 38:6 concluded 44:23 conduct 36:5 confident 44:11 configuration 84:12 94:12 configured 50:8,13 71:15,21 72:10 83:22 conflate 24:16 conflict 43:10 44:18,20 conflicts 43:7 | confusing 42:24 confusion 20:11 connect 55:23 60:18 connected 63:15 72:22 73:7 connecting 54:4 59:11 101:13 connection 69:6,7 74:5,12,15, 17,22 75:2,8,9 78:14 89:2 connections 106:3 consent 5:11 consideration 28:12 considered 31:17,18 53:24 58:7 62:8,25 72:17 constrained 64:18 constraining 43:22 constraint 92:6 construction 7:17 41:12 42:20 43:6,7,10,14,16,17, 25 44:3,4,6,8,11,15, 19,22,25 context 46:5 47:4,10 48:2,24 60:15 61:8,11 62:8, 25 63:4 87:17 96:3 contexts 66:19 continued 31:5, 9 continuing 8:21 15:10 continuity 24:14 continuous 33:1 | contract 21:22 control 34:7 96:9 controlled 88:11 89:4 controller 34:6 controls 34:11 35:15 36:8 88:19 corporate 38:5 correct 7:19,24 12:19,22 14:3,8 18:4,23,24 19:2,11, 14 24:25 30:7 32:9 33:13 40:22 41:21 42:5 45:22 49:18 63:11 65:7 67:10 71:19,22,23 72:20 75:21 77:18 82:1 84:5 85:6,12 86:6 87:2 88:18 89:8,12 91:10,17,18 93:6,17 95:22 96:22 104:25 correctly 19:20 27:4 46:7 71:8 correlated 87:25 costs 27:12 counsel 5:10 9:22 11:18 counterclockw ise 39:23,24,25 40:12 50:15,17 53:13 63:22 71:7 72:11 76:1,3 77:17 78:2,5,16,17,21 80:12 84:15,17 85:9,14 86:10,17,19 88:7 91:17 93:4,5,9 94:14,16 95:6,22,25 96:1,18 98:4 99:9, 14 couple 79:22 90:22 couplings 101:3 coursework 13:9 | court 5:1 8:7,9 22:15 107:23 covered 57:14 covers 12:20 craft 21:17 crank 88:11,17,19 89:3,5,12,15,22 90:13,24 91:9,15,16 93:3 96:13,24 97:15 create 17:14 69:8 70:22 86:8 89:2 96:7,20 97:1 created 37:19 creates 81:6 creating 17:8 26:7 95:10 critical 34:8 critically 101:8 cross- examination 107:2 CST 92:17,20 current 62:12 custom 32:23 cutouts 72:16 83:9 CV 12:12 20:7,8,9 | decision 10:15 11:11 40:24 41:3,15 42:7,23 56:2 declaration 9:9 10:20,24 11:7,8,10, 13,22 12:1 20:8,13, 23 39:12 40:18 47:15,21 67:8 73:21 84:7,8 94:8 97:25 99:25 100:6 102:17 declare 5:8 defer 8:7 definition 35:18, 21 36:6 61:9 definitions 35:13,24 degrees 31:7 43:22 91:17,21 93:3 deleted 45:14 department 14:13,17 15:4,18 dependence 99:6 depending 74:7 depends 53:22 58:19 deposed 6:10 7:4,6,13,15 18:22, 25 19:4 deposition 5:2, 4,5 6:15 7:12 8:5,25 9:14,18,20 10:10,21 11:5,16,19,24 42:4 52:6,10 70:5 82:1 87:2 92:19 107:12 depositions 19:7 derivatives 69:19 derived 99:5 describe 9:2 32:12 56:25 57:3 87:12 88:1,6,9 93:8 |
|---|---|--|--|---|

