

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

3SHAPE A/S and 3SHAPE INC.
Petitioners

v.

MEDIT CORPORATION
Patent Owner

Case No. IPR2024-01265
Patent 9,262,864

**DECLARATION OF ELI SABER IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,262,864**

3SHAPE EXHIBIT 1005
3Shape v. Medit

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APPENDIX A

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EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 9,262,864, issued on February 16, 2016 to J. Rohaly <i>et al.</i> (“the ’864 Patent”)
1002	File History of U.S. Patent Application No. 14/487,371, filed on September 16, 2014
1004	U.S. Provisional Application No. 60/947,009, filed on June 29, 2007
1007	<i>Curriculum Vitae</i> of Eli Saber
1008	U.S. Patent Publication No. 2003/0018250 (“Trousset”)
1009	U.S. Patent Publication No. 2006/0119622 (“Kariathungal”)
1012	U.S. Patent Publication No. 2002/0055082 (“Durbin”)
1013	U.S. Patent Publication No. 2005/0089822 (“Geng”)
1014	U.S. Patent Publication No. 2006/0020363 (“Orth”)
1017	Claim Construction Order for U.S. Patent Nos. 7,912,257; 9,191,648; 9,245,374; 9,262,864 filed on May 31, 2024 in <i>Medit Corporation v. 3Shape A/S</i> , Civ. Action No. 6:23-cv-00658 (WDTX)
1019	Multiple View Geometry in computer vision, Richard Hartley and Andrew Zisserman, Second Edition (2003), Introduction pp. 1-21.

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I, Eli Saber, hereby state as follows:

I. INTRODUCTION

1. I have been retained by Buchanan Ingersoll & Rooney (“Counsel”) on behalf of 3SHAPE A/S (“Petitioner”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

2. I have been asked by Counsel to provide opinions regarding Claims 3-7 and 9-13 of U.S. Patent No. 9,262,864 (“the ’864 Patent”). My opinions and the bases for my opinions are set forth below.

3. I am being compensated at my ordinary and customary consulting rate for my work, which is \$500 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

4. This report is based on information currently available to me. I reserve the right to continue my investigation and analysis, which may include a review of documents and information not listed above. I also reserve the right to expand or otherwise modify my opinions and conclusions as my investigation and study

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continues, and to supplement my opinions and conclusions in response to any additional information that becomes available to me.

II. BACKGROUND AND QUALIFICATIONS

5. All my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and teaching the technology referenced in this declaration.

6. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. I understand that a copy of my current curriculum vitae, which details my education and professional and academic experience, is being submitted as EX1007. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this declaration.

7. I am a Professor in the Department of Electrical and Microelectronic Engineering (EME) and the Chester F. Carlson Center for Imaging Science at the Rochester Institute of Technology (RIT) in Rochester, New York. I also serve as the Director of the Image, Video and Computer Vision Laboratory. I joined RIT's full-time faculty in 2004. I have over thirty-four (34) years of industry and academic experience, thirty (30) of which are in the fields of Computer Vision, Digital Image/Video Processing, Pattern Recognition, and Machine Learning.

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8. I received a Ph.D. in Electrical Engineering from the University of Rochester in 1996. My concentration was in Signal/Image/Video Processing, Pattern Recognition, and Computer Vision. I received a Master of Science Degree in Electrical Engineering from the University of Rochester in 1992 in the same concentration as listed above, and I received a Bachelor of Science Degree in Electrical and Computer Engineering, Summa Cum Laude, from the State University of New York at Buffalo in 1988.

9. Before becoming a full-time professor, I worked for Xerox Corporation for 16 years, from 1988 to 2004. During my years at Xerox, I was responsible for delivering color management, image processing innovations, architectures, and algorithms; xerographic sub-systems for a variety of color products; and control systems for toner production facilities. One of several roles I held at Xerox was Advanced Development Scientist and Manager. In that capacity, I established the Advanced Design Laboratory—an Imaging/Xerographics lab—and provided technical and managerial leadership for the Electrical, Imaging and Xerographics Department. In another role, as Product Development Scientist and Manager, I led the research and development of image quality metrics for various product platforms. I also led the Image Science, Analysis, and Evaluation area, with 12 to 15 direct reports and a budget of approximately \$2 million.

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10. From 1997 until 2004, I was an adjunct faculty member at the Electrical Engineering Department of the Rochester Institute of Technology and at the Electrical & Computer Engineering Department of the University of Rochester. I was responsible for teaching undergraduate and graduate coursework such as Digital Signal Processing, Digital Image Processing, Digital Video Processing, Pattern Recognition, Detection and Estimation Theory and Communication Systems; and performing research in multimedia applications, pattern recognition, image understanding and color engineering.

11. Since joining RIT full time, I have been responsible for teaching several undergraduate and graduate courses in Digital Signal Processing, Digital Image Processing, Digital Video Processing, Pattern Recognition, Advanced Neural Networks and Deep Learning, Engineering Analysis, Random Signal & Noise, Advanced Engineering Mathematics, Matrix Methods, Communications, Modern Control Theory, and Linear Systems.

12. I proposed, developed and introduced the Digital Video Processing and the Advanced Neural Network and Deep Learning courses; and reestablished the Pattern Recognition course at the Electrical Engineering Department at RIT. These graduate courses were instrumental in providing MS/PhD students with the proper

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foundation and knowledge in all aspects of the subject areas in order to perform in-depth research in the field and continue to advance the state of the art.

13. The Digital Video Processing course is designed to provide a thorough and comprehensive coverage of the field. Topics covered include the mathematical representation of digital video including motion and time-varying image formation models, spatio-temporal sampling/reconstruction, sampling structure conversions, motion estimation using optical flow, block-based, pel-recursive, Bayesian and point correspondence type methodologies, segmentation, motion tracking, filtering, restoration, super-resolution and image/video compression.

14. The Pattern Recognition course, on the other hand, covers pertinent concepts in Bayes decision theory, linear and nonlinear classifiers, artificial neural networks, feature selection/generation/extraction and various types of clustering algorithms and techniques.

15. The “Advanced Neural Networks and Deep Learning: Theory, Mathematics and Algorithms” course is intended to provide an in-depth comprehensive study of the theory, mathematics and algorithms for advanced neural networks and their usage in deep learning. It is primarily targeted for upper graduate students that are planning to pursue advanced studies/research in the field. The course begins with an in-depth study of the mathematical methodologies for neural

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networks and optimization (zero-, first- and second-order) techniques. It then progresses to provide a thorough study of shallow and deep neural networks architectures and algorithms, activation functions, regression, two- and multi-class classification, unsupervised learning, feature engineering/selection, backpropagation along with applications to a variety of engineering problems.

16. I am currently working to develop a follow-on course (part 2) to the Advanced Neural Networks and Deep Learning course described above. This course is intended to cover convolutional and recurrent style neural networks, principles of feature engineering, kernel methods, tree-based learners, attention mechanisms/transformers, reinforcement learning and generative adversarial networks. This course is being targeted to debut in Fall 2025.

17. My current research focuses on machine learning for object tracking/remote sensing applications; image/video processing for multimedia, military & biomedical applications; and computer vision and three-dimensional scene reconstruction. As a principal investigator (PI) or co-principal investigator, I have acquired almost \$6 million in research funding since joining RIT and have managed multiple government grants from the Department of Defense as well as several corporate grants from Hewlett-Packard, Lenel, and Data Physics. I am currently managing (as PI) a multiyear government grant from the Department of

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Defense titled “Target Detection/Tracking and Activity Recognition from Multimodal Data.” In this project, we propose to develop operational target detection/tracking techniques and activity recognition/understanding methods that can leverage multimodal data in a fusion framework using deep learning algorithms while providing accurate and near real-time performance.

18. In 2012, I was awarded the Prestigious Trustees Scholarship, the highest award at RIT with regard to research recognition.

19. I am the author or co-author of thirty-eight (38) peer-reviewed journal publications.

20. I have also authored or co-authored 102 conference and workshop publications and a book entitled Advanced Linear Algebra for Engineers with MATLAB, published by CRC Press in February 2009, and am a named inventor on multiple U.S. and foreign patents.

21. I am a senior member of the Institute of Electrical and Electronic Engineers and a member of the IEEE Signal Processing Society, the Electrical Engineering Honor Society, Eta Kappa Nu.

22. A detailed record of my professional qualifications, including a list of publications, awards, and professional activities, is set forth in my curriculum vitae and is attached to this report as Appendix A.

III. INFORMATION CONSIDERED

23. In preparing this declaration, I have reviewed the '864 Patent, its prosecution history, and the exhibits and documents referenced herein. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

24. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

25. I have been informed that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I have been informed that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

B. Perspective of One of Ordinary Skill in the Art

26. I have been informed that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSITA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I have been informed that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

C. Anticipation

27. I have been informed that a claim is not patentable if it is anticipated. I have been informed that anticipation of a claim requires that every element of a claim is disclosed expressly or inherently in a prior art reference, arranged as in the claim, when considered from the perspective of a person of ordinary skill in the relevant art. I have been informed that when the structure recited in a reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. I have been informed that extrinsic evidence may be used to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter.

D. Obviousness

28. I have been informed that a patent claim is obvious under 35 U.S.C. §103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

29. I have been informed that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long-felt but unmet need, failure of others, copying by others, and skepticism of experts).

30. I have been informed that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. §103. I have been informed that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I have been informed that a POSITA is presumed to know the relevant prior art. I have been informed that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

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31. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;

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- whether the combination is “obvious to try”;
- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces, where the variations are predictable to a POSITA;
- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

32. I have been informed that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is

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some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have been informed, however, that a teaching, suggestion, or motivation to combine is not required.

V. SUMMARY OF OPINIONS

33. It is my opinion that Claims 3-7 and 9-13 of the '864 Patent are unpatentable under 35 U.S.C. §103 at least under on the grounds discussed below.

VI. IDENTIFICATION OF CHALLENGES TO THE CLAIMS

34. The '864 Patent contains 20 claims. I have been asked to opine on the validity of Claims 3-7 and 9-13. Grounds 1-3, which are discussed below in greater detail, are as follows:

Ground	References	Basis	Claims Challenged
1	U.S. Patent Pub. No. 2003/0018250 ("Trousset") (EX1008) in view U.S. Patent Pub. No. 2002/0055082 ("Durbin") (EX1012)	103	3-7 and 9-13
2	U.S. Pat. Pub. No. 2006/0119622 ("Kariathungal") (EX1009) in view of Durbin	103	3-5, 7, and 9-11, 13
3	Kariathungal in view Durbin, and in further view of Trousset	103	6 and 12

VII. LEVEL OF ORDINARY SKILL IN THE ART

35. I have been informed that a POSITA is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity.

36. I believe that a POSITA would have at least (1) a bachelor's degree in electrical engineering, computer engineering, computer science, or an equivalent field, as well as at least two to three years of industry or research experience with computer vision/graphics making use of three-dimensional virtual models; or (2) a master's degree in electrical engineering, computer engineering, computer science, or an equivalent field with a focus in making use of three-dimensional virtual models in the area of computer vision/graphics

VIII. TECHNICAL BACKGROUND

A. The '864 Patent

37. I understand that the '864 Patent was filed on September 16, 2014 as U.S. Patent Application No. 14/487,371 ("the '371 Application"). EX1001. I further understand that the '371 Application is a continuation of U.S. Patent Application No. 12/666,464, filed on November 15, 2010 (U.S. Patent 8,866,883), which is a National Stage of PCT International Application No. PCT/US08/68522, which claims priority to U.S. Provisional Application No. 60/947,009, filed on June 29, 2007 (EX1004).

