

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. IPR2024-01276
Patent 9,245,374

**DECLARATION OF ELI SABER IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,245,374**

3SHAPE EXHIBIT 1014
3Shape v. Medit

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Petition for *Inter Partes* Review of U.S. Patent No. 9,245,374

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2.	[1.2]: obtaining three-dimensional data from an object within the scan space using a scanner;	28
3.	[1.3]: identifying a one of the plurality of voxels in the mesh that is unoccupied;	30
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 3. [12.3]: identifying one of the plurality of voxels in the mesh of the scan space that is unoccupied;.....64
 4. [12.4]: storing an indication in the spatial matrix for a modified processing of data from the one of the plurality of voxels, thereby identifying a prohibited volume within the scan space; and.....64
 5. [12.5]: processing a portion of the three-dimensional data in the prohibited volume according to the modified processing and processing a second portion of the three-dimensional data that is not in the prohibited volume according to an unmodified processing, ...65
 6. [12.6] wherein the modified processing includes detecting a point in the prohibited volume and displaying

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4.	[23.4]: to store an indication in the spatial matrix for a modified processing of data from a one of the plurality of voxels that contains the point, thereby identifying a prohibited volume within the scan space, ...	69
5.	[23.5]: to process a portion of the three-dimensional data that is not in the prohibited volume according to an unmodified processing, and to process a second portion of the three-dimensional data that is in the prohibited volume according to the modified processing, ...	69
6.	[23.6]: wherein the modified processing includes detecting a point in the prohibited volume and displaying the point for a decay time with the second portion of the three-dimensional data.	70
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APPENDIX A

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EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 9,245,374, issued on January 26, 2016 to J. McQueston and I. Kriveshko (“the ’374 Patent”)
1002	File History of U.S. Patent Application No. 14/000,446, filed on August 20, 2013
1003	International PCT Publication No. WO 2012/115862, published on August 30, 2012 (Int’l Appln. No. PCT/US2012/025548)
1004	U.S. Provisional Application No. 61/445,499, filed on February 22, 2011
1005	U.S. Patent No. 5,553,207 (“Sekiguchi”)
1006	U.S. Patent No. 7,394,889 (“Partain”)
1007	U.S. Patent No. 6,999,073 (“Zwern”)
1008	U.S. Patent Application Publication No. 2007/0172112 (“Paley”)
1009	U.S. Patent Application Publication No. 2006/0202989 (“Yinghui”)
1012	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)
1013	Plaintiff Medit Corporation’s Responsive Claim Construction Brief filed on February 26, 2024 in <i>Medit Corporation v. 3Shape A/S</i> , Civ. Action No. 6:23-cv-00658 (WDTX)
1015	<i>Curriculum Vitae</i> of Eli Saber, Ph.D.

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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 1, 3, 5, 7-12, 14, 16, and 18-23 of U.S. Patent No. 9,245,374 (“the ’374 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 EX1015. 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

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” 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 networks and

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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 '374 Patent 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 1, 3, 5, 7-12, 14, 16, and 18-23 of the '374 Patent are unpatentable under 35 U.S.C. §102 and/or 35 U.S.C. §103 on the following grounds:

VI. IDENTIFICATION OF CHALLENGES TO THE CLAIMS

34. The '374 Patent contains 26 claims. I have been asked to opine on the validity of Claims 1, 3, 5, 7-12, 14, 16, and 18-23.

Ground	References	Basis	Claims Challenged
1	U.S. Patent No. 5,553,207 ("Sekiguchi", EX1005)	§102	1, 3, 5, 7, 8, 10-12, 14, 16, 18, 19, and 21-23
2	Sekiguchi	§103	1, 3, 5, 7-12, 14, 16, and 18-23
3	Sekiguchi in view of U.S. Patent No. 7,394,889 ("Partain", EX1006)	§103	8, 9, and 20

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 Purported Invention

37. I understand that the '374 Patent (EX1001) was filed on August 20, 2013 as U.S. Patent Application No. 14/000,446 ("the '446 Application"). I understand that the '446 Application is a National Stage of PCT International Application No. PCT/US2012/025548 (EX1003), filed on February 17, 2012, which claims priority to U.S. Provisional Application No. 61/445,499 (EX1004), filed on February 22, 2011.

