

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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VALVE CORPORATION,

Petitioner,

v.

Case No. IPR2024-00478

Patent No. 9,430,042

IMMERSION CORPORATION,

Patent Owner.

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DEPOSITION OF ROBERT AKL, D.SC.

Conducted Remotely

2111 Norwalk Lane

Dallas, Texas

December 18, 2024

10:05 a.m. to 12:23 p.m.

Reporter: Laurie J. Berg, CCR, RPR, CRR

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I N D E X

DEPONENT: ROBERT AKL, D.SC.

(Present via videoconference.)

EXAMINATION	PAGE
(BY ATTORNEY SPEED)	5

E X H I B I T S

NO.	PAGE
(No exhibits marked.)	

P R E V I O U S L Y - M A R K E D E X H I B I T S

NO.	
Exhibit 1001	United States Patent No. 9,430,042 B2, Aug. 30,2016 (21 pages)
Exhibit 2007	Declaration of Robert Akl, D.Sc. in Support of Immersion Corporation's Patent Owner Response (87 pages)
Exhibit 2008	Curriculum Vitae, Professor Robert Akl, D.Sc. (58 pages)

P R O C E E D I N G S

MADAM COURT REPORTER: This is Laurie Berg. I am a Registered Professional Reporter and a Certified Realtime Reporter with the National Court Reporters Association, as well as a Certified Court Reporter with the State of New Hampshire. I am a Notary Public in the State of New Hampshire and the Commonwealth of Massachusetts.

The attorneys participating in this proceeding acknowledge that I am not physically present in the proceeding room, nor am I physically present with the witness, and that I will be reporting this proceeding remotely via videoconference.

They further acknowledge that, in lieu of an oath administered in person, the witness will verbally declare his testimony in this matter under the penalty of perjury.

The parties and their counsel consent to this arrangement and waive any objections to this manner of reporting the proceeding.

Will the attorneys now please indicate your agreement by stating your name and your agreement on the record, after which I will swear in the witness

1 and we may begin.

2 MR. SPEED: Nathan Speed for Wolf,
3 Greenfield; I agree with the stipulation.

4 MR. XIE: And this is Moses Xie with
5 Folio Law Group, also representing the witness,
6 Dr. Robert Akl, and I agree with the stipulation.

7 (Deponent sworn.)

8 MADAM COURT REPORTER: Thank you very
9 much. You may proceed.

10

11 ROBERT AKL, D.SC.

12

13 having been satisfactorily identified and
14 duly sworn remotely by the Notary Public, was examined
15 and testified as follows:

16 DIRECT EXAMINATION

17 BY MR. SPEED:

18 Q. Morning, Dr. Akl.

19 A. Good morning.

20 Q. Can you just state your full name for the
21 record?

22 A. Robert Akl.

23 Q. Akl, okay.

24 And you understand you're under oath today?

1 A. Yes.

2 Q. Yeah. And you understand that it's a
3 question-and-answer process where you need to provide
4 your answers audibly during the deposition?

5 A. Yes.

6 Q. Okay. And from time to time, your counsel
7 may object. You still need to answer the question
8 unless he instructs you not to answer the question.

9 Do you understand that?

10 A. Yes.

11 Q. Okay. And you've been -- I'm -- have you
12 been deposed before?

13 A. Yes.

14 Q. And approximately how many times have you
15 been deposed?

16 A. Over a hundred and 50 times.

17 Q. Okay. So you've been deposed more than I've
18 taken, which is always great (laughs).

19 What did you do to prepare for today's
20 deposition?

21 A. I reviewed relevant exhibits like my
22 declaration, the asserted prior art. I did that over
23 the weekend, this past weekend. I also had a call
24 with counsel for a couple hours.

1 Q. I'm going to put into the chat what's
2 previously been marked as 2007. Let's see if that
3 works.

4 Let me know when you have it on your end.

5 MR. SPEED: And, Laurie, I don't see the
6 realtime up yet.

7 MR. XIE: Same here.

8 (Off the record at 10:58 a.m.)

9 (Recess taken.)

10 (Back on the record at 11:01 a.m.)

11 BY MR. SPEED:

12 Q. So I put into the chat what's previously been
13 designated as Exhibit 2007.

14 Did you receive that?

15 A. Yes.

16 Q. All right. And do you recognize this as your
17 declaration in this proceeding?

18 A. (Deponent viewing exhibit.) Yes.

19 Q. All right. And if you turn to Page 84, is
20 that your signature?

21 A. (Deponent viewing exhibit.) Yes.

22 Q. Okay. And approximately how much time did
23 you spend putting this declaration together?

24 A. About 20 hours.

1 Q. And how many times have you served as an
2 expert witness in a patent litigation matter?

3 A. Over 200 times.

4 Q. I'm going to put into the chat what's
5 previously been marked as Exhibit 2008.

6 Do you have it?

7 A. (Deponent viewing exhibit.) I do.

8 Q. Okay. Perfect. And this is a copy of your
9 CV, correct?

10 A. (Deponent viewing exhibit.) Yes.

11 Q. And if I look at the bottom, it says it was
12 updated as of 2020 -- October of 2024; is that right?

13 A. (Deponent viewing exhibit.) Yes.

14 Q. Okay. And it's accurate, to the best of your
15 knowledge?

16 A. Yes.

17 Q. Okay. So according to your CV, you have
18 broad expertise in wireless communication, Bluetooth,
19 CDMA/WCDMA network optimization, GSM, VoIP, telephony,
20 computer architecture and computer networks; is that
21 right?

22 A. In the summary, that is what I state at a
23 high level.

24 Q. Okay. And under Areas of Expertise, you list

1 certain areas of expertise; is that right?

2 A. Yes, again, this is not an exhaustive list,
3 but that is correct.

4 Q. Right. And it's fair to say that those areas
5 of expertise that you identified all relate to
6 wireless communication technologies?

7 A. No, I disagree.

8 Q. Which one of the areas of expertise does not
9 relate to wireless communication technologies?

10 A. (Deponent viewing exhibit.) Computer
11 architecture. Network Security is not limited to
12 wireless communication. Packet-networks is not
13 limited to wireless communication. Voiceover IP is
14 not limited to wireless over -- a wireless
15 communication. Channel Coding. Channel Estimation,
16 Communication Interfaces and Standards, Compression.
17 Those are not limited to wireless communication.

18 Q. And your dissertation relates to wireless
19 communication; is that correct?

20 A. Yes, it relates to -- at the time, it was on
21 second-generation cellular communication.

22 Q. And in September of 2002, you started as an
23 assistant professor at the University of North Texas;
24 is that right?

1 A. Yes.

2 Q. And you earned tenure in May of 2008?

3 A. Yes.

4 Q. And as a faculty member at the University of
5 North Texas, you have taught courses and directed
6 research in networking and telecommunications; is that
7 right?

8 A. Among other things, yes. I also teach
9 computer organization and courses related to computer
10 architecture.

11 Q. And in addition to your academic work, you've
12 remained active in the communication industry through
13 your consulting work; is that right?