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38. The '864 Patent is generally directed to display of three-dimensional dental data acquired intraorally from a dental patient. EX1001, Abstract. More particularly, the claims challenged in this proceeding concern display of a three-dimensional dental model alongside still images that were acquired during a three-dimensional scan of the dentition, such that “the two views (model and still image) may be synchronized to provide a common perspective of the model's subject matter.” EX1001, Abstract.

39. According to the '864 Patent, that synchronized display “provides useful visual information for disambiguating surface features of the model during interactive model processing steps such as marking a margin of a prepared tooth surface for a restoration.” EX1001, Abstract.

B. The '864 Patent Examination History

40. A single office action issued rejecting all claims over U.S. Pat. Pub. No. 2005/0089822 (“Geng”) (EX1013) as anticipated and claim 1 as anticipated by U.S. Pat. Pub. No. 2006/0020363 (“Orth”) (EX1014).¹ Important to claims discussed in this Declaration, Applicant amended independent Claim 3 to recite “synchronizing the first window and the second window with the processor to provide a common

¹ The issued and pending claims share the same numbering.

perspective on the subject for both the three-dimensional model and the one of the plurality of images.” EX1002, at 48. Applicant amended independent Claim 9 to recite “synchronize the first window and the second window to provide a common perspective on the subject in both the three-dimensional model and the one of the plurality of images.” EX1002, at 49.

41. In connection with these amendments, Applicant explained that “a system can store a three-dimensional model that was derived from a sequence of still frames of video data,” and that “the source data – the sequence of still frames from the video feed – can be retained to provide visually clear two-dimensional data of dental content from a variety of poses that were used to generate the three-dimensional model.” EX1002, pp. 52-53. Regarding the amendments, Applicant noted that “these two data sources can usefully be presented into a single workspace to concurrently provide the two different and useful sources of visual information as visual context for accurately determining a margin. The claims have been amended to clarify this inventive concept.” *Id.* at 53. Applicant successfully achieved allowance by arguing Geng (EX1013) and Orth (EX1014) both failed to disclose the claimed feature of “synchronizing the first window and the second window with the processor to provide a common perspective on the subject *for both the three-dimensional model and the one of the plurality of images.*” EX1002, at 13

(emphasis added). Instead, both of the applied references are directed solely to rendering and manipulation of three-dimensional models alone.

42. The prior art discussed in this Declaration explicitly discloses the synchronized three-dimensional model and two-dimensional image display that was absent from the prior art applied by the Examiner.

C. Overview of the Prior Art

43. I have been informed that Troussel, Kariathungal, and Durbin all qualify as prior art to the '864 Patent. EX1019 provides some background on three-dimensional computer modeling.

1. Troussel (EX1008)

44. Troussel discloses a system for medical image display that allows a three-dimensional representation to be displayed from a viewpoint corresponding to the viewpoint from which an underlying two-dimensional image was acquired, simultaneously with the two-dimensional image itself. EX1008, Abstract. The two-dimensional image is used to construct the three-dimensional representation. EX1008, Abstract.

45. Troussel includes a single FIGURE with displays 3a, 3b, and 3c – along with storage 5 and 3D representation management subsystem 7. EX1008, ¶[0019]. Storage 5 stores two-dimensional images acquired by various technologies including

X-ray imaging, CT tomography, or magnetic resonance. EX1008, ¶[0019]. Storage 5 also stores additional imaging parameters “such as the angular orientation of the imaging direction and possibly other parameters: field of view, distance between the source and the detectors, sensor resolution, position of the table on which the patient lies, rotation of the sensors in their plane, rotation of the image acquired, geometric operations on the image, etc.” EX1008, at ¶[0020].

46. 3D representation management subsystem 7 is configured to reconstruct three-dimensional models from the two-dimensional images stored in storage 5. EX1008, at ¶[0024].

47. Troussel’s displays 3a, 3b, and 3c allow simultaneous display of various image types, including a three-dimensional representation and a previously acquired two-dimensional image that was used to construct the three-dimensional representation. EX1008, ¶¶[0022]-[0023]. Such display is from the same viewpoint (i.e. the same imaging orientation), to assist in a surgical procedural theater, as summarized by Troussel:

“[I]n order to display **3D images** corresponding to the models thus reconstructed, the subsystem 7 comprises means for computing which automatically orient **the 3D representation** so that it corresponds *substantially to the same viewpoint* as **a 2D image** with which it must be

displayed on the means 3, and particularly to the *same imaging orientation as the latter.*” EX1008, ¶[0027] (emphasis added).

2. Kariathungal (EX1009)

48. Kariathungal also discloses a system for medical image display that allows a three-dimensional representation to be displayed from a viewpoint corresponding to the viewpoint from which an underlying two-dimensional image was acquired, simultaneously with the two-dimensional image itself. EX1009, Abstract. The two-dimensional image is used to construct the three-dimensional representation. EX1009, Abstract.

49. Kariathungal’s system comprises a computer unit 180 that includes a picture archival communication system (PACS) configured to create a three-dimensional model with a processor from a sequence of images sets stored in a memory. EX1009, ¶[0024]; ¶[0009]. Kariathungal explains that a variety of different imaging technologies may be used to capture its two-dimensional images stored and managed by its Picture Archival Communication Systems (PACS), including x-ray, ultrasound, CT, MRI, EBT, MR, or nuclear medicine. EX1009, ¶[0007].

50. As one example embodiment, Kariathungal’s Figure 6 embodiment includes windows/regions 622, 624, 626, or 628 within the same display unit 620 in which one previously acquired two-dimensional image (used to create a three-

dimensional model) may be displayed according to its disclosed display protocol. EX1009, ¶[0042].

51. Continuing with the Figure 6 embodiment, Kariathungal also discloses rendering a three-dimensional model within one of windows/regions 622, 624, 626, or 628 within the same display unit 620 as a corresponding two-dimensional image in its own “window,” as summarized by Kariathungal:

“[A] display protocol for medical imaging equipment may allow at **least one three-dimensional medical image to be concurrently displayed with at least one two-dimensional medical image**. The three-dimensional medical image may be linked with the two-dimensional medical image so a user can manipulate the viewing angle and pointer in the linked images.” EX1009, Abstract (emphasis added).

3. Durbin (EX1012)

52. Durbin “relates to intra-oral methods and apparatus for optically imaging a structure and creating representative 3D models from the images.” EX1012, Abstract.

53. Significant to this Petition, Durbin evidences the understanding of a POSITA concerning multi-aperture scanning systems and the capture of image sets with each image in the set captured from a different optical axis;

“FIG. 3 shows another embodiment with multiple image apertures that require only lateral motion. In this embodiment a plurality of image apertures 132A and the illuminator(s) 134A are mounted in a known orientation to one another on a laterally moveable apparatus. The number of image apertures and their orientation is selected to provide sufficient coverage and overlap of the dental structure to be modeled at the desired resolution. At each lateral position, an image from each of the apertures 132A is recorded for later processing.” EX1012, ¶[0047].

IX. CLAIM CONSTRUCTION

54. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the '864 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. This is reflected in the Claim Construction Order from the District Court proceeding included as Exhibit 1017. In determining the ordinary and customary meaning, I have been informed that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also have been informed that the claims, specification, and file history may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. I have been informed that even treatises and dictionaries may be used

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under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

55. I have reviewed the '864 Patent and its prosecution history as well as additional documents and have used a plain-meaning understanding for each claim term.

X. CLAIMS 3-7 AND 9-13 WOULD HAVE BEEN OBVIOUS OVER TROUSSET (EX1008) IN VIEW OF DURBIN (EX1012) (GROUND 1).

56. In my opinion, claims 3-7 and 9-13 are unpatentable over Troussset in view of Durbin.

57. The following sections explain where each element of these claims is found in the prior art.

A. Claim 3 (Preamble): A method comprising:

58. Troussset discloses a method that includes the steps (among others) of creating a three-dimensional model [3.1], along with displaying one of the plurality of images (used to create that model) in a first window of a display [3.2] and rendering the three-dimensional model with its processor in a second window of the display [3.3].

59. As Troussset succinctly explains:

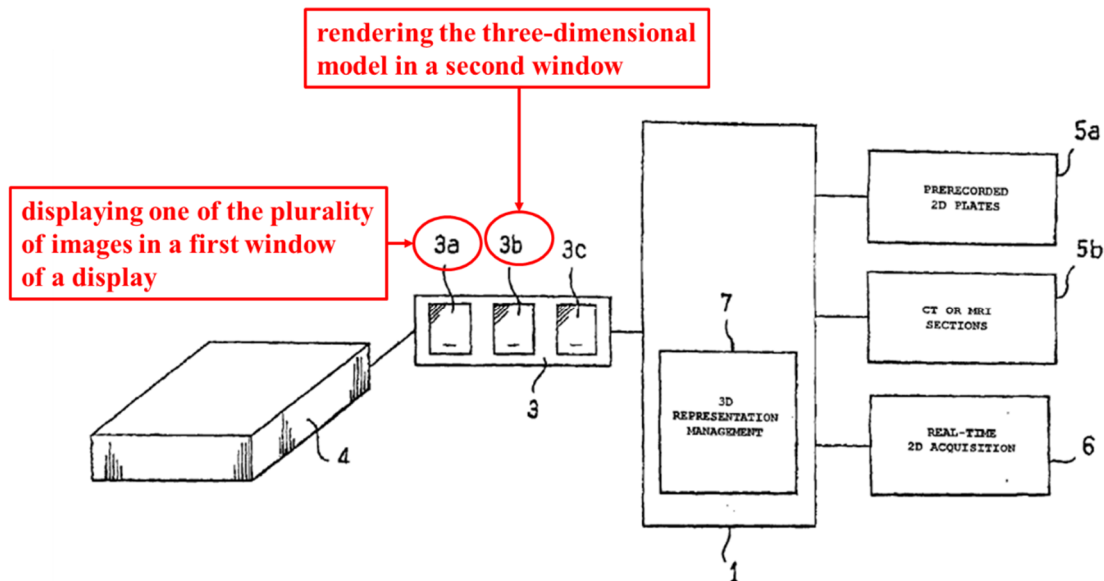
“In the example illustrated in the drawing FIGURE, provision the means for display 3 may comprise three

different screens 3a, 3b, and 3c, allowing the simultaneous display of these various image types.”

¶[0023] (emphasis added)

“[I]n order to display 3D images corresponding to the models thus reconstructed, the subsystem 7 comprises means for computing which automatically orient the 3D representation so that it corresponds *substantially to the same viewpoint* as a 2D image with which it must be displayed on the means 3, and particularly to the *same imaging orientation as the latter.*” ¶[0027] (emphasis added); see also Abstract.

60. An example of Troussel’s FIGURE annotated to reflect its disclosure is provided below (annotations in **RED**):



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61. In my opinion, Troussel discloses all of the requirements of the preamble of Claim 3.

