

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Axon Enterprise, Inc. and Dedrone Holdings, Inc.

Petitioners,

v.

Airspace Systems, Inc.

Patent Owner,

Case IPR2025-00530

U.S. Patent No. 10,249,199

REMOTE VIDEOTAPED DEPOSITION OF

NIKOLAOS PAPANIKOLOPOULOS, PH.D.

February 25, 2026

Reported by: Susan S. Klinger, RMR-CRR, CSR

Job No. 620987

1

2

3

February 25, 2026

4

9:01 a.m.

5

6

7

8

Remote Videotaped Deposition of NIKOLAOS

9

PAPANIKOLOPOULOS, PH.D., held before Susan S.

10

Klinger, a Registered Merit Reporter and Certified

11

real-time Reporter of the State of Texas.

12

13

14

15

16

17

18

19

20

21

22

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1 A P P E A R A N C E S:

2
3 Attorneys for Petitioners:

4 Chad C. Walters, Esquire

5 Ellyar Barazesh, Esquire

6 BAKER BOTTS

7 2001 Ross Avenue, Suite 900

8 Dallas, Texas 75201

9 214.953.6500

10
11 Attorneys for Patent Owner:

12 Suhrid Wadekar, Esquire

13 Amanda L'Esperance, Esquire

14 PRINCE LOBEL TYE LLP

15 1 International Place, Suite 3700

16 Boston, Massachusetts 02110

17 617.456.8000

18
19
20 Also Present:

21 Jake MacKay

22

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

I N D E X

WITNESS	PAGE
NIKOLAOS PAPANIKOLOPOULOS, PH.D.	
EXAMINATION BY MR. WALTERS	5
EXAMINATION BY MR. WADEKAR	109

E X H I B I T S

No.	Description	Page
No Exhibits Marked		

1 P R O C E E D I N G S
2 NIKOLAOS P. PAPANIKOLOPOULOS, PH.D.,
3 having been first duly sworn testified as follows:
4 EXAMINATION
5 BY MR. WALTERS:
6 Q Good morning, Dr. Nikos.
7 A Good morning.
8 Q Could you state your full name for the
9 record, please?
10 A Sure. My name is Nikolaos
11 Papanikolopoulos.
12 Q And where are you physically located right
13 now?
14 A We're in Bloomington, Minnesota.
15 Q And who is in the room with you?
16 A Counsel Suhrid.
17 Q You have been deposed before?
18 A Yes.
19 Q About how many times?
20 A Around a dozen times.
21 Q How many of those depositions were for IPR
22 proceedings?

1 A I believe around 10 or 11.

2 Q In what setting were your other
3 depositions?

4 A Can you please -- what do you mean by
5 "setting"?

6 Q What types of proceedings?

7 A IPR proceedings supporting the petitioner,
8 the patent owner in a variety of cases.

9 Q Okay. And have you been deposed in non
10 IPR cases?

11 A Yes.

12 Q What types of cases?

13 A One I recall is an ITC case.

14 Q Have you testified at trial?

15 A No.

16 Q You understand you have been sworn to
17 testify truthfully to the best of your ability?

18 A I do.

19 Q Is there any reason you cannot testify
20 truthfully today?

21 A Not to the best of my knowledge.

22 Q What did you do to prepare for today's

1 deposition?

2 A I went over my declaration, my notes.

3 Q Did you meet with anyone?

4 A Yes.

5 Q With whom did you meet?

6 A I meet with the legal team.

7 Q Which members of the legal team?

8 A Suhrid, Matt.

9 Q Anyone else?

10 A There may be a few others present.

11 Amanda, I believe, was present in one of the
12 sessions.

13 Q How many sessions did you have?

14 A Around two or three. You mean for
15 preparation?

16 Q Yes.

17 A Around two to three.

18 Q Did you have any sessions other than for
19 preparation?

20 A Do you mean within the last month or in
21 general?

22 Q In general?

1 A Yes, because when I was preparing my
2 declarations.

3 Q When did the meetings occur to prepare for
4 today's deposition?

5 A I believe after February 10.

6 Q And about how long did you meet in total
7 to prepare for today's deposition?

8 A Do you mean the hours, days or --

9 Q Hours and days?

10 A Around 25 hours.

11 Q Did those meetings cover the other
12 depositions that are scheduled later this week as
13 well?

14 A Yes, this is the total time.

15 Q Okay. What rate are you being compensated
16 at for your time in this matter?

17 A My normal rate, \$500 an hour.

18 Q And you have submitted a declaration in
19 this proceeding that you referenced earlier?

20 A For this particular one today?

21 Q Yes.

22 A Yes.

1 Q That is Exhibit 2001?

2 A I believe so. Let me make sure, yes.

3 Q That declaration accurately states your
4 opinions?

5 A Yes.

6 Q It sounds like you have your declaration
7 in front of you; is that right?

8 A Yes, I have actually a hard copy unmarked.

9 Q Okay. Do you have any other documents in
10 front of you?

11 A I have actually -- so it is my declaration
12 and then I have some of the other exhibits.

13 Q Okay. And all of those are clean
14 versions?

15 A Yes.

16 Q And do you have access to any documents on
17 the computer in front of you?

18 A Yes, I -- someone sent me a link and I
19 have access to the IP -- IPR docket,
20 IPR2025-00530.

21 Q Do you have any other documents in front
22 of you or access to on the computer that do not

1 involve or -- or that do not include the filings
2 in this IPR?

3 A No, I have shut down everything else.

4 Q What is the novelty of the '199 patent?

5 A Give me one minute. So if you go in my
6 declaration starting with paragraph 61 I've
7 explained the content of the patent.

8 MR. WADEKAR: Sorry about the late
9 objection, but I just quickly want to object for
10 vagueness. I will stop there, because I don't
11 want to give -- say anything more.

12 Q You can answer the question.

13 A So can you --

14 COURT REPORTER: I'm sorry, Mr. Wadekar,
15 could you go back on mute, please? We can't hear
16 the witness. Thanks.

17 A Can you -- I have a lot of opinions about
18 the '199 patent, so you want me to -- with respect
19 to the amended claims, with respect to the subject
20 matter?

21 Q I'm interested in your opinion on what the
22 alleged novelty of the '199 patent is?

1 MR. WADEKAR: Objection, outside the
2 scope.

3 A Counsel, I was given the task of reviewing
4 the patent, the amended claims, and also all the
5 other material and I just expressed my opinions on
6 that front.

7 Q And what is your opinion on the alleged
8 novelty of the '199 patent?

9 MR. WADEKAR: Objection, outside -- and
10 vague --

11 MR. WALTERS: Can we go off the record?

12 (Recess, 9:10 to 9:16 a.m.)

13 Q Dr. Nikos, before we broke I asked you
14 what is your opinion of the alleged novelty of the
15 '199 patent?

16 MS. L'ESPERANCE: Objection, outside the
17 scope.

18 A I was asked to express opinions which can
19 be found. Can you elaborate on what specifically
20 you want me -- can you point me somewhere in my
21 report where I -- you want me to elaborate?

22 Q Do you believe the '199 patent covers

1 novel subject matter?

2 MS. L'ESPERANCE: Objection.

3 A I think actually several -- in several
4 areas in my report I express opinion about if the
5 '199 claims, amended claims, subject claims are
6 defensible, and based on requirements for
7 something to be defensible. So I want to stick to
8 the record on what I was asked to do in this
9 particular case.

10 Q Do you have any thoughts on the general
11 novelty of the '199 patent?

12 MS. L'ESPERANCE: Objection, scope.

13 A All my notes are expressed in my -- in my
14 report.

15 Q Can you turn to paragraph 5 of your
16 declaration?

17 A Just give me a minute.

18 Yes, I'm there.

19 Q Paragraph 5 starts with a discussion of
20 your background and qualifications with respect to
21 the subject matter that you are opining on.

22 A Yes, indeed.

1 Q Can you look at paragraph 8?

2 A Yes.

3 Q Paragraph 8 discusses your Ph.D. thesis
4 which was titled, "Controlled Active Vision." And
5 you say that it focused on computer vision in a
6 controlled fashion to detect, track and manipulate
7 objects in the environment.

8 Can you generally --

9 A Yes.

10 Q -- describe the subject matter of that
11 thesis?

12 A Sure. So this work involved a manipulator
13 with a camera mounted on the interceptor. And
14 contrary to whatever was the state of the art at
15 that time around early 1990s, the information for
16 the camera was used in order to guide the
17 manipulator or any other robotic system in order
18 to perform tasks such as detecting objects,
19 following objects, grasping objects or generally
20 interacting with the environment.

21 So instead of random movements, the main
22 premise was actually having a purposeful motion of

1 the system, of the dynamical system in order to
2 maximize the amount of information we can get
3 about the environment including targets.

4 Q Did it involve UAVs in any way?

5 A At that time it was -- it was
6 manipulators, although some of my colleagues in
7 the lab have used some of these principles in
8 other systems including more variables.

9 Q Did it involve authentication techniques?

10 A At that time I played with an operating
11 system called Chimera, which has involved some
12 basic authentication, but this was not my work. I
13 was just using in order to move the robot from
14 point A to point B.

15 Q Can you describe that basic
16 authentication?

17 A It was -- so basically it is try to make
18 sure that we don't have accessing the same space
19 of data tied to different processes. So it was
20 something close to using semaphores, a concept in
21 real-time systems in order to protect the data
22 integrity.

1 Q Can you look at paragraph 13 of your
2 declaration?

3 A Give me a minute. Yes, I'm there.

4 Q Can you describe the computer vision
5 algorithms that you developed as described in
6 paragraph 13?

7 MS. L'ESPERANCE: Objection, relevance.

8 A Are you referring to the work I did for
9 Banner Engineering or Sentera?

10 Q Both?

11 A Banner Engineering is a local company and
12 I helped them in a number of years develop their
13 camera systems for industrial inspection systems.

14 For Sentera, which is a local start-up
15 which is currently owned by John Deere, they're
16 using drone technology derived from patents that
17 stem from locate marking in order to use drones
18 for a procedure in agriculture.

19 And I advised them on how they can do, for
20 example, identification of weeds, use machine
21 learning techniques to classify different objects
22 of interest, to plant phenotyping, by using their

1 drones and their sensors, which are not only the
2 visible range but also hyperspectral.

3 Q Did your drone work for Sentera involve
4 drone authentication techniques?

5 MS. L'ESPERANCE: Objection, relevance.

6 A We have covered the whole -- the whole set
7 of what is needed for a drone to be successful.
8 So we had an arrangement basically that lasted
9 more than five years. So we have talked about
10 many things including generally having rogue
11 drones and how these rogue drones will be accepted
12 by the farmers.

13 Q What timeframe was this in?

14 A The timeframe goes back to when one of my
15 Ph.D. students Demetri Adrahtas was hired by the
16 then CEO. And then I was introduced to the CEO by
17 a common friend, so I was advising the company on
18 general strategies in the area. So I will say it
19 is more than 10 years ago.

20 Q In what ways were you authenticating the
21 drone in that work?

22 MS. L'ESPERANCE: Objection, scope.

1 A This was staff camera by their
2 proprietary. So I don't have a good recollection
3 of how their specific drones were authenticated,
4 so I don't want to speculate because it has been
5 quite some time.

6 Q So is it fair to say that your work that
7 you were just describing did not get into the
8 details of the authentication of the drones?

9 A We talked about many things, in particular
10 having rogue drones and how basically the drones
11 can be flown in the rural areas of Minnesota and
12 Iowa. So this was associated with how their
13 products, the marketing and the planting and the
14 usability of the products.

15 Q So my question was whether your work that
16 you described with Sentera got into the details of
17 the authentication of the drones?

18 MS. L'ESPERANCE: Objection, relevance.

19 A The best of my recollection it was one of
20 the topics we decided, because I was pushing
21 Sentera more to the data analytics and how they
22 can keep the data non corrupt and useful and how

1 you can calibrate the data in order to be usable.
2 So the issue of authenticating the drone was an
3 integral part of these discussions.

4 Q And how were those drones authenticated?

5 MS. L'ESPERANCE: Objection, relevance.

6 A I believe there has been some time. If my
7 memory serves me well, there was some factor of
8 authentication and then moved to multifactor
9 authentication, but it has been quite some time.

10 Q What do you mean by "multifactor
11 authentication"?

12 A Having, for example, two distinct
13 identifiers.

14 Q Can you give me an example of how that
15 would work?

16 A With respect to Sentera or in general?

17 Q With respect to Sentera?

18 MS. L'ESPERANCE: Objection, scope.

19 A So if my memory serves me well, one of the
20 issues was actually, think of a drone flies over a
21 field, serves the data or processes the data. And
22 this is an area which is close to the Twin Cities

1 International Airport. There were issues there,
2 but we needed to identify how, for example, we can
3 keep the system operating in the appropriate
4 altitudes without being shutdown or basically
5 interfere.

6 Q And how would -- I'm sorry, I didn't mean
7 to interrupt you. Go ahead.

8 A Sorry, but again, the issue I was pushing
9 the company on having the whole data analytics
10 pushed to the next level. In other words,
11 offering -- think of the following. You decide
12 for example, if a field needs fertilizer. Instead
13 of applying fertilizer all over the area, we
14 wanted to have a plant-based application of
15 fertilizer.

16 Now, if this data was corrupt, it would
17 have been a major issue. So my emphasis was
18 actually to make any airport -- to convince the
19 company that this is an area where they need to
20 invest and put effort.

21 Q And how would multifactor authentication
22 work in that context?

1 MS. L'ESPERANCE: Objection, scope.

2 A In general, if you look at the POSITA at
3 that time, someone who was in this area, the drone
4 will sense one identifier, unique and then it will
5 send a second identifier that will be
6 authenticated based on the information from the
7 first identifier.

8 Now, I'm not sure if they ever implemented
9 this, but this was part of the discussions and how
10 this could be integrated with their data
11 management policies.

12 Q Was this type of multifactor
13 authentication used in other contexts back in the
14 2015 timeframe?

15 MS. L'ESPERANCE: Objection, vague.

16 A It was actually -- there were discussions,
17 but I had a particular application and a
18 particular product that I was trying with Sentera
19 to help them develop. It was actually a
20 collection about plants and crops.

21 Q Was multifactor authentication used in
22 other contexts outside of drones back in this

1 timeframe in 2015?

2 MS. L'ESPERANCE: Objection, relevance.

3 A Yeah, there are discussions. For example,
4 I have been very active in the robotics community,
5 and in fact, there were discussions about
6 authentication of mobile systems at that time.

7 Q Was multifactor authentication used in
8 mobile systems at that time?

9 A Discussed is one thing, used I don't know.
10 I mean, I don't have the specific -- especially if
11 you look at the development in autonomous vehicles
12 no one was really forthcoming about the
13 authentication they were using.

14 Q What is an autonomous vehicle?

15 A A vehicle -- I will tell you what the
16 POSITA will have understood at that time. A
17 vehicle that can move from point A to point B
18 based on their own computational power sensing and
19 system management. So it is a self-contained
20 system that can make inferences about what to do
21 next where everything was contained within the
22 vehicle.

1 Q Can you turn --

2 A Again, there were several different
3 variations of this particular concept.

4 Q What were the variations?

5 A For example, there were people who were
6 arguing about different levels of autonomy. You
7 might have heard autonomy 2, autonomy 3, autonomy
8 4, involvement of the human in the loop.

9 Q What would be an example of autonomy 2
10 versus autonomy 3 versus autonomy 4?

11 A As you increase the autonomy, you take the
12 human more and more out. So for example, if we're
13 looking at higher numbers, the human is completely
14 out of the loop. If you look at autonomy 2 and 3,
15 you may have things like a blind spot integration
16 or keeping the car within the lanes.

17 Q So complete autonomy means that there is
18 no human involved?

19 MS. L'ESPERANCE: Objection,
20 mischaracterizes, vague.

21 A If you ask some of the leaders, you are
22 going to get completely different pitches. In

1 hindsight we're talking 2026. In 2015 people were
2 saying different things, they were promising
3 different things. I mean, this is -- this is a
4 biggest challenge in robotics and AI that we can
5 say things and several people have their own
6 perspectives. By the way, need to be able to
7 manage expectations.

8 Q Were there people in 2015 that had the
9 opinion that complete autonomy meant there is no
10 human involved?

11 A Yeah, this goes back -- it is not only
12 2015. Discussions were going back to the darker
13 projects in the 1980s with NavLab. When I was a
14 graduate student, we would see the NavLab
15 navigating and failing.

16 And then Bingman in Germany indicated the
17 track going in the highway 100 miles an hour, but
18 since we are very much instrumented in order to
19 accommodate this autonomy. So autonomy has been a
20 term -- that is why I want to be very careful on
21 how I'm using it. I have seen different
22 interpretations, different pieces and I think this

1 continues even nowadays.

2 Q Can you turn to paragraph 16 of your
3 declaration?

4 A Yes, I'm there.

5 Q Paragraph 16 discusses your UAV research,
6 correct?

7 A Part of my UAV research.

8 Q What is the timeframe in years that
9 paragraph 16 -- the research described in
10 paragraph 16 covers?

11 A If you don't mind, I need to look at my
12 resume. Is it okay to go, because there is a
13 patent and also several papers.

14 Q Sure.

15 A Just to be accurate, do you mind if I
16 go --

17 Q I don't --

18 A -- retrieve my resume? Just give me one
19 minute, so I can go to my resume. This exhibit
20 004. So Exhibit 2004 it is not -- it is my
21 declaration. If it is okay if I read from my own
22 copy of the resume just to be accurate?

1 Q Yes.

2 A Okay. Just give me one minute.

3 So if you go to some of the -- so let me
4 -- if you allow me, let me go to my grants -- give
5 a little bit of the ground and then at my
6 publications basically.

7 So after September 11, my lab got several
8 grants work on monitoring infrastructure sites for
9 threats. So if you go to my resume, you are going
10 to see grants. I don't know if you have -- if you
11 go to my grants, there is a grant from NSF, Center
12 for Safety, Security and Rescue Robotics, which
13 started 2003 and finished 2016.

14 We also had a Department of Homeland
15 Security grant, NSF grants, Minnesota DOT and
16 others in order to look at sensory methodologies
17 in order to assess threats and of course, drones
18 was one of them.

19 At that time I was very likely to have a
20 variety of very talented students which did some
21 great work, which resulted in a number of
22 publications. Let me go back to the one that I'm

1 referring here.

2 So if you look there is a publication with
3 first author Scott Morton, second author Ruben
4 D'Sa and myself as a third author. This is in
5 specific of 2015 conference on Intelligent Robots
6 and Systems in Hamburg, Germany. The title is,
7 Solar Powered UAV: Design and experiments.

8 So Scott came to me with the idea I want
9 to design the most self-contained UAV that can go
10 on for days flying. Ruben was at that time a
11 graduate, I believe, and this started a variety of
12 activities.

13 It is important to note that there were a
14 few other people who worked with me on basically
15 -- sorry, in early 2000 as part of a DARPA project
16 who developed the electronic robotic scout, which
17 was a mobile platform that can be thrown through
18 windows or thrown by a UAV and it has been used
19 extensively by the US Army in order to get
20 information. So always there was the issue of
21 drones.

22 There were other students like, for

1 example, there is a publication of the proceedings
2 of the International Conference on Robotics and
3 Automation in Karlsruhe again with Scott and L.
4 Scharber, Solar Powered Unmanned Aerial Vehicle
5 for Continuous Flight: Conceptual Overview and
6 Optimization. This is 2013.

7 Then we can go back to -- let me make
8 sure.

9 So even in 2000 there were some, but Scott
10 and Ruben pushed this work at the forefront. We
11 got some extra money from National Science
12 Foundation and then something that epitomizes this
13 is the paper -- let me tell you.

14 So there is a paper by Ruben D'Sa and
15 David Jenson and myself, A Hybrid Approach to
16 Solar-Powered Flight, SUAV: Q.

17 And then another paper in 2016,
18 Self-Feeding Aerial Robots: Methods for Detection
19 and Localization of Standard Wall Outlets.

20 And then another paper which describes a
21 Two Meter Solar UAV, this is 2016. And of course
22 when you have these publications, it takes several

1 years before.

2 And then we have 2017, Design and
3 Experiments for a Transformable Solar-UAV, which
4 is this one that I'm referring here. The
5 Multi-Section-Transformable (MIST) UAV, a
6 Shape-Shifting Vertical Take-Off and Landing
7 platform that can transform in-air between
8 multi-rotor, tail-sitter and fixed-wing
9 configurations.

10 There are other publications as well in
11 later years. Sorry for the long-winded answer, I
12 tried to provide some context.

13 Q Thank you for that.

14 When you said that it takes several years
15 with respect to a publication, are you talking
16 about several years of work before the publication
17 date or several years after to implement the idea?

18 A Before -- because basically you want to
19 present always a -- in my lab we want actual
20 systems to be built, and system building takes a
21 lot of time and many figures.

22 Q You mentioned your grants -- your grant

1 from the NSF Center for Safety and Security from
2 2003 to 2016. Did your work there involve -- or
3 excuse me.

4 Did the drones at issue that you worked on
5 in that timeframe involve or implement multifactor
6 authentication?

7 MS. L'ESPERANCE: Objection, relevance.

8 A So let me explain how the system works.
9 And there were -- I was the second PI. There was
10 someone who was the first PI and then left the
11 University of Minnesota. So I inherited this lab,
12 I was co PI.

13 So the way that we work with the centers
14 these are hubs funded by NSF. In other words,
15 companies like Honeywell will come and support the
16 project. So there were multiple projects on
17 drones, on autonomous systems, computer vision, on
18 algorithms.

19 At that time there was a faculty, a group
20 of faculty in electrical engineering. And then in
21 my department Isler (phonetic), who had interest
22 in authentication. So the center was funding

1 these efforts, but they weren't -- they were
2 exploring different -- I will say different
3 approaches to this problem.

4 Q Can we take a short break? We have been
5 going almost an hour.

6 (Recess, 9:52 to 10:05 a.m.)

7 Q Welcome back, Dr. Nikos.

8 A Thank you.

9 Q Let's look at your declaration Exhibit
10 2001 at paragraphs 84 and 85 if we can.

11 A Paragraph 84 you said?

12 Q Yes.

13 A Yes.

14 Q Paragraph 84 discusses claim limitation
15 [10.d], do you see that?

16 A Yes.

17 Q And [10.d] is written just above paragraph
18 84, do you see that?

19 A Yes.

20 Q And [10.d] recites, wherein the
21 identification receiver is configured to receive
22 the aerial system identifier signal and a second

1 factor identifier associated with the aerial
2 system, correct?

3 A That's correct.

4 Q This limitation requires receipt of both
5 an aerial system identifier signal and a second
6 factor identifier?

7 A That's correct.

8 Q What is an aerial system identifier
9 signal?

10 A Let's go back to paragraph 78 where I'm
11 discussing the claim element [10.a] and the
12 support in the specification, an identifier
13 transmission system coupled to an aerial system
14 wherein the identifier transmission system is
15 configured to broadcast an aerial system
16 identifier signal comprising an aerial system
17 identifier unique to the aerial system.

18 And then if you look at the support table
19 I have the references to the spec.

20 Q So my question was what is an aerial
21 system identifier signal in your understanding?

22 A I use again in the same paragraph if you

1 look at Exhibit 2002, 14, row 13-16 is on the
2 third element in the table. The Exhibit 2002
3 says, the identifier transmission system 101
4 preferably periodically or constantly broadcasts
5 the aerial system identifier 300, but can
6 alternatively display the aerial system identifier
7 310, sent the aerial system identifier 300 in
8 response to receipt of request for aerial system
9 identifier 310 or otherwise transmit the aerial
10 system identifier 310.

11 The aerial system identifier 310
12 preferably identifies an aerial system 100 and is
13 preferably globally unique, but can alternatively
14 be unique for the geographic region unique for a
15 period of time, et cetera.

16 This is also contained in Exhibit 2003
17 paragraph 44, 45. I believe this is the
18 provisional and the Exhibit 101, column 7, 51 to
19 62.

20 Q So do you have any other understanding of
21 what an aerial system identifier signal is beyond
22 referencing Exhibit 2002 at 14, lines 13 to 16 and

1 the other portions you cited?

2 A I have several paragraphs in my support
3 table which describe this. It is basically the
4 same -- the same idea.

5 Q What types of things can be aerial system
6 identifiers?

7 A In general or you want to point me
8 something I'm missing in my report.

9 Q In general?

10 A It could be just the code, alphanumeric
11 code 101. A POSITA will understand this as
12 something like 1011.

13 Q What is the purpose of an aerial system
14 identifier?

15 A I think the spec here is pretty clear.
16 This says, again, the same text be used I cited.
17 We want something which is preferably globally
18 unique.

19 Q What is a second factor identifier?

20 A Just give me a minute. Is the second
21 distinct -- again, if you go to paragraph 84 and
22 paragraph 87, claim element [10.e1], Exhibit 2002

1 30, column 30, 17 to 18. It says at the -- let me
2 stand corrected. At 30 column, 24 row until
3 column 31, line 1, in a second variation
4 authentication is accomplished by using a
5 secondary identifier.

6 And then if you go to column 4, 15 to 20
7 rows, in some variations the aerial system 100 can
8 include a first and second identifier, transmitted
9 by a first and second identifier transmission
10 system, respectively wherein the second identifier
11 can function as a second factor identifier for the
12 aerial system 100.

13 For example, as the second barrier
14 authenticator for the aerial system to prevent
15 tampering and/or identifier production.

16 Q Can the same type of information that
17 could be an aerial system identifier be a second
18 factor identifier?

19 A Can you repeat the question?

20 Q Could the same type of information that
21 could be an aerial system identifier be a second
22 factor identifier?

1 A It should be distinct, different.

2 Q It should be distinct in the same
3 instance?

4 A A POSITA will understand that this
5 distinction is important, because you want -- you
6 don't want to have compromise. If the first one
7 is compromised, you don't want the second one, if
8 it is dependent on the first one to be compromised
9 as well.