| | | | | |
|--|--|---|--|--|
| describes 60:21 87:15 88:3 89:14 95:8 describing 93:23 description 73:10 76:9,12 79:14 91:12 descriptive 16:10 66:4 design 21:12,22, 23 22:3,5 23:4 24:1, 3,7 25:8,10,15,16 26:7,11,19,25 28:17 29:8 31:19 33:7 100:20,22 103:18 designed 21:7, 21 22:12 24:23 27:15 28:13 33:10, 13 68:14 designer 23:14, 18 105:18 designing 22:4 23:8 25:10 26:22 33:1 destroy 68:22 destroys 68:23 detail 65:1 85:24 details 76:17,20 77:9 78:9 79:9,15 80:5 94:23 determinations 41:12 develop 15:21 developed 21:21 25:2,17 106:19 development 33:6 104:20 device 54:4,20 72:22,23 73:2,7,9 75:25 76:8,11,14, 16,19 77:4,6,8,10, 14 80:11,14,18,19 84:14,22,24 85:8 | 94:13,22,25 96:7, 20,25 devices 26:20 97:9 die 91:24 difference 44:21 50:5 66:5 differences 46:12 47:22 48:9,19 50:2 51:14 differently 29:10 difficult 34:4 difficulties 81:7 90:18 diffusion 59:16 Dina 8:8 92:15 107:22 direct 99:3 direction 53:6 71:2,5,7 80:16 86:9 89:23 96:14 97:19, 22 directly 27:21 99:12 104:15 disagreement 44:15 disapprove 28:3 disclose 76:8 77:3,16 78:2,11 80:4 83:18 84:22,24 85:4,8 94:22 95:6 disclosed 55:25 56:14 59:8 64:13 74:15 80:22 86:4,14 95:24 discloses 43:12, 24 44:7 61:4 71:11 77:23 78:4,13 84:11 94:11 disclosure 56:4 60:1,20 discuss 9:21 | 10:5 29:8 52:4,23 87:6 discussed 11:9 106:22 discussing 27:10 30:14 92:25 100:20 102:2 discussion 8:11 11:20 18:10 22:22 73:8 97:8 discussions 106:8 disparages 100:21 dissertation 13:15 16:4 17:25 Dissimilar 62:24 distinct 33:18 34:12 63:14 distinction 23:11 distinguished 14:17 DJI 33:24,25 38:19 99:19 document 11:12 42:3,8,19 52:9,17 81:23 83:15 documents 10:11,18,23,24 11:1 12:7 dollar 19:25 donation 105:7 drafting 40:17 draw 23:10 drive 78:25 driveshaft 40:12 54:12,13 60:19 63:8,13 64:7,8 65:10,13 98:6 99:1, 5 101:13 driveshafts 54:7,15 59:3,25 | 61:5 Ducharme 99:24 100:6,14 101:22 102:8,19 103:5,16 104:10,11 106:5,11 Ducharme's 11:13 due 16:22 duly 5:21 6:2 duties 14:12,16 dying 90:21 <hr/> E <hr/> earlier 6:24 7:12, 20 10:16 19:7 24:21 34:1 37:18 44:17 46:25 48:22 102:15 earliest 23:25 24:2 early 19:20,24 24:12 34:3 99:21 104:4,9,19 105:9 earn 36:22 earth 16:23 easiest 53:7 eastern 92:9 easy 24:16 101:6 eat 92:4 editing 45:12 education 102:24 efficient 17:8,15 elastic 72:6 electrical 66:11 electronic 55:7 element 68:14,21 88:11,14 elements 22:7 67:13,18 71:17 | 74:24 75:4,13 elliptical 21:20 embellish 66:3 embodiment 59:2,21,23 78:23 Embry-riddle 14:14 15:16 30:6,8, 20 31:3 32:2,3,5,6,8 104:24 105:2 emulate 16:11 encompass 57:10 encompassed 44:14 encompasses 10:23 encouraged 14:22 end 31:7 63:3 105:9 ending 52:21,24 ends 75:14 energy 16:17,18, 21,25 17:1,11 Energy- harvesting 16:5 engage 46:20 47:7 50:8,13,19 71:15,21 72:10 80:9 83:9,12,22,24 96:22 engageable 39:21,24 engaged 19:17 39:22 40:1 42:12 43:1,18 46:7 71:18 78:25 engagement 40:6,10,17,21 42:21 43:6,7,13,24 44:8 60:21 76:2 81:9 84:16 85:11,13 88:1,3,6 93:8 94:15 98:10,12,13,17,18, 21 |
|--|--|---|--|--|

| | | | | |
|--|--|--|--|---|
| engagements 78:20 engaging 46:15 50:21 93:14 engineering 14:14 26:5 Engineers 23:11 ensure 26:18 entire 42:8 47:19 70:6 envision 79:21 EP067 81:13 82:7 83:18,21 84:11,22, 24 85:19 86:2,13,16 96:10,17 EPE067 73:25 equipment 7:17 established 100:25 estimate 29:25 European 81:12, 17 evaluate 28:7 102:8 evaluated 31:18 32:15 evaluating 33:2 evaluation 33:5 events 105:9 evidence 67:15 evolve 106:3 exact 19:19 49:2 104:5 105:8 exam 37:5 EXAMINATION 6:4 examined 6:3 exclude 58:11,14 excluded 59:15 81:1 | excludes 81:5 excluding 57:13 exclusively 25:20,22 executed 23:19 exerted 87:24 exhibit 10:3,19 11:8,23 12:2,13 20:9,19 39:11 45:2 49:13,24 52:2,5 55:2 67:9 69:24 70:4 73:21 81:11, 19,20,25 84:7 86:21 87:1 94:8 97:25 100:1,5 exhibits 9:25 experience 21:10 35:1 102:24 experiment 10:1 expert 19:18 explain 50:2 60:16 explicit 50:24 51:21 explicitly 94:6 explore 35:23 105:21 expressed 43:11,23 44:6 extent 23:6 external 13:11 | facing 89:22 90:13,25 fact 100:21 faculty 14:18,20, 21,23 105:24 fair 65:16 70:12 71:16 82:21 88:5 98:16 101:25 fairly 66:10 68:25 familiar 16:19 59:19 fast 101:7 fastener 53:7,8, 25 54:2,3,11 55:9, 17,21,23 56:2,3,5,9, 23 57:1,3,5,8,11,14, 15,18,19,22 fasteners 54:6, 15,18,23 55:23 56:11,13,21 68:13 91:7 fastening 68:16 69:8 faster 99:22 100:16 feature 9:25 10:2 39:11 41:14 52:1 55:1 69:23 86:22 100:4 features 78:8 feedback 13:13 26:9,10 28:24 105:14 feel 55:4 fields 68:25 figure 20:2 55:10, 17,21,22 56:8,9 59:2,21,23 61:4,12 63:6,9,15,16,20 65:3,4,9,21,22 66:6 70:8,10,16 71:3,4, 14,20 72:9,10,21 73:6 80:2,8,20 82:14,17 85:6 88:12,14 89:5,7,12, | 14,19,21 90:2,10, 12,24 91:5,15,16 94:1,4 96:12 97:10 Figures 83:15 90:10 91:14,16 92:25 93:4 filing 45:7 filler 58:7 60:11 final 40:24 41:15 finality 41:5 find 16:15,23 29:6 finding 13:10 fine 6:22 7:3 9:16 20:17 39:2 40:7 55:14 finish 6:25 finished 87:11 fit 58:24 97:16 fitted 83:8 five-minute 107:3 fixed-wing 25:13 26:2 35:2 37:20 flew 30:1,24 35:14 38:10 105:12 fliers 36:20 flight 17:14,15 35:8 36:5 flipping 97:10 Florida 7:22 105:6 flown 25:17 33:19,24,25 34:1 fly 17:1 34:4 36:2, 8,21 37:1 38:1,8,9 flying 17:9 18:9 30:21 35:10,12 36:10,22 106:15,16 focal 26:14,15 105:16 | focus 27:4 30:22 focused 26:2,24 follow-on 7:19 follow-up 93:7 force 95:9 96:4 forces 87:16,18, 24 97:20 foremost 26:18 forgotten 50:9 form 48:6 66:8 79:5 89:24 forms 89:16 found 41:6 fourth 67:11 84:10 94:10 fraction 83:10 frame 9:1 15:1 29:19 34:12 35:16 37:19 102:8,12 105:12 Frederick 6:1,8 free 55:4 freedom 43:22 Frequently 16:13 frictional 69:6 friend 35:1 front 20:2 full 6:7 35:8 36:5 71:11,12 83:10 90:16 99:16 fully 88:23 function 64:18 77:25 functions 97:1 funding 13:11 fused 60:7 62:2,6 fuselage 22:6 |
|--|--|--|--|---|