1. **[3.1]: creating a three-dimensional model with a processor from a sequence of image sets stored in a memory, each image set including a plurality of images of a subject, each one of the plurality of images in each image set captured from a different optical axis;**

62. Element [3.1] is disclosed in Troussel (EX1008).

63. Troussel's system includes a processing unit 1 with a 3D representation management subsystem 7 as the claimed processor. ¶[0019] ("The drawing FIGURE shows schematically an imaging system comprising a means for processing unit 1 and means forming an interface 2 which comprise one or more screens 3 and a control box 4, for example, with buttons and a joystick."). ¶[0022] ("[The processing unit 1] also manages, via a subsystem 7, the reconstruction of 3D models and the display of corresponding images.").

64. Troussel's processing unit 1 via 3D representation management subsystem 7 is configured to create a three-dimensional model from a sequence of image sets stored in storage 5 as the claimed memory. As explained by Troussel:

"The three-dimensional models are, in particular, reconstructed by the subsystem 7 from 2D images and particularly from some of the images acquired by X-ray (not fluoroscopy) prior to the operation and stored in the

means for storage 5a.” ¶[0024]; *see also* ¶[0016] (3D models from X-ray images); ¶[0017] (3D models from CT or MRI); ¶[0019] (storage of previously acquired 2D images); ¶[0024], ¶[0026] (3D model reconstruction from previously acquired 2D images); Claim 17 (3D models from X-rays); Claim 18 (3D models from CT or MRI).

“A method and system for medical image display comprising means for acquiring two-dimensional images; means for displaying images; means for managing the display of a three-dimensional representation on the means display and for **automatically orienting the three-dimensional representation** according to at least one operating parameter of the means for acquisition means so that **the three-dimensional representation** is viewed on the means for display **from a viewpoint corresponding to that** from which the means for image acquisition acquire or **have acquired a two-dimensional image.**”
Abstract (emphasis added).

65. Concerning “each image set including a plurality of images of a subject, each one of the plurality of images in each image set captured from a different optical axis,” Troussel’s stored two-dimensional images used to create its three-dimensional model are sets of images. And, each one of the plurality of images in each image set

was captured from a different optical axis. Troussel uses the information concerning the parameters of the two-dimensional image acquisition to drive its process of orienting its three-dimensional model into the same perspective, including the angular position of the imaging means that was used during the imaging process as a “different optical axis” as between individual images.

66. Troussel explains exactly this:

“For each image or plate, the means for storage 5 a and 6 store, in addition to the matrices with pixels, **the imaging parameters to which the image corresponds**, such as the **angular orientation of the imaging direction** and possibly other parameters: field of view, distance between the source and the detectors, sensor resolution, position of the table on which the patient lies, **rotation of the sensors in their plane, rotation of the image acquired**, geometric operations on the image, etc.” ¶[0020] (emphasis added)

“The processing implemented by the means for computing of the subsystem 7 for automatically orienting the 3D representation may be particularly simple and, for example, be based on a **simplified geometric description of the parameters involved on image acquisition**. In particular, the path of the X-ray tubes and of the detectors

around their pivot shaft may be deduced simply **from information relating to the angular position.** ¶[0030] (emphasis added); *see also* ¶¶[0027]-[0028], [0033], [0008], [0011]-[0011], (discussing parameters relating to imaging orientation of 2D images).

67. While Troussel does not expressly state precisely how its two-dimensional images were obtained from different optical axes and stored in its sets to implement its viewing capabilities discussed above, multi-aperture scanner/camera arrangements were known to obtain a plurality of two-dimensional image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis.” In such arrangements, images are obtained from different optical axes and stored its sets not by simply moving the imaging apparatus (e.g. an intra-oral scanner) relative to the structure being imaged, but instead multiple images from different optical axes are captured at the same overall position of the imaging apparatus relative to the structure being imaged using the multiple apertures.

68. The '864 Patent acknowledges these multi-aperture scanner/camera arrangements that obtained a plurality of two-dimensional image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis” were known in the prior art.

69. As stated by the '864 Patent:

“While Rohály discloses one multi-aperture system, it will be appreciated that any multi-aperture system suitable for reconstructing a three-dimensional point cloud from a number of two-dimensional images may similarly be employed.” EX1001, 9:9-13.

70. Durbin discloses a multi-aperture arrangement that a POSITA would have understood is exemplary of how the two-dimensional images of Troussset’s system would have been captured and organized to implement its system with viewing capabilities of two-dimensional images from different optical axes:

“FIG. 3 shows another embodiment with multiple image apertures that require only lateral motion. In this embodiment a plurality of image apertures 132A and the illuminator(s) 134A are mounted in a known orientation to one another on a laterally moveable apparatus. The number of image apertures and their orientation is selected to provide sufficient coverage and overlap of the dental structure to be modeled at the desired resolution. At each lateral position, an image from each of the apertures 132A is recorded for later processing.” Durbin, ¶[0047].

71. In my opinion, Troussset discloses all of the requirements of Element [3.1].

2. [3.2]: displaying one of the plurality of images in a first window of a display:

72. Element [3.2] is disclosed in Troussel (EX1008).

73. Troussel's system displays one of its plurality of images in a first window of a display. Specifically, Troussel teaches display of one of its two-dimensional previously acquired images on one of screens 3a, 3b, or 3c as the claimed "first window of a display.":

"In the example illustrated in the drawing FIGURE, provision the means for display 3 may comprise three different screens 3a, 3b, and 3c, allowing the simultaneous display of these various image types."

¶[0023] (emphasis added).

"[I]n order to display 3D images corresponding to the models thus reconstructed, the subsystem 7 comprises means for computing which automatically orient the 3D representation so that it corresponds substantially to the same viewpoint as a 2D image with which it must be displayed on the means 3, and particularly to the same imaging orientation as the latter." ¶[0027] (emphasis added).

74. Troussel's individual screens 3a, 3b, and 3c are individual windows. In addition, Troussel contemplates images displayed simultaneously within regions of a single one of screens 3a, 3b, or 3c as the claimed "windows":

"Of course, other types of display are possible; in particular, the various image types can be displayed simultaneously on the same screen, subdivided into several display regions." ¶[0023].

75. In my opinion, Troussel discloses all of the requirements of Element [3.2].

3. [3.3]: rendering the three-dimensional model with the processor in a second window of the display; and

76. Element [3.3] is disclosed in Troussel (EX1008).

77. Troussel's system renders the three-dimensional model with its processor (processing unit 1 via 3D representation management subsystem 7) in a second window of the display. Specifically, Troussel teaches rendering the three-dimensional model on one of screens 3a, 3b, or 3c, or within the same screen as a corresponding two-dimensional image in its own "window" as the claimed "second window of a display."

"In the example illustrated in the drawing FIGURE, provision the means for display 3 may comprise three different screens 3a, 3b, and 3c, allowing the

simultaneous display of these various image types. Of course, other types of display are possible; in particular, the various image types can be displayed simultaneously on the same screen, **subdivided into several display regions.** ¶[0023] (emphasis added).

“[I]n order to display **3D images** corresponding to the models thus reconstructed, the subsystem 7 comprises means for computing which automatically orient the 3D representation so that it corresponds substantially to the same viewpoint as a 2D image with which it must be **displayed on the means 3,** and particularly to the same imaging orientation as the latter.” ¶[0027] (emphasis added).

78. In my opinion, Troussel discloses all of the requirements of Element [3.3].

4. **[3.4]: synchronizing the first window and the second window with the processor to provide a common perspective on the subject for both the three-dimensional model and the one of the plurality of images**

79. Element [3.4] is disclosed in Troussel (EX1008).

80. Troussel’s display of its two-dimensional image and rendering of its three-dimensional model are synchronized between its first and second windows, as Troussel explains:

“[I]n order to display **3D images** corresponding to the models thus reconstructed, the subsystem 7 comprises means for computing which automatically orient **the 3D representation** so that it corresponds *substantially to the same viewpoint* as **a 2D image** with which it must be **displayed on the means 3**, and particularly to the *same imaging orientation as the latter*.” ¶[0027] (emphasis added); *see also* ¶[0023] (discussing simultaneous display).

“When the radiologist now wishes better understanding of a series of prerecorded 2D images, a second operating mode for the system is selected. In the second mode, the means for storage 5 automatically transmit the parameters relating to the imaging which corresponds to the series of image on which the radiologist wishes to focus, to the subsystem 7 which manages the 3D image. The subsystem 7 **then automatically adjusts the 3D representation so that it corresponds to the same viewpoint and possibly to the same scale and to the same centering as the 2D plates which are displayed**.” ¶[0033] (emphasis added); ¶[0034] (preselected orientations); Claim 1(c); Claim 3; Claim 4; Claim 19(c); Claim 20(d).

81. In my opinion, Troussel discloses all of the requirements of Element [3.4].

B. Claim 4: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and rotating the three-dimensional model to maintain the common perspective.

82. Troussel discloses the additional limitations of Claim 4.

83. Troussel's system allows a user to select a different one of the plurality of images (used to construct its three-dimensional model) which rotates its three-dimensional model to maintain the common perspective:

“When the radiologist now wishes better understanding of a series of prerecorded 2D images, a second operating mode for the system is selected. In the second mode, the means for storage 5 automatically transmit the parameters relating to the imaging which corresponds to the series of image on which the radiologist wishes to focus, to the subsystem 7 which manages the 3D image. The subsystem 7 **then automatically adjusts the 3D representation so that it corresponds to the same viewpoint and possibly to the same scale and to the same centering as the 2D plates which are displayed.**” ¶[0033] (emphasis added); *see also* ¶[0022] (discussing user selection of 2D images); ¶[0024] (discussing creation of 3D models from 2D images); ¶[0028] (discussing translating 3D model); ¶¶[0029], [0031] (discussing scaling 3D model); Abstract,

¶¶ [0007], [0010], [0011], [0027] (discussing display of 3D model in the same orientation as stored 2D image).

84. In my opinion, Troussel discloses the requirements of Claim 4.

C. Claim 5: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and translating the three-dimensional model to maintain the common perspective.

85. Troussel discloses the additional limitations of Claim 5.

86. Troussel's system allows a user to select a different one of the plurality of images (used to construct its three-dimensional model) which *translates* its three-dimensional model to maintain the common perspective:

“Also, the means for management comprises means for automatically translating the three-dimensional representation and in centering it in the same way as a two-dimensional image acquired in real time or previously acquired. It may also comprise means for automatically adjusting the scale of the three-dimensional representation with respect to a two-dimensional image acquired in real time or previously acquired.” ¶[0012] (emphasis added); *see also* ¶[0028], Claims 5-7.

87. In my opinion, Troussel discloses all of the requirements of Claim 5.

D. Claim 6: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and scaling the three-dimensional model to maintain the common perspective.

88. Troussel discloses the additional limitations of Claim 6.

89. Troussel's system allows a user to select a different one of the plurality of images (used to construct its three-dimensional model) which *scales* its three-dimensional model to maintain the common perspective:

“Also, the means for management comprises means for automatically translating the three-dimensional representation and in centering it in the same way as a two-dimensional image acquired in real time or previously acquired. It may also comprise means for automatically adjusting the scale of the three-dimensional representation with respect to a two-dimensional image acquired in real time or previously acquired.” ¶[0012] (emphasis added); *see also* ¶[0029], [0031], Claim 8-14, Claim 21-22.