14 A. I have.

15 Q. Okay. If you could turn to Paragraph 28 of
16 your declaration, which is Exhibit 2007 --

17 A. (Deponent viewing exhibit.) I'm there.

18 Q. -- in this paragraph, you set forth your
19 understanding of how the hypothetical person of
20 ordinary skill in the art is determined; is that
21 right?

22 A. Yes.

23 Q. Right. And part of assessing the level of
24 skill in the art is to consider the level of education

1 of active workers in the field, correct?

2 A. Yes.

3 Q. And another part of assessing the level of
4 skill in the art is the rep -- rapidity with which
5 innovations are made, right?

6 A. Yes.

7 Q. Okay. And another part of assessing the
8 level of skill in the art is the type of problems
9 encountered in the art, correct?

10 A. Yes.

11 Q. Okay. And if we look at Paragraph 31 of your
12 declaration, you state that you are familiar with the
13 types of problems encountered in systems that use
14 haptic feedback; is that right?

15 A. (Deponent viewing exhibit.) Yes.

16 Q. Well, at -- so I guess at a high lev -- what
17 is haptic feedback?

18 A. Haptic feedback is a way to provide physical
19 sensations to a user interacting -- in this context,
20 interacting with an electronic device or a computer or
21 some electronics. And normally, it's the way to
22 provide sensation that would simulate a mechanical
23 device on some level.

24 Q. Is tacti -- tactile feedback a form of haptic

1 feedback?

2 A. Yes.

3 Q. Okay. What -- is force feedback a type of
4 haptic feedback?

5 A. Force feedback is an example -- is one type,
6 that is correct, where it would simulate, like a pull
7 or a push, like a "rubber band effect" or a force,
8 like you're pulling a string or a -- applying some
9 force, that would be the simulation to the user.

10 Q. Okay. So looking at Paragraph 31 of your
11 declaration, what were some of the problems that were
12 encountered in systems that use haptic feedback as of
13 the date of the patent?

14 A. (Deponent viewing exhibit.) Well, some of
15 the problems involved not providing a proper haptic
16 feedback or not providing haptic feedback at all.

17 And what haptic feedback does at a high
18 level, it provides a more immersive experience. And
19 that's part of why it's used is, it provides -- it
20 allows the user to have a better experience, a more
21 immersive experience, when using an electronic device
22 or a touchpad or some device as they're interacting
23 with the computer or a touchscreen so they get the
24 proper feedback to know that they're -- either they're

1 carrying out the action properly or the action that
2 they're doing is providing an immersive experience for
3 them.

4 Q. And are those benefits to haptic feedback
5 benefits that would've been known to a person of
6 ordinary skill in the art at the time of the
7 invention?

8 A. Those are some of the problems that were
9 being addressed at the time of the invention.

10 Q. And in Paragraph 31, you talk about -- you
11 also say that you're familiar with the rapidity at
12 which innovations are made in this field.

13 And how -- so how rapidly are innovations
14 made in the art?

15 A. There was rapidity in the inventions that
16 were done, and people, inventors, were coming up with
17 better ways to provide an immersive experience to
18 users and improve on existing art.

19 Q. If you look at Paragraph 30 of your
20 declaration, in this paragraph you set forth your
21 understanding of the person of ordinary skill in the
22 art; is that right?

23 A. (Deponent viewing exhibit.) Yes.

24 Q. And your proposed definition requires the

1 hypothetical person of ordinary skill in the art to
2 have a bachelor's degree in electrical engineering or
3 computer science or an equivalent degree; is that
4 right?

5 A. Yes.

6 Q. And your proposed definition also requires
7 the hypothetical person of ordinary skill in the art
8 to have two years of practical or industry experience
9 in the field of human-computer interaction; is that
10 right?

11 A. Or an equivalent -- a more formal education,
12 but yes.

13 Q. Okay. And is it fair to say that the field
14 of human-computer interaction relates to the various
15 ways in which humans interact with computers?

16 A. That's fair, at a high level, I agree.

17 Q. And the field of human-computer interaction
18 would include software for providing haptic feedback
19 effects to a user of an electronic device, correct?

20 A. It could. It's a combination of hardware and
21 software.

22 Q. And if you look at Paragraph 29 of your
23 declaration, that paragraph sets forth the
24 petitioner's definition of the person of ordinary

1 skill in the art.

2 Do you see that?

3 A. (Deponent viewing exhibit.) Yes, they're
4 fairly close.

5 Q. Okay. That's what it is.

6 Do -- would your opinions set forth in your
7 declaration change if the board adopted Petitioner's
8 definition of the person of ordinary skill in the art?

9 A. No. I think both definitions are fairly
10 close, and my opinions would be the same under either
11 set of qualification.

12 Q. Okay. If you could turn to Paragraph 33, in
13 this paragraph, you note that the patent owner, which
14 is Immersion, proposes a construction for the phrase
15 "input device configured to control a plurality of
16 systems," correct?

17 A. (Deponent viewing exhibit.) Yes.

18 Q. All right. And the patent owner's
19 construction is, quote, input device configured to
20 control a plurality of systems, where each system to
21 be manipulated provides context for virtual detents;
22 is that right?

23 A. (Deponent viewing exhibit.) Yes.

24 Q. All right. And do you agree with the patent

1 owner's construction?

2 A. Yes, and I provide a description in my
3 declaration supporting this construction.

4 Q. Okay. And in your opinion, the word
5 "systems" and the phrase "input device configured to
6 control a plurality of systems" would encompass
7 software applications, correct?

8 A. It could encompass software applications if
9 software applications can be manipulated and they
10 provide context for virtual detents. So that would be
11 a requirement for a software application to be
12 considered a claims system.

13 Q. Okay. And what do you mean by, provide
14 context for virtual detents?

15 A. So those are words from the specification.
16 And I do describe what it means to provide context for
17 virtual detents in Paragraphs 38 through 49.

18 But at a high level, what that means is,
19 there is -- there is a context, and so, if we look at
20 Paragraph 38, there could be, like, a profile or
21 context that configures the virtual detent for that
22 specific application that the processor can use and --
23 to -- in -- in turn, carry out the invention.

24 And so, in that context -- and I -- maybe I

1 shouldn't use the word "context."

2 In that environment, the context -- because
3 that's the term -- is a virtual detent context, or
4 like a profile, that provides an example or provides
5 instructions for the type of virtual detents that
6 would be applicable for that application, if it's a
7 software application; similarly for a -- for a system
8 in general.

9 But that's what it means to be a claims
10 system is, it needs to be a system that can be
11 manipulated and provides context for the virtual
12 detents that are going to be used as part of the claim
13 language, like the claim to be -- the invention in the
14 claim.

15 Q. Okay. It's -- so if the system, whether it's
16 a hardware system or application, instructs an
17 actuator to output a particular type of effect, would
18 that hardware device or application be a system within
19 the language of the claim?