| | | | | |
|---|--|--|---|--|
| fusing 60:4 <hr/> G <hr/> gaining 16:18 gave 47:20 105:9, 13 general 16:20 46:5 47:4,10 48:1, 24 49:4 generally 25:24 26:4,17 36:25 58:3 90:9 generate 28:17 geometry 90:4 91:2,12 give 10:2 17:10 28:24 41:14 52:1 54:21 55:1 69:23 81:11 100:5 giving 86:21 glide 38:4,5 glider 16:19 gliders 16:19 glue 58:6 good 6:6 22:3 29:24 38:23 91:24 100:19 101:15 GORDON 22:19 government 8:3,16 graduate 14:21 23:17 31:6 105:24 graduated 14:1, 7 15:10 16:2 graduating 14:9 grammatical 82:10 groove 83:12 group 37:19 105:5 | groups 105:5 Gudmundsson 16:3 17:19 18:2,13, 19 Gudmundsson 's 16:7 17:17 guess 38:21 88:4 92:6 104:20 guide 13:8 <hr/> H <hr/> hand 53:14,15 hang 16:19 hang-up 52:17 happened 30:14 38:10 happy 19:21 hard 22:16 harvest 17:11 harvesting 16:17 17:2 head 14:17 15:4 69:19 heads 56:12 headset 22:18,20 hearing 19:14 22:16 heated 16:23 heavily 14:21 heavy 7:17 helical 53:6 helicopter 73:15 helped 30:2 helpful 90:2 helps 53:17 highest 26:23 hobby 36:20 | Hockley 24:20 25:5 31:23 hold 36:19 37:10 56:11 69:1 holds 36:3 hole 53:11 90:7 home 92:7 hour 38:23 hours 11:17 21:3, 5 house 7:23,24 95:15 Hoverfly 104:20 hub 84:4 88:21,25 89:18,22 hundred 20:4 hypothetical 58:17,25 <hr/> I <hr/> i.e. 42:14 43:3 ID 8:3,16 idea 22:2 26:25 illustrate 70:10 illustrated 89:17 93:25 94:3,4,6 image 53:19,21 80:4,8,15,20 86:18 96:8,12,20 97:11 immediately 58:23 immobile 64:21 implement 80:6 81:7 implementing 106:14 implicated 42:15 implies 61:25 62:13 | important 8:4 101:8 improperly 42:13 43:3 improvement 101:5 102:5 106:18 include 55:23 57:11 includes 27:6 33:6 72:25 85:14 96:24 including 7:9 21:19 inclusion 57:13 incorrect 42:12, 14 43:1,4,18 78:24 incorrectly 93:18 increase 16:25 individual 17:20 infeasible 97:21 inform 56:2 informal 28:22 inherently 26:20 injection- molded 62:6 insert 90:3 inserted 88:20 89:1,22 insertion 88:22 89:18 installed 65:5,8 105:11 installing 68:9 102:4 instructions 8:2 integral 60:13, 17,21,23 61:1,4,13, 17,21,25 62:4,8,11, 13,23,25 63:5,12,17 64:2,3,5,8,14,15,21, 23,24,25 89:16 | integrated 73:2, 4 intended 11:3 intent 74:8 94:25 Inter 9:11 interacted 104:15 interacting 105:4 interactive 106:5 interest 106:13 interests 105:4 interface 69:12 interfere 65:14 interlock 65:20, 25 66:1,7,10,16,21 intermediate 58:6 intermixing 60:9 International 19:13 interpret 72:14 interpretation 40:16,21 interpretations 34:21 interrupt 7:25 101:16 invalid 41:8 invention 102:13 involved 16:8 19:7 21:11,23 involvement 23:24 involving 7:16 |
|---|--|--|---|--|

