

Filed on Behalf of Novarad Corp.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDIVIS, INC.,

Petitioner,

v.

NOVARAD CORP.,

Patent Owner.

Patent 11,004,271 B2

Case IPR 2023-00042

PATENT OWNER SUR-REPLY

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<i>SEB S.A. v. Montgomery Ward & Co.</i> , 594 F.3d 1360 (Fed. Cir. 2010)	3
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EXHIBIT LIST

Exhibit No.	Exhibit Description
Ex. 2002	Declaration of Mahesh S. Mulumudi, M.D. (“Mulumudi”)
Ex. 2003	Dr. Mulumudi C.V.
Ex. 2004	Declaration of Craig Rosenberg, Ph.D. (“Rosenberg”)
Ex. 2005	Dr. Rosenberg C.V.
Ex. 2006	Dr. Kazanzides Deposition (“Kazanzides Depo”)
Ex. 2007	Dr. Rosenberg Resume
Ex. 2008	Dr. Rosenberg Supplemental Declaration
Ex. 2009	Dr. Mulumudi Supplemental Declaration

LIST OF ABBREVIATIONS

Kazanzides	Dr. Peter Kazanzides
Kaz.Dec.	Ex. 1012, Kazanzides' Trial Declaration dated October 12, 2022
Kaz.Supp.	Ex. 1021, Kazanzides' Supplemental Trial Declaration dated May 22, 2023
Kaz.Tr.	Ex. 2006, Kazanzides' Trial Deposition Transcript dated June 22, 2023
Mulumudi	Dr. Mahesh Mulumudi
Mul.Dec.	Ex. 2002, Mulumudi's Trial Declaration dated July 18, 2023
Mul.Supp.	Ex. 2009, Mulumudi's Supplemental Trial Declaration dated August 8, 2023
Mul.Tr.	Ex. 1022, Mulumudi's Trial Deposition Transcript dated September 19, 2023
Rosenberg	Dr. Craig Rosenberg
Ros.Dec.	Ex. 2004, Rosenberg's Trial Declaration dated July 17, 2023
Ros.Supp.	Ex. 2008, Rosenberg's Supplemental Trial Declaration dated August 8, 2023

I. PETITIONER HAS NOT CARRIED ITS BURDEN

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F. 3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity ... the evidence that supports the grounds for challenge to each claim”)). Medivis has failed to carry this burden. Indeed, much of Medivis’ Reply (Paper 20) is attorney argument or expert testimony that is unsupported by facts or data. “Attorney argument is no substitute for evidence.” *Enzo Biochem v. Gen-Probe, Inc.*, 424 F.3d 1276, 1285 (2005). And expert testimony that is not based on facts or data is afforded “little weight.” 37 C.F.R. § 42.65(a).

In short, the invention allows a physician to look inside a patient while the patient is lying on the operating table. It also provides a physician with the ability to navigate an immersive 3D volume of patient imaging in any direction while it is co-registered to the patient. The prior art does not do this. The prior art only displays 2D images, stacks of 2D images, and 3D surface models.

II. NOVARAD’S EXPERTS ARE QUALIFIED

Medivis argues that Novarad’s experts are not qualified to provide testimony helpful to the trier of fact. Reply, 2. More specifically, Medivis argues that Novarad “has not cited in its response any evidence that its declarants are qualified

or that their opinions are reliable.” *Id.*, 2. Medivis accuses Novarad of forcing the Board to “play ach[a]eologist with the record” and argues that “none of the statements in the [Patent Owner’s] Response attributed to Novarad’s declarants should be considered admissible evidence.” *Id.*, 2. This argument lacks merit.

Medivis’ only legal support is an unpublished opinion, *General Access Solutions, Ltd. v. Sprint Spectrum L.P.*, 811 F. App’x 654, 657 (Fed. Cir. 2020). That case is not applicable. There, the patent owner attempted to establish a date of conception, but only made general allegations in its patent owner response. The Board was forced to turn to the inventor’s declaration but refused to “delve into a twenty-nine-page claim chart attached as an exhibit” to the inventor’s declaration. *Id.*

That is not the case here. In proceedings before the USPTO, the qualifications of an expert are provided within the expert’s declaration that accompanies the patent owner’s response. That declaration is treated like trial testimony, which lays the foundation for the expert’s qualifications. *See generally*, 37 C.F.R. § 42.53(a). There is no requirement that the patent owner repeat those qualifications in its briefing. The Declarations of Mahesh S. Mulumudi (Ex. 2002) and Craig Rosenberg (Ex. 2004) and Supplemental Declarations of Mulumudi (Ex. 2009) and Rosenberg (Ex. 2008) are part of the trial record and comfortably establish their qualifications.

Moreover, “[a] witness may qualify as an expert if they have ‘knowledge, skill, experience, training, or education’ of a ‘scientific, technical, or other specialized’ nature that is likely to help the Board ‘to understand the evidence or to determine a fact in issue.’” *Flex Logix Technologies, Inc. v. Venkat Konda*, IPR2020-00260/61 (July 29, 2021) (Paper 55/58, *8) (citing FRE 702). There is “no requirement of a perfect match between the expert’s experience and the relevant field.” PTAB Consolidated Trial Practice Guide, 34 (Nov. 2019), <https://go.usa.gov/xpvPF> (“CTPG”) (citing *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1373 (Fed. Cir. 2010))). Indeed, “[a] person may not need to be a person of ordinary skill in the art in order to testify as an expert under Rule 702, but rather must be “qualified in the pertinent art.” *Id.* (citing *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008).