20 MR. XIE: Objection.

21 A. So the opinion that I have is the -- the
22 system has to be manipulated, or can be manipulated,
23 and provides context for virtual detents. The context
24 for virtual detents, the -- the specification

1 describes examples of that. And I provide examples in
2 Paragraph 45, where -- Paragraph 45 provides virtual
3 detent profiles. Those would be examples of such
4 examples.

5 The -- the hypothetical that you gave me, I
6 don't know if I specifically addressed that, but
7 that's the best way I can answer your question, by
8 pointing you to examples in the specification, or one
9 example, of what virtual detent profiles are or what
10 the context is.

11 Q. Okay. So looking at Paragraph 45 that you
12 drew my attention to, if an application has code that
13 says, if Event X happens, then please output the
14 detent profile shown in Figure 9A, does that
15 application provide context for the virtual detent?

16 A. I don't know if I have articulated
17 specifically an opinion regarding your hypothetical.

18 There just needs to be an association to a
19 profile that provides context -- context for virtual
20 detents for this subsystem or this application and for
21 -- and then -- and the specification teaches that a
22 processor in a computer system can access that profile
23 that would be associated.

24 But the -- and it doesn't go into additional

1 details on the type of implementation, and I think
2 your question might be a little narrower than what
3 Paragraph 46 states.

4 Q. Okay. And if you look at Paragraph 38, where
5 we started, at the -- before you have the quote from
6 the specification, you've bolded the phrase
7 "applications contain code that provide context for
8 virtual detents."

9 Do you see that?

10 A. (Deponent viewing exhibit.) Yes.

11 Q. Okay. And -- and so if an application has
12 code that would trigger or cause a processor to
13 generate a virtual detent, is that an example of an
14 application that provides context for virtual detents?

15 MR. XIE: Objection.

16 A. That is -- at a high level, that is one
17 example that the '042 Patent describes; software
18 applications can be systems to be manipulated. When
19 those applications contain code that provide context
20 for virtual detents, and then I cite to the content,
21 Column 4, Lines 30 to 34. So that is one example that
22 I describe based on how a POSITA would understand the
23 specification.

24 Q. If you turn to Paragraph 50 --

1 A. I'm sorry, I just -- before --

2 Q. Yeah.

3 A. -- just for the record, POSITA is capital P,
4 capital O, capital S, capital I, capital T, capital A.
5 And I -- and sometimes I use the term "POSITA" and
6 sometimes I'm -- I use the term "POSA," capital P,
7 capital O, capital S, capital A. And they both are an
8 acronym for the same thing, which is a person of
9 ordinary skill in the art, just to be clear.

10 Q. Thanks. I appreciate that.

11 So if you turn to Paragraph 50 of your
12 declaration, in this paragraph, you note that patent
13 owner has taken the position that all other terms in
14 the claim should be given their plain meaning, right?

15 A. (Deponent viewing exhibit.) Yes.

16 Q. All right. And -- and if we look at
17 Paragraph 51, you -- is it correct to say that your
18 understanding of the plain meaning of a virtual detent
19 is haptic, parenthetical, touch-based, end
20 parenthetical, feedback to simulate the sensation of a
21 mechanical detent without the need for actual
22 mechanical components?

23 A. (Deponent viewing exhibit.) I am providing
24 an understanding. I'm not exactly articulating a

1 claim construction. But I think that is consistent
2 with the plain and ordinary meaning, and I believe it
3 is consistent with what Petitioner has stated in this
4 report.

5 Q. And that construction that you referenced by
6 Petitioner, that's in Paragraph 53; is that correct?

7 A. (Deponent viewing exhibit.) That -- that is
8 correct, which is in the sentence right before the
9 sentence that you read where a virtual detent includes
10 a simulated mechanical detent created through
11 vibrotactile feedback.

12 Q. Okay. And so you don't have a substantive
13 disagreement with the petitioner's construction that's
14 identified in Paragraph 53; is that correct?

15 A. I have not provided an opinion, other than I
16 agree that the -- that the plain and ordinary meaning
17 is consistent with my understanding and with what I
18 had seen with regard to this term and what Petitioner
19 proposed the construction for vibrotactile feedback as
20 it relates to the litigation.

21 Q. And then, in Paragraph 54, you identify your
22 -- the plain meaning of the term detent -- or
23 "detent" -- sorry -- "profile"; is that correct?

24 A. (Deponent viewing exhibit.) Yes. Again, I'm

1 not articulating a definition, per se, but I am
2 providing an understanding from the point of view of a
3 person of ordinary skill in the art what a detent
4 profile -- how a person of ordinary skill would
5 understand a detent profile to be tied to this
6 vibrotactile effect and the context of a -- the haptic
7 feedback that we were discussing earlier as part of
8 the claim construction, that there is some context, or
9 some profile, that would be associated with a system
10 that is manipulated -- that is to be manipulated.

11 And -- and so that profile could include some
12 specific characteristics or parameters that would
13 define how the virtual detents behave and would
14 simulate that feedback, and that would be what would
15 make a system or an application the claim subsystem in
16 the claims.

17 Q. Okay. And the characteristics or parameters
18 that would define the virtual detents, that would
19 include things like the magnitude of the effect and/or
20 its duration; is that correct?

21 A. (Deponent viewing exhibit.) Those would be
22 examples, and those would be consistent with the
23 examples that were given in the specification when we
24 were looking -- for example, in Paragraph 45 and

1 Figures 9A, 9B, 9C, 9D were examples of virtual detent
2 profiles in terms of the simulation -- the simulated
3 output that the user may experience.

4 Q. And if we look at Paragraph 56 of your
5 declaration, in that paragraph, you identify what you
6 understand the petitioner's construction to be for
7 detent profile from the district court litigation; is
8 that correct?

9 A. (Deponent viewing exhibit.) Yes.

10 Q. And is it fair to say that the petitioner's
11 construction is at least consistent with your
12 understanding of the plain meaning of the term?

13 A. I -- again, I haven't provided an opinion
14 agreeing or disagreeing, but I did say I understand
15 that the petitioner agreeing that the detent profile
16 represents a vibrotactile effect, because the
17 petitioner defines virtual detent as a vibrotactile
18 feedback that simulates a mechanical detent. So
19 that's my understanding.

20 But I -- again, I have not expressed the --
21 presented an opinion agreeing or disagreeing, other
22 than this, is my understanding of what Petitioner is
23 stating.

24 Q. If you disagreed with Petitioner's

1 construction for detent profile, would you have
2 provided an opinion on that?

3 A. Probably not here. I understand I was
4 retained in the district court matter, and I was
5 providing a declaration regarding claim construction
6 early this year, and then the case was stayed before I
7 finalized my declaration.

8 Q. I think -- okay. Well, I guess my question
9 was more, if -- having seen Petitioner's construction,
10 if you disagreed with it, would you have provided an
11 opinion explaining why you disagreed with it?