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38. The '374 Patent relates to a three-dimensional scanning technique for “exclud[ing] certain scan results from processing and display.” EX1001, 1:27-29.

39. The '374 Patent discloses, for example, that “[b]y excluding or modifying processing of subsequent outlier data from within these unoccupied voxels, a three-dimensional reconstruction process can achieve concurrent improvements in accuracy and speed.” EX1001, 1:31-34.

40. The '374 Patent explains that “[t]here remains a need for techniques to exclude such outliers from a three-dimensional scanning process.” EX1001, 1:21-23.

41. The independent claims of the '374 Patent call for processing a portion of the three-dimensional data that is in a prohibited volume according to a “modified processing”.

42. This modified processing includes detecting a point in the prohibited volume and “displaying the point for a decay time” with the portion of the three-dimensional data. The '374 Patent discloses that the decay time relates to the time the data in the prohibited volume is displayed:

In another aspect, modified processing may include controlling how data in the prohibited volume is displayed. For example, data within the prohibited volume may be excluded from display, or may be displayed temporarily

using a brief decay time such as 0.5 seconds or any other
short interval.

EX1001, 17:40-44. Displaying data for a decay time is nothing new. Sekiguchi discloses temporarily displaying data that is present in an overflow/deletion region to allow a user to visually confirm that such data does not correspond to the organ of interest, and either deleting the data or rendering the data invisible. EX1005, 5:7-26, 6:57-65, 9:4-24.

B. Overview of the Prior Art

1. Sekiguchi (EX1005)

43. Sekiguchi relates to techniques for “individual internal organ extraction” and “presenting a three-dimensional display of individual internal organs by use of three-dimensional digital data attained through a shooting operation by an MRI, an X-ray CT, and the like.” EX1005, 1:22-29.

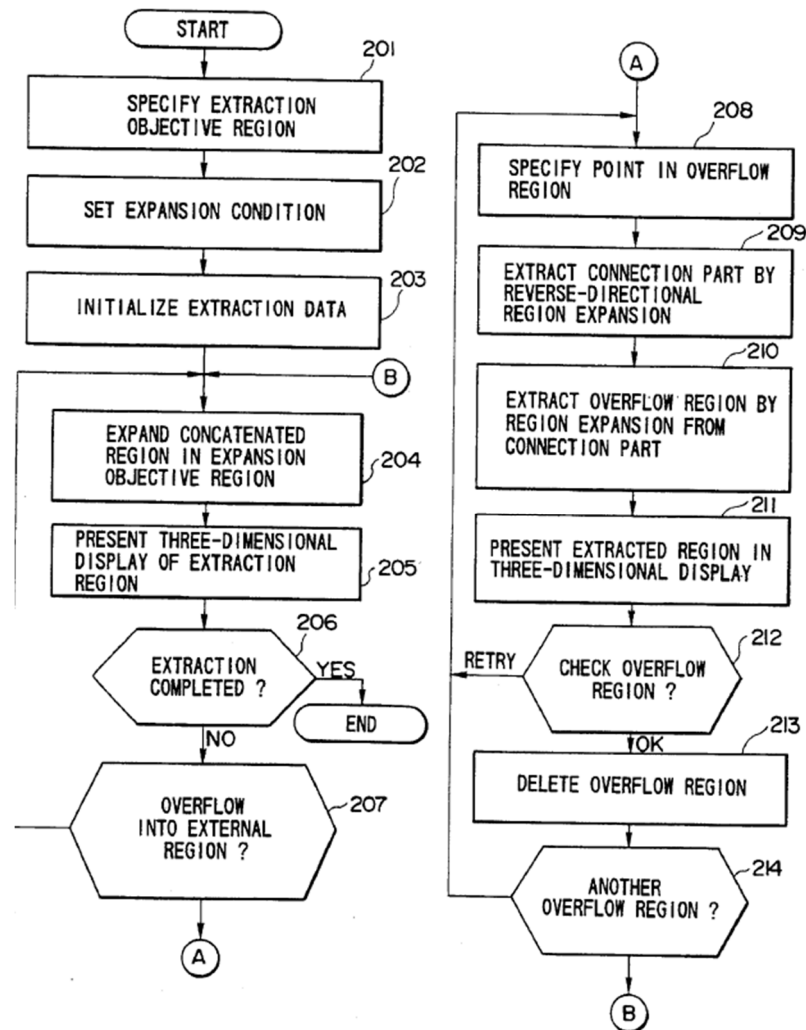
44. Sekiguchi discloses techniques for mitigating or preventing the problem of extracting image data that does not belong to the region intended to be extracted, *e.g.*, the individual internal organ. EX1005, 4:40-43 (addressing situation where “a completely wrong extraction result is obtained”).

