

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

3 *****

4 MEDIVIS, INC.,
5 Petitioner,

6 v.

7 NOVARAD CORP.,
8 Patent Owner.

9 Inter Partes Review No. IPR2023-00042
10 US Patent No. 11,004,271

11 Inter Partes Review No. IPR2023-00045
12 US Patent No. 10,945,807

13 *****

14 Remote Deposition of MAHESH S.
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16 deponent, commencing at 10:06 a.m. Eastern, on
17 the 19th of September, 2023, before Maureen
18 O'Connor Pollard, Registered Diplomate Reporter,
19 Realtime Systems Administrator, Certified
20 Shorthand Reporter, Notary Public.

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P R O C E E D I N G S

* * *

Whereupon,

MAHESH S. MULUMUDI, MD,

being first remotely duly sworn to testify to the truth, the whole truth, and nothing but the truth, was examined and testified as follows:

EXAMINATION

BY MS. FREEMAN:

Q. Good morning, Dr. Mulumudi.

A. Hi, good morning.

Q. Is there any reason why you can't give truthful testimony today?

A. No.

Q. Do you have any illness that can affect your ability to provide truthful testimony?

A. No.

Q. Have you taken any medication that can affect your ability to provide truthful testimony?

A. No.

1 Q. Do you understand that no one can
2 assist you in answering questions in this
3 deposition?

4 A. Yes.

5 Q. Is there anybody in the room with
6 you today?

7 A. No.

8 Q. Are you using any device or software
9 to receive assistance in answering questions?

10 A. No.

11 Q. Do you agree not to accept any
12 assistance in answering any questions in this
13 deposition?

14 A. I agree.

15 Q. Do you have any reference materials
16 in front of you?

17 A. I don't have, but I have them on my
18 computer.

19 Q. You have done your computer. Can
20 you explain what you mean by that?

21 A. Because my own deposition
22 declaration that I wrote.

1 Q. Okay. Would you close that out,
2 please?

3 A. Okay.

4 Q. Let me know when you're --

5 A. It's closed, yeah.

6 Q. Dr. Mulumudi, what country were you
7 born in?

8 A. India.

9 Q. What is your mother tongue?

10 A. Telugu.

11 Q. What language did you speak with
12 your family growing up?

13 A. English and Telugu.

14 Q. How many languages do you speak?

15 A. Three.

16 Q. What languages do you speak?

17 A. I speak English, Telugu, and Hindi.

18 Q. Have you noticed any differences
19 between British English and American English?

20 A. I don't think so, no.

21 Q. Are you familiar with the English
22 word "being"?

1 A. I'm sorry, what?

2 Q. Are you familiar with the English
3 word "being"?

4 A. Being? Yes. Why?

5 Q. Is the English word "being" a
6 technical word?

7 A. All I know is a literary English
8 word. I don't know if it's technical or not.

9 Q. So you don't know whether the
10 English word "being" has a technical meaning?

11 A. I don't think so. This can be a
12 human being, it can be a being as in a being,
13 but I don't know of anything else technical
14 about it.

15 Q. So are you saying you don't know
16 whether it's a technical word?

17 A. I don't.

18 Q. What does the English word "being"
19 mean?

20 A. Being is a thing, human being, or
21 animal being or plant being.

22 I'm assuming you're using B-E-I-N-G.

1 Q. Yes.

2 A. Okay.

3 Q. Does the word "being" have any other
4 meaning that you're aware of?

5 A. I'm being asked questions right now,
6 that's a being.

7 Q. Can you explain what being means in
8 that context?

9 A. As it is happening.

10 Q. Are you aware of any other meaning
11 of the word "being"?

12 A. Not that I know of.

13 Q. Are you familiar with the English
14 word "having"?

15 A. Yeah. I do, yeah. I am having a
16 cup of coffee.

17 Q. Is the English word "having" a
18 technical word?

19 A. I use it as an English word to
20 express meaning, that's about it. I don't know
21 if it's a technical word.

22 Q. So you don't know whether the

1 English word "having" is a technical word?

2 A. I don't.

3 Q. What does the English word "having"
4 mean?

5 A. Can I ask a question?

6 Q. Sure.

7 A. What is the "technical" in your
8 definition of "technical word"?

9 Q. Do you understand the English word
10 "technical"?

11 A. I understand "technical word." What
12 is the meaning of a "technical word" in your
13 dictionary that you are asking me?

14 Q. My dictionary doesn't matter for
15 purposes of this deposition. I am asking
16 questions, and you're providing answers.

17 So do you understand --

18 MR. HARMER: Objection.

19 The questions are clearly vague. If
20 he needs clarity to understand the
21 question, that's appropriate.

22 MS. FREEMAN: There's a rule against

1 speaking objections.

2 BY MS. FREEMAN:

3 Q. Professor Mulumudi, do you
4 understand the word "technical"?

5 A. Technical is something that is
6 technical that is mechanical, that is related to
7 a specific purpose, but I don't know if you're
8 asking me technical in terms of a technical
9 technology, is it something to do with a
10 technical process, is it to do with technical
11 for a particular legal language or a medical
12 language, or is it for expression of
13 technicalities?

14 That is the question I was asking
15 about what do you mean by technical.

16 Q. Okay. Applying your definition of
17 technical, does the English word "having" have a
18 technical meaning?

19 MR. HARMER: Objection. Vague.

20 You can answer if you understand.

21 THE WITNESS: I don't understand.

22 ///

1 BY MS. FREEMAN:

2 Q. What don't you understand about that
3 question?

4 A. I'm not completely understanding
5 what do you mean by technical meaning of having.

6 Q. Okay. We talked about the word
7 "technical," and you said you understand that
8 word, right?

9 A. (Nodding in the affirmative.)

10 Q. Okay. So applying your
11 understanding of the word "technical," what is
12 your lack of understanding of that word, of that
13 question, does the English word "having" have a
14 technical meaning?

15 MR. HARMER: Objection. Vague,
16 compound.

17 Dr. Mulumudi, after I object you can
18 answer, unless I specifically tell you not
19 to answer.

20 THE WITNESS: Got it.

21 Technical is contextual, depends on
22 the context you are applying it for. What

1 would you like me to say about technical,
2 in what context? Technical as in general
3 speaking English, technical as written in
4 a legal language, technical written in a
5 medical textbook, or technical in a
6 technology paper? Which context do you
7 want me to use the word "technical"?

8 BY MS. FREEMAN:

9 Q. Does the English word "having" have
10 a technical meaning in any context that you're
11 aware of?

12 A. Not I'm aware of.

13 Q. What does the English word "having"
14 mean?

15 MR. HARMER: Objection. Vague.

16 THE WITNESS: Having a cup of
17 coffee, for example.

18 BY MS. FREEMAN:

19 Q. I'm sorry, I didn't hear. What does
20 the English word "having" mean?

21 MR. HARMER: Same objection.

22 THE WITNESS: I think it's too vague

1 of a question. I don't want to answer
2 that.

3 BY MS. FREEMAN:

4 Q. Can you provide any definition of
5 the word "having"?

6 A. Yes.

7 MR. HARMER: Objection. Vague.

8 THE WITNESS: Having a cup of
9 coffee.

10 BY MS. FREEMAN:

11 Q. Okay. Do you believe that using a
12 word defines the word?

13 MR. HARMER: Objection. Vague.

14 THE WITNESS: I think it is too
15 vague for me to answer these type of
16 questions from you.

17 BY MS. FREEMAN:

18 Q. Can you provide any definition of
19 the English word "having"?

20 MR. HARMER: Asked and answered.

21 THE WITNESS: I already explained
22 what having is in my technical meaning to

1 me, which is having a cup of coffee,
2 having a piece of cake.

3 BY MS. FREEMAN:

4 Q. Those are examples. Can you provide
5 any definition at all for the English word
6 "having"?

7 A. No, I can't.

8 MR. HARMER: Same objection. Vague.

9 BY MS. FREEMAN:

10 Q. Are the English words "having" and
11 "being" synonyms?

12 A. No.

13 Q. What is the difference between the
14 meaning of the English word "having" and the
15 English word "being"?

16 A. Being is a not directly related to a
17 particular item; example, it's a definition of a
18 thing or a process. Having is a -- is a verb,
19 in a way, to say that I'm having cup of coffee,
20 having a piece of cake, or actively doing
21 something can be having.

22 Q. Can you provide any other definition

1 of the word "having"?

2 A. These are the only ones that I know
3 of.

4 MR. HARMER: Vague.

5 BY MS. FREEMAN:

6 Q. Are you familiar with the English
7 word "shape"?

8 MR. HARMER: Objection.

9 THE WITNESS: Yes. Yes. English
10 word "shape" is shape.

11 BY MS. FREEMAN:

12 Q. Is the English word "shape" a
13 technical word?

14 MR. HARMER: Objection. Vague.

15 THE WITNESS: Not that I know of.
16 Depends on context.

17 BY MS. FREEMAN:

18 Q. What does the English word "shape"
19 mean?

20 MR. HARMER: Objection. Vague.

21 THE WITNESS: Shape of a cup, shape
22 of a fingernail.

1 BY MS. FREEMAN:

2 Q. Dr. Mulumudi, you've just given me
3 two examples. Can you give me any definition of
4 the English word "shape"?

5 MR. HARMER: Objection. Vague.

6 THE WITNESS: Shape is a form.

7 Defining a form is a shape.

8 BY MS. FREEMAN:

9 Q. Can you give me any other definition
10 of the English word "shape"?

11 MR. HARMER: Objection. Asked and
12 answered, vague.

13 THE WITNESS: No.

14 BY MS. FREEMAN:

15 Q. Are you familiar with the English
16 word "confine"?

17 MR. HARMER: Objection. Vague.

18 THE WITNESS: Context, please?

19 BY MS. FREEMAN:

20 Q. Are you familiar with the English
21 word "confine" in any context?

22 A. Yes.

1 MR. HARMER: Objection.

2 THE WITNESS: Confine is being in a
3 certain spot, confined to a corner,
4 confined to a place, confined to a time.
5 What context is the important one there?

6 BY MS. FREEMAN:

7 Q. Is the English word "confine"
8 technical?

9 MR. HARMER: Objection. Vague.

10 THE WITNESS: Everything can be
11 technical in the right context.

12 BY MS. FREEMAN:

13 Q. Do you know the context in which the
14 English word "confine" is technical?

15 MR. HARMER: Objection. Vague.

16 THE WITNESS: No.

17 BY MS. FREEMAN:

18 Q. How do you define the English word
19 "confine"?

20 MR. HARMER: Objection. Vague,
21 asked and answered.

22 THE WITNESS: To conform to or to be

1 placed in a certain spot.

2 BY MS. FREEMAN:

3 Q. Can you provide any other definition
4 of the English word "confine"?

5 MR. HARMER: Objection. Vague.

6 THE WITNESS: No.

7 BY MS. FREEMAN:

8 Q. Are you familiar with the English
9 word "slice"?

10 MR. HARMER: Objection. Vague.

11 THE WITNESS: Yes. A piece of.

12 BY MS. FREEMAN:

13 Q. Is the English word "slice"
14 technical?

15 MR. HARMER: Objection. Vague.

16 THE WITNESS: Depends on the
17 context.

18 BY MS. FREEMAN:

19 Q. Is the English word "slice"
20 technical in any context that you're aware of?

21 MR. HARMER: Same objection.

22 THE WITNESS: It's contextual.

1 Unless we define a context, I cannot say
2 if it's technical, non-technical. It's --

3 BY MS. FREEMAN:

4 Q. I'm not -- sorry, Dr. Mulumudi, I
5 think I inadvertently interrupted you. I
6 thought you were done speaking.

7 A. That's okay.

8 So I'm saying that it's contextual,
9 number one, and the other one I was mentioning
10 is depends on the context and where it's being
11 used.

12 Q. Okay. Can you identify a context in
13 which the English word "slice" is technical?

14 MR. HARMER: Objection. Vague.

15 THE WITNESS: I'm having trouble
16 with understanding when you keep asking
17 about "technical." Would you say a
18 context, please?

19 BY MS. FREEMAN:

20 Q. I'm asking if you're aware of a
21 context in which the English word "slice" is
22 technical.

1 A. In a baker's context, slice of a
2 bread is a slice.

3 MR. HARMER: Objection.

4 BY MS. FREEMAN:

5 Q. Okay. So are you saying in a
6 baker's context the English word "slice" is
7 technical?

8 A. Yes, for him it's technical. For a
9 bakery, or a baker, that's a technical term.

10 Q. Okay. Are you aware of any other
11 context in which the English word "slice" is
12 technical?

13 A. For a cake, slice of a cake is a
14 technical term.

15 Q. Okay. Are you aware of any other
16 context in which the English word "slice" is
17 technical?

18 A. In medicine, for example, a slice
19 can be a piece.

20 Q. Are you aware of any other context
21 in which the English word "slice" is technical?

22 A. It can be any context. If you give

1 me a context, it will be easier, but you seem to
2 be quite open about context here, so I'll keep
3 telling about contextual things.

4 So let us see here. For an image,
5 it can be a slice, meaning a piece. Or for that
6 matter, if you think about in surgery, you can
7 say slice can be to cut. And slice can also be
8 as a technical term if somebody is slicing the
9 data, for example. In computer industry, they
10 use the word "slice."

11 So technicality about any word is
12 contextual.

13 Q. In the context of an image, the
14 English word "slice" is technical, is that
15 correct?

16 MR. HARMER: Objection. Vague.

17 THE WITNESS: Anything can be made
18 technical depending upon the context.

19 BY MS. FREEMAN:

20 Q. Okay. So I'm asking you in the
21 context of an English -- image, sorry, is the
22 English word "slice" technical?

1 MR. HARMER: Same objection.

2 THE WITNESS: Yes, it can be.

3 BY MS. FREEMAN:

4 Q. Can you say whether it is or it
5 isn't?

6 MR. HARMER: Objection. Vague.

7 THE WITNESS: Yes, it is.

8 BY MS. FREEMAN:

9 Q. Okay. In the context of the
10 computer industry, is the English word "slice"
11 technical?

12 A. I tend to use the word "slice" for
13 slicing the data. If it is technical or not
14 is -- depends upon who is using it. Some people
15 can use "partition" the data.

16 Q. When you use the English word
17 "slice" in the context of the computer industry,
18 is the English word "slice" technical?

19 A. It can be. Depends on who I'm
20 speaking with.

21 Q. So when you use the English word
22 "slice" in the context of the computer industry,

1 you may or may not be using it as a technical
2 word?

3 A. Depends on the context. If I'm
4 using it for certain population of people that
5 I'm speaking with, it is technical.