| | | | | |
|--|--|---|--|--|
| IPR 7:12 10:16 IPR2019-00343 12:2 41:16 IPR2019-00864 9:12 isolation 22:14 23:2,3,12 28:9 issue 6:17 59:6 issued 10:15 ITC 19:14 <hr/> J <hr/> job 15:18 26:17 27:3,5 John 5:19 8:13 92:13 107:21 joined 30:5 journal 90:5 97:14 <hr/> K <hr/> kid 95:15 kind 22:1 76:11 91:10 King 5:17 kitchen 92:4 knew 18:7 30:1 knowledge 67:21 <hr/> L <hr/> lab 29:3 labeled 82:16,19 83:3 lack 56:1 75:25 84:13 94:13 laid 49:16,24 | land 36:11 38:1 landing 34:8 35:15 language 46:20 47:6 48:3 50:3 98:12,22,24 99:3,12 late 104:8 law 36:18,24 lead 23:7,14,18 24:1,3,6 26:6 learning 34:2 ledge 17:12 left 53:15 63:21 left-hand 53:3,4, 5,12,19 legal 41:4 legs 27:17 length 92:2 letting 36:11 level 57:24 64:11 65:1 68:10 102:3,23 lieu 5:6 lift 65:12 91:20 limit 68:17 limitation 40:5, 6,9,10,17,21 42:21 43:6,8,13,20,25 44:8 98:10,12,14, 17,18,21 limitations 77:6, 15 lines 75:22 82:3 87:22 93:12 list 11:3 listed 10:11 11:3 13:4 live 11:21 19:9 lived 15:17 located 7:21 | lock 39:21,23,25 40:1 42:12 43:1,18 46:16,21 47:7,8 48:4,5 50:7,11,12, 13,14,20,21 51:19, 25 55:24 56:11,15, 17,21,22 57:1,5,10 58:15,21 59:7,13 63:23 65:5,14,18, 20,21 66:3,20 70:10,12,14,16,22 71:1,14 72:10 76:1, 3 77:13,17,23 78:2, 5,11,21 80:1 83:18, 21 84:15,17,25 85:9,14 86:2,4,8,15 87:12,15 94:14,16 95:7,10 96:1,6,21, 23 98:4 99:10 locked 65:23 71:4 locking 55:22 64:17 66:13,17 77:24 95:9 96:3 97:1,6 locks 87:19,23 logic 62:16 long 16:9 84:2 92:4 long-felt 100:16 longer 17:1 92:10 lost 82:25 91:10 lot 22:4 24:13 33:23 96:10 105:4 106:18 loud 72:3 83:6 lugs 71:15,17,18, 24 72:5,7,11,17 80:9 83:22,24 88:2, 3,7 93:8 lunch 90:20 91:25 92:2 <hr/> M <hr/> machine 27:12 68:9 | made 21:18,20 38:9 41:11 62:15, 17,20 64:23 80:14 90:4 major 15:7 17:24 make 26:18 27:3 28:17 48:1 59:12 63:10 64:9 79:7 80:19 85:22 86:2,19 96:18 97:12,21 makes 50:24 51:20 making 26:23 80:18 97:11 manned 35:2 manner 5:12 manufactured 64:12 marked 52:2 55:2 Master's 15:22 31:7 matching 28:10, 11,19 material 27:12 58:6,7 60:11 62:15, 18,20,22 63:2 materials 60:5,9 62:19,24 63:2 mathematical 17:18 matter 5:8 maximum 68:6 means 17:4 22:4 23:3 34:19 40:11 61:22 meant 56:20 mechanical 14:14 60:13,18,21, 23 61:2,5,13,17,22 62:8,11 63:10 66:11 81:6 mechanically 63:7 | mechanism 32:20 39:22,23,25 40:2 42:12 43:1,18 46:16,22 47:8 48:5 50:8,12,14 51:20,25 57:12 58:15,21 59:7 65:6 66:13,17 70:11,13,14,16 71:14 72:10 74:5, 13,22 75:1,8,9 76:3 77:17,23 78:3,6,12, 21 79:2 80:1 81:10 83:19,21 84:17,25 85:9,15,19 86:2,4,9, 16,18 87:13 94:17 95:7 96:2,6,21,23 97:6,13 99:14 100:17 mechanisms 7:17 57:10 76:1 77:13 84:15 94:15 98:5 99:10,23 meet 11:18 33:3 39:4 105:25 meeting 11:21 meets 77:6,15 melted 62:21 melting 60:5,9 member 14:18 70:18,23,24,25 73:1,3,6,13 89:16 members 70:20 73:13 memory 29:16 32:14 33:17 34:12 mental 104:8 mention 53:2 mentioned 11:12 27:23 32:10 37:18 53:25 105:20 mentioning 102:1 met 104:10 metal 58:8 |
|--|--|---|--|--|

| | | | |
|---|--|--|---|
| methods 62:9 69:13,16,20 microdrones 44:23 middle 42:9 Mike 24:20 mind 10:22 22:11 24:13 26:22 69:22 74:12,21 77:3 83:14 minutes 6:24 39:1 48:17 mirror 53:19,21 80:1,4,12,15,18,19 86:2,4,15,18 96:6,7, 8,12,20 97:3,5,8,11 mirrored 80:5,8 mirroring 53:23 misattachment 85:11 mistake-proof 99:22 100:17 101:3, 7 103:19 mistake- proofing 101:12 mix 62:21 modification 79:10 modifications 79:3,8,13,15,17 85:20,22 86:1 modify 79:21,24 modifying 79:25 molten 58:8 money 36:22 monocopters 21:18 morning 6:6 motion 12:8 45:7 65:9 70:22 87:17,20 95:4 96:14,15 motor 28:7,10,11, 20 29:12,23 32:19, 21 33:16 42:15 55:24 56:12 73:10, 12 motors 27:12,22, 23,25 28:1,8 mount 72:25 mountain 17:9 mounted 42:14 43:4,21 73:2,7,19 mounting 70:18, 23,25 73:1,4,6,13 83:7 move 9:1 65:17, 19 moved 30:19 movement 65:14 moving 92:10 multi-rotor 21:24 multiple 18:13, 14 26:16 | note 15:16 104:8 noted 102:20 number 17:20 20:12,14 21:2,23 81:15,19 104:16 numbers 20:10 nut 53:10 | operates 18:14 97:13 operating 27:5 operation 16:16 29:17 38:12 80:25 81:1 103:25 operations 35:8 36:5 opinion 43:11, 17,23 44:7 45:16 46:12,23,24 48:11 56:3 57:4,9 58:10, 13 59:6 61:3 76:15, 22,24 77:2 78:19 79:1 85:17 97:4 opinions 43:19 44:14 opportunities 106:9,22 opposite 53:14 80:16 97:22 opposition 95:3 ordinary 50:23 51:1,4,7,22 55:18 56:7 57:7,16,21 67:16,23 72:14 73:16 86:7 96:5 97:5 100:15 101:23 102:9 103:7,11,15 oriented 89:7 original 45:11, 17,21 46:1 49:20 50:4,6,18 51:8,15 originally 51:18 outlines 36:25 overlook 8:4 oversee 21:14 26:8 36:4 overseen 22:10 overtightening 68:2,11 69:2,4,14, 17 100:23 owned 33:24 | owner 5:20 8:14 owner's 42:15 95:1 owns 18:13 |
| <hr/> <p style="text-align: center;">P</p> <hr/> | | | |
| p.m. 92:20 107:9 pages 20:10 82:15 paging 52:17 paid 19:15,24 Paper 41:20,22 paragraph 10:8, 12 39:17,19 40:8 45:3,5,6,12,19 49:14,16,24 67:8, 10,12 73:20 74:11, 20 75:5,23 77:2 79:1 82:23 83:3,6 84:6,11 85:18 87:4, 6,9,12,14 88:1,6 94:7,10 97:24 98:2 99:17 100:1,10,14 101:20 103:3 pardon 95:13 parsing 31:4 part 8:4 15:20 16:10 17:2,16,22,24 20:9 25:15 26:10 29:16 58:20 68:18, 22,23 69:1,7 72:21 81:9 89:16 93:13 98:14 99:17 106:21 partial 50:15,17 71:9 72:11 83:25 84:1 88:7,10 93:9 95:11,21 participating 5:2 parties 5:10 9:11 parts 12:4 27:14 28:22 52:12 66:12 73:11 | | | |