10 Q My -- my question is a little different.
11 Is the category of second identifier -- second
12 factor identifier encompassing different types of
13 information than an aerial system identifier
14 generally?

15 MS. L'ESPERANCE: Objection, form.

16 Q Let me ask a different way.

17 A Yeah.

18 Q Could a MAC address be an aerial system
19 identifier?

20 A In what context?

21 Q In the drone context of the '199 patent?

22 A Maybe. It depends -- depends on -- I

1 mean, we want to -- whenever we have these type of
2 systems, we want to look at the totality of the
3 engineering effort. We call this embedded
4 systems. So a MAC address on its own is -- we're
5 missing information.

6 Q Can you give me an example of a type of
7 information that could -- that could be an aerial
8 system identifier?

9 A I think I gave you one earlier the
10 alphanumeric one. 1011, which is according to the
11 spec, needs to be globally unique.

12 Q In a particular drone context for a
13 particular drone, if 1011 were not the aerial
14 system identifier, could 1011 instead be used as a
15 second factor identifier?

16 A So to use the same one you mean?

17 Q No.

18 A As long as they are distinct and satisfies
19 some of the spec, some of the things I read,
20 possibly.

21 Q Okay. So do you understand what I'm
22 getting at? My question is, does the term second

1 factor identifier describe another type of
2 information than the aerial system identifier
3 other than the requirement that they need to be
4 distinct in the same -- when used in the one
5 context?

6 MS. L'ESPERANCE: Objection, form.

7 A As long -- so let me give you what -- the
8 spec is quite clear, and a POSITA I think will
9 have seen.

10 As long as the second and the first
11 identifier they can say that this is Scott's drone
12 1 with this characteristic, if we say that this
13 identifier characterizes all the drones of Scott,
14 this does not satisfy the spec.

15 But if we have something that says this is
16 a drone with the serial number that belongs to
17 John, and this is another identifier that
18 basically points to the same -- distinct
19 identifier that points to the same identical
20 drone, that is the way that the spec clears this.

21 But if we're talking about the drones that
22 characterize all the last mile delivery drones of

1 Amazon, I don't think this is supported by the
2 spec.

3 Q You said that a requirement for the aerial
4 system identifier is that it needs to be globally
5 unique, correct?

6 A I didn't say this. It is just what the
7 spec says.

8 Q Is that also a requirement for a second
9 factor identifier?

10 A This is the intention of the spec the way
11 I understand it.

12 Q Your understanding is that a second factor
13 identifier must be globally unique to the drone?

14 A Yes.

15 Q In paragraph -- can we look at paragraph
16 84 of your declaration?

17 A Sure.

18 Q In the chart in paragraph 84 on the left
19 column you have limitation [10.d], and on the
20 right column you have support in the
21 specifications for limitation [10.d].

22 Do you see that?

1 A Yes.

2 Q And the first support you identify is a
3 reference to your support for limitation [10.b].

4 Do you see that?

5 A Yes, I see.

6 Q And you state that that support discloses
7 the identification receiver receives from the
8 identifier transmission system broadcast signals
9 that include the aerial system identifier signal
10 and the secondary second factor.

11 Do you see that?

12 A I see.

13 Q So I would like to go back to your support
14 for [10.b]. This is paragraph 80.

15 A Yes.

16 Q Can you identify where in the support for
17 [10.b] it discloses an identification receiver
18 receives from an identifier transmission system,
19 broadcast signals that include the aerial system
20 identifier and the secondary second factor?

21 A Just give me a minute. If you go to the
22 table just before paragraph 81, do you see Exhibit

1 2002?

2 Q Yes.

3 A If you go at column 4, 15 to 20 rows, in
4 some variations the aerial system 100 can handle a
5 first and second identifier transmitted by a first
6 and second identifier transmission system
7 respectively, wherein, the second identifier can
8 function as a second factor identifier for the
9 aerial system 100. For example, as a secondary
10 authenticator for the aerial system to prevent
11 tampering and all identifier reproduction.

12 And it says Exhibit 2003, paragraphs 14,
13 66 and Exhibit 1001, column 2, 57-64, column 16,
14 rows 6 to 8, and column 16, 17, 18.

15 Q Broadcast signals are not mentioned there,
16 are they?

17 A What do you mean?

18 Q Well, your support for [10.d] states the
19 identification receiver receives from the
20 identifier transmission system broadcast signals.

21 A It says here, transmitted -- again, column
22 4, lines 15 to 20, transmitted by a first and

1 second identifier transmission system where the
2 transmission system is supposed to be the one
3 defined in [10.e] and the other elements.

4 Q Okay. This portion states that a first
5 identifier -- strike that.

6 This portion states that a first
7 transmission system is transmitting the first
8 identifier and a second transmission system is
9 transmitting the second identifier; is that
10 correct?

11 A Yes, but it is not plural. It is not
12 talking about systems. It is talking about a
13 first and second identifier transmission system.

14 Q Well, it says, in some variations, the
15 aerial system 100 can include a first and second
16 identifier transmitted by a first and second
17 identifier transmission system respectively.

18 Do you see that?

19 A Yes.

20 Q So what that means is that the first
21 identifier transmission system transmits the first
22 identifier and a second identifier transmission

1 system transmits the second identifier, correct?

2 A The POSITA will look at this as basically
3 being the same or being a transponder or
4 something, but all of them are contained within
5 the aerial vehicle, because it talks for the
6 aerial system 100.

7 Q This portion here describes it as two
8 separate transmission systems?

9 MS. L'ESPERANCE: Objection,
10 mischaracterizes.

11 A I think a POSITA will look at basically
12 what it is conveying here, the same aerial vehicle
13 transmits a first and a second identifier, which
14 are distinct, and the second identifier is used in
15 order to authenticate the aerial system 100.

16 Q Can you turn to paragraph 85 of your
17 declaration?

18 A Just give me one minute. Yes, I'm there.

19 Q In paragraph 85 you state that disclosure
20 for the '303 app and the '838 provisional, do you
21 see that?

22 A I see.

1 Q What -- you don't cite any support in this
2 paragraph. What is your support for the
3 statements in this paragraph?

4 A This paragraph summarizes what I have
5 already provided above. The same also for 86
6 paragraph.

7 Q Okay. This portion discusses that the
8 second factor identifier is received by the
9 identification receiver, correct?

10 A Are you referring to paragraph 85?

11 Q Yes, I am.

12 A Yeah, I'm saying both disclosed that the
13 identification receiver receives the identifier
14 signal. The '303 App and the '838 provisional
15 each also teaches that the identification receiver
16 receives information broadcast by the aerial
17 system, broadcast signals from an aerial system
18 which include the secondary/second factor
19 identifier that is included in, and is thus
20 associated with the aerial system.

21 Q You state here that the '838 provisional
22 discloses this, correct?

1 A Yes, I believe in paragraphs 30, 31, and
2 Figure 6 and also paragraphs 32 and 59.

3 Q The '838 provisional is Exhibit 2003?

4 A That's correct.

5 Q Can you point me to where the '838
6 provisional discloses the transmission or receipt
7 of a second factor identifier?

8 A Do you want me to go to the provisional?

9 Q If you would like to, sure.

10 A Just give me a minute. So first of all,
11 if you look at Figure 6 of the provisional, and if
12 you look at paragraph 10 it says Figure 6 is a
13 specific example of an aerial system and a
14 detection system.

15 And then if we go -- if we go to paragraph
16 30 it says, the identification system can include
17 an identification receiver, which functions to
18 receive the aerial system identifier. The
19 identification receiver can be passive, for
20 example, receive information broadcast by the
21 aerial system, active, be powered, request
22 information from and/or provide power for

1 information broadcast by the aerial system, or be
2 otherwise configured.

3 And then continues in paragraph 31, which
4 talks, let me read it just one minute.

5 Q And my -- my specific question was,
6 disclosure about transmission or receipt of a
7 second factor identifier, and I haven't heard you
8 mention that yet, so I just wanted to make sure
9 you weren't suggesting those portions disclosed a
10 second factor identifier?

11 MS. L'ESPERANCE: Objection,
12 argumentative.

13 A I believe you asked me about the receiver.

14 Q My question was can you show me where the
15 provisional discloses the transmissional receipt
16 of a second factor identifier?

17 A Let me go back to the spec, just give me a
18 minute. If you look at paragraph 14, if you go to
19 the provisional. Fourth, in some variations, the
20 aerial system can include a first and second
21 identifier, transmitted by a first and second
22 identifier transmission system, respectively,

1 providing the second identifier can function as a
2 backup identifier in case of, a second identifier
3 for the aerial system, as a secondary
4 authenticator for the aerial system to prevent
5 tampering an/or identifier reproduction.

6 So I think for a POSITA 14 it says that we
7 have two transmissions. And if you go to the 30,
8 it says that the identification system can include
9 an identification receiver, which functions to
10 receive the aerial system identifier. The
11 identification receiver can be passive or be
12 otherwise configured. So we have a transmission
13 module and a receiving module, so a POSITA will
14 connect these two.

15 I think the spec is pretty clear about
16 this and the 31 it shows how in different
17 variations how this can be implemented.

18 Q You said that for a POSITA paragraph 14
19 describes two transmissions?

20 A Two identifiers.

21 Q Okay.

22 A Transmitted by the drone 100.

1 Q Okay. Let's look at a similar disclosure
2 in the patent, the '199 patent, at column 2, line
3 57?

4 A Just give me one minute to go there.
5 Where do you want me to go.

6 Q Column 2, line 57?

7 A Yes.

8 Q This starts by saying, fourth, in some
9 variations the aerial system 100 can include a
10 first and second identifier transmitted by a first
11 and second identifier and transmission system
12 respectively.

13 Do you see that?

14 A Fourth, in some variations the aerial
15 system includes a first and second identifier,
16 transmitted by a first and second identifier
17 transmission system, yes.

18 Q The patent here describes that the second
19 identifier is transmitted from a second identifier
20 transmission system?

21 A As I mentioned earlier, it can be the same
22 or it can be a transponder, which is always within

1 the boundaries of aerial vehicle 100, aerial
2 system 100.

3 Q But -- but this sentence here states that
4 the second identifier is transmitted by a second
5 identifier transmission system?

6 A The second identifier, the second may --
7 in the way I understand it, and the important part
8 is actually we have a second identifier. And we
9 can say the transmission system, as long as it is
10 contained within the aerial system 100, serves the
11 intention of the spec.

12 Q It is not explicit in the spec, this is
13 based on your understanding of the spec?

14 A I think it is explicit.

15 Q It is explicit in this section that the
16 second identifier is transmitted by a second
17 identifier transmission system?

18 A Yeah, because it is actually, as I
19 mentioned earlier, it doesn't mention systems. It
20 says system.

21 Q And it also describes a first identifier
22 transmission system?

1 A It describes a first and second identifier
2 transmission system.

3 Q This also states that the second
4 identifier can function as a backup identifier,
5 correct?

6 A In one of -- in one variation.

7 Q It also describes a second factor
8 identifier, correct?

9 A Can you point me where it says that?

10 Q About two lines further down?

11 A I'm not sure, are you referring to which
12 line 60 --

13 Q 62.

14 A A second factor identifier -- is this the
15 one you are referring to?

16 Q Yes.

17 A A second factor identifier for the aerial
18 system 100, for example, as a secondary
19 authenticator for the aerial system to prevent
20 tampering and/or identifier production.

21 Q So this section describes a second
22 identifier that functions as a backup identifier,

1 and a second factor identifier that functions as a
2 secondary authenticator for the system; correct?

3 MS. L'ESPERANCE: Objection,
4 mischaracterizes, form.

5 THE WITNESS: I didn't hear -- Amanda, I
6 didn't hear what you said. Can you repeat,
7 please?

8 MS. L'ESPERANCE: You didn't hear me.
9 Objection, mischaracterizes, form.

10 A If you go to 57 it says fourth, in some
11 variations, the aerial system can include a first
12 and second identifier, transmitted by a first and
13 second identifier transmission, respectively,
14 wherein the second identifier can function as a
15 backup identifier (in case the primary identifier
16 system is inoperable), a second factor identifier
17 for the aerial system 100 (as a secondary
18 authenticator for the aerial system to prevent
19 tampering and/or identifier reproduction), an
20 identifier for a secondary identification system,
21 (a user device-compatible identifier).

22 So all of these are different variations.

1 Q Okay. Let me ask a little different way.
2 One of the functions identified here for the
3 second identifier is as a backup identifier,
4 correct?

5 A One of the -- one of the variations, the
6 embodiments basically I mentioned here with
7 respect.

8 Q And a separate variation or embodiment has
9 the second factor identifier acting as a secondary
10 authenticator to prevent tampering and/or
11 identifier reproduction, correct?

12 A As an example, yes. It is a very clear
13 disclosure.

14 Q We discussed earlier that this portion
15 describes the second identifier coming from a
16 second identifier transmission system?

17 MS. L'ESPERANCE: Objection,
18 mischaracterizes, form.

19 Q And my question is, does the '199 patent
20 ever describe a second identifier as coming from
21 anything other than a second identifier
22 transmission system?

1 A Can you repeat the question, because it
2 has so many segments?

3 Q Sure. In column 57 to 59 the patent
4 states that the second identifier is coming from a
5 second identifier transmission system.

6 And my question is, whether the '199
7 patent ever describes a second identifier as
8 coming from anything other than a second
9 identifier transmission system?

10 A I don't -- really I don't recall. My --
11 my emphasis was on this, but maybe it has not been
12 -- has been some time since I looked at other
13 pieces. You want me to point somewhere in my
14 declaration where I mention other ways or is it a
15 general question?

16 Q I would like you to identify anywhere else
17 in the patent which describes that?

18 A In the patent itself?

19 Q Yes.

20 A Give me a minute to refresh my memory. So
21 if you go to my declaration, paragraph 87. If you
22 look at the support in the specification, and

1 Exhibit 1001, which is the patent. I'm
2 referencing 2, 57 -- column 2, 57, 64, okay.

3 Then I mention 16, 6, 8. Column 16,
4 determining an aerial system identifier can
5 optionally include verifying the authenticity of
6 the aerial system identifier 310.

7 And this relates to the earliest statement
8 when in column 2 that this cannot -- the second
9 identifier or the second factor identifier can be
10 used to authenticate.

11 And the next one is 16, 17, 18. In a
12 second variation authentication is accomplished by
13 using a secondary identifier. For example, the
14 authenticity of the identifier transmission system
15 101 can be verified when a first aerial system
16 identifier with a second signal 300 received from
17 a WiFi transmitter, with a second aerial system
18 identifier 310 extracted from a patten of pulsed
19 light. In a third variation, authentication is
20 accomplished by using a communication network
21 interface identifier.

22 So this is based on what I have in my

1 report.

2 Q Anywhere else?

3 A I don't know. I can go over the patent
4 again if you want me to, but these are some of the
5 examples that I have in my report.

6 Q If you have other instances where that is
7 disclosed, that is what I'm -- that is what I'm
8 looking for. If you are not aware of any --

9 A I need some time to look at this, I don't
10 know if you want me to go through the whole patent
11 or not.

12 Q Sure.

13 A Give me some minutes then.

14 Q Let me ask a different question.

15 A Sure.

16 Q If you are aware of any other portion that
17 disclosed that, you would have cited it in the
18 support in the specification section of your
19 declaration?

20 A Possibly, but I just use I think the ones
21 which I found in support of the spec I was given.

22 Q What were you given?

1 A The spec -- I was given the spec and the
2 claim element.

3 Q And you identified from the spec the
4 portions that you thought supported the
5 limitations?

6 A That's correct.

7 Q Let's look at paragraph, or excuse me,
8 claim limitation [10.e1] which you address --

9 A Sure.

10 Q -- starting in paragraph 87.

11 A Yes.

12 Q [10.e1] requires that the identification
13 system is configured to determine an authenticity
14 of the aerial system identifier. That is part of
15 the requirement, correct?

16 A To determine and verify.

17 Q And I'm focused on determining right now.

18 A Uh-huh, yes.

19 Q What does it mean to determine an
20 authenticity of an aerial system identifier?

21 A I don't have -- I mean, if we use the
22 proposed claim construction with the ordinary

1 meaning, it is actually if the drone of John
2 number 1 with the serial number is really the
3 drone 1 of John.

4 Q Okay. The claim also requires
5 verification of the authenticity of the aerial
6 system identifier?

7 A That's correct.

8 Q What does it mean to verify an
9 authenticity?

10 A I may be a rogue drone and I may pretend
11 I'm the drone 1 of John. So the system has to
12 verify that the indeed I'm the drone 1 of John.

13 Q How is that different from determining an
14 authenticity?

15 A The verify is just an expansion, an
16 explanatory addition.

17 Q What do you mean by that?

18 A It just determines. It is a --
19 verification is stronger, I will say it is a clear
20 explanation, because there is an end. We want to
21 be absolutely sure that this is drone 1 of John.

22 Q Can you give me an example of an operation

1 of determining an authenticity of John 1 and then
2 verifying the authenticity of John 1?

3 A Are you familiar with -- for example, I
4 will think something that the POSITA will have
5 considered, which is challenge response.

6 Q And how does a challenge response work?

7 A A challenge response may help in the
8 determination, but doesn't help in the
9 verification because it involves the ground
10 station sending a signal back.

11 Q Sending a signal back is part of the
12 verification?

13 A As part of the determination, but if the
14 initial signal is compromised, then you have the
15 added effect that you don't have any way -- you
16 may drive the ground station in the wrong
17 determination. So verification, and I think that
18 is really here very clearly disclosed, it should
19 be done by the use of the two factor that is
20 disclosed here.

21 Q If a system performed consecutive checks
22 of authenticity, in other words, it checked

1 authenticity and then confirmed that authenticity,
2 would that be determining and verification of
3 authenticity?

4 A Think of the following, and I think this
5 is what is at stake here. If you have somehow a
6 rogue entity spoofing a signal, and then we have
7 accumulation of errors in determination of the
8 authenticity, unless you have a distinct second
9 factor identifier, you are getting more and more
10 in the hole of being mislead.

11 Q Is the second identifier -- second factor
12 identifier used in the determination of the
13 authenticity?

14 A Based on -- in the spec, in a second
15 variation authentication is accomplished by using
16 a second ident -- a secondary identifier. And
17 then if you see we continue, this is -- I'm
18 reading from the support table in 87.

19 In some variations the aerial system can
20 include the first and second identifier
21 transmitted, wherein, the second identifier can
22 function as -- a second identifier -- factor

1 identifier for the aerial system 100. For
2 example, as a secondary authenticator for the
3 aerial system to prevent tampering and/or identify
4 reproduction.

5 Q You agree that determining an authenticity
6 of the aerial system identifier and verifying the
7 authenticity of the aerial system identifier are
8 both required in [10.e1]?

9 A As stated in the claim, yes, but as I
10 mentioned and verified is an explanatory addition.

11 Q What does that mean?

12 A It makes -- it is an expanded circle
13 around the determination. In other words, the
14 claim element tries to make clear to a POSITA what
15 has been disclosed here.

16 Q The portion that you have quoted and cited
17 in the chart for limitation [10.e1] in paragraph
18 87, can you point me to the specific portion that
19 discloses determining the authenticity of the
20 aerial system identifier using the second factor
21 identifier?

22 A Again, I'm saying if you look at Exhibit

1 2002, again from the support, column 30, 17, 18.

2 Q I see verifying the authenticity there,
3 but I don't see determining the authenticity?

4 A So verifying to a POSITA is actually
5 determining in the context. I mean a POSITA this
6 is hard to understand.

7 Q What do you mean determining in the
8 context?

9 A In the way that -- it is the same thing,
10 but it is just a stronger element in an
11 explanation. So in the context of this
12 authentication we need to determine and verify.

13 Q So your support for determining an
14 authenticity of the aerial system identifier in
15 the spec is verifying the authenticity of the
16 aerial system identifier; is that fair?

17 A It is -- it is the whole -- in the context
18 it says can optionally include verifying the
19 authenticity of the aerial system identifier 310.

20 Q Would now be a good time for another
21 break?

22 MS. L'ESPERANCE: Yes.

1 Q 10 minutes?

2 A Sure.

3 Q You understand, Dr. Nikos, the IPR rules
4 prevent you and prohibit you from discussing the
5 substance of your testimony with counsel during
6 the breaks?

7 A I do.

8 MR. WALTERS: We can go off the record.

9 (Recess, 11:11 to 11:24 a.m.)

10 Q Welcome back, Dr. Nikos.

11 A Thank you.

12 Q I would like to look at limitation [10.g],
13 which is on -- it is discussed with respect to
14 paragraph 93 in your declaration?

15 A Give me a minute. Yes, I'm there.

16 Q Can you -- do you want to refamiliarize
17 yourself with this limitation? You don't need to
18 read it out loud. I just wanted you to take a
19 look at it again.

20 A Sure.

21 Q Just let me know when you are ready.

22 A Yes, I'm ready.

1 Q Okay. This limitation recites a
2 disruption system configured to disrupt an
3 operation of the aerial system, right?

4 A Yes.

5 Q And it then recites two alternative
6 conditions which would trigger disruption of
7 operation of the aerial system, correct?

8 A Yes.

9 Q And the first condition requires
10 disruption when it is determined that the aerial
11 system associated with the authenticated aerial
12 system identifier is not permitted to be in an
13 airspace?

14 A Yeah, with the help of the permission
15 module, which is described earlier.

16 Q Yes.

17 A Which is disclosed earlier, yes.

18 Q In this first scenario, the aerial system
19 identifier must first be authenticated and then it
20 must be determined that the aerial system
21 associated with the identifier is not permitted to
22 be in an airspace; is that right?

1 A That's correct.

2 Q And the second condition requires
3 disruption when the authenticity of the aerial
4 system identifier is not verified, right?

5 A Yes, the authenticity of the aerial system
6 identifier of the aerial system identifier signal
7 is not verified.

8 Q Okay. And the claim limitation requires a
9 disruption system that is configured to disrupt
10 operation upon either of these conditions?

11 A That's correct.

12 Q Okay. So my question is, in order to read
13 on this claim limitation, would a disruption
14 system need to be able to disrupt operation of the
15 aerial system if both conditions were met or does
16 it only need to be able to disrupt if only one
17 were met?

18 A Can you repeat the question?

19 Q Yeah. So my question is centered around
20 the use of the words disruption system configured
21 to disrupt operation upon either of these events.

22 And so my question is, in order to read on

1 this limitation, does the disruption system have
2 to have the ability to disrupt upon both of these
3 events or just one?

4 A There is an "or" here, so we want the
5 disruption system if one of these conditions is
6 met or both to disrupt the operation of the aerial
7 system 100.

8 Q Okay. So if you had a disruption system
9 that was able to disrupt operation when the
10 authenticity of the aerial system identifier was
11 not verified, but that same disruption system did
12 not have the ability to disrupt operation when it
13 was determined that the aerial system is not
14 permitted to be in an airspace, would that system
15 read on the limitation?

16 A Let me understand -- let me tell you what
17 I understand you are asking. If, for example, we
18 have a condition 2 met, so basically we cannot
19 verify the authenticity of the aerial system, what
20 about the second condition, if the second
21 condition is not met? Is this what you are
22 asking?

1 Q My question is about the capability of the
2 disruption system that you are looking at, okay.
3 So it is clear from the claim that the disruption
4 system has to be able to disrupt upon either of
5 these conditions being met?

6 A Or both.

7 Q Or both. Let me ask my other question
8 again.

9 So if you had a disruption system that had
10 the ability to disrupt operation of the aerial
11 system when the first condition was met but it did
12 not have the ability to disrupt operation when the
13 second condition was met, would that disruption
14 system still read on [10.g]?

15 A I believe so, because it satisfies one of
16 the conditions, there is an "or," there is not an
17 "and."

18 Q Okay. The last part of [10.g] states,
19 wherein, the disruption system is preemptively
20 enabled based on the received aerial system
21 identifier signal.

22 A Yes.

1 Q What does preemptively enabled mean?

2 A That it needs to have the capability that
3 is provided, that is based on the receive aerial
4 system identifier. In other words, if we have --
5 we go back to the discussion we had earlier that
6 these operations, if we cannot verify the
7 authenticity and the disruption systems connect to
8 this authenticity second mechanism that we discuss
9 earlier or that is disclosed earlier, then we have
10 to do this operation.

11 Q What does it mean to enable a disruption
12 system?

13 MS. L'ESPERANCE: Objection, scope.

14 A We have to look at this at the context.
15 Enable based on the received aerial system
16 identifier signal.

17 Q I'm talking about generally, what does it
18 mean to a POSITA to enable a disruption system?

19 A I would like to read the whole thing,
20 because I don't want to take out of context.
21 Wherein, the disruption system is preemptively.
22 Before the drone comes in we need to have this

1 exchange of -- of -- of basically identifier
2 signals and then we need to have the connection
3 between the authentication module and the
4 disruption system. In order to have -- basically
5 we need have this flow in order for this to
6 materialize.

7 Q You understand my other -- my initial
8 question was what does it mean to enable a
9 disruption system?

10 A To make it operate in the fashion which is
11 described here.

12 Q What does preemptively -- how does
13 preemptively change that? In other words, what
14 does preemptively enable mean that is different
15 from just being enabled?

16 MS. L'ESPERANCE: Objection, scope.

17 A I see this as an explanatory.

18 Q What do you mean by that?

19 A Just explanation of how this enablement --

20 Q Is preemptively -- I'm sorry, I didn't
21 mean to interrupt.

22 A It is an explanation of how this

1 enablement takes place.

2 Q And how does preemptively enable differ
3 from just enabling?

4 A It is just -- it just makes more clear to
5 a POSITA.

6 Q In what way?

7 A That you want to make sure that you have
8 this thing running, this authentication mechanism.
9 So you want this thing to be on in order for
10 authentication to happen.