Rosenberg and Mulumudi are clearly qualified to help the Board here. Medivis submits no expert evidence to the contrary.¹ Mulumudi is a medical doctor. Ex. 2002, ¶¶ 16-24. He is “very familiar with conventional medical imaging data and visualization of that data for use during medical procedures.” Ex. 2009, ¶ 6. And he has “over 20 years of experience treating peripheral vascular and coronary artery diseases using 2D and 3D medical imaging, including

¹ Petitioner deposed Mulumudi but chose not to ask any questions about his qualifications. Petitioner did not depose Rosenberg.

‘3D Ultrasound, gated Computerized Tomography (CT), and Magnetic Resonance Imaging (MRI).’” Ex. 2002, ¶ 13 (citing Ex. 2003, Mulumudi’s C.V., 1). *See also id.*, ¶¶ 6, 7.

Rosenberg has a BS in Industrial Engineering, a MS in Human Factors, and a PhD in Human Factors. Ex. 2004, ¶ 16. Rosenberg has over 30 years of experience in “human factors, user interface design, user interaction design, human-computer interaction, and software engineering from 1988 through today.” *Id.*, ¶ 13.

III. MEDIVIS’ BELATED PRODUCTION

In its Response, Novarad noted Medivis’ failure to authenticate its references. In an attempt to remedy that failure, Medivis added additional chapters to *Amira*. Medivis attempts to tangentially rely on those additional chapters by referencing *Amira*’s previously produced table of contents. Reply, 22 (citing Ex. 1005, vi/100-vii/11). This is improper. Medivis cannot rely on additional prior art that was submitted after its Petition to carry its burden without leave from the Board. *See, e.g., Laboratoire Francais du Fractionnement et des Biotechnologies S.A. v. Novo Nordisk Healthcare AG*, IPR2017-00028 (June 13, 2017) (Paper 22). All of Exhibits 1023 and 1024, to the extent they are relied on as prior art, should be disregarded.

IV. MEDIVIS' LACK OF CANDOR

Everyone involved in proceedings before the Board is expected to have a duty of candor and good faith during the course of a proceeding. 37 C.F.R.

§ 42.11. “Even the slightest accommodation of deceit or a lack of candor in any material respect quickly erodes the validity of the process.” *Blackberry Corp. v. Zipit Wireless, Inc.*, IPR2014-01506, Final Written Decision, *9 (March 29, 2016).

In support of its argument, and for the first time on Reply, Medivis frequently references a supposed “preferred” embodiment. *See, e.g.*, Reply, 6, 7, 16, 17, 21, 28, etc. This argument lacks candor. Nowhere does the '271 Patent even mention the term “preferred.” Medivis’ “preferred embodiment” arguments are consistent with its other unsupported attorney argument and baseless opinions. The Board should not take any of these arguments at face value.

In other locations throughout its papers, Medivis misleads the Board by taking excerpts from Mulumudi’s deposition out of context. For example, after asking Mulumudi if English was his first language, counsel assaulted him with a belittling vocabulary test and litany of obtuse questions (for example, “Are you familiar with the English word ‘shape’?” and, “Is the English word ‘shape’ a technical word?”). Medivis takes these answers out of context to misrepresent “facts” to the Board. Medivis argues that “Novarad’s proffered-expert testified that ‘shape’ is not a technical term and that the only meaning of ‘shape’ he could

identify is ‘form.’” Reply, 11 (citing Ex. 1022, 17:5-18:13). However, Mulumudi’s actual answer to “Is the English word ‘shape’ a technical word?” was “Not that I know of. Depends on the context.” Ex. 1022, 17:12-16.

V. NOVARAD’S CLAIM CONSTRUCTIONS ARE PROPER

Novarad’s claim construction is consistent with a skilled artisan’s understanding of the specification and the claims.

A. “3D Data” is Not “2D Data.”

The person of ordinary skill in the art (POSITA) understands that the “3D data” described in the ’271 Patent is a navigable direct volume rendered dataset. *See* Ex. 2002, Mul.Dec., ¶ 60. Medivis argues that “3D data” means merely “one or more [2D] images.” Reply, 3. Medivis also argues that the “3D data” must include a 2D X-ray because the ’271 Patent says “3D data may include a 2D image, such as an X-ray image, because when the 3D image is projected into a 3D space the 2D image has **3D significance**.” *Id.*, 5 (citing Ex. 1001, 12:4-7) (emphasis added). Medivis’ argument lacks merit for several reasons.

First, the specification does not say that an X-ray image projected into a 3D space is in fact 3D. Rather, it explains that it has 3D **significance**. The ’271 Patent provides several embodiments of “3D data,” some of those embodiments “include an outer layer of the patient and multiple inner layers of the patient,” as claim 1 requires. Ex. 1001, 11:61-63. A 2D X-ray is not 3D and “does not include

‘an outer layer ... and multiple inner layers of the patient...’” Ex. 2002, Mul.Dec., ¶ 99.

