

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDIVIS, INC.,
Petitioner,

v.

NOVARAD CORP.,
Patent Owner.

IPR2023-00042 (Patent 11,004,271 B2)
IPR2023-00045 (Patent 10,945,807 B2)

Record of Oral Hearing
Held: January 30, 2024

Before MIRIAM L. QUINN, *Acting Vice Chief Administrative Patent Judge*,
MICHAEL R. ZECHER and SCOTT RAEVSKY, *Administrative Patent Judges*.

IPR2023-00042 (Patent 11,004,271 B2)

IPR2023-00045 (Patent 10,945,807 B2)

APPEARANCES:

ON BEHALF OF THE PETITIONER:

KIA L. FREEMAN, ESQ.

ERIK P. BELT, ESQ.

McCarter & English, LLP

265 Franklin Street

Boston, MA 02110

kfreeman@mccarter.com

ebelt@mccarter.com

(617) 449-6549 (Freeman)

(617) 449-6506 (Belt)

ON BEHALF OF THE PATENT OWNER:

JOSEPH HARMER, ESQ.

Thorpe North & Western LLP

8180 South 700 East, Suite 350

Sandy, Utah 84070

Joseph.harmer@tnw.com

(801) 566-6633

The above-entitled matter came on for hearing on Tuesday, January 30, 2024, commencing at 1:00 p.m., via video teleconference.

P R O C E E D I N G S

- - - - -

JUDGE RAEVSKY: Welcome, everyone. My name is Judge Raevsky and welcome to the Patent Trial and Appeal Board. I'm joined today by Judges Quinn and Zecher. We're here today for oral arguments in *inter partes* review numbers 2023-00042 and 00045, in which Medivis, Inc. is the Petitioner, and Novarad Corp. is the Patent Owner. At issue in the 042 case is U.S. Patent Number 11,004,271. At issue in the 045 case is U.S. Patent Number 10,945,807. Petitioner, would you please enter your appearances?

MS. FREEMAN: Yes, this is Kia Freeman representing Medivis. With me today is Erik Belt and --

MR. BELT: Good afternoon, Your Honors.

MS. FREEMAN: -- our colleague, Leah McCoy. Also listening on the public line are the founders of Medivis, Chris Morley, and Osamah Choudhry, and Saba Nagy.

JUDGE RAEVSKY: And, Kia, you'll be presenting today?

MS. FREEMAN: I'll be presenting for IPR2023-00042, and Mr. Belt will be presenting for IPR2023-00045.

JUDGE RAEVSKY: Thank you. And who do we have for Patent Owner today?

MR. HARMER: Good afternoon. My name is Joseph Harmer, representing Patent Owner Novarad. I have Mr. Jed Hansen in the room with me, though he won't appear on screen. And I will be representing, or presenting, pardon me, in both IPRs.

JUDGE RAEVSKY: Thank you, counsel. Before we begin, I

1 have a number of housekeeping items. First of all, when you're referring to
2 a slide today, please tell us the slide number so that we can follow along.
3 Secondly, please remember to mute yourself when you're not speaking and
4 then identify yourself at the beginning of your presentation for the benefit of
5 the court reporter. And please also be aware that members of the public may
6 be listening to this hearing.

7 I'd like to also note that we've received objections from Patent
8 Owner to a number of Petitioner's slides in the 045 case. In particular,
9 Patent Owner objects to slides 60 and 62 through 76 of Petitioner's 045
10 demonstratives because they raised new theories of obviousness. We agree
11 with Patent Owner. The 045 Petition discusses Ground 2, obviousness over
12 Jones without citing prior art other than referring to a scope and content of
13 the prior art section earlier in the Petition. In contrast, nearly all of the
14 aforementioned slides refer to Jones plus knowledge in the art and supply
15 detailed citations that are not present in the obviousness over Jones section
16 of the Petition. Accordingly, we sustain Patent Owner's objections, and
17 Petitioner must not refer to those slides or raise similar arguments orally. In
18 addition, should either party wish to make further objections during the
19 hearing, that party must raise those objections during its own presentation
20 time and must not object during opposing counsel's presentation.

21 As far as the mechanics of the hearing, argument will proceed
22 for each case separately. Each side will have 45 minutes to argue the 042
23 case. We will then take a 10-minute break, and then each side will have an
24 additional 45 minutes to argue the 045 case. And for convenience, we'd like
25 to have a single transcript covering both cases. Does either party object to
26 having a single transcript?

1 MR. BELT: No, Your Honor. Petitioner does not object. And
2 may I ask a question, Your Honor?

3 JUDGE RAEVSKY: You may.

4 MR. BELT: So, I would like to lodge a, you know, for the
5 record an objection or, you know, reserve my right with respect to your
6 ruling on those slides. May I argue that point when it comes to the
7 argument on the '807 Patent?

8 JUDGE RAEVSKY: You may argue that point, but you may
9 not refer to those slides substantively.

10 MR. BELT: Okay.

11 JUDGE RAEVSKY: Thank you. For each case, we will first
12 hear from Petitioner, and then we'll hear from Patent Owner, followed by
13 any rebuttal by Petitioner and then any sur-rebuttal by Patent Owner. For
14 the first part of our hearing addressing the 042 case, Petitioner, would you
15 like to reserve any time for rebuttal today?

16 MS. FREEMAN: Yes, Your Honor. I'd like to reserve 15
17 minutes for rebuttal.

18 JUDGE RAEVSKY: Okay. So that will leave you with 30
19 minutes for your primary argument. When you're ready, you may begin.

20 MS. FREEMAN: Thank you, Your Honors. I'm going to start
21 by going over the trial record in this IPR. Under Rule 42.64(c), a motion to
22 exclude evidence must be filed to preserve any objection. Novarad waived
23 all of its objections to Medivis's exhibits by not moving to exclude any of
24 Medivis's evidence. On the other hand, Medivis's motion to exclude
25 Novarad's Exhibits 2002 and 2004, which are the declarations of Mulumudi
26 and Rosenberg, remains pending.

1 As you know, there are three challenges. The first one is
2 anticipation of certain claims by Doo. The Board provided its preliminary
3 findings in its institution decision here. And we would rest on our papers as
4 to anticipation by Doo and focus on obviousness for the purposes of oral
5 argument. The second Ground is obviousness over Doo in view of Amira.
6 And the third Ground is obviousness over Chen 3D slicer visualization and
7 3D slicer-GUI. Just for reference 3D slicer visualization is Exhibit 1007. It
8 might also be called 3D slicer, sorry, 3D slicer or 3D slicer-visualization, I'm
9 sorry. I already got this wrong. 3D slicer visualization, or 3D visualization.
10 Also, 3D slicer, the reference Exhibit 1010 might be called 3D slicer GUI,
11 alternatively.

12 Now turning to obviousness, Graham v. Deere laid out the
13 factual inquiries that are the framework for assessing obviousness. The last
14 one is objective evidence of non-obviousness. There is none at issue here,
15 so we'll turn to the next. The third factual inquiry is the level of skill in the
16 art and we'd like to look at that. Turning to, let's see. Turning to slide 5. In
17 the Petition Medivis proposed a definition of a person of ordinary skill in the
18 art and proposed that that person would have three qualifications. The first
19 qualification is a bachelor's degree in computer science, electrical
20 engineering, or a related field. The second qualification is several years of
21 experience in the design, development, and study of AR devices. And the
22 third qualification is either familiarity with conventional medical imaging
23 data and visualization of data for medical procedures, or working with a
24 team, including someone with such familiarity. In the scheduling order, the
25 Board cautioned Novarad about waiver if Novarad failed to present any
26 challenges in the Patent Owner reply. And the reason for that is because the

1 Petitioner is limited as to what it can argue after the Petition is filed. And,
2 for example, the reply can only respond to what is in the Patent Owner
3 response. So by not ever challenging Medivis's definition of a person of
4 ordinary skill, Novarad waived the right to dispute Medivis's definition of a
5 person of ordinary skill in the art. And in fact, they never presented their
6 own proposed definition of a person of ordinary skill in the art. Moving to
7 the next.

8 JUDGE ZECHER: Ms. Freeman, this is Judge Zecher. I do
9 have a question. Can you go back to that slide? In your third element, it's
10 an either or. It says familiarity with conventional medical imaging data and
11 visualization of data for medical procedures or working with a team
12 including someone with such familiarity. What does the second aspect of
13 that mean? Does that just mean that somebody can work with somebody
14 who's more experienced in medical imaging data and visualization of data
15 for medical procedures but doesn't actually have to do it him or herself?

16 MS. FREEMAN: Well, I think this addresses the situation
17 where you have a team that has a variety of skills and experience and
18 knowledge that they're bringing to the table. If you work with someone that
19 includes this familiarity with medical imaging data and with the
20 visualization of data for medical procedures, then you could leverage that
21 knowledge, skill, and experience if you are working with them.

22 JUDGE ZECHER: So, in other words, the person doesn't
23 actually have to work on that him or herself, as long as he or she works with
24 somebody who's done that work on those particular things, the medical
25 imaging data and visualization of data, medical procedures, that's sufficient,
26 correct?

1 MS. FREEMAN: Well, it's not -- it is working with someone
2 using the familiarity. It's not like I could work with someone who might
3 have that familiarity and it might be something I wouldn't know. But if they
4 were working together on a project and leveraging their various skills and
5 experience, then yes, that would qualify, Your Honor.

6 JUDGE ZECHER: Well, I'm just curious, how does that
7 qualify them as a person of ordinary skill in the art? If they don't actually
8 work on it themselves, then how would they -- I'm a little confused. I mean
9 I can just work with somebody who has the knowledge and that makes me
10 qualified?

11 MS. FREEMAN: It's like working on a team. Not everyone
12 brings the same things to the team. But this person could also have
13 experience with conventional medical imaging data and visualization of that
14 data themselves. As Novarad itself said, it's likely a multidisciplinary team.
15 It's not like two individuals working separately are equivalent to a team
16 working together on an AR project. A team is greater than the sum of its
17 parts.

18 JUDGE ZECHER: Okay. Well that adds more confusion for
19 me because we're talking about a person of ordinary skill in the art, not a
20 team of people of ordinary skill in the art. But in any event, let's move past
21 this. You can go on and continue with your presentation.

22 MS. FREEMAN: Okay. So, Medivis presented the declaration
23 of Professor Kazanzides. He has the credentials to opine on the
24 understanding of a person of ordinary skill in the art and Novarad never
25 disputed that he qualifies as a person of ordinary skill in the art. For
26 example, he is a research professor in the Department of Computer Science

1 and he researches AR systems for surgical applications, and he's a co-
2 inventor on a patent application entitled Augmented Reality for Surgical
3 Procedures. That was slide 6.

4 Moving on to slide 7. This is just an example. Azimi Exhibit
5 1011 as an example of a paper co-authored by Kazanzides. It's entitled
6 Augmented Reality Goggles with an Integrated Tracking System for
7 Navigation in Neurosurgery, and that's dated 2012. Moving on to slide 8.
8 Novarad did not qualify Mulumudi as a person of ordinary skill in the art,
9 and he lacks both the academic qualifications, the AR device experience
10 required by the undisputed definition of a person of ordinary skill in the art.
11 Also in the Petition, as an example of what a person of ordinary skill in the
12 art would have been familiar with, it says a person of ordinary skill in the art
13 would have been familiar with the 3D-slicer application and its ability to
14 load and display data for a user. But Mulumudi was not familiar with 3D
15 Slicer, as we noted in the motion to exclude. And as another example, he
16 did not recognize one of the exhibits that we rely on as a basis for our
17 challenge, that's 3D Slicer visualization, Exhibit 1007.

18 Moving on to slide 9. Novarad did not qualify Rosenberg as a
19 person of ordinary skill in the art either. He admitted that he is not an expert
20 in the specifics of medical imaging, and he did not claim the required
21 qualification as to conventional medical imaging data and visualization of
22 data for medical procedures. Nor did he claim the required experience with
23 AR devices. I will say that this brings into bear, like, how your concern
24 about our definition of a person of an ordinary skill in the art might work.
25 Rosenberg, if he didn't have either personal familiarity with conventional
26 medical imaging data or visualization of that data, then he's really -- has a

1 bad starting point if he's not working with someone, he can use to leverage
2 their knowledge, skills, and understanding of that data. So that's an example
3 how you might have -- if he doesn't have personal knowledge, which he says
4 he doesn't, then he could have leveraged someone else's knowledge to help
5 him come up to speed on how to use that data and what the existing
6 technology in that area was.

7 JUDGE RAEVSKY: Counsel, I'll just jump in and note that we
8 appreciate your presentation on this issue. I think we understand your
9 position on this issue and might be interested in hearing your positions on
10 claim construction and the merits.

11 MS. FREEMAN: Okay. Okay. Moving on to the claims. This
12 is Claim 1. It's a method for augmenting real-time non-image actual views
13 of a patient with three-dimensional data. The method comprising two steps
14 with one additional limitation. The first step, this is slide 17, is identifying
15 3D data for the patient, the 3D data including an outer layer of the patient
16 and multiple inner layers of the patient. And the second step constituting
17 displaying an augmented reality headset. One of the inner layers of the
18 patient from the 3D data projected onto real-time non-image actual views of
19 the outer layer of the patient. The third limitation is the projected inner layer
20 of the patient from the 3D data being confined within a volume of a virtual
21 3D shape. Moving on to Claim 11, there's a lot of overlap.

22 The preamble and the first and second step from Claim 1 are also
23 in Claim 11. The third limitation of Claim 1 does not appear in Claim 11 but
24 Claim 11 also introduces the fact that the 3D data from the patient in that
25 data, the multiple inner layers of the patient have an original color gradient.
26 Claim 11 also introduces another step, which is altering the color gradient of

1 the multiple inner layers to be lighter than the original color gradient in order
2 to be better visible when projected onto real-time non-image actual views of
3 the outer layer of the patient. And then also as a limitation on the displaying
4 step, it adds the projected interlayer of the patient from the 3D data being
5 having the altered color gradient.

6 So originally, Novarad took the position, this is slide 19, that no
7 claim construction is necessary. And you can read Exhibit 1014, which is a
8 Novarad email we cite in the Petition in which Novarad says all of the
9 claims should have their plain and ordinary meaning as they would be
10 understood by one having ordinary skill in the art. Therefore, no claim
11 construction is necessary. But after institution, Novarad proposed
12 unordinary meanings that contradict the '271 patent claims and the
13 specification. Moving on to slide 20. So these are some issues that have
14 been raised over the course of the trial, which is, must 3D data both exclude
15 X-ray imaging and, more importantly, be limited to data that has been direct
16 volume rendered? And if so, what does that mean? Secondly, must the
17 inner layer of the patient be limited to 3D and DVR. And if so, what does
18 that mean in terms of those limitations? Then, Novarad has really raised a
19 lot of questions with regard to the meaning of Claim 1's limitation of
20 combined within a volume of a virtual 3D shape. And all of this raises the
21 questions as to whether 3D has the same meaning in Claim 1's 3D data and
22 also in Claim 1's virtual 3D shape. And as a subsidiary matter, what does
23 3D mean in that context?

24 Secondly, as to Claim 11, they have raised the question as to
25 whether the word being is meaningless in Claim 11, but not in Claim 1. And
26 they have not moved to amend Claim 11 to eliminate that word being or --

1 and they have not sought a correction of the inclusion of that word which
2 they have admitted is its own error.

3 So going into background to help us understand what the
4 meaning of the words is and the context of the slides we refer to slide 22,
5 which is an overview of the '271 Patent and Figure 1. Figure 1 shows
6 patient 106 here. User 104 in this case looks like a surgeon. There's an AR
7 headset 108, which might be Microsoft HoloLens, and the surgeon is
8 wearing that headset, surgeon/user. There are virtual lines displayed, virtual
9 elements shown in dashed lines on Figure 1. The Patent discloses these are
10 generated by the AR headset and only viewable by the user through the AR
11 headset 108. Among the virtual display that is visible only to the user, there
12 is a virtual user interface 114 which is an upper portion of Figure 1. And
13 there is an also a virtual spatial difference box 116 which is overlaid on the
14 patient. Within the box 116 there are bones 106B. This is all described
15 within the Patent. This is a larger view, slide 23. Moving on to slide 24.
16 The '271 Patent explains what the virtual user interface 114 is all about. It
17 says virtual user interface 114 may cause that AR headset to three, adjust the
18 characteristics of the 3D data that is projected, including the brightness and
19 color of the projected 3D data. Four, adjust the alignment of the 3D data
20 with the patient. Five, display the virtual difference box. Six, display a
21 slice instead of a volume of the 3D data. Seven, drag 3D data in the
22 direction of the user, such as in repositioning of a slice of the data. That
23 sounds like maybe it has to do with getting a better registration. And finally,
24 eight, displaying different slices of the 3D data. Moving on to slide --

25 JUDGE RAEVSKY: I have a question about your construction
26 related to confined within a virtual 3D shape. Maybe you could go there in

1 your slides and get us going on that claim construction. And then I'll jump
2 in with a question if that's okay with you.