90. In my opinion, Troussel discloses all of the requirements of Claim 6.

E. Claim 7: The method of claim 3 further comprising receiving a user selection of a different perspective of the three-dimensional model and selecting a new one of the plurality of images to maintain the common perspective.

91. Troussel discloses the additional limitations of Claim 7.

92. Troussel's system allows a user to select a different perspective of the three-dimensional model which selects a new one of the plurality of images (used to construct its three-dimensional model) to maintain the common perspective:

“In a third operating mode, the means for management unit is programmed to allow the radiologist to store one or more orientations which correspond to particularly interesting views of the anatomical region that is being studied, when analysis is made of the 3D model. The radiologist may then recall these preselected orientations during the operations.” ¶[0034].

93. In my opinion, Troussel discloses all of the requirements of Claim 7.

F. Claim 9 (Preamble): A system comprising:

94. Troussel discloses the additional limitations of Claim 9.

95. Troussel discloses a system with each of the claimed features of claim 9, as detailed below. *See also* Claim 3 (detailing the method of 2D and 3D display of Troussel's system).

1. **[9.1]: a memory storing a three-dimensional model of a subject and a sequence of image sets used to create the three dimensional model, each image set including a plurality of images of a subject, each one of the plurality of images in each image set captured from a different optical axis;**

96. Troussel discloses Element [9.1].

97. Troussel's system includes a memory that can store a previously constructed three-dimensional model of a subject:

“In a third operating mode, the means for management unit is programmed to allow the radiologist to store one or more orientations which correspond to particularly interesting views of the anatomical region that is being studied, when analysis is made of the 3D model. The radiologist may then recall these preselected orientations during the operations.” ¶[0034].

98. The claim language concerning three-dimensional model creation and image sets is substantially the same as that for Claim 3, element [3.1], which is incorporated here by reference. In addition, a POSITA would have appreciated that any generated three-dimensional model in Troussel will be stored in a memory, whether temporary or persistent.

99. In my opinion, Troussel discloses all of the requirements of Element [9.1].

2. **[9.2]: a display configured to provide a user interface displaying one of the plurality of images in a first window; and**

100. Troussel discloses Element [9.2].

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101. Troussel's display 3 is connected to control box 4 which may include a keyboard, buttons, and a joystick as a user interface to its system, which allows selections such as a specific two-dimensional image among the stored sets:

“The drawing FIGURE shows schematically an imaging system comprising a means for processing unit 1 and means forming an interface 2 which comprise one or more screens 3 and a control box 4, for example, with buttons and a joystick.” ¶[0019].

“The means for processing unit 1 manages the display of the 2D plates acquired before the operation or of the 2D images acquired in real time, depending on the selections controlled by the user from the interface keyboard 4.”
¶[0022].

102. As explained above with reference to Claim 3, element [3.2], Troussel's display is configured to display one of its plurality of images in a first window.

103. In my opinion, Troussel discloses all of the requirements of Element [9.2].

3. **[9.3]: a processor configured to render the three-dimensional model in a second window displayed in the user interface concurrently with the one of the plurality of images in the first window and to synchronize the first window and the second window to provide a common perspective on the subject in both the three-dimensional model and the one of the plurality of images.**

104. Troussel discloses Element [9.3].

105. As explained above with reference to Claim 3, element [3.1] Troussel's processing unit 1 via 3D representation management subsystem 7 is configured to create a three-dimensional model from a sequence of image sets stored in a memory as storage 5.

106. The claim language concerning rendering the created three-dimensional model in a second window is substantially the same as that for Claim 3, elements [3.3] and [3.4], which is incorporated here by reference.

107. In my opinion, Troussel discloses all of the requirements of Element [9.3].

G. Claim 10: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and rotate the three-dimensional model to maintain the common perspective.

108. Troussel discloses the additional limitations of Claim 10.

109. *See* Claim 4 addressing identical language, but in method form.

110. In my opinion, Troussel discloses all of the requirements of Claim 10.

H. Claim 11: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and translate the three-dimensional model to maintain the common perspective.

111. Troussel discloses the additional limitations of Claim 11.

112. *See* Claim 5 addressing identical language, but in method form.

113. In my opinion, Troussel discloses all of the requirements of Claim 11.

I. Claim 12: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and scale the three-dimensional model to maintain the common perspective.

114. Troussel discloses the additional limitations of Claim 12.

115. *See* Claim 6 addressing identical language, but in method form.

116. In my opinion, Troussel discloses all of the requirements of Claim 12.

J. Claim 13: The system of claim 9 wherein the processor is configured to receive a user selection of a different perspective of the three-dimensional model and select a new one of the plurality of images to maintain the common perspective.

117. Troussel discloses the additional limitations of Claim 13.

118. *See* Claim 7 addressing identical language, but in method form.

119. In my opinion, Troussel discloses all of the requirements of Claim 13.

K. Explanation of Why Claims 3-7 and 9-13 Would Have Been Obvious over Troussel in View of Durbin (Ground 1)

120. Claims 3-7 and 9-13 would have been obvious over Troussel (EX1008) in view of Durbin (EX1012).

1. Difference between the claimed invention and the prior art.

121. As discussed above in Paragraphs 62-71, Troussel discloses details concerning the use of its model and two-dimensional image viewing system, but it does not expressly state precisely how its two-dimensional images are captured from different optical axes and stored to implement its viewing capabilities. Durbin provides that express disclosure in the form of a multi-aperture scanner/camera arrangement that obtains a plurality of two-dimensional image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis.”

2. A POSITA would have had motivation to combine the disclosures of Troussel and Durbin

122. A POSITA would have been motivated to apply Durbin’s disclosure concerning multi-aperture scanner/camera arrangements that obtain a plurality of two-dimensional images from different optical axes to confirm how a POSITA would have implemented Troussel’s existing model and two-dimensional imaging viewing system. Given the existing details of Troussel’s system that allows for viewing of two-dimensional images from different optical axes, a POSITA would have already been aware that multi-aperture scanner/camera arrangements, such as the one disclosed in Durbin, provided the ability to capture two-dimensional images in a form that readily met the requirements of Troussel’s system for recall and later

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viewing. In addition, Durbin itself provides motivation to a POSITA to use its multi-aperture scanner/camera arrangement disclosure because it efficiently facilitates “automated intra-oral scanning of all the dental structures in the jaw through an optical aperture and combines the information available in the entire set of images to create and present an accurate 3D model of the scanned structures. The system allows intra oral images of dental structures *to be taken rapidly and with high resolution such that the acquired images can be processed into accurate 3D models of the imaged dental structures.*” ¶[0024] (emphasis added). Even further, the understanding that multi-aperture scanner/camera arrangements such as that disclosed in Durbin were known in the prior art is confirmed by the ’864 Patent itself. EX1001, 9:9-13.

3. A POSITA would have had a reasonable expectation of success based on the disclosures of Troussel and Durbin and knowledge generally available in the art.

123. A POSITA would have had a reasonable expectation of success in making the combination of Troussel’s model and two-dimensional imaging viewing system with the multi-aperture scanner/camera disclosure of Durbin relating to capture of two-dimensional images from multiple optical axes. This is so because both references are directed to generation of three-dimensional models from underlying two-dimensional images. *See* Discussion above regarding element [3.1]

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(concerning Troussset's model generation), and Durbin, ¶¶[0052]-[0053] (concerning Durbin's model generation). And, Durbin simply provides a POSITA's existing understanding of capture of two-dimensional images using a multi-aperture scanner/camera arrangement which two-dimensional images would have been stored in Troussset's existing storage system to facilitate its viewing capabilities.

124. Combining the disclosures of Troussset with Durbin would only require the use of “known methods”—using each in the same way they were used as disclosed. Specifically, Troussset already discloses maintenance of a three-dimensional model in a common perspective based on selection of a two-dimensional image and all the viewing capabilities of its underlying model and imaging viewing system – And, Durbin provides the POSITA's existing understanding of capture of two-dimensional images using a multi-aperture scanner/camera technique demonstrating how a POSITA would have understood two-dimensional images would have been captured to support Troussset's model and two-dimensional imaging viewing and stored in its preexisting storage system. None of the methods would need to be used in an unexpected or unintended way. Each would be fulfilling its original purpose and used in an expected way.

125. In my opinion, the combination of Troussset renders obvious all the recited features of Claims 3-7 and 9-13.

**XI. CLAIMS 3-5, 7, 9-11, AND 13 WOULD HAVE BEEN OBVIOUS
OVER KARIATHUNGAL (EX1009) IN VIEW OF DURBIN (EX1012)
(GROUND 2).**

126. In my opinion, claims 3-5, 7, 9-11, and 13 are unpatentable over Kariathungal in view of Durbin. The following sections explain where each element of Claims 3-5, 7, 9-11, and 13 are found in the prior art.

A. Claim 3 (Preamble): A method comprising:

127. Kariathungal discloses a method that includes the steps (among others) of creating a three-dimensional model [3.1], along with displaying one of the plurality of images (used to create that model) in a first window of a display [3.2] and rendering the three-dimensional model with its processor in a second window of the display [3.3].

128. As Kariathungal succinctly explains:

“[A] display protocol for medical imaging equipment may allow at least one three-dimensional medical image to be concurrently displayed with at least one two-dimensional medical image. The three-dimensional medical image may be linked with the two-dimensional medical image so a user can manipulate the viewing angle and pointer in the linked images.” Abstract

dimensional model with a processor from a sequence of images sets stored in a memory. ¶[0024] (“The system 100 also includes a computer unit 180...In an embodiment, the computer unit 180 may be, or may be part of, a picture archival communication system (PACS).”); ¶[0009] (“As computer and medical imaging technology has become more sophisticated, the PACS diagnostic workstations have become capable of creating a reformatted three-dimensional model from the two-dimensional data sets.”).

133. Concerning “each image set including a plurality of images of a subject, each one of the plurality of images in each image set captured from a different optical axis,” Kariathungal’s stored two-dimensional images used to create its three-dimensional model are sets of images. And, each one of the plurality of images in each image set were captured from a different optical axis. Kariathungal uses the information concerning the orientation relative to the subject from which the image was taken to drive its process of orienting its three-dimensional model into the same perspective, including the position of the imaging means that was used during the imaging process as a “different optical axis” as between individual images.

134. Kariathungal explains that a variety of different imaging technologies may be used to capture its two-dimensional images stored and managed by its Picture Archival Communication Systems (PACS):

“An example of a medical diagnostic imaging system is Picture Archival Communication Systems (PACS). PACS is a term for equipment and software that permits images, such as x-rays, ultrasound, CT, MRI, EBT, MR, or nuclear medicine for example, to be electronically acquired, stored and transmitted for viewing. Images from an exam may be viewed immediately or stored, or transmitted.” ¶[0007]; *see also* ¶[0024] (applicable imaging technologies).

“The images acquired on a PACS system are generally two-dimensional datasets from imaging devices.” ¶[0008].

135. These technologies provide images of different orientations relative to the subject, including axial images, sagittal images, coronal images, or oblique images:

“The two-dimensional medical images may comprise an axial image, a sagittal image, a coronal image, or an oblique image.” ¶[0014]; ¶[0006] (discussing imaging relative to subject being imaged).