| |
|---|
| pass 107:16 passage 82:11 patent 5:20 8:14 9:10,12,15 11:6 19:1,5,10,18 39:20 40:23,25 41:6,8,17 42:15 54:6,8,10,14, 16,17,21,23,25 55:3,6,8,20 56:3,5, 14,24 57:2 59:4,24 60:17 61:1,4,11,12 63:6 64:10 65:2 66:2,14,17,19 69:24 70:7 71:10 73:11 81:12 86:5,23 87:19 89:11 95:1 101:6 102:3,13 103:17 patent's 56:1 patents 19:7 path 17:7,11,15 Path-planning 16:6 paths 17:8 pause 95:17 PDF 55:7 penalty 5:9 pending 107:16 people 23:6 30:1 35:5,11 36:21 53:17 62:3 92:10 people's 33:25 perfect 107:5 perform 16:14 performance 105:14 performs 46:9 period 15:25 25:2,25 32:15 35:4 perjury 5:9 person 5:7 23:7 36:2 50:23 51:1,4,7, 22 55:18 56:7 57:7, 16,20 67:16,23 72:13 73:16 86:7 96:5,19 97:4 100:14 101:23 102:9,23 103:7,11,15 104:6 personal 18:20 23:23 38:18 personally 22:9, 12 29:11,22 32:18 33:15,19 36:4 perspective 85:5 Peters 5:16 6:5 8:7,18,20 18:18 22:18,21,24 38:22 39:4,9 48:14 66:15, 22 67:1,6 79:11 81:17,20,24 90:11, 17,23 91:22 92:13, 15,22 95:13,18,20 106:24 107:7,10,15, 20 petitioner 5:17 42:10 petitioner's 95:3 petitioners 41:8,9 petitioners' 41:7 Ph.d. 6:1 12:17,24 13:2,7,10,14,17 14:2,5 15:10,19,22, 25 16:8 17:24 103:21 Phantom 33:25 38:19 Philistine 69:25 70:13 71:24 72:15 73:25 74:4,11,20 75:1,7,16,18,24 76:8,13 77:12,16, 21,23 78:2,4,8 79:3 80:1,3,23 phone 11:20 90:21 91:23 phrase 99:4 physically 5:3 piece 62:1,6 64:23 95:11 pieces 64:12,18 pilot 34:19 35:11 36:3,14,15,17,18,19 37:2,7,8,10,12 piloted 34:15,17 35:17 piloting 35:6,18, 25 pilots 16:19 pitch 85:2 91:19, 20 93:5,10 95:23 96:9,14 97:12,19,20 place 71:1 94:5 plan 17:11,15 89:14 planning 17:7,16 plate 83:8 platforms 18:8 21:16 pockets 31:5 point 8:24 38:9 46:15 47:12 50:5 66:23 68:18 69:9 100:13 106:17 pointed 91:11 points 43:9 44:15,18,20 portion 46:8,16, 21 47:7 48:4 50:7, 12,13,20,21 55:24 56:11,16,18,21,22 57:1,5,22 59:13 63:23 64:16 65:5, 14,18,20,21 89:20 portions 55:22 57:3 POSA 99:20 POSITA 102:23 position 89:17, 19 positioned 72:6 positive 67:12,17 possibility 15:24 81:5 potential 106:20 potentially 26:20 power 28:11 pre-defined 68:6 preceded 15:5 precludes 81:8 preference 92:1 preparation 9:19 10:10,20 11:19,24 42:3 52:10 70:5 82:1 87:2 prepare 9:17 11:4 prepared 38:8 preparing 9:20 11:15 present 5:3 18:15 presume 76:10 94:24 pretty 16:9 17:3 36:9 44:11 100:18 101:15 prevent 68:2,11 69:2 78:20 98:5 99:4,11 preventing 69:3,13,17 96:3 98:25 prevents 76:1 84:15 94:15 previous 23:1 42:19 47:24 49:12 55:5 previously 42:2 53:25 primarily 31:16 primary 13:2,5,7, 18,23 14:2,5,6 105:18,23 106:13, 21 printing 21:19 prior 11:9 15:9 43:12,24 44:7 74:16 78:14 priority 26:23 problem 82:10 100:21 problematic 101:2 problems 100:23 103:18 procedure 95:10 proceeding 9:11 10:3 11:14 39:12 41:23 52:3,7 55:3 81:11,13 86:22 100:5 process 21:22 25:10,15,16 26:11 31:19 41:5 57:24 produce 76:14, 16,19 96:14 professionally 36:21 program 14:14 15:22 33:1 programs 15:19 progresses 13:13 project 24:10,14 25:4 27:10 31:24 37:23,24 projection 93:24 projections 82:8 83:12 87:15 |
|---|