3 MS. FREEMAN: Sure. I'll jump ahead to that. Okay. Part of
4 their construction of, yeah, okay, so moving to slide 40, this is claim
5 construction of confined within a volume of a virtual 3D shape. So Medivis
6 proposed that virtual 3D shape encompasses a form as simple as a box and
7 as complex as the outer layer of the patient. Thereafter, Novarad, having
8 previously said no construction is required, decided that the confined within
9 a virtual 3D shape somehow required navigation along any axis in a virtual
10 control. I'm not sure how they relate the actual words in the claims to
11 their -- what they proposed to read into the claims. Nonetheless, in our
12 reply, we were clear that confined within a volume has its plain and ordinary
13 meaning, which does not involve any navigation function, but rather requires
14 the virtual 3D shape to be a boundary. Moving on to slide 41.

15 JUDGE RAEVSKY: Okay. So that -- now I'd like to jump in
16 since you've kind of primed the question. So could you please go back to
17 the previous slide?

18 MS. FREEMAN: Sure. Going to slide 40.

19 JUDGE RAEVSKY: Okay. So you mentioned that the virtual
20 3D shape could be as simple as a box, as complex as the outer layer of a
21 patient. In the reply, you also cite deposition testimony from Patent Owner's
22 declarant, related to the meaning of shape as being a form, et cetera. And
23 you also define, I believe, confines to be kept. And so my question is, can
24 we simply, would it be a correct construction to simply construe -- confined
25 within a virtual 3D shape to be kept within the virtual 3D shape or kept
26 within the virtual 3D form or volume. Do we need to say that it requires a

1 virtual 3D shape to be a boundary?

2 MS. FREEMAN: I don't think so because if you interpret
3 confined as kept within a volume of a virtual 3D shape, I think in this
4 context, kept, and confined are pretty much synonyms. And keeping
5 something within a volume of a virtual 3D shape would cause the volume of
6 the 3D shape to be a boundary for whatever was kept within.

7 JUDGE RAEVSKY: Okay. That's helpful. Thank you.

8 MS. FREEMAN: So, Claim 3 has a virtual 3D shape
9 configured to be controlled to toggle between displaying and hiding lines of
10 the virtual 3D shape. This is a dependent claim, of course. I'm on slide 41.
11 It also says the virtual 3D shape is configured to be controlled to reposition
12 two-dimensional slices and/or 3D slices of the projected inner layer of the
13 patient from the 3D data. That's for background. We're moving back into
14 construction. So as the Judge just mentioned, confined and shape both
15 appear as words within a larger phrase, and Novarad's proffered expert
16 Mulumudi opined that each of those terms are not technical. And in their
17 sur-reply, Novarad argues that the virtual 3D shape is a box. And I'm citing
18 their sur-reply at 7 where they say a virtual 3D shape, i.e., a virtual spatial
19 difference box 116. That is slide 42.

20 JUDGE RAEVSKY: Related to that slide that you were just
21 on, Patent Owner charges you with lack of candor for asking Dr. Mulumudi
22 about the meaning of these terms. Do you have a response to that charge?

23 MS. FREEMAN: Yes, I do. I think it's a ridiculous charge.
24 Dr. Mulumudi opines as to the meaning of those words, and it should have
25 been completely expected that he'd be asked about the meaning of those
26 words in his deposition. I'm not actually quite sure that I understand the

1 allegation of the lack of candor. I don't really get it. We were asking
2 questions in a deposition. I don't understand where the lack of candor is
3 there. I mean, an attorney deposing a witness is asking questions. What is
4 there to -- what is the candor that applies in the context of asking questions?
5 If there's any lack of clarity, the witness could always ask for a clarification,
6 which the witness generally did not. Does that answer your question, Your
7 Honor?

8 JUDGE RAEVSKY: Thank you.

9 MS. FREEMAN: Moving on to slide 43. Novarad, their
10 arguments aren't very clear and they're not put together well in a clear
11 summary. So, I'm trying to kludge together various arguments that they've
12 made in their efforts to distinguish the prior art reference and put those into
13 the claim construction section where they properly belong. So, in the sur-
14 reply at 12, Novarad argues that confined within a volume means navigable
15 along any access. There is no support for that in the '271 Patent. The '271
16 Patent only does use the word navigate. So clearly, the applicant knew how
17 to use the word navigate, and chose not to use that word in the claims. They
18 did include the word once into the specification, and it appears in the
19 sentence which I have copied on slide 43. It says that the virtual spatial
20 difference box 116 may assist the user when navigating the projected 3D
21 data by providing a frame of reference for the user. So the function of box
22 116 is to provide a frame of reference for the user. That is what it's doing.
23 The box is providing a frame of reference. And that actually can be helpful,
24 such as when you're registering or trying to maybe move the slides or select
25 a different slide that you could display on the user.

26 JUDGE RAEVSKY: Counsel, I'll just jump in and note that

1 you have just under five minutes of your planned argument time remaining.

2 Of course, you're free to go into your planned rebuttal as needed.

3 MS. FREEMAN: Okay. Is there anything in particular that
4 you would like to hear about, Your Honor?

5 JUDGE RAEVSKY: I do have one very simple procedural
6 question. And I apologize, it's not related to this claim construction
7 argument you're on. But it's very simple. On page 34 of the Petition, in the
8 Doo ground, in the heading for the displaying limitation, you mentioned
9 Claims 1, 7 and 11. And I believe that you didn't intend to challenge Claim
10 7 because that's the only reference to Claim 7 that I could see in the Petition.
11 And I was just wondering if you could confirm that for me.

12 MS. FREEMAN: I do confirm that. The challenges are put
13 forward, the particular challenge -- sorry, I'm just looking for the right page.
14 The particular -- wait, 31. Page 31 includes the particular challenges. This
15 is page 31 of the Petition. It includes the particular claims that are
16 challenged as well as the particular challenges for each of those challenged
17 claims.

18 JUDGE RAEVSKY: Okay. So it's Claim 7, you were
19 affirmatively not challenging.

20 MS. FREEMAN: That is -- was a typo. That is not an intended
21 part of our challenge.

22 JUDGE RAEVSKY: Thank you. You may proceed as you
23 wish.

24 JUDGE ZECHER: Yeah. Ms. Freeman, this is Judge Zecher.
25 I would like you to just take a step back because I imagine Patent Owner is
26 going to get to this in their presentation. If we're talking about the claim

1 construction of 3D data, --

2 MS. FREEMAN: Yes.

3 JUDGE ZECHER: -- I believe it's your slide 30.

4 MS. FREEMAN: Yes.

5 JUDGE ZECHER: And I think there's a lot of argument as to
6 whether or not direct volume rendering should be read into this construction.
7 I guess my -- my first kind of general question is if there -- is there more
8 than one way to render 3D data? I assume that it's not limited such that the
9 only way of doing is to direct volume rendering. Is that fair?

10 MS. FREEMAN: Yes. Actually, we included a slide as
11 background on the prior art. Direct volume rendering is, as you would
12 expect from the inclusion of direct as an adjective in front of volume
13 rendering, it is a subset of volume rendering. And you can see this in both
14 Amira and also in the background we referenced Casas discloses volume
15 rendering when we reference page 75, sorry, paragraph 75 of Casas on
16 Petition page 26. This is on slide 39. And it provides a little background on
17 types of volume rendering that exist, which include direct volume rendering,
18 but aren't limited to volume rendering. And there's of course, other types of
19 rendering. There's segmentation, and there's just a lot of different types of
20 rendering that are possible even within volume rendering. And once you do
21 volume rendering, you can do further rendering and/or segmentation based
22 on the volume rendering that you've done. So I hope that I've answered your
23 question.

24 JUDGE ZECHER: Yeah. That's very helpful. I appreciate it.
25 Thank you. So, obviously, we know what the arguments are in this case,
26 and Patent Owner's attempt to read in direct volume rendering into its 3D

1 data construction. I did not see that word in the specification. I mean, you
2 can correct me if I'm wrong, but was there anything in the limitations
3 themselves that would speak to direct volume rendering specifically or is
4 this just something that -- and I think I understand you to argue that they're
5 just trying to read into the claim to further limit it.

6 MS. FREEMAN: Yeah. So if you look at slide 38, the '271
7 Patent never mentions direct volume rendering. And during the deposition
8 of Novarad's proffered expert Mulumudi, he testified that he could only
9 recognize direct volume rendering by the phrase direct volume rendering.
10 That phrase appears nowhere in the Patent, so we think they don't really
11 have a reasonable basis even to use an unqualified expert to try and read
12 direct volume rendering limitation into the claims. Additionally, I would
13 note that both Novarad and its proffered expert, Mulumudi, distinguish
14 between 3D data and direct volume rendering when they say, for example,
15 DVR is a method for visualizing medical imaging data. That is
16 distinguishing the data from the process of direct volume rendering.
17 Similarly, Novarad and Mulumudi both said, Novarad operates on the
18 original data set. That distinguishes DVR and what it operates on from the
19 data, which is the original data set. I don't know -- are there any more
20 questions? I'm not sure how much time I have left.

21 JUDGE QUINN: I have a question. I have a question for you,
22 counsel, if you can indulge me for a second. On your new ground, you state
23 that for the confined within a volume of a virtual 3D shape, your Petition
24 relies on several embodiments of Doo. And I'd like for you to clarify how
25 exactly are you stitching together all these embodiments in this anticipation
26 ground. For example, you say that it's Figure 7, which is a false 3D or a

1 2.5D wrapped image on top of a body. Then you discuss Figure 9 as the
2 actual volume within which the 3D data is being confined. Then you
3 describe Figure 6 as a virtual heart, and then you go on to describe Figure 11
4 as a virtual box. So I need for you to explain to me how you're stitching all
5 of these embodiments together, or are they separately identified as meeting
6 the limitation under the anticipation ground?

7 MS. FREEMAN: Thank you, Your Honor. We're looking at
8 those as alternative disclosures. Looking first at Figure 7, there is a 3D
9 shape, which is a curved plane. A curved plane is no longer a plane, it
10 becomes a 3D shape. And Novarad has admitted that a 3D shape has a
11 volume. I'm looking at slide 59 now, and I'm referring to the opposition in
12 support of the motion to exclude at page 15 where Novarad admitted that a
13 3D shape has a volume. So looking at this as an example, Figure 7
14 displayed on slide 59, the image appears to be confined within the virtual 3D
15 shape, which is shown in Figure 7. Alternatively, on slide 60, which is
16 discussion of Figure 11, you have a group, a series of three-dimensional
17 tomographic slices which can be stitched together to form a 3D image. The
18 3D image if it were stitched together from the individual slices here would
19 form a box which would be like all defaults bounding boxes, the boundaries
20 at which the data exists, the outer boundaries. So that is another example of
21 a virtual 3D shape disclosed in Doo. I don't have anything to say about
22 Figure 6.

23 JUDGE QUINN: Okay. So if you -- if this is correct, if that's
24 what you're relying on. So Figure -- Claim 5 depends from Claim 1, and for
25 Claim 5 you're relying on Figures 9 and 7 only. You're not relying on Figure
26 11 is meeting that limitation?

1 MS. FREEMAN: Well, let me clarify a little bit, Your Honor,
2 that the information that is illustrated in Figure 11, Doo discloses that that
3 could be projected onto the patient. So, we think that this virtual 3D shape
4 that's illustrated in Figure 11 would, when the information in Figure 11 was
5 projected onto Doo's patient, that the shape would also be projected onto the
6 default bounding box, would also be projected onto Doo. And that's what a
7 person of ordinary skill in the art, based on all the understanding that default
8 bounding boxes were normally used, how they would interpret Doo.

9 JUDGE QUINN: I understand that that's your argument for
10 Claim 1. For Claim 5, a dependent claim, you've only identified Figures 7
11 and 9. And Claim 5 --

12 MS. FREEMAN: I'm sorry, could you repeat that, Your
13 Honor?

14 JUDGE QUINN: Claim 5.

15 MS. FREEMAN: Yes.

16 JUDGE QUINN: Which requires that the lines of the shape are
17 hidden.

18 MS. FREEMAN: Yes.

19 JUDGE QUINN: You're not relying on Claim 11 for that. I
20 don't see it mentioned. And I want to make sure that I understand that --

21 MS. FREEMAN: Yes.

22 JUDGE QUINN: -- your contention for the hidden lines is only
23 based on Figures 7 and 9.

24 MS. FREEMAN: It's based on Figures 7 and 9, and the
25 understanding of a person of ordinary skill in the art that bounding boxes are
26 normally used and not always displayed.

1 JUDGE QUINN: This is your anticipation ground?

2 MS. FREEMAN: Yes.

3 JUDGE QUINN: How do you contend that we can rely on
4 additional knowledge of a person of skill in the art?

5 MS. FREEMAN: Well, that each reference is viewed from the
6 perspective of a person of ordinary skill in the art. And how would you
7 propose that they display hidden lines? Like, they're not that interesting.
8 There's no reason to even mention them because they're so omnipresent. But
9 if you don't like our anticipation grounds, then you can certainly invalidate
10 the claims based on our obviousness over the combination of Doo and
11 Amira, which gets into really a lot of detail about the bounding box and how
12 it can be used and how it can be toggled on and off for display or not.

13 JUDGE QUINN: But before we can go into your obviousness
14 ground, we would have to find that there's some motivation to combine the
15 references or the art. Correct?

16 MS. FREEMAN: Yes. And that is explicitly set forward in
17 Doo itself in the background. It explains that it's building on conventional
18 medical imaging data and visualization with the motive to reduce cognitive
19 load, for example. And also on the testimony of our qualified person of
20 ordinary skill in the art, who is Professor Kazanzides.

21 JUDGE RAEVSKY: Counsel, you have about eight minutes
22 remaining. Would you like to continue or reserve the remainder of your
23 time?

24 MS. FREEMAN: I would like to reserve the rest of my time,
25 Your Honor.

26 JUDGE RAEVSKY: Okay. Thank you. Mr. Harmer, would

1 you like to reserve any time for sur-rebuttal?

2 MR. HARMER: Yes, Your Honor. Five minutes, please.

3 JUDGE RAEVSKY: Okay. You'll have 40 minutes, and you
4 may begin when ready.

5 MR. HARMER: Thank you, Your Honor. At the outset, I
6 would like to object to slide 39, which referenced in, or pardon me, slide 39
7 in Petitioner's slides, the reference is Exhibit 1006 Casas, and introduces a
8 new theory of obviousness, including that Casas discloses various methods
9 of volume rendering, which is an argument that was not made in the Petition.

10 JUDGE RAEVSKY: Counsel, we'll take that under advisement
11 and hold that objection in abeyance.

12 MR. HARMER: Thank you, Your Honor.

13 JUDGE ZECHER: Mr. Harmer, I do actually have a question
14 about that because I understand and I think I invoked their reference to slide
15 39, that they were relying on Casas as general background knowledge in the
16 art to basically discuss what volume rendering was and that direct volume
17 rendering was a subset of that. Are you saying that we can't reference that as
18 background knowledge in the art when considering at least their obviousness
19 grounds?

20 MR. HARMER: Yes. It was not included in their grounds,
21 their obviousness grounds in their Petition.

22 JUDGE ZECHER: But it's part of the general knowledge of
23 one of ordinary skill in the art. Are you suggesting we can't consider that?

24 MR. HARMER: I'm suggesting that they didn't specifically
25 combine Doo with Casas in their grounds. And I don't think that they can do
26 it now, respectfully.

1 JUDGE ZECHER: Okay.

2 MR. HARMER: If necessary, I can begin with the
3 qualifications of Dr. Mulumudi and Rosenberg, Patent Owner's team of
4 experts. That's not of interest to the Board at this moment I can move on to
5 the merits.

6 JUDGE RAEVSKY: You're welcome to jump in and address
7 the arguments how you like, Mr. Harmer, but we would like to get to the
8 merits sooner than later.