6 Q. Who would you be speaking to in
7 which you would use the word "slice" in a
8 technical sense?

9 A. If my computer engineers are slicing
10 the data, they try to slice it in this direction
11 of the data and see what we have, and sometimes
12 I will say, I'll partition the database in this
13 way and see how it happens.

14 Q. How would the meaning of the word
15 "slice" differ if you weren't using it in a
16 technical sense in the context of the computer
17 industry?

18 A. Can you repeat the question, please?

19 Q. How would the meaning of the word
20 "slice" differ if you weren't using it in a
21 technical sense in the context of the computer
22 industry?

1 MR. HARMER: Objection. Calls for
2 speculation.

3 THE WITNESS: In computer industry
4 if I use the word "slice" and -- let us
5 slice the information, I will say this to
6 my engineers, or I'll say, Let us slice
7 the data.

8 BY MS. FREEMAN:

9 Q. Okay. Am I right in understanding
10 that you said you could use the word "slice" in
11 a technical sense and in a non-technical sense
12 in the context of the computer industry?

13 A. Yes.

14 Q. Okay. How would the -- how would
15 the meaning of the word "slice" differ in the
16 context of the computer industry depending on
17 whether you were using it in a technical sense
18 or not?

19 A. Can you repeat the question, please?

20 Q. How would the meaning of the word
21 "slice" differ in the context of the computer
22 industry depending on whether you were using it

1 in a technical sense or not?

2 A. If I'm using in a technical sense, I
3 will tell them, Slice the data, I'm talking
4 about the data here, or sometimes I might say,
5 Let us slice the information. If I say to slice
6 the information, that can be defined as
7 non-technical. If I say slice the data, that
8 may be viewed as technical.

9 Q. Okay. You've given me examples of
10 what you might be referring to as an object of
11 the slice, but can you tell me how the meaning
12 of the word "slice" may differ?

13 A. It wouldn't differ. It's the way
14 you are expressing it.

15 Q. Are you familiar with the English
16 noun "layer"?

17 A. Yes.

18 Q. Is the English word "layer"
19 technical?

20 MR. HARMER: Objection. Vague.

21 THE WITNESS: Depends on the
22 context, please.

1 BY MS. FREEMAN:

2 Q. Are you aware of the English word
3 being a technical word in any context?

4 MR. HARMER: Objection. Vague,
5 ambiguous.

6 THE WITNESS: Depends on the context
7 it's being utilized, and it's technical to
8 one expertise or one group of people where
9 it's non-technical for other expertise or
10 other groups of people. The same word
11 will be different for different groups.

12 BY MS. FREEMAN:

13 Q. In what context would the English
14 word "layer" be technical?

15 MR. HARMER: Objection. Vague.

16 THE WITNESS: In medicine, in
17 surgery we use the word "layer," meaning
18 the layer of tissue, for example, or
19 expose the layers.

20 BY MS. FREEMAN:

21 Q. In the context of medicine, what
22 does the English word "layer" mean?

1 A. Layer is -- a defined stratum can be
2 a layer.

3 Q. All right. You just provided an
4 example. Can you provide me a definition of the
5 word "layer" in the context of medicine?

6 A. Can I reference a dictionary?

7 Q. I'm asking you to provide your
8 answer without referring to any reference.

9 A. I didn't realize that we are doing
10 verbal language skills here, so I will try to
11 explain this.

12 Technical word "layer" is a certain
13 thickness, defined substance in the human body
14 can be a layer.

15 Q. Okay. You say "a certain
16 thickness." Can you be more specific about the
17 thickness required for a layer?

18 A. It can be any thickness.

19 Q. Okay. So a layer is not limited by
20 thickness?

21 A. No.

22 Q. So a layer is -- and your definition

1 is a "defined substance in the human body"?

2 MR. HARMER: Objection.

3 THE WITNESS: Not my definition. In
4 the context -- sorry, Joe, go ahead.

5 MR. HARMER: Objection. Misstates
6 testimony.

7 Thank you.

8 THE WITNESS: In the context of
9 medicine and especially human anatomy is
10 what I described.

11 BY MS. FREEMAN:

12 Q. Can you -- I'm sorry, I don't think
13 I understood what you described. Can you
14 describe the definition of layer in the context
15 of medicine?

16 MR. HARMER: Objection. Vague,
17 ambiguous.

18 THE WITNESS: Medicine is a very
19 large field. Where do you want me to go?

20 BY MS. FREEMAN:

21 Q. Do you know any definition of layer
22 in the context of medicine?

1 A. Medicine is a large field. Can you
2 define medicine, please?

3 Q. I'm asking you in any part of
4 medicine, context of medicine, can you define
5 layer?

6 A. I think I already described it.
7 Layer is a defined substance that conforms
8 itself into a stratum, or a certain thickness is
9 a layer, and the thickness is of varying depths
10 and can be variable. It can be very thin to
11 very large. They all are construed "layer" in
12 medicine. That is in the context of human body
13 and human tissue.

14 Q. Can you explain what you mean by the
15 word "stratum" in your answer?

16 A. Stratum is a -- for me, it's a
17 medicine word that we use for layers. Stratum
18 is also used as layers.

19 Q. Okay. So --

20 A. Stratification is separation of
21 tissues by certain amount of characteristics.
22 That is where the stratum comes from.

1 Stratification is the verb, and stratum would be
2 what would come out of a stratification.

3 MS. FREEMAN: I hear a child's voice
4 in the background. Could someone please
5 mute themselves if they have a child
6 making noise in the background?

7 Q. Are the English words "slice" and
8 "layer" synonyms?

9 A. They're not.

10 Q. What is the difference between a
11 slice and a layer?

12 A. Layer is more of a natural
13 confirmation of the tissues in the context of
14 human tissue and body. Slice is something that
15 is created off a human body or a tissue by an
16 operator.

17 Q. Are you familiar with the English
18 term "3D"?

19 MR. HARMER: Objection. Vague.

20 THE WITNESS: Can you expand the
21 term "3D," please?

22 ///

1 BY MS. FREEMAN:

2 Q. Are you familiar with the English
3 term "3D"?

4 A. I don't know what "D" stands for.
5 Do you mean three-dimensional, or are you asking
6 something else?

7 Q. So when I say the word "3D" to you,
8 you need clarification as to whether D refers to
9 dimension?

10 MR. HARMER: Objection.

11 Argumentative.

12 THE WITNESS: Because you're asking
13 very vague questions, so I need to be very
14 concrete about what exactly you're asking
15 me.

16 BY MS. FREEMAN:

17 Q. Okay. Are you familiar with the
18 term "3D," which is the Arabic numeral 3
19 followed by the capital letter D?

20 MR. HARMER: Objection. Vague.

21 THE WITNESS: In the most common
22 parlance, 3D is three-dimensional.

1 BY MS. FREEMAN:

2 Q. Is 3D technical?

3 A. Depends on context.

4 Q. Is 3D non-technical?

5 A. Yes. My kids go watch a
6 three-dimensional movie, and they don't consider
7 it as a technical term.

8 Q. So are your children the judge as to
9 whether 3D is a technical word?

10 MR. HARMER: Objection.

11 Argumentative.

12 THE WITNESS: Since we're using very
13 vague definitions and asking -- that's why
14 I'm asking. I'm telling you in a
15 contextual way, so to make it clear.

16 BY MS. FREEMAN:

17 Q. What context is the term "3D"
18 technical?

19 MR. HARMER: Objection. Vague.

20 THE WITNESS: It can be in the
21 context of imaging, for example. It can
22 be 3D, meaning three-dimensional imaging.

1 D is a dimension, that's what the
2 definition should be.

3 BY MS. FREEMAN:

4 Q. In the context of imaging, is 3D
5 technical?

6 A. Yes.

7 Q. What does the term "3D" mean in the
8 context of imaging?

9 MR. HARMER: Objection. Vague.

10 THE WITNESS: Three-dimensional can
11 be -- in the context of imaging,
12 three-dimension is ability to see the
13 object of interest in multiple angles and
14 multiple depths, and also related to
15 multiple textures.

16 BY MS. FREEMAN:

17 Q. Is there any other meaning of the
18 word "3D" in the context of imaging?

19 A. Not that I know of.

20 Q. Are you aware of any other
21 definition of the term "3D"?

22 A. Besides what I explained, no.

1 Q. What would 3D mean to your children
2 when they went to see a 3D movie?

3 MR. HARMER: Objection. Relevance.

4 THE WITNESS: For them, objects
5 appear them -- appeared to be
6 three-dimensional as if they're seeing
7 them in reality.

8 BY MS. FREEMAN:

9 Q. So other than your children's
10 definition of 3D and the definition that you
11 just gave me in the context of imaging, is there
12 any other definition of 3D that you're aware of?

13 A. No.

14 Q. Is 3D synonymous with
15 three-dimensional?

16 A. From what you're asking, yes.

17 Q. From what I'm asking?

18 A. Mm-hmm. In this context of
19 questioning, yes.

20 Q. Have I provided a definition of 3D?

21 A. I believe I did.

22 Q. Okay. So in the context of your

1 definition of 3D, 3D is synonymous with
2 three-dimensional, is that correct?

3 A. Yes. From what you're asking, yes.

4 Q. I'm confused by what you're saying.
5 What do you mean, from what I'm asking?

6 A. Because we're talking about what 3D
7 means the last few minutes, so, yes, in that
8 context, 3D is three-dimensional.

9 THE STENOGRAPHER: Excuse me,
10 Mr. Harmer, if you're objecting, you're on
11 mute.

12 MR. HARMER: I apologize. Can you
13 hear me now? I'm trying to object and not
14 have kids in the background. I have
15 health issues so I have to be at home. I
16 apologize for any inconvenience. Thank
17 you.

18 BY MS. FREEMAN:

19 Q. Are you familiar with the English
20 noun "identify"?

21 MR. HARMER: Objection. Vague.

22 THE WITNESS: Yes, I am.

1 BY MS. FREEMAN:

2 Q. Is the English word "identify"
3 technical?

4 MR. HARMER: Objection. Vague.

5 THE WITNESS: Depends on the
6 context.

7 BY MS. FREEMAN:

8 Q. Is the English word technical in any
9 context?

10 MR. HARMER: Objection. Ambiguous,
11 vague.

12 THE WITNESS: Can you repeat that,
13 please?

14 BY MS. FREEMAN:

15 Q. Is the English word technical in any
16 context -- sorry, my question -- I withdraw the
17 question, confusing.

18 Just have a sip of water.

19 Is the English word "identify"
20 technical in any context?

21 MR. HARMER: Same objection.

22 THE WITNESS: Identify can be

1 technical if in the context of surgery I
2 say, Can you identify a structure in human
3 body.

4 BY MS. FREEMAN:

5 Q. So in the context of surgery, is the
6 English word "identify" technical?

7 A. Yes, can be.

8 Q. You said it "can be." How would I
9 know if the English word "identify" is technical
10 in the context of surgery?

11 MR. HARMER: Objection. Calls for
12 speculation.

13 THE WITNESS: Depends on what is the
14 prefix before and after. Can you identify
15 a structure, if I say that to an
16 assistant, that's a technical term.

17 BY MS. FREEMAN:

18 Q. Is the English word "identify"
19 non-technical?

20 A. It can be.

21 Q. What does the English word
22 "identify" mean?

1 MR. HARMER: Objection. Vague.

2 THE WITNESS: To name a structure,
3 to name a particular item, to pick out
4 about a group of things.

5 BY MS. FREEMAN:

6 Q. Can you provide any other meaning of
7 the English word "identify"?

8 MR. HARMER: Objection. Vague.

9 THE WITNESS: No other meaning that
10 I can identify.

11 BY MS. FREEMAN:

12 Q. Are you familiar with the English
13 word "tag"?

14 MR. HARMER: Objection. Vague.

15 THE WITNESS: Yes.

16 BY MS. FREEMAN:

17 Q. Is the English word "tag" technical?

18 MR. HARMER: Same objection.

19 THE WITNESS: Depends on the
20 context.

21 BY MS. FREEMAN:

22 Q. Please identify a context in which

1 the English word "tag" is technical.

2 A. In the context of medicine, when you
3 are operating -- or when you are looking at
4 images, for example, you will say, Can you tag
5 the structure, and it's quite common to say
6 that, and it can be tagged or an identifier
7 could be attached to something to make sure it's
8 easy for identification at a later time, and
9 that is a technical word "tag" for me in
10 medicine context.

11 Q. So is it your testimony that the
12 English word "tag" technically means to identify
13 for later in the context of looking at images in
14 medicine?

15 A. Identify any time, meaning in an
16 hour, can you tag the structure. Can you point
17 and put a marker on a structure, that's a tag.

18 Q. Can you identify any other meaning
19 of the word "tag"?

20 MR. HARMER: Objection. Vague.

21 THE WITNESS: No.

22 ///

1 BY MS. FREEMAN:

2 Q. Can you identify a non-technical
3 meaning of the word "tag"?

4 MR. HARMER: Objection. Vague.

5 THE WITNESS: Tagging the bags for
6 travel, that's -- in my context, it's
7 non-technical. For a baggage handler,
8 that's technical.

9 BY MS. FREEMAN:

10 Q. Okay. You've given me an example.
11 Can you give me a non-technical definition of
12 the word "tag"?

13 A. No other way of explaining to me.
14 No, I cannot.

15 Q. Are you familiar with the English
16 term "medical image"?

17 A. Yes.

18 Q. Is the English term "medical image"
19 technical?

20 A. Yes.

21 Q. What is the technical meaning of the
22 English term "medical image"?

1 A. Image of an item that is of medical
2 interest, either diagnostic or therapeutic
3 interest.

4 Q. Does the English term "medical
5 image" have a non-technical meaning?

6 A. Not that I know of.

7 Q. Are you familiar with the English
8 word "model"?

9 MR. HARMER: Objection. Vague.

10 THE WITNESS: Yes, I am.

11 BY MS. FREEMAN:

12 Q. What does the English word "model"
13 mean?

14 A. Model is to illustrate something.

15 Q. Is there a difference between a
16 medical image and a model?

17 A. Yes.

18 Q. What is the difference?

19 A. Model is typically constructed.
20 Image is the actual picture.

21 Q. Is a model based on a medical image
22 not a medical image?

1 A. Depends.

2 Q. Depends on what?

3 A. Context, what it's being used for.

4 Q. Can you give me an example when a
5 model based on a medical image is not a medical
6 image?

7 MR. HARMER: Objection. Vague.

8 THE WITNESS: Yes. An image can be
9 modeled and shown for illustration
10 purposes to a patient. That's not truly a
11 medical image, it's an illustration for
12 the patient to review and understand.