45. Sekiguchi discloses temporarily displaying certain voxel data (in an “overflow region”) to allow the operator to confirm that the data is not associated with the individual internal organ to be extracted. EX1005, 5:9-11 (“operator

visually checks the three-dimensional display image to delete the region if the extracted region is actually the overflow region”), abstract.

46. The data in question is then deleted or rendered invisible and the data associated with the individual internal organ is displayed during this process. EX1005, 9:4-24 (“[a]fter the result is confirmed as described in operation (9), the overflow region is deleted” or the data is rendered invisible). *See also* EX1005, 5:7-64, 6:26-65, 10:49-65.

47. Like the ’374 Patent, Sekiguchi discloses subjecting three-dimensional voxel data to different types of processing depending on the region in which the voxel data is located. For voxel data that is present in Sekiguchi’s overflow/deletion region, Sekiguchi discloses visually confirming that the voxel data does not correspond to the organ to be extracted, and processing such voxel data by either deleting the data or rendered the data invisible. *See, e.g.*, EX1005, 5:7-26, 6:57-65. For voxel data that is present in Sekiguchi’s objective region, Sekiguchi discloses extracting and visually displaying this data, *i.e.*, such data is not deleted or rendered invisible. *See, e.g.*, EX1005, 5:62-64, 6:26-27, 10:49-55, 12:64-65. Figure 14 of Sekiguchi depicts a flowchart showing the operation of a first embodiment:



EX1005, Fig. 14.

2. Partain (EX1006)

48. Partain relates to X-ray and CT imaging techniques and discloses that “[i]n imaging three dimensional volumes, the smallest volume (often a cube) that can be resolved is referred to as a voxel.” EX1006, 8:58-60.

49. Partain discloses employing “voxels with dimensions of 0.4 mm or less in at least two orthogonal directions”. EX1006, abstract. Partain is in the same field

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of endeavor as Sekiguchi and the '374 Patent, *e.g.*, data processing relating to medical imaging. Partain is reasonably pertinent to the technical issues and problem addressed in Sekiguchi and the '374 Patent, *e.g.*, processing and display of three-dimensional data such as that obtained from X-ray and CT imaging.

50. I have been informed that Sekiguchi and Partain qualify as prior art with respect to the '374 Patent.

IX. CLAIM CONSTRUCTION

51. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the '374 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. 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 under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

A. “displaying the point for a decay time”

52. In the Related Litigation, Petitioners asserted that the term “displaying the point for a decay time” (Claims 1, 12, 23) refers to “temporarily displaying the point for a predetermined, short time interval.” EX1012, pp. 3-4. Patent Owner asserted that this term should be given its plain and ordinary meaning. EX1012, pp. 3-4. The District Court construed the term as having its plain and ordinary meaning. EX1012, pp. 3-4. The prior art meets the language of the claims regardless of whether a plain and ordinary meaning is applied or if Petitioners’ non-adopted litigation construction is adopted (*see* EX1012, pp. 3-4). The Challenged Claims are unpatentable under all the potential constructions of “displaying the point for a decay time”.

53. I have reviewed the ’374 Patent and its prosecution history as well as additional documents and have used a plain-meaning understanding for each claim term.

X. CLAIMS 1, 3, 5, 7, 8, 10-12, 14, 16, 18, 19, AND 21-23 ARE ANTICIPATED BY SEKIGUCHI (GROUND 1).

54. In my opinion, Claims 1, 3, 5, 7, 8, 10-12, 14, 16, 18, 19, and 21-23 are anticipated by Sekiguchi.

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

A. Claim 1 (Preamble): A method comprising:

56. In my opinion, Sekiguchi discloses the Preamble of Claim 1.

57. Sekiguchi is entitled “method of and apparatus for region extraction in three-dimensional voxel data”. EX1005, p. 1.

58. Sekiguchi discloses “a multi-dimensional data processing method” for processing three-dimensional voxel data. EX1005, 3:20-27.