9 MR. HARMER: I'm going to share screen. In its attempts to
10 invalidate the patents at issue today, Petitioner Medivis oversimplifies the
11 patents and by so doing disregards their novelty. The inventions claimed in
12 the '271 and '807 Patents allow physicians to look inside their patients in an
13 immersive augmented reality environment. In the '271 Patent that we're
14 discussing right now, a physician can navigate through a three-dimensional
15 image or picture of the internal anatomy of the patient while the patient is
16 lying on the operating table. A physician can view the whole volume of that
17 image or lesser portion like slices of the volume. And those slices can
18 include oblique slices which are off-angle slices and even 3D curved slices
19 that follow the natural curve of an anatomical feature. The '271 Patent also
20 includes a virtual user interface and a virtual 3D shape which confines the
21 3D data and assist the physician when navigating the 3D data.

22 If we look at Claim 1, Claim 1 requires 3D data, and that 3D
23 data includes an outer layer and multiple inner layers of the patient. A key
24 issue in this matter is what 3D data means. I will explain why 3D data is not
25 only three-dimensional, but also a direct volume rendered image of a patient.
26 Let's look at the specification, column 5, lines 18 through 42, and I don't

1 have a slide for that. But you'll see that in the specification there's a
2 description of a virtual user interface with several options listed for altering
3 the display of the projected interlayers. Option 6 allows the user to display a
4 slice of the 3D data instead of the full volume. And slide 3 shows Figure 2C
5 from the Patent and it shows a user displaying a slice of the 3D data instead
6 of the full volume. Option 7, --

7 JUDGE RAEVSKY: Counsel?

8 MR. HARMER: Yes.

9 JUDGE RAEVSKY: Counsel, you mentioned those slices. My
10 understanding from column 6 of the Patent around line 17 is that it says the
11 slices may be two-dimensional slices and/or 3D slices. So why is it that we
12 should be reading only 3D slices into the claim?

13 MR. HARMER: Well, if it's 3D slices, it's still 3D slices of the
14 3D volume.

15 JUDGE RAEVSKY: But doesn't the Patent encompass both
16 2D and 3D slices?

17 MR. HARMER: It does, but it specifically claims 3D data.
18 And projecting an inner layer of the 3D data. So it's still a portion of the 3D
19 volume. It's not just predicting a 2D picture in an augmented reality
20 environment. And I can explain a little bit more why that's so if I can
21 continue.

22 JUDGE RAEVSKY: Go ahead.

23 MR. HARMER: Thank you. Option seven allows the user to
24 drag the 3D data in a direction of the user, such as in the repositioning of a
25 slice of the 3D data. Counsel for Petitioner argued for the first time today
26 that this may mean a better registration. That can't be possible because

1 option four says adjust the alignment of the 3D data with the patient. So that
2 can't be what option seven means. Rather what option seven means is if I
3 hold up my notepad here and as you look at Figure 2C, the user using hand
4 gestures can move the slice through the 3D volume. And as the slice moves
5 through the 3D volume, the image changes based on the location in the
6 patient so that the user, the physician, can see inside the patient, multiple
7 inner layers, the internal anatomy of the patient, while the patient is laying
8 on the operating table. And the user, as we'll see in other options, is not
9 limited to a single axis. The user can move through the 3D volume in any
10 direction, including oblique slices, which are off-angle slices, and curve
11 slices. If we look at option eight, just one moment, please. Excuse me.

12 If we look at option eight, option eight explains that users can
13 adjust the location of the slice to show axial, which axial slices are like from
14 the top of the head to the feet. Sagittal slices, or rather, coronal slices that are
15 front to back, and coronal slices, or sagittal slices that divide the body in half,
16 so shoulder to shoulder or ear to ear. And option eight includes oblique
17 slices. This is really important because Dr. Mulumudi explained that the
18 only way that you can slice the 3D data along oblique slices is with a direct
19 volume rendered 3D image, that there isn't any other way to do that. Also in
20 the specification, if we look at column 6, lines 11 through 21, we see that the
21 user can navigate the projected 3D data by moving slices, as we've already
22 discussed. But it also explains that the slices may include curved 3D slices
23 that follow the natural curve of an anatomical feature. So in other words, the
24 invention allows a physician to peel away the layers of a patient while he or
25 she is laying on the operating table as one would peel away an orange. That
26 is not disclosed anywhere in the prior art, and Dr. Mulumudi explained that

1 the only way to do that is with a direct volume rendered 3D image.

2 JUDGE RAEVSKY: Counsel, does the term direct volume
3 rendered or any similar terms like direct volume rendered appear in the
4 specification?

5 MR. HARMER: The exact phrase direct volume rendered does
6 not appear in the specification.

7 JUDGE RAEVSKY: So what's your theory then for reading
8 direct volume rendering into the claim?

9 MR. HARMER: The theory for reading direct volume
10 rendering into the claim is because Dr. Mulumudi, who considered the
11 specification and the claims, understood that a physician could not navigate
12 through a 3D volume of a patient image along oblique slices or along curved
13 slices that follow the natural curve of an anatomical feature unless the 3D
14 data was direct volume rendered, and that a person of ordinary skill in the art
15 would understand that, and that there's no other way to do it.

16 JUDGE RAEVSKY: So I don't think I remember seeing in
17 your briefing, maybe you can point me to it. Where do you discuss this
18 oblique or curved aspect being part of the claim?

19 MR. HARMER: It is in Patent Owner's Response, pages 11
20 through 14, and Dr. Mulumudi's declaration, Exhibit 2002, paragraphs 59
21 through 61.

22 JUDGE RAEVSKY: But the claim doesn't say oblique or
23 curved. So what's your theory for reading those aspects into the claim?

24 MR. HARMER: Well, let's look at the claims. So Dr.
25 Mulumudi explains that the three-dimensional data described in the
26 specification needs to be direct volume rendered. And that if we look at

1 Claim 3, that the virtual 3D shape is configured to be controlled to reposition
2 these slices of the projected inner layer of the patient from the 3D data, and
3 that the only way to project them the way that it's described in the patent
4 meaning to reposition them along oblique angles and to show curved slices
5 requires direct volume rendering.

6 JUDGE RAEVSKY: So, you're pointing to Claim 3 here, and
7 I'll just note that Claim 3 mentions repositioning two-dimensional slices
8 and/or 3D slices. That's very similar to the language we discussed in column
9 six already. But wouldn't that suggest that Claim 1 is broad -- Claim 1's
10 inner layer is broad enough to cover just 2D slices?

11 MR. HARMER: As long as the 2D slice is from the 3D data?
12 Yes.

13 JUDGE RAEVSKY: Okay.

14 MR. HARMER: But we're projecting a portion of the whole.
15 And we can project the whole volume, or we can project a lesser portion of
16 it, including a slice.

17 JUDGE ZECHER: Mr. Harmer, this is Judge Zecher. I guess
18 what I'm struggling with here is you keep referencing Dr. Mulumudi's
19 testimony on this issue and how these claims should be construed, but you
20 haven't talked about the intrinsic record, which is the spec, which case law
21 dictates is the single best guide in understanding the claim. I don't think
22 there's any discussion in the record of anything in the prosecution history,
23 but we don't have the word direct volume rendering in the spec. Even that
24 whole notion is not even identified as a problem or anything or how it's done
25 in the art, nothing in the specification. And yet, you're asking us to look at
26 that document, say it's not in there and go directly to this extrinsic evidence

1 which is Dr. Mulumudi's testimony. I guess I'm just struggling why we
2 should do that because I think the cannons of claim construction are pretty
3 clear that we – the intrinsic record is going to be controlling unless there's
4 some ambiguity. And here, we just don't have any reference to direct
5 volume rendering in the spec. It's just hard for me to understand how we
6 should be reading that term in the claim.

7 MR. HARMER: It's just that Dr. Mulumudi read the patent and
8 understood that the only way to have the functionality of oblique slices and
9 curved slices that follow the natural curve of an anatomical feature, the only
10 way to do that is with direct volume rendered imaging. That's the basis.

11 JUDGE ZECHER: Well, you would think if that was the case,
12 the spec would have mentioned that. And it's silent as to that. So, I guess
13 I'm just struggling why we need to credit his testimony in this regard when
14 the spec has nothing to that effect.

15 MR. HARMER: Well, Dr. Mulumudi's testimony is unrebutted
16 on this issue. Petitioner had the opportunity to provide expert testimony to
17 rebut Dr. Mulumudi's testimony that 3D data requires direct volume
18 rendering, and they chose not to.

19 JUDGE ZECHER: Well, I don't think it matters that it's
20 unrebutted. My point to you is that I don't even know if we need to get to
21 his testimony. I think the spec is controlling, and it doesn't mention DVR.

22 MR. HARMER: And Patent Owner's position, again, is that
23 there's no other way to navigate through 3D data along oblique angles or to
24 slice up the 3D data with curved slices unless 3D data means direct volume
25 rendering. That's the only way that makes any sense.

26 JUDGE QUINN: All right. So, let me ask you, let me try to

1 simplify this here. Okay. So, you're not relying on lexicography, obviously.

2 There's no definition in the specs, correct?

3 MR. HARMER: That's correct.

4 JUDGE QUINN: You're not relying on plain and ordinary

5 meaning because the claims themselves don't say anything about this,

6 correct?

7 MR. HARMER: That's correct.

8 JUDGE QUINN: You're not relying on this, on any particular

9 term here, having a construction that is customary to a person of skill in the

10 art. Is that right?

11 MR. HARMER: I guess I don't understand here. I apologize,

12 Your Honor.

13 JUDGE QUINN: Which term in the claim do you think has a

14 customary meaning to a person of skill in the art?

15 MR. HARMER: There is not a term with the custom -- I mean,

16 3D data is not a customary term. That's what I understand. I apologize.

17 JUDGE QUINN: Okay. But if you don't have that then we

18 don't, we cannot actually go and resort to either a dictionary, extrinsic

19 evidence such as an expert, to try to breathe life into the claims according to

20 the meaning of a person of skill in the art, because there's no term that raises

21 the question of what does this term mean to a person of skill in the art.

22 That's what I'm trying to get to, because we treat the evidence differently if

23 it's under the Teva type of cases in which we do look at the expert testimony

24 to figure out what do persons of skill in the art would understand from that

25 particular term, then we can go into all of that. Otherwise, we don't have a

26 door to do that. And I'm looking for the door.

1 MR. HARMER: Our position is that the Patent doesn't work.
2 What's disclosed in the specification, as understood by a person of ordinary
3 skill in the art, like Dr. Mulumudi, it doesn't make any sense unless 3D data
4 means a direct volume 3D image. There's no other way to navigate through
5 a volume, a picture, a 3D picture that's projected onto a person in an
6 augmented reality environment and navigate through that along oblique
7 angles or to look at curved slices. It's just impossible to do that any other
8 way. And that testimony is unrebutted at this point.

9 JUDGE QUINN: And your disclosure for supporting this is,
10 again, in column six? Is that what you said?

11 MR. HARMER: Column five and column six. Column five for
12 the oblique slices and column six for curved slices.

13 JUDGE QUINN: Okay. And as my colleague said, we don't
14 see direct volume rendering there. So are you -- I mean we have a concern
15 now that you're saying this is the only way the claims can work based on
16 what persons of skill and the art would know. And in what's disclosed,
17 we've got a problem that you're not disclosing really how this is performed.
18 You see the problem we're having here with this?

19 MR. HARMER: Yes, I understand the problem. But at this
20 point, the facts kind of are what they are.

21 JUDGE QUINN: Okay. Got you. Thank you.

22 MR. HARMER: Thank you very much, Your Honor.

23 JUDGE RAEVSKY: I don't want to belabor this issue, but I do
24 just want to understand very briefly, for the record, could you define what
25 DVR means? It wasn't clear to me from your briefing.

26 MR. HARMER: A direct volume rendering is explained in the

1 Petition. But it is a volume rendering that is rendered directly from the
2 source data. For example, a CT scan. And it generates into a volume of the
3 whole picture. It's like when you look at a CT scan and you look at one slice
4 of it, you see a 2D picture of the internal anatomy of a patient. A direct
5 volume rendering of that data is all of it. It's the full volume. It includes the
6 outer layer of the patient, all the inner layers, the internal anatomy of the
7 patient. It's not a model. It's a picture of the internal anatomy of a patient.

8 JUDGE RAEVSKY: Okay. And you said that's defined in the
9 Petition?

10 MR. HARMER: Sorry, the Patent Owner's response. I
11 apologize.

12 JUDGE RAEVSKY: Okay. That's what I thought you meant
13 to say. If, and you could feel free to bring this back on your rebuttal time,
14 but I'd like to know where in the Patent Owner response so that that would
15 help me know where to cite that.

16 MR. HARMER: Yes, Your Honor.

17 JUDGE RAEVSKY: Thank you. All right, please proceed.

18 MR. HARMER: I'm going to point something out really
19 quickly. We're looking at, this is slide 4, and we're looking at figure 2D,
20 again from the Patent. And it's actually a slice of the 3D volume. If we look
21 at the specification, column 8, lines 33 through 36, we read that a user may
22 employ a hand gesture in order to have an axial slice of 3D data representing
23 a CT image of the patient's brain projected onto a real-time view of the
24 patient. So again, the slice looks like it's 2D, but it's a slice of the full
25 volume, and it looks like a CT image, but it's a slice of the full 3D volume.

26 Look at these other claims really quickly. Claim 1 also requires

1 a virtual 3D shape. That's been discussed briefly. Claim 3. So Claim 1, the
2 virtual 3D shape confines the 3D data within a volume of itself, within a
3 volume of the virtual 3D shape. And Claim 3, the virtual 3D shape is
4 configured to be controlled to reposition slices, 2 and 3D slices, of the
5 projected interlay of the patient from the 3D data. It's important to note that
6 these elements are different. The 3D data and the virtual 3D shape are not
7 the same element.

8 So briefly, let's talk about the prior art here. The prior art does
9 not augment real-time non-image actual views of a patient with direct
10 volume rendered 3D imaging. And it does not disclose a virtual 3D shape
11 that confines that data or that is configured to be controlled to reposition
12 slices within virtual 3D volume. Doo and Chen -- I apologize.

13 JUDGE RAEVSKY: Oh, I was just going to briefly jump in.
14 Thank you. So, you argue the preamble, you just mentioned augmenting
15 from the preamble, and I didn't see any discussion from the parties on
16 whether the preamble is limiting. As you know, typically the preamble is
17 not limiting unless there's some other reason for it to be so. What's your
18 theory for the preamble being limiting in this case?

19 MR. HARMER: I'm not sure that this was discussed in the
20 Petition or in Patent Owner's response. So I'm hesitant to argue something
21 new now. I guess as it relates to this issue, I'd rest on our papers to avoid
22 making a new argument if that's fair.

23 JUDGE RAEVSKY: That's fair.

24 MR. HARMER: Thank you, Your Honor. Doo and Chen are
25 the only prior art mentioned that actually projects something in an
26 augmented reality environment. Doo and Chen both project 3D models.

1 Doo projects 2D slices and 3D slices sequentially, but neither disclose
2 confining the 3D data within a virtual 3D shape. Neither of them disclose a
3 3D volume that's navigable while projected onto a patient. And neither
4 disclose a virtual 3D shape that's configured to be controlled to reposition
5 slices. Look at Doo and move to slide 5. It shows a 2D image hovering
6 over a patient. Slide 6 shows a 2D image wrapped over a patient. Contrary
7 to Petitioner's argument, a curved plane does not have volume. And this
8 does not disclose 3D data or a virtual 3D shape that's capable of confining
9 3D data or this configured to be controlled to reposition slices. Slide 7.

10 JUDGE RAEVSKY: Counsel, why does a curved plane not
11 have a volume?

12 MR. HARMER: Because it's a curved plane. It's open-ended.
13 It can't confine anything within it. So it's just half of a column or something.
14 Half of a cylinder. This doesn't dispose half of a cylinder. It's just a
15 wrapped piece of paper.

16 JUDGE RAEVSKY: So when it's curved it would have a
17 dimension in a third axis, not simply -- or two axis set of dimensions like a
18 non-curved plane. Wouldn't that third dimension give a volume?

19 MR. HARMER: It would have the same volume it had if it
20 weren't wrapped. Because it's just a wrapped piece of paper. For example,
21 it's discontinuous as well. I mean, this page, if it has any volume, the
22 volume doesn't change if I wrap it, even though it has dimensions along an
23 additional axis.