13 But as in a technical word, "model"
14 is -- something that is synthesized from
15 an image, that's going to be a model, and
16 that may be the technical term that you're
17 looking for.

18 BY MS. FREEMAN:

19 Q. Can you give me an example when a
20 model based on a medical image is a medical
21 image?

22 A. We think of them as models. For

1 example, model of an image is a model. Do we
2 use it for medical purposes? No. Do you use
3 for illustration purposes? Yes.

4 Q. When you use the word "we" in your
5 answer, who are you referring to?

6 A. The technical people, people that
7 are technical in medicine.

8 Q. Are you saying that when a model is
9 used -- strike that.

10 Are you saying that when a model
11 based on a medical image is used for a medical
12 purpose, then it is a medical image?

13 A. If you're saying a model, is it a
14 physical model or is it a virtual model? Which
15 model are we explaining here? Because we do
16 have physical models.

17 Q. Let's start with physical model.
18 Are you saying when a physical model based on a
19 medical image is used for a medical purpose,
20 then it is a medical image?

21 A. It's not image at all, it's a
22 structure.

1 Q. Okay. Let's go to your second
2 suggested option, virtual model. Are you saying
3 that when a virtual model based on a medical
4 image is used for a medical purpose, then it is
5 a medical image?

6 A. It's a medical thing of interest.
7 Do we call it a model as a medical image? I'm
8 not aware of somebody will call it an image. I
9 will say, Let's look at the model.

10 Q. I'm just very confused. Do you --
11 can you explain the difference between a medical
12 image and a model created from the medical
13 image?

14 A. They're never used interchangeably.

15 Q. So you're saying the word "medical
16 image" and the word "model" are never used
17 interchangeably?

18 A. In my context, no. I never seen
19 people saying that, Hey, let me show the medical
20 model image. Nobody says medical model image.
21 They'll say, Can I see the model or, Can I see
22 the medical image? I've never seen them use

1 either interchangeably or all together. Have
2 you heard of medical model image, I don't think
3 I've heard that, or medical image model, for
4 that matter.

5 Q. All right. So you see a definite
6 difference between a medical image and a model,
7 is that correct?

8 A. I see them as different things,
9 different purposes.

10 Q. Can you explain the difference
11 between a medical image and a model?

12 A. Model is something that tells me
13 what the shape of a structure is, what the
14 structure of a structure is. Medical image is
15 specifically used in a traditional form of where
16 it is, for example, an x-ray image or a CT scan
17 or echocardiogram.

18 When the medical image is processed
19 into a particular shape, that's when it's
20 referred to as a model. But I never heard
21 anybody say medical image model.

22 Q. Dr. Mulumudi, who asked you to

1 appear at this deposition?

2 A. After I got the invite, correct?

3 Q. I'm confused by your answer so I'm
4 going to ask again.

5 Who asked you to appear at this
6 deposition?

7 A. I'm quite confused about that
8 question also, but I'll explain to you.

9 The attorneys that I working with,
10 and they are the ones that said today's the
11 deposition and then I'm being deposed for it.

12 Q. Who are the attorneys that you're
13 working with?

14 A. Joseph Harmer.

15 Q. Who else is an attorney that you're
16 working with?

17 A. Jed Hansen.

18 Q. Who else is an attorney that you're
19 working with?

20 A. Those are the only two folks I met.

21 Q. Do you expect to be paid for
22 appearing at this deposition?

1 A. Yes, I believe so.

2 Q. And who do you expect to pay you for
3 this deposition?

4 A. I don't know.

5 Q. You don't know who is going to pay
6 you for this deposition?

7 A. Yeah, whoever is I'm being expert,
8 being called for, that's what I'm being called
9 for, so...

10 Q. Do you know who you're being an
11 expert called for?

12 A. You're asking me about which company
13 that's paying me or -- that's what I'm trying to
14 understand.

15 Q. I'm asking you who you expect to be
16 paid by.

17 A. I'm being an expert, I'm an expert
18 to define on things I know about, the technology
19 that we are discussing, hopefully, and that's
20 who is paying me.

21 Q. Is Mr. Harmer paying you?

22 A. I don't think so.

1 Q. Is Mr. Hansen paying you?

2 A. I don't think so either.

3 Q. When did you begin working with
4 Mr. Harmer and Mr. Hansen?

5 A. I don't recall the exact date.
6 That's probably in June.

7 Q. June of 2023?

8 A. 2023, correct.

9 Q. And have you been paid for any work
10 that you've done with Mr. Harmer and Mr. Hansen?

11 A. Yes.

12 Q. And who paid you for that work?

13 A. I believe there's an agent that
14 handles that.

15 Q. Do you know who paid you for the
16 work that you've done with Mr. Harmer and
17 Mr. Hansen?

18 A. They're called Cahn Associates, and
19 they're the ones who paid me for that.

20 Q. Who is Cahn Associates?

21 A. Can I ask my attorneys a question?

22 Q. Only if it relates to privilege.

1 THE WITNESS: Joe, can I disclose
2 this information, or is this line of
3 questioning appropriate for me to answer?

4 MR. HARMER: If you have a question
5 about privilege, we can talk about it for
6 a minute and come back. Would you like to
7 do that?

8 THE WITNESS: Yes, please.

9 MR. HARMER: Okay.

10 MS. FREEMAN: Before you go, I'm not
11 stopping you from going, but there is a
12 rule in this type of deposition, which is
13 outside of privilege there is no
14 consulting with -- a witness may not
15 consult with any attorney as to the
16 substance of his testimony or as to the
17 substance of potential future testimony
18 once a deposition begins.

19 So feel free to confer on privilege.
20 We'll be here.

21 MR. HARMER: Absolutely understood.
22 Thank you.

1 Dr. Mulumudi, you can turn off your
2 camera and you're mic. We'll talk just
3 for a second.

4 (Whereupon, a recess was taken
5 from 11:05 a.m. to 11:06 a.m.)

6 BY MS. FREEMAN:

7 Q. Dr. Mulumudi, the question that was
8 pending that you stopped to confer with
9 Mr. Harmer as to privilege, I'm going to ask
10 that question again.

11 Who is Cahn Associates?

12 A. Cahn Associates is the agent that
13 handles and processes the payment system, and
14 that's how -- that's what I know of them, that's
15 how I know of them.

16 Q. That's how you know of them.

17 Are you an employee of Cahn
18 Associates?

19 A. No, I'm not.

20 Q. Are you an independent contractor
21 working for Cahn Associates?

22 A. Yes.

1 Q. What is your relationship with Cahn
2 Associates?

3 A. I have no relationship besides being
4 the expert witness.

5 Q. So you're an expert witness for Cahn
6 Associates?

7 A. That's correct.

8 MS. FREEMAN: Okay. We've been
9 going for about an hour now, and I'm going
10 to take a 15-minute break. Actually,
11 since it's 11:08, that's a little bit
12 awkward, so why don't we plan to be back
13 at 11:30.

14 Does that work for you?

15 THE WITNESS: Yeah, I think so.
16 I'll go get a cup of coffee. Yes.

17 (Whereupon, a recess was taken
18 from 11:08 a.m. to 11:30 a.m.)

19 MS. FREEMAN: Mr. Harmer, at the
20 beginning of this deposition I asked you
21 to refrain from speaking objections, which
22 are barred by the board. In this first

1 segment of the deposition, you have said
2 "Objection, vague" more than 35 times, and
3 that is given as an example by the board
4 of an objection that would not be proper.

5 So I'm going to ask you to refrain
6 from any further speaking objections.

7 MR. HARMER: Ms. Freeman, that's
8 fine as long as you agree that in the
9 event this goes to trial and the objection
10 is objection to form, I will be permitted
11 to specify with the appropriate amount of
12 specificity my objection.

13 Do you agree?

14 MS. FREEMAN: I'm asking you to
15 comply with the board rules, and I'm not
16 going to agree to any condition for your
17 compliance.

18 MR. HARMER: Well, objection, vague
19 is an appropriate objection.

20 MS. FREEMAN: It is absolutely not.

21 Do you not agree to refrain from
22 making the objection, which is objection,

1 vague, because if you cannot agree to
2 that, then we'll have to talk to the
3 board.

4 MR. HARMER: I need a moment,
5 please.

6 Can we go off the record for a few
7 moments?

8 MS. FREEMAN: Sure.

9 MR. HARMER: Thank you.

10 (Whereupon, a recess was taken
11 from 11:31 a.m. to 11:33 a.m.)

12 MR. HARMER: Ms. Freeman, I agree
13 not to use the word "vague" or "ambiguous"
14 in my objections.

15 MS. FREEMAN: Do you agree not to
16 make any further speaking objections?

17 MR. HARMER: I am allowed to say,
18 for example, objection, foundation;
19 objection, relevance. Or do you want me
20 to say, object to form?

21 MS. FREEMAN: I would like you to
22 comply with the board guidelines.

1 MR. HARMER: Okay. I will do that
2 to the best of my ability.

3 BY MS. FREEMAN:

4 Q. Dr. Mulumudi, during the break did
5 you discuss your testimony with Mr. Harmer or
6 Mr. Hansen?

7 A. No. I made a cup of coffee.

8 Q. Dr. Mulumudi, do you have any
9 reference materials in front of you right now?

10 A. None.

11 Q. Dr. Mulumudi, why has Cahn
12 Associates paid you?

13 A. For the work I've done for the
14 company that I'm representing. If you ask me
15 the name of the company that I'm representing,
16 it's Novarad is what I'm representing. Cahn
17 Associates is the one -- I've never spoken with
18 Novarad.

19 Q. Okay. You said, "Cahn Associates is
20 the one." Cahn Associates is the one what?

21 A. I don't even know if Cahn Associates
22 is their term. It's C-A-H-N, Cahn Litigation, I

1 believe is what their e-mail says, and that is
2 how I -- those are the people that speak with me
3 and that allowed the meeting between me and Joe
4 Harmer and Jed Hansen.

5 Q. And why is Cahn Associates speaking
6 with you about your work with Mr. Harmer and
7 Mr. Hansen?

8 A. They are the ones who introduced me
9 and said that, We would like you to interview
10 with these attorneys to see whether you are the
11 right person or qualified to do this expert
12 work.

13 Q. Okay. You'll have to pardon me, I'm
14 trying to introduce an exhibit. It's the first
15 time. It's taking me a little time.

16 (Whereupon, Exhibit Mulumudi 1029
17 was marked for identification.)

18 BY MS. FREEMAN:

19 Q. I have introduced an exhibit,
20 Dr. Mulumudi. Can you check and see if you have
21 access to that exhibit?

22 A. How do I find it?

1 MS. FREEMAN: Do you have any advice
2 for the witness?

3 MS. MCCOY: If you go to your
4 Exhibit Share window.

5 BY MS. FREEMAN:

6 Q. Do you have an Exhibit Share window?

7 A. No, I don't. It's a Zoom meeting
8 that I see.

9 MS. FREEMAN: Can we go off the
10 record for a moment?

11 (Discussion off the record.)

12 MS. FREEMAN: I'm happy to hear that
13 Exhibit Share appears to be working for
14 Dr. Mulumudi.

15 BY MS. FREEMAN:

16 Q. Dr. Mulumudi, I have made a document
17 marked Exhibit Mulumudi 1029 accessible to you.
18 Can you bring up that document? Let me know
19 when you've done so.

20 A. Yep.

21 Q. Do you recognize the document marked
22 Exhibit 1029?

1 A. Yes, I do.

2 Q. Please read the title on the first
3 page beginning with the word "Decision."

4 A. "Granting Institution of Inter
5 Partes Review."

6 Q. Okay. So could you read the full
7 title beginning with the word "Decision"?

8 A. "Granting Institution of Inter
9 Partes Review."

10 Q. Dr. Mulumudi, I'd like you to begin
11 with the word "Decision."

12 A. "Decision Granting Institution of
13 Inter Partes Review."

14 Q. Great.

15 And does the first page refer to a
16 particular patent?

17 A. There's a Patent 11,004,271 B2.

18 Q. And do you recognize that patent
19 number?

20 A. Yes, I do.

21 Q. And is there an IPR number on the
22 first page?

1 A. It's 2023-00042.

2 Q. Have you read the exhibit marked
3 Exhibit 1029?

4 Dr. Mulumudi, there's been a long
5 delay here so I'm going to just -- my question
6 was, have you read Exhibit 1029? Can you answer
7 that question?

8 A. I can answer that. I'm not clear if
9 I'm reading the exact document or not. It
10 doesn't sound completely familiar to me.

11 Q. Okay.

12 A. Because there are very similar
13 documents that I've read, so I'm not sure if I
14 saw this exact document.

15 Q. Okay. So is it fair to say that you
16 can't say whether you've read Exhibit 1029,
17 which is the Decision Granting Inter Partes
18 Review of the '271 patent?

19 A. Yes, it's fair to say that I don't
20 exactly recall this exact document or not.

21 Q. Can you tell me if you recall
22 reading a Decision Granting Inter Partes Review

1 of the '271 patent?

2 A. Yes. Not the inter partes review,
3 but similar documents I've read, but I don't
4 know exactly it's inter partes review or not. I
5 don't know the word "inter partes review."

6 Q. What similar document are you
7 referring to?

8 A. Referring to the review of the
9 patent and when we constructed my declaration,
10 and I remember reviewing materials that are
11 pertinent, but I'm not exactly sure if I read
12 exactly the same document.

13 Q. Dr. Mulumudi, you just said, "we
14 constructed my declaration." Who did you mean
15 by the word "we" in that answer?

16 A. I work with a team, Joseph Harmer
17 and Jed, so when I work with the team, and
18 that's how I constructed my declaration.

19 Q. Well, you just testified that "we
20 constructed my declaration." So is it fair to
21 say that you constructed your declaration with
22 Mr. Harmer and Mr. Hansen?

1 A. That's my declaration, those are my
2 views, and, yes, I did work with them.

3 Q. Did you construct your declaration
4 with Mr. Harmer and Mr. Hansen?

5 A. I guess in consultation, yes, sure,
6 yes, yeah, those are my views. Yes, that's
7 correct.

8 Q. So returning to Exhibit 1029, do you
9 recognize Exhibit 1029?

10 MR. HARMER: Objection. Asked and
11 answered.

12 THE WITNESS: To my recollection,
13 very similar material, but I'm not sure
14 exactly the same document.

15 BY MS. FREEMAN:

16 Q. So is it your testimony that you
17 don't know whether you've read Exhibit 1029?

18 MR. HARMER: Objection. Misstates
19 testimony.

20 MS. FREEMAN: Mr. Harmer, that is a
21 speaking objection, and I'm going to ask
22 you to refrain from any further speaking

1 objections. This is my third request, at
2 least.