Second, there is no dispute that 3D data has height, width, and depth and is confined within a virtual 3D shape, *i.e.*, a virtual spatial difference box 116. *See* Ex. 1001, 6:5-8 (“the virtual spatial difference box 116 may confine within a volume of the virtual spatial difference box 116 the projected inner layer of the patient 106 from the 3D data”). A single 2D X-ray does not have height, width, and depth. And while a user may “display a slice **of the 3D data** instead of a volume of the 3D data,” the 3D data (and the “slice” for that matter) is still three-dimensional. *See* Ex. 1001, 5:34-35 (emphasis added).

Third, in support of its “3D is really 2D” argument, Medivis’ counsel argues that “FIGS. 2C and 2E each illustrate a 2D CT image projected and confined within a virtual box.” Reply, 9.

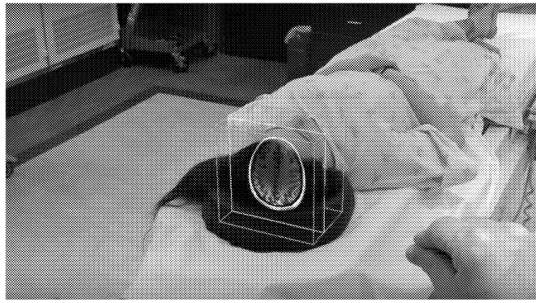


FIG. 2C

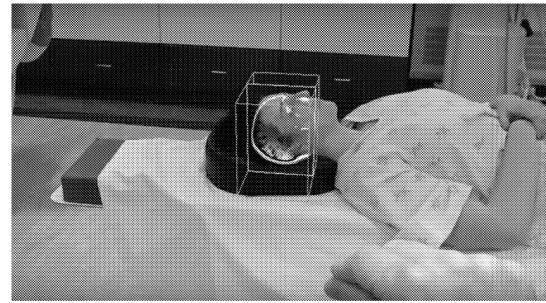


FIG. 2E

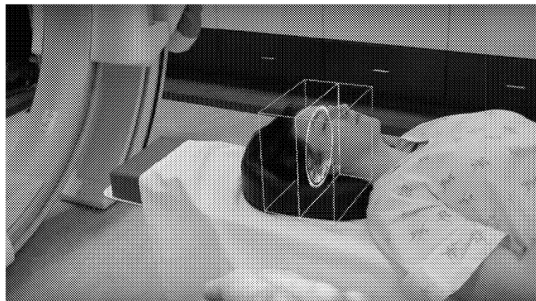


FIG. 2D



FIG. 2F

Ex. 1001, 5-6. That characterization is incorrect. The '271 Patent explains that “a user may employ a hand gesture in order to have an axial slice **of 3D data representing a CT image** of the patient’s brain projected onto a real-time view of the first patient.” Ex. 1001, 8:33-36 (emphasis added). FIGS. 2C-2F show slices **of the 3D data** confined within the virtual box that “represent” a CT image—they are not conventional 2D CT images themselves.

Fourth, the record evidence establishes that the 3D data is a 3D volume navigable in any direction. *See* Ex. 1001, 6:5-25 (“when navigating the projected 3D data...”). A user can navigate the volume by dragging the plane shown in FIGS. 2C-2F through the 3D volume, thereby revealing anatomical structure at any

location and **along any axis within the 3D volume**. In other words, a user may “display different slices of the 3D data **including, but not limited to**, axial slices, coronal slices, sagittal slices, and oblique slices.” Ex. 1001, 5:38-40. *See also*, Ex. 1001, 6:11-21 (“In some embodiments, the virtual spatial difference box 116 may also assist a user when navigating the projected 3D data by providing a frame of reference for the user 104. For example, this frame of reference may assist the user when moving axial slices, coronal slices, sagittal slices, or oblique slices² **of the 3D data** within the virtual spatial difference box 116.” (emphasis added)).

A user can also display the full volume of the 3D data within the 3D virtual shape. *See* Ex. 1001, 5:34-35 (“display ... a volume of the 3D data”). A user can also peel back the layers of the 3D data as one might peel an orange. The ’271 Patent explains that the “3D slices may include curved slices, such as curved slices that follow the natural curve of an anatomical feature, or slices that have depth as well as height and width.” Ex. 1001, 6:18-20.

Any argument that “3D data” should be read to mean a single 2D X-ray is nonsense.

B. 3D Data is Direct Volume Rendered (DVR).

Medivis contends that “DVR is found nowhere in the claims or

² “Oblique slices” also indicates a 3D volume because medical images are not acquired obliquely.

specification” (Reply, 3) but offers absolutely no evidence to contradict

Mulumudi’s explanation as to why, in the context of the ‘271 Patent, “3D data” must be describing DVR data. Mulumudi explains:

a POSITA understands that the ’271 Patent describes direct volume rendered 3D data because only a DVR image is 3D, includes an outer layer and multiple inner layers of the patient, and can be cut along any axis and viewed from any angle in real-time. A POSITA understands that **only DVR** provides the comprehensiveness, detail, and flexibility to visualize and navigate the internal layers of a projected 3D volume of a patient in real time: “all the way through the patient,’ at a ‘certain partial depth into the patient,’ and along multiple axes, as described in the ’271 Patent.

Ex. 2002, ¶ 60 (citing Ex. 1001, 12:13-16).

Moreover, only DVR:

can offer perspectives that are not limited to traditional planes (*e.g.*, axial, sagittal, and coronal), enabling a view of the anatomical structures within the volume of a patient from any direction,” as described in the ’271 Patent.

Id., ¶ 54; *see also, id.* at ¶ 56.