| | | | | |
|--|--|---|--|---|
| projects 23:24 24:7,17,19 31:15 pronounced 104:14 pronouncing 93:17 pronunciation 93:19 propeller 28:10, 20 29:12,22 30:3 32:19,21 33:16 proposal 28:22, 24 29:6,7 proposals 106:1 prototyped 25:17 protrusions 72:5 provide 12:16 26:8 39:11 46:11 48:11 67:20 80:5 89:4 provided 19:9 43:16,19 44:12 46:24 85:25 providing 9:24 13:13 PTAB 10:14 11:11 publish 13:17,21, 22 published 14:20 pull 48:20 55:12 purchase 27:25 28:1 purchased 38:19 purchases 27:11 purchasing 27:7,9,24 purpose 56:6 86:14 | purposes 20:13 33:3 pursuing 13:11 pushing 36:10 put 25:7 <hr/> Q <hr/> quadcopters 32:10,11,12,15 quadrotor 23:15,22 24:2,24 25:1,6,9,17,20,23 27:20 29:12,17,23 32:19 33:15,20 34:15,19 35:19,25 37:15,16 38:12,17 103:25 quadrotors 26:13 30:1,23 31:17,18 33:6 34:1, 3 104:3 105:11 quarter 72:5 question 6:16, 18,20 10:17 19:16 22:8,11,17,25 24:2 30:12 45:24 47:6,17 52:20 54:22 55:5 58:17 64:4,6 69:15 89:20 90:16 93:7 101:18 questioning 6:25 8:21 61:8 questions 6:14 47:19 90:22 91:22 107:16,18 quick 101:6 quickness 102:4 quoted 43:17 <hr/> R <hr/> radial 68:2 82:19, 22 83:11 | radially 67:13,18 ramifications 41:5 Randy 24:20 ranks 14:20 RC 34:5 re-ask 22:11 reach 69:10 74:24 reached 66:22 reaches 68:16 75:13 read 42:8 52:11,12 70:6 72:2 83:5 85:18 93:20 reading 87:11 103:16 ready 10:5 39:15 41:18 45:4 52:4,15, 22 87:6 100:8,9 reangle 90:7 reangled 89:1 reason 8:24 9:5 80:23 86:3,8 105:16,23 106:2 reasonable 29:1,2 49:21 50:1 92:9 reasoning 103:13 reasons 75:11 105:3,15,20,22 recall 10:18 18:7 19:3,20,23 24:9,11 32:20 37:21 38:11, 16 54:11 60:25 64:12 66:1 71:8 92:24 93:2 103:24 104:4 105:1,16 106:11,15 receive 103:21 received 8:2 receiving 70:20, | 24 73:3,13 recent 10:14 49:11 recently 29:19 106:6 recess 39:7 67:4 107:8 recessed 92:19 recesses 72:6,7 88:4 recitation 42:11 recognition 103:5 recognize 101:7,24 recognized 99:20 102:10 103:8 recognizing 102:6 recollection 18:21 32:18 66:20 76:18 reconvene 92:8 record 5:15 6:7 8:10,12,25 9:2 18:11 22:21,23 52:5 72:3 92:16 95:14 records 19:21 38:20 recovering 16:18 redirect 107:16 refer 9:15 20:12 40:5,9 49:19,23 57:17 73:24 74:10 reference 48:2 99:21 referenced 44:23 101:20 references 79:20 96:10 referred 81:13 | 88:16 95:21 referring 35:21 46:10 47:9 56:15 61:16 63:19 72:23 75:5,15,17 85:14 87:21 98:9,17,20 102:23 104:24 refers 53:5 74:17 78:13 98:11 reframe 6:19 regard 87:16,24 90:3 Reinholtz 6:1,8, 9 8:17,22 21:7 39:1, 10 67:7 92:2,23 103:22 107:11,21 relates 103:6 relating 19:1 40:25 relation 19:4,10, 18 relative 45:10 46:1 65:9 89:23 90:14,25 91:19 releasable 58:20 72:19 84:3 remember 9:4 23:25 24:18 25:24 30:22 31:23 46:7 105:8 remote 36:3,13, 19 37:2 92:18 remotely 5:5 7:4, 7,13,15 rendered 40:24 repeat 6:19 22:17 rephrase 58:12 69:15 replan 17:14 reporter 5:1 8:8, 9 22:15 107:23 reporting 5:4,12 |
|--|--|---|--|---|