3 BY MS. FREEMAN:

4 Q. Go ahead, Dr. Mulumudi.

5 A. I don't recall the exact document.

6 Q. Okay. Dr. Mulumudi, I have a
7 particular document that I've made available.
8 It has been labeled Exhibit 1029. That is the
9 one singular document that I am referring to as
10 Exhibit 1029.

11 My question is, do you recognize
12 Exhibit 1029?

13 MR. HARMER: Objection. Form.

14 THE WITNESS: I do recognize the
15 content. I don't know if they're exactly
16 the same document. I don't know how else
17 to explain it.

18 BY MS. FREEMAN:

19 Q. All right. Dr. Mulumudi, you've
20 been asked to tell the truth and tell the whole
21 truth here, and my question --

22 A. Right.

1 Q. -- now is, have you read
2 Exhibit 1029?

3 MR. HARMER: Objection. Form.

4 THE WITNESS: And as I explained,
5 there are very similar documents that I
6 read, but I'm not completely confident to
7 say that what you are showing me, the
8 exact document that I read.

9 BY MS. FREEMAN:

10 Q. Can you tell me what similar
11 documents you're referring to?

12 A. For example, the patent, the patent
13 from Novarad, and the surrounding prior art
14 patents that go around it, that's the
15 information that I read.

16 Q. Are there any other similar
17 documents you're referring to?

18 A. Those are the items that I read for
19 this particular scenario.

20 Q. So you're saying that the patent
21 from Novarad and the surrounding prior art
22 patents are similar to Exhibit 1029?

1 A. Similar information.

2 Q. Okay. I'm going to ask you to take
3 a look at Exhibit 1029, and read the line above
4 the word "Decision" for the record, please.
5 Read it out loud, please.

6 A. I will.

7 "Before Miriam L. Quinn, Jo-Anne M.
8 Kokoski, and Scott Raevsky, Administrative
9 Patent Judges. Kokoski, Administrative Patent
10 Judge."

11 Q. Okay. Is that information familiar
12 to you?

13 A. No.

14 Q. Do you recall reading any document
15 that had that information in it?

16 A. No.

17 Q. Thank you.

18 Dr. Mulumudi, I'm making another
19 exhibit available to you. This exhibit has been
20 marked Exhibit Mulumudi 1030. Let me know when
21 you have access to that document.

22 ///

1 (Whereupon, Exhibit Mulumudi 1030
2 was marked for identification.)

3 A. Okay. Not yet.

4 BY MS. FREEMAN:

5 Q. You may have to hit refresh on your
6 window in order for it to --

7 A. All right. I'm trying. Yes.

8 Q. Okay. Would you please read the
9 patent number on Exhibit Mulumudi 1030?

10 A. Patent 10,945,807 B2.

11 Q. Would you please read the IPR number
12 in Exhibit Mulumudi 1030?

13 A. IPR2023-00045.

14 Q. Would you please read the title
15 beginning with the word "Decision"?

16 A. "Decision Granting Institution of
17 Inter Partes Review."

18 Q. Do you recognize Exhibit
19 Mulumudi 1030?

20 A. In a similar fashion that I
21 described, this content looks familiar, and I am
22 not sure if I read exactly the same document.

1 Q. Okay. I'm referring only to the one
2 document that's been marked Exhibit Mulumudi
3 1030. Referring to that one document, do you
4 recognize Exhibit Mulumudi 1030?

5 A. No.

6 Q. Sorry for the delay, Dr. Mulumudi.
7 I have introduced another exhibit to you. It is
8 labeled Exhibit Mulumudi 1032. It's also marked
9 Medivis Exhibit 1001. Let me know when you have
10 access to that document.

11 (Whereupon, Exhibit Mulumudi 1032
12 was marked for identification.)

13 A. I do.

14 BY MS. FREEMAN:

15 Q. Do you recognize -- do you recognize
16 Exhibit Mulumudi 1032?

17 A. Yes, I do.

18 Q. What is Mulumudi 1032?

19 A. It's a copy of the US patent grant.

20 Q. Can you be more specific as to what
21 patent you're referring to?

22 A. It's Augmented Reality Viewing and

1 Tagging for Medical Procedures.

2 Q. Is it -- does it have a designated
3 number?

4 A. As I read before, it's US 10,945,807
5 B2.

6 Q. Is it all right if I refer to this
7 exhibit as the '807 patent?

8 A. Yes.

9 Q. I'd like to direct your attention to
10 Claim 1 of the '807 patent. Let me know when
11 you're there.

12 A. Scrolling down.

13 Yes, I'm there. "A method for
14 augmenting medical imaging of a patient, the
15 medical imaging displayed using an augmented
16 reality headset."

17 Am I correct?

18 Q. Are you in a column with the
19 heading 15, and just below a line that says,
20 "The invention claimed is"?

21 A. Yeah, I am.

22 Q. Okay. Do you see Claim 1 of the

1 '807 patent in front of you right now?

2 A. Mm-hmm, yes, I do. Yeah.

3 Q. Are you familiar with Claim 1 of the
4 '807 patent?

5 A. Yes, I am.

6 Q. I'd like to direct your attention to
7 the second retrieving step in Claim 1. The
8 second retrieving step of Claim 1 reads,
9 "Retrieving an augmentation tag from data
10 storage, the augmentation tag associated" --

11 A. I'm sorry to interrupt. You said
12 Claim 1, and we are -- okay. Got it. So not
13 the first retrieving. Okay, go ahead, please.

14 Q. I'm going to start over.

15 Are you oriented?

16 A. Yes, I am.

17 Q. I'm going to read the second
18 retrieving step of Claim 1, and please let me
19 know if I make any errors.

20 The second retrieving step of Claim
21 1 reads, Retrieving an augmentation tag from
22 data storage, the augmentation tag associated

1 with the location in one layer of the acquired
2 medical image, the augmentation tag identifying
3 at least one anatomical feature found at that
4 location.

5 Correct?

6 A. Anatomical structure, yeah, mm-hmm.

7 Q. Is it true that the second
8 retrieving step of Claim 1 requires an
9 augmentation tag associated with a location in
10 one layer of the acquired medical image?

11 A. I would say at least one layer.

12 Q. Okay. But the second step, the
13 second retrieving step in Claim 1 says, "...the
14 augmentation tag associated with the location in
15 one layer of the acquired medical image."

16 Correct?

17 A. Yeah, but the sentence continues
18 with a comma, "...the augmentation tag
19 identifying at least one anatomical structure."

20 So I read this as at least one.

21 Q. So you interpret "associated with a
22 location in one layer of the acquired medical

1 image" as associated with one layer of the --
2 excuse me.

3 Can you explain how you're
4 interpreting that?

5 A. Yeah. At least one --

6 MR. HARMER: Objection. Form.

7 THE WITNESS: -- layer.

8 MR. HARMER: You can answer,
9 Dr. Mulumudi.

10 THE WITNESS: I said at least one
11 layer, or at least one structure.

12 BY MS. FREEMAN:

13 Q. So you're interpreting "associated
14 with the location in one layer" as associated
15 with a location in at least one layer?

16 A. Yes. One or more, correct, yes.

17 Q. The second retrieving step of
18 Claim 1 requires the augmentation tag to
19 identify at least one anatomical structure found
20 at that location, correct?

21 A. That's correct.

22 Q. Does associated with the location

1 and identifying at least one anatomical
2 structure mean the same thing?

3 MR. HARMER: Objection. Form.

4 THE WITNESS: They're two
5 different --

6 MR. HARMER: Dr. Mulumudi, I didn't
7 mean to interrupt you. After I object,
8 you're free to answer.

9 THE WITNESS: They're two different
10 things, to my interpretation.

11 BY MS. FREEMAN:

12 Q. Okay. Associated with a location
13 and identifying at least one anatomical
14 structure mean two different things, correct?

15 A. At least one layer and at least one
16 anatomic structure are two different things,
17 because anatomic structure can have multiple
18 layers.

19 Q. Okay. Returning to the second
20 retrieving step of Claim 1, what does that
21 second retrieving step require the augmentation
22 tag to be associated with?

1 MR. HARMER: Objection. Form.

2 THE WITNESS: The augmentation tag
3 to be associated with at least one layer
4 or at least one structure.

5 BY MS. FREEMAN:

6 Q. What is the meaning of the word "a
7 location" in that second retrieving step of
8 Claim 1?

9 MR. HARMER: Objection. Form.

10 THE WITNESS: An area of interest.

11 BY MS. FREEMAN:

12 Q. Okay. Is there any difference
13 between a location in one layer and at least one
14 layer?

15 A. There is a difference, because layer
16 can extend for certain length or certain
17 distance, location is a specific mark on that
18 layer, on that length.

19 Q. Are you familiar with the English
20 term "augmentation tag"?

21 MR. HARMER: Objection. Form.

22 THE WITNESS: Yeah, I know the

1 meaning of augmentation tag.

2 BY MS. FREEMAN:

3 Q. What is the meaning of augmentation
4 tag?

5 A. A marker to enhance an area of
6 interest.

7 Q. Does augmentation tag have any other
8 meanings?

9 MR. HARMER: Objection. Form.

10 THE WITNESS: Not to me in this
11 context.

12 BY MS. FREEMAN:

13 Q. Dr. Mulumudi, I'd like to direct
14 your attention to Figure 1A of the '807 patent.
15 Let me know when you're there.

16 A. Yeah, I'm there.

17 Q. Are you familiar with Figure 1A of
18 the '807 patent?

19 A. Yes.

20 Q. What does Figure 1A of the '807
21 patent illustrate?

22 A. It illustrates an individual with a

1 headset viewing at a patient's leg, ankle area,
2 with what, from the cartoon, looks like
3 structures exposed.

4 Q. Do you see any augmentation tag in
5 Figure 1A of the '807 patent?

6 A. I don't.

7 Q. What is labeled in Figure 1A of the
8 '807 patent as 118?

9 MR. HARMER: Objection. Foundation.

10 THE WITNESS: I have to reference
11 it. Hold on.

12 BY MS. FREEMAN:

13 Q. Let me withdraw my question for a
14 moment.

15 Do you see anything labeled in
16 Figure 1A as 118?

17 A. Yes, I do.

18 Q. Do you know what is labeled in
19 Figure 1A of the '807 patent at 118?

20 A. I have to reference the 118 number.
21 Can you point me to the reference exactly where
22 it is described?

1 Q. I'm going to direct your attention
2 to column 3 of the '807 patent. Let me know
3 when you're there.

4 A. Yes, I'm there.

5 Q. Do you see around line 37, with the
6 line numbers in the middle of the page --

7 A. "An augmentation tag 118 associated
8 with the location in one layer of the acquired
9 medical image 114."

10 Am I correct?

11 Q. I'm asking you questions.

12 A. Are we in the right location?
13 That's the question. I can ask for
14 clarification.

15 Q. Well, I believe that we're reading
16 column 3 beginning around line 37.

17 A. I'm asking for a clarification.
18 It's a human interaction also at the same time,
19 by the way.

20 Q. Okay. Now I'd like to direct your
21 attention back to Figure 1A of the '807
22 patent --

1 A. Okay.

2 Q. -- and ask you again if you know
3 what is labeled in Figure 1A of the '807 patent
4 as 118.

5 MR. HARMER: Objection. Foundation.

6 THE WITNESS: Per the description,
7 that's an augmentation tag, an area of
8 interest.

9 BY MS. FREEMAN:

10 Q. Can you describe the shape of
11 augmentation tag 118 in Figure 1A of the '807
12 patent?

13 A. It looks oval to me.

14 Q. Does augmentation tag 118 in
15 Figure 1A of the '807 patent identify anything?

16 A. Not from the detail of the picture
17 given.

18 Q. So is it your testimony that
19 augmentation tag 118 in Figure 1A of the '807
20 patent does not identify anything?

21 A. This is an illustration, so it is
22 meant to illustrate, I believe, and I don't

1 expect it to show a particular anatomic
2 structure. This is a cartoon.

3 Q. Okay. I understand that Figure 1A
4 is a cartoon, as you testified. You have the
5 entirety of the '807 patent in front of you.
6 And my question to you is, does augmentation tag
7 118, Figure 1A of the '807 patent, identify
8 anything?

9 MR. HARMER: Objection. Form and
10 foundation.

11 THE WITNESS: It illustrates an
12 area. It doesn't identify anything of
13 anatomic interest to me.

14 BY MS. FREEMAN:

15 Q. Okay. I'm not -- without limiting
16 your answer to what may be of interest to you,
17 my question is, does augmentation tag 118 in
18 Figure 1A of the '807 patent identify anything?

19 MR. HARMER: Objection. Form and
20 foundation.

21 THE WITNESS: It identifies a
22 tendon, from what I can see on the

1 illustration.

2 BY MS. FREEMAN:

3 Q. How does augmentation tag 118 in
4 Figure 1A of the '807 patent identify a tendon?

5 MR. HARMER: Objection. Foundation.

6 THE WITNESS: Because it is the
7 location where the achilles tendon exists.

8 BY MS. FREEMAN:

9 Q. Does augmentation tag 118 in
10 Figure 1A of the '807 patent coincide with the
11 achilles tendon?

12 A. From the illustration, yes.

13 Q. So is it your testimony that the
14 achilles tendon in Figure 1A of the '807 patent
15 is oval?

16 MR. HARMER: Objection. Foundation.

17 THE WITNESS: It's a tag. It is not
18 a structure. It's not a shape of the
19 structure.

20 BY MS. FREEMAN:

21 Q. So augmentation tag 118 in Figure 1A
22 of the '807 patent does not share the shape of

1 the achilles tendon, is that correct?

2 A. One tag, no, it doesn't.

3 Q. So how does augmentation tag 118 in
4 Figure 1 of the '807 patent coincide with the
5 achilles tendon?

6 MR. HARMER: Objection. Foundation.

7 THE WITNESS: From the illustration,
8 it marks an elongated structure attached
9 to that area, and that is the common
10 insertion site for achilles tendon.

11 BY MS. FREEMAN:

12 Q. So let me ask a clarifying question.
13 Is the augmentation tag 118 in
14 Figure 1A of the '807 patent, is that
15 identifying the achilles tendon or a common
16 insertion site for the achilles tendon?

17 MR. HARMER: Objection. Form,
18 foundation.

19 THE WITNESS: I have to clarify this
20 answer. What we are seeing is a cartoon
21 illustration. From the cartoon
22 illustration, you cannot identify the

1 exact structure.