11 Q So preemptively means that the thing must
12 be on before authentication to happen?

13 A That this whole mechanism needs to be
14 running. So think of the following. I don't turn
15 the cameras on after the intruder comes into a
16 space. I need to have the cameras on, the -- the
17 whole authentication scheme running before I can
18 basically say, okay, I have an alarm.

19 Q So preemptively in this context means that
20 you enable the disruption system before the drone
21 enters the space?

22 A It is one of the explanations --

1 Q What other --

2 A -- that I can think of. I'm going back to
3 this example. I have an intruder detection system
4 at the home. I need to have the sensors on and I
5 need to have the authentication. Otherwise,
6 people will ignore the alarms.

7 Q So in the intruder context, you have the
8 detection system on before the intruder enters the
9 home. That is what preemptively enabling means in
10 that context?

11 A I think actually, let me -- let me look.
12 Give me a minute, because I think I have some text
13 in the specification. Give me -- give me one
14 minute.

15 Look at page 43 of my declaration.
16 Exhibit 2002, 5th line, 36 column and column 37
17 from line 20 to line 2. Where the spec says,
18 certain scenarios may require the disruption
19 system to be ready to engage on short notice. As
20 depicted in Figure 5, the disruption system may
21 thus be preemptively enabled if certain conditions
22 are met. For example, an aerial system detected

1 without an identifier 500, identifier is received
2 by is invalid 501.

3 If you go at 24, 4 to 5, the
4 discrimination system 110 can additionally include
5 a control system that functions to selectively
6 activate or deactivate disruption system
7 operation.

8 The control system -- this is column 24,
9 10 to 15. The control system 104 is preferably
10 operable between a locked and unlocked mode. The
11 control system 104 preferably locks or otherwise
12 disables disruption system 105 operation in the
13 locked mode, and unlocks or otherwise enables
14 disruption system 105 operation in the unlocked
15 mode.

16 Q You are reading from the patent?

17 A I'm reading from the Exhibit 2003. This
18 is -- this is page 43 I read initially from the
19 Exhibit 2002.

20 Q Which is the patent, correct?

21 A No, the patent is Exhibit 101 -- 1001,
22 right.

1 Q I'm sorry, it is the application?

2 A Yeah.

3 Q Yeah. I would like to get into that
4 disclosure in a minute. Let me ask you -- let me
5 ask you just a general question about the claim
6 language. The claim language states, wherein, the
7 disruption system is preemptively enabled based on
8 the received aerial system identifier signal?

9 A Uh-huh.

10 Q Does that have a different meaning than if
11 the claim had said, wherein, the disruption system
12 is enabled based on the received aerial system
13 identifier signal? In other words, does
14 preemptively change the meaning there?

15 MS. L'ESPERANCE: Objection, scope, form.

16 A I haven't looked at this, because I had
17 this text in the spec, which is pretty clearly
18 disclosed, because it says as depicted in Figure
19 5, the disruption system 105 may thus be
20 preemptively enabled if certain conditions are
21 met.

22 Q And is preemptively enabling different

1 than just enabling?

2 A I have to stick with the spec. This is --
3 I think that -- I was asked to look at.

4 Q You don't know if preemptively enabling is
5 different from just enabling?

6 A I have to look in the context, because I
7 say, thus, be preemptively enabled if certain
8 conditions are met.

9 Q So if the Board was interested in that
10 question, whether preemptively enabling is
11 different than just enabling, is it fair that you
12 haven't looked at that issue and so you don't
13 know, or do you have an opinion?

14 MS. L'ESPERANCE: Objection,
15 mischaracterizes.

16 A What I said is actually I have to look at
17 the spec, I have to look at the claim element and
18 I have -- and I mentioned the support that I
19 found. For example, I explain here if you look,
20 the spec has all these conditions which basically
21 I discussed. For example aerial system detected
22 without an identifier, identifier is received but

1 is invalid. It says, the control system 104 is
2 preferably operable between the locked and
3 unlocked mode. So I have to look at all of this,
4 I have to look within the context.

5 Q Let's look as Exhibit 2002 that you are
6 quoting.

7 A Just give me a minute. Yeah, I'm there.
8 You want me to repeat or --

9 Q No, I would like to look at that portion
10 that you quoted in reference to your quote in your
11 declaration on page -- it is exhibit page 47.
12 There is a page number 43, but it is actually
13 exhibit page 47, same -- same page you were
14 looking at earlier?

15 A Yeah.

16 Q So specifically on exhibit page 47,
17 Exhibit 2001, you are quoting from Exhibit 2002 at
18 36, line 20 to 37, line 2. And there is a
19 sentence that says, as depicted in Figure 5, the
20 disruption system 105 may thus be preemptively
21 enabled if certain conditions are met, e.g.,
22 aerial system detected without an identifier 500,

1 identifier is received but is invalid 501.

2 Do you see that?

3 A Yes.

4 Q So if you go to Exhibit 2002 at page 36,
5 line 21, you see that same sentence, correct?

6 A It starts at 21.

7 Q Yes.

8 A Yes.

9 Q And then the parenthetical says, e.g.,
10 aerial system detected without an identifier 500,
11 identifier is received but is invalid 501,
12 identifier is valid but is not permission 502, et
13 cetera.

14 Do you see that?

15 A Yes.

16 Q Okay. That last part of that
17 parenthetical identifier is valid but is not
18 permission 502, is not quoted in your declaration.

19 Do you see that?

20 A Yeah, let me. Just let me read it. Yes,
21 that is true.

22 Q Why is that portion not quoted in your

1 declaration?

2 A It is just I thought that these two
3 examples that I mentioned were sufficient.

4 Q Okay. Looking at Exhibit 2002?

5 A Yes.

6 Q You agree that the application describes
7 that last portion of the parenthetical, which is
8 identifier is valid but is not permission 502 as a
9 possible condition for preemptively enabling the
10 disruption system?

11 A One of the many, because there is "et
12 cetera" after.

13 Q Let's look at Figure 5 of Exhibit 2002 or
14 of the patent, either one?

15 A Let me, sure.

16 Q Figure 5 shows that at step 500 if there
17 is no identifier, then the disruption system goes
18 directly to enablement at step 503?

19 A That's true.

20 Q And that skips steps 501 and 502?

21 A That's true.

22 Q And if the identifier for the aerial

1 system is received at step 501 but the identifier
2 is valid, then the method proceeds directly to the
3 disruption system being enabled at step 503,
4 correct?

5 A Let me follow your -- your question. Can
6 you repeat your question so I can follow the --

7 Q Yes. If the identifier for the aerial
8 system is received at step 501, but the identifier
9 is invalid, then the method proceeds directly to
10 the disruption system being enabled at step --

11 A Yes, through the step 502.

12 Q It skips 502. Let me ask it again just to
13 make sure.

14 A Yeah, yeah. Basically you say the next
15 arrow, yeah. If the -- if the identifier is
16 invalid on the left, am I right, yes, you are
17 right.

18 Q Then it proceeds to step 503, which is
19 enablement of the disruption system and skips 502?

20 A That's true.

21 Q Okay. And if the received aerial system
22 identifier is valid, but it is determined that the

1 aerial system does not have permission, then the
2 method proceeds directly to the disruption system
3 being enabled at step 503?

4 A Yeah, if it doesn't have the permission.

5 Q Does Figure 5 help in determining what it
6 means to preemptively enable the disruption
7 system?

8 A I think it is a visual representation of
9 what we discussed earlier. That is why I
10 reference the Figure 5 in my support table.

11 Q Figure 5 only explicitly says enable
12 disruption system at 503, correct?

13 A That's correct.

14 Q So does anything in Figure 5 help you
15 understand what preemptively enabled means versus
16 just enabled?

17 MS. L'ESPERANCE: Objection, asked and
18 answered.

19 A I'm going to stick that these are
20 different pieces of the spec, are related, and
21 they address -- this is a general visual chart
22 that helps us identify the flow of information,

1 the permissions in the steps. And then the spec
2 explicitly states the -- 36, 20 to 37, 2, as
3 depicted in Figure 5 the disruption system 105 may
4 thus be preemptively enabled if certain conditions
5 are met.

6 So I think these work in tandem. They
7 inform you have more disclosure to the POSITA.

8 Q If you were to use Figure 5 to explain to
9 the Board what preemptively enabled means, how
10 would you do that?

11 MS. L'ESPERANCE: Objection, scope.

12 A I'm not -- I'm going to use the actual
13 words from the spec, the ones that I mentioned
14 earlier.

15 Q And that is at Exhibit 2002, line 21 to 24
16 on page 36?

17 A Yeah, page 36 starts from 20 and finishes
18 the whole segment, because we have to give the
19 whole context.

20 Q Okay.

21 A On page 37, line 2.

22 Q Okay. Would you use any other words to

1 explain to the Board what preemptively enabled
2 means beyond just enablement other than those
3 words that are at page 36, line 20 to page 37,
4 line 3?

5 A I think all the elements I have in the
6 support on pages 42 and 43 serve this purpose.

7 Q Would you add any explanation to what is
8 written there in order to explain what
9 preemptively enables means beyond enabling?

10 MS. L'ESPERANCE: Objection, asked and
11 answered.

12 A At this point all the information is
13 contained within my report. Now, if -- if your
14 expert or if you -- you file basically another
15 petition based on this, I reserve my rights to
16 look at them and consider the arguments, your
17 arguments.

18 Q What does the word preemptively mean to
19 you?

20 MS. L'ESPERANCE: Objection, relevance.

21 A I have to look at the spec. Preemptively
22 as a word, I think -- it says preemptively enable

1 if certain conditions are met.

2 Q Sure. What does the word preemptively by
3 itself mean to you, the ordinary meaning?

4 MR. WADEKAR: Objection, relevance.

5 A That is why I have highlighted
6 preemptively enabled if certain conditions are
7 met. So in other words, we activate it if these
8 conditions are met.

9 Q So preemptively enable means to activate?

10 A There are 1,000 scenarios. If we isolate
11 the words, I think we can have all these different
12 scenarios but I have to look at the -- as depicted
13 in Figure 5, the disruption system 105 may thus be
14 preemptively enabled if certain conditions are
15 met.

16 Q In your declaration for limitation [10.g]
17 at exhibit page 47 the same page we were just
18 looking at?

19 A Yes.

20 Q You also cite to Exhibit 2003 for support
21 for preemptively enabled specifically at paragraph
22 42, do you see that?

1 A Yes, that's true.

2 Q Can we look at that provisional Exhibit
3 2003?

4 A Give me a minute. Give me a minute to
5 review this.

6 Q Sure.

7 A Sure.

8 Q Your paragraph 42 of Exhibit 2003?

9 A That's true.

10 Q Okay. Does Exhibit 2003, which is the
11 provisional include the subject matter that you
12 quoted from Exhibit 2002, which is the application
13 from page 36, line 20 to page 37, line 2?

14 A I think a POSITA will have seen these
15 disclosing the same thing.

16 Q Does Exhibit 2003, the provisional
17 application, use the term preemptively enabled?

18 MS. L'ESPERANCE: Objection, relevance.

19 A It doesn't use the word, but gives the
20 context and the words that support the similar
21 operation. And these are the quoted in my -- in
22 my support table.

1 Q Where are you referring to?

2 A So if you look -- do you see in the
3 support table I have, for example -- just give me
4 a minute. Figure 5 depicting -- this is from the
5 Exhibit 2003, paragraph 42. Figure 5 depicting
6 that the disruption system is enabled for
7 disrupting an aerial system upon determining that
8 the aerial system does not have permission. And
9 the 42 goes into these statements.

10 Q Okay.

11 A So, for example, it says, the
12 discrimination system can additionally include a
13 control system that functions to selectively
14 activate or deactivate disruption system
15 operation. The control system -- I'm reading from
16 paragraph 42 -- the control system can
17 additionally or alternatively control an auxiliary
18 system based on whether the aerial system is
19 permitted within the airspace.

20 The control system is preferably connected
21 to the disruption system more preferably to the
22 launching mechanism, but alternatively the

1 interdiction module, but can additionally or
2 alternatively be connected to any other suitable
3 component. The control system is preferably
4 operable between a locked and unlocked mode, but
5 can ordinarily be operable between any other
6 suitable modes.

7 The control system preferably locks or
8 otherwise disables disruption system operation in
9 the locked mode and unlocks or otherwise enables
10 disruption system operation in the unlocked mode.
11 The control system can disable the disruption
12 system by acting on the launching mechanism,
13 (disable the trigger, disconnect the power,
14 disconnect the trigger from the propulsion
15 mechanism), acting on the tracking system, (for
16 example, disable the tracking system), acting on
17 the interdiction module (prevent second-stage
18 deployment), or otherwise interfere with
19 disruption system operation.

20 Q Is unlocking the disruption system
21 preemptively enabling the disruption system?

22 A Unlocking or locking can be associated

1 with enablement, yes.

2 Q What about preemptively enablement?

3 A If the conditions which are mentioned here
4 are met.

5 Q Which conditions?

6 A Based on -- so the control system can
7 additionally or alternatively control an auxiliary
8 system based on whether the aerial system is
9 permitted within the airspace. Again, paragraph
10 42.

11 Q Of Exhibit 2003?

12 A Exhibit 200 -- for example, there are
13 other examples of conditions as well.

14 Q Did you mean to say Exhibit 2003?

15 A That's correct, yes.

16 Q Is activating the disruption system
17 preemptively enabling the disruption system?

18 MS. L'ESPERANCE: Objection, asked and
19 answered.

20 A Can you repeat the question?

21 Q Is activating the disruption system
22 preemptively enabling the disruption system?

1 A If certain conditions are met, yes.

2 Q What conditions?

3 A The ones I just mentioned.

4 Q From exhibit --

5 A Support table -- excuse me?

6 Q From Exhibit 2003?

7 A From Exhibit 2003 and from the overall set
8 of specifications I had in front of me.

9 Q I think we've been going another hour.
10 Would you like to take a break and keep going or
11 would you like to break for lunch? I don't have
12 -- I think I think I have less than an hour left.
13 So it is up to you.

14 MR. WADEKAR: Can you hear me?

15 MR. WALTERS: I can hear you.

16 MR. WADEKAR: So you mentioned less than
17 an hour left, so that is -- so I will just
18 discuss. Do we want to go off the record so we
19 can discuss this?

20 (Recess, 12:12 to 12:14 p.m.)

21 A I think it is very important if we look at
22 the paragraph 42 there is a statement at the end

1 which summarizes all these different variations
2 and embodiments, which are described here which
3 says, however, the control system can include any
4 other suitable mechanism or process that
5 selectively permits disruption mechanism
6 operation.

7 Because you asked me specifically where I
8 based, and I said basically the whole paragraph 42
9 but I want to underscore also this -- the
10 concluding statement.

11 Q Thank you.

12 (Recess, 12:15 to 12:34 p.m.)

13 Q Welcome back, Dr. Nikos. I would like to
14 turn to your declaration at paragraph 126
15 discussing the Whitmarsh reference.

16 A Sure. Do you want me to bring also the
17 Whitmarsh reference on my computer or trust my
18 report?

19 Q It is up to you. You're welcome if you
20 would like.

21 A Just give me one minute. If you don't
22 mind let me bring it from the repository. Is the

1 1006, am I right?

2 Q Yes, that is the Whitmarsh provisional.

3 A Give me one minute, yes, I'm there.

4 Q In paragraph 126 you discuss the
5 signatures in Whitmarsh that may be used to
6 identify a drone?

7 A Yes.

8 Q And those signatures relate to the
9 behavior of the drone, how the drone is observed
10 to move?

11 A Yes. For example, if you see in paragraph
12 10 he describes -- they describe basically the RTS
13 system, which is the remote transmission -- remote
14 security -- remote transmission security system.

15 Q And if you look at the top of the next
16 page in your declaration which is exhibit page 62?

17 A Exhibit -- you want me go to which page?

18 Q It is the page that paragraph 126 of your
19 declaration ends and paragraph 127 starts?

20 A Yes.

21 Q At the top of that page, you -- you
22 discuss the signature in Whitmarsh and its

1 movement pattern. And you state that Whitmarsh's
2 movement pattern may be used to identify the
3 drone, correct?

4 A That's true.

5 Q But you also state that the signature is
6 computed and observed, correct?

7 A That's correct.

8 Q So why does an observed movement of a
9 drone not constitute an identifier or a second
10 factor identifier?

11 MS. L'ESPERANCE: Objection, form.

12 A So the signature cannot be viewed as an
13 identifier for the following reason. Many drones
14 can have the same position and the same movement.
15 Think of drones basically which are part of a
16 show. They may have the same movement, I'm
17 talking about entertainment drones. But we have
18 no information that is saying that this is drone 1
19 of John as I mentioned earlier.

20 Q Is that why the observed movement would
21 not constitute a second factor identifier as well?

22 MS. L'ESPERANCE: Objection, asked and

1 answered.

2 THE WITNESS: Amanda, I didn't hear your
3 comment. Can you repeat, please?

4 MS. L'ESPERANCE: Yes, I said, objection,
5 asked and answered. You can go ahead and answer.

6 A Some people may call this a behavior ID,
7 but the behavior ID is not the ID of the drone 100
8 that we're talking about.

9 Q But a behavior ID can be used to identify
10 a drone?

11 A Uniquely and globally as it is stated in
12 the -- in the spec, no.

13 Q Could a MAC address be an identifier or a
14 second factor identifier?

15 A As I mentioned earlier, possibly.

16 Q How is that?

17 A Let me go back. I think there is some
18 spec that covers this. Give me a minute to locate
19 it. I believe it in my declaration let me see.
20 Sorry, let me, give me a minute or so.

21 So go to my paragraph 65 of my declaration
22 and we say, according to another technique,

1 Authentication is accomplished by using a
2 secondary identifier. For example, the
3 authenticity of the identifier transmission system
4 101 can be verified when a first aerial system
5 identifier signal 300 is received from a -- from a
6 WiFi transmitter is associated with a second
7 aerial system identifier 310 extracted from a
8 pattern of pulsed light. In a third variation,
9 authentication is accomplished by using a
10 communications network interface identifier, for
11 example, MAC address. And this highlighted in
12 bold. However, the aerial system identifier can
13 otherwise -- can be otherwise verified.

14 Q Must the aerial system identifier from
15 substitute Claim 10 be unique, globally unique to
16 the drone?

17 A I think there is a term before in the
18 spec, just give me a minute.

19 Yeah, if you can go on page 31 of my
20 declaration on the support table, look in the
21 middle. Exhibit 2002, which is the application, I
22 believe. We say, the aerial system identifier

1 signal 300 can be globally unique, locally unique
2 to a geographic location, to an aerial system
3 manufacturer type, et cetera.

4 And it says, the aerial system identifier
5 is associated with an authorized -- so the
6 different options in the spec as stated.

7 Q The reason I ask is that you distinguish
8 the -- a behavior ID, you stated that it cannot be
9 used to identify a drone because it wasn't
10 globally unique.

11 So my question is whether you understand
12 the aerial system identifier in Claim 10, you
13 understand whether it must be globally unique to
14 the drone?

15 MS. L'ESPERANCE: Objection,
16 mischaracterizes.

17 A What I said is actually we need something
18 that is a unique identifier for drone 1 of John.

19 Q So does it need to be globally unique?

20 A It can be -- as is stated in the spec, it
21 can be globally unique, locally unique. In other
22 words, to a particular geographical location or

1 something else that uniquely identifies these
2 drones among other drones.

3 Q It could be an identifier that
4 distinguishes this drone from one other drone,
5 correct?

6 A Not really, because threat/non threat, so
7 imagine the characterization of foe versus friend.
8 It is not disclosed here. So it is not to say
9 drone 1 is friend, drone 2 is foe. That is --
10 that I think is -- is exists. We need two
11 distinct identifiers in order to say this is John
12 drone -- John's drone 1.

13 Q If in the example you provided you have a
14 set of friend drones and a set of foe drones, do
15 you understand? In that example if all the friend
16 drones had a identifier that was the same, but was
17 different from the identifier of the foe drones,
18 could that friend drone identifier be a aerial
19 system identifier in the claim?

20 A No, I think this is against the
21 disclosure.

22 Q Why is that?

1 A Because in this case, we have the case of
2 -- of a drone that may not have permission to
3 operate. Think of a hobbyist drone in an airport
4 area below the 10,000 feet.

5 Q Is that the end of your example?

6 A Yes.

7 MS. L'ESPERANCE: Objection, form.

8 A Among others, just the first one that
9 comes to my mind.

10 Q Can you explain that example further?

11 A Let me go back to the discussion we had
12 about [10.g]. So there are two conditions, one is
13 when it is determined by the permission module
14 that the aerial system associated with the
15 authenticated aerial system identifier or the
16 aerial system identifier signal is not permitted
17 to be in an airspace or when the authenticity of
18 the aerial system identifier of the aerial system
19 identifier signal is not verified.

20 So my example is the example that Nick is
21 flying a drone that is not permitted to be in this
22 particular location. The other one is actually we

1 have a rogue drone that may be using -- maybe
2 tries to use identifier signals which are fake and
3 we want to stop it. That is the example also of
4 foe versus friend. One is a classification
5 problem, the other one is verification.

6 That is why I mentioned this verification
7 determination. The verification is -- is a
8 slightly larger circle where the determination may
9 be the one ID, but the verification may be just we
10 want to make sure that we have the right decision
11 and it will be the second ID.

12 Q You said --

13 A It is far more elaborate to say that
14 basically this is friend versus foe.

15 Q Could a classification of a drone be used
16 as the aerial system identifier?

17 A Classification means, if we go back to
18 what a POSITA will understand. Classification
19 means I have some data, a signal and I am saying
20 belongs to a particular class. That is why we use
21 the term classification.

22 Verification means that we say something

1 about the identity of this particular object, in
2 this case, aerial system 100.

3 Q So are you saying that a classification of
4 a drone cannot be used as the aerial system
5 identifier in the claim?

6 A No, I'm saying if we started with a
7 classification, we have classification and we have
8 identification. So classification sometimes these
9 terms are used interchangeably, but we have to be
10 careful in general. Classification is around --
11 so the POSITA will understand classification. I
12 decide if this drone belongs to a particular
13 class.

14 Let's say these are all Uber taxi drones,
15 for example. Now, identification means this is
16 the Uber taxi drone 1 which was -- I'm thinking of
17 applications, for example, that track different
18 flights like FlightAware, for example, comes to my
19 mind.

20 It says commercial/military, this is a
21 class. But saying this is the plane X or -- which
22 was constructed then and this is the name is the

1 identification part.

2 Q Are you familiar with -- I'm sorry, go
3 ahead.

4 A And the same is used for ships. So I
5 mean, one of the things ships they want to go
6 undetected, they -- they turn off their
7 transponders, so basically they cannot be
8 identified.

9 Q Are you familiar with an IMSI, an
10 International Mobile Subscriber Identity?

11 A I have heard about it. It is not
12 something that I have studied in-depth.

13 Q Could an IMSI be an aerial system
14 identifier?

15 A I have to look at this in more detail. I
16 cannot answer. I didn't consider this in my...

17 Q Okay. Could a drone's intended flight
18 plan be an aerial system identifier?

19 A No.

20 Q Why not?

21 A Because think about the flight that goes
22 from Minneapolis to Amsterdam. The flight path is

1 the same.

2 Q Could the drone's intended flight plan be
3 a second factor identifier?

4 A Not according to the spec.

5 Q Why is that?

6 A Because it is not distinct and locally or
7 globally unique. That says this is -- this is the
8 plane Erasmus that flies that was built at this
9 particular day that has this particular code
10 associated with it.

11 Q Let's look at paragraph 129 of your
12 declaration.

13 A Viggiano.

14 Q Yes.

15 A Right, yeah, give me a minute to bring it
16 up. The exhibit is --

17 Q Sure.

18 A -- Exhibit 1007, correct. I can remove
19 the exhibit of Whitmarsh?

20 Q Yes.

21 A Bear with me one minute. Sure.

22 Q In paragraph 129 you state that Viggiano

1 requires ADS-B systems to respond to
2 authentication challenges verifying the identity
3 of the ADS-B systems using an authentication
4 challenge format.

5 A Yes. This is directly -- sorry, sorry to
6 interrupt. Finish, please finish.

7 Q Further down skipping another sentence you
8 state, the ADS-B transmitter on the aircraft uses
9 the unique identifier, the ADS-B transmitter's ID
10 22 and specific data 24 to generate its
11 authentication challenge responses?

12 A That's true.

13 Q ID 22 is an identifier of ADS-B
14 transmitter, correct?

15 A Yes.

16 Q Let's look at Figure 1 of Viggiano, which
17 is Exhibit 1007.

18 A Yes.

19 Q The challenge response that you referred
20 to in paragraph 129 is shown in Figure 1 as
21 response 18?

22 A Yes.

1 Q And that response 18 includes ADS-B
2 transmitter ID 22?

3 A Yes.

4 Q Looking at Figure 1 again, you can see
5 that ID 22 is optionally encrypted?

6 A That's true.

7 Q And then it becomes encrypted ID 32?

8 A You mean the line that says 32
9 identification?

10 Q Yes, that is transmitted to authenticator
11 10?

12 A Yes.

13 Q Is the encrypted ID 32 a second factor
14 identifier?

15 A No.

16 Q Why is that?

17 A Because basically if you see we have the
18 identification, so we have one identifier which is
19 the 22. And then it uses the 24, which is
20 specific data. So the specific data it's -- may
21 be completely compromised.

22 So in other words, this is not distinct,

1 so it may drive the authenticator. So one could
2 argue that the 22, the specific data is the second
3 identifier, but for the reasons we describe
4 earlier, the specific data cannot play this role
5 of the second factor identifier for the reasons
6 that we describe earlier. So it is not distinct
7 and unique to the system.