136. While Kariathungal does not expressly state precisely how its two-dimensional images were obtained from different optical axes and stored in its sets to implement its viewing capabilities discussed above, multi-aperture scanner/camera arrangements were known to obtain a plurality of two-dimensional

image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis.” In such arrangements, images are obtained from different optical axes and stored its sets not by simply moving the imaging apparatus (e.g. an intra-oral scanner) relative to the structure being imaged, but instead multiple images from different optical axes are captured at the same overall position of the imaging apparatus relative to the structure being imaged using the multiple apertures.

137. The '864 Patent acknowledges these multi-aperture scanner/camera arrangements that obtained a plurality of two-dimensional image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis” were known in the prior art. As stated by the '864 Patent:

“While Rohály discloses one multi-aperture system, it will be appreciated that any multi-aperture system suitable for reconstructing a three-dimensional point cloud from a number of two-dimensional images may similarly be employed.” EX1001, 9:9-13.

138. Durbin discloses a multi-aperture arrangement that a POSITA would have understood is exemplary of how the two-dimensional images of Kariathungal's system would have been captured and organized to implement its PACS with viewing capabilities of two-dimensional images from different optical axes:

“FIG. 3 shows another embodiment with multiple image apertures that require only lateral motion. In this embodiment a plurality of image apertures 132A and the illuminator(s) 134A are mounted in a known orientation to one another on a laterally moveable apparatus. The number of image apertures and their orientation is selected to provide sufficient coverage and overlap of the dental structure to be modeled at the desired resolution. At each lateral position, an image from each of the apertures 132A is recorded for later processing.” Durbin, ¶[0047].

139. In my opinion, Kariathungal discloses all of the requirements of Element [3.1].

2. [3.2]: displaying one of the plurality of images in a first window of a display:

140. Element [3.2] is disclosed in Kariathungal (EX1009).

141. Kariathungal’s system displays one of its plurality of images in a first window of a display. Specifically, Kariathungal teaches the concept of a two-dimensional “driver image” which controls the angle of view for volumetric images (i.e. three-dimensional models):

“In the computer system for displaying medial images at least one volumetric medical image is linked to at least one two-dimensional medical image comprising the linked images. If the images are linked at least one of the medical

images may be a driver image. The driver image may control the angle of view for other volumetric medical images.” ¶[0014]; *see also* ¶[0029] (driver image controls angle of view).

142. Kariathungal discloses selection of a two-dimensional “driver image” to display a linked volumetric image (i.e. a three-dimensional model):

“The method for displaying medical images also includes selecting an exam or image for display, the selected exam or image being linked and displayed according to the display protocol.” ¶[0015]; ¶[0030] (selection of two-dimensional image).

143. Kariathungal also explains that its images (two-dimensional and three-dimensional) may be displayed within windows (or regions) of a singular display in its embodiments:

“The more display units available, as in the case of FIG. 3, or display windows available, as in the case of FIG. 4, the more combinations of views exist.” ¶[0037].

144. Kariathungal’s Figure 6 embodiment includes windows/regions 622, 624, 626, or 628 within the same display unit 620 in which one of the plurality of two-dimensional images may be displayed according to its disclosed display protocol:

“Unit 620 includes four display regions, 622, 624, 626, and 628, respectively... Moreover, any combination of images may be displayed in accordance with the present invention.” ¶[0042]; *see also* ¶[0025] (discussing multiple images on a single display in windows for Figure 2) ¶[0032] (discussing multiple images on a single display in windows for Figure 4).

145. In my opinion, Kariathungal discloses all of the requirements of Element [3.2].

3. [3.3]: rendering the three-dimensional model with the processor in a second window of the display; and

146. Element [3.3] is disclosed in Kariathungal (EX1009).

147. Kariathungal’s system renders its three-dimensional model with the processor of computer unit 180 in a second window of the display. Specifically, Kariathungal teaches rendering the three-dimensional model within one of windows/regions 622, 624, 626, or 628 within the same display unit 620 as a corresponding two-dimensional image in its own “window” as the claimed “second window of a display.”:

“Unit 620 includes four display regions, 622, 624, 626, and 628, respectively... Moreover, any combination of images may be displayed in accordance with the present invention.” ¶[0042].

“As computer and medical imaging technology has become more sophisticated, the PACS diagnostic workstations have become capable of creating a reformatted three-dimensional model from the two-dimensional data sets.” ¶[0009]

“In the computer system for displaying medial images at least one volumetric medical image is linked to at least one two-dimensional medical image comprising the linked images. If the images are linked at least one of the medical images may be a driver image. The driver image may control the angle of view for other volumetric medical images.” ¶[0014].

148. In my opinion, Kariathungal discloses all of the requirements of Element [3.3].

4. **[3.4]: synchronizing the first window and the second window with the processor to provide a common perspective on the subject for both the three-dimensional model and the one of the plurality of images**

149. Element [3.4] is disclosed in Kariathungal (EX1009).

150. Kariathungal’s display of its two-dimensional image and rendering of its three-dimensional model are synchronized between its first and second windows, as Kariathungal explains:

“Therefore, a need exists for a system and method that provides a display protocol for controlling the display and synchronization of three-dimensional data with other three-dimensional data and three-dimensional data with two-dimensional data. Such a system and method may allow a user to be more efficient and effective of diagnosis and treatment of medical conditions.” ¶[0011] (emphasis added).

“In the computer system for displaying medial [sic] images at least one volumetric medical image is linked to at least one two-dimensional medical image comprising the linked images. If the images are linked at least one of the medical images may be a driver image. The driver image may control the angle of view for other volumetric medical images.” ¶[0014]; *see also* ¶[0029] (driver image controls angle of view); ¶[0034] (simultaneous review of three and two dimensional images).

151. In my opinion, Kariathungal discloses all of the requirements of Element [3.4].

B. Claim 4: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and rotating the three-dimensional model to maintain the common perspective.

152. Kariathungal discloses the additional limitations of Claim 4.

153. Kariathungal's system allows a user to select a different one of the plurality of images (used to construct its three-dimensional model) which rotates its three-dimensional model to maintain the common perspective:

“The method for displaying medical images also includes selecting an exam or image for display, the selected exam or image being linked and **displayed according to the display protocol.**” ¶[0015] (emphasis added); ¶[0030] (selection of two-dimensional image).

“In the computer system for displaying medial images at least one volumetric medical image is linked to at least one two-dimensional medical image comprising the linked images. If the images are linked at least one of the medical images may be a driver image. **The driver image may control the angle of view for other volumetric medical images.**” ¶[0014] (emphasis added).

154. A POSITA would have appreciated that such rotation of the three-dimensional model occurs in response to selection of a new linked two-dimensional image in Kariathungal's display protocol. Further, Kariathungal itself acknowledges that customization of its display protocol is possible to present any combination of two-dimensional images and three-dimensional models in various synchronized views and positions, including at the time of selection:

“FIG. 5 illustrates a method 500 in accordance with an embodiment of the present invention. At step 510, a user may customize the display protocol or use the factory default display protocol for displaying at least two volumetric medical images concurrently as well as displaying at least one volumetric medical image concurrent with at least one two-dimensional medical image. At step 520, a user may select an exam or image for display. The selected exam or image is linked and displayed according to the display protocol. At step 530, a user may navigate the selected exam or images.” ¶[0041] (emphasis added).

155. In my opinion, Kariathungal discloses the requirements of Claim 4.

C. Claim 5: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and translating the three-dimensional model to maintain the common perspective.

156. Kariathungal discloses the additional limitations of Claim 5.

157. Kariathungal’s system allows a user to select a different one of the plurality of images (used to construct its three-dimensional model) which *translates* its three-dimensional model to maintain the common perspective:

“The method for displaying medical images also includes selecting an exam or image for display, the selected exam or image being linked and displayed according to the

display protocol. ¶[0015] (emphasis added); ¶[0030]
(selection of two-dimensional image).

“In the embodiment of system 100 and 200, a user may select an image with a computer mouse, and use the computer mouse to rotate the image. The selected image may be the driver image. Rotation or **movement** in the driver image may drive rotation in the other images.”

¶[0030] (emphasis added).

158. A POSITA would have appreciated that Kariathungal’s reference to movement is a translation of a linked three-dimensional image/model by changing the relative location of the linked three-dimensional image/model with respect to its original position by changing its coordinates. A POSITA would have appreciated that such translation of the three-dimensional model occurs in response to selection of a new linked two-dimensional image in Kariathungal’s display protocol.

159. Further, Kariathungal itself acknowledges that customization of its display protocol is possible to present any combination of two-dimensional images and three-dimensional models in various synchronized views and positions, including at the time of selection:

“FIG. 5 illustrates a method 500 in accordance with an embodiment of the present invention. At step 510, a user may **customize the display protocol** or use the factory

default display protocol for displaying at least two volumetric medical images concurrently as well as displaying **at least one volumetric medical image concurrent with at least one two-dimensional medical image**. At step 520, a user may select an exam or image for display. The selected exam or image is linked and displayed according to the display protocol. At step 530, a user may navigate the selected exam or images.” ¶[0041] (emphasis added).

160. In my opinion, Kariathungal discloses all of the requirements of Claim 5.

D. Claim 7: The method of claim 3 further comprising receiving a user selection of a different perspective of the three-dimensional model and selecting a new one of the plurality of images to maintain the common perspective.

161. Kariathungal discloses the additional limitations of Claim 7.

162. Kariathungal’s system allows a user to select a different perspective of the three-dimensional model which selects a new one of the plurality of images (used to construct its three-dimensional model) to maintain the common perspective:

“In the embodiment of system 300 and 400, a user may select a driver image with a computer mouse, and use the computer mouse to move or rotate the image. Rotation or movement in one image may drive movement or rotation in the other images. **For example, the user may select the**

volume displayed in display unit 310 as the driver image. The user may then **move** or rotate the angle of view **of the volume in display unit 310 using the computer mouse.** Because the display protocol has linked the other views displayed on display units 320, 330, and 340 respectively, **the two-dimensional views may move** or rotate to present an angle of view **similar to the angle of view displayed for the volume.** In such a manner, the user may view the volumetric view and the two-dimensional views from the same angle.” ¶[0039] (emphasis added).

163. A POSITA would have appreciated that presentation of a common perspective two-dimensional image occurs in response to selection of a different perspective of the three-dimensional model in Kariathungal’s display protocol. As stated by Kariathungal with regard to oblique views:

“Moreover, the display protocol may also display two-dimensional oblique views of objects along with other two-dimensional views and at least one volume view. For example, instead of displaying the axial, sagittal, and coronal views along with the volume view in FIGS. 3 and 4, **the display protocol may display the volume view with three oblique views.** The display protocol may also display a mix of the axial, sagittal, and coronal views along with the oblique views. For example, the volume view

may be displayed with the axial, sagittal, **and one oblique view**, or any combination thereof.” ¶[0039] (emphasis added).