C. “Inner Layer(s) of the Patient”

Claim 1 requires “displaying ... one of the inner layers of the patient from the 3D data projected onto real-time, non-image actual views of the outer layer of the patient....” Ex. 1001, 18:60-63. Within the context of the ’271 Patent, any lesser portion of a 3D volume is also 3D. *See* Ex. 2002, Mul.Dec., ¶¶ 67-72. The ’271 Patent explains that the “multiple inner layers [of the 3D data] may be layers that go all the way through the patient 106, or may be layers that only go to a

certain **partial depth** into the patient.” Ex. 1001, 12:13-16 (emphasis added). Put plainly, the projected inner layer will always have a “depth” and will therefore always be 3D.

Medivis argues that FIG. 1 of the '271 Patent demonstrates that the inner layers of the “3D data” can be two-dimensional and are “segmented from the whole volume” Reply, 8 (arguing that FIG. 1 shows still X-ray images). Medivis’ attorney argument lacks merit. “3D data ... **may be captured or generated using one or more methods**” from a variety of different sources. Ex. 1001, 11:37-38, 45-51 (emphasis added). This includes a direct volume rendering generated from multiple X-rays. Just because the '271 Patent provides an example of using a plurality of X-rays to generate a direct volume rendering does not mean that the “3D data” itself is merely a single conventional 2D X-ray.

In support of its “2D inner layer” argument, Medivis asserts that the bones 16b in FIG. 1 are “a specific feature segmented from the whole volume.” Reply, 8. But the '271 Patent does not mention “segmentation” at all. Rather, the bones 16b, illustrated in FIG. 1, are merely one example of the many 3D inner layers available and visible within the 3D dataset, including, “but not limited to, ... muscles, organs, or fluids of the patient 106.” Ex. 1001, 12:1-4.

Medivis also argues that “FIGS. 2C and 2E each illustrate a 2D CT image projected and confined within a virtual box.” Reply, 9. However, as explained

above (*see supra*, 8-9), FIGS. 2C and 2E show an “...axial slice **of 3D data representing a CT image** of the patient’s brain projected onto a real-time view of the first patient.” Ex. 1001, 8:33-36 (emphasis added). These slices are not a conventional 2D CT image, but a slice of the “3D data.”

D. “Confined Within a Volume”

Medivis contends that “Novarad argues that ‘confined’ means ‘navigated ... along any axis.’” Reply, 10 (citing PO’s Response (Paper 12), 18, 27, and 28). Petitioner misstates Novarad’s construction.

It is true that the 3D data of the ‘271 Patent is navigable along any axis. However, “confinement” of the 3D data within the virtual 3D shape “requires a navigational or orientation function that allows the user to manipulate and view 3D slices of the patient’s anatomy along multiple axes.” Response, 18. Claim 3, for example, recites that “the virtual 3D shape **is configured to be controlled** to reposition two-dimensional (2D) slices and/or 3D slices of the projected inner layer of the patient from the 3D data.” Ex. 1001, 19:7-10. The virtual 3D shape not only shows the user the boundaries where the 3D data is available for the user to view, navigate, and/or explore, but it is also “configured to be controlled.”

E. “Being Having” is Correctable Error.

Claim 11 comprises, among other things, “displaying ... the projected inner layer *being having* the altered color gradient.” Ex. 1001, 20:23-28. Medivis

contends that Novarad failed to prove that it was clerical error. Reply, 13.

Petitioner's contention lacks merit. Petitioner cites 35 USC §255 in support. But that statute only requires that a correction not involve changes that "would constitute new matter or would require re-examination." The change from "being having" to "having" would not constitute new matter and would not require reexamination. More importantly, all the experts agreed that "being having" is clerical error. *See* Ex. 2002, ¶ 83; Ex. 2004, ¶ 91; Ex. 1012, ¶ 34.

Medivis also asks the Board to interpret *being having* as "being or having," which results in two possible statements:

1. "displaying the projected inner layer *being* the altered color gradient;" and
2. "displaying the projected inner layer *having* the altered color gradient."

Only the second sentence, using the term "having," makes any sense.

VI. DOO DOES NOT ANTICIPATE CLAIMS 1, 5, AND 6.

A. Doo Does Not Anticipate Claim 1.

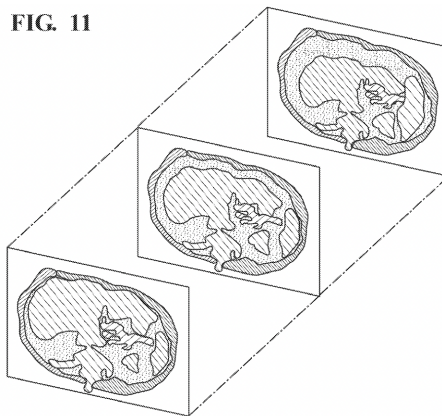
Medivis cherry picks portions of different embodiments from *Doo* and arranges them, using hindsight, in an attempt to arrive at the challenged claims. The Federal Circuit has explicitly rejected this approach. In *Net MoneyIn, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008), the Federal Circuit reversed a district court's anticipation finding because the defendant did not demonstrate that the reference disclosed the limitations "arranged as in the claim." *Id.* The claimed

system comprised five links, and the district court found the invention anticipated by a reference disclosing all five links. *Id.*, 1368-69. The Federal Circuit reversed, concluding that the district court “wrong[ly] combine[d] parts of [two] separate protocols,” each of which included some of the claimed links. *Id.*, 1371. The court explained that the differences in embodiments “invoke the question of obviousness, not anticipation.” *Id.* Medivis’ anticipation argument does the same thing here when it attempts to combine teachings from different “modalities” in *Doo*. As such, its argument should be disregarded.