24 JUDGE RAEVSKY: Do we have anything in the specification
25 that would contribute to our understanding of volume?

26 MR. HARMER: It describes in column six, when it talks about

1 curved slices. If you look at line 20, it says slices that have depth as well as
2 height and width. I think plain and ordinary meaning there.

3 JUDGE RAEVSKY: Okay. Thank you.

4 MR. HARMER: Moving to slide 8. Petitioner argues that
5 Figure 11 shows a series, well Figure 11 does show a series to illustrate its
6 fifth three-dimensional modality, fly-through 3D, in which it shows or
7 displays a series of slices that can be sequentially exhibited. And Petitioner
8 argues that they can be stitched together to create 3D data and
9 simultaneously create a virtual 3D shape. This is not really disclosed in
10 Doo. Doo discloses that they can be stitched together to create a
11 holographic model of a heart, but it doesn't disclose more than that. And
12 again, the virtual 3D shape and the 3D data are separate -- separate elements.

13 Moving to slide 9. The element issue at here is 332, that image
14 of a heart. Doo discloses that 332 is a feature-specific 3D image and Dr.
15 Mulumudi opined that that's because it's feature-specific, in it's a 3D model
16 similar to Chen, and that it's not a direct volume rendered image. There's no
17 evidence that the heart model includes an outer layer of the patient and
18 multiple inner layers of the patient. And there's no evidence that this heart
19 model is confined within a volume of a virtual 3D shape or that that virtual
20 3D shape is configured to reposition slices within it. Petitioner tries to
21 remedy these deficiencies with Amira. Amira's computer software, we're on
22 slide 14, Amira's computer software, and it does include a VR option, but as
23 you'll see that VR option is vastly different from what's disclosed in the '271
24 Patent. Amira is used by researchers to visualize medical imaging on a
25 computer screen. And so it's not virtual. There's no evidence that this box
26 that's shown on this window in the computer screen is actually used in their

1 virtual reality option, or that it is configured to be controlled to reposition
2 slices. Petitioner argues that this box is configured to be controlled because
3 a user can use a mouse and keyboard to rotate the 3D object in the window.
4 But again, this is vastly different from navigating 3D slices in a virtual
5 environment to view different aspects of the internal anatomy of the patient.

6 If we look at slide 11, we get an understanding of Amira's
7 virtual reality option. This is Figure 8.2. It shows a sketch of a single screen
8 passive stereo projection system. If we go to slide 12, it's Figure 8.3. It
9 shows a sketch of a super wide projection system with soft end blending.
10 And Figure 8.4 is a single screen 3D projection system. These virtual reality
11 options are vastly different from those disclosed in Doo and cannot be used
12 to project 3D data onto non-image actual views of a patient in a virtual
13 reality environment. Amira does not disclose virtual reality or, pardon me,
14 augmented reality at all. So in summary, neither Doo nor Amira disclose
15 navigating a 3D image while it's projected onto a patient. Neither Doo nor
16 Amira disclose any virtual tool that can be used to assist the user when
17 navigating the 3D data like a virtual 3D shape. And neither Doo nor Amira
18 disclose a virtual tool that can be configured to be controlled in an
19 augmented reality environment to reposition slices of the 3D data.

20 JUDGE ZECHER: Mr. Harmer, I know you're focusing on
21 kind of the deficiencies you see in Amira and Doo. Could you hit on
22 Petitioner's rationale to combine these two references and why you think it's
23 deficient?

24 MR. HARMER: It's deficient to combine these two references
25 because even if you were to combine them, you wouldn't be able to arrive at
26 the claims of the '271 Patent because Amira is incapable of, well, let me see.

1 I mean, it's really easy with the benefit of hindsight bias to select elements
2 from Doo and Amira and pull these together and be like, oh yeah, this is
3 simple. But Kazanzides and Petitioner did not provide an explanation why
4 you should combine these two together, and it's Petitioner's burden to do so.
5 They just said that a person of ordinary skill in the art would be motivated to
6 do it. We don't even know what Amira's capabilities, virtual reality
7 capabilities are, and so it's very similar to trying to combine Slicer, which is
8 limited to a box on a computer monitor that a user can use a mouse and
9 keyboard to rotate, which you wouldn't rotate a 3D image in the '271 Patent
10 because it's projected onto a patient and it's registered to the patient so that
11 the physician can look inside the patient.

12 JUDGE ZECHER: I know we're focusing on various teachings
13 in the two reference, but I guess I'm more concerned on explicitly what
14 Petitioner said, which I believe is on page 41 of the Petition. I'm not sure if
15 you have that in front of you.

16 MR. HARMER: I can get that. One moment please.

17 JUDGE ZECHER: Yeah, I'll just go ahead and read it.

18 MR. HARMER: Okay.

19 JUDGE ZECHER: They argue that a person of ordinary skill in
20 the art at the relevant time period would have been motivated to combine
21 Amira and Doo to enable the inner intraoperative medical image viewing
22 system and method disclosed in Doo to take advantage of the visualization
23 technology disclosed in Amira. What do you think they meant by that?

24 MR. HARMER: I'm not going to presume to guess what they
25 meant by that.

26 JUDGE ZECHER: Would you think it's a sufficient motivation

1 to combine?

2 MR. HARMER: I don't think it's a sufficient motivation to
3 combine. I mean, they haven't -- let me pull it up here. According to
4 Professor Kazanzides, a person of ordinary skill in the art at the relevant
5 time would have been motivated to combine Amira with Doo to enable the
6 medical imaging view a system of Doo to take advantage of the visual
7 technology disclosed in Amira. We don't even know what the visual
8 technology of Amira is or what is disclosed. They don't explain that other
9 than they say that there's a bounding box in a window on a computer
10 monitor. I mean, if we're going to make that leap, we at least need to
11 understand what the visual technology in Amira, at least in their virtual
12 reality option is, which they did not do.

13 JUDGE ZECHER: So, you're saying it lacks specificity or
14 particularity. In other words, we don't know what visualization technology
15 in Amira they're seeking to incorporate into Doo.

16 MR. HARMER: Yes. I agree with that, Your Honor.

17 JUDGE ZECHER: Thank you.

18 JUDGE QUINN: I also am puzzled a little bit because what
19 you see on the screen in Amira, it's obviously an image, a digital image from
20 the data. But I don't see how you have disclosure from the Petitioner or their
21 expert explaining how you can take that information, push it out into virtual
22 reality display, which is completely different than a computer screen display.
23 Do you have any evidence addressing that?

24 MR. HARMER: There is no evidence on that. Dr. Kazanzides
25 has not opined on this issue at all. I'm going to move on to Chen now. Slide
26 15. Chen projects a feature specific model in this case. It's a model of a

1 pelvis which is green and a bladder. These are 3D models, they're not
2 images, it's not a direct volume rendered image. I know that's talked
3 extensively about that, but it's not a direct volume rendered image and it's
4 not an image at all. It's a model.

5 JUDGE ZECHER: Mr. Harmer, I actually had a question about
6 that. What's the difference between a 3D model and a 3D image?

7 MR. HARMER: A 3D image, at least with regard to a direct
8 volume rendered image, is a picture of the internal anatomy of a patient,
9 which is why navigating through it is so valuable. The model can be
10 generated from the same data. You select isosurfaces, for example, you
11 would select surfaces of the pelvis here or surfaces of the bladder, and from
12 that you would generate a model and then you project just the model. But
13 it's not a picture. It's not a picture of the inside of a patient.

14 JUDGE ZECHER: But isn't this picture of the inside of a
15 patient's bladder?

16 MR. HARMER: This is a model generated from -- this is a
17 model of a bladder generated from -- I mean they generate models from CT
18 scans and MRI scans. But that's not what they project onto the patient.
19 They just project the model.

20 JUDGE ZECHER: The reason I'm confused is I thought you
21 said earlier that a 3D image had to have some depth and of course a model
22 would to some extent. So I'm just wondering if -- I'm trying to understand
23 the distinction you're trying to draw between the two.

24 MR. HARMER: Yeah. I mean, Mulumudi explained this,
25 Mulumudi explains it in his declaration, it's explained in Petitioner's
26 response. This is a, it's called a surface model, and it's generated from 3D

1 data, but it's not the 3D data itself. So, in the case of Chen, they generated a
2 3D model of a pelvis and a 3D model of a bladder, and they project this,
3 these models onto the patient. But they don't disclose projecting the full 3D
4 volume. They don't disclose projecting an outer layer of the patient and
5 multiple inner layers of the patient as recited in Claim 1. It's just, just the
6 model. It's different from the image.

7 JUDGE QUINN: I think what you're getting at, Mr. Harmer, is
8 that the 3D data that is being used for this depiction doesn't come from the
9 patient. It's a standard model of that particular bone on an average body, but
10 it's not from the patient itself.

11 MR. HARMER: No, I think it is from the patient. I mean, they
12 generate the model of the -- they create a model of the pelvis of the patient
13 or the cadaver in this case, it's a cadaver in Chen, and a model of the bladder
14 and they project it onto the patient. But it's a model, it's not the image. You
15 can't, you don't navigate through it, you don't look at oblique slices, you
16 don't move through it the way it's described in the '271 Patent. There's
17 nothing to explore. You've already found what the anatomic features of
18 interest, you've generated a model and you've projected them onto the
19 patient. It's a different application completely.

20 JUDGE QUINN: Thank you.

21 JUDGE RAEVSKY: Counsel, you're just passed 37 minutes,
22 so you're about two and a half minutes to your initially reserved time.

23 MR. HARMER: Thank you, Your Honor. I'm going to move
24 to, I think we've discussed, I'm going to move to Claim 11 really quickly.
25 I'll reserve my time. Claim 11, this is slide 18, discloses -- not discloses,
26 pardon me. Claim 11 claims altering the original color gradient of the

1 multiple inner layers of the 3D data to be lighter than the original to be better
2 visible when projected onto non-image actual views of the outer layer of the
3 patient. None of the prior art discloses a 3D data or 3D image or altering the
4 color gradient of that 3D image to be better visible in AR. In Chen, they
5 alter the color gradient of, well, they alter the color of a model, but they're
6 not altering the color gradient of a medical image to be better visible when
7 projected onto a patient. And they're also not altering the color gradient of
8 the multiple inner layers of the patient in the image. And Doo is completely
9 silent on altering color and gradient completely.

10 One last thing, dependent claims 12 through 19 claim various
11 tissue properties wherein the altered color gradient represents these various
12 tissue properties and none of these tissue properties are disclosed at all in
13 any of the prior art. And with that I'll reserve the rest of my time. Thank
14 you very much.

15 JUDGE RAEVSKY: Thank you, counsel. You have six
16 minutes remaining.

17 MR. HARMER: Thank you, Your Honor.

18 JUDGE RAEVSKY: Okay. Ms. Freeman, you have eight
19 minutes for your rebuttal.

20 MS. FREEMAN: Thank you, Your Honor. First, I would like
21 to point out that Claim 11 requires an original color gradient to be a property
22 of the 3D data. So, the original 3D data has an existing color gradient, and
23 that is what is altered in the altering step. There is no dispute that, sorry, if
24 you go to slide 11 of our presentation, which I'm not going to bring up, I
25 would like to confirm that the patent itself relies on conventional medical
26 imaging systems and their ability to create 3D data for a patient. So the step,

1 the 3D data is not new. No one is arguing that the 3D data itself in fact
2 because they rely on the prior art for that. So as to once you have altered the
3 color gradient, displaying it as routine, let me step back to a second and say,
4 as Judge Quinn rightly pointed out, you cannot, unless there is an ambiguity
5 in the claims, you can't go to an expert for an unordinary meaning. And that
6 is exactly what Novarad seeks to do here.

7 Let's get into the specifics of that a little bit. If you go to
8 column 6, lines 11 to 13, the one place in the '271 Patent where navigation is
9 mentioned, the sentence begins in some embodiments. So the sentence itself
10 indicates that not all embodiments would necessarily have that function, and
11 Novarad is leveraging this possibility which is not recited in any of their
12 claims to try and read new things into their claims. That is improper. Like
13 the '271 Patent, Doo discloses an improvement on conventional visualization
14 of conventional medical imaging, and Doo discloses that the reduction of
15 cognitive load is a valid reason to take conventional imaging, which may
16 have been displayed on a computer screen, and instead overlay it on the
17 patient. Novarad relies on reference to oblique slices as a rationale for direct
18 volume rendering, but there's nothing and they themselves never argue that
19 conventional medical imaging never includes oblique slices. There are some
20 traditional axes that are used, but those are not always used in medical
21 imaging. So the reference to oblique slices doesn't lend the meaning that
22 Novarad seeks to gain from it. Additionally, Novarad relies on the existence
23 of curved slices to justify their effort to read in direct volume rendering and
24 3D in a lot of places. At the same time, where they say if it's curved, it has
25 to be 3D. At the same time, Doo discloses something that is curved and
26 Novarad inconsistently argues that it can be curved, but of course it's not 3D.

1 It either is --

2 JUDGE RAEVSKY: I'm sorry, I'd like to jump in on that point
3 because as I understood it, I think Patent Owner's counsel's point was that
4 the specification mentions that those curved slices could have width and
5 depth. However, Patent Owner also argued that in Doo, however, there
6 doesn't appear to be depth. In other words, it's like a piece of paper that
7 when curved, it doesn't change, it doesn't create depth, ignoring the thickness
8 of the paper for this example. What's your response to that argument?

9 MS. FREEMAN: Just a moment, Your Honor. Trying to go,
10 hold on a minute. I'm going to go to slide 24. All right. I'd just like to point
11 out, this is on slide 24, that Novarad is talking about repositioning slices and
12 that is discussed as option 7 under possible things that the virtual user face
13 114 can do. And that's different in the possible -- what can the virtual user
14 interface 114 can do than displaying different slices. So repositioning slices
15 is not the same according to the Patent as displaying different slices. But
16 moving on let's go to slide 25. The examples of the displaying step which
17 are steps 612 in the Patent that's displaying one of the inner layers of the
18 patient from the 3D data projected onto the real-time views of the outer layer
19 of the patient. They have a few examples. These are in column 13, lines 11
20 to 34. The first example is AR headset 108 displaying bones 106B. And if
21 you flip ahead --

22 JUDGE RAEVSKY: I apologize, counselor. I feel like I asked
23 a question that was poorly focused. I'd like to focus more on the teachings
24 of Doo than the teachings of the Patent. So I apologize for leading you
25 down the wrong path. Let me ask a slightly different question. So how
26 precisely is the image in Figures 7 and 9 of Doo, how does that constitute a

1 volume?

2 MS. FREEMAN: A curve, well, only a plane is two-
3 dimensional. Once you curve a plane, it becomes three-dimensional. And
4 Novarad has taken the position in their sur-reply that a 3D -- sorry, let me
5 just go see if I can find that. A 3D shape has volume. And I don't think
6 there's any reasonable argument that a curved plane is not a 3D shape.

7 JUDGE RAEVSKY: How would you define volume in the
8 context of the claims?

9 MS. FREEMAN: Well, I haven't been called upon to do that,
10 Your Honor. A volume, well, the virtual 3D shape has a volume, so I guess
11 the simplest form would be I think box 116, which is just an empty box. It
12 has height, width, and depth, but not necessarily any content.

13 JUDGE RAEVSKY: So does the plane, when it's curved, how
14 does the plane have height, width, and depth in Doo?

15 MS. FREEMAN: Well okay. If you take a plane and you
16 curve it, then there is a distance between the closer sides and that defines
17 another boundary.

18 JUDGE RAEVSKY: Okay. So, and then your alternative
19 argument is based on Figures 6 and 11 for the combined limitation. What
20 constitutes the volume in Figures 6 and 11?

21 MS. FREEMAN: So, in Figure 6 there's different volumes that
22 could be existing. None are clearly displayed in Figure 6. But in order to
23 register the heart with the patient, you would have to have some kind of
24 alignment of where the heart exists in the data with where it exists in the
25 virtual patient with where it exists in the actual patient. And as Dr.
26 Kazanzides said, there's a virtual -- a bounding box is like the default. It is

1 the boundaries of the data that are possessed. So the normal way to align
2 this would be to match up the outer components of the skin with the data on
3 the outer components of the skin. But I agree, it's not shown in Figure 6.
4 I'm sorry, what were your other questions there?

5 JUDGE RAEVSKY: When you say it is not shown in Figure 6,
6 are you saying that a volume is not shown, a boundary is not shown, or
7 both?