12 A. Again, I think I was answering your question,
13 but I may not have done a good job answering your
14 question.

15 I think a claim construction declaration
16 would be the correct venue to provide opinions
17 agreeing or disagreeing, rather than this declaration,
18 because a lot of times -- you know, the P -- my
19 understanding is, the PTAB sometimes may not construe
20 terms if they're not relevant to the dispute.

21 So I'm just providing the minimum amount of
22 analysis to be able to resolve the dispute rather than
23 providing complete opinions regarding claim
24 construction, because this would not be the correct

1 venue for that, is my understanding.

2 Q. Okay. So you did provide an expressed
3 construction for the term "each of the plurality of
4 systems" -- sorry, strike that.

5 You did provide a formal construction for the
6 claim term "plurality of systems," correct?

7 A. I would say Patent Owner has, which I agree
8 with.

9 Q. Okay.

10 A. And I do provide opinions in this declaration
11 if the board adopts Patent Owner's construction, and
12 also I have opinions if that construction is not
13 adopted.

14 Q. I've put into the chat what's previously been
15 marked as Exhibit 1001.

16 Do you recognize this as US Patent Number
17 9,430,042?

18 A. (Deponent viewing exhibit.) I do.

19 Q. Okay. And if -- is it okay if I refer to
20 Exhibit 1001 as the '042 Patent?

21 A. Yes, I believe we have already done so.

22 Q. Okay. Perfect. And the title of the '042
23 Patent is Virtual Detents Through Vibrotactile
24 Feedback; is that right?

1 A. Yes.

2 Q. If you look at Column 3, Lines 6 to 14 of
3 the '042 Patent, that passage identifies certain
4 advantages to -- that virtual detents provide; is that
5 correct?

6 MR. XIE: Objection.

7 A. (Deponent viewing exhibit.) Can -- I hadn't
8 gone to that section yet. I am in Column 3.

9 Can you please repeat which line numbers?

10 Q. I was looking at Line 6 to 14, that first
11 full paragraph in Column 3.

12 A. (Deponent viewing exhibit.) Okay. I have
13 read Column 3, Line 6 to 15.

14 Can you ask your question again, please?

15 Q. Yeah, no problem.

16 And that paragraph in Column 3 provide --
17 identifies certain benefits that virtual detents
18 purportedly provide, correct?

19 MR. XIE: Objection.

20 A. (Deponent viewing exhibit.) I think they
21 provide an example of the -- it states, this is an ill
22 -- illustrative embodiment, and it provides examples
23 of the benefits that a user might experience as a
24 result of this embodiment, yes --

1 Q. Okay.

2 A. -- at a high level.

3 Q. And one of the benefits is that it provides
4 useful feedback to a user; is that right?

5 A. (Deponent viewing exhibit.) It says it may
6 provide useful feedback to a user. I do see those
7 words on Line 9 of Column 3.

8 Q. And so, the virtual detent allows for a user
9 to kind of feel that there's been a change in the -- a
10 system setting; is that right?

11 MR. XIE: Objection.

12 A. It is providing -- it is assimilating what a
13 mechanical detent would do through a vibrotactile
14 feedback.

15 Q. And so, what would a mechanical detent do on,
16 say, a car radio knob?

17 MR. XIE: Objection.

18 A. I don't believe I specifically rendered an
19 opinion on that here.

20 Q. But you're familiar with that -- what a
21 mechanical detent is, correct?

22 A. Yes.

23 Q. And what's your understanding of a mechanical
24 detent?

1 A. (Deponent viewing exhibit.) The -- the term
2 appears many times in the specification.

3 In terms of a mechanical -- the -- so if we
4 go to the background and if we go to Column 1,
5 Lines 21 through 25, for example, or in -- in fact,
6 you know, Lines 21 all the way to Line 44, the
7 background describes traditional mechanical devices
8 that can control switches and knobs and levels and
9 sliders and so on.

10 And -- and Line 37 of the Column 1 says, A
11 detent, such as a mechanical detent, can refer to the
12 resistance of rotation of a wheel or shaft. And, A
13 detent can be used to divide a rotation into discrete
14 increments, or may be used to arrest rotation in a
15 direction. For instance, a mechanical detent can be
16 constructed from a notched wheel and a small gravity
17 or springed-actuated lever.

18 Q. So is an example of a mechanical detent a
19 physical knob that, when you turn it, each -- every
20 5 degrees of rotation, say, you feel a click sensation
21 as you're turning the knob? Is that an example of a
22 mechanical detent?

23 MR. XIE: Objection.

24 A. I -- I haven't expanded on examples of

1 mechanical detent, but the best way I was able to
2 answer your question is referring back to the
3 specification.

4 Q. Do you have an understanding of how a
5 mechanical detent can be constructed from a notched
6 wheel in a small gravity or spring-actuated lever?

7 A. I have not provided an opinion on that, and
8 it was not necessary for the opinions that I have in
9 this declaration to do so.

10 Q. Do you have an understanding of how a
11 mechanical detent can be used to divide a rotation
12 into discrete increments?

13 A. Again, I -- I did not need to provide
14 opinions on that for the opinions that I have in my
15 declaration, so that is not something I provided an
16 opinion on.

17 Q. But you do have an opinion that a virtual
18 detent is -- simulates the sensation of a mechanical
19 detent without the need for actual mechanical
20 components, right?

21 A. That's what the specification does -- I mean,
22 that's what the specification explains. So I am
23 providing support based on what appears in the
24 specification.

1 Q. So how does a virtual detent simulate the
2 sensation of a mechanical detent without the need for
3 actual mechanical components?

4 A. And, again, I address that part, for example,
5 by referring to Figure 9A, 9B, 9C, 9D as examples of
6 -- and so, if you look at Column 2, Lines 33 to 35, in
7 fact, the specification states, Figures 9A, 9B, 9C,
8 9D, 9E, 9F, 9G and 9H are eight illustrations of
9 virtual detent profiles in various embodiments of the
10 present invention. And I discuss four of those in --
11 as an example in my declaration.

12 Q. So if we look at figure -- Figure 9A through
13 Figure 9H in the patent -- just to make sure we're on
14 the same page, we'll start with Figure 9A.

15 So Figure 9A on the right-hand side depicts a
16 rotary knob; is that correct?

17 A. (Deponent viewing exhibit.) It could, yes.

18 Q. And then on the left-hand side is the virtual
19 detent profile, right?

20 A. (Deponent viewing exhibit.) Yes.

21 Q. Okay. And if we look at the detent profile
22 on the left in Figure 9A, what does the x-axis
23 correspond to?

24 A. (Deponent viewing exhibit.) I believe it's

1 time.

2 And so, the y-ax -- so this is -- the figure
3 is giving you an example of a signal where the y-axis
4 could be, like, the amplitude of the signal, and the
5 x-axis is time, so it's illustrating what if -- what a
6 -- what an electrical signal looks like and it's being
7 associated with the notches, capital A, B, C, D and E.
8 And if -- if a -- if that signal is implemented, it
9 would simulate the mechanical detents of the figure on
10 the right, as -- as an example.