Medivis’ improper rearrangement aside, *Doo* still does not disclose all the elements of claim 1.

i. *Doo* does not disclose “3D data ... including an outer layer ... and multiple inner layers.”

Medivis argues that “*Doo*’s Figure 11 ... illustrates 3D data, including an outer layer and multiple inner layers of the patient.” Reply, 15.



But “Figure 11 illustrates the application of a fifth three-dimensional modality, ‘fly through 3D’ in which a series of three-dimensional tomographic slices **can be sequentially exhibited**. Each tomographic slice can be a distinct image.”

Ex. 1008, ¶ [0078] (emphasis added). Unlike *Doo*, the “3D data” of claim 1 is not “sequentially exhibited” like a flipbook. It is also not limited to one axis, like a sequential exhibition would be. Rather, the “3D Data” of the ’271 Patent is an immersive 3D volume—navigable along any axis. *See supra*, 6, 9. Importantly, Fig. 11 of *Doo* is never disclosed as being projected onto the patient. Rather, it is simply there to “allow a surgeon to gain an understanding of the patient’s internal anatomy.” Ex. 1008, ¶ 74.

ii. *Doo* does not disclose “displaying ... one of the inner layers of the patient from the 3D data.”

Medivis contends that “*Doo*’s Figures 2 and 3 ... show that the ‘projected display may be inner layers of the patient from the 3D data.’” Reply, 16. *Doo* projects conventional 2D images and modified 2D images onto or hovering above a patient. For example, in FIG. 2 of *Doo* a 2D image is projected so as to appear hovering over the patient.

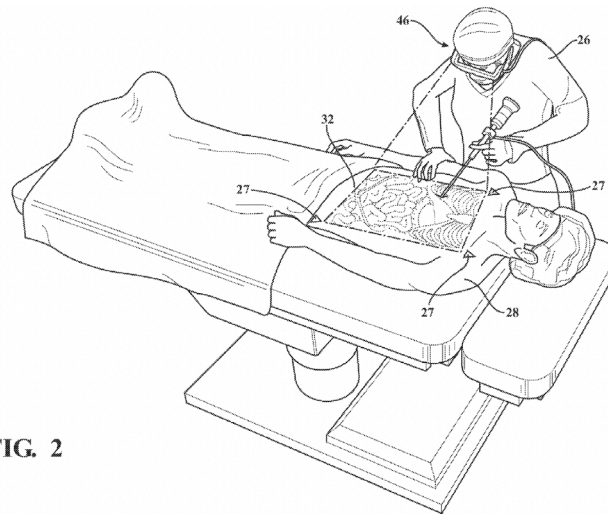


FIG. 2

Medivis also argues that there is no real distinction between the image 132 in FIG 3 and the bones 106b in FIG. 1 of the '271 Patent. Reply, 16. For the Board's convenience, both figures are copied below side-by-side.

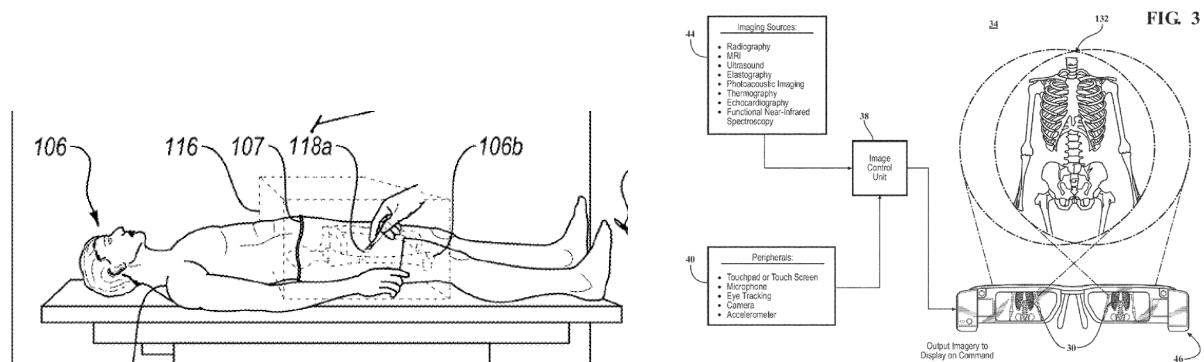


FIG. 3

Medivis is incorrect. The “3D data” of the '271 Patent is a 3D volume confined within a virtual 3D box. The '271 Patent illustrates bones 106b in FIG. 1 merely as one example of the many inner layers available and visible within the 3D dataset, including, “but not limited to, ... muscles, organs, or fluids of the patient 106.” Ex. 1001, 12:1-4. In contrast, there is no indication in *Doo* that image 132

in FIG. 3 is a 3D volume including “**an outer layer ... and multiple inner layers** of the patient,” as recited in claim 1. Rather, it is simply a single skeletal surface model. *See* Ex. 2002, Mul.Dec., ¶ 103 (“...Figure 3 shows only a bone model...”).

iii. *Doo* does not disclose “being confined within a virtual 3D shape.”