8 The other thing which is important here is
9 actually it is based on what we call here is the
10 challenge response. So in other words, the drone
11 senses the ground station. The ground station
12 sends something back that need to be verified. If
13 the first information is basically compromised,
14 the ground station has no second unique identifier
15 in order to base its authenticity.

16 So everything is basically start to
17 becoming compromised. This is what I'm saying
18 here at the last -- the challenge response
19 received from the aircraft by the ground station,
20 whether encrypted or unencrypted or encrypted is
21 not a second factor identifier.

22 Q I may have -- I don't think I followed

1 you, but can you explain why the use of specific
2 data 24 affects whether identification 22 is an
3 aerial system identifier or a second factor
4 identifier?

5 A So specific data let's -- let's -- let me
6 go where basically it is defined. In operation
7 I'm -- basically paragraph 12 of Exhibit 1007. In
8 operation its aircraft transiting through an
9 airspace is broadcasting its specific position
10 data 24. So position data, we had this discussion
11 earlier, is not a unique identifier.

12 Q Does the use of specific data -- and maybe
13 there was some confusion, because I didn't ask
14 whether specific data 24 was an identifier. My
15 original question was whether encrypted ID 32
16 could that be a second factor identifier?

17 MS. L'ESPERANCE: Objection, asked and
18 answered.

19 A Let me give you -- let me go back. If you
20 look at the 32.

21 Q Yes.

22 A The 32 is basically -- is associated with

1 one ID, am I right?

2 Q Yes.

3 A So the only other choice you have is
4 basically to use the specific data 24 to act as a
5 second ID. That is why I'm saying you have
6 already used the 32 as the first ID. The 24
7 cannot be the second ID as required by the specs
8 in the claim language.

9 Q I see your explanation, thanks.

10 I would like to turn to paragraph 130.

11 A Sure. Let me bring the reference -- may I
12 take the reference out? May I remove the other
13 one?

14 Q Sure.

15 A Give me a minute to bring the reference of
16 Falk. Yes, I'm there.

17 Q In paragraph 130 you cite to Falk at 3, 42
18 to 44?

19 A Yes.

20 Q And the beacon includes first indicia
21 identifying an owner or responsible party and
22 second indicia identifying a particular unmanned

1 aerial vehicle?

2 A That's true.

3 Q And you say that a first indicia 121 --
4 strike that.

5 Let's look at Falk at column 2, line 26 to
6 39.

7 A Column --

8 Q Column 2, line 26 to 39?

9 A Just give me one minute. Tell me again,
10 column 2.

11 Q Yes, line 26?

12 A Another regulatory action?

13 Q Yes.

14 A Yes.

15 Q This discusses an FAA registration number?

16 A Yes.

17 Q Could a registration number of a UAV that
18 is transmitted by the UAV be an aerial system
19 identifier?

20 A Possibly, but I don't -- if my
21 recollection -- let me -- let me read my
22 declaration. If you look at 131, the problem I

1 see with Falk is actually there is no discussion
2 of authentication, number 1. And number 2, it
3 uses collection of information for a later
4 retrieval and analysis which I believe, again, for
5 the same reasons that we discussed earlier do not
6 come close to the two factor, the second factor
7 secure identifier.

8 In other words, the registration is
9 controlled by the owner. So again, it is very
10 easy to start monkeying around with registration.

11 Q Could the --

12 A In other words, it identifies the owner,
13 not the particular drone. In other words, it ties
14 the specific owner -- if you go to the line 31,
15 although the FAA provides a registration number
16 with a completed certificate of authorization, and
17 ties the specific owner with a specific UAV, the
18 FAA does not dictate how the registration number
19 is to be placed onto the UAV.

20 So in other words, the registration
21 number, although the intentions -- the
22 registration number is controlled by the owner.

1 So you have a rogue owner, you have a compromise
2 of the whole system and this is explained by Falk
3 himself.

4 Q Could the FAA registration number be a
5 second factor identifier if it was transmitted by
6 the drone?

7 A No, for the reasons I just mentioned.

8 Q Even though the FAA registration number
9 might uniquely identify the drone?

10 A No, it identifies the owner. So think if
11 I have 40 drones, I cannot say that this is John
12 drone 1.

13 MR. WALTERS: Can we take a short break?
14 I may be done. I would like to go over my notes.

15 MS. L'ESPERANCE: Sounds good.

16 (Recess, 1:21 to 1:28 p.m.)

17 Q Welcome back, Dr. Nikos. I have got just
18 a couple more questions.

19 And I would like to look at the '199
20 patent or the application 2002, whichever is
21 easier for you.

22 A Let me go -- let's go to the patent.

1 Q Okay.

2 A I'm there.

3 Q Okay. I would like to look at column 2,
4 line -- lines 57 and below that we discussed
5 earlier.

6 A 57 you said?

7 Q Yes.

8 A Fourth, in some variations?

9 Q Yes.

10 A Sure.

11 Q So we've discussed this portion earlier in
12 the -- in the deposition. And it states, Fourth,
13 in some variations the aerial system 100 can
14 include a first and second identifier transmitted
15 by a first and second identifier transmission
16 system respectively, wherein, the second
17 identifier can function as a backup identifier,
18 e.g., in case the primary identifier transmission
19 system is inoperable. Do you see that?

20 A Yes.

21 Q So when that second factor is
22 functioning -- or excuse me.

1 When the second identifier is functioning
2 as a backup identifier, does the second identifier
3 uniquely identify the drone?

4 A I think there are two parts on this.
5 Backup it means that the first one didn't work.
6 So because it says in case the primary identifier
7 transmission is inoperable, so -- and then
8 continuing it says, the second factor identifier
9 for the aerial system as a secondary authenticator
10 for the aerial system to prevent tampering and
11 other identifier production. So I think this is
12 the -- the spec, the important one that the POSITA
13 would read into.

14 Q Yes. And it also then says that the
15 second identifier could also function as an
16 identifier for a secondary identification system
17 or be used in any other suitable manner, correct?

18 A That's correct.

19 Q Okay. So my -- my question was, the first
20 example given, when the second identifier is
21 functioning as a backup identifier, must the
22 second identifier be unique to the drone?

1 A I think the intent, if I read the spec,
2 the intent is this, that always identifiers are
3 unique to the drone.

4 Q Okay. So in the next example, where the
5 second identifier is functioning as a second
6 factor identifier as a secondary authenticator for
7 the system, when it is functioning as a secondary
8 authenticator, must it be unique to the drone?

9 A That's correct.

10 MR. WALTERS: I don't have any further
11 questions, so I will pass the witness.

12 THE WITNESS: Can I take just one minute
13 break just to drink some water.

14 MR. WADEKAR: Are we good to go or do you
15 want to take a longer break?

16 THE WITNESS: I'm ready, yeah.

17 MR. WADEKAR: So is everybody ready, then
18 can we continue with the redirect or --

19 MR. WALTERS: Yes, could you speak up just
20 a little bit.

21 MR. WADEKAR: Let me move closer. I think
22 I'm a little bit farther away from the -- from the

1 computer, so give me one second. I'm sorry about
2 that. I lost my -- one of my -- my computer is
3 acting up now at this exact moment. Bear with me.

4 A Did I do something?

5 MR. WADEKAR: I will figure it out. It is
6 not important.

7 EXAMINATION

8 BY MR. WADEKAR:

9 Q So let's go back to the -- let's start
10 with the beginning that you mentioned your
11 experience with the Sentera systems or the -- or
12 the company. Do you remember that, do you recall
13 that?

14 A Yes, let me go back to my declaration.
15 Just give me one minute.

16 Q Sure, I think I may be --

17 A Paragraph 13.

18 Q Okay. So when we were discussing the
19 Sentera system, in the context of that if I recall
20 correctly, you -- you mentioned that you were
21 exploring authentication and then you also
22 mentioned data integrity.

1 So what -- what -- what was -- what is it
2 that you were actually exploring?

3 A So Sentera was trying to create these maps
4 and sell it to farmers by using drones. So one of
5 the key things it was actually these maps will
6 contain plant health, lack of water or nitrogen or
7 weeds. One of the key problems is actually you
8 have one chance with the farmers as a product. If
9 you give them bad data, they are going to ignore
10 you.

11 So one of the things that I try to advise
12 them is actually they need to make sure that the
13 data are accurate, they are registered correctly.
14 Registered in the sense that spatially, and then
15 they correspond to particular time and day and
16 drone. So basically we need to have information
17 about the data that is verifiable.

18 So I was pushing hard the systems people
19 to try to use an idea called semaphores, which is
20 around operating systems and real-time systems
21 required some time. That they will use flags,
22 software flags and also okay, I am modifying the

1 data or I'm creating the data. So when another
2 drone comes in and places data, there is a way of
3 not overwriting or destroying the data maps.

4 Now, it was basically a way to make sure
5 that we verify and ID the data as they were
6 acquired by the drone.

7 Q Okay. So -- so when you say verify and ID
8 the data -- so is this the authentication of the
9 drone or authentication of the data?

10 A Authentication of the data.

11 Q Not the authentication of the drone?

12 A The authentication of the drone it was --
13 it was not at that point the objective. The
14 objective was actually to provide reliable,
15 accurate data as the drones. That is why I'm
16 saying, I advised them on image processing and
17 image segmentation for precision agriculture.

18 Q And so -- and you also described these
19 semaphores as flags?

20 A Uh-huh.

21 Q So are these flags -- where are these
22 flags placed?

1 A On the data.

2 Q On the data, okay.

3 Now, we looked at -- would you mind
4 turning to Exhibit 1001, which is the -- which is
5 the patent and column 2. And we spent some time
6 discussing the system here.

7 A Where do you want me to go?

8 Q Exhibit 1001, which is the '199 patent and
9 column 2, line 57.

10 A Just give me a minute, yes.

11 Q Okay. So do you recall that we have
12 discussed this paragraph a few times?

13 A That's true.

14 Q Okay. So when it says here transmitted by
15 a first and second identifier transmission
16 systems --

17 A System.

18 Q No, no. If you continue specifically at
19 line -- line 59 it says, first and second
20 identifier transmission -- oh, I'm sorry. First
21 and second identifier transmission system, my
22 mistake, sorry.

1 So the two transmission system, where are
2 these two transmission systems based on your
3 reading of this paragraph?

4 A No, it says explicitly here, if you go to
5 64 on this same aerial system 100.

6 Q Okay. And we also -- let me search for
7 the words.

8 So now if you go to a little bit earlier
9 in column -- same column, column 2, line 10. It
10 says here, in operation the wireless communication
11 system receives an aerial system identifier signal
12 broadcast. So --

13 A Where -- where again, can you point me?

14 Q Sorry, yeah, column 2, line 10?

15 A Yeah, sure.

16 Q So yeah, please read the sentence, I mean
17 to yourself, the sentence that starts on line 10,
18 it starts with, in operation?

19 A Yeah. In operation the wireless
20 communication system receives an aerial system
21 identifier signal broadcast from an aerial
22 vehicle, the aerial system 100. The aerial system

1 identifier 300 is checked against the permission
2 module.

3 Should I continue?

4 Q No, no. That is -- that is -- that is
5 enough.

6 So is there a -- is there a -- in your
7 mind when you look at this paragraph, is there a
8 difference between a broadcast signal and a signal
9 transmitted by -- now, referring back to, again,
10 lines 57, the first and second identifier
11 transmission system, is there a difference between
12 what is transmitted by the transmission system?

13 A Broadcast with a POSITA means transmitted,
14 transmission.

15 Q Okay. So when we were -- let me get the
16 exact claim limitation. So we also discussed
17 paragraph 87 of your declaration fairly
18 extensively.

19 A Let me go -- just let me go there, yes.

20 Q So when you are there, please let me know.

21 A Sure, I'm there.

22 Q Okay. So if you look at claim [10.e1], it

1 says here that verify and authenticity of the
2 aerial system identifier. Do you see those words?

3 A Yes.

4 Q And I may be paraphrasing somewhat, but I
5 recall you saying, you are describing this as a
6 broader circle. Do you recollect that you used
7 similar language? I may not be quoting it
8 exactly, because I don't have a live transcript in
9 front of me, but do you recall the broader circle?

10 A Yes.

11 Q So what -- what -- would you please
12 explain what that means?

13 A So I want to go back and say is configured
14 to determine and verify, and this is where we had
15 the discussion, right?

16 Q Uh-huh.

17 A So I said it verifies specifically an
18 explanation and is a larger circle, because the
19 termination may include one ID --

20 Q Uh-huh.

21 A -- unique ID, and then the verification it
22 just can be done, for example, with a second

1 factor ID. Just -- we persist. We try to make
2 sure that we are right.

3 Q Okay.

4 A So sometimes these terms are used
5 interchangeably, but I think here if you look at
6 Exhibit 2002 it says, determining and verifying.
7 And I think a POSITA will have looked at this in
8 the way that I just described.

9 Q Okay. Now, you just mentioned 2002. That
10 is the application as filed; is that correct, the
11 patent application as filed?

12 A Patent application, yes.

13 Q So could you please turn to Figure 5 of
14 that?

15 A Just one minute. This is Exhibit 2002?

16 Q Yes, yes, yes.

17 A This is on page 48?

18 Q I am actually looking at -- yeah, it is
19 PDF page 48, yes, yeah.

20 A Yes.

21 Q Yeah. So okay. So I know you're looking
22 at a printed copy, but if you want to look at the

1 provisional, which is Exhibit 2003 on your
2 computer, because what I want you to do is I want
3 you to look at Figure 5 of the provisional and
4 Figure 5 of the application as filed together. So
5 if you want to look at one of those on your
6 computer that might be helpful, but I will leave
7 it to you, whichever you want to do.

8 A Let's make sure. I'm having in the hard
9 copy --

10 Q Yeah.

11 A I'm in both -- both basically here.

12 Q Yeah, okay. So if you look at the
13 application you see there is an arrow to the left
14 coming from box that says 500 and it says, no
15 identifier. And that -- that arrow goes to box
16 503. Do you see that?

17 A Yes.

18 Q And do you see a similar arrow coming from
19 box 501, and that says invalid identifier and that
20 is also going to box 503?

21 A That's true.

22 Q Now, if you look at the provisional, in

1 the provisional do you see -- so there is no --
2 there are no box numbers, but do you see that
3 there is an arrow coming out of the first box and
4 it says no, and then that arrow is going to a box
5 that says enable disruption system. Do you see
6 that?

7 A Yes.

8 Q And then do you also see an arrow coming
9 out of the next box and that is also going to that
10 same box that says, enable description system?

11 A Can you repeat your last sentence?

12 Q Yeah. So the second box from the top,
13 there is an arrow coming out on the left, a hashed
14 arrow?

15 A Uh-huh.

16 Q It goes to -- it is directed to a box that
17 says, enable disruption system. Do you see that?

18 A That's true.

19 Q Okay. And then there is a label which
20 actually is sitting on -- on the arrow, the dashed
21 arrow to the left. It says, invalid identifier.

22 So is it fair to say that this label is

1 actually for the box that says identified for the
2 aerial system?

3 A The invalid identifier refers to the line
4 that connects the identifier for the aerial system
5 received box to the named disruption system box.

6 Q Okay. Okay. So and then if we just
7 quickly turn back to the -- the Figure 5 in the
8 application as filed, it also has labels but the
9 labels have now turned in orientation so they're
10 not intersecting any lines. So the label -- no
11 identifier is to the left of the -- the dashed
12 arrow coming out of the top box. Do you see that?

13 A That's true.

14 Q And then the other label, invalid
15 identifier that is to the right of the dashed
16 arrow coming out of the second box, do you see
17 that?

18 A That's true.

19 Q Okay. And then in this figure you see the
20 box 502 that is also -- there is an arrow that
21 goes to box 503 with a label, no. Do you see
22 that?

1 A That's true.

2 Q So based on what is described here, is it
3 possible that if the aerial system does not have
4 permission, then the disruption system would be as
5 described there enabled; is that correct? Is
6 that --

7 A That's correct.

8 Q Okay. But without performing this step,
9 is it also -- is it also correct that you would
10 simply skip this step? And if the identifier is
11 invalid as it shows here, then also the disruption
12 system would be -- let me use the word that is
13 here, enabled; is that correct?

14 A That's true.

15 Q So that -- so in that sense, then, the
16 disruption system would be enabled even before you
17 check whether there is any permission; is that
18 correct?

19 A That's true.

20 Q And then continuing along, so in the -- so
21 referring to box 500 it says here, if there is no
22 identifier as it is shown on the arrow to the

1 left, then the disruption system would be enabled;
2 is that correct?

3 A That's true.

4 Q Okay. And then that will also certainly
5 happen before the permission -- you would check
6 for the permission; is that correct?

7 A Give me a minute, yes.

8 Q Okay. One -- so now staying on this
9 application as filed, let me give you -- so if you
10 turn to page 3, line 3.

11 A Page 3.

12 Q Page 3, line 3?

13 A Which exhibit?

14 Q 2002?

15 A Yeah, it states 3?

16 Q Uh-huh.

17 A Yeah.

18 Q Line 3 there is -- let me know when you
19 are there.

20 A Page 3, line 3.

21 Q Yes.

22 A Yes, I'm there.

1 Q Do you see the sentence that starts, in a
2 specific example, do you see that?

3 A Yes.

4 Q Okay. So you can read it out loud or you
5 can read it by yourself. There is -- that -- that
6 one sentence. It goes all the way up to line 6?

7 A In a specific example, discrimination
8 system 110 includes a disruption system 105
9 including a launcher and interdiction module 304,
10 an identification system 11 including a wireless
11 communication system and a permissions module 103
12 connected to the wireless communication system.

13 Q So I'm going to ask you if you know what a
14 launcher is. And if you want to take a look at
15 other parts of the specification then feel free,
16 but if you know what a launcher is, then let me
17 know what a launcher is.

18 A If you go Figure 3.

19 Q Okay.

20 A The element 303 is a launching system.

21 Q Okay. So in that case is enabling a
22 disruption system different from actually

1 launching the -- launching -- let me go back. Let
2 me scratch that.

3 What is -- in Figure 3, what is -- what is
4 the launching system doing?

5 A So the launching system is fed information
6 from the permission module.

7 Q Uh-huh.

8 A And then there is an arrow that goes to
9 the launching system and an arrow -- and also
10 there is some text that says aerial system
11 identifier 310 plus the sensor measurements.

12 Q Okay. So in Figure 3 you see -- you see
13 the launch -- you pointed out the launching system
14 303. Do you also see the interdiction module 304?

15 A Yes.

16 Q Okay. So now let's go back to page 3.

17 A Yes.

18 Q Give me one second, I'm not there myself,
19 okay. So now on page 3, please take a look at the
20 discussion starting at line 14.

21 A When the disruption system 105 is in an
22 unlocked state, the launcher 303 can launch the

1 interdiction module 304 towards the UAV, wherein
2 the interdiction module 304 can immobilize the
3 mode of mechanism of the aerial system 100, by
4 disabling the power system, entangling the motive
5 mechanism, et cetera.

6 Q So now here it talks about the disruption
7 system in an unlocked state. Do you see that,
8 right?

9 A Yes.

10 Q And earlier from -- from the earlier
11 discussion I think you may recall that you pointed
12 out the discussion about the disruption system in
13 the locked state and unlocked state?

14 A That's true.

15 Q And so is this an example -- so is there a
16 difference between placing the disruption system
17 in the locked state and unlocked state and then
18 actually launching the interdiction module or are
19 those one and the same thing?

20 A Can you repeat the question?

21 Q Yeah. So is it the same -- let me ask you
22 this. Is launching an interdiction module the

1 same thing as putting the disruption system in the
2 locked state or unlocked state or are those two
3 different things?

4 A So based on the spec here it says, I may
5 have it locked or I may have it unlocked, because
6 we don't want to waste -- for example, the way it
7 is described here is the following.

8 Unlocked it means that they can launch the
9 interdiction module. If it is locked, you cannot
10 have this interdiction. So based on the
11 conditions which are described in Figure 5, we can
12 have basically the whole operation control in
13 scenarios that are going to remove a threat or a
14 particular UAV that for all these three reasons
15 that you mentioned you may want to.

16 Q Okay. But one -- one last question about
17 this. What it says here is that when the
18 disruption 105 is in an unlocked state, the
19 launcher 303 can launch the interdiction module.

20 But does that mean that it is always
21 launched or it -- could it be launched on some
22 other conditions that are -- at least not

1 described here, they may be elsewhere in the
2 patent?

3 A I think if we look at the plain language
4 here, it just -- it means it is ready.

5 Q Okay.

6 MR. WADEKAR: I believe that is all I
7 have. I would like to pass for any recross.

8 MR. WALTERS: I don't have additional
9 questions.

10 (Deposition adjourned at 2:01 p.m.)

11

12

13

14

15

16

17

18

19

20

21

22

1 CERTIFICATE OF SHORTHAND REPORTER

2

3 I, Susan S. Klinger, Certified Reporter
4 before whom the foregoing deposition was taken, do
5 hereby certify:

6 That NIKOLAOS PAPANIKOLOPOULOS, PH.D., the
7 witness whose deposition is hereinbefore set
8 forth, was duly sworn by me before the
9 commencement of such deposition, and that such
10 deposition was taken before me and is a true
11 record of the testimony given by such witness,
12 that said testimony was taken by me
13 stenographically and thereafter reduced to
14 typewriting under my direction.

15 I further certify that the adverse party,
16 Airspace Systems, was represented by counsel at
17 the deposition.

18 I further certify that the deposition of
19 NIKOLAOS PAPANIKOLOPOULOS, PH.D., occurred
20 remotely on the 25th, February, 2026, commencing
21 at 9:01 to 2:01.

22 I further certify that reading and signing

1 was not discussed.

2 I further certify that I am not related to
3 any of the parties to this action by blood or
4 marriage, I am not employed by or an attorney to
5 any of the parties to this action, and that I am
6 in no way interested, financially or otherwise, in
7 the outcome of this matter.

8 IN WITNESS WHEREOF, I have herunto set my
9 hand on the 1st of March, 2026.

10

11

12

A handwritten signature in cursive script, reading "Susan S. Klinger", is written over a horizontal line.