2 From the best guess of what the
3 cartoon represents, it identifies more
4 than likely achilles tendon. That is the
5 common site where achilles tendon exists
6 in human body.

7 BY MS. FREEMAN:

8 Q. So is it fair to say that it's
9 un- -- not 100 percent clear what augmentation
10 tag 118 in Figure 1A identifies?

11 MR. HARMER: Objection. Form,
12 foundation.

13 THE WITNESS: It doesn't tell the
14 exact structure. It is an illustration,
15 and I see the limitation of illustration,
16 and we are sure.

17 BY MS. FREEMAN:

18 Q. And what is the limitation of
19 illustration?

20 A. An illustration is to demonstrate
21 what it can potentially show and what it is
22 meant to show, but I'm not going to say that it

1 does show achilles tendon or an artery or a
2 nerve from the illustration.

3 Q. Okay. Am I right in saying that
4 you're saying that Figure 1 of the '807 patent
5 may illustrate an achilles tendon or an artery
6 or a nerve?

7 MR. HARMER: Objection. Form.

8 THE WITNESS: Yes.

9 BY MS. FREEMAN:

10 Q. So are you certain what augmentation
11 tag 118 in Figure 1A of the '807 patent
12 identifies?

13 A. I already mentioned, I believe, from
14 the illustration, it is highly likely it's
15 representing a tendon.

16 Q. Okay. I didn't ask you if you
17 believe it to be highly likely. I asked you,
18 are you certain what augmentation tag 118 in
19 Figure 1A of the '807 patent identifies?

20 A. From the illustration, I think it is
21 a tendon.

22 Q. Okay. Are you certain that

1 augmentation tag 118 in Figure 1A of the '807
2 patent identifies a tendon?

3 MR. HARMER: Objection. Form.

4 THE WITNESS: I am not certain, but
5 I believe that's what it represents.

6 BY MS. FREEMAN:

7 Q. Okay. You believe that augmentation
8 tag 118 in Figure 1A of the '807 patent
9 identifies a tendon. Can you explain how it may
10 do so?

11 A. I believe I did. I'll explain
12 again.

13 This is the common area where
14 achilles tendon exists in human body.

15 Q. So if there's an augmentation tag in
16 the common area where achilles tendon exists in
17 the human body, then that augmentation tag
18 identifies that tendon, is that correct? Is
19 that your testimony?

20 A. If you're talking about the
21 illustration, yes. From the illustration, yes.
22 In real life, it's different.

1 Q. How is it different in real life?

2 A. The augmentation tag can represent a
3 tendon, can represent a nerve that runs next to
4 it, can represent an artery that runs by it, can
5 represent to some pathology in these structures.

6 Q. Is it your testimony, then, that
7 augmentation tag 118 in Figure 1A of the '807
8 patent may identify a nerve that runs next to
9 the tendon?

10 A. In real life.

11 Q. Well, how do you --

12 A. I'm sorry?

13 Q. How do you mean in real life? This
14 is real life.

15 A. We are looking at illustration, I
16 believe.

17 Q. Yes, we're looking at an
18 illustration in real life.

19 A. In real life on my computer screen,
20 since we're being technical about this, what I
21 see is an augmentation tag in the area of
22 achilles tendon.

1 In real life meaning, in the real
2 life when you're operating on a patient, this
3 doesn't mean that is an achilles tendon, it can
4 represent where it is exactly located.

5 Q. Okay. Does Figure 1A of the '807
6 patent -- strike that.

7 Do you agree that augmentation
8 tag 118 in Figure 1A of the '807 patent could
9 identify a tendon, a nerve, an artery, or some
10 pathology?

11 A. Correct. In real human ankle, yes.

12 Q. Is that because augmentation tag 118
13 in Figure 1A of the '807 patent is not clear
14 enough to show whether it is identifying a
15 tendon, a nerve, an artery, or some pathology?

16 A. That's correct, and it's only an
17 illustration.

18 Q. Dr. Mulumudi, I'd like to direct
19 your attention to Figure 1C.

20 A. Yes, I'm there.

21 Q. Are you familiar with Figure 1C of
22 the '807 patent?

1 A. Yes, I am.

2 Q. What does Figure 1C of the '807
3 patent illustrate?

4 MR. HARMER: Objection. Foundation.

5 THE WITNESS: It shows a series of
6 augmentation tags, which is 130a, 130b, c,
7 d, and e, and they are placed around an
8 artery which is labeled as number 120.
9 And it also shows to perform a Procedure A
10 at a particular tag, which is 130d, or
11 perform a particular Procedure B at 130e.

12 And this is all represented in a --
13 what appears to be a three-dimensional
14 representation/format.

15 BY MS. FREEMAN:

16 Q. Is item 130a in Figure 1C of the
17 '807 patent an augmentation tag in accordance
18 with Claim 1 of the '807 patent?

19 MR. HARMER: Objection. Foundation.

20 THE WITNESS: From the best of my
21 knowledge, yes.

22 ///

1 BY MS. FREEMAN:

2 Q. Is item 130b in Figure 1C of the
3 '807 patent an augmentation tag in accordance
4 with Claim 1 of the '807 patent?

5 MR. HARMER: Objection. Foundation.

6 THE WITNESS: Can you go back to the
7 Claim 1, please? Let me show the -- go
8 back to Claim 1, and which part of the
9 Claim 1 you are referring to?

10 BY MS. FREEMAN:

11 Q. I'm referring to Claim 1.

12 A. Claim 1 for the entirety, or any
13 particular subclaims of Claim 1?

14 Q. I'm referring to Claim 1.

15 A. Yes.

16 Q. Is item 130c in Figure 1C of the
17 '807 patent an augmentation tag in accordance
18 with Claim 1 of the '807 patent?

19 MR. HARMER: Objection. Foundation.

20 THE WITNESS: Can you repeat the
21 question one more time, please?

22 ///

1 BY MS. FREEMAN:

2 Q. Is item 130c in Figure 1C of the
3 '807 patent an augmentation tag in accordance
4 with Claim 1 of the '807 patent?

5 MR. HARMER: Same objection.

6 THE WITNESS: Go back to the -- 1C,
7 the augmentation tags, yes, they are very
8 similar to what is described in Claim 1.

9 BY MS. FREEMAN:

10 Q. Okay. You said augmentation tags
11 "are very similar to what is described in
12 Claim 1."

13 Is that correct?

14 A. Yes.

15 Q. Are augmentation tags in Figure 1C
16 what is described -- what is claimed in Claim 1?

17 MR. HARMER: Objection. Form.

18 THE WITNESS: Let me go back to read
19 the Claim 1. Claim 1 is, "A method for
20 augmenting medical imaging of a patient,
21 the medical imaging displayed using an
22 augmented reality headset worn by a

1 medical professional, the method
2 comprising:

3 "receiving a visual image of patient
4 anatomy captured by a visual image
5 camera."

6 I'm going to move to the next
7 portion, "retrieving an acquired medical
8 image associated with the patient anatomy
9 from data storage"... "and one or more
10 anatomical structures at a plurality of
11 anatomical layers.

12 "associating the acquired medical
13 image to align with the viewable
14 portion...

15 "retrieving an augmentation tag from
16 data storage, the augmentation tag
17 associated with a location in one layer...

18 "projecting the acquired medical
19 image and the augmentation tag using the
20 augmented reality headset."

21 Yes, the 1C is illustrating what was
22 described in Claim 1. The augmentation

1 tags that are being described in Claim 1
2 are what are being diagrammatically or
3 pictorially represented in 1C.

4 BY MS. FREEMAN:

5 Q. Okay. You're referring to
6 augmentation tags in the plural. Does Claim 1
7 refer to one augmentation tag or a plurality of
8 augmentation tags?

9 A. It does state that it is associated
10 with a layer and also mentions plurality of
11 layers, so it has to be a plurality, to my
12 interpretation.

13 Q. So in your opinion, Claim 1 of the
14 '807 patent requires a plurality of augmentation
15 tags?

16 A. Requires either/or, single or
17 plurality.

18 Q. Okay. What did you mean, "it has to
19 be a plurality, to my interpretation"?

20 A. Because the Claim 1 is describing a
21 layer and plurality of layers.

22 Q. Okay. So which does Claim 1

1 require, one augmentation tag or more than one
2 augmentation tag?

3 A. I believe I already stated this.
4 I'll state it one more time.

5 It said both, augmentation tag for a
6 layer and plurality of layers.

7 Q. Can you point me to the claim
8 language that would require a plurality of
9 augmentation tags?

10 A. I point to the area where it
11 mentions the plurality of layers.

12 Q. Can you point me to the specific
13 line?

14 A. Yeah. Associating the acquired
15 medical image to align with the viewable portion
16 of the patient anatomy captured by the visual
17 image camera, wherein the one or more anatomical
18 structures that is plurality of the medical
19 imaging at the plurality of layers are aligned
20 with the visual image of the patient anatomy.

21 Q. I'm sorry, can you point me to the
22 line or lines in column 15 that you're referring

1 to?

2 A. In column 15, Claim 1, and I don't
3 have the line numbers.

4 Q. Line numbers are in between the two
5 columns. They're very small.

6 A. Oh, got it. 35. Starting from 35,
7 36, 37, 37 and 38, 38 and 39.

8 Q. Okay. Now that you've given me the
9 line numbers, can you explain to me how the
10 language in column 15, lines 35 to 39 requires a
11 plurality of augmentation tags?

12 A. It is describing the plurality of
13 layers and structures, and it goes on to
14 describe what can be identified. And in the
15 context of what we are discussing, it is to do
16 with augmentation tags.

17 Q. Okay. I'm reading column 15, line
18 35 through 40. That is the associating step of
19 Claim 1, and I don't see any reference to
20 augmentation tags, so I'm confused.

21 MR. HARMER: Form.

22 THE WITNESS: That particular

1 paragraph doesn't show -- sorry, Joe, you
2 were saying something.

3 MR. HARMER: My objection is
4 recorded. You can continue, Dr. Mulumudi.

5 THE WITNESS: Thank you.

6 No, it doesn't show the word
7 "augmentation tag" in that particular
8 lines.

9 BY MS. FREEMAN:

10 Q. So since column 15, the associating
11 step of Claim 1, doesn't reference any
12 augmentation tag, how does that require a
13 plurality of augmentation tags?

14 A. The paragraph starting 35, it's
15 describing part of the claim that shows that the
16 medical image will have plurality of layers, and
17 paragraph 40, starting line 40 and beyond,
18 "retrieving an augmentation tag from data
19 storage" and associated with location in one
20 layer of the acquired medical image, the
21 augmentation tag having at least one anatomical
22 structure of that medical image.

1 Reading together, I read them as
2 medical image will consist of multiple layers,
3 and the augmentation tag that is described is
4 associated with one or more layers.

5 Q. Can you point me to the part of
6 Claim 1 that requires a plurality of layers?

7 A. Yes.

8 Q. Strike that. Sorry.

9 Can you point me to the part of
10 Claim 1 that requires the medical image to have
11 a plurality of layers?

12 A. "Associating the acquired medical
13 image to align with the viewable portion of the
14 patient anatomy captured by the visual image
15 camera, wherein the one or more anatomical
16 structures of the medical imaging at the
17 plurality of layers."

18 Q. So in your view, the associating
19 step of Claim 1 requires the medical image to
20 have a plurality of layers?

21 A. One or more.

22 Q. Okay. So is it your testimony that

1 the associating step of Claim 1 only requires
2 the medical image to have one layer?

3 MR. HARMER: Objection.

4 THE WITNESS: I said one or more.

5 BY MS. FREEMAN:

6 Q. So what is the minimum requirement
7 of the number of layers that a medical image in
8 accordance with Claim 1 requires?

9 MR. HARMER: Objection. Form.

10 THE WITNESS: Can you describe that
11 to me, please, or can you repeat the
12 question for me?

13 BY MS. FREEMAN:

14 Q. In Claim 1 of the '807 patent, what
15 is the minimum number of layers that a medical
16 image requires?

17 A. One.

18 Q. Okay. So the medical image of
19 Claim 1 of the '807 patent only requires a
20 medical image with one layer. How many
21 augmentation tags does Claim 1 of the '807
22 patent require?

1 MR. HARMER: Objection. Form.

2 THE WITNESS: I thought we already
3 said it requires minimum one and can be
4 more, or should be more.

5 BY MS. FREEMAN:

6 Q. So Claim 1 of the '807 patent only
7 requires a single augmentation tag, is that
8 correct?

9 MR. HARMER: Objection. Form.

10 THE WITNESS: What I'm reading and
11 pointed out, and I already stated, it says
12 one or more.

13 BY MS. FREEMAN:

14 Q. Where does Claim 1 say one or more
15 augmentation tag?

16 A. I did not say with augmentation tag.
17 I thought we were talking about the layers. You
18 just asked the question about layers.

19 Q. Okay. Let me ask the question again
20 so there's no confusion.

21 Does Claim 1 of the '807 patent only
22 require a single augmentation tag?

1 A. No.

2 Q. Would you please clarify what you
3 mean by "no"? Sorry, strike that.

4 Does Claim 1 of the '807 patent
5 require a plurality of augmentation tags?

6 A. My interpretation, yes.

7 Q. Can you please explain to me --
8 referring to Figure 1C of the '807 patent, how
9 does augmentation tag 130a identify artery 120?

10 MR. HARMER: Objection. Foundation,
11 form.

12 BY MS. FREEMAN:

13 Q. Let me withdraw my question.

14 Does augmentation tag 130a in
15 Figure 1C of the '807 patent identify
16 artery 120?

17 MR. HARMER: Objection.

18 THE WITNESS: It identifies one view
19 of the artery.

20 BY MS. FREEMAN:

21 Q. How does augmentation tag 130a in
22 Figure 1C of the '807 patent identify one view

1 of artery 120?

2 A. You said 130c, correct?

3 Q. 130a.

4 A. 130a. Yeah.

5 From the view that I can see at the
6 pictorial representation, 130a points to a
7 superior and anterior portion.

8 Q. How does augmentation tag 130a in
9 Figure 1C of the '807 patent identify a superior
10 and anterior portion of artery 120?

11 A. From the way the picture is drawn,
12 the artery 120, the augmentation tag, to me,
13 marks the upper portion of an artery pointing
14 up, and viewing as if I am standing where 122 on
15 the picture is. I'm starting at that and
16 looking down. When I'm looking down at that,
17 what that 130a points to is the location artery,
18 as I mentioned.