11 Q. And so, as you -- if a user turns -- rotates
12 the knob shown in Figure 9A and rotates it to the --
13 Point A, there will be a corresponding haptic effect
14 that is output at that point in time?

15 MR. XIE: Objection.

16 A. (Deponent viewing exhibit.) So if we go to
17 Column 13 --

18 Q. Mm-hmm.

19 A. -- and we go to Lines 47 to 53, the
20 specification states that, Figure 9A depicts a
21 programmable virtual detent profile, and the virtual
22 detents are shown at A, B, C, D and E. And so, for
23 example, as a rotary knob is rotated through each
24 Point A through E, the rotary knob may be vibrated to

1 generate the feeling of a real detent. The magnitude
2 and width of the vibrotactile feedback applied to the
3 input device at each virtual detent may simulate the
4 magnitude and width of a mechanical detent.

5 So the figure is showing the signal that can
6 be used to assimilate the magnitude and width of a
7 mechanical detent, that's shown on the right.

8 Q. All right. So if the user turns the rotary
9 knob through each of Point A through E, they're going
10 to feel a short vibration at each point; is that
11 correct?

12 A. (Deponent viewing exhibit.) In a virtual
13 environment, that is correct. So the -- there is no
14 actual knob, there is no mechanical knob, and there
15 could be a picture of what looks like a knob.

16 And on the trackpad or on a flat surface that
17 has this picture, as the user moves their fingers or
18 they rotate this virtual picture or they move their
19 fingers along this drawing, they are going to
20 experience a signal, a vibration. They're going to
21 have vibrotactile feedback on this trackpad that is
22 going to assimilate the magnitude and the width of,
23 had they been using a mechanical detent, but there is
24 no actual knob that the user is going to touch.

1 They're own -- they're going to interact with a
2 virtual drawing and they're going to get a
3 vibrotactile feedback as they're interacting with, for
4 example, a touchpad.

5 Q. But if you look at Column 13, Lines 39 to 42,
6 isn't it accurate to say that the -- what's shown on
7 the right-hand side of Figure 9A is a rotary knob 202?

8 MR. XIE: Objection.

9 A. (Deponent viewing exhibit.) The
10 specification in Line 39 says, in Figures 9A to 9H,
11 the rotary knob 202 is shown on the right along with a
12 representation of the virtual detent profile on the
13 left corresponding with the rotary knob.

14 Q. All right. So the -- the bod -- the
15 specification discloses some embodiments that use a
16 touchpad, correct?

17 A. I think you're always using a touchpad.

18 Q. What --

19 A. Like, you're -- you're interacting and you're
20 getting a virtual -- you're getting a simulation from
21 a virtual detent profile on a touchpad.

22 Q. But --

23 A. And the examples of the feedback that you're
24 getting could, in one example, be for a rotary knob,

1 but the user is never interacting with an actual
2 rotary knob, it's just being simulated on a touchpad.

3 Q. If you look at Column 3, Line 40 to 41 --

4 A. (Deponent viewing exhibit.) I'm there.

5 Q. -- is it correct that the patent says that
6 the input device can be, for example, a mechanical
7 input device?

8 A. (Deponent viewing exhibit.) I'm sorry, where
9 are you again?

10 Q. Line 40 to 41 in Column 3.

11 A. (Deponent viewing exhibit.) Oh, I'm sorry, I
12 was still in Column 13 and I thought I was in this
13 Column 3. That's my mistake. My bad. Let me go back
14 to Column 3.

15 Okay. Now I am back in Column 3, because I
16 thought we were still talking about Figure 9. And we
17 are -- you said Lines 40 to 41. So Column 3, Lines 40
18 to 41. Oh, okay. I'm there.

19 What is your question again?

20 Q. So is it accurate to say that the
21 specification describes embodiments in which the input
22 device is a mechanical input device rather than a
23 touchpad?

24 A. (Deponent viewing exhibit.) Well, the --

1 that paragraph starts out by saying, The input device
2 can be, for example, a mechanical input device, and
3 this ends on Line 45 by saying, the input device may
4 be a touch-sensitive device, such as a touchpad or a
5 touchscreen.

6 Q. Right. So the specification in that
7 paragraph is saying the input device could be a
8 mechanical input device like a rotary knob or, in some
9 embodiments, it could be a touchpad, correct?

10 A. (Deponent viewing exhibit.) That paragraph
11 is providing examples where it could be a mechanical
12 or a nonmechanical input device.

13 Q. Okay. And so that -- the rotary knob
14 depicted in Figure 9A, in at least some embodiments,
15 could be a physical or a mechanical input device,
16 correct?

17 MR. XIE: Objection.

18 A. I don't think that's the tie-in. I don't
19 agree with that characterization.

20 (Deponent viewing exhibit.) I think, in the
21 context of Figure 9, ye -- it's describing the virtual
22 detent of a -- an actual knob, is my understanding
23 looking at the -- how the virtual detents -- because
24 if I go back to Column 13, where I was, under the

1 sections Examples of Virtual Detent, so the -- this
2 section is describing the virtual detents, and the
3 virtual detents are simulations of actual mechanical
4 devices. And in this example, the rotary knob on the
5 right is going to be represented by a virtual detent
6 on the left.

7 So this is -- this would not be the input
8 device, the input device is not shown here, but you
9 have the mechanical device and you have the virtual
10 detent that represents the mechanical device.

11 Q. Would you agree, you could apply the top
12 profile on Figure 9A to a mechanical input device like
13 a physical knob?

14 A. (Deponent viewing exhibit.) I haven't
15 rendered opinions on that, so I'm not sure.

16 Q. Can you --

17 A. Ahh...

18 Q. Sorry, go ahead.

19 A. The -- that's my answer.

20 Q. If you look at Figure 4 of the patent --

21 A. (Deponent viewing exhibit.) Yes.

22 Q. -- would you agree that that figure is
23 depicting a physical rotary knob that can be turned
24 and that's coupled to an actuator?

1 A. (Deponent viewing exhibit.) I actually
2 address Figure 4 in my declaration. And so, when
3 discussing Figure 4, I believe it's discussing a force
4 feedback, which is different than a vibrotactile
5 feedback in Figure 4.

6 So -- I'm sorry, so going back to Figure 2 --
7 sorry -- going back to Column 2, it says, Figure 4 is
8 an illustration of a second device for providing
9 virtual detents through vibrotactile feedback in one
10 embodiment of the present invention. So, to the
11 extent you do provide vibrotactile feedback, you can
12 do so in Figure 4.

13 Q. And -- but the rotary knob 400 in Figure 4 is
14 a mechanical knob, not a virtual knob, correct?

15 A. (Deponent viewing exhibit.) Column 10,
16 Lines 22 [sic] to 26, do state that Figure 4 is an
17 illustration of a second device for providing
18 virtual detent through vibrotactile feedback in one
19 embodiment, and the device in Figure 4 comprises a
20 mechanical device.