59. Sekiguchi discloses that “region extraction is conducted on three-dimensional voxel data ... to present a three-dimensional display of the extraction objective region”. EX1005, 3:27-31.

60. Sekiguchi discloses techniques for “conducting an individual internal organ extraction ... by use of three-dimensional digital data attained through a shooting operation by an MRI, an X-ray CT, and the like.” EX1005, 1:22-29. *See also* EX1005, 10:30-32 (“three-dimensional voxel data attained by the MRI system”). Similarly, the '374 Patent discloses that its technique “may be used to improve *any* three-dimensional acquisition” such as “x-ray computed tomography” and the like. EX1001, 3:18-19 (emphasis added). Sekiguchi discloses “present[ing] a three-dimensional display of individual internal organs”. EX1005, 1:22-29. Similarly, the '374 Patent relates to “medical imaging or other sensitive applications”. EX1001, 7:17-18.

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61. Sekiguchi discloses temporarily displaying voxel data in an overflow region to allow the operator to visually confirm that the data is not associated with the individual internal organ to be extracted. EX1005, 5:9-11, 9:4-24, abstract. *See also* EX1005, 5:7-26, 6:57-65, 12:57-60, 4:66-67. The data in question is then deleted or rendered invisible while the data associated with the individual internal organ is displayed. EX1005, 5:7-26, 6:57-65, 12:57-60, 4:66-67. Similarly, the '374 Patent discloses that its technique may be employed to “exclude certain scan results from processing and display” such as “outlier data”. EX1001, 1:27-29, 3:19-23. Thus, Sekiguchi discloses the preamble of claim 1.

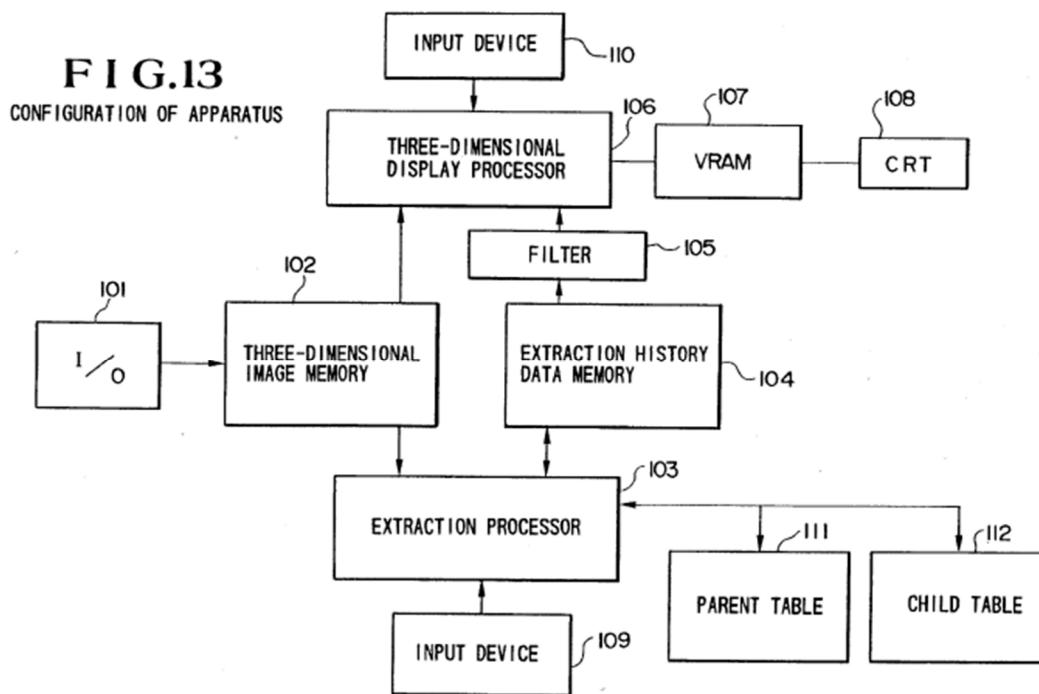
1. [1.1]: storing a spatial matrix in a memory, the spatial matrix including information for a plurality of voxels in a mesh of a scan space;

62. Sekiguchi discloses Element [1.1].

63. Sekiguchi is entitled “method of and apparatus for region extraction in three-dimensional *voxel data*”. EX1005, p. 1 (emphasis added).