8 MS. FREEMAN: A virtual 3D shape apart from the heart, and
9 the lines coming off of the goggles is not separately shown. I would like
10 to --

11 JUDGE RAEVSKY: Is a volume shown in Figure 6?

12 MS. FREEMAN: On paragraph 74 of Doo it says Figure C
13 illustrates the application of a second three-dimensional modality,
14 holographic 3D, in which three-dimensional tomography or other suitable
15 form data can be used to create a feature-specific three-dimensional view.
16 So, this presumes that the 3D data is used to create the heart.

17 JUDGE RAEVSKY: So, the 3D data is used to create the
18 heart. I just really want to get at the heart of what you said is not shown in
19 Figure 6. Is a volume shown in Figure 6?

20 MS. FREEMAN: A volume is shown. The heart has a volume.
21 The patient has a volume. There are different volumes.

22 JUDGE RAEVSKY: Is a boundary shown?

23 MS. FREEMAN: In figure 6.

24 JUDGE RAEVSKY: Is there a boundary in figure 6?

25 MS. FREEMAN: There are boundaries shown. The outer layer
26 of the patient is certainly one boundary. The outer layer of the heart is

1 another boundary. And there's also the 1232 shows one boundary as it
2 would be projected to in the AR goggles. I would -- there seems to be some
3 lack of clarification in terms of how -- and how the AR goggles works. I'm
4 just going to direct the Board's attention to Figure 3 of Doo. And I'm not
5 claiming that this is unique to Doo, but what it shows is that --

6 JUDGE RAEVSKY: And please go ahead and make this your
7 last comment. I've taken you over your time, but we'll end with this
8 statement.

9 MS. FREEMAN: Thank you, Your Honor. What you can see
10 from the AR goggles in Figure 3 of Doo is how AR goggles are generally
11 used to take a 3D view that may exist in the prior art and to display it to a
12 surgeon in AR goggles. Those are -- there's two different displays, they're
13 slightly different, and the distinction between the two different displays are
14 perceived to the user's mind as a 3D shape in real space. Thank you, Your
15 Honors.

16 JUDGE RAEVSKY: Thank you so much. All right. Due to
17 my questioning, I took you four minutes over your time. I appreciate the
18 responses to the questions. Patent Owner, you had six minutes, but I'll add
19 four minutes to be fair. So you have 10 minutes remaining for rebuttal.

20 MR. HARMER: Thank you, Your Honor. Don't anticipate that
21 that will be necessary. But in response to the Board's question, that 3D data
22 is DVR is discussed in Patent Owner's response on pages 12 through 14.
23 And in that section, Patent Owner cites paragraphs 59 through 62 of
24 Mulumudi's declaration. And there, Dr. Mulumudi explains that 3D data is
25 direct volume rendered. I'm sorry, I think I said DVR before, I meant direct
26 volume rendered. In the preceding paragraphs in Dr. Mulumudi's

1 declaration, paragraphs 54 through 58, Dr. Mulumudi explains what DVR is.
2 It's in response to the Board's question about what is DVR.

3 Whether the Board accepts Patent Owner's construction of 3D
4 data as direct volume rendering, Petitioner has still not met its burden
5 because nowhere in the prior art is a virtual 3D shape disclosed. Nowhere in
6 Doo or Chen is a virtual 3D shape disclosed. Those are the only pieces of
7 prior art that disclose augmented reality at all. And the boxes that Petitioner
8 wishes to combine in the computer software in Amira and 3D slicer are not
9 virtual. They're just boxes. They're not configured to be controlled to
10 reposition slices while 3D data is projected onto a patient in an augmented
11 reality environment.

12 JUDGE RAEVSKY: Counsel, can you address the disclosure
13 in Doo that the Petition points to about, I believe it's Figure 6, but it might be
14 Figure 11, where it's referring to a fusion of several tomographic slices that
15 can be stitched together to create a 3D image. How is the image in Figure 6
16 not a 3D shape?

17 MR. HARMER: Yes, Your Honor. One moment, please. All
18 right. Can everyone see? I had a brief hiccup there for a moment. So I'm
19 going to look at Figure 11 first, quickly. This is the explanation from Doo
20 where Doo explains that it can show a sequence of tomographic slices
21 sequentially. It's fly-by 3D, I think is how it's termed there. And then if we
22 look at Figure 6, which is on slide 9, the heart, 332, Dr. Mulumudi explained
23 that that is a 3D model like the pelvis and the bladder and shin, that it was
24 generated using CT or tomographic slices that have been stitched together,
25 but it's not a direct volume rendered image. It doesn't include an outer layer
26 of the patient and multiple inner layers of the patient. Contrary to

1 Petitioner's argument, the outer layer of the patient in Figure 6 is not
2 projected in augmented reality environment in Doo. It just shows the outer
3 layer of the actual patient.

4 JUDGE RAEVSKY: So you gave a lot of explanation as to
5 why Figures 7 and 9 don't show a volume. How about this heart here? Why
6 is there no volume here, and why is the projected -- why is there no
7 projected layer confined within a volume?

8 MR. HARMER: So it projects a -- well I'm not going to say
9 that. According to -- assuming Petitioner's correction that the heart is 3D
10 data. So, if that were true, then Figure 6 discloses a 3D model of a heart that
11 constitutes 3D data. But it does not disclose a separate virtual 3D shape that
12 is separate and apart from the 3D image. It doesn't disclose that at all. And
13 so there is no virtual 3D shape confining the heart. There's no virtual 3D
14 shape that's configured to be controlled or that's configured to be controlled
15 to reposition slices of the heart or anything like that.

16 JUDGE RAEVSKY: Isn't the image shown, doesn't it have a
17 boundary? The heart, doesn't it have a boundary that confines the image
18 within it?

19 MR. HARMER: It's a model of -- Patent Owner's position is
20 that it's a surface model of a heart, that it's a feature-specific surface model
21 that was generated from stitching tomographic slices together. And so the
22 isosurfaces, the surface of the model has a boundary like all models. It
23 would be very similar to Chen. Just, I mean, it's a model. So just like Chen
24 shows a model of the pelvis and a model of the bladder, but it doesn't.
25 Neither Chen nor Doo show a virtual 3D shape that confines this data when
26 it's projected in an augmented reality environment. It can't be used by a user

1 in an augmented reality environment to control what slices are shown. It's
2 not a frame of reference. There's none of that functionality is closed in Doo
3 or Chen.

4 JUDGE RAEVSKY: And please correct me if I'm wrong. Is it
5 correct my understanding that your argument for this confined within a 3D
6 shape limitation for Figure 6 depends solely on your claim construction? Is
7 that correct?

8 MR. HARMER: I apologize, Your Honor. I don't think I
9 understand your question. Would you mind asking me one more time?

10 JUDGE RAEVSKY: So do you have any argument apart from
11 the 3D data requiring direct volume rendering for why this figure in the
12 associated disclosure in Doo does not disclose a confined within a 3D
13 volume or a 3D shape limitation?

14 MR. HARMER: Yes. Even if the heart model in Doo satisfies
15 the 3D data requirement of Claim 1, Doo does not show or disclose a virtual
16 3D shape that confines the heart model, separate and apart from the heart
17 model itself.

18 JUDGE RAEVSKY: Okay. So, your argument is there needs
19 to be like some box or some other shape that surrounds the heart model and
20 that's not there.

21 MR. HARMER: Correct. It doesn't have to be a box, some
22 shape.

23 JUDGE RAEVSKY: Some shape. Thank you.

24 MR. HARMER: Patent Owner has nothing further, Your
25 Honors, unless you have additional questions.

26 JUDGE QUINN: No questions from me.

1 JUDGE RAEVSKY: Okay. Thank you, counsel.

2 MR. HARMER: Thank you.

3 JUDGE RAEVSKY: We will take a short break of 10 minutes
4 and then we will return to discuss the '045 case. Thank you for your
5 participation.

6 (Whereupon the above-entitled matter went off the record at
7 2:42 p.m. and resumed at 2:52 p.m.)

8 JUDGE RAEVSKY: I'd just like to make sure we have, it
9 looks like we have both Petitioner and Patent Owner counsel.

10 MR. BELT: Yes, Your Honor. Petitioner here.

11 MR. HARMER: Patent Owner is here as well.

12 JUDGE RAEVSKY: And do we have the court reporter?
13 Thank you. Do we also have the court reporter on the line?

14 COURT REPORTER: Yes, you do, Judge. I'm here.

15 JUDGE RAEVSKY: Thank you. Okay. As I mentioned
16 earlier, each side will have 45 minutes again to argue its case. Petitioner,
17 would you like to reserve time for rebuttal?

18 MR. BELT: Yes, please. I'll start with 30 minutes for my
19 initial presentation and 15 minutes for rebuttal, please.

20 JUDGE RAEVSKY: Okay. You may begin when you're
21 ready.

22 MR. BELT: All right. Thank you, Your Honors. Again, for
23 the record, I'm Erik Belt representing the Petitioner Medivis. And thank you
24 for hearing us today. I want to -- I was going to talk about why Dr.
25 Mulumudi doesn't qualify as a POSA, but I take it from the discussion we
26 had with respect to the first IPR, it's probably something you will take on the

1 papers. So, unless you had specific questions about the argument with in
2 with respect to the '807 Patent, the IPR -00045, I'll probably pass on that,
3 other than to know we don't have the issue of Rosenberg helping out Dr.
4 Mulumudi.

5 So I did want to start with in that case with the claim
6 construction because I think if you take away Patent Owner's claim
7 construction, really all of their arguments against Jones and Doo really fall
8 apart and really maybe 90 percent of their arguments go away. So I won't
9 get into that. But before I start with the claim construction, Your Honors, I
10 did want to just reserve, just note for the record, my objection to the rulings
11 about slide 60 and 62 to 76.

12 And the basis for that, Your Honors, is that I think it's a
13 misconception that we were instituting new arguments in those slides, and
14 that is absolutely not the case. In pages 16 to 25 of our Petition, we talked
15 very extensively about the prior art and what a person of ordinary skill in the
16 art would know, what the knowledge was in the art. And in that section,
17 pages 16 to 25, and as cited in corresponding sites to Professor Kazanzides'
18 declaration at, I think, paragraphs 37 to 55, he talks about all of those
19 references and the Petition talks about all of those other references, Amira,
20 and Casas and Azimi and 3D visualization and so forth. And when you get
21 to the sections -- the section on Doo plus the knowledge in the art, we very,
22 very clearly say we are incorporating by reference that discussion, pages 16
23 to 25 of the knowledge of the art. Those references are only the evidence of
24 what someone of ordinary skill in the art would have known in the art. So in
25 other words, we're not just saying, oh Professor Kazanzides knew all this
26 stuff.

1 We're actually giving you specific evidence supporting what
2 one of ordinary skill in the art would know. And so we weren't relying on
3 new grounds like Jones plus Amira, Jones plus Casas, it was all the -- and I
4 never intended to use those slides to argue otherwise. But I will note that in
5 our reply brief that I think it's at page 23, when we're talking about what the
6 knowledge of the art was with respect to direct volume rendering, on page
7 23 of our reply brief, we do specifically quote Amira and the section on
8 direct volume rendering, which of course was also quoted in the Petition. So
9 that's all I'll say on that subject, Your Honor, just to preserve my rights there.
10 And I'll go by the --

11 JUDGE ZECHER: Mr. Belt, this is Judge Zecher. I'd love just
12 to push back a little bit. I mean, you're talking about nine pages of your
13 Petition that you incorporate by reference. And then I guess you're
14 expecting us, as well as Patent Owner, to understand what specific portions
15 of the prior art you're relying on for general background knowledge to
16 incorporate by reference in one statement that's made later on in your
17 Petition? I mean, that's not very clear. You are leaving it very open-ended
18 and you can see the problem here, right? You can go all sorts of different
19 directions with that. And that's why we're trying to limit you to explicitly
20 what you said. Now, if you wanted to call out something very specific and
21 reiterate it down below and tell us that's what you're combining, that would
22 have been helpful. We wouldn't have this issue. But that's not what you
23 did.

24 MR. BELT: Well, I would disagree with that, Your Honor.
25 Because we very specifically -- it's not just that we said there's Casas, there's
26 Amira. We very specifically in pages 16 to 25 called out the specific

1 sections of those references that we're relying on, Your Honor. And then
2 when we get to our, for example, in our reply brief, we did, as one example
3 specifically call out Amira in response to the Patent Owner's argument about
4 3D and DVR.

5 JUDGE ZECHER: Right, but you're putting parties and us on
6 notice at the Petition stage. We can't wait until the Reply for you to clarify
7 this when it's so open-ended. I mean, how is that fair?

8 MR. BELT: Well, it's fair because as I understand it, we are
9 allowed to incorporate by reference arguments that were made earlier in the
10 same brief. Now we're not referencing a different paper, which I understand
11 would not be appropriate. So that was the reason for that, Your Honor.
12 And really, you know, when I was first making my slides, I thought, well,
13 why don't I just do a section in the beginning where we talk about the
14 knowledge and the art just the way we do in our Petition? That's kind of the
15 way I had originally arranged my slides. But then I thought it's kind of all
16 part of the same argument. So that was really the issue there. And I think,
17 Judge Quinn, you were going to ask me a question?

18 JUDGE QUINN: I was just going to say that demonstratives
19 are not evidence anyway. So we have all the evidence and arguments
20 presented in the briefs. So this is just an issue of not having surprises here.
21 So can we just move on? And if you need to address that ground, if you
22 have questions, we can get to them. There are other issues that are more
23 important.

24 MR. BELT: No, no, no. I think I just want to make sure I
25 preserved it for the record in case there's an appeal, Your Honor. And it was
26 really the arguments that were made. So, as I mentioned to you, I think I'll

1 move on from, given the time allotment here, from the arguments about why
2 Dr. Mulumudi isn't qualified. Not only isn't he qualified, but his testimony
3 really shouldn't be given any weight. But I'll rely on the papers for that.

4 And I'll go straight to the claim construction arguments.

5 So let's go, Your Honors, to slide 14. Oh, I need to show you
6 on the share screen. All right. Is my -- did the --

7 JUDGE RAEVSKY: We can see your slides.

8 MR. BELT: Oh, okay. You can see my slides. Thank you.

9 So, if you look at slide 14, Your Honor, the first claim construction issue
10 with respect to the '807 Patent is the definition of acquired medical image.
11 And Medivis's construction is, you know, very simply the plain meaning, we
12 think, which is taken almost directly and verbatim from the specification,
13 which is the acquired medical image could include MRI, fluoroscopy,
14 mammography, CT scans, x-rays, and all the kinds of medical imaging that
15 you would think about. And it's not limited to, say, 3D or direct volume
16 rendered. And of course, as we know from the arguments earlier with
17 respect to the '271 Patent, Novarad has tried to read into the Patent this
18 concept of 3D direct volume rendered medical image. And I'm not very
19 clear on what they really mean by direct volume rendered, and I'm still not
20 very clear on it, even after Mr. Harmer's explanation earlier today. But I
21 think what they're saying, at least in the papers with respect to the '807
22 Patent, Your Honors, is that direct volume rendered requires some sort of
23 non-feature specific, unsegmented image of the entire volume of the patient
24 anatomy. All right.

25 So let me tell you why I think that's wrong. So if we go to 15
26 here, let's take a look at what the '807 Patent actually says. First of all,

1 you're never going to see the words direct volume rendered or DVR or
2 anything like it in the specification of the '807 Patent, nor do I recall seeing
3 it in the prosecution history. What you do see is these acquired medical
4 images.

5 Again, this is on slide 15, and I'm quoting from the '807 Patent
6 at column 2, lines 32, it says 26 but it should be 36. These acquired medical
7 images may be MRI, magnetic resonance imaging, fluoroscopy, CT, which
8 is computer tomography, sonography, nuclear medicine, computer-generated
9 images, CGI, photos, videos, and so forth and so on. And then you have
10 other examples throughout the Patent, for example, at column 5, lines 16 to
11 27, again saying the acquired medical image can be, you know, all these
12 different kinds of radiological images, x-rays and CT scans, ultrasound and
13 so forth. So that's where we're getting our definition. And nowhere in these
14 sections of the specification do you see anything about DVR, or even that it
15 has to be a 3D image.

16 So going on to slide 16, there are some more references to the
17 kinds of medical imaging that you can have. So it's sort of this very broad
18 definition of medical imaging. The acquired medical image can be sort of
19 basically any sort of radiological image. And so if you go to slide 17, Your
20 Honors, as we know, Novarad has argued that the acquired medical image
21 cannot comprise only a single 2D layer, such as a conventional X-ray or
22 MRI scan.