19 These tags and the series of tags,
20 what they're showing is the course around the
21 artery.

22 Q. I'm not asking you about any

1 augmentation tag other than augmentation
2 tag 130a.

3 A. Yeah. I'm just putting it in
4 context so that you understand better.

5 So 130a is one particular area of
6 the artery is being highlighted.

7 Q. Okay. How does augmentation tag
8 130a in Figure 1C of the '807 patent identify a
9 superior portion of artery 120?

10 MR. HARMER: Objection. Form.

11 THE WITNESS: Because that is how I
12 look at it as a medical person and
13 operating on arteries.

14 BY MS. FREEMAN:

15 Q. Can you explain that in any more
16 detail?

17 MR. HARMER: Objection. Form.

18 THE WITNESS: I believe I explained
19 it, but I'll explain again.

20 If I'm standing where the
21 marker 122, the label, is and looking down
22 on the artery, and I'm assuming I'm

1 looking down at a femoral artery, for
2 example, and if I am looking up towards
3 the patient, what I see is that marks the
4 upper portion of the artery at the -- I
5 was going to use technical terms -- I'm
6 going to call it superior inferior portion
7 of the femoral artery.

8 BY MS. FREEMAN:

9 Q. How does augmentation tag 130a in
10 Figure 1A of the '807 patent identify an
11 anterior portion of artery 120?

12 MR. HARMER: Objection. Form.

13 THE WITNESS: It's a conventional
14 method to draw anterior as the top and
15 posterior as below, and what is called
16 medial, towards the midline of the body,
17 or lateral are the two aspects of it.

18 And I'm assuming that the laterality
19 is being defined by where Procedure B is
20 marked, and where is "Complicating
21 Conditions, Medical Allergy" to be the
22 medial portion of it, depending upon where

1 I stand.

2 And if I'm standing on that side of
3 122, I view the 130a as to be the superior
4 inferior portion of the femoral artery.

5 BY MS. FREEMAN:

6 Q. So in your answer, you referred to
7 Procedure B, but Procedure B is --

8 A. I just gave you for orientation.

9 Q. -- augmentation tag 130e in
10 Figure 1C of the --

11 A. I just gave you the orientation of
12 where I'm standing to the procedure.

13 So if you don't mind, I can mark the
14 thing. And is there a marker on this that I can
15 use instead of using what is written on the
16 paper here? So I'll draw a cartoon of myself
17 standing. Because if I use any terms written on
18 the paper, and you are construing them as I'm
19 describing some other tag, so I just want to be
20 clear.

21 Q. All right. Let me ask you a
22 different question.

1 What is the difference between the
2 superior portion and the anterior portion of
3 artery 120?

4 A. Yeah. So the anterior and --
5 anterior superior are two different things.
6 Anterior is statically above. Superior inferior
7 is most of the time kind of cut in half. If you
8 take a structure and cut superior portion and
9 inferior portion, anterior will be right on the
10 top, posterior will be right on the bottom, and
11 this is medial, for example. This is medial and
12 this is lateral.

13 So if something is anterior, it
14 means right on the top here. Anterior medial,
15 anterior lateral, lateral, medial, inferior,
16 inferior medial, inferior lateral.

17 And I can draw this if I have a
18 whiteboard that's available to me digitally.

19 Q. All right. You used hand gestures
20 to refer to a different -- a lot of different
21 portions, but I'd like to focus on just the
22 superior and anterior portion.

1 Could you explain how the superior
2 portion of artery 120 differs from the anterior
3 portion of artery 120?

4 A. Okay. So the area between -- again,
5 I'm using the markers as a way of describing.
6 At 130d, where it is line as 130d, and if I take
7 a corresponding layer on the other side, meaning
8 into the paper, anything above that is superior.

9 Q. Okay. What about anterior, the
10 anterior portion of artery 120?

11 A. Anterior portion of the artery is
12 where approximately the 130b that is marked as a
13 tag is pointing, is -- right underneath that is
14 the anterior portion.

15 Q. Okay. Can you explain in words the
16 difference between the anterior portion and the
17 superior portion of an artery?

18 A. Yes. Superior portion is the upper
19 half, anterior portion is right on top.
20 Anterior is more confined to the top surface,
21 superior is half a segment above.

22 Q. Does augmentation tag 130a in

1 Figure 1C of the '807 patent touch artery 120?

2 A. No. It points, but no.

3 Q. Does augmentation tag 130a point to
4 artery 120 in Figure 1C of the '807 patent?

5 A. Yes. A specific surface of the
6 artery, yes.

7 Q. Okay. I see a line with an arrow in
8 Figure 1C of the '807 as leading from
9 augmentation tag 130a to augmentation tag 130b.

10 Do you agree with that?

11 A. Sure. Yes, I do.

12 Q. Okay. So are you saying that the
13 line pointing from augmentation tag 130a to
14 augmentation tag 130b points to artery 120 in
15 Figure 1C of the '807 patent?

16 A. It provides different surfaces of
17 the artery.

18 Q. Okay. Is figure -- is augmentation
19 tag 130a on the surface of artery 120 in
20 Figure 1C of the '807 patent?

21 A. Can you repeat that question,
22 please?

1 Q. Is augmentation tag 130a on the
2 surface of artery 120 in Figure 1C of the '807
3 patent?

4 A. Yes. To me, yes.

5 Q. Aren't there three parallel lines
6 between augmentation tag 130a and artery 120 in
7 Figure 1C of the '807 patent?

8 A. Yes, there are.

9 Q. What do those lines represent?

10 A. Different depths.

11 Q. So the three lines between
12 augmentation tag 130a and artery 120 indicates
13 there is some distance between augmentation tag
14 130a and artery 120, doesn't it?

15 A. Yes.

16 MS. FREEMAN: Okay. It is now
17 12:53, and I think this is a good time to
18 take a lunch break.

19 Does that work for you,
20 Dr. Mulumudi?

21 THE WITNESS: It's breakfast time
22 for me. Yes, yeah.

1 MS. FREEMAN: How much time would
2 you like to take for lunch, or breakfast?

3 THE WITNESS: In my case it's
4 breakfast, and 30 minutes will be fine.

5 MS. FREEMAN: So since it's an
6 awkward time, why don't we make it 1:30.
7 We'll resume at 1:30.

8 THE WITNESS: 10:30 my time. Okay.
9 Thank you.

10 (Whereupon, a luncheon recess was
11 taken at 12:53 p.m.)
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AFTERNOON SESSION

1:30 P.M.

BY MS. FREEMAN:

Q. Dr. Mulumudi, I am making another exhibit available to you. This is available, it's been marked as Exhibit Mulumudi 1031.

(Whereupon, Exhibit Mulumudi 1031 was marked for identification.)

A. Let me refresh.

BY MS. FREEMAN:

Q. Let me know when it's available to you.

A. It is, yes.

Q. Okay.

MR. HARMER: Objection. Hearsay to exhibit, what is it, Exhibit 1031.

MS. FREEMAN: Mr. Harmer?

MR. HARMER: Yes.

MS. FREEMAN: Forget it. Sorry.

BY MS. FREEMAN:

Q. Turning to Exhibit Mulumudi 1031, which was previously marked Medivis Exhibit 1014

1 in IPR2023-00042.

2 Dr. Mulumudi, do you recognize
3 Exhibit Mulumudi 1031?

4 A. Is this the e-mail from Brett Davis?

5 Q. Are you asking me?

6 A. Yes.

7 Q. I'm referring to a document that
8 bears a yellow stamp that says Exhibit
9 Mulumudi 1031.

10 Do you see that?

11 A. I see that. I'm asking you a
12 description clarification. That's okay. I
13 think I got it.

14 No, I don't know what this is.

15 Q. What is the subject line of
16 Mulumudi 1031?

17 A. Novarad v. Medivis.

18 Q. Do you know who Novarad is?

19 A. I know brief about them, I don't
20 know in detail. I know that they are a medical
21 imaging and augmented reality and virtual
22 reality company.

1 Q. Do you have any particular
2 relationship with Novarad?

3 A. No.

4 Q. Do you have any relationship with
5 Novarad?

6 A. No.

7 Q. No relationship at all?

8 A. As an expert witness representing.
9 And otherwise, I don't know any other
10 relationship.

11 Q. Do you know who Medivis is?

12 A. I believe they're also in a similar
13 type of technology development where they
14 provide technology for medical imaging,
15 augmented reality put together. That's all I
16 know.

17 Q. Can you tell me what law firm
18 Mr. Harmer is part of?

19 A. I don't know the actual name of the
20 law firm.

21 Q. Can you identify the law firm that
22 Mulumudi 1031 came from?

1 A. Thorpe North & Western.

2 Q. Is that the law firm that you're
3 working with now?

4 A. I believe so.

5 Q. Please read the body of the e-mail
6 that follows the introduction "Brian" comma.

7 A. "Pursuant to Paragraph 14 of the
8 Scheduling Order regarding claim construction
9 issue identification, Novarad asserts that all
10 of the claim terms in the asserted patents
11 should be given their plain and ordinary meaning
12 as understood by one having ordinary skill in
13 the art. Therefore, no court claim construction
14 is necessary."

15 Q. Do you agree that all of the claim
16 terms should be given their plain and ordinary
17 meaning?

18 MR. HARMER: Object to form,
19 foundation.

20 THE WITNESS: I am an expert in
21 technical matters, and from what I can
22 tell, I don't know if the ordinary meaning

1 is being given as being understood, and
2 from the way that's being -- the question
3 is being asked of me today, and I'm not
4 sure if ordinary meaning is being
5 utilized.

6 BY MS. FREEMAN:

7 Q. So do you agree that the claim terms
8 should be given their plain and ordinary meaning
9 or not?

10 A. Yes. It should be in the context.

11 Q. Do you agree that no court claim
12 construction is necessary?

13 A. I don't know the legal --

14 MR. HARMER: Objection. Foundation,
15 relevance, form.

16 THE WITNESS: I'm not an expert in
17 this, so I cannot say this requires court
18 claim construction or not.

19 BY MS. FREEMAN:

20 Q. Okay. So are you saying you can
21 offer no opinion as to whether court claim
22 construction is necessary?

1 A. That's correct, I cannot offer an
2 opinion on whether there is necessary for court
3 claim construction or not.

4 Q. During the break did you discuss
5 your testimony with Mr. Harmer or Mr. Hansen?

6 A. No one.

7 Q. Do you have any reference material
8 in front of you?

9 A. No.

10 MR. HARMER: Objection.

11 Counsel, I just want to put on the
12 record, this is the third time during your
13 examination that you have laughed, and I
14 think that's inappropriate. Can you
15 please stop from doing that?

16 MS. FREEMAN: I didn't laugh. I
17 smiled. I'm sorry for smiling. I'll try
18 not to smile if that offends you.

19 MR. HARMER: Just laughter. Thank
20 you.

21 BY MS. FREEMAN:

22 Q. Dr. Mulumudi, how would you

1 determine if something was available at the
2 beginning of 2017?

3 MR. HARMER: Objection. Foundation,
4 form.

5 THE WITNESS: I'm sorry, can you
6 repeat the question one more time?

7 BY MS. FREEMAN:

8 Q. How would you determine if something
9 was available at the beginning of 2017?

10 A. I need to know what "something" is.
11 There are a lot of things available in 2017.

12 Q. How would you determine if an
13 article was available in 2017?

14 MR. HARMER: Objection. Foundation,
15 form.

16 THE WITNESS: It is to some form of
17 a search, and current technology tends to
18 be search engines like Google.

19 BY MS. FREEMAN:

20 Q. Is there anything more that would be
21 required to determine if something was available
22 in early 2017 than the use of a search engine

1 such as Google?

2 MR. HARMER: Objection. Foundation,
3 form.

4 THE WITNESS: That is one method.
5 The other method is go physically to a
6 library and look for it.

7 BY MS. FREEMAN:

8 Q. Is either method acceptable to you
9 to determine whether something was available in
10 early 2017?

11 MR. HARMER: Same objection.

12 THE WITNESS: It's a reasonable
13 effort, yes.

14 BY MS. FREEMAN:

15 Q. Are you familiar with the acronym
16 D-I-C-O-M, which I'm going to call DICOM?

17 A. Yes, I am.

18 Q. What does DICOM stand for?

19 A. I don't know the exact expansion.
20 It's a medical imaging format.

21 Q. So to your knowledge, DICOM is a
22 format?

1 A. DICOM is a method of storage and
2 delivery that is utilized. That is how images
3 are either displayed, or it's the format that's
4 utilized by medical professionals. It's a very
5 commonly accepted method of viewing images or
6 giving access to images.

7 Q. Are you familiar with OsiriX -- I'll
8 spell it -- O-S-I-R-I-X?

9 A. No, I'm not.

10 Q. Are you familiar with ClearCanvas --
11 I'll spell it -- C-L-E-A-R, Canvas, C-A-N-V-A-S?

12 A. No, I am not.

13 Q. I'm going to mark another exhibit.
14 Dr. Mulumudi, I have made -- I have just marked
15 an exhibit, Exhibit Mulumudi 1033. It was
16 previously marked Medivis Exhibit 1011 in
17 IPR2023-00042.

18 Do you recognize Mulumudi 1033?

19 (Whereupon, Exhibit Mulumudi 1033
20 was marked for identification.)

21 A. No, I don't.

22 ///

1 BY MS. FREEMAN:

2 Q. Is it all right if I refer to
3 Mulumudi 1033 as AR goggles for neurosurgery for
4 short?

5 A. Sure.

6 Q. When was AR goggles for neurosurgery
7 published?

8 MR. HARMER: Objection. Foundation.

9 THE WITNESS: I don't know. If
10 there's a publication date, I need to
11 identify. Do you happen to have where the
12 location is? I don't see a date that I
13 can identify on this document.

14 BY MS. FREEMAN:

15 Q. Perhaps if you look in the lower
16 left-hand corner.

17 A. 2012.

18 Q. I direct your attention to page 124
19 of AR goggles for neurosurgery. Let me know
20 when you're there.

21 A. Mm-hmm. I'm there.

22 Q. Would you please read for the record

1 the first sentence under the heading Conclusions
2 and Future Work?

3 A. "To the best of our knowledge this
4 is the first time that a head mounted tracking,
5 registration and display system are integrated
6 for surgical navigation. This would reduce the
7 line of sight problem (because the tracker's
8 line-of-sight is the same as the surgeon's), the
9 difficulty in association of preoperative
10 images, and the bulkiness that exists in the
11 current system.

12 "This was" -- is that enough, or
13 continue on?