13

Susan S. Klinger, RMR-CRR, CSR

14

Texas CSR 6531, Exp: 10/31/27

15

California CSR 14487, Exp: 11/30/26

16

17

18

19

20

21

22

A ability 6:17, 64:2, 64:12, 65:10, 65:12 able 23:6, 63:14, 63:16, 64:9, 65:4 about 5:19, 8:6, 10:8, 10:17, 12:4, 14:3, 16:9, 17:9, 20:20, 21:5, 21:12, 21:20, 22:6, 28:16, 37:21, 41:12, 45:6, 45:13, 46:15, 49:10, 64:20, 65:1, 66:17, 71:5, 84:2, 88:17, 89:8, 93:12, 95:1, 96:11, 96:21, 109:1, 110:17, 124:6, 124:12, 125:16 above 30:17, 43:5 absolutely 56:21 accepted 16:11 access 9:16, 9:19, 9:22 accessing 14:18 accommodate 23:19 accomplished 34:4, 53:12, 53:20, 58:15, 90:1, 90:9 according 36:10, 89:22,	97:4 accumulation 58:7 accurate 24:15, 24:22, 110:13, 111:15 accurately 9:3 acquired 111:6 act 102:4 acting 51:9, 83:12, 83:15, 83:16, 109:3 action 103:12, 128:3, 128:5 activate 70:6, 80:7, 80:9, 82:14 activating 84:16, 84:21 active 13:4, 21:4, 44:21 activities 26:12 actual 28:19, 78:12 actually 9:8, 9:11, 12:3, 13:22, 18:20, 19:18, 20:16, 20:19, 48:8, 48:18, 56:1, 60:4, 69:11, 72:16, 73:12, 91:17, 93:22, 100:9, 104:1, 110:2, 110:5, 110:7, 110:12, 111:14, 116:18, 118:20, 119:1, 122:22, 124:18 add 79:7	added 57:15 addition 56:16, 59:10 additional 126:8 additionally 70:4, 82:12, 82:17, 83:1, 84:7 address 35:18, 36:4, 55:8, 77:21, 89:13, 90:11 adjourned 126:10 adrahtas 16:15 ads-b 98:1, 98:3, 98:8, 98:9, 98:13, 99:1 adverse 127:15 advise 110:11 advised 15:19, 111:16 advising 16:17 affects 101:2 after 8:5, 25:7, 28:17, 68:15, 75:12 again 19:8, 22:2, 27:3, 31:22, 33:16, 33:21, 40:21, 54:4, 59:22, 60:1, 61:19, 65:8, 76:12, 84:9, 99:4, 103:9, 104:4, 104:9, 113:13, 114:9 against 92:20, 114:1	ago 16:19 agree 59:5, 75:6 agriculture 15:18, 111:17 ahead 19:7, 89:5, 96:3 ai 23:4 aircraft 98:8, 100:19, 101:8 airport 19:1, 19:18, 93:3 airspace 1:8, 62:13, 62:22, 64:14, 82:19, 84:9, 93:17, 101:9, 127:16 alarm 68:18 alarms 69:6 algorithms 15:5, 29:18 all 9:13, 11:4, 12:13, 19:13, 37:13, 37:22, 40:11, 42:4, 44:10, 50:22, 72:20, 73:3, 79:5, 79:12, 80:11, 86:1, 92:15, 95:14, 122:6, 125:14, 126:6 alleged 10:22, 11:7, 11:14 allow 25:4 almost 30:5
--	---	---	---

along 120:20	among 92:2, 93:8	application 19:14, 20:17, 71:1, 75:6, 81:12, 81:17, 90:21, 105:20, 116:10, 116:11, 116:12, 117:4, 117:13, 119:8, 121:9	118:8, 118:13, 118:14, 118:20, 118:21, 119:12, 119:16, 119:20, 120:22, 123:8, 123:9
alphanumeric 33:10, 36:10	amount 14:2	amsterdam 96:22	art 13:14
already 43:5, 102:6	analysis 104:4	applications 95:17	asked 11:13, 11:18, 12:8, 45:13, 72:3, 77:17, 79:10, 84:18, 86:7, 88:22, 89:5, 101:17
also 3:20, 11:4, 16:2, 24:13, 25:14, 32:16, 38:8, 43:5, 43:15, 44:2, 48:21, 49:3, 49:7, 56:4, 80:20, 86:9, 86:16, 88:5, 94:3, 107:14, 107:15, 109:21, 110:22, 111:18, 113:6, 114:16, 117:20, 118:8, 118:9, 119:8, 119:20, 120:9, 120:11, 121:4, 123:9, 123:14	analytics 17:21, 19:9	approach 27:15	asking 64:17, 64:22
alternative 62:5	another 27:17, 27:20, 37:1, 37:17, 60:20, 79:14, 85:9, 89:22, 98:7, 103:12, 111:1	approaches 30:3	assess 25:17
alternatively 32:6, 32:13, 82:17, 82:22, 83:2, 84:7	answer 10:12, 28:11, 89:5, 96:16	appropriate 19:3	associated 17:12, 31:1, 43:20, 62:11, 62:21, 83:22, 90:6, 91:5, 93:14, 97:10, 101:22
although 14:6, 104:15, 104:21	answered 77:18, 79:11, 84:19, 89:1, 89:5, 101:18	area 16:18, 18:22, 19:13, 19:19, 20:3, 93:4	attorney 128:4
altitudes 19:4	any 6:19, 7:18, 9:9, 9:16, 9:21, 12:10, 13:17, 14:4, 19:18, 32:20, 43:1, 54:8, 54:16, 57:15, 78:22, 79:7, 83:2, 83:5, 86:3, 107:17, 108:10, 119:10, 120:17, 126:7, 128:3, 128:5	argue 100:2	attorneys 3:3, 3:11
always 26:20, 28:19, 47:22, 108:2, 125:20	anyone 7:3, 7:9	arguing 22:6	authenticate 42:15, 53:10
amanda 3:13, 7:11, 50:5, 89:2	anything 10:11, 51:21, 52:8, 77:14	argumentative 45:12	authenticated 17:3, 18:4, 20:6, 62:11, 62:19, 93:15
amazon 38:1	anywhere 52:16, 54:2	arguments 79:16, 79:17	authenticating 16:20, 18:2
amended 10:19, 11:4, 12:5	app 42:20, 43:14	army 26:19	authentication 14:9, 14:12, 14:16, 16:4, 17:8, 17:17, 18:8, 18:9, 18:11, 19:21, 20:13, 20:21, 21:6, 21:7, 21:13, 29:6, 29:22, 34:4,
	appeal 1:3	around 5:20, 6:1, 7:14, 7:17, 8:10, 13:15, 59:13, 63:19, 95:10, 104:10, 110:20	
		arrangement 16:8	
		arrow 76:15, 117:13, 117:15, 117:18, 118:3, 118:4,	

53:12, 53:19,
58:15, 60:12,
67:3, 68:8,
68:10, 68:12,
68:17, 69:5,
90:1, 90:9,
98:2, 98:3,
98:11, 104:2,
109:21, 111:8,
111:9, 111:10,
111:11, 111:12
authenticator
34:14, 40:10,
46:4, 49:19,
50:2, 50:18,
51:10, 59:2,
99:10, 100:1,
107:9, 108:6,
108:8
authenticity
53:5, 53:14,
55:13, 55:20,
56:5, 56:9,
56:14, 57:1,
57:2, 57:22,
58:1, 58:3,
58:8, 58:13,
59:5, 59:7,
59:19, 60:2,
60:3, 60:14,
60:15, 60:19,
63:3, 63:5,
64:10, 64:19,
66:7, 66:8,
90:3, 93:17,
100:15, 115:1
author
26:3, 26:4
authorization
104:16
authorized
91:5
automation
27:3
autonomous
21:11, 21:14,
29:17
autonomy
22:6, 22:7,

22:9, 22:10,
22:11, 22:14,
22:17, 23:9,
23:19
auxiliary
82:17, 84:7
avenue
3:7
aware
54:8, 54:16
away
108:22
axon
1:5

B

back
10:15, 16:14,
20:13, 20:22,
23:11, 23:12,
25:22, 27:7,
30:7, 31:10,
39:13, 45:17,
57:10, 57:11,
61:10, 66:5,
69:2, 86:13,
89:17, 93:11,
94:17, 100:12,
101:19, 105:17,
109:9, 109:14,
114:9, 115:13,
119:7, 123:1,
123:16
background
12:20
backup
46:2, 49:4,
49:22, 50:15,
51:3, 106:17,
107:2, 107:5,
107:21
bad
110:9
baker
3:6
banner
15:9, 15:11
barazesh
3:5

barrier
34:13
base
100:15
based
12:6, 20:6,
21:18, 48:13,
53:22, 58:14,
65:20, 66:3,
66:15, 71:7,
71:12, 79:15,
82:18, 84:6,
84:8, 86:8,
100:9, 113:2,
120:2, 125:4,
125:10
basic
14:12, 14:15
basically
14:17, 16:8,
17:10, 19:4,
25:6, 26:14,
28:18, 33:3,
37:18, 42:2,
42:11, 51:6,
64:18, 67:1,
67:4, 68:18,
72:20, 76:14,
79:14, 86:8,
87:12, 88:15,
94:14, 96:7,
99:17, 100:13,
100:16, 101:6,
101:7, 101:22,
102:4, 110:16,
111:4, 117:11,
125:12
beacon
102:20
bear
97:21, 109:3
because
8:1, 10:10,
17:4, 17:20,
24:12, 28:18,
35:5, 42:5,
48:18, 52:1,
56:20, 57:9,

65:15, 66:20,
69:12, 71:16,
71:18, 72:6,
75:11, 78:18,
86:7, 91:9,
92:6, 93:1,
96:21, 97:6,
99:17, 101:13,
107:6, 115:8,
115:18, 117:2,
125:5
becomes
99:7
becoming
100:17
been
5:3, 5:17, 6:9,
6:16, 17:4,
18:6, 18:9,
19:17, 21:4,
23:19, 26:18,
30:4, 52:11,
52:12, 59:15,
85:9
before
1:3, 2:9, 5:17,
11:13, 28:1,
28:16, 28:18,
39:22, 66:22,
68:12, 68:17,
68:20, 69:8,
90:17, 120:16,
121:5, 127:4,
127:8, 127:10
beginning
109:10
behavior
87:9, 89:6,
89:7, 89:9, 91:8
being
8:15, 19:4,
42:3, 58:10,
65:5, 67:15,
76:3, 76:10,
77:3
believe
6:1, 7:11, 8:5,
9:2, 11:22,

18:6, 26:11,
32:17, 44:1,
45:13, 65:15,
89:19, 90:22,
104:4, 126:6
belongs
37:16, 94:20,
95:12
below
93:4, 106:4
best
6:17, 6:21,
17:19
between
28:7, 67:3,
70:10, 73:2,
83:4, 83:5,
114:8, 114:11,
124:16
beyond
32:21, 79:2,
79:9
biggest
23:4
bingman
23:16
bit
25:5, 108:20,
108:22, 113:8
blind
22:15
blood
128:3
bloomington
5:14
board
1:3, 72:9,
78:9, 79:1
bold
90:12
boston
3:16
both
15:10, 31:4,
43:12, 59:8,
63:15, 64:2,
64:6, 65:6,
65:7, 117:11

botts
3:6
boundaries
48:1
box
117:14, 117:15,
117:19, 117:20,
118:2, 118:3,
118:4, 118:9,
118:10, 118:12,
118:16, 119:1,
119:5, 119:12,
119:16, 119:20,
119:21, 120:21
break
30:4, 60:21,
85:10, 85:11,
105:13, 108:13,
108:15
breaks
61:6
bring
86:16, 86:22,
97:15, 102:11,
102:15
broadcast
31:15, 39:8,
39:19, 40:15,
40:20, 43:16,
43:17, 44:20,
45:1, 113:12,
113:21, 114:8,
114:13
broadcasting
101:9
broadcasts
32:4
broader
115:6, 115:9
broke
11:13
building
28:20
built
28:20, 97:8
C
calibrate
18:1

california
128:15
call
36:3, 89:6,
100:9
called
14:11, 110:19
came
26:8
camera
13:13, 13:16,
15:13, 17:1
cameras
68:15, 68:16
can't
10:15
cannot
6:19, 53:8,
64:18, 66:6,
88:12, 91:8,
95:4, 96:7,
96:16, 100:4,
102:7, 105:11,
125:9
capability
65:1, 66:2
car
22:16
careful
23:20, 95:10
case
1:11, 6:13,
12:9, 46:2,
50:15, 93:1,
95:2, 106:18,
107:6, 122:21
cases
6:8, 6:10, 6:12
category
35:11
center
25:11, 29:1,
29:22
centered
63:19
centers
29:13
ceo
16:16

certain
69:18, 69:21,
71:20, 72:7,
73:21, 78:4,
80:1, 80:6,
80:14, 85:1
certainly
121:4
certificate
104:16, 127:1
certified
2:10, 127:3
certify
127:5, 127:15,
127:18, 127:22,
128:2
cetera
32:15, 74:13,
75:12, 91:3,
124:5
chad
3:4
challenge
23:4, 57:5,
57:6, 57:7,
98:4, 98:11,
98:19, 100:10,
100:18
challenges
98:2
chance
110:8
change
67:13, 71:14
characteristic
37:12
characterization
92:7
characterize
37:22
characterizes
37:13
chart
38:18, 59:17,
77:21
check
120:17, 121:5
checked
57:22, 114:1

checks	46:15, 51:12,	commencement	13:5, 15:4,
57:21	56:19, 59:14,	127:9	29:17, 86:17,
chimera	65:3, 68:4	commencing	109:1, 109:2,
14:11	clearly	127:20	117:2, 117:6
choice	57:18, 71:17	comment	concept
102:3	clears	89:3	14:20, 22:3
circle	37:20	commercial	conceptual
59:12, 94:8,	close	95:20	27:5
115:6, 115:9,	14:20, 18:22,	common	concluding
115:18	104:6	16:17	86:10
cite	closer	communication	condition
43:1, 80:20,	108:21	53:20, 113:10,	62:9, 63:2,
102:17	code	113:20, 122:11,	64:18, 64:20,
cited	33:10, 33:11,	122:12	64:21, 65:11,
33:1, 33:16,	97:9	communications	65:13, 75:9
54:17, 59:16	colleagues	90:10	conditions
cities	14:6	community	62:6, 63:10,
18:22	collection	21:4	63:15, 64:5,
claim	20:20, 104:3	companies	65:5, 65:16,
30:14, 31:11,	column	29:15	69:21, 71:20,
33:22, 55:2,	32:18, 34:1,	company	72:8, 72:20,
55:8, 55:22,	34:2, 34:3,	15:11, 16:17,	73:21, 78:4,
56:4, 59:9,	34:6, 38:19,	19:9, 19:19,	80:1, 80:6,
59:14, 63:8,	38:20, 40:3,	109:12	80:8, 80:14,
63:13, 65:3,	40:13, 40:14,	compensated	84:3, 84:5,
71:5, 71:6,	40:21, 47:2,	8:15	84:13, 85:1,
71:11, 72:17,	47:6, 52:3,	complete	85:2, 93:12,
90:15, 91:12,	53:2, 53:3,	22:17, 23:9	125:11, 125:22
92:19, 95:5,	53:8, 60:1,	completed	conference
102:8, 114:16,	69:16, 70:8,	104:16	26:5, 27:2
114:22	103:5, 103:7,	completely	configurations
claims	103:8, 103:10,	22:13, 22:22,	28:9
10:19, 11:4,	106:3, 112:5,	99:21	configured
12:5	112:9, 113:9,	component	30:21, 31:15,
class	113:14	83:3	45:2, 46:12,
94:20, 95:13,	come	comprising	55:13, 62:2,
95:21	29:15, 104:6	31:16	63:9, 63:20,
classification	comes	compromise	115:13
94:4, 94:15,	66:22, 68:15,	35:6, 105:1	confirmed
94:17, 94:18,	93:9, 95:18,	compromised	58:1
94:21, 95:3,	111:2	35:7, 35:8,	confusion
95:7, 95:8,	coming	57:14, 99:21,	101:13
95:10, 95:11	51:15, 51:20,	100:13, 100:17	connect
classify	52:4, 52:8,	computational	46:14, 66:7
15:21	117:14, 117:18,	21:18	connected
clean	118:3, 118:8,	computed	82:20, 83:2,
9:13	118:13, 119:12,	88:6	122:12
clear	119:16	computer	connection
33:15, 37:8,		9:17, 9:22,	67:2

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

134

connects	control	corrupt	dallas
119:4	70:5, 70:8,	17:22, 19:16	3:8
consecutive	70:9, 70:11,	could	darker
57:21	73:1, 82:13,	5:8, 10:15,	23:12
consider	82:15, 82:16,	20:10, 33:10,	darpa
79:16, 96:16	82:17, 82:20,	34:17, 34:20,	26:15
considered	83:3, 83:7,	34:21, 35:18,	dashed
57:5	83:11, 84:6,	36:7, 36:14,	118:20, 119:11,
constantly	84:7, 86:3,	89:13, 92:3,	119:15
32:4	125:12	92:18, 94:15,	data
constitute	controlled	96:13, 96:17,	14:19, 14:21,
88:9, 88:21	13:4, 13:6,	97:2, 100:1,	17:21, 17:22,
constructed	104:9, 104:22	101:16, 103:17,	18:1, 18:21,
95:22	conveying	104:11, 105:4,	19:9, 19:16,
construction	42:12	107:15, 108:19,	20:10, 94:19,
55:22	convince	116:13, 125:21	98:10, 99:20,
contain	19:18	counsel	100:2, 100:4,
110:6	copy	5:16, 11:3,	101:2, 101:5,
contained	9:8, 24:22,	61:5, 127:16	101:10, 101:12,
21:21, 32:16,	116:22, 117:9	couple	101:14, 102:4,
42:4, 48:10,	correct	105:18	109:22, 110:9,
79:13	24:6, 31:2,	coupled	110:13, 110:17,
content	31:3, 31:7,	31:13	111:1, 111:2,
10:7	38:5, 41:10,	course	111:3, 111:5,
context	42:1, 43:9,	25:17, 27:21	111:8, 111:9,
19:22, 28:12,	43:22, 44:4,	court	111:10, 111:15,
35:20, 35:21,	49:5, 49:8,	10:14	112:1, 112:2
36:12, 37:5,	50:2, 51:4,	cover	date
60:5, 60:8,	51:11, 55:6,	8:11	28:17
60:11, 60:17,	55:15, 56:7,	covered	david
66:14, 66:20,	62:7, 63:1,	16:6	27:15
68:19, 69:7,	63:11, 70:20,	covers	day
69:10, 72:6,	74:5, 76:4,	11:22, 24:10,	97:9, 110:15
73:4, 78:19,	77:12, 77:13,	89:18	days
81:20, 109:19	84:15, 88:3,	create	8:8, 8:9, 26:10
contexts	88:6, 88:7,	110:3	deactivate
20:13, 20:22	92:5, 97:18,	creating	70:6, 82:14
continue	98:14, 107:17,	111:1	decide
58:17, 108:18,	107:18, 108:9,	crops	19:11, 95:12
112:18, 114:3	116:10, 120:5,	20:20	decided
continues	120:7, 120:9,	csr	17:20
24:1, 45:3	120:13, 120:18,	1:21, 128:13,	decision
continuing	121:2, 121:6	128:14, 128:15	94:10
107:8, 120:20	corrected	currently	declaration
continuous	34:2	15:15	7:2, 8:18, 9:3,
27:5	correctly		9:6, 9:11, 10:6,
contrary	109:20, 110:13	d'sa	12:16, 15:2,
13:14	correspond	26:4, 27:14	24:3, 24:21,
	110:15		

30:9, 38:16, 42:17, 52:14, 52:21, 54:19, 61:14, 69:15, 73:11, 74:18, 75:1, 80:16, 86:14, 87:16, 87:19, 89:19, 89:21, 90:20, 97:12, 103:22, 109:14, 114:17	depositions 5:21, 6:3, 8:12 derived 15:16 describe 13:10, 14:15, 15:4, 33:3, 37:1, 51:20, 87:12, 100:3, 100:6 described 15:5, 17:16, 24:9, 62:15, 67:11, 86:2, 111:18, 116:8, 120:2, 120:5, 125:7, 125:11, 126:1 describes 27:20, 42:7, 46:19, 47:18, 48:21, 49:1, 49:7, 49:21, 51:15, 52:7, 52:17, 75:6, 87:12 describing 17:7, 115:5 description 4:11, 118:10 design 26:7, 26:9, 28:2 destroying 111:3 detail 96:15 details 17:8, 17:16 detect 13:6 detected 69:22, 72:21, 73:22, 74:10 detecting 13:18 detection 27:18, 44:14,	69:3, 69:8 determination 57:8, 57:13, 57:17, 58:7, 58:12, 59:13, 94:7, 94:8 determine 55:13, 55:16, 55:19, 60:12, 115:14 determined 62:10, 62:20, 64:13, 76:22, 93:13 determines 56:18 determining 53:4, 55:17, 56:13, 57:1, 58:2, 59:5, 59:19, 60:3, 60:5, 60:7, 60:13, 77:5, 82:7, 116:6 develop 15:12, 20:19 developed 15:5, 26:16 development 21:11 device-compatible 50:21 dictate 104:18 differ 68:2 difference 114:8, 114:11, 124:16 different 14:19, 15:21, 22:2, 22:6, 22:22, 23:2, 23:3, 23:21, 23:22, 30:2, 35:1, 35:10, 35:12, 35:16, 46:16, 50:22,	51:1, 54:14, 56:13, 67:14, 71:10, 71:22, 72:5, 72:11, 77:20, 80:11, 86:1, 91:6, 92:17, 95:17, 122:22, 125:3 directed 118:16 direction 127:14 directly 75:18, 76:2, 76:9, 77:2, 98:5 disable 83:11, 83:13, 83:16 disables 70:12, 83:8 disabling 124:4 disclosed 43:12, 45:9, 54:7, 54:17, 57:18, 57:20, 59:15, 62:17, 66:9, 71:18, 92:8 discloses 39:6, 39:17, 43:22, 44:6, 45:15, 59:19 disclosing 81:15 disclosure 42:19, 45:6, 47:1, 51:13, 71:4, 78:7, 92:21 disconnect 83:13, 83:14 discrimination 70:4, 82:12, 122:7 discuss 66:8, 85:18, 85:19, 87:4,
---	---	---	---

87:22	67:4, 67:9,	115:22	111:11, 111:12
discussed	68:20, 69:18,	dot	drone's
21:9, 51:14,	69:20, 70:6,	25:15	96:17, 97:2
61:13, 72:21,	70:12, 70:14,	down	drones
77:9, 104:5,	71:7, 71:11,	10:3, 49:10,	15:17, 16:1,
106:4, 106:11,	71:19, 73:20,	98:7	16:11, 17:3,
112:12, 114:16,	75:10, 75:17,	dozen	17:8, 17:10,
128:1	76:3, 76:10,	5:20	17:17, 18:4,
discusses	76:19, 77:2,	dr	20:22, 25:17,
13:3, 24:5,	77:6, 77:12,	5:6, 11:13,	26:21, 29:4,
30:14, 43:7,	78:3, 80:13,	30:7, 61:3,	29:17, 37:13,
103:15	82:6, 82:14,	61:10, 86:13,	37:21, 37:22,
discussing	82:21, 83:8,	105:17	88:13, 88:15,
31:11, 61:4,	83:10, 83:11,	drink	88:17, 92:2,
86:15, 109:18,	83:19, 83:20,	108:13	92:14, 92:16,
112:6	83:21, 84:16,	drive	92:17, 95:14,
discussion	84:17, 84:21,	57:16, 100:1	105:11, 110:4,
12:19, 66:5,	84:22, 86:5,	drone	111:15
93:11, 101:10,	118:5, 118:17,	15:16, 16:3,	duly
104:1, 115:15,	119:5, 120:4,	16:4, 16:7,	5:3, 127:8
123:20, 124:11,	120:11, 120:16,	16:21, 18:2,	during
124:12	121:1, 122:8,	18:20, 20:3,	61:5
discussions	122:22, 123:21,	35:21, 36:12,	dynamical
18:3, 20:9,	124:6, 124:12,	36:13, 37:11,	14:1
20:16, 21:3,	124:16, 125:1,	37:16, 37:20,	
21:5, 23:12	125:18	38:13, 46:22,	E
display	distinct	56:1, 56:3,	e1
32:6	18:12, 33:21,	56:10, 56:11,	33:22, 55:8,
disrupt	35:1, 35:2,	56:12, 56:21,	55:12, 59:8,
62:2, 63:9,	36:18, 37:4,	66:22, 68:20,	59:17, 114:22
63:14, 63:16,	37:18, 42:14,	87:6, 87:9,	each
63:21, 64:2,	58:8, 92:11,	88:3, 88:9,	43:15
64:6, 64:9,	97:6, 99:22,	88:18, 89:7,	earlier
64:12, 65:4,	100:6	89:10, 90:16,	8:19, 36:9,
65:10, 65:12	distinction	91:9, 91:14,	47:21, 48:19,
disrupting	35:5	91:18, 92:4,	51:14, 62:15,
82:7	distinguish	92:9, 92:12,	62:17, 66:5,
disruption	91:7	92:18, 93:2,	66:9, 73:14,
62:2, 62:6,	distinguishes	93:3, 93:21,	77:9, 78:14,
62:10, 63:3,	92:4	94:1, 94:15,	88:19, 89:15,
63:9, 63:13,	docket	95:4, 95:12,	100:4, 100:6,
63:20, 64:1,	9:19	95:16, 100:10,	101:11, 104:5,
64:5, 64:8,	documents	104:13, 105:6,	106:5, 106:11,
64:11, 65:2,	9:9, 9:16, 9:21	105:9, 105:12,	113:8, 124:10
65:3, 65:9,	doing	107:3, 107:22,	earliest
65:13, 65:19,	123:4	108:3, 108:8,	53:7
66:7, 66:11,	done	110:16, 111:2,	early
66:18, 66:21,	57:19, 105:14,	111:6, 111:9,	13:15, 26:15

easier	67:14, 68:2,	29:20, 36:3	examination
105:21	68:20, 77:6,	enough	4:5, 4:6, 5:4,
easy	77:11, 79:22,	114:5	109:7
104:10	80:9, 118:5,	entangling	example
effect	118:10, 118:17	124:4	15:20, 18:12,
57:15	enabled	enterprise	18:14, 19:2,
effort	65:20, 66:1,	1:5	19:12, 21:3,
19:20, 36:3	67:15, 69:21,	enters	22:5, 22:9,
efforts	71:7, 71:12,	68:21, 69:8	22:12, 27:1,
30:1	71:20, 72:7,	entertainment	34:13, 36:6,
either	73:21, 76:3,	88:17	40:9, 44:13,
63:10, 63:21,	76:10, 77:3,	entity	44:20, 49:18,
65:4, 75:14	77:15, 77:16,	58:6	51:12, 53:13,
elaborate	78:4, 78:9,	environment	56:22, 57:3,
11:19, 11:21,	79:1, 80:6,	13:7, 13:20,	59:2, 64:17,
94:13	80:14, 80:21,	14:3	69:3, 69:22,
electrical	81:17, 82:6,	epitomizes	72:19, 72:21,
29:20	120:5, 120:13,	27:12	82:3, 82:11,
electronic	120:16, 121:1	erasmus	83:16, 84:12,
26:16	enablement	97:8	87:11, 90:2,
element	67:19, 68:1,	errors	90:11, 92:13,
31:11, 32:2,	75:18, 76:19,	58:7	92:15, 93:5,
33:22, 55:2,	79:2, 84:1, 84:2	especially	93:10, 93:20,
59:14, 60:10,	enables	21:10	94:3, 95:15,
72:17, 122:20	70:13, 79:9,	esquire	95:17, 95:18,
elements	83:9	3:4, 3:5, 3:12,	107:20, 108:4,
41:3, 79:5	enabling	3:13	115:22, 122:2,
ellyar	68:3, 69:9,	et	122:7, 124:15,
3:5	71:22, 72:1,	32:15, 74:12,	125:6
else	72:4, 72:5,	75:11, 91:3,	examples
7:9, 10:3,	72:10, 72:11,	124:5	54:5, 75:3,
52:16, 54:2,	75:9, 79:9,	even	84:13
92:1	83:21, 84:17,	24:1, 27:9,	exchange
elsewhere	84:22, 122:21	105:8, 120:16	67:1
126:1	encompassing	events	excuse
embedded	35:12	63:21, 64:3	29:3, 55:7,
36:3	encrypted	ever	85:5, 106:22
embodiment	99:5, 99:7,	20:8, 51:20,	exhibit
51:8	99:13, 100:20,	52:7	9:1, 24:19,
embodiments	101:15	everybody	24:20, 30:9,
51:6, 86:2	end	108:17	32:1, 32:2,
emphasis	56:20, 85:22,	everything	32:16, 32:18,
19:17, 52:11	93:5	10:3, 21:21,	32:22, 33:22,
employed	ends	100:16	39:22, 40:12,
128:4	87:19	exact	40:13, 44:3,
enable	engage	109:3, 114:16	53:1, 59:22,
66:11, 66:15,	69:19	exactly	69:16, 70:17,
66:18, 67:8,	engineering	115:8	70:19, 70:21,
	15:9, 15:11,		