23 That's from a quote from the Patent Owner's response at 10.
24 POR is our abbreviation for Patent Owner Response. And they're also
25 arguing that CT and MRI images are unequivocally not 3D direct volume
26 renderings. But as we saw in those sections that I quoted from the from the

1 specification of the '807 Patent, the acquired medical image may be an MRI
2 or CT image as just one example. And, you know, and so forth. So the
3 specification would seem to -- Novarad's definition would seem to conflict
4 with everything that's very expressed in the specification of the '807 Patent.
5 And in slide 18 here we have some examples. So figures 2C and 2D depict
6 two-dimensional, i.e., cross-sectional views in one plane. And so for
7 example 210, I'm sorry, Figure 2C on the left, I believe that's showing a
8 medical image displayed in the sagittal plane, and I think that 2D is showing
9 an image in the transverse plane.

10 I think I have those terminology right. And those are 2D
11 images, as explained in the specification's discussion of these images. So,
12 you know, there's nothing really requiring DVR. Certainly, those words
13 aren't in the specs. They're not in the claim wording, certainly. And I think
14 that Novarad and Dr. Mulumudi, I think they relied on one particular image,
15 but, you know, everywhere in the specification, the specification says it may
16 include this, it may include that. May, may, may, may is all throughout the
17 specification, and as you know when it comes to claim construction, when
18 the specification says that a certain embodiment may, you know, that the
19 claims may include a certain embodiment, that's not required. It's just an
20 option. It's one embodiment that the claims may cover but they're not
21 required to cover. And when you look at, for example, in slide 19, Your
22 Honors, when you look at Figure 1G, 1G illustrates an acquired medical
23 image, I'm quoting here, Figure 1G illustrates the acquired medical image
24 that depicts a bowel structure and bone structure of the patient. And that's at
25 '807 Patent, column 5, lines 63 to 66. Now, why did I cite that? I cited that
26 and I'm showing you that because if Novarad is saying that a DVR means a

1 non-feature specific unsegmented image of the entire volume of the patient
2 anatomy, 1G is now showing that. 1G is showing a feature specific
3 segmented version of just a portion of the anatomy. And it doesn't include,
4 for example, in this image, the lungs, which you would expect to see in the
5 image. It doesn't show the circulatory structures, et cetera. So I think when
6 you have all of these examples in the Patent that conflict with Novarad's
7 definition, I think you have to be suspicious of Novarad's definition. I can
8 skip.

9 JUDGE RAEVSKY: Counselor, I think we've heard a lot about
10 this type of argument today and I apologize for stealing your thunder. One
11 of the main differences that I see in the claim here, claim 1 here and the
12 claims in the earlier patent discussed today is the concept of an
13 augmentation tag. So it'd be interesting to hear your opinion on what that
14 means and how that applies to the art.

15 MR. BELT: Absolutely, Your Honor. Let me go to slide 25
16 where I discuss augmentation tags. So Medivis's construction is any
17 annotation, mark selection, extraction or highlighting associated with the
18 location and acquired medical image. So basically what an augmentation
19 tag is, it's something sort of like a marker or something to highlight a
20 particular anatomical feature. And Novarad's construction is that the
21 augmentation portion of the 3D medical image that identifies the 3D
22 anatomical structure within the 3D medical image.

23 So basically, they're reading in this 3D requirement into
24 augmentation tag. That's the way that I understood it. And their definition
25 would necessarily exclude an outline. And in fact, if you recall, Dr.
26 Mulumudi, in his deposition said that an augmentation tag can't be an

1 outline. Well, first of all, let's take a look at Figure, I think this is 1A, this is
2 slide 26, and citing the 807 Patent at column 3, lines 43 to 46. Quote, the
3 augmentation tag may be a simple geometric shape. All right. You know,
4 circle, square, whatever, and you kind of see that if you look at in this image
5 of, and I'm sorry, I'm pointing to, which you can't see, when you look in
6 slide 28, there's an element 118 that appears to be sort of a circle around a
7 particular point on the ankle of the patient, 116, I think it is. And I think,
8 you know, circle, that's a simple geometric shape. It appears to be one
9 dimensional. And it says, such as a circle, a square, a triangle, or another
10 more complex shape.

11 And then here's the kicker, Your Honors. In two dimensions or
12 three dimensions, such as an outline of the anatomy in question. I mean, to
13 me, that sort of is the argument in a nutshell why you don't read this 3D
14 requirement or DVR rendered requirement into the claims, because you have
15 very clearly the Patent telling you, here's what we mean by augmentation
16 tag. It's something that can be used to outline or identify a particular
17 anatomical feature within, you know, the image that's projected onto the
18 patient.

19 And here's some examples. So if you look at slide 27, Your
20 Honor, we have Figure 2A. And Figure 2A, according to the Patent at
21 column 6, lines 21 to 24 in slide 27, Figure 2A illustrates an augmentation
22 tag 210 and an acquired medical image 212 used as an overlay within an AR
23 headset for an appendix related medical procedure. Now, those appear to be,
24 at least in my poor vision of it, 2D overlays. It doesn't appear to be any sort
25 of 3D imagery there. And, of course, relying on these exact figures and
26 those exact portions of the specification that I just called out in the previous

1 slides, Professor Kazanzides says, okay, here's what the definition of an
2 augmentation tag is, which is the one that I read you earlier.

3 And there's some other interesting passages from the
4 specification that I'd like to call to your attention. So for example, at column
5 12, lines 42 to 44, this augmentation tag may represent an anatomical
6 structure, a point where an incision may be made, or other mappings and
7 markings for the medical procedure. So that would also be a perfectly fine
8 definition of an augmentation tag. But, you know, we sort of have this sort
9 of broad definition that includes these things. And in fact, --

10 JUDGE RAEVSKY: I wonder, counsel, if it might be too
11 broad to say that an augmentation tag covers a point where an incision may
12 be made or other mappings and markings for the medical procedure. Of
13 course, it's listed there in the specification as you note. But doesn't the claim
14 require it to identify at least one anatomical structure?

15 MR. BELT: Well, sure. A, well, very specifically, the Patent
16 itself, the inventors are saying, here's what we mean by an augmentation tag,
17 Your Honor. An anatomical -- that may represent an anatomical structure
18 such as a point of incision. Now, an incision or a point is identifying the
19 anatomical structure because it's showing the surgeon, here's where to cut.
20 And, you know, ID is a separate requirement of the claim. So, in other
21 words, you can't read in the identification requirement into augmentation
22 tag. If I can go back to, I'll show you what the claim language here is.

23 JUDGE RAEVSKY: Why don't you go ahead and stay on that
24 slide because I have the claim language in front of me.

25 MR. BELT: Oh, okay.

26 JUDGE RAEVSKY: Let's have you -- you read the words such

1 as, if you go back to the slide, you read the words “such as” a point, “in
2 other words” a point, and I don't see them there. So is it that the
3 augmentation tag may represent an anatomical structure or a point, or does it
4 mean such as a point?

5 MR. BELT: Oh, I mean, yes, the words such as are not in this
6 passage, but that's the way I would read the disjunctive or. You're giving
7 some examples.

8 JUDGE RAEVSKY: So in your view, a point where an
9 incision may be made identifies at least one anatomical structure?

10 MR. BELT: Yeah. Yes, Your Honor.

11 JUDGE RAEVSKY: How does that identify an anatomical
12 structure?

13 MR. BELT: Because it's showing you -- and I actually may
14 have a slide on that if you give me a second, Your Honor.

15 JUDGE RAEVSKY: Sure.

16 MR. BELT: I know I have a slide on this and if I can't find it, I
17 will find it as we were talking. So just in the interest of time, Your Honor, if
18 you don't mind, I will come back to that as soon as I find it.

19 JUDGE QUINN: And so my question for you on this is if it
20 piques your memory as to where this is. When I read that sentence, it meant
21 for me that those are alternative embodiments of an augmentation tag, that it
22 could be an anatomical structure as one embodiment of it, a point where an
23 incision may be made as another embodiment of it, but the claims only went
24 to the embodiment of the anatomical structure tag.

25 MR. BELT: Right. So, the augmentation tag is, and this is of
26 course, a separate requirement, identifying at least one anatomical structure

1 of the acquired medical image found at that location. The reason that I think
2 that a point where an incision may be made is identifying the anatomical
3 structure is because it's telling the surgeon, it's pointing to here's where you
4 need to make your incision and that's where the anatomical structure of
5 interest is.

6 JUDGE RAEVSKY: And, counsel, I've also been looking in
7 your briefing, the pages that you cited in the Petition and Reply. I don't see a
8 discussion of this quote. So I'm wondering if this is a new argument.

9 MR. BELT: No, no. I -- and apologize if it is, but I remember
10 very specifically, aware of the Board's, you know, requirement to only talk
11 about things that are in our papers. I remember going very specifically
12 through our papers to find that. So it was either in our Reply at 13 or 16.
13 Let me see if I can find it, Your Honor.

14 JUDGE RAEVSKY: And, of course, you can take that offline
15 if you need to and let us know on the sur-rebuttal, or on your rebuttal rather.

16 MR. BELT: Sure. I can come back on my rebuttal, but I do
17 remember quoting very specifically that particular thing. And I'll come back
18 to that, Your Honor.

19 JUDGE RAEVSKY: Thank you.

20 MR. BELT: All right. So, all right. So, where was I? So, let's
21 do some claim differentiation here. Claim 4. So, Claim 1 just requires an
22 augmentation tag. And Claim 4 recites creating a plurality of two-
23 dimensional 2D augmentation tags, each located on one of a plurality of
24 layers of the acquired medical image. So that would indicate that the
25 augmentation tag can be 2D, it does not need to be 3D. And that was, again,
26 sort of contradicting Novarad's argument there.

1 And finally, I'd like to point to Figure 1E and we cite to this
2 passage from the '807 Patent, column 5, lines 34 to 44, and this is at slide 29.
3 Figure 1E illustrates a two-dimensional 2D augmentation tag for a kidney.
4 And, again, it's a 2D augmentation tag. I highlighted this. And this in slide
5 30 is so that you can see it, there's Figure 1E. So I'll go back to this slide.
6 So the augmentation tag is 172, element 172, and you'll see the line to the
7 sort of boundary or outline around the kidney that 172 is pointing to. So that
8 would be a good example of that, Your Honor. So that would be our
9 arguments about the augmentation tag unless you have another question.
10 And would you like me to go then to the one-layer issue or do you think that
11 the Board has a handle on that?

12 JUDGE RAEVSKY: I'll just first note that you have just a hair
13 over three minutes remaining in your initial time.

14 MR. BELT: Okay. Well, then I wanted to go.

15 JUDGE RAEVSKY: You can use it on that, of course.

16 MR. BELT: And I'm pretty happy then, Your Honor, with our
17 discussion of the claim construction.

18 JUDGE ZECHER: Mr. Belt, this is Judge Zecher. Just so it is
19 clear, I know you didn't hit the one-layer issue, but I think the theme is you
20 don't want us to read 3D into the construction. Is that correct?

21 MR. BELT: That's very exactly right, Your Honor.

22 JUDGE ZECHER: Okay. Thank you.

23 JUDGE QUINN: What about the issue of the outline? So you
24 believe it could be an outline?

25 MR. BELT: Absolutely, Your Honor. Not only do I believe it,
26 the Patent says it. With my time remaining, I'd like to go to Jones. I know

1 that the court extensively, I mean the Board extensively discussed Doo in the
2 institution decision. So we have your views on Doo, but I do want to
3 discuss Jones with my remaining time. If we go to slide 32, Your Honors.
4 So, Jones --

5 JUDGE QUINN: Mr. Belt, if you have an argument about Doo
6 that you want us to consider, you can raise it too, --

7 MR. BELT: Yeah.

8 JUDGE QUINN: -- because we can change our minds from
9 what was our position on it.

10 MR. BELT: You certainly can. And I'm not quite sure that I'll
11 have time to get it. I guess the one thing I would say about Doo, Your
12 Honor, is I think Doo calls out treatment guide, going from memory here,
13 1232, that's the element. And treatment guide 1232 is what we say an
14 augmentation tag is. And when you look at treatment guide and the
15 discussion about treatment guide 1232, within the Patent it calls it out as
16 being it could be like an outline, it could be an incision point. It could be
17 notes or a marking of any sort to identify, you know, a particular anatomical
18 structure. So I think that's the main point I want to get across on Doo, and I
19 won't bother going to the slides on that.

20 JUDGE RAEVSKY: I apologize. I'd actually like to go just a
21 bit further on that.

22 MR. BELT: Sure.

23 JUDGE RAEVSKY: For the benefit of my colleagues, if you
24 have a slide with Figure 6 of Doo, would you mind pulling that up?

25 MR. BELT: I am almost certain that I have a slide of Doo.
26 Here's Figure 6.

1 JUDGE RAEVSKY: Excellent. And so, --

2 MR. BELT: It's 105.

3 JUDGE RAEVSKY: -- if I remember correctly, it's a little
4 small, but the item 1232, which appears to be a dashed oval, is the treatment
5 guide. Is that correct?

6 MR. BELT: That is one example of a treatment guide, Your
7 Honor. Sure.

8 JUDGE RAEVSKY: Okay. And so the claim requires
9 retrieving an augmentation tag, the augmentation tag associated with the
10 location in one layer of the acquired medical image. How do you map Doo
11 to the one layer of the acquired medical image, whether it be through that
12 1232 treatment tag or some other item of Doo that you map to the treat -- the
13 augmentation tag?

14 MR. BELT: Yeah, let's look at slide 104, Your Honor. Slide
15 104, there's a passage here in Doo, paragraph 74 of Doo where it's saying
16 that as one example, the treatment guide 1232 represents a tumor boundary.
17 So that is very specifically showing an outline of the tumor, in other words,
18 the layer of the image that you're interested in.

19 JUDGE RAEVSKY: Is that the layer in the heart image next to
20 the oval treatment code?

21 MR. BELT: Yeah, I think that's what that is trying to show, is
22 that this is a -- it's trying to show the tumor on the heart that is on in this -- in
23 Figure 6. And of course it also says that the 1232 the treatment guide could
24 be guiding lines or annotations. So I think that I think that answers your
25 question, Your Honor.

26 JUDGE RAEVSKY: So we're at 31 minutes. Would you like

1 to continue and discuss Jones or would you like to reserve the remainder of
2 your time?

3 MR. BELT: Why don't I take three minutes to discuss Jones,
4 Your Honor, just to get a couple points across and then I'll reserve the
5 remaining ten minutes or whatever for rebuttal.

6 JUDGE RAEVSKY: Thank you.

7 MR. BELT: Thank you, Your Honor. I appreciate that. So I
8 think Jones is a really good example of everything that is going on in the
9 '807 Patent. So going back to slide 32, Your Honors, here is Jones. I
10 particularly like this figure in slide 32, which is Figure 13 for personal
11 reasons, because just in December I had my hip replaced. So I can sort of
12 sympathize with this figure. But it's really showing everything that is in the
13 '807 Patent, which is you have a surgeon wearing a head-mounted display
14 that is superimposing a real image onto the patient. It is taking this image
15 from medical imaging as the accompanying description of Figure 13 that I
16 cite over on the right of slide 32 shows. It is, and as I can discuss it is
17 showing an augmentation tag. That seems to be the issue that the court
18 really -- the Board really wants to hear.

19 So let's talk about the augmentation tag in Jones. And if I
20 have -- what do I have, maybe a minute left? So let's go to step I think it's
21 Step D, retrieving an augmentation tag. So we have Figure 18 as an
22 example, and really Figures 18 through 23 kind of belong together because
23 they're showing pulled out versions of really the same image as the way that
24 I read it. But you have figure 18 that shows a virtual trajectory of a drill bit
25 1310 extending from a drill or other surgical tool into a patient's anatomical
26 bone model 1302. So that is pointing to and identifying it's some sort of

1 marker that is projected onto the medical image that is identifying a
2 particular point, and then all of that is overlaid onto the patient so that the
3 surgeon is seeing this graphical overlay onto the patient. So this is one
4 example. We have other examples that we cite in our papers certainly, and
5 of course it all comes together as a graphical overlay as we see in slide 45.

6 JUDGE RAEVSKY: I'd just like to note for the record that I
7 believe that's a new argument because although you quote Jones extensively,
8 I don't see anything in the Petition or the Reply or your declarant's testimony
9 that identifies anything as the augmentation tag. You're free to persuade me
10 otherwise.