164. Further, Kariathungal itself acknowledges that customization of its display protocol is contemplated to present any combination of two-dimensional images and three-dimensional models in various synchronized views and positions, including at the time of selection:

“FIG. 5 illustrates a method 500 in accordance with an embodiment of the present invention. At step 510, a user may **customize the display protocol** or use the factory default display protocol for displaying at least two volumetric medical images concurrently as well as displaying **at least one volumetric medical image concurrent with at least one two-dimensional medical image**. At step 520, a user may select an exam or image for display. The selected exam or image is linked and displayed according to the display protocol. At step 530, a user may navigate the selected exam or images.” ¶[0041] (emphasis added). In my opinion, Kariathungal discloses all of the requirements of Claim 7.

E. Claim 9 (Preamble): A system comprising:

165. Kariathungal discloses the additional limitations of Claim 9.

166. Kariathungal discloses a system with each of the claimed features of claim 9, as detailed below. *See also* Claim 3 (detailing the method of 2D and 3D display of Kariathungal's system).

1. **[9.1]: a memory storing a three-dimensional model of a subject and a sequence of image sets used to create the three dimensional model, each image set including a plurality of images of a subject, each one of the plurality of images in each image set captured from a different optical axis;**

167. Kariathungal discloses Element [9.1].

168. Kariathungal's system includes a memory that can store a previously constructed three-dimensional model of a subject:

“As computer and medical imaging technology has become more sophisticated, the PACS diagnostic workstations have become capable of creating a reformatted three-dimensional model from the two-dimensional data sets.” ¶[0009]

169. The claim language concerning three-dimensional model creation and image sets is substantially the same as that for Claim 3, element [3.1], which is incorporated here by reference. In addition, a POSITA would have appreciated that any generated three-dimensional model in Kariathungal will be stored in a memory, whether temporary or persistent.

170. In my opinion, Kariathungal discloses all of the requirements of Element [9.1].

2. **[9.2]: a display configured to provide a user interface displaying one of the plurality of images in a first window; and**

171. Kariathungal discloses Element [9.2].

172. Kariathungal's display units of its various embodiments are connected to computer 180 which may include a mouse as a user interface to its system, which allow selections such as a specific two-dimensional image among the stored sets:

“Alternatively, the computer unit 180 and display units 110 and 120 may be separate units. In such a case, the display unit 110 and a display unit 120 may be in electrical communication with the computer unit 180. The components of the system 100 may be single units, separate units, may be integrated in various forms, and may be implemented in hardware and/or in software.” ¶[0041].

“The method for displaying medical images also includes selecting an exam or image for display, the selected exam or image being linked and **displayed according to the display protocol.**” ¶[0015] (emphasis added); ¶[0030] (selection of two-dimensional image).

173. As explained above with reference to Claim 3, element [3.2], Kariathungal's display units are configured to display one of its plurality of images in a first window.

174. In my opinion, Kariathungal discloses all of the requirements of Element [9.2].

- 3. [9.3]: a processor configured to render the three-dimensional model in a second window displayed in the user interface concurrently with the one of the plurality of images in the first window and to synchronize the first window and the second window to provide a common perspective on the subject in both the three-dimensional model and the one of the plurality of images.**

175. Kariathungal discloses Element [9.3].

176. As explained above with reference to Claim 3, element [3.2] Kariathungal's computer unit 180 that includes a picture archival communication system (PACS) is configured to create a three-dimensional model with a processor from a sequence of images sets stored in a memory.

177. The claim language concerning rendering the created three-dimensional model in a second window is substantially the same as that for Claim 3, elements [3.3] and [3.4], which is incorporated here by reference.

178. In my opinion, Kariathungal discloses all of the requirements of Element [9.3].

F. Claim 10: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and rotate the three-dimensional model to maintain the common perspective.

179. Kariathungal discloses the additional limitations of Claim 10.

180. *See* Claim 4 addressing identical language, but in method form.

181. In my opinion, Kariathungal discloses all of the requirements of Claim
10.

G. Claim 11: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and translate the three-dimensional model to maintain the common perspective.

182. Kariathungal discloses the additional limitations of Claim 11.

183. *See* Claim 5 addressing identical language, but in method form.

184. In my opinion, Kariathungal discloses all of the requirements of Claim
11.

H. Claim 13: The system of claim 9 wherein the processor is configured to receive a user selection of a different perspective of the three-dimensional model and select a new one of the plurality of images to maintain the common perspective.

185. Kariathungal discloses the additional limitations of Claim 13.

186. *See* Claim 7 addressing identical language, but in method form.

187. In my opinion, Kariathungal discloses all of the requirements of Claim
13.

I. Explanation of Why Claims 3-5, 7, 9-11, and 13 Would Have Been Obvious (Ground 2)

188. Claims 3-5, 7, 9-11, and 13 would have been obvious over Kariathungal in view of Durbin.

1. Difference between the claimed invention and the prior art.

189. As discussed in Paragraphs 131-139, Kariathungal discloses details concerning the use of its Picture Archival Communication System (PACS), but it does not expressly state precisely how its two-dimensional images are captured from different optical axes and stored to implement its viewing capabilities. Durbin provides that express disclosure in the form of a multi-aperture scanner/camera arrangement that obtains a plurality of two-dimensional image sets such that “each one of the plurality of images in each image set [is] captured from a different optical axis.”

2. A POSITA would have had motivation to combine the disclosures of Kariathungal and Durbin.

190. A POSITA would have been motivated to apply Durbin’s disclosure concerning multi-aperture scanner/camera arrangements that obtain a plurality of two-dimensional images from different optical axes to confirm how a POSITA would have implemented Kariathungal’s existing Picture Archival Communication System (PACS). Given the existing details of Kariathungal’s PACS system that allows for viewing of images from different optical axes, a POSITA would have

already been aware that multi-aperture scanner/camera arrangements, such as the one disclosed in Durbin, provided the ability to capture two-dimensional images in a form that readily met the requirements of Kariathungal's PACS system for recall and later viewing. In addition, Durbin itself provides motivation to a POSITA to use its multi-aperture scanner/camera arrangement disclosure because it efficiently facilitates "automated intra-oral scanning of all the dental structures in the jaw through an optical aperture and combines the information available in the entire set of images to create and present an accurate 3D model of the scanned structures. The system allows intra oral images of dental structures *to be taken rapidly and with high resolution such that the acquired images can be processed into accurate 3D models of the imaged dental structures.*" ¶[0024] (emphasis added). Even further, the understanding that multi-aperture scanner/camera arrangements such as that disclosed in Durbin were known in the prior art is confirmed by the '864 Patent itself. EX1001, 9:9-13.

3. A POSITA would have had a reasonable expectation of success based on the disclosures of Kariathungal and Durbin, and knowledge generally available in the art.

191. A POSITA would have had a reasonable expectation of success in making the combination of Kariathungal's Picture Archival Communication System (PACS) with the multi-aperture scanner/camera disclosure of Durbin relating to

capture of two-dimensional images from multiple optical axes. This is so because both references are directed to generation of three-dimensional models from underlying two-dimensional images. *See* Discussion above regarding element [3.1] (concerning Kariathungal's model generation), and Durbin, ¶¶[0052]-[0053] (concerning Durbin's model generation). And, Durbin simply provides a POSITA's existing understanding of capture of two-dimensional images using a multi-aperture scanner/camera arrangement which two-dimensional images would have been stored in Kariathungal's existing storage system to facilitate its image viewing capabilities.

192. Combining the disclosures of Kariathungal with Durbin would only require the use of "known methods"—using each in the same way they were used as disclosed. Specifically, Kariathungal already discloses maintenance of a three-dimensional model in a common perspective based on selection of a two-dimensional image and all the viewing capabilities of its underlying Picture Archival Communication System (PACS) – And, Durbin provides the POSITA's existing understanding of capture of two-dimensional images using a multi-aperture scanner/camera technique demonstrating how a POSITA would have understood two-dimensional images would have been captured to support Kariathungal's PACS system and stored in its preexisting storage system. None of the methods would need

to be used in an unexpected or unintended way. Each would be fulfilling its original purpose and used in an expected way.

193. In my opinion, the combination of Kariathungal and Durbin renders obvious all the recited features of Claims 3-5, 7, 9-11, and 13.

XII. CLAIMS 6 AND 12 WOULD HAVE BEEN OBVIOUS OVER KARIATHUNGAL (EX1009) IN VIEW OF DURBIN (EX1012), AND IN FURTHER VIEW OF TROUSSET (EX1008) (GROUND 3).

194. In my opinion, Claims 6 and 12 are unpatentable over Kariathungal in View of Durbin, and in further view of Troussel.

195. The following sections explain where each element of these claims is found in the prior art.

A. Claim 6: The method of claim 3 further comprising receiving a user selection of a different one of the plurality of images and scaling the three-dimensional model to maintain the common perspective.

196. Kariathungal in view of Troussel discloses the additional limitations of Claim 6.

197. While Kariathungal directly discloses many of the functions of its Picture Archival Communication System (PACS), it does not expressly disclose a commonly understood feature of scaling a three-dimensional model to maintain a common perspective with a selected two-dimensional image. However, Troussel's system allows a user to select a different one of a plurality of images (used to

construct a three-dimensional model) which *scales* its three-dimensional model to maintain the common perspective:

“Also, the means for management comprises means for automatically translating the three-dimensional representation and in centering it in the same way as a two-dimensional image acquired in real time or previously acquired. It may also comprise means for automatically adjusting the scale of the three-dimensional representation with respect to a two-dimensional image acquired in real time or previously acquired.” ¶[0012] (emphasis added); *see also* ¶[0029], [0031], Claim 8-14, Claim 21-22.

198. In my opinion, Kariathungal in view of Troussel discloses all of the requirements of Claim 6.

B. Claim 12: The system of claim 9 wherein the processor is configured to receive a user selection of a different one of the plurality of images and scale the three-dimensional model to maintain the common perspective.

199. Kariathungal in view of Troussel discloses the additional limitations of Claim 12.

200. *See* Claim 6, discussions above.

201. In my opinion, Kariathungal in view of Troussel discloses all of the requirements of Claim 12.

C. Explanation of Why Claims 6 and 12 Would Have Been Obvious (Ground 3).

202. Claims 6 and 12 would have been obvious over Kariathungal in view of Durbin, and in further view of Troussel.

1. Difference between the claimed invention and the prior art.

203. As discussed above in Paragraphs 196-198, Kariathungal directly discloses many of the functions of its Picture Archival Communication System (PACS), but it does not expressly disclose a commonly understood feature of scaling a three-dimensional model to maintain a common perspective with a selected two-dimensional image. Troussel provides that express disclosure.

2. A POSITA would have had motivation to combine the disclosures of Kariathungal and Troussel.

204. A POSITA would have been motivated to use the express disclosure in Troussel concerning scaling a three-dimensional model to maintain a common perspective with a selected two-dimensional image as another navigation feature to supplement the large suite of capabilities of Kariathungal's existing Picture Archival Communication System (PACS). This functional disclosure in Troussel is readily useable into Kariathungal's system as another way to navigate three-dimensional models through selection of previously captured two-dimensional images. In addition, the ability to scale, much like rotation and translation, is a fundamental feature of three-dimensional model navigation and readily adapts directly to

Kariathungal's existing functionality. Kariathungal's PACS already provides rotation (*see* claim 4) and translation (*see* claim 5) functionality, which a POSITA would have appreciated involved the same fundamental three-dimensional model manipulations prior to re-rendering/re-display that would be used to implement scaling of a three-dimensional model in response to selection of a previously captured two-dimensional image.