Providing no expert rebuttal to Novarad’s experts, Medivis repeats its same argument from its Petition that “*Doo*’s shape 532 in Figure 9 and shape 432 in Figure 7 are virtual 3D shapes.” Reply, 18. Figures 7 and 9 of *Doo* are copied below.

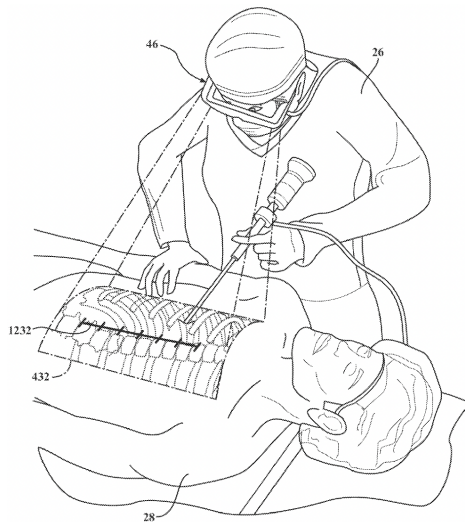


FIG. 7

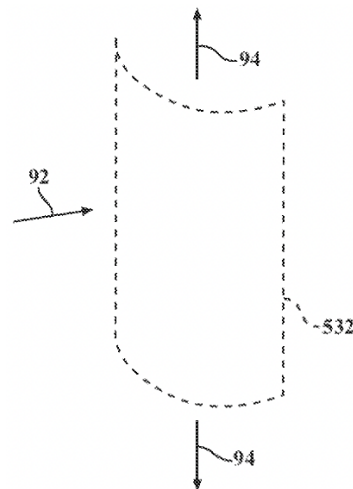
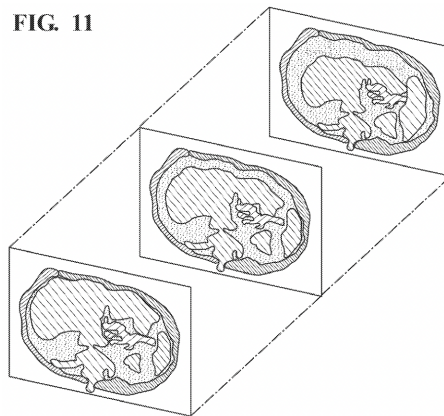


FIG. 9

Contrary to Medivis' argument, "a POSITA would understand that Figures 7 and 9 show only a curved [2D] image." Ex. 2004, Ros.Dec., ¶ 123. "On its face, this is not 3D data." Mul.Dec., ¶ 107.³

Medivis also argues again that *Doo*'s FIG. 11 discloses a "virtual 3D shape" after *Doo*'s series of slices are fused together. Reply, 18.



However, "the rectangles surrounding and the dashed lines connecting each slice are only meant to illustrate an alignment of the representative slices." Ex. 2002, Mul.Dec., ¶ 110. "[E]ven if the projection of the stack created a box ... the resultant box would be static." Ex. 2004, Ros.Dec., ¶ 128. In short, *Doo*'s Figure 11 also does not and cannot confine a 3D volume. See PO Response, 30-31.

³ Within that vein, callout 432 in FIG. 7 and 532 in FIG. 9 of *Doo* are not capable of confining "the projected inner layer of the patient from the 3D data ... within a volume of a virtual 3D shape," as recited in claim 1. See PO Response, 28-30.

B. *Doo* Does Not Anticipate Claims 5 and 6.

For the first time on Reply, Medivis contends that because *Doo* can adjust the opacity of a projected image until the image is fully transparent that *Doo* teaches “hiding the lines of the 3D shape.” Reply, 18. Its belated argument lacks merit. Medivis conflates the projected 3D data with the 3D shape confining it. According to Medivis, FIG. 11 discloses the lines of the 3D shape, separate and apart from the 3D data (*i.e.*, the patient image). But now it contends that adjusting the opacity of the image is the same as hiding the lines of the 3D shape. Medivis cannot have it both ways.

VII. CLAIMS 1-6 AND 11-20 ARE NOT OBVIOUS IN VIEW OF *DOO* AND *AMIRA*.

A. No Motivation to Combine *Doo* and *Amira*.

“A party that petitions the Board for a determination of obviousness must show that ‘a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Apotex Inc. v. Wyeth LLC*, IPR2014-00115, Paper 94, slip op. at 11 (Apr. 20, 2015) (quoting *Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009)). Medivis has not carried its burden here.

Medivis contends that there is motivation to combine *Doo* and *Amira* because “*Doo* suggests an improvement on conventional medical imaging displays, such as disclosed in *Amira*.” Reply, 20. Medivis also states that there is a reasonable expectation of success in combining these references but does not provide a single cite to expert testimony explaining why. This is not enough. “[C]onclusory labels do not substitute for a fact-based analysis....” *Shopkick, Inc. v. Novitaz, Inc.*, IPR2015-00279, Paper 7, slip op. at 26–30 (May 29, 2015).

That fatal flaw aside, *Amira* does not remotely suggest an improvement to the AR technology described in the '271 Patent. Indeed, *Amira* does not use AR at all. Rosenberg explained that the “Virtual Reality Option” disclosed in *Amira* is completely different from the augmented reality disclosed in the '271 Patent. *See* Ex. 2004, Ros.Dec., ¶ 119 (“*Amira*’s 2D and VR solutions are not solutions to the challenges of projecting [] medical imaging onto a real patient in an AR environment”).