11 MR. BELT: Yeah, no. I -- let me go back to this. So I think
12 we cited very specifically at pages 33 to 34, Your Honor, and then again in
13 the Reply at 19 to 21. I mean in every slide here, you'll see that I've cited in
14 the bottom where in the Petition I cite to those specific passages.

15 JUDGE RAEVSKY: Thank you. You have a little more than
16 10 minutes remaining for your rebuttal time.

17 MR. BELT: Yeah, I'll take that. Thank you, Your Honor. I
18 appreciate your giving me the extra time today.

19 JUDGE RAEVSKY: Thank you. Mr. Harmer, would you like
20 to reserve any time?

21 MR. HARMER: Yes, Your Honor. Five minutes, please.

22 JUDGE RAEVSKY: Thanks. So you have 40 minutes, and
23 you may begin when you're ready.

24 MR. HARMER: Okay. Thank you. All right. Thank you,
25 Your Honors. At the outset, I just want to note a couple of things. First, on
26 slide 19, Petitioner's slide 19, Figure 1G, counsel for Petitioner argued that

1 Figure 1G is not direct volume rendered. That is a wholly attorney
2 argument. There has been no expert testimony from Petitioner that that's the
3 case. Similarly, with regard to Figure 2A, counsel argued that Figure 2A is
4 two-dimensional. There's no expert testimony from Petitioner's expert,
5 Kazanzides that Figure 2A is two-dimensional. There is, however, expert
6 testimony on record from Dr. Mulumudi that Figure 2A is three-
7 dimensional.

8 JUDGE RAEVSKY: Counsel, we discussed earlier a claim in
9 the other patent that mentions three-dimensional explicitly, but I'll note that
10 this claim, Claim 1, does not mention 3D explicitly. That does appear in
11 Claim 2. So how is it that we are legally obligated to read three-dimensional
12 into this claim?

13 MR. HARMER: Yes --

14 JUDGE ZECHER: This is Judge Zecher. I'd like to add on to
15 that question, too. I think in the last case we talked about how the slices
16 may be kind of a hook for you to read in direct volume rendering. I don't see
17 that as well in this claim. So when you're answering my colleague's
18 question, if you could just hit on that as well.

19 MR. HARMER: Thank you, Your Honors. Those are great
20 questions and I'm happy to answer them. If we look at the claim language,
21 really quickly, see, retrieving an acquired medical image associated with the
22 patient anatomy from data storage. The acquired medical image comprising
23 imaging acquired of one or more anatomical structures out of a plurality of
24 anatomical layers of the patient anatomy. Dr. Mulumudi opined that this
25 means because it's a plurality of anatomical layers, one or more anatomical
26 structures, and also, if I go back, if you look at the next part, it says

1 associating the acquired medical image to align with the visible, viewable
2 portion of the patient anatomy captured by the visual image camera.

3 And I'm going to skip down. Wherein the plurality of layers are
4 aligned with the visual image of the patient anatomy. I mean, Dr. Mulumudi
5 opines that that's a 3D image. In addition to that, if we look at the dependent
6 claims, and I'm not going to turn to all of them right now, but each of the
7 dependent claims presume that the acquired medical image is three-
8 dimensional. It's in Claim 2, as Your Honors have noted, but it's also in the
9 other claims. And we've got --

10 JUDGE ZECHER: Mr. Harmer, doesn't it kind of hurt your
11 argument that it's in Claim 2, but it's not in Claim 1? Claim 2 being a
12 narrower dependent claim, Claim 1 being a broader claim?

13 MR. HARMER: With respect, Your Honor, I don't think it
14 hurts our argument that it's in the -- that the dependent claims presume a 3D
15 medical image. The claims are still narrower, but it's Patent Owner's
16 position that the acquired medical image in Claim 1 is also three-
17 dimensional.

18 JUDGE ZECHER: Well, I guess maybe I wasn't clear on my
19 point here. 3D does not appear anywhere in Claim 1, correct?

20 MR. HARMER: That is correct.

21 JUDGE ZECHER: Okay. It does appear in Claim 2, correct?

22 MR. HARMER: It does, yes.

23 JUDGE ZECHER: Okay. So, we know just by independent
24 versus dependent claims that independent claims are broader than their
25 dependent claims. Dependent claims need to further limit the independent
26 claim, correct?

1 MR. HARMER: Yes, sir.

2 JUDGE ZECHER: Okay. So, my point is, why do we need to
3 read 3D into Claim 1 when it explicitly calls for it in Claim 2? In other
4 words, Claim 1 can be broader.

5 MR. HARMER: Right, Your Honor. Let me just pull up Claim
6 2 just to make this easier. Claim 2 requires that the 3D tag is not, pardon
7 me, the 3D image is three-dimensional, but also that the tag conforms to the
8 three-dimensional structure in the acquired medical image. I mean, so that
9 further limits Claim 1, even if claim -- the medical image of Claim 1 is
10 constructed as three-dimensional.

11 JUDGE ZECHER: Yeah, I'm not disputing that it doesn't. It
12 certainly further limits it. My point is, we're trying to construe, of course,
13 acquired medical image here, whether or not it requires 3D direct volume
14 rendering. Why would that -- my point is that we see 3D here. It's not
15 actually in reference to the acquired medical image itself. It seems to be
16 referring it more to the tag. But my point is clearly whoever drafted this
17 claim knew what 3D meant because they put it in this dependent claim. So
18 why are we supposed to now read that into the acquired medical image of
19 independent Claim 1?

20 MR. HARMER: I'll explain that. Let me move on if that's
21 okay, Your Honor.

22 JUDGE ZECHER: You'll explain it or you're going to move
23 on?

24 MR. HARMER: No, I'm going to try to explain it.

25 JUDGE ZECHER: Okay. Okay.

26 MR. HARMER: I might not be able to convince you. If that be

1 the case, then I can't convince you and we'll move on. But Dr. Mulumudi,
2 considering the language of Claim 1, that it comprises imaging acquired of
3 one or more anatomical structures and a plurality of anatomical layers, that
4 those have to be aligned with the actual physical patient lying on the
5 operating table. In addition to the fact that the claim language, the
6 dependent claims require a 3D image, he concluded that the acquired
7 medical image of Claim 1 is three-dimensional. And in addition to that, he
8 concluded that it's direct volume rendered. I know we discussed that in the
9 '271 IPR, but this is a separate IPR, and I will address that just briefly.

10 There are many examples of direct volume rendered images in
11 the '807 Patent. One example is Figure 3B. The Patent explains that Figure
12 3B illustrates an acquired medical image that is overlaid on a patient's head.
13 Dr. Mulumudi saw that and said that's a direct volume rendered image.
14 Figure 1B, this is slide two, is another example of a direct volume rendered
15 image. Figure 1B, this is slide 2, is another example of a direct volume
16 rendered 3D image. It shows an augmentation tag, that's 170, identifying a
17 patient's spleen within the 3D image. And Figure 1B is pretty helpful, right?
18 Because the whole purpose of the '807 Patent is to identify anatomical
19 structure within the 3D medical image. And if you look throughout the
20 figures in the '807 Patent, you can see that the direct volume rendering
21 includes an outer layer of the patient, multiple inner layers of the patient,
22 multiple anatomical structures. And so it's beneficial to a physician to be
23 able to identify specific anatomical structures within that 3D medical image.

24 JUDGE RAEVSKY: Mr. Harmer, I'd like to clarify the
25 meaning of DVR again, if we could. I know we talked about it earlier, and if
26 I remember correctly, if I wrote down what you said correctly, I believe you

1 defined DVR to mean a volume rendering that is rendered directly from the
2 source data, such as from a CT scan, generating a volume from the whole
3 picture. Petitioner, on slide 14, believes that you've addressed it differently
4 in your briefing. They say direct volume rendered requires a non-feature
5 specific unsegmented image of the entire volume of the patient anatomy. Do
6 those definitions conflict? Do you agree with the definition that Petitioner is
7 ascribing to you?

8 MR. HARMER: I do not agree. I don't think it's the entire
9 volume of the patient anatomy from head to toe. But the viewable portion of
10 the patient anatomy that's being projected, a direct volume rendering does
11 include an outer layer of the patient, all the internal anatomy on the inside of
12 the patient. So to that extent, it's accurate. But it doesn't need to be an
13 image from the head of the patient to the toe of the patient.

14 JUDGE RAEVSKY: What does it mean when it says
15 unsegmented image?

16 MR. HARMER: So in order to create a 3D model, you take a
17 3D image and you have to segment it out, like you pull -- you identify
18 isosurfaces and you pull out and generate a model. That's a segmented
19 image. The '807 Patent does not discuss segmentation or generation of
20 models at all.

21 JUDGE RAEVSKY: So the plurality of layers are not
22 segmented?

23 MR. HARMER: The plurality of layers are not segmented. It's
24 a 3D image.

25 JUDGE RAEVSKY: Okay.

26 MR. HARMER: Unsegmented image. Let's see. The

1 dependent claims discuss various ways of identifying anatomical structure
2 within the acquired medical image. I'll get back to that later. Let's just
3 move to the prior art for now. Let's go to Jones. This is slide 10. Jones
4 does not anticipate any of the challenged claims because it does not disclose
5 a direct volume rendered medical image or a medical image at all actually.
6 And it does not identify anatomical structure within a medical image, or a
7 direct volume rendered medical image. If we look at this Figure 18 on slide
8 10, the 1300 is the patient site.

9 So this is not projected in augmented reality environment. This
10 is the patient's actual leg. What is projected onto the patient in Jones is this
11 bone model 1302, this rendered slice here, this is, what is it, 1320, and this
12 virtual drill trajectory 1312. All of these are models. None of them are an
13 image of the patient. None of them are a CT scan, an MRI scan, anything
14 like that. They are generated models. So if we look at slide 9, this is
15 Figures 16 and 17 from Jones. You'll see that they build this voxel model,
16 1110, that's on the far left, Figure 16 in the cylinder voxel model. That is
17 generated after selection of the relevant ISO surfaces, bone structure, outer
18 skin, organ, et cetera. That's the segmentation step.

19 And from this voxel model, we move to Figure 17, 1110. Jones
20 generates a slice using a slice builder and then projects it onto the patient.
21 So if we go back, everything that's projected in Jones, the bone model, the
22 slice, the drill trajectory, those are all models. None of them are images.
23 And Jones does not identify anatomical structure within a medical image at
24 all, let alone the requirements of the dependent claims. And it's important
25 to note too that in the '807 Patent, in the specification, it explicitly
26 differentiates between an image and a model. If you look at column 5, lines

1 27 through 23, and I'll just read it here. The acquired medical image and
2 rendered anatomy, bones, rendered bones, et cetera. Oh, no, let me just read
3 it. That's not, that's just a summary. So line 27, column 5.

4 In addition, the acquired medical images may include
5 completely virtual elements that have been graphically rendered in a virtual
6 3D space, and this is the important part, and added into the acquired medical
7 image. So that means that rendered tags, rendered anatomy, rendered
8 orthopedic hardware to be installed or other virtual renderings are different
9 than the acquired medical image. They're not the same.

10 I'll move to Doo quickly. Doo similarly does not anticipate any
11 of the challenged claims because it does not disclose a direct volume
12 rendered 3D medical image. Doo does not disclose identifying anatomical
13 structure within a 3D medical image. We've talked about, or Petitioner
14 talked about heart model 332. Dr. Mulumudi testified that that's a model,
15 that it's not a 3D image. And to the extent the tumor boundary identifies a
16 tumor on the model that's not augmenting a 3D medical image to identify
17 anatomical structure. To the extent it does that, it doesn't, it's not explicitly
18 disclosed in Doo.

19 JUDGE RAEVSKY: Doesn't Dr. Mulumudi's testimony
20 conflict with the teachings of Doo, which seem to explicitly teach that that
21 heart is a 3D image?

22 MR. HARMER: Doo -- not at all. Doo teaches that you can
23 generate a feature-specific part. They call it holographic 3D by stitching
24 together tomographic slices. Dr. Mulumudi's testimony that the result of
25 that is a model does not contradict what's disclosed in Doo.

26 JUDGE RAEVSKY: It's difficult to see the difference between

1 that and what the claim says. So there's a -- the claim refers to the acquired
2 medical image including this plurality of anatomical layers and Doo's heart
3 is an amalgam or fusion of several tomographic slices. What is -- I mean
4 what's the difference there?

5 MR. HARMER: Well, Dr. Mulumudi is -- opined that when
6 you put those together, you have a model of a heart. But there's no
7 disclosure in Doo, right, that you're identifying anatomical structure within
8 the heart, whether it's a model or whether it's an image. All right. It's not --
9 there's no disclosure in Doo that it's tagging anatomical structure within the
10 heart. Whether you want to define it as a 3D image or a 3D model or a
11 direct volume rendering. It's Dr. Mulumudi's understanding that it's a model
12 not a 3D image.

13 Let's look at these dependent claims quickly here. Slide 17, this
14 is Claim 2. So, in Claim 2 requires that the augmentation tag conforms to a
15 three-dimensional structure in the acquired medical image to identify an
16 anatomical structure. Jones and Doo do not do this. They don't identify
17 anatomical structure within the medical image and they certainly don't
18 conform to a 3D structure in the acquired medical image. If we look at
19 Claim 3, and this is similar to Claim 6, but this is where in a plurality of
20 augmentations are provided in a plurality of layers of the acquired medical
21 image and the plurality of augmentation tags are associated to form a tag
22 group to guide a surgeon. I'm going to show Claim 6 quickly just so we can
23 compare these together, and then I'm going to talk about them as they're
24 described in the specification.

25 So, just bear with me for one moment. Claim 6 says wherein
26 retrieving an augmentation tag further comprises retrieving a plurality of

1 augmentation tags that are linked together to show a surgical path of incision
2 through the patient's anatomy with respect to the one or more anatomical
3 structures at the plurality of layers of the acquired medical image. There's
4 two really good examples in the specification that teach about these two
5 claims, Claim 3, and Claim 6. If we look at column 4 of the specification
6 and beginning on line 3, I'm going to read. As a more specific example,
7 there may be a group of diseased anatomical structures that needs to be
8 operated on and these structures can be linked together in an ordered group
9 and the surgeon can be guided from one augmentation tag to the next. So
10 again, the augmentation tags are related to identifying anatomical structure.
11 This is akin to Claim 3.

12 Again, the plurality of augmentation tags and the plurality of
13 layers to guide a surgeon. Claim 6 is illustrated in the next example, and it
14 is line 13, column 4. In another example, the augmentation tags may guide a
15 surgeon through a safe path to avoid structures such as an artery which may
16 be delicate or cause problems if the structures are damaged. So in both
17 cases, in Claim 3 and Claim 6, the augmentation tags are importantly
18 identifying anatomical structure. This is not disclosed in Jones or Doo.
19 Claim 4 is creating a plurality of 2D augmentation tags and then joining
20 them together to create, in a plurality of layers, and then joining them
21 together to create a 3D augmentation tag. Jones and Doo do not disclose
22 this.

23 JUDGE ZECHER: Mr. Harmer, this is Judge Zecher. Go back
24 to Claim 4.

25 MR. HARMER: Yes, Your Honor.

26 JUDGE ZECHER: I guess I do have one question about this

1 claim, primarily because I understand you'd argue that augmentation tags
2 need to be 3D. Yet, this claim says they can be 2D.

3 MR. HARMER: Well -- sorry. I apologize.

4 JUDGE ZECHER: Well, I think what you're trying to do is
5 construe the augmentation tag in independent Claim 1 to be 3D. But how
6 would that work in the context of this claim?

7 MR. HARMER: Well, I mean, it's Patent Owner's position.
8 When we believe that the augmentation tag in Claim 1 is 3D. The Board can
9 accept that construction or not. But the way that 2D augmentation tags are
10 explained in the Patent, and specifically with Figure 1E as well, that
11 Petitioner showed you, is to identify it in 2D and then create a 3D
12 augmentation tag in the 3D image. If you go back and look at Figure 1E,
13 you'll see that it shows an augmentation tag around the anatomical structure,
14 but then it has an arrow to it, and it tells you the volume of that anatomical
15 structure. So, I mean, it's identifying anatomical structure within a 3D
16 image.

17 JUDGE ZECHER: Right. But let's just, for example, let's just
18 take the language that you proposed. I think it's augmentation portion of a
19 3D medical image for an augmentation tag. And let's just sub it into this
20 claim, right? Creating a plurality of two-dimensional augmented portions of
21 3D medical images, each located on one of the plurality layers. How would
22 that make any sense?