3. A POSITA would have had a reasonable expectation of success based on the disclosures of Kariathungal and Troussel and knowledge generally available in the art.

205. A POSITA would have had a reasonable expectation of success in making the combination of Kariathungal's Picture Archival Communication System (PACS) with the specific functionality of Troussel's system concerning scaling of the three-dimensional model. This is so because both references are directed to a Picture Archival Communication System (PACS), and both references disclose maintenance of a common perspective of a rendered three-dimensional model based upon selection of a previously captured two-dimensional image as detailed more fully above in Grounds 1 and 2. And, as discussed above, Kariathungal's PACS already provides rotation (*see* claim 4) and translation (*see* claim 5) functionality, which a POSITA would have appreciated involved the same fundamental three-dimensional model manipulations prior to re-rendering/re-display that would be

used to implement scaling of a three-dimensional model in response to selection of a previously captured two-dimensional image.

206. Combining the disclosures of Kariathungal with Troussel would only require the use of “known methods”—using each in the same way they were used as disclosed. Specifically, Kariathungal already discloses maintenance of a three-dimensional model in a common perspective based on selection of a two-dimensional image, and Troussel provides the specific disclosure concerning scaling when performing that operation. None of the methods would need to be used in an unexpected or unintended way. Each would be fulfilling its original purpose and used in an expected way.

207. In my opinion, the combination of Kariathungal and Troussel renders obvious all the recited features of Claims 6 and 12, and would be in addition to the combination of Kariathungal with Durbin relating to image capture from different optical axes discussed in Ground 2 above.

**XIII. ANY PURPORTED SECONDARY CONSIDERATIONS EVIDENCE
DOES NOT OVERCOME THE STRONG EVIDENCE OF THE
OBVIOUSNESS OF THE CLAIMS**

208. I am currently unaware of any secondary considerations evidence that may be commensurate with the challenged claims of the '864 Patent such as commercial products produced by the Patent Owner.

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

XIV. CONCLUSION

209. For the reasons set forth above, it is my opinion that all elements of Claims 3-7 and 9-13 of the '864 Patent are disclosed or suggested by the prior art. In my opinion, Claims 3-7 and 9-13 of the '864 Patent would have been rendered obvious by the prior art.

210. In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

211. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: August 12, 2024



Eli Saber

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

APPENDIX A

I have previously testified and/or been consulted as an expert in the
following matters:

Maxell, LTD. v. TCL Electronics Holdings Ltd. Et. al.

June 2024 – Present

Case 5:23-CV-00108-RSW-JBB (EDTX) and related proceedings including
against LG Electronics and Samsung

- Legal Firm: Mayer-Brown
- Retained as an expert on behalf of Maxell
- Provide expert opinions in support of legal proceedings.

3Shape A/S (Petitioner) v. Medit Corporation

Jan. 2024 – Present

US Patent and Trademark Office, Patent Trial and Appeal Board

- Legal Firm: Buchanan, Ingersoll and Rooney PC
- Retained as an expert on behalf of 3Shape A/S to provide expert opinions for multiple inter partes proceedings involving U.S. Patent US 10,076,391 (IPR2024-00548), US 11,234,798 (IPR2024-00549), US 9,191,648, US 9,262,864, US 7,912,257 and US 9,245,374.

3Shape A/S (Petitioner) v. Dental Imaging Technologies & Carestream Dental

Jan. 2024 – Present

US Patent and Trademark Office, Patent Trial and Appeal Board

- Legal Firm: Buchanan, Ingersoll and Rooney PC
- Retained as an expert on behalf of 3Shape A/S to provide expert opinions on inter partes proceedings involving U.S. Patent US 10,076,391 (IPR2024-00548), US 11,234,798 (IPR2024-00549) and US 9,191,648

Amazon v. Nokia

Jan. 2024 – Present

- Legal Firm: Perkins-Coie
- Retained as an expert on behalf of Amazon (Petitioner)

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Provided expert opinions and a declaration in support of US 7,724,818 (IPR2024-00572)
- Provide expert opinions and a declaration for an IPR proceeding re. US 6,856,701
- Provide expert opinions and a declaration for an IPR proceeding re. US 8,175,148
- Provide expert reports with regards to invalidity, non infringement and domestic industry with regards to ITC case No. 337-TA-1380
- Provided a Deposition on June 28st, 2024 for ITC case No. 337-TA-1380.

Autonomous Devices LLC v. Tesla, Inc

October 2022 - Present

US District Court, District of Delaware, case No.

- Legal Firm: McKool-Smith
- Retained as an expert by the Barr Group on behalf of Autonomous Devices.
- Provided declarations in support of legal proceedings.
- Working on multiple IPRs (5X): IPR2023-01054, IPR2023-01055, IPR2023-01169, IPR2023-01172, IPR2023-01173.
- Provided or in process of providing multiple declarations in support of Patent Owner Response and Motion to Amend with regards to the above IPRs
- Provided a Deposition on May 16th, 2024 with regards to IPR 2023-01054.
- Provided a Deposition on May 21th, 2024 with regards to IPR 2023-01055.
- Provided a Deposition on June 14th, 2024 with regards to IPR 2023-01169.
- Provided a Deposition on June 21st, 2024 with regards to IPR2023-01172 and IPR 2023-01173.

Medit USA, Crown Jade Co. Ltd. (Petitioner) v. 3Shape A/S (Patent Owner)

Oct. 2023 – Present

US Patent and Trademark Office, Patent Trial and Appeal Board

- Legal Firm: Buchanan, Ingersoll and Rooney PC
- Retained as an expert on behalf of 3Shape A/S to provide expert opinions on IPR proceedings involving U.S. Patent Nos. 10,695,151; 11,076,146; 11,368,667.

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Provide expert opinions in support of Patent Owner Response.
- Institution was denied for 11,076,146; 11,368,667.
- Institution granted for U.S. 10,695,151 (IPR2023-01315)
- Provided a declaration in support of Patent Owner regarding US 10,695,151 (IPR2023-01315)
- Provided a Deposition on August 8th, 2024 for IPR2023-01315.

Meta Platforms, Inc.; Instagram, Inc.; WhattsAPP LLC; Meta Platforms Technologies, LLC; and Giphy, Inc. (Petitioners) v. VL Collective IP LLC (Patent Owner)

Jan. 2024 – Present

- Legal Firm: Reichman Jorgensen Lehman & Feldberg LLP
- Retained as an expert on behalf of VL Collective IP LLC
- Provided expert opinions and a declaration in support of Patent Owner Response with regards to IPR2023-00924.
- Provided a Deposition on May 30th, 2024 with regards to IPR 2023-00924.

Facetec, Inc. v. iProov Ltd., Case No. 2:21-cv-02252-ART-BNW

October 2022 - Present

US District Court, District of Nevada

- Legal Firm: OneLLP
- Retained as an expert by Teklicon on behalf of FaceTec, Inc.
- Provided expert opinions as needed in support of legal proceedings

TVISION INSIGHTS v. The NIELSEN Company (US), LLC

August 2023 - Present

US Patent and Trademark Office, Patent Trial and Appeal Board

- Legal Firm: Erise Intellectual Property Law
- Retained as an expert on behalf of the Nielsen Company (US), LLC
- Provided expert opinions and a declaration in support of patent owner in IPR2023-01014. Documents were filed on 10/11/2023.
- PTAB decision to institute was reached January 2024.
- Provided a Deposition on July 2nd, 2024.

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

In Re Lyft Rideshare Litigation

Dec. 2021 – Present

Superior Court of the State of California, Case No. CJC-20-005061

- Legal Firm: Williams & Connolly, LLP
- Retained as an expert by WIT Legal, LLC on behalf of Lyft (Defendant)
- Provide reports and consulting services on the challenges of the use of Dashcam solutions in Vehicles
- Provided a Deposition on March 24th, 2023.
- The first portion of the Case that requires my expertise has been settled.

RealD, LLC v. Microsoft Corp., NO. 2:22-cv-00942-TL

Feb. 2023 – June 2024

- Legal Firm: Michelman & Robinson
- Retained as an expert on behalf of RealD, LLC
- Provided expert opinions and a declaration in support of IPR2023-01046. Patent Owner Preliminary Response filed on 10/13/2023.
- Provide expert opinions and additional reports in support of Federal case.
- Provide algorithm support for software review.
- Provided expert opinions and a declaration in support of Patent Owner Response with regards to IPR2023-01046. POR filed on March 15th, 2024
- Provided a Deposition on June 5th and 7th, 2024 with regards to IPR 2023-01046.

Meta Platforms, Inc. f/k/a Facebook, Inc. v. Angel Technologies Group LLC

May 2023 – October 2023

US District Court, District of Nevada

- Legal Firm: McKool-Smith
- Retained as an expert by Alliance Technical Staffing on behalf of Angel Technologies Group LLC.
- Provide expert opinions and declarations in support of four IPR proceedings (IPR2023-00057, IPR2023-00058, IPR2023-00059, IPR2023-00060).
- Provided a Deposition on October 20th, 2023 for IPR2023-00057, IPR2023-00058 and IPR2023-00059

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Provided a Deposition on October 23rd, 2023 for IPR2023-00060.

Alarm.com Incorporated v. Vivint, Inc NO. 2:23-CV-00004-JRG-RSP

March 2023 – Dec. 2023

- Legal Firm: Cravath, Swaine and Moore, LLP
- Retained as an expert on behalf of Alarm.com, Inc.
- Case has been settled

HL Holdings, Inc. v. LNHL, LLC, et al.

July 2023 – Dec. 2023

- Legal Firm: Nelson, Mullins, Riley and Scarborough LLP
- Retained as an expert by IMS Consulting and Expert Services on behalf of LNHL, LLC and Seek Now Inc. f/k/a Ladder Now LLC.
- Provided expert opinions and a report in support of legal proceedings.
- Provided a Deposition on November 29th, 2023
- Case has been settled.

Angel Group Co. Ltd. V. Sensen Networks Group Pty Ltd

July 2023 – Oct. 2023

- Legal Firm: Norton Rose Fulbright
- Retained as an expert on behalf of Angel Group Co. Ltd.
- Provide expert opinions in support of a potential IPR proceeding.
- Case has been settled.

United Services Automobile Association v. Truist Bank

March 2023 – Oct. 2023

- Case No. 2-22-CV-00291
- Legal Firm: Cravath, Swaine and Moore, LLP
- Retained as an expert on behalf of Truist Bank.
- Performed review of six patents.
- Case was settled.

Dental Imaging Technologies Corp. (Petitioner) v. 3Shape A/S (Patent Owner)

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

Feb. 2023 – July 2023

US Patent and Trademark Office, Patent Trial and Appeal Board

- Legal Firm: Buchanan, Ingersoll and Rooney PC
- Retained as an expert on behalf of 3Shape A/S.
- Provided consulting services in support of POPR for IPR2023-00387 (US 11,076,146).
- Provided consulting services in support of POPR for IPR2023-00400 (US 10,695,151).
- Provided consulting services in support of POPR for IPR2023-00411 (US 11,368,667).
- PTAB decision to NOT Institute on all three IPRs.