73:5, 73:11, 73:13, 73:16, 73:17, 74:4, 75:4, 75:13, 78:15, 80:17, 80:20, 81:2, 81:8, 81:10, 81:12, 81:16, 82:5, 84:11, 84:12, 84:14, 85:4, 85:6, 85:7, 87:16, 87:17, 90:21, 97:16, 97:18, 97:19, 98:17, 101:7, 112:4, 112:8, 116:6, 116:15, 117:1, 121:13 exhibits 4:13, 9:12 exists 92:10 exp 128:14, 128:15 expanded 59:12 expansion 56:15 expectations 23:7 experience 109:11 experiments 26:7, 28:3 expert 79:14 explain 29:8, 72:19, 78:8, 79:1, 79:8, 93:10, 101:1, 115:12 explained 10:7, 105:2 explanation 56:20, 60:11, 67:19, 67:22, 79:7, 102:9,	115:18 explanations 68:22 explanatory 56:16, 59:10, 67:17 explicit 48:12, 48:14, 48:15 explicitly 77:11, 78:2, 113:4 exploring 30:2, 109:21, 110:2 express 11:18, 12:4 expressed 11:5, 12:13 extensively 26:19, 114:18 extra 27:11 extracted 53:18, 90:7 F faa 103:15, 104:15, 104:18, 105:4, 105:8 fact 21:5 factor 18:7, 31:1, 31:6, 33:19, 34:11, 34:18, 34:22, 35:12, 36:15, 37:1, 38:9, 38:12, 39:10, 39:20, 40:8, 43:8, 43:18, 44:7, 45:7, 45:10, 45:16, 49:7, 49:14, 49:17, 50:1, 50:16, 51:9, 53:9,	57:19, 58:9, 58:11, 58:22, 59:20, 88:10, 88:21, 89:14, 97:3, 99:13, 100:5, 100:21, 101:3, 101:16, 104:6, 105:5, 106:21, 107:8, 108:6, 116:1 faculty 29:19, 29:20 failing 23:15 fair 17:6, 60:16, 72:11, 118:22 fairly 114:17 fake 94:2 falk 102:16, 102:17, 103:5, 104:1, 105:2 familiar 57:3, 96:2, 96:9 far 94:13 farmers 16:12, 110:4, 110:8 farther 108:22 fashion 13:6, 67:10 february 1:17, 2:3, 8:5, 127:20 fed 123:5 feel 122:15 feet 93:4 fertilizer 19:12, 19:13,	19:15 few 7:10, 26:14, 112:12 field 18:21, 19:12 figure 44:2, 44:11, 44:12, 69:20, 71:18, 73:19, 75:13, 75:16, 77:5, 77:10, 77:11, 77:14, 78:3, 78:8, 80:13, 82:4, 82:5, 98:16, 98:20, 99:4, 109:5, 116:13, 117:3, 117:4, 119:7, 119:19, 122:18, 123:3, 123:12, 125:11 figures 28:21 file 79:14 filed 116:10, 116:11, 117:4, 119:8, 121:9 filings 10:1 financially 128:6 finish 98:6 finished 25:13 finishes 78:17 first 5:3, 20:7, 26:3, 29:10, 34:8, 34:9, 35:6, 35:8, 37:10, 39:2, 40:5, 40:22, 41:4, 41:6,
---	---	--	---

41:7, 41:13,
41:15, 41:16,
41:20, 41:21,
42:13, 44:10,
45:20, 45:21,
47:10, 47:15,
47:16, 48:21,
49:1, 50:11,
50:12, 53:15,
58:20, 62:9,
62:18, 62:19,
65:11, 90:4,
93:8, 100:13,
102:6, 102:20,
103:3, 106:14,
106:15, 107:5,
107:19, 112:15,
112:19, 112:20,
114:10, 118:3
five
16:9
fixed-wing
28:8
flags
110:21, 110:22,
111:19, 111:21,
111:22
flies
18:20, 97:8
flight
27:5, 27:16,
96:17, 96:21,
96:22, 97:2
flightaware
95:18
flights
95:18
flow
67:5, 77:22
flown
17:11
flying
26:10, 93:21
focused
13:5, 55:17
foe
92:7, 92:9,
92:14, 92:17,

94:4, 94:14
follow
76:5, 76:6
followed
100:22
following
13:19, 19:11,
58:4, 68:14,
88:13, 125:7
follows
5:3
forefront
27:10
foregoing
127:4
form
35:15, 37:6,
50:4, 50:9,
51:18, 71:15,
88:11, 93:7
format
98:4
forth
127:8
forthcoming
21:12
found
11:19, 54:21,
72:19
foundation
27:12
fourth
45:19, 47:8,
47:14, 50:10,
106:8, 106:12
free
122:15
friend
16:17, 92:7,
92:9, 92:14,
92:15, 92:18,
94:4, 94:14
front
9:7, 9:10,
9:17, 9:21,
11:6, 85:8,
115:9
full
5:8

function
34:11, 40:8,
46:1, 49:4,
50:14, 58:22,
106:17, 107:15
functioning
106:22, 107:1,
107:21, 108:5,
108:7
functions
44:17, 46:9,
49:22, 50:1,
51:2, 70:5,
82:13
funded
29:14
funding
29:22
further
49:10, 93:10,
98:7, 108:10,
127:15, 127:18,
127:22, 128:2

G

gave
36:9
general
7:21, 7:22,
12:10, 16:18,
18:16, 20:2,
33:7, 33:9,
52:15, 71:5,
77:21, 95:10
generally
13:8, 13:19,
16:10, 35:14,
66:17
generate
98:10
geographic
32:14, 91:2
geographical
91:22
germany
23:16, 26:6
getting
36:22, 58:9

give
10:5, 10:11,
12:17, 15:3,
18:14, 24:18,
25:2, 25:4,
33:20, 36:6,
37:7, 39:21,
42:18, 44:10,
45:17, 47:4,
52:20, 54:13,
56:22, 61:15,
69:12, 69:13,
73:7, 78:18,
81:4, 82:3,
86:21, 87:3,
89:18, 89:20,
90:18, 97:15,
101:19, 102:15,
103:9, 109:1,
109:15, 110:9,
112:10, 121:7,
121:9, 123:18
given
11:3, 54:21,
54:22, 55:1,
107:20, 127:11
gives
81:19
globally
32:13, 33:17,
36:11, 38:4,
38:13, 89:11,
90:15, 91:1,
91:10, 91:13,
91:19, 91:21,
97:7
go
10:5, 10:15,
11:11, 19:7,
24:12, 24:16,
24:19, 25:3,
25:4, 25:9,
25:11, 25:22,
26:9, 27:7,
31:10, 33:21,
34:6, 39:13,
39:21, 40:3,
44:8, 44:15,

45:17, 45:18,	grasping	helps	home
46:7, 47:4,	13:19	77:22	69:4, 69:9
47:5, 50:10,	great	here	homeland
52:21, 54:3,	25:21	26:1, 28:4,	25:14
54:10, 61:8,	ground	33:15, 40:21,	honeywell
66:5, 70:3,	25:5, 57:9,	42:7, 42:12,	29:15
74:4, 85:18,	57:16, 100:11,	43:21, 47:18,	hour
87:17, 89:5,	100:14, 100:19	48:3, 51:2,	8:17, 23:17,
89:17, 89:21,	group	51:6, 57:18,	30:5, 85:9,
90:19, 93:11,	29:19	57:20, 58:5,	85:12, 85:17
94:17, 96:2,	guide	59:15, 64:4,	hours
96:5, 101:6,	13:16	67:11, 72:19,	8:8, 8:9, 8:10
101:19, 104:14,	H	84:3, 86:2,	however
105:14, 105:22,	hamburg	92:8, 100:8,	86:3, 90:12
108:14, 109:9,	26:6	100:9, 100:18,	hubs
109:14, 112:7,	hand	112:6, 112:14,	29:14
113:4, 113:8,	128:9	113:4, 113:10,	human
114:19, 115:13,	handle	115:1, 116:5,	22:8, 22:12,
122:18, 123:1,	40:4	117:11, 120:2,	22:13, 22:18,
123:16	happen	120:11, 120:13,	23:10
goes	68:10, 68:12,	120:21, 124:6,	hybrid
16:14, 23:11,	121:5	125:4, 125:7,	27:15
75:17, 82:9,	hard	125:17, 126:1,	hyperspectral
96:21, 117:15,	9:8, 60:6,	126:4	16:2
118:16, 119:21,	110:18, 117:8	hereby	I
122:6, 123:8	hashed	127:5	id
going	118:13	hereinbefore	89:6, 89:7,
22:22, 23:12,	health	127:7	89:9, 91:8,
23:17, 25:9,	110:6	herunto	94:9, 94:11,
30:5, 69:2,	hear	128:8	98:9, 98:13,
77:19, 78:12,	10:15, 50:5,	higher	99:2, 99:5,
85:9, 85:10,	50:6, 50:8,	22:13	99:7, 99:13,
110:9, 117:20,	85:14, 85:15,	highlighted	101:15, 102:1,
118:4, 118:9,	89:2	80:5, 90:11	102:5, 102:6,
122:13, 125:13	heard	highway	102:7, 111:5,
good	22:7, 45:7,	23:17	111:7, 115:19,
5:6, 5:7, 17:2,	96:11	himself	115:21, 116:1
60:20, 105:15,	held	105:3	idea
108:14	2:9	hindsight	26:8, 28:17,
graduate	help	23:1	33:4, 110:19
23:14, 26:11	20:19, 57:7,	hired	ident
grant	57:8, 62:14,	16:15	58:16
25:11, 25:15,	77:5, 77:14	hobbyist	identical
28:22	helped	93:3	37:19
grants	15:12	holdings	identification
25:4, 25:8,	helpful	1:5	15:20, 30:21,
25:10, 25:11,	117:6	hole	39:7, 39:17,
25:15, 28:22		58:10	

40:19, 43:9, 43:13, 43:15, 44:16, 44:17, 44:19, 46:8, 46:9, 46:11, 50:20, 55:12, 95:8, 95:15, 96:1, 99:9, 99:18, 101:2, 107:16, 122:10 identified 51:2, 55:3, 96:8, 119:1 identifiers 18:13, 33:6, 46:20, 92:11, 108:2 identifies 32:12, 92:1, 104:12, 105:10 identify 19:2, 39:2, 39:16, 52:16, 59:3, 77:22, 87:6, 88:2, 89:9, 91:9, 105:9, 107:3 identifying 102:21, 102:22 identity 95:1, 96:10, 98:2 ignore 69:6, 110:9 image 111:16, 111:17 imagine 92:7 immobilize 124:2 implement 28:17, 29:5 implemented 20:8, 46:17 important 26:13, 35:5, 48:7, 85:21, 100:8, 107:12,	109:6 imsi 96:9, 96:13 in-air 28:7 in-depth 96:12 inc 1:5, 1:8 include 10:1, 34:8, 39:9, 39:19, 41:15, 43:18, 44:16, 45:20, 46:8, 47:9, 50:11, 53:5, 58:20, 60:18, 70:4, 81:11, 82:12, 86:3, 106:14, 115:19 included 43:19 includes 47:15, 99:1, 102:20, 122:8 including 14:3, 14:8, 16:10, 122:9, 122:10 increase 22:11 indeed 12:22, 56:12 indicated 23:16 indicia 102:20, 102:22, 103:3 industrial 15:13 inferences 21:20 inform 78:7 information 13:15, 14:2, 20:6, 26:20, 34:16, 34:20,	35:13, 36:5, 36:7, 37:2, 43:16, 44:20, 44:22, 45:1, 77:22, 79:12, 88:18, 100:13, 104:3, 110:16, 123:5 infrastructure 25:8 inherited 29:11 initial 57:14, 67:7 initially 70:18 inoperable 50:16, 106:19, 107:7 inspection 15:13 instance 35:3 instances 54:6 instead 13:21, 19:12, 36:14 instrumented 23:18 integral 18:3 integrated 20:10 integration 22:15 integrity 14:22, 109:22 intelligent 26:5 intended 96:17, 97:2 intent 108:1, 108:2 intention 38:10, 48:11 intentions 104:21	interacting 13:20 interceptor 13:13 interchangeably 95:9, 116:5 interdiction 83:1, 83:17, 122:9, 123:14, 124:1, 124:2, 124:18, 124:22, 125:9, 125:10, 125:19 interest 15:22, 29:21 interested 10:21, 72:9, 128:6 interface 53:21, 90:10 interfere 19:5, 83:18 international 3:15, 19:1, 27:2, 96:10 interpretations 23:22 interrupt 19:7, 67:21, 98:6 intersecting 119:10 introduced 16:16 intruder 68:15, 69:3, 69:7, 69:8 invalid 70:2, 73:1, 74:1, 74:11, 76:9, 76:16, 117:19, 118:21, 119:3, 119:14, 120:11 invest 19:20 involve 10:1, 14:4,
---	---	--	--

14:9, 16:3,
29:2, 29:5
involved
13:12, 14:11,
22:18, 23:10
involvement
22:8
involves
57:9
iowa
17:12
ip
9:19
ipr
1:11, 5:21,
6:7, 6:10, 9:19,
9:20, 10:2, 61:3
isler
29:21
isolate
80:10
issue
18:2, 19:8,
19:17, 26:20,
29:4, 72:12
issues
18:20, 19:1
itc
6:13
itself
52:18, 80:3
J
jake
3:21
jenson
27:15
job
1:22
john
15:15, 37:17,
56:1, 56:3,
56:11, 56:12,
56:21, 57:1,
57:2, 88:19,
91:18, 92:11,
105:11
john's
92:12

K
karlsruhe
27:3
keep
17:22, 19:3,
85:10
keeping
22:16
key
110:5, 110:7
klinger
1:21, 2:10,
127:3, 128:13
know
21:9, 25:10,
54:3, 54:10,
61:21, 72:4,
72:13, 114:20,
116:21, 121:18,
122:13, 122:16,
122:17
knowledge
6:21

L
l'esperance
3:13, 11:16,
12:2, 12:12,
15:7, 16:5,
16:22, 17:18,
18:5, 18:18,
20:1, 20:15,
21:2, 22:19,
29:7, 35:15,
37:6, 42:9,
45:11, 50:3,
50:8, 51:17,
60:22, 66:13,
67:16, 71:15,
72:14, 77:17,
78:11, 79:10,
79:20, 81:18,
84:18, 88:11,
88:22, 89:4,
91:15, 93:7,
101:17, 105:15
lab
14:7, 25:7,

28:19, 29:11
label
118:19, 118:22,
119:10, 119:14,
119:21
labels
119:8, 119:9
lack
110:6
landing
28:6
lanes
22:16
language
71:6, 102:8,
115:7, 126:3
larger
94:8, 115:18
last
7:20, 37:22,
65:18, 74:16,
75:7, 100:18,
118:11, 125:16
lasted
16:8
late
10:8
later
8:12, 28:11,
104:3
launch
123:13, 123:22,
125:8, 125:19
launched
125:21
launcher
122:9, 122:14,
122:16, 122:17,
123:22, 125:19
launching
82:22, 83:12,
122:20, 123:1,
123:4, 123:5,
123:9, 123:13,
124:18, 124:22
leaders
22:21
learning
15:21

least
125:22
leave
117:6
left
29:10, 38:18,
76:16, 85:12,
85:17, 117:13,
118:13, 118:21,
119:11, 121:1
legal
7:6, 7:7
less
85:12, 85:16
let's
30:9, 31:10,
47:1, 55:7,
73:5, 75:13,
95:14, 97:11,
98:16, 101:5,
103:5, 105:22,
109:9, 117:8,
123:16
level
19:10
levels
22:6
light
53:19, 90:8
likely
25:19
limitation
30:14, 31:4,
38:19, 38:21,
39:3, 55:8,
59:17, 61:12,
61:17, 62:1,
63:8, 63:13,
64:1, 64:15,
80:16, 114:16
limitations
55:5
line
34:3, 47:2,
47:6, 49:12,
69:16, 69:17,
73:18, 74:5,
78:15, 78:21,

79:3, 79:4, 81:13, 99:8, 103:5, 103:8, 103:11, 104:14, 106:4, 112:9, 112:19, 113:9, 113:14, 113:17, 119:3, 121:10, 121:12, 121:18, 121:20, 122:6, 123:20 lines 32:22, 40:22, 49:10, 106:4, 114:10, 119:10 link 9:18 little 25:5, 35:10, 51:1, 108:20, 108:22, 113:8 live 115:8 llp 3:14 lobel 3:14 local 15:11, 15:14 localization 27:19 locally 91:1, 91:21, 97:6 locate 15:17, 89:18 located 5:12 location 91:2, 91:22, 93:22 locked 70:10, 70:13, 73:2, 83:4, 83:9, 124:13, 124:17, 125:2, 125:5, 125:9 locking 83:22	locks 70:11, 83:7 long 8:6, 36:18, 37:7, 37:10, 48:9 long-winded 28:11 longer 108:15 look 13:1, 15:1, 20:2, 21:11, 22:14, 24:11, 25:16, 26:2, 30:9, 31:18, 32:1, 36:2, 38:15, 42:2, 42:11, 44:11, 44:12, 45:18, 47:1, 52:22, 54:9, 55:7, 59:22, 61:12, 61:19, 66:14, 69:11, 69:15, 72:3, 72:6, 72:16, 72:17, 72:19, 73:3, 73:4, 73:5, 73:9, 75:13, 79:16, 79:21, 80:12, 81:2, 82:2, 85:21, 87:15, 90:20, 96:15, 97:11, 98:16, 101:20, 103:5, 103:22, 105:19, 106:3, 114:7, 114:22, 116:5, 116:22, 117:3, 117:5, 117:12, 117:22, 122:14, 123:19, 126:3 looked 52:12, 71:16, 72:12, 112:3, 116:7	looking 22:13, 54:8, 65:2, 73:14, 75:4, 80:18, 99:4, 116:18, 116:21 loop 22:8, 22:14 lost 109:2 lot 10:17, 28:21 loud 61:18, 122:4 lunch 85:11 M mac 35:18, 36:4, 89:13, 90:11 machine 15:20 mackay 3:21 main 13:21 major 19:17 make 9:2, 14:17, 19:18, 21:20, 27:7, 45:8, 59:14, 67:10, 68:7, 76:13, 94:10, 110:12, 111:4, 116:1, 117:8 makes 59:12, 68:4 manage 23:7 management 20:11, 21:19 manipulate 13:6 manipulator 13:12, 13:17	manipulators 14:6 manner 107:17 manufacturer 91:3 many 5:19, 5:21, 7:13, 16:10, 17:9, 28:21, 52:2, 75:11, 88:13 maps 110:3, 110:5, 111:3 march 128:9 marked 4:13 marketing 17:13 marking 15:17 marriage 128:4 massachusetts 3:16 material 11:5 materialize 67:6 matt 7:8 matter 8:16, 10:20, 12:1, 12:21, 13:10, 81:11, 128:7 maximize 14:2 maybe 35:22, 52:11, 94:1, 101:12 mean 6:4, 7:14, 7:20, 8:8, 18:10, 19:6, 21:10, 23:3,
--	---	---	--

36:1, 36:16, 40:17, 55:19, 55:21, 56:8, 56:17, 59:11, 60:5, 60:7, 66:1, 66:11, 66:18, 67:8, 67:14, 67:18, 67:21, 79:18, 80:3, 84:14, 96:5, 99:8, 113:16, 125:20 meaning 56:1, 71:10, 71:14, 80:3 means 22:17, 41:20, 68:11, 68:19, 69:9, 77:6, 77:15, 78:9, 79:2, 79:9, 80:9, 94:17, 94:19, 94:22, 95:15, 107:5, 114:13, 115:12, 125:8, 126:4 meant 23:9 measurements 123:11 mechanism 66:8, 68:8, 68:13, 82:22, 83:12, 83:15, 86:4, 86:5, 124:3, 124:5 meet 7:3, 7:5, 7:6, 8:6 meetings 8:3, 8:11 members 7:7 memory 18:7, 18:19, 52:20 mention 45:8, 48:19,	52:14, 53:3 mentioned 28:22, 40:15, 47:21, 48:19, 51:6, 59:10, 72:18, 75:3, 78:13, 84:3, 85:3, 85:16, 88:19, 89:15, 94:6, 105:7, 109:10, 109:20, 109:22, 116:9, 125:15 merit 2:10 met 63:15, 63:17, 64:6, 64:18, 64:21, 65:5, 65:11, 65:13, 69:22, 71:21, 72:8, 73:21, 78:5, 80:1, 80:7, 80:8, 80:15, 84:4, 85:1 meter 27:21 method 76:2, 76:9, 77:2 methodologies 25:16 methods 27:18 middle 90:21 might 22:7, 105:9, 117:6 mile 37:22 miles 23:17 military 95:20 mind 24:11, 24:15,	86:22, 93:9, 95:19, 112:3, 114:7 minneapolis 96:22 minnesota 5:14, 17:11, 25:15, 29:11 minute 10:5, 12:17, 15:3, 24:19, 25:2, 33:20, 39:21, 42:18, 44:10, 45:4, 45:18, 47:4, 52:20, 61:15, 69:12, 69:14, 71:4, 73:7, 81:4, 82:4, 86:21, 87:3, 89:18, 89:20, 90:18, 97:15, 97:21, 102:15, 103:9, 108:12, 109:15, 112:10, 116:15, 121:7 minutes 54:13, 61:1 mischaracterizes 22:20, 42:10, 50:4, 50:9, 51:18, 72:15, 91:16 mislead 58:10 missing 33:8, 36:5 mist 28:5 mistake 112:22 mobile 21:6, 21:8, 26:17, 96:10 mode 70:10, 70:13, 70:15, 73:3, 83:4, 83:9,	83:10, 124:3 modes 83:6 modifying 110:22 module 46:13, 62:15, 67:3, 83:1, 83:17, 93:13, 114:2, 122:9, 122:11, 123:6, 123:14, 124:1, 124:2, 124:18, 124:22, 125:9, 125:19 moment 109:3 money 27:11 monitoring 25:8 monkeying 104:10 month 7:20 more 10:11, 14:8, 16:9, 16:19, 17:21, 22:12, 58:9, 68:4, 78:7, 82:21, 94:13, 96:15, 105:18 morning 5:6, 5:7 morton 26:3 most 26:9 motion 13:22 motive 124:4 mounted 13:13 move 14:13, 21:17, 87:10, 108:21
--	---	--	---

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

145

moved	54:9, 60:12,	novelty	13:19, 15:21
18:8	61:17, 63:14,	10:4, 10:22,	observed
movement	63:16, 66:22,	11:8, 11:14,	87:9, 88:6,
88:1, 88:2,	67:2, 67:5,	12:11	88:8, 88:20
88:8, 88:14,	68:16, 69:4,	nowadays	occur
88:16, 88:20	69:5, 91:17,	24:1	8:3
movements	91:19, 92:10,	nsf	occurred
13:21	100:12, 110:12,	25:11, 25:15,	127:19
much	110:16	29:1, 29:14	offering
23:18	needed	number	19:11
multi-rotor	16:7, 19:2	15:12, 25:21,	office
28:8	needs	37:16, 56:2,	1:1
multi-section-tr-	19:12, 36:11,	73:12, 103:15,	oh
ansformable	38:4, 66:2,	103:17, 104:2,	112:20
28:5	68:13	104:15, 104:18,	okay
multifactor	network	104:21, 104:22,	6:9, 8:15, 9:9,
18:8, 18:10,	53:20, 90:10	105:4, 105:8	9:13, 24:12,
19:21, 20:12,	next	numbers	24:21, 25:2,
20:21, 21:7,	19:10, 21:21,	22:13, 118:2	36:21, 41:4,
29:5	53:11, 76:14,		43:7, 46:21,
multiple	87:15, 108:4,	O	47:1, 51:1,
29:16	118:9	object	53:2, 56:4,
must	nick	10:9, 95:1	62:1, 63:8,
38:13, 62:19,	93:20	objection	63:12, 64:8,
62:20, 68:11,	nikolaos	10:9, 11:1,	65:2, 65:18,
90:14, 91:13,	1:16, 2:8, 4:4,	11:9, 11:16,	68:18, 74:16,
107:21, 108:8	5:2, 5:10,	12:2, 12:12,	75:4, 76:21,
mute	127:6, 127:19	15:7, 16:5,	78:20, 78:22,
10:15	nikos	16:22, 17:18,	81:10, 82:10,
myself	5:6, 11:13,	18:5, 18:18,	96:17, 106:1,
26:4, 27:15,	30:7, 61:3,	20:1, 20:15,	106:3, 107:19,
123:18	61:10, 86:13,	21:2, 22:19,	108:4, 109:18,
	105:17	29:7, 35:15,	110:22, 111:7,
N	nitrogen	37:6, 42:9,	112:2, 112:11,
name	110:6	45:11, 50:3,	112:14, 113:6,
5:8, 5:10,	non	50:9, 51:17,	114:15, 114:22,
95:22	6:9, 17:22,	66:13, 67:16,	116:3, 116:9,
named	92:6	71:15, 72:14,	116:21, 117:12,
119:5	normal	77:17, 78:11,	118:19, 119:6,
national	8:17	79:10, 79:20,	119:19, 120:8,
27:11	note	80:4, 81:18,	121:4, 121:8,
navigating	26:13	84:18, 88:11,	122:4, 122:19,
23:15	notes	88:22, 89:4,	122:21, 123:12,
navlab	7:2, 12:13,	91:15, 93:7,	123:16, 123:19,
23:13, 23:14	105:14	101:17	125:16, 126:5
need	notice	objective	one
19:19, 23:6,	69:19	111:13, 111:14	6:13, 7:11,
24:11, 37:3,	novel	objects	8:20, 10:5,
	12:1	13:7, 13:18,	