23 MR. HARMER: It's just another way of creating a 3D
24 augmentation tag by linking together a plurality of 2D tags. Just a more
25 specific way of doing it.

26 JUDGE ZECHER: So it's a different way than how Claim 1

1 does it? Is that, I mean, I guess you're narrowing how you're creating a tag
2 here. But I'm just --

3 MR. HARMER: Exactly.

4 JUDGE ZECHER: -- curious.

5 MR. HARMER: Yeah, it's just a narrower way to do it.

6 JUDGE ZECHER: Right. But why does the tag itself needs to
7 be 3D if in this case you're actually putting together a plurality of 2D
8 augmentation tags to form a three-dimensional tag? It seems to imply that
9 you could have 2D tags.

10 MR. HARMER: Novarad uses three-dimensional images to
11 identify anatomical structure within the 3D medical image in an augmented
12 reality environment. I mean, that's the novelty of the invention. And so it
13 makes sense to persons of ordinary skill in the art that you're overlaying a
14 3D image on a patient, you have multiple layers, you have multiple
15 anatomical structures, and you're registering it with the patient, which is
16 what Claim 1 requires. Then what you're looking at is 3D. I mean, you're
17 not looking at a 2D image on the patient. You're trying to identify
18 anatomical structure within that 3D picture of the patient.

19 JUDGE ZECHER: And this is according to your expert?

20 MR. HARMER: According to Dr. Mulumudi, correct. Claim
21 5. This is another way of creating a three-dimensional augmentation tag.
22 Wherein retrieving an augmentation tag further comprises retrieving a
23 plurality of augmentation tags that are linked together to represent an
24 anatomical structure and independent layers of the acquired medical image.
25 Again, Doo and Jones don't teach this as art. And there's a good illustration
26 actually in the Patent. If we look at slide 8, this is Figure 1D. This shows

1 multiple layers, shows an augmentation tag on each layer and joining them
2 together to create a 3D augmentation tag. And I mean, it's clear from these
3 that the layers are three-dimensional too. I mean, you can look at Figure 1C
4 as well. You can see that the artery goes between layers. The layers are
5 three-dimensional. We're talking about a 3D image here, 3D patient
6 anatomy, and identifying anatomical structure within it. The prior art Jones
7 and Doo don't disclose that at all.

8 With regard to Grounds 2 and 4 of the Petition, Petitioner's
9 argument that these claims are obvious about what was known in the art, as
10 we've discussed, I guess. The Board -- well, need to rephrase. I apologize.
11 Medivis argues that the challenged claims are obvious in view of what was
12 known in the art without making any specific connection to any prior art.
13 This is insufficient and the Board should completely disregard any specific
14 combinations that were not put forward in the Petition, as doing so could
15 constitute reversible error. And with that I'll reserve my five minutes unless
16 the Board had additional questions.

17 JUDGE ZECHER: Mr. Harmer, I was -- go ahead Judge
18 Raevsky. I was just going to ask him real quickly, we were talking with Mr.
19 Belt about his application of Jones to the augmentation tag. I was just
20 curious what you understood in reading the Petition as him mapping in Jones
21 to teach the augmentation tag in your claim. I think it's on Petition 33
22 through 34.

23 MR. HARMER: Yeah, I think Petitioner's argument is
24 inappropriate. I don't think the target point for the drill trajectory identifies
25 anatomical structure. Is that what we're talking about? Whether Jones
26 identifies it?

1 JUDGE ZECHER: Well, yeah. I mean, effectively, I look at
2 this figure and what do you call out in this figure as Petitioner mapping to
3 teach the augmentation tag?

4 MR. HARMER: This figure does not teach an augmentation
5 tag. For one reason, it doesn't disclose a medical image. For a second, it
6 doesn't identify anatomical structure within that image. The slice, the bone,
7 and the drill trajectory are models. The drill trajectory is not anatomical
8 structure at all.

9 JUDGE RAEVSKY: I'm going to piggyback on Judge Zecher's
10 question because my line of questioning was the same. So it seems like the
11 POR, when discussing the retrieving limitation of Claim 1, attempts to argue
12 why Jones does not teach an augmentation tag. But it also strikes me that
13 the Petition and expert did not clearly point out what is the augmentation
14 tag. It's in other words, they quote a lot of Jones, but don't necessarily have
15 a theory that's clearly articulated, at least in my view, as for what is the
16 augmentation tag. Would you agree with that assessment?

17 MR. HARMER: Absolutely, Your Honor.

18 JUDGE RAEVSKY: Okay. Thank you, counsel. You've taken
19 25 minutes of your time. So you have 20 minutes remaining.

20 MR. HARMER: Thank you, Your Honor.

21 JUDGE RAEVSKY: Mr. Belt, you have about 10 and a half
22 minutes, and you may begin.

23 MR. BELT: Okay. So I'm unmuted. Thank you, Your Honors.
24 I'll go back to our slides. All right. Are you seeing my slides, Your Honor?

25 JUDGE RAEVSKY: Yes, we are.

26 MR. BELT: All right. Thank you. All right. So, I heard -- I

1 thought I heard Mr. Harmer say that rendered, the word rendered, is
2 distinguishable from an acquired medical image. In other words, a rendering
3 produces a model as opposed to an image. And if that's the case, isn't DVR
4 a kind of rendering, direct volume rendered? And wouldn't that sort of poke
5 a hole in the whole DVR argument? If rendered means bone model as
6 opposed to an image using Novarad's argument, it would seem to me that
7 there's an inherent inconsistency there. But I will say this. If you look at the
8 Patent, and we cite this in slide 20, which I'm showing you, at column 5,
9 lines 27 to 33, it says that the acquired medical image may include
10 completely virtual elements that have been graphically rendered in a virtual
11 3D space.

12 And above that in that in lines -- column 12, 59 to 61, it says
13 that the acquired medical image may be a radiological image, a computer
14 rendered image, or another type of visual image. So there's a whole
15 panoply, I guess, a whole sort of menu of things that it could be, but nothing
16 is required because it, again, it's may, may, may. These are all the things
17 that may happen. It could be rendered orthopedic hardware to be installed,
18 like what you see in Jones Figure 13, or other similar rendering. So I do
19 think that there's some inconsistency there. And I know that Dr. Mulumudi
20 points to, I think it was Figure 1B.

21 But again, Figure 1B is just one embodiment. It's not -- I don't
22 know how you go from Figure 1B to say every single embodiment must be
23 that. And that's even assuming that Dr. Mulumudi is right that he can look
24 at that without the words DVR there, direct volume rendered, and look at
25 that figure and say, oh well that was direct volume rendered. I don't know
26 that he can, but assuming that he could, assuming that's right, that was just

1 one image out of many, and there's nothing in the Patent that says 1B is the
2 way that you need to do it.

3 So we had a question last time about -- and I'll go to slide 95
4 now. We had a question last time about the how is a sort of an incision point
5 or a guiding line an anatomic -- I'm sorry, an augmentation tag. So I have a
6 slide on this. I knew I had a slide on this. I think it was Judge Quinn who
7 asked me this. If you look at slide 95, Your Honors, we have in Doo as an
8 example. And then on the right, you have Figure 6. And on the left of the
9 slide, we have Figure 1C from the Patent. And Figure 1C, we discussed this,
10 I know, in our reply fairly extensively at line -- pages 16 and 18. And I
11 think the argument there is 130. When you see 130A, 130B, 130C, and so
12 forth, those are identified as being the augmentation tags. And they're not
13 on the artery itself, artery 120. This is showing sort of a line over it, like a
14 sort of a guiding line into performing the procedure, kind of like an incision
15 point. And I think that that is exactly what, for example, Doo is showing.
16 By the way, I seem to have lost, unless I have the wrong -- I seem to have
17 lost the view of, oh, there, now I see you. All right. So, I think that is why
18 you can say that as Doo is an example is -- shows an augmentation tag, or
19 why any sort of line of incision as could be an augmentation tag, just the
20 way that it shown in Figures 18 and 23.

21 JUDGE QUINN: Mr. Belt?

22 MR. BELT: Yes?

23 JUDGE QUINN: We're going to need to pause here.

24 MR. BELT: Oh, sure.

25 JUDGE QUINN: We lost our colleague, Judge Raevsky, for a
26 second.

1 MR. BELT: Oh, he's back.

2 JUDGE QUINN: Yes.

3 MR. BELT: Should I repeat that? Did -- did you hear
4 everything I was talking about, Your Honor? Judge Raevsky?

5 JUDGE QUINN: He can't hear you.

6 MR. BELT: Oh, he -- you're -- he's -- you appear to be on
7 mute.

8 JUDGE RAEVSKY: I'm sorry. I lost about 30 seconds.

9 MR. BELT: I'll just repeat what -- I knew that I lost you, and I
10 got a little flummoxed. So the -- what I was saying, Your Honors, if you
11 look at, for example, Figure 1C in the patent, that is showing sort of an
12 incision, line of incision. When you look at this figure, it's showing that
13 130A, 130B, 130C, and so forth are identified as the augmentation tags for
14 the artery 120. And that is why we would say that something like an
15 incision point could be, whether in Jones or in Doo, could be an
16 augmentation tag. But of course, Doo also talks about tumor boundaries and
17 so forth. For example, 1232 could also be a tumor boundary. So any way
18 you slice it, those are the augmentation tags, Your Honors. I think that's all I
19 had in --

20 JUDGE ZECHER: Mr. Belt, do you mind walking through at
21 least Figure 18 of Jones, and pointing out how one of those elements is the
22 augmentation tag?

23 MR. BELT: Yeah. And I know that we discussed, Your
24 Honor, I'm going to the slides here. We cite to I think, 18 through 23 in
25 particular, but let me see if I can call this up. All right. So if we look at, as
26 an example, slide 43, Your Honor. So Figure 18 according to Jones at

1 paragraphs 115 and also at 117, you're showing a virtual trajectory of a drill
2 bit extending from a drill or other surgical tube into a patient's anatomical
3 bone model 1302, and which is overlaid at a patient site 1300. And then
4 Figure 18 is also showing location 1314, which corresponds to a point where
5 the drill bit would impact the graphically displayed bone model. So that is
6 very specifically the point that is identifying the anatomical structure of
7 interest. So that would be one example in Jones of an augmentation tag,
8 Your Honor.

9 JUDGE ZECHER: So just to be clear, you're saying it's the
10 target location, 1314, is the augmentation tag in Jones?

11 MR. BELT: I think it's a combination of 1312 and 1314. I
12 mean it could be either one because either one is pointing to.

13 JUDGE RAEVSKY: And where do you define that as the
14 augmentation tag in your briefing?

15 JUDGE ZECHER: Well, can I take a step back? Why is 1312
16 the augmentation tag? I don't understand how that identifies at least one
17 anatomical structure. That's talking about the trajectory of the drill.

18 MR. BELT: Right, because I think that we had responded
19 earlier that the augmentation tag could be, for example, a, you know, a
20 guideline into a patient, into the patient to where you're going to make your
21 incision. So that's why I think that could be. But certainly 1314 is as well.

22 JUDGE ZECHER: Well, it may be generally, but it -- doesn't
23 claim 1 require it to identify at least one anatomical structure of the required
24 medical image found at that location?

25 MR. BELT: Yeah, well, it's showing if you -- so it is
26 identifying the bone 1302. And also going back to that, I'll go back to that

1 slide 95 that shows it clearly, Your Honor. The Figure 1C, which we do
2 discuss in our papers, is showing the trajectory. Again, this is slide 95, and
3 you have the augmentation tags 130A through, I guess it's 130B. You are
4 showing that. So that is the trajectory that the surgeon would follow, and
5 that is deemed to be a, you know, an embodiment, you can't sort of ignore
6 that. And so I think that that would show that in yours. So I didn't have
7 anything else.

8 So I did want to come back and say, during Mr. Harmer's
9 argument, I was looking for that one site that we had, I think it was at
10 column 12, 42 to 44. I could have sworn that I cited that in the brief, and I
11 remember when we got the Board's order that everything had to be cited. I
12 went back very meticulously and tried to put in everywhere where we had
13 cited something in the Petition or Reply or the motion to exclude. Going
14 back quickly, I could not find it. So if I didn't cite it, mea culpa, that was not
15 intentional. I don't think it changes my argument because the other sites that
16 we do cite earlier in the previous slide are broad enough to cover all of that
17 anyway. And that is all I have. And I thank you for your time, Your
18 Honors. Unless you have any questions.

19 JUDGE RAEVSKY: Any other questions from the panel?

20 JUDGE QUINN: I don't have any questions. Thank you.

21 JUDGE ZECHER: Yeah. This is Judge Zecher. Nothing
22 further from me.

23 MR. BELT: Thank you, Your Honors.

24 JUDGE RAEVSKY: Thank you. Patent Owner, you have
25 about 20 minutes.

26 MR. HARMER: I -- pardon me. Thank you, Your Honor. I

1 need it now. I won't take that much time. Just a couple of things, very
2 briefly. One, I'm kind of losing patience with the argument that Dr.
3 Mulumudi is incapable of detecting direct volume rendering. Just so the
4 Board is aware, Dr. Mulumudi is a medical doctor with 20 years of
5 experience treating peripheral and coronary artery diseases using 2D and 3D
6 medical imaging, including CT and MRI images. He's proficient in medical
7 imaging processing techniques. He's an expert in using 2 and 3D ultrasound
8 guidance for safe vascular access, facilitating entry into arteries and veins,
9 and navigating medical equipment securely to the desired implantation site
10 or area of interest. The argument that he's incapable of detecting direct
11 volume rendering, I mean, to be frank, it does lack candor. During the
12 deposition, they showed Dr. Mulumudi one page from Amira that has only
13 text on it, and asked him if it disclosed direct volume rendering, to which he
14 affirmed. And then they said, is the only way that you can detect that is
15 because of the words of direct volume rendering? And he said yes. That
16 does not mean that he is incapable of detecting or identifying direct volume
17 renderings in the '807 Patent or the '271 Patent. That's enough of that.

18 And then really quickly with regard to Figure 1C, I'm not going
19 to pull it up. I think the Board's aware of that figure. If it's helpful, I can.
20 But Petitioner in his rebuttal said that 130A, 130B, 130C, this path here is an
21 incision path. I just want to point the Board to the specification. The
22 paragraph begins at the very bottom of column 3, begins Figure C illustrates,
23 and then continues on to column 4. And the first sentence on column 4, it
24 says, in addition the augmentation tags can be associated to form a tag
25 group, 130A through E, to guide a surgeon. And then it goes on and
26 provides the examples that I already read.

1 The example of moving from one disease structure to the next,
2 and the example of a safe path to avoid structures. Just so we are clear. And
3 in summary, I mean, whether the medical image in Claim 1 is 2D or 3D, the
4 dependent claims all require a 3D medical image, and none of Doo and
5 Jones do not disclose any of the dependent claims, number two through six.
6 And if we have additional questions on those issues or any other, I'm happy
7 to answer them, but with that I close.

8 JUDGE RAEVSKY: Do you have any response to how during
9 rebuttal time Petitioner maps Jones to the augmentation tag of the claims?

10 MR. HARMER: We've talked about this before. I won't,
11 unless I need to, I won't pull the image up. But again, the Petitioner does not
12 clearly identify its theory with regard to Jones about what an augmentation
13 tag is. It argues that the drill bit, or the drill trajectory and the target are
14 augmentation tags I think at one moment it argues that the bone model is an
15 augmentation tag. The point is Jones discloses models and does not identify
16 anatomical structure within a medical image at all.

17 JUDGE RAEVSKY: Thank you, counsel. Any further
18 questions from the panel?

19 JUDGE ZECHER: This is Judge Zecher. Nothing from me.

20 JUDGE QUINN: I'm good. Thank you counsel.

21 JUDGE RAEVSKY: Thank you to my colleagues and thank
22 also to our court reporter and unseen court staff who make this run so
23 smoothly. With that, we're adjourned.

24 (Whereupon, the above-entitled matter went off the record at 4:09
25 p.m.)

IPR2023-00042 (Patent 11,004,271 B2)

IPR2023-00045 (Patent 10,945,807 B2)

PETITIONER

Kia Freeman

John Curran

MCCARTER & ENGLISH, LLP

kfreeman@mccarter.com

jcurran@mccarter.com

PATENT OWNER

Joseph Harmer

Jed Hansen

THORPE NORTH & WESTERN LLP

joseph.harmer@tnw.com

hansen@tnw.com