Nike v. Valmarc

January 2023 – Present

- Legal Firm: Hilgers Graben
- Retained as an expert on behalf of Valmarc Corporation
- Provided expert opinions in support of Patent Owner Preliminary Response on petitions IPR2022-01403 & IPR2022-01404
- PTAB granted institution but client opted not to pursue defending the patents.

Sensormatic Electronics, LLC v. Genetec, Inc. et al.

Oct. 2021 – Feb. 2023

US District Court, District of Delaware, Case 1:20-cv-00760-MN

- Legal Firm: Fish & Richardson, P.C.
- Retained as an expert by IMS Expert Services on behalf of Genetec, Inc. et al. (Defendant)
- Representing Genetec (USA) Inc. and Genetec Inc. (C. A. No. 20-760)
- Provided Opening, Rebuttal and Reply reports regarding invalidity & Non-infringement with regards to US 7,307,652.
- Sat in on a deposition of Plaintiff expert (April 29th, 2022) per counsel request.
- Provided a deposition on May 3rd, 2022
- Case is completed.

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

Roku, Inc. v. Flexiworld Technologies, Inc.

June 2022 – October 2022

US Patent and Trademark Office, Patent Trial and Appeal Board, Case No. IPR2022-01112

US Patent and Trademark Office, Patent Trial and Appeal Board, Case No. IPR2022-001269

- Legal Firm: Perkins-Coie, LLP
- Retained as an expert by WIT Legal, LLC on behalf of Roku (Petitioner).
- Provided a declaration in June 2022 in support of the IPR petition for US 10,140,073.
- Provided a declaration in July 2022 in support of the IPR petition for US 7,944,577.
- Case was settled in October 2022.

CareView Communications, Inc. v. Interactive Digital Solutions, Inc.

Jan. 2022 – April 2022

- Legal Firm: Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P. C.
- Retained as an expert by IMS Expert Services on behalf of Interactive Digital Solutions, LLC (Defendant) to provide declarations in support of 3 IPR proceedings
- Case was settled in April 2022.

Sovereign Peak Ventures, LLC v. Hisense Co., LTD

Nov. 2021 – Dec. 2021

US District Court, Eastern District of Texas, Case No. 21-cv-00209

- Legal Firm: Perkins-Coie, LLP
- Retained as an expert by WIT Legal, LLC on behalf of Hisense Co. (Defendant).
- Working to provide a declaration in support of the IPR petition for US 8,019,169.
- Case was settled in Early 2022.

Perfect Corporation v. Lennon Image Technologies, LLC

Sept. 2021 – June 2022

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2021-00124

- Legal Firm: Perkins-Coie, LLP
- Retained as an expert by WIT Legal, LLC on behalf of Perfect Corporation (Petitioner).
- Provided a declaration in support of the IPR petition for US 6,624,843.
- Petitioner filed a motion to dismiss its petition on April 5th, 2022.

Apple Inc. v. Corephotonics, LTD

Jan. 2021 – May 2021

- Legal Firm: Russ, August & Kabat,
- Retained as an expert by WIT Legal, LLC on behalf of Corephotonics in two IPR cases.
- Provided two declarations in support of IPR Petitions IPR2020-00487 & IPR2020-00860.
- Provided a deposition on 04/14/2021.

Davis Polk

Aug. 2020 – Nov. 2021

- Legal Firm: Davis Polk
- Retained as an expert by WIT Legal, LLC
- Provided expert and consulting services for video and point cloud type imagery.

Cravath, Swaine & Moore, LLP

Feb. 2020 – Mar. 2020 and Jan. 2021

- Legal Firm: Cravath, Swaine & Moore, LLP
- Retained as an expert by WIT Legal, LLC
- Evaluated computer vision technology for various clients.
- No reports, depositions or expert testimonies were provided.

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

Wells Fargo & Co. v. Lighthouse Consulting Group

Feb. 2020 – Sept. 2020

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2020-00758 and IPR2020-00759

- Legal Firm: Winston & Strawn LLP
- Retained as an expert by DOAR on behalf of Petitioner Wells Fargo.
- Submitted two declarations in support of IPR Petitions IPR2020-00758 & IPR2020-00759 for US 8,590,940 and US RE44,274.

3Shape A/S v. Align Technology, Inc.

Jan. 2020 – April 2020

US District Court, District of Delaware, Case No. 18-cv-00886 (consolidated with 18-cv-00697)

- Legal Firm: Buchanan, Ingersoll and Rooney, PC
- Retained as an expert by DOAR on behalf of plaintiff for US Patents-in-Suit Nos. 9,962,244 and 9,629,551 with regards to invalidity.
- Case was transferred to Troutman Pepper LLP very shortly after my engagement.

3Shape A/S et al v. Align Technology, Inc.

Oct. 2019 – Oct. 2020

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2020-00222 and IPR2020-00223

- Legal Firm: Buchanan, Ingersoll and Rooney, PC
- Retained as an expert by DOAR on behalf of Petitioner 3Shape A/S with respect to US 7,156,661
- Provided two declarations in support of IPR petitions (IPR2020-00223 and IPR2020-0222) for US 7,156,661. Both petitions were filed in December 2019.
- Provided a deposition on July 30th, 2020 in support of IPR2020-00223 that was instituted by PTAB and supporting materials for follow on responses.

Uniloc 2017 LLC v. Netflix, Inc. (Petitioner) (18-cv-2055)

July 2019 – July 2020

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2020-00044

- Legal Firm: Perkins-Coie, LLP

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Retained as an expert by DOAR on behalf of Petitioner Netflix, Inc.
- Provided an expert declaration in support of IPR2020-00044 for US 6,584,229.
- Case was settled in July 2020.

Align Technology, Inc. v. 3Shape A/S et al

Feb. 2019 – Feb. 2022

US District Court, District of Delaware, Case No. 17-cv-01646 (LPS) (CJB)

- Legal Firm: Troutman Pepper LLP
- Retained as an expert by WIT Legal, LLC on behalf of Defendant 3Shape for US Patent-in-Suit No. 9,510,757 ('757 Patent).
- Served as expert for invalidity and non-Infringement for US 9,510,757
- Provided expert reports regarding Invalidity and non-infringement of '757
- Provided a deposition on 10 January 2020
- Case was settled in February 2022.

Certain Dental and Orthodontic Scanners and Software

Feb. 2019 – Oct. 2019

US International Trade Commission, Investigation No. 337-TA-1144 (3Shape v. Align)

- Legal Firm: Pepper Hamilton, PC
- Retained as an expert by DOAR on behalf of respondent 3Shape A/S with respect to US Patent-in-Suit No. 9,299,192 ('192 Patent).
- Served as expert on invalidity, non-infringement and domestic industry.
- Provided expert opinions and rebuttal reports in support of the above proceedings.
- Provided a deposition (8/13/2019).
- Provided trial testimony on October 30th, 2019 (Trial was held Oct. 24-30, 2019) with regards to Invalidity, Non-infringement and Domestic Industry.

3Shape A/S et al v. Align Technology, Inc.

Oct. 2018 – Sept. 2019

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2019-00132 and IPR2019-00134 and IPR2019-00148

- Legal Firm: Buchanan, Ingersoll and Rooney, PC

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Retained as an expert by DOAR on behalf of respondent 3Shape A/S with respect to US 7,112,065, US 9,451,873 and US 9,299,192
- Represented 3Shape (Petitioner) in three IPR Petitions v. Align (Patent Owner).
- Provided three declarations in support of the IPR petitions for US 7,112,065, US 9,299,192 and US 9,451,873. All three petitions were filed in November 2018 and all three were instituted.
- Provided three depositions with regards to US 7,112,065 (8/16/2019), US 9,451,873 (09/18/2019) and US 9,299,192 (09/30/2019).

Blackberry Corp. et al v. Maxell, Ltd

Sept. 2018 – Oct. 2018

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2019-00087 and IPR2019-00095 and IPR2019-00097

- Legal Firm: Oblon, McClelland, Maier and Neustadt, LLP
- Retained as an expert on behalf of petitioner Blackberry Corp.
- Provided three declarations in support of the IPR petitions for US 9,100, 604 (Joinder), US 6,765, 616 and US 7,995,897.
- Case settled in May 2019.

Exocad GmbH et al v. 3Shape A/S

March 2018 – Sept. 2019

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2018-00788

- Legal Firm: Buchanan, Ingersoll and Rooney, PC
- Retained as an expert by DOAR on behalf of 3Shape A/S in defending an IPR filings of EXOCAD (Petitioner) v. 3Shape (Patent Owner). Case No. IPR 2018-00788
- Provided a declaration in support of the Patent Owner response for US 9,336,336.
- Provided a deposition on April 1st, 2019.

Certain Intraoral Scanners and Related Hardware and Software

February 2018 – Sept. 2018

US International Trade Commission, Investigation No. 337-TA-1090 & No. 337-TA-1091 (Align v. 3Shape)

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Legal Firm: Pepper Hamilton, LLP
- Retained as an expert by DOAR on behalf of respondent 3Shape A/S.
- Provided expert opinions regarding claim construction, noninfringement, and the domestic industry analysis.
- Attended a *Markman* hearing and provided a tutorial for the technology in suit.
- Provided a Deposition on July 16, 2018.
- Provided trial testimony as an expert on Sept. 20th, 2018 with regards to Non-infringement and Domestic Industry.

Nikon Corporation et al v. ASML Netherlands BV et al

July 2017 – Nov. 2017

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2018-00227

- Legal Firm: Morrison & Foerster
- Retained as an expert on behalf of petitioner Nikon Corporation.
- Provided an expert declaration in support of IPR petition for US 7,209,167.

Raster Printing Innovations, LLC v. Hewlett-Packard Company et al

April 2016 – May 2016

US District Court, Northern District of Illinois, Case No. 15-cv-03967

- Legal Firm: Morgan, Lewis & Bockius, LLP
- Retained as an expert by IMS Expert Services on behalf of defendant Hewlett Packard.
- Contributed to the development of initial invalidity contentions charts.
- Case settled very quickly after my engagement in June 2016.

Qomo Hitevision LLC v. Pathway Innovations and Technologies, Inc.

Nov. 2015 – Jan. 2016

US Patent and Trademark Office, Patent Trial and Appeal Board, IPR2016-00661

- Legal Firm: Mei & Mark, LLP
- Retained as an expert on behalf of petitioner Qomo Hitevision.
- Provided an expert declaration in support of petition for inter partes review.

Sony Corp of America. v. Image Processing Technologies, LLC

Aug. 2014 – Nov. 2014

US Patent and Trademark Office, Patent Trial and Appeal Board

Declaration of Eli Saber in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,262,864

- Legal Firm: Lerner, David, Littenberg, Krumholz & Mentlik LLP
- Retained as an expert on behalf of Sony.
- Provided an expert declaration in support of petition to institute inter partes review of US Patent No. 6,959,293.

Image Processing Technologies, LLC v. Canon Inc. et al

June 2011 – Dec. 2012

Case: US District Court, Eastern District of New York, Case No. 10-cv-03867

- Legal Firm: Fitzpatrick, Cella, Harper & Scinto
- Retained as an expert on behalf of defendant Canon Inc.
- Traveled to Japan twice to meet with Canon Technical & Engineering Teams
- Provided reports related to Invalidity, Non-Infringement, Rebuttals, and summary judgement.
- Provided a Deposition in April 2012.