In addition, *Amira*’s VR solutions are completely unusable for projecting 3D data onto a patient. As shown below, *Amira*’s VR is for “large tiled displays” and “immersive multi-wall displays like *CAVEs* and *Holobenches*.” *See* Ex. 1023, *Amira*, 265/282 and Figures 8.2-8.3 copied below.

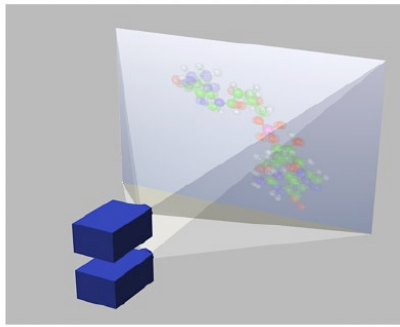
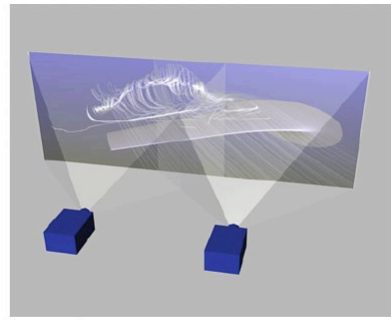


Figure 8.2: Sketch of a single-screen passive stereo projection system. Figure 8.3: Sketch of a super-wide projection system with soft-edge blending.



Figure 8.4: A single-screen 3D projection system.

Id., 294, 298, 304. The imaging displays disclosed in *Amira* cannot be used to “augment[] real-time, non-image actual views of a patient with three-dimensional (3D) data,” as recited in claims 1 and 11. Rosenberg provided unrebutted testimony explaining the differences between AR and VR, explaining that a POSITA would not have been motivated to combine *Doo* and *Amira* nor would they have had a reasonable expectation of success because neither *Doo* nor *Amira* disclose:

- (1) “navigating 3D data while it is projected onto non-image actual views of a patient;”

- (2) “any virtual tool ‘configured to be controlled’” or “that can be used to ‘assist the user when navigating the projected 3D data;’” or
- (3) “adjust[ing] the color gradient of direct volume rendered 3D data ‘to be better visible when projected onto real-time, non-image actual views of ... a patient.’”

See Ex. 2004, Ros.Dec., ¶ 163. Medivis provides no evidence in response.

B. Claim 1 is Not Obvious in view of *Doo* and *Amira*.

Medivis’ mistaken obviousness assertions are addressed in PO’s Response. Those mistakes are underscored by impermissible cherry picking of the prior art that “stitch[es] together an obviousness finding from discrete portions of prior art references without considering the references as a whole.” *In re Enhanced Security Research, LLC*, 739 F.3d 1347, 1355 (Fed. Cir. 2014).

Medivis generally repeats its arguments from its Petition, which Novarad already responded to. In sum, neither *Amira* nor *Doo* disclose the projected inner layer of the patient from the 3D data being confined within a volume of a virtual 3D shape. See PO Response, 37. Rosenberg provides unrebutted testimony that “*Amira*’s 2D and VR solutions are not solutions to the challenges of projecting medical imaging onto a real patient in an AR environment.” Ex. 2004, Ros.Dec., ¶ 118.

Medivis also contends that “*Amira*’s axis aligned bounding box may assist the user when navigating the projected 3D data by providing a frame of reference.” Reply, 21. Medivis’ attorney argument fails to recognize that the “virtual 3D shape” of claim 1 is a tool for navigating 3D data projected in an AR environment, which *Amira* unequivocally does not do. See Ex. 2004, Ros.Dec., ¶¶ 83, 137-38; Ex. 2002, Mul.Dec., ¶ 111. Moreover, neither *Amira* nor *Doo* navigates an immersive 3D volume of medical imaging data in any direction while it is projected onto an actual patient in an operating room. See Ex. 2004, Ros.Dec., ¶ 163; Ex. 2002, Mul.Dec., ¶ 141.

C. Claims 2-6 are Not Obvious in view of *Doo* and *Amira*.

Claim 3 recites wherein “the virtual 3D shape” is configured to be controlled to: (1) “toggle between displaying and hiding the lines of the virtual 3D shape;” and (2) “to reposition ... slices of the projected inner layer ... from the 3D data.” *Doo* does not disclose a virtual 3D shape configured to be controlled to reposition slices of the projected inner layer from the 3D data, particularly the repositioning of the 3D while the projected 3D data is fixed on a patient. See PO’s Response, 40-42. *Amira*’s “Virtual Reality Option” does not remedy these deficiencies, as Medivis contends (See Reply, 22) at least because it cannot be used in an AR environment and does not reposition portions of inner layers of a 3D volume while it is projected onto a patient. See Ex. 2004, Ros.Dec., ¶ 114; Ex. 2002, Mul.Dec.,

¶ 96.⁴ Importantly, the repositioning function in claim 3 is not the same as merely rotating an object in space. *See* Ex. 2004, Ros.Dec., ¶ 174 (“A POSITA would ... understand that the projected 3D data is not rotated because it’s registered to the patient.”).