| | | | | |
|---|--|--|--|---|
| request 28:5 requested 105:6 require 58:19 67:13,17 80:9,15, 20,24 86:16 98:4 99:9 required 36:20, 21 70:22 76:4 84:18 86:19 94:17 requirement 8:15 requirements 26:24 27:1,4 33:4 37:1 58:18 requires 35:10 36:18 39:20 80:12 98:25 research 13:10, 12 37:19 105:5 106:8,22 resisting 96:4 97:19 resists 87:17 respect 57:24 64:19,22 85:2 91:11 responsibilitie s 13:6 responsibility 15:8,21 rest 13:15 restart 76:22 restricted 65:9 result 45:1 74:4 resulted 62:22 resulting 72:18 74:21 results 84:3 resumé 15:3 retracting 48:25 returning 103:3 | reverse 96:17 review 9:11 10:11,14 11:2,22 12:1,8 15:7 28:15, 23 42:6,19 52:9,20 54:16,22 55:5 70:8 87:4,7 95:1,3 reviewed 10:18, 25 11:6,7,9,11,13 12:4,5 42:3 53:1 70:4,7 81:25 87:1 reviewing 13:12 revised 12:8 45:7,8,17 46:8,12, 13 47:20 48:3 49:25 50:3,10 51:9,15,20, 24 57:9 58:10,13 75:4,13,21 76:4 81:2 84:18 94:17 98:3,13,22,25 99:2, 8 revision 45:10, 25 47:1,25 48:23 49:12 revolution 83:11 ridge 17:9 right-hand 53:8, 20 89:11 rise 16:24 road 7:17 robotics 16:12 rod 60:11 role 13:18,23 14:11,23,24,25 15:12 24:5 roles 14:19 23:13 room 5:4 8:22 101:5 102:5 106:18 root 85:4 89:15,23 90:14,25 91:3,6,8, 11 95:11,25 rotate 95:10 rotated 82:7 83:10 91:17,21 93:3 | rotates 77:24 rotating 63:21,22 71:6,7 78:16 rotation 50:16,18 70:25 71:2,9,11,12, 13 72:12 78:5 80:9, 13,16,21 83:25 84:1 86:9,17,20 88:8,10, 19 89:4 93:9 95:11, 21,22,25 96:22 rotational 69:12 rotor 39:20,24 40:11 42:11,13 43:2,4 63:7 65:4,8, 12 76:2 78:20 79:4 84:16 85:20,23 94:16 99:22 100:17 rotorcraft 24:23 30:22 rotors 25:11 78:16 routine 29:16 routinely 30:21 | scratch 21:21 screen 55:12 screw 57:15,17 101:3 screwed 91:7 search 55:7 seat 93:15,17,22, 25 seated 72:8 section 42:6 secured 73:1,3 securely 72:8 selected 28:9 selection 28:18 self-explanatory 17:4 send 29:7 sense 35:6 64:9, 20 67:22 sensors 17:5 sentence 42:18 72:2 73:5,23 76:21, 23 77:1 82:11 83:5 85:17 93:14,20 98:2,9 99:16,19 100:18 101:21,22 103:6 separate 31:20 sequence 88:23 105:8 serve 23:16 serves 86:13 set 27:1 setting 22:9 shaft 46:16,21 47:7 48:4 50:13,20 55:24 56:15,21,22 59:13 63:23 65:5, 13,17,21 99:12 | shapes 22:6 shear 68:14 69:1 shears 68:19,21 shop 27:12 show 8:3,15 55:17 56:21 76:18 showed 29:9 showing 89:21 90:9 shown 45:14,18 66:6 70:18 85:6 88:23 89:19 90:8, 13,24 shows 45:12,13, 20 63:9 65:4,22 83:15 89:14 90:3 sic 86:11 side 29:3 53:22 70:21 89:11 signature 20:21 signing 13:14 similar 10:17 27:16 simpler 99:22 100:16 simplicity 102:4 simply 42:14 43:4,20 single 32:25 33:8 62:14,22 84:12 94:11,25 single-rotor 21:17 sit 29:7 site 38:9 situations 36:18,23 skids 27:16 skill 50:23 51:1,5, 7,22 55:18 56:7 57:7,17,21 67:16,23 |
|---|--|--|--|---|

| | | | | |
|---|---|---|---|--|
| 72:14 73:16 86:7 96:5 97:5 100:15 101:23 102:9 103:7, 12,15 skilled 96:19 102:22 skipped 19:16 slide 78:5 93:24 slides 77:24 sliding 70:23 71:5,13 80:24 81:1, 6,9 slips 69:9,12 slots 70:24 small 37:20 Smyrna 7:22 Snorri 16:3 solution 101:1,2, 7 solve 101:9 sort 28:23 sorts 27:8 sound 6:21 7:2 38:25 Sounds 107:5 space 63:24 Spalding 5:17 specific 59:1 105:3 specifically 22:8 49:9 93:13 94:3 specificity 64:11 speculate 56:10 61:19 77:11 spend 11:15 20:25 sponsor 38:3 | stage 33:7 stages 25:14 stamp 12:12 20:14 start 22:1 48:17 61:22 100:19 101:1, 15 104:22 started 15:3 105:7 starting 14:13 52:21 82:6 87:5 starts 72:3 state 6:6 16:25 39:19 40:9 45:6 60:8 67:12 75:23 84:11 94:11 98:3 99:19 102:20 stated 23:1 42:2 44:17 statement 48:25 98:23 states 9:10 42:10 82:7 stating 5:14 stay 95:14 99:15 steps 92:3 Steve 81:16 Steven 5:16 8:1 13:19 22:16 sticks 35:3 stop 67:13,18 82:9 stopping 66:22 stops 67:13,17 68:2 82:9,16,19,20, 22 strike 51:5 76:25 strike-through 45:15,19 structural 22:6 student 13:2,7,8, 9,10 15:13,25 16:2 | 23:17 26:1,6 28:4,6, 21,24 31:11 32:1,3, 5 student's 13:12 students 12:17, 23,24 13:4,18,22 14:2,5,6,9,21 15:9, 11 21:13,14 22:10 23:17,20 24:9,14, 16,22 25:7,19 26:2, 4,8,12 28:16 29:4 30:15 31:2,6,14,22, 24 34:10 105:25 students' 24:6 studied 37:4 submitted 9:10 substance 107:13 substitute 45:8, 10,11,17,18,25 46:1,8,13,14 47:1 49:20,25 50:3,4,6, 10,18 51:9,15,16,20 57:10 58:11,14 81:2 success 16:15 successfully 38:1 summer 31:13 supervised 21:15 24:6 supervising 23:9 supply 28:12 support 26:10 35:14 73:4 98:23 surface 73:4,14 surfaces 58:9 sworn 5:21 6:3 system 23:4 26:7,24 27:15,16,20 28:12 33:1,8 34:13 systems 16:11, 14 21:12 26:19 | 27:14,18 31:10,12 34:2 <hr/> T <hr/> table 12:16 13:25 takeoff 34:8 taking 34:11 35:7, 15 53:23 81:3 97:10 talk 23:13,23 36:1, 13 48:18 68:4 99:13 101:11 talked 47:9 102:14 talking 15:25 24:24 25:4 31:1 32:25 33:7 62:14,17 73:9 80:17,18 85:1 93:2 101:12,23 103:6 talks 61:1 93:14 tallied 21:2 tally 20:3 task 16:14 25:25 26:15 tasks 25:11 26:14 teach 77:12 teaches 85:10 100:19 teachings 75:21 team 31:10 32:24 33:9,12 37:25 teams 23:12,17 30:17 Tech 14:16 15:4 30:17 31:3,7,11,12, 16 32:1,5 technical 34:21 35:18,20,24 90:18 technically 99:17 | technique 68:25 techniques 21:19 technological 6:17 teleconference 92:18 telling 49:1 tells 87:23 ten 11:17 21:3 39:1 ten-minute 66:24 tend 23:11 tended 31:16 term 23:1 35:22 54:3,17,19 56:2,24 57:2,24 60:22 61:7, 10,13,25 62:12,13 65:24 66:1,10 terms 53:7 59:16 test 18:16,20 38:5 testified 6:3 testify 9:6,9 testimony 5:8 19:9 47:21,25 48:2 107:13 testing 17:20,23 18:1,2,6,15 26:10 theoretical 17:22 thereof 51:18 89:16 thermals 16:20, 24 thing 10:13 12:5 36:14 things 21:25 28:14 33:12 79:22 92:9 97:15 thinking 37:22, 25 102:12 103:10 105:25 |
|---|---|---|---|--|