14 Q. I was just looking for the first
15 sentence. That's good.

16 Do you understand that first
17 sentence that you just read?

18 A. Yes, I do.

19 Q. What is head-mounted tracking?

20 A. A device to wear on the head and
21 track a particular object of interest.

22 Q. Is that what's going on in Figure 1

1 of AR goggles for neurosurgery?

2 A. I think so, from what I'm
3 interpreting. I see a person wearing goggles
4 and looking at, I guess, skull, it looks like,
5 and they're trying to pinpoint the area that
6 they want to reach.

7 Q. Going back to that sentence that you
8 read under the heading Conclusions and Future
9 Work, what is "registration"?

10 A. From what I'm interpreting, it's
11 registering the actual object in front of you,
12 namely the skull in this example, to be
13 registered to an image that is being tracked.

14 Q. And can you explain what you mean?
15 What does it mean, "to be registered to an image
16 that is being tracked"?

17 A. Trying to explain this so that it's
18 clear to all of us here.

19 In this context, the registration of
20 the object in front of you, the human skull,
21 registration meaning tying it to a particular
22 axis so that when the tracking system moves on

1 the head the axis moves with it.

2 Q. Okay. And what is "surgical
3 navigation"?

4 A. Any kind of a system that will allow
5 a surgeon or a proceduralist to navigate or
6 perform their procedure and to guide them to go
7 to the area of location.

8 Q. Can you go back to the first page of
9 AR goggles for neurosurgery and read the title
10 for me?

11 A. Augmented Reality Goggles with an
12 Integrated Tracking System for Navigation in
13 Neurosurgery.

14 Q. Are you aware of any integration of
15 a head-mounted tracking registration and a
16 display system for neurosurgical navigation
17 prior to 2012?

18 A. Not that I know of.

19 Q. Do you believe that you would be
20 aware of any earlier integration?

21 MR. HARMER: Objection. Form.

22 THE WITNESS: No.

1 BY MS. FREEMAN:

2 Q. I'm going to introduce another
3 exhibit.

4 Okay. Dr. Mulumudi, you should have
5 another exhibit available to you. Let me know
6 when you're able to access it.

7 (Whereupon, Exhibit Mulumudi 1034
8 was marked for identification.)

9 A. Let me refresh this. 34?

10 BY MS. FREEMAN:

11 Q. It's been marked Exhibit
12 Mulumudi 1034.

13 A. Yes. Okay. Got it.

14 Q. As I said, this exhibit that's in
15 front of you now has been marked Exhibit
16 Mulumudi 1034. It was previously marked Medivis
17 Exhibit 1005.

18 Do you recognize Exhibit 1005?

19 A. Yes, I do. I've seen this before.

20 Q. What is -- is it all right if I
21 refer to the exhibit that is now in front of you
22 as Amira?

1 A. Sure.

2 Q. What is Amira?

3 MR. HARMER: Just one moment,
4 Counsel, please. Exhibit 1034, you said
5 it's also been marked as Medivis
6 Exhibit 1005. If I remember correctly,
7 1005 does not contain the same number of
8 pages. Please correct me if I'm wrong.
9 Maybe it does and I'm just wrong. It's
10 the exact same, Counsel?

11 MS. FREEMAN: I copied our
12 Exhibit 1005.

13 MR. HARMER: My mistake. Just
14 wanted to check. Thank you.

15 BY MS. FREEMAN:

16 Q. So the question that was pending
17 before Mr. Harmer interrupted was, what is
18 Amira?

19 MR. HARMER: Objection. Form.

20 THE WITNESS: I think it was a 3D
21 utilization software.

22 ///

1 BY MS. FREEMAN:

2 Q. When did you first become aware of
3 Amira?

4 A. After I was acquainted to this
5 particular case.

6 Q. When was Amira published?

7 A. I think you know that they existed
8 before.

9 Q. I'm not sure what you mean.

10 A. I mean Amira existed. I didn't know
11 that Amira is a company or anything else.

12 Q. Okay. Are you familiar with Visage
13 imagining -- Imaging, sorry, Visage Imaging?

14 A. No.

15 Q. Have you ever heard of Visage
16 Imaging?

17 A. These are very obscure companies,
18 look like.

19 Q. What are you referring to by
20 "these"?

21 A. Both Amira and Visage.

22 Q. Okay. So you believe Amira is a

1 company?

2 A. Whatever you want to define it, yes.
3 The word "Amira" itself, whatever they do. I'm
4 referring to it as a company. May I?

5 Q. That actually I think could be
6 confusing, because I thought we agreed to refer
7 to Exhibit Mulumudi 1034 as Amira.

8 A. Sure, yeah. And I never even knew
9 that the Amira or Visage, any of these names or
10 existence of companies or any such thing in the
11 past.

12 Q. Okay. When you say "in the past,"
13 when are you referring to?

14 A. Before my acquaintance with this
15 particular case.

16 Q. And that was in June of 2023?

17 A. Yes, that's the best of my
18 recollection, June is when I first knew.

19 Q. When you first knew what?

20 A. About the existence of this conflict
21 and whether I'm the person to be involved in
22 this or not. That's when I knew. Before that,

1 I did not know anything about Amira or Visage
2 Imaging systems.

3 Q. I'm going to direct your attention
4 to page 4 of Amira. Let me know when you're
5 there.

6 A. Okay.

7 Q. Can you tell me when Amira was
8 published?

9 A. I cannot. I don't know.

10 Q. Do you know what the significance of
11 a copyright notice is?

12 MR. HARMER: Objection. Form.

13 THE WITNESS: I don't know the
14 technical definition of copyright is.

15 BY MS. FREEMAN:

16 Q. Do you know any definition of a
17 copyright notice?

18 MR. HARMER: Objection to form.

19 THE WITNESS: I know this means that
20 when it is published and the date from
21 which a copyright is held.

22 ///

1 BY MS. FREEMAN:

2 Q. Okay. Do you see any copyright
3 notice in Amira?

4 A. I don't. If you can point to me --
5 point me in the right direction, that will help.

6 Q. Maybe take a look at page 4 of
7 Amira.

8 A. Can you please point to me instead
9 of me looking around? If it's already published
10 there, then you can just point to me.

11 Q. Well, there is a heading on page 4
12 that says Copyright Information near the top.

13 A. On page 4 at the top, it says
14 "Chapter 1: Introduction."

15 Q. Okay. I'm referring to the Arabic
16 number 4 in the lower right hand.

17 A. It's on the lower left-hand corner,
18 I see a 4, and I see a 16. Hold on, there are
19 two numbers here.

20 Q. I understand that's a little
21 confusing. I'm referring to the number in the
22 lower right-hand corner.

1 A. Okay. Let me go to the lower
2 right-hand corner. All right. And I see the
3 copyright information of 1995 to 2009, and also
4 see the 1999 to 2009.

5 Q. Okay. Having looked at that now,
6 can you tell me when Amira was published?

7 MR. HARMER: Objection. Foundation.

8 THE WITNESS: It's either '95 or
9 '99. I am not sure.

10 BY MS. FREEMAN:

11 Q. All right. I'm going to direct your
12 attention to -- it's confusing because there's
13 different page numbers, so I'll make sure to be
14 clear what page number I'm referring to. Scroll
15 through.

16 Okay. I'd like to direct your
17 attention to page 39. And by the number 39, the
18 page number 39, I'm talking about an Arabic
19 numeral that's in the lower right-hand corner,
20 and this might be below a different number.

21 A. Okay. I see 39 below 27.

22 Q. Okay. Do you see a heading on

1 page 39 of Amira that begins 2.2.2?

2 A. Yes.

3 Q. Would you please read the whole
4 heading that begins 2.2.2?

5 A. "Reading 3D Image Data from Multiple
6 2D Slices."

7 Q. And can you read the first -- just
8 the first sentence under that heading?

9 A. "A common way to store 3D image data
10 is to write a separate 2D image file for each
11 slice."

12 Q. So in other words, 3D data can be
13 stored as a plurality of 2D images, correct?

14 A. In this form, yes.

15 Q. I'm going to direct your attention
16 to page 49, and I'm going to continue to refer
17 to the lower-most number in the lower right-hand
18 corner.

19 A. 48, 49. Okay.

20 Q. Do you see a heading that begins
21 2.3.6?

22 A. Yes.

1 Q. Would you read the entire heading
2 beginning 2.3.6?

3 A. Yes. "Volume Rendering. Volume
4 Rendering is a visualization technique that
5 gives a 3D impression of the whole data set
6 without segmentation."

7 Q. Is that what you -- is that direct
8 volume rendering?

9 A. I believe, yes.

10 Q. How can you tell that it's a direct
11 volume rendering?

12 A. I can't say it's direct. That's why
13 I hesitated, you know, giving my answer. And it
14 is volume rendering. Is it assimilating a
15 volume or is it a true volume acquired by the
16 imaging modality? It's not very clear from this
17 particular paragraph or the heading.

18 Q. What additional information would
19 you have to have in order to determine whether
20 the volume rendering referenced on page 49 of
21 Amira is direct volume rendering?

22 A. It would have helped me to say this

1 is a direct volume rendering, because direct
2 volume rendering is not 3D impressions of the
3 dataset without segmentation, it is actually the
4 3D of the entire data that is collected at the
5 time of acquisition.

6 Q. What do you mean, "the 3D of the
7 entire data that is collected at the time of
8 acquisition"?

9 A. I cannot tell from this, this volume
10 rendering is a simulation of the data that it
11 has, the storage system has, to create a 3D
12 impression. Typically 3D volume rendering would
13 be to capture the data of the entire area of
14 interest. And it is not a reconstructed image,
15 in a way it's an acquired image that is
16 processed for visualization.

17 Q. Is there any way that you could tell
18 whether the volume rendering referenced on
19 page 49 of Amira is direct volume rendering
20 without the words "direct" -- the phrase "direct
21 volume rendering" being used?

22 MR. HARMER: Objection.

1 THE WITNESS: No.

2 BY MS. FREEMAN:

3 Q. Have you ever used the software
4 described in Amira?

5 A. I haven't heard of them before, no.

6 Q. Are you familiar with 3D Slicer?

7 A. Again, I heard of them before. I
8 haven't personally used it.

9 Q. When did you first become aware of
10 3D Slicer?

11 A. Predominantly after I got involved
12 in this particular case, and it jogged my memory
13 that, yeah, I heard of this name before.

14 Q. Do you recall when you heard of 3D
15 Slicer before you became involved in this case?

16 A. Probably about a year, two years
17 ago.

18 Q. So that would be 2021 or 2022?

19 A. 2022, in that range, yes.

20 Q. What is 3D Slicer?

21 A. From what I know, it's a software
22 utilized to process the images on a computer

1 screen, and to slice it in different axes and
2 look at the image of interest.

3 Q. I mean, I think I can guess the
4 answer to this question, but I need to ask, have
5 you ever used 3D Slicer?

6 A. No.

7 Q. Are you familiar with the features
8 of 3D Slicer that were available at the
9 beginning of 2017?

10 A. No.

11 Q. I'm going to mark another exhibit.
12 Sorry, I think I need to download it before I
13 can --

14 A. Okay.

15 Q. -- mark it.

16 MS. FREEMAN: So let's go off the
17 record. Be back in like five minutes,
18 okay?

19 MR. HARMER: Yes.

20 (Whereupon, a recess was taken
21 from 2:06 p.m. to 2:10 p.m.)

22 ///

1 (Whereupon, Exhibit Mulumudi 1020
2 was marked for identification.)

3 MS. FREEMAN: So again, I apologize
4 for the delay. Sorry about that.

5 But I have been able to mark the
6 exhibit that I planned to mark, and it
7 should now be accessible to Dr. Mulumudi,
8 so --

9 THE WITNESS: Which number, please?

10 BY MS. FREEMAN:

11 Q. The exhibit that I'm referring to is
12 marked Exhibit Mulumudi 1020.

13 A. 1020. Okay.

14 Q. Let me know when you're able to
15 access that.

16 A. Yep, I have it.

17 Q. Okay. Would you please read the
18 title of Exhibit Mulumudi 1020?

19 A. "3D Slicer as an image computing
20 platform for the Quantitative Imaging Network."

21 Q. Okay. Do you recognize
22 Exhibit 1020?

1 A. Yeah, I do recognize, because I read
2 it after I was acquainted with this case. Yes.

3 Q. What is Exhibit 1020?

4 A. It is describing the 3D Slicer
5 software and its capabilities and how it can be
6 utilized possibly.

7 Q. Is it all right if I refer to
8 Exhibit 1020 as the 3D Slicer article?

9 A. Sure.

10 Q. When was the 3D Slicer article
11 published?

12 A. Looks like 2012.

13 Q. When did you first become aware of
14 this 3D Slicer article?

15 A. Recently, after June.

16 Q. Please read the sentence beginning
17 the second paragraph in the abstract of the 3D
18 Slicer article?

19 A. "3D Slicer is a free open-source
20 software application for medical image
21 computing. As a clinical research tool, 3D
22 Slicer is similar to a radiology workstation

1 that supports versatile visualizations but also
2 provides advanced functionality such as
3 automated segmentation and registration for a
4 variety of application domains."

5 Do you want me to continue?

6 Q. That's plenty.

7 All right. And now I'm going to be
8 referring to the page numbers that appear on the
9 upper -- towards the heading. They appear on
10 both sides.

11 A. Yes. 1324 kind of thing, okay.

12 Q. Directing your attention to
13 page 1339, column 2. Let me know when you're
14 there.

15 A. 1339. "In summary," comma, yes?

16 Q. Okay. I think we're on the same
17 column.

18 Please read the -- just the first
19 sentence of the last paragraph above the
20 Acknowledgements heading in the 3D Slicer
21 article.

22 A. "Over the years, 3D Slicer has

1 gained broad acceptance in the medical imaging
2 research community. It is a dynamic software
3 that evolves together with the projects that use
4 it in new research applications, often giving
5 back to the community in the form of new
6 contributions to the Slicer.

7 "The current capabilities of Slicer
8 have resulted from numerous projects conducted
9 over the last 10 years of Slicer history. The
10 Slicer platform ensured continuity,
11 interoperability, improvement and
12 reproducibility of earlier accomplishments that
13 are now available as a resource for the QIN
14 community in further advancing the role of
15 imaging as a biomarker of cancer treatment."

16 Okay. Yes.

17 Q. Okay. Do you agree with the first
18 sentence that you just read, the one that
19 begins, "Over the years"?

20 A. Yes.

21 Q. And this 3D Slicer article was
22 published in 2012, correct?

1 A. Yes.

2 Q. But you were not aware of 3D Slicer
3 prior to 2021?

4 A. This is not a widely accepted tool
5 that I know of.

6 Q. So you disagree that as of 2012, the
7 3D Slicer has gained broad acceptance in the
8 medical imaging research community, correct?