16:14, 17:19, 18:19, 20:4, 21:9, 21:12, 24:18, 25:2, 25:18, 25:22, 28:4, 35:6, 35:7, 35:8, 36:9, 36:10, 36:16, 37:4, 41:2, 42:18, 45:4, 47:4, 49:6, 49:15, 51:2, 51:5, 53:11, 63:16, 64:3, 64:5, 65:15, 68:22, 69:13, 75:11, 75:14, 86:21, 87:3, 92:4, 93:8, 93:12, 93:22, 94:4, 94:5, 94:9, 96:5, 97:21, 99:18, 100:1, 102:1, 102:13, 103:9, 107:5, 107:12, 108:12, 109:1, 109:2, 109:15, 110:4, 110:7, 110:8, 110:11, 115:19, 116:15, 117:5, 121:8, 122:6, 123:18, 124:19, 125:16	110:20 operation 56:22, 62:3, 62:7, 63:10, 63:14, 63:21, 64:6, 64:9, 64:12, 65:10, 65:12, 66:10, 70:7, 70:12, 70:14, 81:21, 82:15, 83:8, 83:10, 83:19, 86:6, 101:6, 101:8, 113:10, 113:18, 113:19, 125:12 operations 66:6 opining 12:21 opinion 10:21, 11:7, 11:14, 12:4, 23:9, 72:13 opinions 9:4, 10:17, 11:5, 11:18 optimization 27:6 optionally 53:5, 60:18, 99:5 options 91:6 order 13:16, 13:17, 14:1, 14:13, 14:21, 15:17, 18:1, 23:18, 25:16, 25:17, 26:19, 42:15, 63:12, 63:22, 67:4, 67:5, 68:9, 79:8, 92:11, 100:15 ordinarily 83:5 ordinary 55:22, 80:3	orientation 119:9 original 101:15 other 6:2, 7:18, 8:11, 9:9, 9:12, 9:21, 11:5, 13:17, 14:8, 19:10, 20:13, 20:22, 26:14, 26:22, 28:10, 29:14, 32:20, 33:1, 37:3, 41:3, 51:21, 52:8, 52:12, 52:14, 54:6, 54:16, 57:22, 59:13, 65:7, 66:4, 67:7, 67:13, 69:1, 71:13, 78:22, 79:2, 80:7, 83:2, 83:5, 84:13, 86:4, 91:21, 92:2, 92:4, 93:22, 94:5, 99:22, 100:8, 100:10, 102:3, 102:12, 104:8, 104:12, 104:13, 104:20, 107:11, 107:17, 119:14, 122:15, 125:22 others 7:10, 25:16, 93:8 otherwise 32:9, 45:2, 46:12, 69:5, 70:11, 70:13, 83:8, 83:9, 83:18, 90:13, 128:6 out 22:12, 22:14, 61:18, 66:20,	102:12, 109:5, 118:3, 118:9, 118:13, 119:12, 119:16, 122:4, 123:13, 124:12 outcome 128:7 outlets 27:19 outside 11:1, 11:9, 11:16, 20:22 over 7:2, 18:20, 19:13, 54:3, 105:14 overall 85:7 overview 27:5 overwriting 111:3 own 21:18, 23:5, 24:21, 36:4 owned 15:15 owner 1:9, 3:11, 6:8, 102:21, 104:9, 104:12, 104:14, 104:17, 104:22, 105:1, 105:10 P page 4:3, 4:11, 69:15, 70:18, 73:11, 73:12, 73:13, 73:16, 74:4, 78:16, 78:17, 78:21, 79:3, 80:17, 81:13, 87:16, 87:17, 87:18, 87:21, 90:19, 116:17, 116:19, 121:10, 121:11,
---	--	--	---

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

147

121:12, 121:20, 123:16, 123:19 pages 79:6 papanikolopoulos 1:16, 2:9, 4:4, 5:2, 5:11, 127:6, 127:19 paper 27:13, 27:14, 27:17, 27:20 papers 24:13 paragraph 10:6, 12:15, 12:19, 13:1, 13:3, 15:1, 15:6, 24:2, 24:5, 24:9, 24:10, 30:11, 30:14, 30:17, 31:10, 31:22, 32:17, 33:21, 33:22, 38:15, 38:18, 39:14, 39:22, 42:16, 42:19, 43:2, 43:3, 43:4, 43:6, 43:10, 44:12, 44:15, 45:3, 45:18, 46:18, 52:21, 55:7, 55:10, 59:17, 61:14, 80:21, 81:8, 82:5, 82:16, 84:9, 85:22, 86:8, 86:14, 87:4, 87:11, 87:18, 87:19, 89:21, 97:11, 97:22, 98:20, 101:7, 102:10, 102:17, 109:17, 112:12, 113:3, 114:7, 114:17 paragraphs 30:10, 33:2,	40:12, 44:1, 44:2 paraphrasing 115:4 parenthetical 74:9, 74:17, 75:7 part 18:3, 20:9, 24:7, 26:15, 48:7, 55:14, 57:11, 57:13, 65:18, 74:16, 88:15, 96:1 particular 8:20, 12:9, 17:9, 20:17, 20:18, 22:3, 36:12, 36:13, 91:22, 93:22, 94:20, 95:1, 95:12, 97:9, 102:22, 104:13, 110:15, 125:14 parties 128:3, 128:5 parts 107:4, 122:15 party 102:21, 127:15 pass 108:11, 126:7 passive 44:19, 46:11 patent 1:1, 1:3, 1:9, 1:12, 3:11, 6:8, 10:4, 10:7, 10:18, 10:22, 11:4, 11:8, 11:15, 11:22, 12:11, 24:13, 35:21, 47:2, 47:18, 51:19, 52:3, 52:7, 52:17, 52:18, 53:1, 54:3, 54:10, 70:16,	70:20, 70:21, 75:14, 105:20, 105:22, 112:5, 112:8, 116:11, 116:12, 126:2 patents 15:16 path 96:22 patter 53:18 pattern 88:1, 88:2, 90:8 pdf 116:19 people 22:5, 23:1, 23:5, 23:8, 26:14, 69:6, 89:6, 110:18 perform 13:18 performed 57:21 performing 120:8 period 32:15 periodically 32:4 permission 62:14, 74:12, 74:18, 75:8, 77:1, 77:4, 82:8, 93:2, 93:13, 114:1, 120:4, 120:17, 121:5, 121:6, 123:6 permissions 78:1, 122:11 permits 86:5 permitted 62:12, 62:21, 64:14, 82:19, 84:9, 93:16,	93:21 persist 116:1 perspectives 23:6 petition 79:15 petitioner 6:7 petitioners 1:6, 3:3 ph 1:16, 2:9, 4:4, 5:2, 13:3, 16:15, 127:6, 127:19 phenotyping 15:22 phonetic 29:21 physically 5:12 pi 29:9, 29:10, 29:12 pieces 23:22, 52:13, 77:20 pitches 22:22 place 3:15, 68:1 placed 104:19, 111:22 places 111:2 placing 124:16 plain 126:3 plan 96:18, 97:2 plane 95:21, 97:8 plant 15:22, 110:6 plant-based 19:14
---	--	---	--

planting	42:11, 46:6,	32:13, 33:17,	proceeds
17:13	46:13, 46:18,	70:9, 70:11,	76:2, 76:9,
plants	57:4, 59:14,	73:2, 82:20,	76:18, 77:2
20:20	60:4, 60:5,	82:21, 83:3,	process
platform	66:18, 68:5,	83:7	86:4
26:17, 28:7	78:7, 81:14,	premise	processes
play	94:18, 95:11,	13:22	14:19, 18:21
100:4	107:12, 114:13,	preparation	processing
played	116:7	7:15, 7:19	111:16
14:10	position	prepare	product
please	88:14, 101:9,	6:22, 8:3, 8:7	20:18, 110:8
5:9, 6:4,	101:10	preparing	production
10:15, 50:7,	possible	8:1	34:15, 49:20,
89:3, 98:6,	75:9, 120:3	present	107:11
113:16, 114:20,	possibly	3:20, 7:10,	products
115:11, 116:13,	36:20, 54:20,	7:11, 28:19	17:13, 17:14
123:19	89:15, 103:20	pretend	prohibit
plural	power	56:10	61:4
41:11	21:18, 44:22,	pretty	project
plus	83:13, 124:4	33:15, 46:15,	26:15, 29:16
123:11	powered	71:17	projects
point	26:7, 27:4,	prevent	23:13, 29:16
11:20, 14:14,	44:21	34:14, 40:10,	promising
21:17, 33:7,	precision	46:4, 49:19,	23:2
44:5, 49:9,	111:17	50:18, 51:10,	proposed
52:13, 59:18,	preemptively	59:3, 61:4,	55:22
79:12, 111:13,	65:19, 66:1,	83:17, 107:10	proprietary
113:13	66:21, 67:12,	primary	17:2
pointed	67:13, 67:14,	50:15, 106:18,	propulsion
123:13, 124:11	67:20, 68:2,	107:6	83:14
points	68:11, 68:19,	prince	protect
37:18, 37:19	69:9, 69:21,	3:14	14:21
policies	71:7, 71:14,	principles	provide
20:11	71:20, 71:22,	14:7	28:12, 44:22,
portion	72:4, 72:7,	printed	111:14
41:4, 41:6,	72:10, 73:20,	116:22	provided
42:7, 43:7,	75:9, 77:6,	problem	43:5, 66:3,
51:14, 54:16,	77:15, 78:4,	30:3, 94:5,	92:13
59:16, 59:18,	78:9, 79:1,	103:22	provides
73:9, 74:22,	79:9, 79:18,	problems	104:15
75:7, 106:11	79:21, 79:22,	110:7	providing
portions	80:2, 80:6,	procedure	46:1
33:1, 45:9,	80:9, 80:14,	15:18	provisional
55:4	80:21, 81:17,	proceeding	32:18, 42:20,
posita	83:21, 84:2,	8:19	43:14, 43:21,
20:2, 21:16,	84:17, 84:22	proceedings	44:3, 44:6,
33:11, 35:4,	preferably	5:22, 6:6, 6:7,	44:8, 44:11,
37:8, 42:2,	32:4, 32:12,	27:1	45:15, 45:19,

81:2, 81:11,
81:16, 87:2,
117:1, 117:3,
117:22, 118:1
publication
26:2, 27:1,
28:15, 28:16
publications
25:6, 25:22,
27:22, 28:10
pulsed
53:18, 90:8
purpose
33:13, 79:6
purposeful
13:22
pushed
19:10, 27:10
pushing
17:20, 19:8,
110:18
put
19:20
putting
125:1

Q
qualifications
12:20
question
10:12, 17:15,
31:20, 34:19,
35:10, 36:22,
45:5, 45:14,
51:19, 52:1,
52:6, 52:15,
54:14, 63:12,
63:18, 63:19,
63:22, 65:1,
65:7, 67:8,
71:5, 72:10,
76:5, 76:6,
84:20, 91:11,
101:15, 107:19,
124:20, 125:16
questions
105:18, 108:11,
126:9

quickly
10:9, 119:7
quite
17:5, 18:9,
37:8
quote
73:10
quoted
59:16, 73:10,
74:18, 74:22,
81:12, 81:21
quoting
73:6, 73:17,
115:7

R
random
13:21
range
16:2
rate
8:15, 8:17
read
24:21, 36:19,
45:4, 61:18,
63:12, 63:22,
64:15, 65:14,
66:19, 70:18,
74:20, 103:21,
107:13, 108:1,
113:16, 122:4,
122:5
reading
58:18, 70:16,
70:17, 82:15,
113:3, 127:22
ready
61:21, 61:22,
69:19, 108:16,
108:17, 126:4
real-time
2:11, 14:21,
110:20
really
21:12, 52:10,
56:2, 57:18,
92:6
reason
6:19, 88:13,

91:7
reasons
100:3, 100:5,
104:5, 105:7,
125:14
recall
6:13, 52:10,
109:12, 109:19,
112:11, 115:5,
115:9, 124:11
receipt
31:4, 32:8,
44:6, 45:6,
45:15
receive
30:21, 44:18,
44:20, 46:10,
66:3
received
43:8, 53:16,
65:20, 66:15,
70:1, 71:8,
71:12, 72:22,
74:1, 74:11,
76:1, 76:8,
76:21, 90:5,
100:19, 119:5
receiver
30:21, 39:7,
39:17, 40:19,
43:9, 43:13,
43:15, 44:17,
44:19, 45:13,
46:9, 46:11
receives
39:7, 39:18,
40:19, 43:13,
43:16, 113:11,
113:20
receiving
46:13
recess
11:12, 30:6,
61:9, 85:20,
86:12, 105:16
recites
30:20, 62:1,
62:5

recollect
115:6
recollection
17:2, 17:19,
103:21
record
5:9, 11:11,
12:8, 61:8,
85:18, 127:11
recross
126:7
redirect
108:18
reduced
127:13
refamiliarize
61:16
reference
39:3, 73:10,
77:10, 86:15,
86:17, 102:11,
102:12, 102:15
referenced
8:19
references
31:19
referencing
32:22, 53:2
referred
98:19
referring
15:8, 26:1,
28:4, 43:10,
49:11, 49:15,
82:1, 114:9,
120:21
refers
119:3
refresh
52:20
region
32:14
registered
2:10, 110:13,
110:14
registration
103:15, 103:17,
104:8, 104:10,

104:15, 104:18, 104:20, 104:22, 105:4, 105:8 regulatory 103:12 relate 87:8 related 77:20, 128:2 relates 53:7 relevance 15:7, 16:5, 17:18, 18:5, 21:2, 29:7, 79:20, 80:4, 81:18 reliable 111:14 remember 109:12 remote 1:15, 2:8, 87:13, 87:14 remotely 127:20 remove 97:18, 102:12, 125:13 repeat 34:19, 50:6, 52:1, 63:18, 73:8, 76:6, 84:20, 89:3, 118:11, 124:20 report 11:21, 12:4, 12:14, 33:8, 54:1, 54:5, 79:13, 86:18 reported 1:21 reporter 2:10, 2:11, 10:14, 127:1, 127:3 repository 86:22	representation 77:8 represented 127:16 reproduction 40:11, 46:5, 50:19, 51:11, 59:4 request 32:8, 44:21 require 69:18 required 59:8, 102:7, 110:21 requirement 37:3, 38:3, 38:8, 55:15 requirements 12:6 requires 31:4, 55:12, 56:4, 62:9, 63:2, 63:8, 98:1 rescue 25:12 research 24:5, 24:7, 24:9 reserve 79:15 respect 10:18, 10:19, 12:20, 18:16, 18:17, 28:15, 51:7, 61:13 respectively 34:10, 40:7, 41:17, 45:22, 47:12, 50:13, 106:16 respond 98:1 response 32:8, 57:5, 57:6, 57:7, 98:19, 98:21, 99:1, 100:10,	100:18 responses 98:11 responsible 102:21 resulted 25:21 resume 24:12, 24:18, 24:19, 24:22, 25:9 retrieval 104:4 retrieve 24:18 review 81:5 reviewing 11:3 right 5:12, 9:7, 38:20, 55:17, 62:3, 62:22, 63:4, 70:22, 76:16, 76:17, 87:1, 94:10, 97:15, 102:1, 115:15, 116:2, 119:15, 124:8 rights 79:15 rmr-crr 1:21, 128:13 robot 14:13 robotic 13:17, 26:16 robotics 21:4, 23:4, 25:12, 27:2 robots 26:5, 27:18 rogue 16:10, 16:11, 17:10, 56:10, 58:6, 94:1, 105:1 role 100:4	room 5:15 ross 3:7 row 32:1, 34:2 rows 34:7, 40:3, 40:14 rts 87:12 ruben 26:3, 26:10, 27:10, 27:14 rules 61:3 running 68:8, 68:14, 68:17 rural 17:11 S s 3:1 safety 25:12, 29:1 said 28:14, 30:11, 38:3, 46:18, 50:6, 71:11, 72:16, 86:8, 89:4, 91:17, 94:12, 106:6, 115:17, 127:12 same 14:18, 18:7, 31:22, 33:4, 33:16, 34:16, 34:20, 35:2, 36:16, 37:4, 37:18, 37:19, 42:3, 42:12, 43:5, 47:21, 60:9, 64:11, 73:13, 74:5, 80:17, 81:15, 88:14, 88:16,
---	--	--	--

92:16, 96:4,
97:1, 104:5,
113:5, 113:9,
118:10, 124:19,
124:21, 125:1
satisfies
36:18, 65:15
satisfy
37:14
say
10:11, 13:5,
16:18, 17:6,
23:5, 30:2,
37:11, 37:12,
38:6, 48:9,
56:19, 68:18,
72:7, 76:14,
84:14, 89:22,
90:22, 92:8,
92:11, 94:13,
94:22, 95:14,
103:3, 105:11,
111:7, 115:13,
118:22
saying
23:2, 43:12,
47:8, 59:22,
88:18, 94:19,
95:3, 95:6,
95:21, 100:17,
102:5, 111:16,
115:5
says
32:3, 33:16,
34:1, 37:15,
38:7, 40:12,
40:21, 41:14,
44:12, 44:16,
46:6, 46:8,
48:20, 49:9,
50:10, 60:18,
69:17, 71:18,
73:1, 73:19,
74:9, 77:11,
79:22, 82:11,
86:3, 91:4,
95:20, 97:7,
99:8, 107:6,

107:8, 107:14,
112:14, 112:19,
113:4, 113:10,
115:1, 116:6,
117:14, 117:19,
118:4, 118:5,
118:10, 118:17,
118:21, 119:1,
120:21, 123:10,
125:4, 125:17
scenario
62:18
scenarios
69:18, 80:10,
80:12, 125:13
scharber
27:4
scheduled
8:12
scheme
68:17
science
27:11
scope
11:2, 11:17,
12:12, 16:22,
18:18, 20:1,
66:13, 67:16,
71:15, 78:11
scott
26:3, 26:8,
27:3, 27:9,
37:13
scott's
37:11
scout
26:16
scratch
123:2
search
113:6
second-stage
83:17
secondary
34:5, 39:10,
39:20, 40:9,
43:18, 46:3,
49:18, 50:2,

50:17, 50:20,
51:9, 53:13,
58:16, 59:2,
90:2, 107:9,
107:16, 108:6,
108:7
section
48:15, 49:21,
54:18
secure
104:7
security
25:12, 25:15,
29:1, 87:14
see
23:14, 25:10,
30:15, 30:18,
38:22, 39:4,
39:5, 39:11,
39:12, 39:22,
41:18, 42:21,
42:22, 47:13,
58:17, 60:2,
60:3, 67:17,
74:2, 74:5,
74:14, 74:19,
80:22, 82:2,
87:11, 89:19,
99:4, 99:17,
102:9, 104:1,
106:19, 115:2,
117:13, 117:16,
117:18, 118:1,
118:2, 118:5,
118:8, 118:17,
119:12, 119:16,
119:19, 119:21,
122:1, 122:2,
123:12, 123:14,
124:7
seen
23:21, 37:9,
81:14
segment
78:18
segmentation
111:17
segments
52:2

selectively
70:5, 82:13,
86:5
self-contained
21:19, 26:9
self-feeding
27:18
sell
110:4
semaphores
14:20, 110:19,
111:19
send
20:5
sending
57:10, 57:11
sends
100:12
sense
20:4, 110:14,
120:15
senses
100:11
sensing
21:18
sensor
123:11
sensors
16:1, 69:4
sensory
25:16
sent
9:18, 32:7
sentence
48:3, 73:19,
74:5, 98:7,
113:16, 113:17,
118:11, 122:1,
122:6
sentera
15:9, 15:14,
16:3, 17:16,
17:21, 18:16,
18:17, 20:18,
109:11, 109:19,
110:3
separate
42:8, 51:8

september	31:9, 31:16,	solar	19:6, 19:8,
25:7	31:21, 32:21,	26:7, 27:4,	26:15, 28:11,
serial	39:9, 43:14,	27:21	67:20, 71:1,
37:16, 56:2	53:16, 57:10,	solar-powered	89:20, 96:2,
serve	57:11, 57:14,	27:16	98:5, 109:1,
79:6	58:6, 63:6,	solar-uav	112:20, 112:22,
serves	65:21, 66:16,	28:3	113:14
18:7, 18:19,	71:8, 71:13,	some	sounds
18:21, 48:10	90:5, 91:1,	9:12, 14:6,	9:6, 105:15
sessions	93:16, 93:19,	14:7, 14:11,	space
7:12, 7:13,	94:19, 113:11,	17:5, 18:6,	14:18, 68:16,
7:18	113:21, 114:8	18:9, 22:21,	68:21
set	signals	25:3, 25:20,	spatially
16:6, 85:7,	39:8, 39:19,	27:9, 27:11,	110:14
92:14, 127:7,	40:15, 40:20,	28:12, 34:7,	speak
128:8	43:17, 67:2,	36:19, 40:4,	108:19
setting	94:2	41:14, 45:19,	spec
6:2, 6:5	signature	47:8, 47:14,	31:19, 33:15,
several	87:22, 88:5,	50:10, 52:12,	36:11, 36:19,
12:3, 22:2,	88:12	54:4, 54:9,	37:8, 37:14,
23:5, 24:13,	signature-mig2k	54:13, 58:19,	37:20, 38:2,
25:7, 27:22,	128:11	69:12, 89:6,	38:7, 38:10,
28:14, 28:16,	signatures	89:17, 94:19,	45:17, 46:15,
28:17, 33:2	87:5, 87:8	101:13, 106:8,	48:11, 48:12,
shape-shifting	signing	106:13, 108:13,	48:13, 54:21,
28:6	127:22	110:21, 112:5,	55:1, 55:3,
ships	similar	123:10, 125:21	58:14, 60:15,
96:4, 96:5	47:1, 81:20,	somehow	69:17, 71:17,
short	115:7, 117:18	58:5	72:2, 72:17,
30:4, 69:19,	simply	someone	72:20, 77:20,
105:13	120:10	9:18, 20:3,	78:1, 78:13,
shorthand	since	29:10	79:21, 89:12,
127:1	23:18, 52:12	something	89:18, 90:18,
should	sites	12:7, 14:20,	91:6, 91:20,
35:1, 35:2,	25:8	27:12, 33:8,	97:4, 107:12,
57:18, 114:3	sitting	33:12, 33:17,	108:1, 125:4
show	118:20	37:15, 42:4,	specific
45:14, 88:16	skip	57:4, 91:17,	17:3, 21:10,
shown	120:10	92:1, 94:22,	26:5, 44:13,
98:20, 120:22	skipping	96:12, 100:12,	45:5, 59:18,
shows	98:7	109:4	98:10, 99:20,
46:16, 75:16,	skips	sometimes	100:2, 100:4,
120:11	75:20, 76:12,	95:8, 116:4	101:1, 101:5,
shut	76:19	somewhat	101:9, 101:12,
10:3	slightly	115:4	101:14, 102:4,
shutdown	94:8	somewhere	104:14, 104:17,
19:4	software	11:20, 52:13	122:2, 122:7
signal	110:22	sorry	specifically
30:22, 31:5,		10:8, 10:14,	11:19, 73:16,

80:21, 86:7, 112:18, 115:17 specification 31:12, 52:22, 54:18, 69:13, 122:15 specifications 38:21, 85:8 specs 102:7 speculate 17:4 spent 112:5 spoofing 58:6 spot 22:15 staff 17:1 stake 58:5 stand 34:2 standard 27:19 start 100:16, 104:10, 109:9 start-up 15:14 started 25:13, 26:11, 95:6 starting 10:6, 55:10, 123:20 starts 12:19, 47:8, 74:6, 78:17, 87:19, 113:17, 113:18, 122:1 state 2:11, 5:8, 13:14, 39:6, 42:19, 43:21, 88:1, 88:5, 97:22, 98:8,	123:22, 124:7, 124:13, 124:17, 125:2, 125:18 stated 59:9, 89:11, 91:6, 91:8, 91:20 statement 53:7, 85:22, 86:10 statements 43:3, 82:9 states 1:1, 9:3, 40:18, 41:4, 41:6, 48:3, 49:3, 52:4, 65:18, 71:6, 78:2, 106:12, 121:15 station 57:10, 57:16, 100:11, 100:14, 100:19 staying 121:8 stem 15:17 stenographically 127:13 step 75:16, 75:18, 76:1, 76:3, 76:8, 76:10, 76:11, 76:18, 77:3, 120:8, 120:10 steps 75:20, 78:1 stick 12:7, 72:2, 77:19 still 65:14 stop 10:10, 94:3 strategies 16:18	strike 41:5, 103:4 stronger 56:19, 60:10 student 23:14 students 16:15, 25:20, 26:22 studied 96:12 suav 27:16 subject 10:19, 12:1, 12:5, 12:21, 13:10, 81:11 submitted 8:18 subscriber 96:10 substance 61:5 substitute 90:15 successful 16:7 sufficient 75:3 suggesting 45:9 suhrid 3:12, 5:16, 7:8 suitable 83:2, 83:6, 86:4, 107:17 suite 3:7, 3:15 summarizes 43:4, 86:1 support 29:15, 31:12, 31:18, 33:2, 38:20, 39:2, 39:3, 39:6, 39:13, 39:16, 40:18, 43:1, 43:2, 52:22,	54:18, 54:21, 58:18, 60:1, 60:13, 72:18, 77:10, 79:6, 80:20, 81:20, 81:22, 82:3, 85:5, 90:20 supported 38:1, 55:4 supporting 6:7 supposed 41:2 sure 5:10, 9:2, 13:12, 14:18, 20:8, 24:14, 27:8, 38:17, 44:9, 45:8, 49:11, 52:3, 54:12, 54:15, 55:9, 56:21, 61:2, 61:20, 68:7, 75:15, 76:13, 80:2, 81:6, 81:7, 86:16, 94:10, 97:17, 97:21, 102:11, 102:14, 106:10, 109:16, 110:12, 111:4, 113:15, 114:21, 116:2, 117:8 susan 1:21, 2:9, 127:3, 128:13 sworn 5:3, 6:16, 127:8 systems 1:8, 14:8, 14:21, 15:13, 21:6, 21:8, 26:6, 28:20, 29:17, 36:2, 36:4, 41:12, 42:8, 48:19, 66:7, 98:1,
---	--	--	--