21 Q. So the patent is teaching those of skill in
22 the art that the virtual detents can be provided to a
23 mechanical device, such as a rotary knob, correct?

24 A. (Deponent viewing exhibit.) There are

1 embodiments, like Figure 4, that discuss and... so
2 that is an embodiment in Column 10.

3 (Off the record at 11:57 a.m.)

4 (Recess taken.)

5 (Back on the record at 12:04 p.m.)

6 BY MR. SPEED:

7 Q. If we could look at Figure 9B, Dr. Akl.

8 Can -- when you get to that, can you just
9 describe to me what the virtual detent being depicted
10 is?

11 A. (Deponent viewing exhibit.) So if we go to
12 Column 13 -- and Column 13, Lines 54 to 61 in the
13 specification describe Figure 9B.

14 Would you like me to read it on the record?

15 Q. No, that's okay.

16 So Figure 9B is depicting what's called a
17 hard stop virtual detent profile; is that correct?

18 A. (Deponent viewing exhibit.) Yes, I see those
19 words.

20 Q. And what's your understanding of a hard stop
21 detent with a -- a mechanical detent?

22 A. (Deponent viewing exhibit.) I mean, I think
23 those words would have their plain and ordinary
24 meaning. That -- the specification just says a hard

1 stop, or barrier virtual detent, may simulate a
2 mechanical hard stop or barrier. So --

3 Q. All right. So that would be --

4 A. -- that example would be a barrier, like a
5 stop.

6 Q. So if you were turning a mechanical knob and
7 it got to its -- the end of its rotation and you
8 couldn't turn anymore, you'd feel that hard stop; is
9 that right?

10 MR. XIE: Objection.

11 A. That could be an example. Again, I have not
12 rendered an opinion specifically on that, but that --

13 Q. Okay.

14 A. -- that specification describes a barrier as
15 an -- maybe as analogous to a hard stop.

16 Q. So in Figure 9B, according to Column 13, as
17 the user turns the rotary knob, virtual detents may
18 indicate each increasing fan level selected by a user;
19 is that right?

20 A. (Deponent viewing exhibit.) I see those
21 words.

22 Q. Great. And then when the user gets to the
23 maximum fan setting, the processor sends the -- a
24 barrier detent instruction; is that right?

1 A. (Deponent viewing exhibit.) Yes, I see those
2 words.

3 Q. Great. And if we look at Figure 9B, that
4 barrier detent instruction would be a vibration of
5 greater magnitude than the earlier vibration; is that
6 right?

7 A. (Deponent viewing exhibit.) I mean, the
8 specification says that it may send a detent signal to
9 the actuator comprising a barrier detent instruction.

10 Q. Right. And then Figure 9B shows two
11 vibrations, correct?

12 A. (Deponent viewing exhibit.) I mean,
13 Figure 9B shows a signal with an increase in amplitude
14 between the first peak and the second peak. It's hard
15 to describe a signal in words, but I -- we can
16 describe the y-axis in terms of increasing power of
17 the first peak -- of the second peak compared to the
18 first peak.

19 Q. It -- would a person of ordinary skill in the
20 art know how to implement the signal shown in
21 Figure 9B on a touchpad?

22 MR. XIE: Objection.

23 A. I have not provided opinions on that.

24 Q. Do you know if the patent provides any

1 details on how the actuator vibrates a touchpad, apart
2 from these illustrations of the detent profile?

3 A. (Deponent viewing exhibit.) I would have to
4 review the patent. That -- those are not opinions
5 that I address in my declaration.

6 But looking at Column 5, it discusses the
7 actuator that's configured to receive a signal.
8 Column 6 continues on through Column 7. So there is a
9 discussion in the specification of an example of how
10 an actuator may be implemented.

11 Q. And if you look at Column 6, Lines 32 to 37,
12 the patent identifies various forms of actuators that
13 can be used with the invention; is that correct?

14 A. (Deponent viewing exhibit.) Yes, I see those
15 words.

16 Q. And these act -- these types of actuators
17 would've been known to persons of skill in the art at
18 the time of the invention, correct?

19 A. (Deponent viewing exhibit.) I would assume
20 so, but again, I have not provided an opinion on that.

21 Q. And -- sorry to keep jumping around, but can
22 we go back to Figure 9 -- let's look at Figure 9E.

23 A. (Deponent viewing exhibit.) I mean -- yes,
24 Figure 9E, yes.

1 I guess the -- the one thing I would add to
2 my response is, the section that you pointed me to in
3 Column 6, they -- all these actuators are configured
4 to provide vibrotactile, so as long as the feedback is
5 vibrotactile, that would be what's being -- within the
6 scope of this patent.

7 Q. Right. I guess my question was just, a
8 person of skill in the art would be familiar with
9 those actuators on how to output vibrations using
10 those actuators, correct?

11 A. I haven't addressed that, so I don't have an
12 opinion on that. But the -- this -- the specification
13 does describe those actuators being able to be
14 configured to provide vibrotactile feedback, so I
15 would assume that is correct.

16 (Mr. Win now present at deposition
17 proceeding.)

18 MR. XIE: I just -- I'm sorry. I just
19 wanted to note, my colleague Cliff Win is now online
20 as well. He's with Folio Law Group.

21 Sorry. Go ahead, Nathan.

22 MR. SPEED: No problem; getting
23 double-teamed.

24 (Laughter.)

1 BY MR. SPEED:

2 Q. If we -- looking at Figure 9E, which is
3 described in Column 14 as well, do you see that?

4 A. (Deponent viewing exhibit.) Yes, I'm there.

5 Q. And so, Figure 9E is depicting a spring
6 virtual detent profile; is that right?

7 A. (Deponent viewing exhibit.) I do see those
8 words, Column 14, Line 21.

9 Q. And can you explain to me how the signal
10 shown on the left of Figure 9E works?

11 MR. XIE: Objection.

12 A. (Deponent viewing exhibit.) I have not
13 provided an opinion on that, but the specification
14 states that you have a spring virtual detent that may
15 indicate a preferred position of an input device. And
16 as a user manipulates a rotary knob away from a home
17 position, its spring effect virtual detent may
18 increase in intensity as the knob distance from the
19 home position increases.

20 Q. So the spring virtual detent profile will
21 increase the intensity of the vibration as the knob
22 goes from Point A towards Point C; is that correct?

23 A. (Deponent viewing exhibit.) I mean, I don't
24 have an opinion on that, other than what I just read

1 from the specification.

2 Q. But looking at Figure 9E, are you able to
3 interpret Figure 9E from the perspective of to one of
4 the skill in the art?

5 A. (Deponent viewing exhibit.) I can try.

6 Can you ask your question again?

7 Q. Is it correct that as the knob on the
8 right-hand side, it rotates from Point A to C, the
9 intensity of the vibration increases?

10 A. (Deponent viewing exhibit.) I don't believe
11 the intensity of the vibration increases, because if I
12 look at figure -- the figure on the left, you have A,
13 B and C, the intensity would be the peak to peak,
14 which doesn't change, but what changes is the
15 frequency.