| | | | | |
|---|--|---|--|---|
| thought 49:5 63:5 74:23,25 thousand 20:5 thread 53:4,5,6,9, 10,12,16,19,20 threaded 53:10 74:14,17 75:2,14 78:14,25 85:10,13 100:20,22 101:2 threaded-type 74:5,12,22 75:7,9 threads 53:3,14 78:18 tilted 88:25 time 6:16 11:15 15:1,19,23 17:10 18:7 19:12 20:25 22:16 25:2,25 26:1 29:18,22 32:15 34:3,12 35:4,16 38:23 48:15 51:5 74:18 76:25 90:16, 20 91:24 92:9 102:8,12 103:13 105:11,24 106:7,13, 17 107:12 times 6:12,13 7:6 17:13 19:3,6 22:4 23:8 29:2 34:5 timing- dependent 103:20 tip 85:3 title 16:8,9 titled 16:4 49:17 today 9:6,9 35:10 36:8,20,25 70:5 87:2 today's 8:25 9:18,20 10:10,20 11:5 42:3 52:10 107:11 tool 69:1 top 53:2 69:18 | topic 13:10 torque 68:5,7,10, 15,17,20,24 69:7, 10,11 total 11:17 19:4 81:4 touching 63:25 tower 29:5 track 91:10 Trade 19:13 Trademark 9:11 transcript 52:6 transition 30:16 Trial 40:23 trivial 96:16 trouble 31:4 44:24 true 35:7 44:10 85:16 86:20 95:12 trunnion 90:5 97:14 truthfully 9:6 turn 10:8 12:11 20:18 39:17 41:25 45:3 52:14 67:7 68:15 72:5 73:20 84:6 93:12 94:7 97:24 100:10 turning 40:8 53:9,13 68:19 72:9 83:14 twistlock 70:14 72:25 two-part 70:22 type 32:20 34:8 37:9 57:15,19 types 62:11 typically 21:13, 25 25:9 57:17 58:6 60:4,5 68:19,24 | <hr/> U <hr/> U.S. 9:12 55:3 69:24 86:22 UAV 18:3,5 21:8, 12 22:13 23:4,14,25 24:2,25 25:6,13,20, 23 29:12,23 32:20, 23 33:20 34:15,19 35:17,19,25 36:7 37:13,15,20 38:1, 12,17 103:25 UAVS 16:6 18:13, 14,16,20 21:24 23:15,22 24:12 25:1,17 33:2,15 35:10 36:8 ultimately 13:14 28:2,15 underlined 45:14 underlining 45:18 understand 6:18 9:8,13 13:20 38:6 41:1,11 42:22 44:2 45:7 47:13 56:8 59:9 60:14 61:15,16 73:17 understanding 34:18 41:2,10 42:20 43:5 45:9,25 46:3 47:1,2 49:2,4,10 51:2 54:1 57:23 58:4 60:3,12 61:13, 24 62:12 66:6 70:15 74:3 93:16 102:7 103:9 understood 51:23 55:18 61:6 99:20 100:15 102:10,21 105:19 undisclosed 96:25 uniform 62:18 | United 9:10 universities 12:21 University 14:15 15:17 105:5 unmanned 31:10,11 upload 17:12 upside 97:10 upwards 90:14, 25 upwelling 16:22 urge 72:7 user 101:6 <hr/> V <hr/> vacuum 27:1 vague 32:14 validity 48:12 variety 21:18 vehicle 17:4 27:2 30:18 vehicles 24:8 verbally 5:8 versa 40:13 76:3 84:17 94:17 96:18 version 48:20 49:7,11 55:7 105:10 versus 47:14,20 vice 40:12 76:3 84:17 94:17 96:18 video 9:1 92:18 videos 104:3 view 53:22 89:14 viewed 71:6 Virginia 14:16 15:4 30:17 31:3,7, 11,12,16 32:1,5 | visit 104:22 106:14,21 visited 104:17,23 visiting 105:1 <hr/> W <hr/> waive 5:11 8:15 wall 73:14,15 wanted 105:21 ways 68:1,3,4,12 69:3,5 79:25 106:11,22 weight 28:13 weld 63:1 welded 60:6 welding 59:19,24 60:2,3,4,5,11 62:3, 10 63:2 wing 21:20 Wirtgen 7:18 witnessed 38:12 wondering 23:2 word 42:25 51:18 52:11,12 54:11 55:8 66:3,20 70:7 87:19 wording 46:6 50:19 51:17 words 36:22 43:20 49:2,6 54:9 60:8 work 13:9,13 16:8 17:17,21 18:8,17,20 21:13,14 23:11,19 24:7,15 25:22 28:4, 16 30:8,11,13 31:1, 15,20 39:1 61:23 worked 7:20 12:21 14:20 24:17, 22 25:20,21 26:4,12 31:24 106:4 |
|---|--|---|--|---|

working 20:25
23:5 24:10,12 29:3
30:17 31:14 34:10

works 25:10
70:16

wrench 68:5

write 20:23

writing 106:1

written 17:24
40:24 41:15 48:12

wrong 81:18 98:6
99:1,5,12 101:13
104:13

wrote 74:19
76:21,23 77:1

Y

year 34:14 38:11,
16 104:21

years 30:19 33:24
104:16 106:5

young 14:21