98:3, 109:11,
110:18, 110:20,
112:16, 113:2,
127:16

T

table

31:18, 32:2,
33:3, 39:22,
58:18, 77:10,
81:22, 82:3,
85:5, 90:20

tail-sitter

28:8

take

22:11, 30:4,
61:18, 66:20,
85:10, 102:12,
105:13, 108:12,
108:15, 122:14,
123:19

take-off

28:6

taken

127:4, 127:10,
127:12

takes

27:22, 28:14,
28:20, 68:1

talented

25:20

talked

16:9, 17:9

talking

23:1, 28:15,
37:21, 41:12,
66:17, 88:17,
89:8

talks

42:5, 45:4,
124:6

tampering

34:15, 40:11,
46:5, 49:20,
50:19, 51:10,
59:3, 107:10

tandem

78:6

targets

14:3

task

11:3

tasks

13:18

taxi

95:14, 95:16

teaches

43:15

team

7:6, 7:7

technique

89:22

techniques

14:9, 15:21,
16:4

technology

15:16

tell

21:15, 27:13,
64:16, 103:9

term

23:20, 36:22,
81:17, 90:17,
94:21

termination

115:19

terms

95:9, 116:4

testified

5:3, 6:14

testify

6:17, 6:19

testimony

61:5, 127:11,
127:12

texas

2:11, 3:8,
128:14

text

33:16, 69:12,
71:17, 123:10

th

127:20

thank

28:13, 30:8,
61:11, 86:11

thanks

10:16, 102:9

thereafter

127:13

thesis

13:3, 13:11

thing

21:9, 60:9,
66:19, 68:8,
68:9, 68:11,
81:15, 100:8,
124:19, 125:1

things

16:10, 17:9,
22:15, 23:2,
23:3, 23:5,
33:5, 36:19,
96:5, 110:5,
110:11, 125:3

think

12:3, 18:20,
19:11, 23:22,
33:15, 36:9,
37:8, 38:1,
42:11, 46:6,
46:15, 48:14,
54:20, 57:4,
57:17, 58:4,
68:14, 69:2,
69:11, 69:12,
72:3, 77:8,
78:6, 79:5,
79:22, 80:11,
81:14, 85:9,
85:12, 85:21,
88:15, 89:17,
90:17, 92:10,
92:20, 93:3,
96:21, 100:22,
105:10, 107:4,
107:11, 108:1,
108:21, 109:16,
116:5, 116:7,
124:11, 126:3

thinking

95:16

third

26:4, 32:2,

53:19, 90:8

thought

55:4, 75:2

thoughts

12:10

threat

92:6, 125:13

threats

25:9, 25:17

three

7:14, 7:17,
125:14

through

26:17, 54:10,
76:11, 101:8

thrown

26:17, 26:18

tied

14:19

ties

104:13, 104:17

time

8:14, 8:16,
13:15, 14:5,
14:10, 17:5,
18:6, 18:9,
20:3, 21:6,
21:8, 21:16,
25:19, 26:10,
28:21, 29:19,
32:15, 52:12,
54:9, 60:20,
110:15, 110:21,
112:5

timeframe

16:13, 16:14,
20:14, 21:1,
24:8, 29:5

times

5:19, 5:20,
112:12

title

26:6

titled

13:4

today

6:20, 8:20

today's

6:22, 8:4, 8:7

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

155

together	106:15, 106:18,	true	34:20, 36:1,
117:4	107:7, 112:15,	74:21, 75:19,	36:6, 37:1, 91:3
top	112:20, 112:21,	75:21, 76:20,	types
87:15, 87:21,	113:1, 113:2,	81:1, 81:9,	6:6, 6:12,
118:12, 119:12	114:11, 114:12,	88:4, 98:12,	33:5, 35:12
topics	114:14	99:6, 103:2,	typewriting
17:20	transmissional	112:13, 117:21,	127:14
total	45:15	118:18, 119:13,	U
8:6, 8:14	transmissions	119:18, 120:1,	uav
totality	46:7, 46:19	120:14, 120:19,	24:5, 24:7,
36:2	transmit	121:3, 124:14,	26:7, 26:9,
towards	32:9	127:10	26:18, 27:21,
124:1	transmits	trust	28:5, 103:17,
track	41:21, 42:1,	86:17	103:18, 104:17,
13:6, 23:17,	42:13	truthfully	104:19, 124:1,
95:17	transmitted	6:17, 6:20	125:14
tracking	34:8, 40:5,	try	uavs
83:15, 83:16	40:21, 40:22,	14:17, 110:11,	14:4
trademark	41:16, 45:21,	110:19, 116:1	uber
1:1	46:22, 47:10,	trying	95:14, 95:16
transcript	47:16, 47:19,	20:18, 110:3	uh-huh
115:8	48:4, 48:16,	turn	55:18, 71:9,
transform	50:12, 58:21,	12:15, 22:1,	111:20, 115:16,
28:7	99:10, 103:18,	24:2, 42:16,	115:20, 118:15,
transformable	105:5, 106:14,	68:14, 86:14,	121:16, 123:7
28:3	112:14, 114:9,	96:6, 102:10,	under
transiting	114:12, 114:13	116:13, 119:7,	127:14
101:8	transmitter	121:10	underscore
transmission	53:17, 90:6,	turned	86:9
31:13, 31:14,	98:8, 98:14,	119:9	understand
32:3, 34:9,	99:2	turning	6:16, 33:11,
39:8, 39:18,	transmitter's	112:4	35:4, 36:21,
40:6, 40:20,	98:9	twin	38:11, 48:7,
41:1, 41:2,	transmitting	18:22	60:6, 61:3,
41:7, 41:8,	41:7, 41:9	two	64:16, 64:17,
41:13, 41:17,	transponder	7:14, 7:17,	67:7, 77:15,
41:21, 41:22,	42:3, 47:22	18:12, 27:21,	91:11, 91:13,
42:8, 44:6,	transponders	42:7, 46:7,	92:15, 94:18,
45:6, 45:22,	96:7	46:14, 46:19,	95:11
46:12, 47:11,	trial	46:20, 49:10,	understanding
47:17, 47:20,	1:3, 6:14	57:19, 62:5,	31:21, 32:20,
48:5, 48:9,	tried	75:2, 92:10,	38:12, 48:13
48:17, 48:22,	28:12	93:12, 104:6,	understood
49:2, 50:13,	tries	107:4, 113:1,	21:16
51:16, 51:22,	59:14, 94:2	113:2, 125:2	undetected
52:5, 52:9,	trigger	tye	96:6
53:14, 87:13,	62:6, 83:13,	3:14	unencrypted
87:14, 90:3,	83:14	type	100:20
		20:12, 34:16,	

unique 20:4, 31:17, 32:13, 32:14, 33:18, 36:11, 38:5, 38:13, 90:15, 91:1, 91:10, 91:13, 91:18, 91:19, 91:21, 97:7, 98:9, 100:7, 100:14, 101:11, 107:22, 108:3, 108:8, 115:21 uniquely 89:11, 92:1, 105:9, 107:3 united 1:1 university 29:11 unless 58:8 unlocked 70:10, 70:14, 73:3, 83:4, 83:10, 123:22, 124:7, 124:13, 124:17, 125:2, 125:5, 125:8, 125:18 unlocking 83:20, 83:22 unlocks 70:13, 83:9 unmanned 27:4, 102:22 unmarked 9:8 until 34:2 usability 17:14 usable 18:1 use 15:17, 15:20, 31:22, 36:16, 54:20, 55:21,	57:19, 63:20, 78:8, 78:12, 78:22, 81:17, 81:19, 94:2, 94:20, 101:1, 101:12, 102:4, 110:19, 110:21, 120:12 useful 17:22 user 50:21 uses 98:8, 99:19, 104:3 using 14:13, 14:20, 15:16, 15:22, 21:13, 23:21, 34:4, 53:13, 53:20, 58:15, 59:20, 90:1, 90:9, 94:1, 98:3, 110:4 V vague 11:10, 20:15, 22:20 vagueness 10:10 valid 74:12, 74:17, 75:8, 76:2, 76:22 variables 14:8 variation 34:3, 49:6, 51:8, 53:12, 53:19, 58:15, 90:8 variations 22:3, 22:4, 34:7, 40:4, 41:14, 45:19, 46:17, 47:9, 47:14, 50:11,	50:22, 51:5, 58:19, 86:1, 106:8, 106:13 variety 6:8, 25:20, 26:11 vehicle 21:14, 21:15, 21:17, 21:22, 27:4, 42:5, 42:12, 48:1, 103:1, 113:22 vehicles 21:11 verifiable 110:17 verification 56:5, 56:19, 57:9, 57:12, 57:17, 58:2, 94:5, 94:6, 94:7, 94:9, 94:22, 115:21 verified 53:15, 59:10, 63:4, 63:7, 64:11, 90:4, 90:13, 93:19, 100:12 verifies 115:17 verify 55:16, 56:8, 56:12, 56:15, 60:12, 64:19, 66:6, 111:5, 111:7, 115:1, 115:14 verifying 53:5, 57:2, 59:6, 60:2, 60:4, 60:15, 60:18, 98:2, 116:6 versions 9:14 versus 22:10, 77:15,	92:7, 94:4, 94:14 vertical 28:6 videotaped 1:15, 2:8 viewed 88:12 viggiano 97:13, 97:22, 98:16 visible 16:2 vision 13:4, 13:5, 15:4, 29:17 visual 77:8, 77:21 W wadekar 3:12, 4:6, 10:8, 10:14, 11:1, 11:9, 80:4, 85:14, 85:16, 108:14, 108:17, 108:21, 109:5, 109:8, 126:6 wall 27:19 walters 3:4, 4:5, 5:5, 11:11, 61:8, 85:15, 105:13, 108:10, 108:19, 126:8 want 10:9, 10:11, 10:18, 11:20, 11:21, 12:7, 17:4, 23:20, 26:8, 28:18, 28:19, 33:7, 33:17, 35:5, 35:6, 35:7, 36:1, 36:2, 44:8, 47:5,
--	---	---	--

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

157

52:13, 54:4, 54:10, 56:20, 61:16, 64:4, 66:20, 68:7, 68:9, 73:8, 85:18, 86:9, 86:16, 87:17, 94:3, 94:10, 96:5, 108:15, 112:7, 115:13, 116:22, 117:2, 117:5, 117:7, 122:14, 125:6, 125:15 wanted 19:14, 45:8, 61:18 waste 125:6 water 108:13, 110:6 way 14:4, 23:6, 29:13, 35:16, 37:20, 38:10, 48:7, 51:1, 57:15, 60:9, 68:6, 111:2, 111:4, 116:8, 122:6, 125:6, 128:6 ways 16:20, 52:14 we're 5:14, 22:12, 23:1, 36:4, 37:21, 89:8 we've 85:9, 106:11 weeds 15:20, 110:7 week 8:12 welcome 30:7, 61:10, 86:13, 86:19, 105:17 went 7:2	weren't 30:1, 45:9 whatever 13:14 whenever 36:1 wherein 30:20, 31:14, 34:10, 40:7, 50:14, 58:21, 65:19, 66:21, 71:6, 71:11, 106:16, 124:1 whereof 128:8 whether 17:15, 52:6, 72:10, 82:18, 84:8, 91:11, 91:13, 100:20, 101:2, 101:14, 101:15, 120:17 whichever 105:20, 117:7 whitmarsh 86:15, 86:17, 87:2, 87:5, 87:22, 97:19 whitmarsh's 88:1 whole 16:6, 19:9, 54:10, 60:17, 66:19, 68:13, 68:17, 78:18, 78:19, 86:8, 105:2, 125:12 wifi 53:17, 90:6 windows 26:18 wireless 113:10, 113:19, 122:10, 122:12 within 7:20, 21:21, 22:16, 42:4, 47:22, 48:10,	73:4, 79:13, 82:19, 84:9 without 19:4, 70:1, 72:22, 73:22, 74:10, 120:8 witness 4:3, 10:16, 50:5, 89:2, 108:11, 108:12, 108:16, 127:7, 127:11, 128:8 word 79:18, 79:22, 80:2, 81:19, 120:12 words 19:10, 29:14, 57:22, 59:13, 63:20, 66:4, 67:13, 71:13, 78:13, 78:22, 79:3, 80:7, 80:11, 81:20, 91:22, 99:22, 100:10, 104:8, 104:12, 104:13, 104:20, 113:7, 115:2 work 13:12, 14:12, 15:8, 16:3, 16:21, 17:6, 17:15, 18:15, 19:22, 25:8, 25:21, 27:10, 28:16, 29:2, 29:13, 57:6, 78:6, 107:5 worked 26:14, 29:4 works 29:8 written 30:17, 79:8 wrong 57:16 Y yeah 21:3, 23:11,	35:17, 43:12, 48:18, 62:14, 63:19, 71:2, 71:3, 73:7, 73:15, 74:20, 76:14, 76:15, 77:4, 78:17, 90:19, 97:15, 108:16, 113:14, 113:15, 113:16, 113:19, 116:18, 116:19, 116:21, 117:10, 117:12, 118:12, 121:15, 121:17, 124:21 years 15:12, 16:9, 16:19, 24:8, 28:1, 28:11, 28:14, 28:16, 28:17 yourself 61:17, 113:17, 122:5 \$ \$500 8:17 . .6500 3:9 .8000 3:17 0 004 24:20 00530 1:11, 9:20 01 2:4, 126:10, 127:21 02110 3:16 05 30:6 1 105:16
---	--	---	---

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

158

1,000

80:10

10

6:1, 8:5,

11:12, 16:19,

30:6, 30:15,

30:17, 30:20,

31:11, 33:22,

38:19, 38:21,

39:3, 39:14,

39:17, 40:18,

41:3, 44:12,

55:8, 55:12,

59:8, 59:17,

61:1, 61:12,

65:14, 65:18,

70:9, 80:16,

87:12, 90:15,

91:12, 93:12,

99:11, 113:9,

113:14, 113:17,

114:22, 128:14

10,000

93:4

10,249,199

1:12

100

23:17, 32:12,

34:7, 34:12,

40:4, 40:9,

41:15, 42:6,

42:15, 46:22,

47:9, 48:1,

48:2, 48:10,

49:18, 50:17,

59:1, 64:7,

89:7, 95:2,

106:13, 113:5,

113:22, 124:3

1001

40:13, 53:1,

70:21, 112:4,

112:8

1006

87:1

1007

97:18, 98:17,

101:7

101

32:3, 32:18,

33:11, 53:15,

70:21, 90:4

1011

33:12, 36:10,

36:13, 36:14

103

122:11

104

70:9, 70:11,

73:1

105

70:12, 70:14,

71:19, 73:20,

78:3, 80:13,

122:8, 123:21,

125:18

109

4:6

11

6:1, 25:7,

61:9, 122:10,

128:15

110

70:4, 122:8

12

85:20, 86:12,

101:7

121

103:3

126

86:14, 87:4,

87:18

127

87:19

129

97:11, 97:22,

98:20

13

15:1, 15:6,

32:1, 32:22,

109:17

130

102:10, 102:17

131

103:22

14

32:1, 32:22,

40:12, 45:18,

46:6, 46:18,

85:20, 123:20

14487

128:15

15

34:6, 40:3,

40:22, 70:9,

86:12

16

11:12, 24:2,

24:5, 24:9,

24:10, 32:1,

32:22, 40:13,

40:14, 53:3,

53:11

17

34:1, 40:14,

53:11, 60:1

18

34:1, 40:14,

53:11, 60:1,

98:21, 99:1

1980

23:13

199

10:4, 10:18,

10:22, 11:8,

11:15, 11:22,

12:5, 12:11,

35:21, 47:2,

51:19, 52:6,

105:19, 112:8

1990

13:15

1st

128:9

2

2

126:10, 127:21

20

34:6, 40:3,

40:22, 69:17,

73:18, 78:2,

78:17, 79:3,

81:13

200

84:12

2000

26:15, 27:9

2001

3:7, 9:1,

30:10, 73:17

2002

32:1, 32:2,

32:22, 33:22,

40:1, 60:1,

69:16, 70:19,

73:5, 73:17,

74:4, 75:4,

75:13, 78:15,

81:12, 90:21,

105:20, 116:6,

116:9, 116:15,

121:14

2003

25:13, 29:2,

32:16, 40:12,

44:3, 70:17,

80:20, 81:3,

81:8, 81:10,

81:16, 82:5,

84:11, 84:14,

85:6, 85:7,

117:1

2004

24:20

2013

27:6

2015

20:14, 21:1,

23:1, 23:8,

23:12, 26:5

2016

25:13, 27:17,

27:21, 29:2

2017

28:2

2025

1:11, 9:20

2026

1:17, 2:3,

23:1, 127:20,

128:9

21

74:5, 74:6,

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

AXON EXHIBIT 1038, Page 158

Axon Enterprises, Inc., Dedrone Holdings, Inc., and Skydio, Inc. v. Airspace Systems, Inc., IPR2025-00629

Transcript of Nikolaos Papanikolopoulos, Ph.D.
Conducted on February 25, 2026

159

78:15, 105:16
214.953
3:9
22
98:10, 98:13,
99:2, 99:5,
99:19, 100:2,
101:2
24
34:2, 61:9,
70:3, 70:8,
78:15, 98:10,
99:19, 101:2,
101:10, 101:14,
102:4, 102:6
25
1:17, 2:3,
8:10, 127:20
26
103:5, 103:8,
103:11, 128:15
27
128:14
28
105:16
3
30
34:1, 34:2,
44:1, 44:16,
46:7, 60:1,
128:15
300
32:5, 32:7,
53:16, 90:5,
91:1, 114:1
303
42:20, 43:14,
122:20, 123:14,
123:22, 125:19
304
122:9, 123:14,
124:1, 124:2
31
34:3, 44:1,
45:3, 46:16,
90:19, 104:14,
128:14

310
32:7, 32:9,
32:10, 32:11,
53:6, 53:18,
60:19, 90:7,
123:11
32
44:2, 99:7,
99:8, 99:13,
101:15, 101:20,
101:22, 102:6
34
86:12
36
69:16, 73:18,
74:4, 78:2,
78:16, 78:17,
79:3, 81:13
37
69:16, 73:18,
78:2, 78:21,
79:3, 81:13
3700
3:15
39
103:6, 103:8
4
40
105:11
42
79:6, 80:22,
81:8, 82:5,
82:9, 82:16,
84:10, 85:22,
86:8, 102:17
43
69:15, 70:18,
73:12, 79:6
44
32:17, 102:18
45
32:17
47
73:11, 73:13,
73:16, 80:17
48
116:17, 116:19

5
500
70:1, 73:22,
74:10, 75:16,
117:14, 120:21
501
70:2, 74:1,
74:11, 75:20,
76:1, 76:8,
117:19
502
74:12, 74:18,
75:8, 75:20,
76:11, 76:12,
76:19, 119:20
503
75:18, 76:3,
76:18, 77:3,
77:12, 117:16,
117:20, 119:21
51
32:18
52
30:6
57
40:13, 47:3,
47:6, 50:10,
52:3, 53:2,
106:4, 106:6,
112:9, 114:10
59
44:2, 52:3,
112:19
5th
69:16
6
60
49:12
61
10:6
617.456
3:17
62
32:19, 49:13,
87:16
620987
1:22

64
40:13, 53:2,
113:5
65
89:21
6531
128:14
66
40:13
7
75201
3:8
78
31:10
8
80
39:14
81
39:22
838
42:20, 43:14,
43:21, 44:3,
44:5
84
30:10, 30:11,
30:14, 30:18,
33:21, 38:16,
38:18
85
30:10, 42:16,
42:19, 43:10
86
43:5
87
33:22, 52:21,
55:10, 58:18,
59:18, 114:17
9
9
2:4, 11:12,
30:6, 127:21
900
3:7
93
61:14



Suhrid Wadekar, Esquire
Prince Lobel Tye LLP (Boston)
One International Place Suite 3700
Boston, MA 02110

Re: Deposition of **Nikolaos Papanikolopoulos, Ph.D.**

Date: 2/25/2026

Case: Axon Enterprise, Inc., et al. -v- Airspace Defense, Inc. (PTAB)

Dear Sir/Madam,

The above-referenced transcript has been finalized for review. If applicable, signature is required within 30 days from the date of receipt of this letter.

In accordance with the disposition of signature at the deposition or the pertinent jurisdictional rules, the deponent should follow these instructions to complete the Errata Sheet:

- (1) Read the transcript and indicate any corrections or changes in ink on the enclosed Errata Sheet. Please include page and line numbers. If more space is needed for corrections, please use a blank sheet of paper. If no corrections or changes are necessary, please indicate "no corrections" or "no changes" on the Errata Sheet.
- (2) Sign and date the Errata Sheet and Acknowledgement of Deponent/Affiant pages.
- (3) Please return the executed Errata Sheet and Acknowledgement pages to the address indicated below, submit via fax (888-503-3767) or email (transcripts@planetdepos.com).

A copy of this letter and the returned signature pages, if any, will be distributed to counsel.

Sincerely,

Production Department
Planet Depos, LLC
451 Hungerford Drive
Suite 400
Rockville, Maryland 20850

No. 620987

Re: Deposition of **Nikolaos Papanikolopoulos, Ph.D.**

Date: 2/25/2026

Case: Axon Enterprise, Inc., et al. -v- Airspace Defense, Inc. (PTAB)

Return to: transcripts@planetdepos.com

Page	Line	Correction / Change and Reason
7	6	“meet” s/b “met” (transcription error)
10	18	“so you” s/b “so do you” (transcription error)
12	4	“opinion” s/b “opinions” (transcription error)
13	13	“interceptor” s/b “end effector” (transcription error)
13	15	“for” s/b “from” (transcription error)
14	8	“systems including” s/b “systems by including” (transcription error)
14	13	“using in” s/b “using it in” (transcription error)
14	18	“accessing” s/b “access to” (transcription error)
15	17	“locate marking” s/b “Lockheed Martin” (transcription error)
16	1	“only the” s/b “only in the” (transcription error)
16	15	“Adrahtas” s/b “Zermas” (factual error)
17	1	“This was staff camera by their” s/b “The stuff in their camera” (transcription error)
17	13	“planting” s/b “planning” (transcription error)
18	7	“same” s/b “some” (transcription error)
19	18	“airport” s/b “drone” (transcription error)
23	3	“a” s/b “the” (transcription error)
23	6	“way, need” s/b “way, we need” (transcription error)
23	12	“darker” s/b DRAPER (transcription error)
23	16	“Bingman” s/b “Dickmanns” (factual error)
23	17	“track” s/b “truck” (transcription error)
23	18	“we are” s/b “they were” (transcription error)

March 6, 2026

(Date)



(Signature)

Re: Deposition of **Nikolaos Papanikolopoulos, Ph.D.**

Date: 2/25/2026

Case: Axon Enterprise, Inc., et al. -v- Airspace Defense, Inc. (PTAB)

Return to: transcripts@planetdepos.com

Page	Line	Correction / Change and Reason
24	19	“This exhibit” s/b “This is exhibit” (transcription error)
25	8	“grants work” s/b “grants to work” (transcription error)
26	4	“in” s/b “indeed” (transcription error)
26	5	“of” s/b “to the” (transcription error)
27	1	“of” s/b “in” (transcription error)
27	11	“from National” s/b “from the National” (transcription error)
28	4	“referring here” s/b “referring to here” (transcription error)
28	21	“figures” s/b “iterations” (transcription error)
29	16	“project” s/b “projects” (transcription error)
33	8	“missing” s/b “mentioning” (transcription error)
33	11	“101” s/b “1011” (transcription error)
34	13	“barrier” s/b “factor” (transcription error)
36	1	“these” s/b “this” (transcription error)
36	18	“satisfies” s/b “satisfy” (transcription error)
46	6	“POSITA 14” s/b “POSITA in paragraph 14” (transcription error)
46	7	“the 30” s/b “the paragraph 30” (transcription error)
51	7	“respect” s/b “respect to the paragraphs” (transcription error)
52	13	“You” s/b “Do you” (transcription error)
53	18	“patter” s/b “pattern” (transcription error)
56	12	“that the indeed” s/b “that indeed” (transcription error)
56	20	“end” s/b “and” (transcription error)
58	10	“mislead” s/b “misled” (transcription error)

March 6, 2026

(Date)



(Signature)

No. 620987

Re: Deposition of **Nikolaos Papanikolopoulos, Ph.D.**

Date: 2/25/2026

Case: Axon Enterprise, Inc., et al. -v- Airspace Defense, Inc. (PTAB)

Return to: transcripts@planetdepos.com

Page	Line	Correction / Change and Reason
60	6	"is hard" s/b "is not hard" (transcription error)
66	3	"receive" s/b "received" (transcription error)
66	7	"systems connect" s/b "system is connected" (transcription error)
82	9	"the 42" s/b "the paragraph 42" (transcription error)
100	12	"need" s/b "needs" (transcription error)
106	1	"So you" s/b "So if you" (transcription error)
119	1	"identified" s/b "identifier" (transcription error)

March 6, 2026

(Date)



(Signature)

No. 620987

Re: Deposition of **Nikolaos Papanikolopoulos, Ph.D.**
Date: 2/25/2026
Case: Axon Enterprise, Inc., et al. -v- Airspace Defense, Inc. (PTAB)
Return to: transcripts@planetdepos.com

ACKNOWLEDGMENT OF DEPONENT

I, Nikolaos Papanikolopoulos, Ph.D., do
hereby acknowledge that I have read and examined the
foregoing testimony, and the same is a true, correct
and complete transcription of the testimony given by
me and any corrections appear on the attached Errata
sheet signed by me.

March 6, 2026

(Date)



(Signature)

PLANET DEPOS
888.433.3767 | WWW.PLANETDEPOS.COM