16 So going -- so the virtual detent of Signal A
17 and the virtual detent of Signal C both have the same
18 intensity, but they have the frequency of this -- the
19 signal has increased. And the periodicity is the
20 distance between the peaks. So as the frequency
21 increases, those peaks come closer together. So you
22 still have a vibrotactile with a higher frequency, I
23 would say, going from A to C.

24 Q. So if that knob in Figure 9E and that virtual

1 detent profile was used, for example, to change the
2 volume on a stereo, as you go from zero to, let's say,
3 up to 11 on the stereo, it's go -- the frequency of
4 the vibration is going to increase as you get closer
5 to 11; is that correct?

6 A. (Deponent viewing exhibit.) No, that's not
7 what's depicted.

8 Because if you look at B, B is a blank;
9 there's no signal. So you only have two discrete
10 signals. At A, you have a vibration. At C, you have
11 a higher frequency vibration. But it -- as you're
12 moving it, the vibrations aren't -- the frequency
13 isn't increasing. You just have a second vibration
14 that is higher in frequency at C than you were at A.
15 But you don't -- but it doesn't increase as you're
16 moving.

17 Q. Okay.

18 A. So it's only two values based on what's shown
19 on the left.

20 Q. And what happens at B?

21 A. (Deponent viewing exhibit.) So B shows that
22 there is no vibration. B is a -- is a -- is a no
23 amplitude signal.

24 Q. So then, does it -- when you turn the knob,

1 does it go from vibration at A, and then you approach
2 B, there's no vibration, and then when you get to C,
3 there's a -- an additional vibration of higher
4 frequency? Is that what happens?

5 A. (Deponent viewing exhibit.) That seems to be
6 what's depicted here is, at A, you have a vibration at
7 a specific frequency, and then, at C, you have a
8 vibration at a higher, maybe double the frequency.

9 Q. And then, the last one I want to look at is
10 Figure 9G.

11 Do you see that?

12 A. (Deponent viewing exhibit.) Yes.

13 Q. So that's described in Column 14 as a
14 constant virtual detent profile; is that right?

15 A. (Deponent viewing exhibit.) Yes, I see those
16 words; Column 14, Line 35.

17 Q. And so, for this exemplary virtual detent,
18 the -- there's a constant vibration applied to the
19 knob, regardless of its rotational position, correct?

20 A. (Deponent viewing exhibit.) It's -- the --
21 the paragraph states that the vibrotactile effect may
22 remain constant, yes.

23 Q. Right. Okay.

24 So for Figure 9G, it's just -- the knob's

1 just vibrating the whole time?

2 A. (Deponent viewing exhibit.) That seems
3 consistent on a high level with Column 14, Lines 35
4 through 50 where you have a constant vibrotactile
5 feedback is produced.

6 Q. And if you turn to Column 6 Lines 16 to 17 --

7 A. (Deponent viewing exhibit.) I am in
8 Column 6, Line 16.

9 Q. Yes.

10 A. (Deponent viewing exhibit.) I'm there.

11 Q. All right. In that sentence, it says, In one
12 embodiment, the virtual detent may comprise a
13 simulated click generated through a single pulse.

14 Do you see that?

15 A. (Deponent viewing exhibit.) I do see those
16 words, yes.

17 Q. What -- what's your understanding of a
18 "pulse"?

19 A. I teach a course, Signals and Systems. I've
20 taught it many times. A pulse is a -- normally is
21 defined as a signal that is zero, and then it goes up
22 to a certain value, is constant over a short window
23 and then goes back to zero. So it would be -- that
24 would be an example of -- at least in my courses, that

1 is an example of a pulse.

2 Q. And if we're talking about pulse in the
3 context of vibrotactile feedback, would the pulse be a
4 short vibration that has a certain magnitude and then
5 has a short duration?

6 MR. XIE: Objection.

7 A. (Deponent viewing exhibit.) The -- I mean,
8 the -- that same paragraph in the previous sentence is
9 describing -- you're generating vibrotactile feedback
10 with different frequencies, amplitudes or waveforms,
11 and a very short square wave would be a -- a very high
12 frequency very -- for a short amount of time.

13 So you can generate a pulse, again, using the
14 three parameters described for a vibrotactile feedback
15 by using different frequencies, amplitudes, and so you
16 would have high frequencies at a specific amplitude
17 for a short amount of time.

18 (Pause.)

19 MR. SPEED: That's all the questions I
20 have.

21 MR. XIE: No questions for Immersion.

22 MR. SPEED: Great. Well, it was nice
23 meeting you, Doctor.

24 THE DEPONENT: Thank you.

1 MR. SPEED: Thanks a lot, Laurie.

2 MADAM COURT REPORTER: Thank you.

3 I just need to do the orders quick, and I do
4 have one spelling now (laughs).

5 THE DEPONENT: Okay.

6 MADAM COURT REPORTER: If the attorneys
7 can just state if you want your usual format, if the
8 regular turnaround time is okay and if you would like
9 a rough draft.

10 And I believe you said that you wanted
11 regular turnaround and a rough draft, Attorney Speed?

12 MR. SPEED: Yes, that's correct.

13 MR. XIE: That's fine for Immersion as
14 well.

15 (DEPOSITION OF ROBERT AKL, D.SC.
16 concluded at 12:23 p.m.)

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3

4 I, Laurie J. Berg, Certified Court Reporter,
5 Registered Professional Reporter, Certified Realtime
6 Reporter, and Notary Public, in and for the
7 Commonwealth of Massachusetts, do hereby certify that
8 pursuant to appropriate notice of taking deposition,
9 there remotely appeared before me the following named
10 person, to wit: ROBERT AKL, D.SC., who was by me duly
11 sworn; that he was thereupon examined upon his oath
12 and his examination reduced to writing by me; and that
13 the deposition is a true record of the testimony given
14 by the witness.

15 IN WITNESS WHEREOF, I have hereunto set my
16 hand and seal this 29th day of December, 2024.

17

18 My commission expires:

19 August 30, 2030

20

21

22

23

24

Laurie J. Berg

Notary Public

1 ERRATA SHEET DISTRIBUTION INFORMATION

2 DEPONENT'S ERRATA AND SIGNATURE INFORMATION

3

4 ERRATA SHEET DISTRIBUTION INFORMATION

5 The original of the errata sheet has been
6 delivered to Moses Xie, Esquire.

7 When the errata sheet has been completed by
8 the deponent and signed, a copy thereof should be
9 delivered to each party of record and the ORIGINAL
10 delivered to Nathan R. Speed, Esquire, to whom the
11 original deposition transcript was delivered.

12

13 INSTRUCTIONS TO DEPONENT:

14 After reading this volume of your deposition,
15 indicate any corrections or changes to your testimony
16 and the reasons therefor on the errata sheet supplied
17 to you and sign it. DO NOT make marks or notations on
18 the transcript volume itself. Add additional sheets
19 if necessary. Please refer to the above instructions
20 for errata sheet distribution information.