D. Claims 12-20 are Not Obvious in view of *Doo* and *Amira*.

Medivis argues that “altering the color gradient is disclosed in *Doo* and *Amira*.” Reply, 24. Medivis’ argument lacks merit. Specifically, Medivis equates changing the brightness of an image with “altering the original color gradient” and then cites *Doo*’s opacity adjustments in an effort to carry its burden. Reply, 23. But there is no evidence that a POSITA would equate changing the brightness of an image to altering an image’s color gradient. Medivis makes the same unsupported and illogical argument with respect to *Amira* (*id.* at 25), which likewise lacks merit. *See* Ex. 2004, Ros.Dec., ¶ 154 (“*Amira*’s color adjustment on a computer monitor, or even in VR, is much different from altering the color gradient of a direct volume 3D rendering on to ... actual views of a patient ... in an AR environment.”).

⁴ Medivis relies on *Amira*’s “Virtual Reality Option User’s Guide,” but only cites to *Amira*’s table of contents—Ex. 1005, vi/10-vii/11. Medivis claims that it “previously served a complete version of *Amira*—Ex. 2024. Reply, 22. However, this Exhibit, among others, was not served with Medivis’ Petition and, therefore it and the others are not evidence.

Finally, Medivis argues that the '271 Patent must involve segmentation like *Amira* otherwise “the claimed invention could not represent any tissue property with an altered color gradient.” Reply, 26 n5. However, the 3D dataset of the '271 Patent is not segmented, or surface rendered. Indeed, the '271 Patent does not mention segmentation or surface rendering at all. “*Amira*’s labeling of [segmented] surface models is very different from identifying tissue properties within the direct volume rendered 3D data.” PO Response, 47 (citing Ex. 2002, Mul.Dec., ¶ 143). As such, neither *Doo* nor *Amira* discloses the ‘altering’ step of claims 11-20. See PO’s Response, 43-48.

VIII. CLAIMS 1-6 AND 11-20 ARE NOT OBVIOUS IN VIEW OF *CHEN*, *3D VISUALIZATION*, AND *3D-SLICER*.

A. No Motivation to Combine *Chen*, *3D Visualization*, and *3D-Slicer* (“the Chen Combination”).

Medivis repeats its argument from its Petition, which Novarad has already responded to. In sum, Rosenberg provided unrebutted testimony that “a POSITA would not have been motivated to so combine *Chen*, *3D Slicer*, and *3D Visualization*, nor do I believe that they would have had a reasonable expectation of success” because neither *Chen*, *3D Slicer*, nor *3D Visualization* disclose:

- (1) “navigating 3D data while it is projected onto non-image actual views of a patient;”

- (2) “any virtual tool ‘configured to be controlled’” or “that can be used to ‘assist the user when navigating the projected 3D data;’” or
- (3) “adjust[ing] the color gradient of direct volume rendered 3D data ‘to be better visible when projected onto real-time, non-image actual views of ... a patient.’”

See PO’s Response (citing Ex. 2004, Ros.Dec., ¶¶ 186-7).

B. Claims 1-6 are Not Obvious in view of the *Chen* Combination.

Medivis repeats its arguments from its Petition, to which Novarad has already responded. See PO’s Response, 52-60. In sum, neither *Chen*, *3D Slicer*, nor *3D Visualization* (“Chen Combination”) disclose navigation of a 3D volume of imaging data in any direction while it is projected onto a patient in an AR environment. *Chen* projects only surface models. See Ex. 2004, Ros.Dec., ¶ 101. And *3D Slicer* and *3D Visualization* cannot display medical imaging in an AR environment at all. See Ex. 2004, Ros.Dec., ¶¶ 104, 111-12. If they could, they do not disclose, for example, manipulating 3D slices of a rendered image while it is fixed on a patient.

C. Claims 11-20 are Not Obvious in view of the *Chen* Combination.

Medivis repeats its arguments from its Petition, to which Novarad has already responded. See PO’s Response, 60-62. As stated above, *Chen* projects only surface models of segmented anatomic features and were not created to be sliced, repositioned, or navigated. Ex. 2002, Mul.Dec., ¶ 156. *3D Slicer* and *3D*

Visualization cannot project anything in an AR environment. *See supra*, 28.

Moreover, the *Chen* Combination does not disclose altering the color gradient to identify any of the characteristics specifically identified in claims 12-19. Ex. 2002, Mul.Dec., ¶ 161.

As with *Amira*, Medivis argues that the '271 Patent must involve segmentation in an attempt to make *Chen* relevant. Reply, 29. However, the '271 Patent does not teach or suggest any segmentation. Medivis argues that *Chen*'s altering of the color gradients of segmented surface rendered models renders claims 11-20 obvious, but the 3D data of the challenged claims is not surface rendered nor segmented.

IX. CONCLUSION

The Board should deny the Petition in its entirety.

Dated: November 21, 2023

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CERTIFICATE OF COMPLIANCE PURSUANT TO 37 C.F.R. §42.24

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing **PATENT OWNER SUR-REPLY** complies with the typeface requirements of 37 C.F.R. §42.6(a)(ii) and the style requirements of 37 C.F.R. §§42.6(a)(iii) and (iv). This document contains 5,548 words, excluding the parts exempted as provided in 37 C.F.R. § 42.24(b). The undersigned relies on the word count of the computer program used to prepare this brief.

Dated: November 21, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a correct copy of this Patent Owner Sur-Reply was served upon the Petitioner on November 21, 2023, by email to the email addresses identified in Petitioner's Updated Mandatory Notices dated February 2, 2023:

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Dated: November 21, 2023

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