9 A. That's correct, yeah. That is their
10 claim, yeah.

11 Q. Still on that same column, would you
12 read just the last sentence in the
13 second-to-last paragraph before the
14 Acknowledgements heading? It begins, "The
15 interested."

16 A. "The current capabilities of Slicer
17 have resulted from numerous projects obtained
18 over the last 10 years of Slicer history," is
19 that what you're asking me?

20 Q. No. Do you see there's a paragraph
21 immediately above the Acknowledgements heading?

22 A. Yes. I see there, "Over the years,

1 3D Slicer," yes.

2 Q. And do you see that there's a
3 paragraph above the paragraph we just discussed?

4 A. "In summary" is what I see, the
5 paragraph.

6 Q. So the paragraph that we just
7 referred to, can you read the last sentence in
8 that paragraph? It reads -- it begins with the
9 words "the interested."

10 A. Okay, I got it. Okay.

11 "The interested reader is encouraged
12 to explore the various resources available from
13 the home page of 3D Slicer project."

14 Okay.

15 Q. Is that the end of the sentence?

16 A. "http://slicer.org."

17 Q. Have you ever explored the resources
18 available at the home page of the 3D Slicer
19 project?

20 A. I never used 3D Slicer, so I haven't
21 utilized their resources.

22 Q. Would you say that you're not

1 interested in 3D Slicer?

2 A. I'm intrigued now that you pointed
3 out 3D Slicer and after I got acquainted during
4 the case, but I was not aware of this particular
5 tool. It is not a very popular tool.

6 Q. How do you reach the -- strike that.
7 I'm going to direct your attention
8 to page 1337.

9 A. Okay.

10 Q. Do you see a figure, Figure 6, on
11 page 1337 of the 3D Slicer article?

12 A. Yes, I do.

13 Q. Can you describe the left pane of
14 Figure 6?

15 A. Okay. It is doing the edge
16 detection of an abnormality found in the brain.

17 Q. Okay. Can you describe the left
18 pane of Figure 6?

19 MR. HARMER: Objection. Form.

20 THE WITNESS: It's an abnormality in
21 the brain, in the temporoparietal area on
22 the right brain that is being demarked

1 what appears to be an edge-drawing tool on
2 3D Slicer.

3 BY MS. FREEMAN:

4 Q. Do you see an enhanced region
5 delineated in the left pane?

6 A. It shows a region of interest, and
7 then it does -- the enhancement is in the
8 middle. The center one is the one that shows
9 the enhancement.

10 Q. Okay. Is the region --

11 A. Enhancement happens after giving the
12 contrast. That's what appears to be a contrast
13 enhancement in the middle image.

14 Q. Is the region of interest in the
15 left pane of Figure 6 identified?

16 MR. HARMER: Objection. Form.

17 THE WITNESS: I need to -- repeat
18 the question again, please.

19 BY MS. FREEMAN:

20 Q. Okay. You said in the left pane of
21 Figure 6 of the 3D Slicer article there's an
22 abnormality in the brain that is demarked, is

1 that correct?

2 A. Mm-hmm, yes.

3 Q. Would you say the abnormality of the
4 brain is identified in the left pane of
5 Figure 6?

6 A. Yes. It's marked by the outline,
7 green outline there.

8 Q. Is the green outline in the left
9 pane of Figure 6 an augmentation tag?

10 A. No, I wouldn't call it an
11 augmentation tag, though.

12 Q. Why not?

13 A. Because it's an edge detection
14 system. Edge detection and augmentation tag in
15 my mind are two different things. Edge
16 detection is to show the extent of abnormality,
17 whereas augmentation tag is location-marking.

18 Q. So the green outline of the
19 abnormality in the left pane of Figure 6 you're
20 saying is identifying the edge of the
21 abnormality?

22 A. Correct.

1 Q. I guess I'm still confused why that
2 isn't an augmentation tag.

3 MR. HARMER: Objection. Form.

4 THE WITNESS: I don't believe so.

5 Augmentation tag is a pointer at a
6 particular structure, whereas edge marker
7 is the -- delineating the margins of an
8 abnormality. I hope you see the
9 difference between the two.

10 I can point a finger at something
11 that is an augmentation tag. If I draw an
12 outline about something, that is edge
13 marker.

14 BY MS. FREEMAN:

15 Q. So an outline is not an augmentation
16 tag, is that correct?

17 A. Correct, yeah. It's not an
18 augmentation tag, in my view.

19 Q. All right. I'm going to try and
20 mark another exhibit. Let's see how this goes.

21 A. While you do that, can I get a glass
22 of water?

1 Q. Yes.

2 MS. FREEMAN: Actually, why don't we
3 take a 15-minute break so you have plenty
4 of time. We'll take a 15-minute break, be
5 back at 2:40.

6 Can you communicate that to him,
7 Mr. Harmer?

8 MR. HARMER: Yes.

9 THE WITNESS: I'm fine to -- okay,
10 sounds good. I'll get a glass of water
11 and come back in 15.

12 (Whereupon, a recess was taken
13 from 2:26 p.m. to 2:39 p.m.)

14 BY MS. FREEMAN:

15 Q. Back on the record.

16 Dr. Mulumudi, during the break did
17 you discuss your testimony with Mr. Harmer?

18 A. No.

19 Q. During the break did you discuss
20 your testimony with Mr. Hansen?

21 A. No.

22 Q. Do you have any reference material

1 in front of you right now?

2 A. No.

3 Q. Did you look at any reference
4 material on the break?

5 A. No.

6 Q. I have made a new exhibit available
7 to you. This exhibit is marked Exhibit Mulumudi
8 1037.

9 (Whereupon, Exhibit Mulumudi 1037
10 was marked for identification.)

11 BY MS. FREEMAN:

12 Q. It was previously marked in
13 IPR2023-00042 as Medivis Exhibit 1009. Let me
14 know when you're able to access Mulumudi 1037.

15 A. Okay. Yes.

16 Q. Do you recognize Exhibit
17 Mulumudi 1037?

18 A. Yes, I do.

19 Q. What is Exhibit Mulumudi 1037?

20 A. It's an early development of a
21 surgical navigation system for augmented reality
22 using an optical see-through head-mounted

1 display.

2 Q. When did you -- okay.

3 Is it fair to say that Exhibit
4 Mulumudi 1037 is an article?

5 A. It is, yes.

6 Q. And is it all right if I refer to
7 Mulumudi 1037 as Chen, going by the first
8 author's last name?

9 A. Yes.

10 Q. Where was Chen published?

11 A. I have to look up the actual
12 journal. It's the Biomedical Informatics.

13 Q. And when was Chen published?

14 A. 2015.

15 Q. When did you first become aware of
16 Chen?

17 A. After I was acquainted with this
18 case in June.

19 Q. June of 2023?

20 A. 2023, correct.

21 Q. I'm going to go by the numbers in
22 the upper heading area.

1 A. Okay.

2 Q. And I direct your attention to
3 page 131 of Chen.

4 A. Okay.

5 Q. Do you see the heading on that page
6 that says "Conflicts of Interest"?

7 A. Yes, I do.

8 Q. And do you see a paragraph above the
9 heading Conflicts of Interest on page 131 of
10 Chen?

11 A. Mm-hmm.

12 Q. Would you please read just the first
13 sentence of that paragraph that begins,
14 "Currently"?

15 A. Sure. Yeah.

16 "Currently, there is a well-known,
17 free and open-sourced software package named 3D
18 Slicer for visualization and medical image
19 computing."

20 Yes.

21 Q. And does it give -- does it include
22 a website address in that sentence?

1 A. It does.

2 Q. Can you read the sentence including
3 the website address, please?

4 A. Sure.

5 "Currently, there is a well-known,
6 free and open-sourced software package named 3D
7 Slicer (<http://www.slicer.org/>) for
8 visualization and medical image computing."

9 Q. Okay. And when the word "currently"
10 is used there, do you understand that to mean
11 2015?

12 A. Mm-hmm, yes.

13 Q. So according to Chen, as of 2015, 3D
14 Slicer was well known, correct?

15 A. It is only for the research
16 community that is involved. It is not in the
17 medical world or general parlance. It is not a
18 well-publicized or highly known tool.

19 Q. Well, that sentence doesn't refer to
20 anything other than visualization and medical
21 image computing, does it?

22 A. If only you can read the next

1 sentence.

2 Q. What would that do?

3 A. Would you please read that, or I can
4 read it for you.

5 It has been developed as a common
6 research multi-platform with plenty of modules
7 to support a wide variety of clinical
8 applications such as visualization,
9 segmentation, volume representation, etc.

10 So it's a research multi-platform
11 tool. It is not a clinical day-to-day used tool
12 that is prevalent everywhere.

13 Q. Okay. So are you saying that
14 researchers would be familiar with 3D Slicer?

15 A. Maybe. These are all highly
16 specialized tools that are being utilized by
17 specialized groups, and I'm not confident to say
18 that these are widely used tools by wide variety
19 of medical personnel.

20 Q. Do you have any personal knowledge
21 that leads you to disbelieve Chen when Chen says
22 that as of 2015, 3D Slicer was a well-known

1 visualization and medical image computing
2 package?

3 A. He himself writes that it is a
4 common research tool to be used by multiple
5 research groups.

6 Q. So since you weren't involved in
7 research, you weren't familiar with 3D Slicer,
8 is that correct?

9 A. That's partly correct, yes.

10 Q. I'm going to mark another exhibit.

11 (Whereupon, Exhibit Mulumudi 1038
12 was marked for identification.)

13 BY MS. FREEMAN:

14 Q. Okay. Dr. Mulumudi, you should have
15 another -- a new exhibit available to you. This
16 exhibit has been marked Exhibit Mulumudi 1038.
17 It was previously marked Medivis Exhibit 1010 in
18 IPR2023-00042.

19 A. Got it. Yes, I'm seeing it right
20 now. It's documentation for a slicer
21 application.

22 Q. Do you recognize Mulumudi 1038?

1 A. Yes, I do. I have seen this.

2 Q. When did you first see Exhibit
3 Mulumudi 1038?

4 A. After June 2023.

5 Q. When was Exhibit Mulumudi 1038
6 published?

7 A. Looks like 9/20/22.

8 Q. I'm going to mark another exhibit.
9 Sorry, the software is slow. All right.

10 (Whereupon, Exhibit Mulumudi 1039
11 was marked for identification.)

12 BY MS. FREEMAN:

13 Q. Still processing, sorry.

14 A. That's not your problem, so...

15 MR. HARMER: Exhibit 1039 is
16 available, if that's what you're looking
17 for.

18 MS. FREEMAN: Really? It's not
19 available to me yet.

20 MR. HARMER: I've been able to pull
21 it up right now.

22 THE WITNESS: Let me go and check it

1 myself, too.

2 Yeah, it's available to me now.

3 BY MS. FREEMAN:

4 Q. Okay. I'm sorry, my computer is,
5 like, choking on it. It looks 80 percent of the
6 way ready to reveal it to me.

7 I apologize, my computer is still
8 processing, trying to close things. Okay. I
9 can see it now.

10 All right. Dr. Mulumudi, I have
11 just marked an exhibit, Exhibit Mulumudi 1039.
12 It was previously marked Medivis Exhibit 1007 in
13 IPR2023-00042.

14 A. Okay. I got it.

15 Q. Do you recognize Exhibit 1007?

16 A. I don't believe I recognize this
17 one.

18 Q. To your knowledge, have you ever
19 reviewed Medivis Exhibit 1007?

20 A. No. I don't remember. I don't
21 recollect.

22 Q. At the beginning of 2017, was it

1 known how to change the brightness of a medical
2 image?

3 A. Yes.

4 Q. At the beginning of 2017, how would
5 one change the brightness of a medical image?

6 A. By changing the contrast.

7 Q. Okay. At the beginning of 2017, was
8 changing the brightness of the medical image
9 something that could be done predictably?

10 A. Yes.

11 MS. FREEMAN: Okay. That is all the
12 questions that Medivis has for
13 Dr. Mulumudi right now.

14 MR. HARMER: Novarad has no further
15 questions.

16 MS. FREEMAN: In that case, we will
17 close the deposition, go off the record.

18 (Whereupon, the deposition was
19 concluded at 2:55 p.m.)

20 THE STENOGRAPHER: Mr. Harmer, would
21 you like a copy of the transcript?

22 MR. HARMER: Yes, please.

1 CERTIFICATE
2

3 I, MAUREEN O'CONNOR POLLARD,
4 Registered Diplomate Reporter, Realtime
5 Systems Administrator, and Certified
6 Shorthand Reporter, do hereby certify that
7 prior to the commencement of the
8 examination, MAHESH S. MULUMUDI, MD, was
9 remotely duly identified and sworn by me
10 to testify to the truth, the whole truth,
11 and nothing but the truth.

12 I DO FURTHER CERTIFY that
13 the foregoing is a verbatim transcript of
14 the testimony as taken stenographically by
15 and before me at the time, place, and on
16 the date hereinbefore set forth, to the
17 best of my ability.

18 I DO FURTHER CERTIFY that I
19 am neither a relative nor employee nor
20 attorney nor counsel of any of the parties
21 to this action, and that I am neither a
22 relative nor employee of such attorney or
counsel, and that I am not financially
interested in the action.

17 

18 MAUREEN O'CONNOR POLLARD
19 NCRA Registered Diplomate
20 Reporter
21 Realtime Systems Administrator
22 Certified Shorthand Reporter
Notary Public
Dated: September 21, 2023

INSTRUCTIONS TO WITNESS

Please read your deposition over carefully and make any necessary corrections. You should state the reason in the appropriate space on the errata sheet for any corrections that are made.

After doing so, please sign the errata sheet and date it. It will be attached to your deposition.

It is imperative that you return the original errata sheet to the deposing attorney within thirty (30) days of receipt of the deposition transcript by you. If you fail to do so, the deposition transcript may be deemed to be accurate and may be used in court.

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ACKNOWLEDGMENT OF DEPONENT

I, _____, do
Hereby certify that I have read the foregoing
pages, and that the same is a correct
transcription of the answers given by me to the
questions therein propounded, except for the
corrections or changes in form or substance, if
any, noted in the attached Errata Sheet.

WITNESS NAME

DATE _____

Subscribed and sworn

To before me this

_____ day of _____, 20____.

My commission expires: _____

Notary Public

LAWYER'S NOTES

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and
(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES
ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL 1,
2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES
OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted

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