21

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1 PLEASE ATTACH TO THE DEPOSITION OF ROBERT AKL, D.SC.

2 CASE: Valve Corporation

3 V. Immersion Corporation

4 DATE TAKEN: December 18, 2024

5

6 ERRATA SHEET

7 Please refer to Page 51 for errata sheet instructions
8 and distribution instructions.

9 PAGE LINE CHANGE/REASON

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1 ERRATA SHEET

2 (continued)

3 PAGE LINE CHANGE/REASON

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12 _____

13

14 I have read the foregoing transcript of my deposition

15 and except for any corrections or changes noted above,

16 I hereby subscribe to the transcript as an accurate

17 record of the statements made by me.

18 Executed this ____ day of _____, 2024.

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ROBERT AKL, D.SC.

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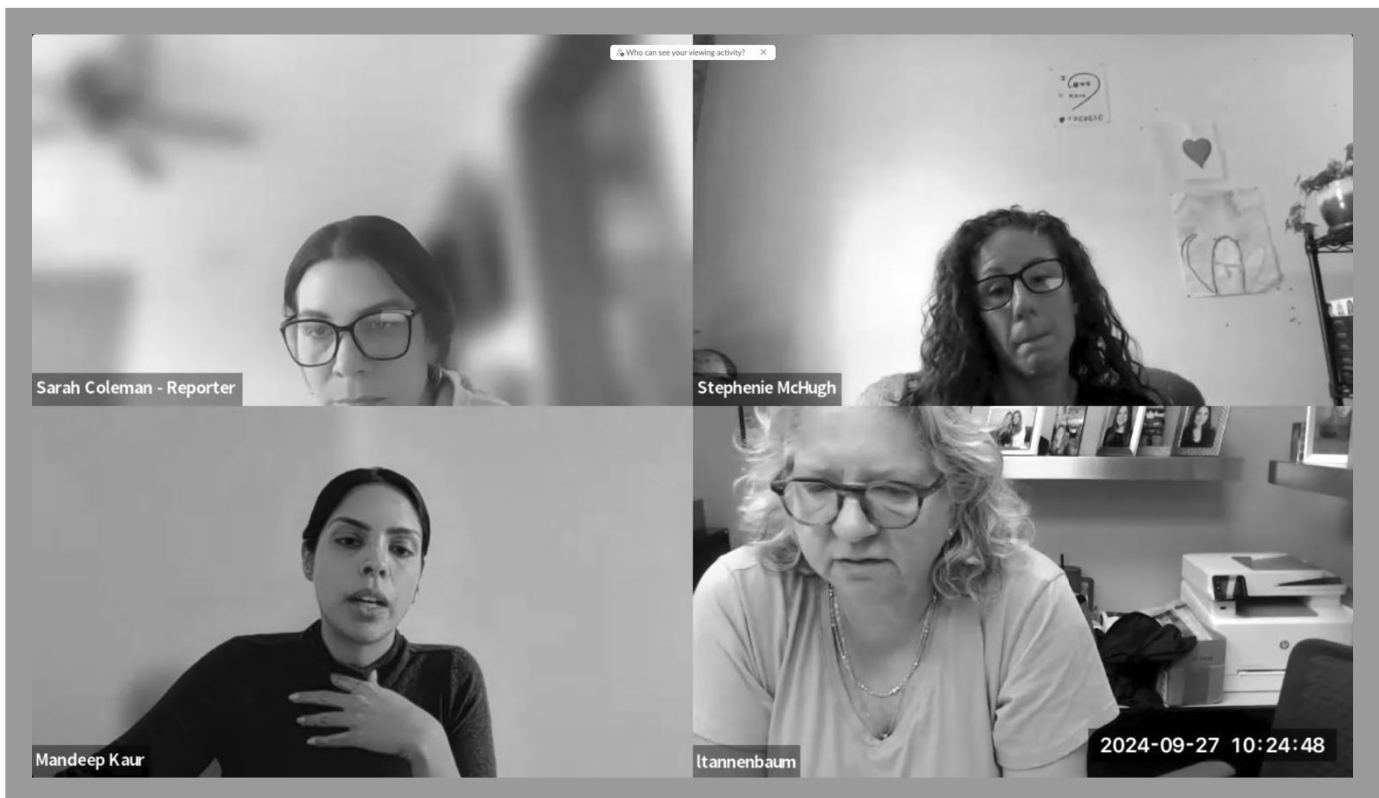
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a.m 1:19 7:8,10 38:3 able 24:22 29:1 42:13 44:2 academic 10:11 access 18:22 accurate 8:14 33:6 34:20 53:16 acknowledge 4:11,15 acronym 20:8 act 41:16 action 13:1,1 active 10:12 11:1 actual 20:21 29:19 30:3 32:14,24 34:1 35:22 36:3 actuator 17:17 36:24 40:9 41:1,7,10 actuators 41:12,16 42:3,9,10 42:13 add 42:1 51:18 addition 10:11 additional 18:24 46:3 51:18 address 30:4 37:2 41:5 addressed 13:9 18:6 42:11 administered 4:16	adopted 15:7 25:13 adopts 25:11 advantages 26:4 agree 5:3,6 14:16 15:24 21:16 25:7 35:19 36:11,22 agreeing 23:14,15,21 24:17 agreement 4:23,23 ahead 36:18 42:21 Ahh 36:17 Akl 1:14 3:3,17,20 5:6,11 5:18,22,23 38:7 49:15 50:10 52:1 53:23 allows 12:20 27:8 amount 24:21 48:12,17 amplitude 31:4 40:13 45:23 48:16 amplitudes 48:10,15 analogous 39:15 analysis 24:22 and/or 22:19 answer 6:7,8 18:7 29:2 36:19 answering 24:12,13 answers 6:4 anymore 39:8	apart 41:1 APPEAL 1:2 appeared 50:9 appears 28:2 29:23 applicable 17:6 application 16:11,22 17:6,7,16 17:18 18:12,15,20 19:11,14 22:15 applications 16:7,8,9 19:7,18,19 applied 32:2 46:18 apply 36:11 applying 12:8 appreciate 20:10 approach 46:1 appropriate 50:8 approximately 6:14 7:22 architecture 8:20 9:11 10:10 areas 8:24 9:1,4,8 arrangement 4:20 arrest 28:14 art 6:22 10:20,24 11:4,8 11:9 13:6,14,18,22 14:1,7 15:1,8 20:9 22:3 37:22 40:20 41:17 42:8 44:4 articulated 18:16	articulating 20:24 22:1 asserted 6:22 assessing 10:23 11:3,7 assimilate 32:6,22 assimulating 27:12 assistant 9:23 associated 18:23 22:9 31:7 association 4:6 18:18 assume 41:19 42:15 Atlantic 2:5 ATTACH 52:1 attention 18:12 Attorney 3:7 49:11 attorneys 4:10,22 49:6 audibly 6:4 Aug 3:16 August 50:19 Avenue 2:5,15
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