64. Sekiguchi discloses that three-dimensional voxel data is “*stored* in a three-dimensional image *memory* 102.” EX1005, 10:30-32 (emphasis added). Sekiguchi discloses storing “three-dimensional voxel data” associated with a “three-dimensional display image data space” and “three-dimensional space” which constitutes a spatial matrix. EX1005, 7:24-30.

65. Sekiguchi discloses storing information associated with its techniques in “three-dimensional image memory 102” and “extraction history data memory 104”. EX1005, 10:30-55. Figure 13 of Sekiguchi discloses a configuration of the apparatus depicting three-dimensional image memory 102 and extraction history data memory 104:



The stored voxel data (“information”) is for a plurality of voxels given that the data is associated with various regions, *e.g.*, an objective region and an overflow region, which are not limited to a single voxel. *See, e.g.*, EX1005, 4:56-6:15. *See also* EX1005, Figs. 1-4 and 6-12 (depicting data for a plurality of voxels), 6:19-24.

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66. In addition, Sekiguchi discloses a spatial matrix in Figures 1-4 and 6-12. Figures 1 and 8 of Sekiguchi are reproduced below:

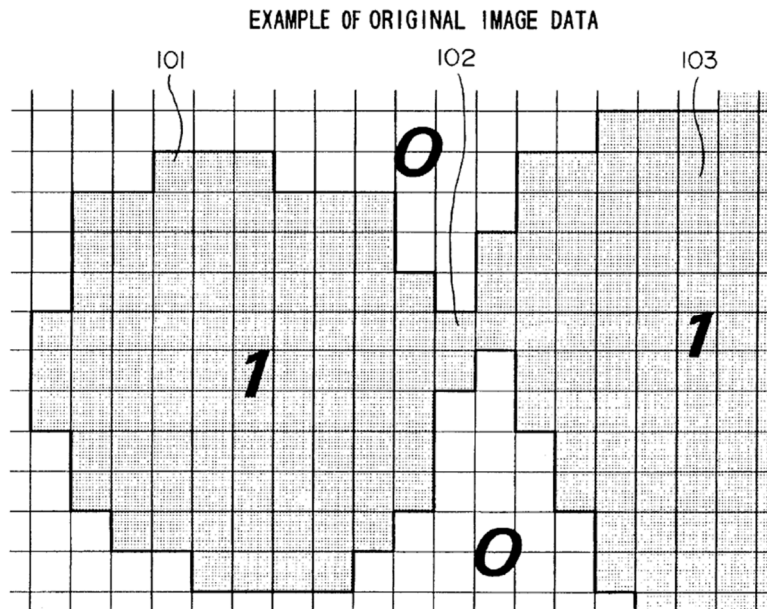


Figure 1 of Sekiguchi

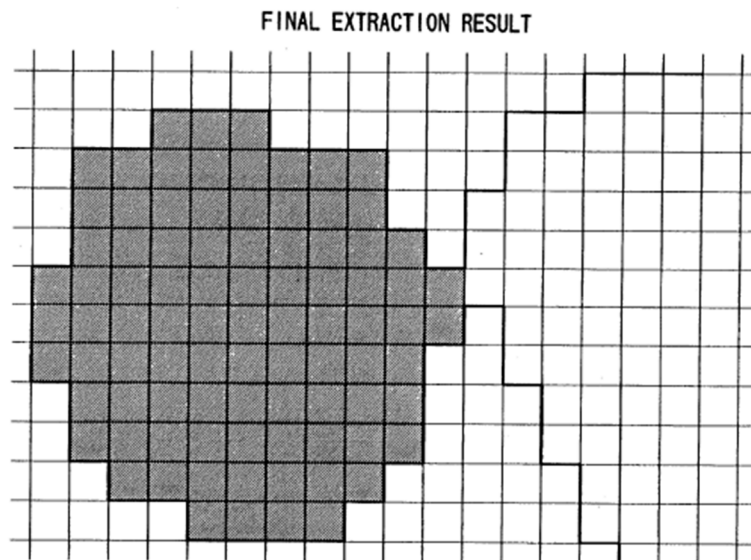


Figure 8 of Sekiguchi

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67. Sekiguchi discloses that depiction of figures in two dimensions is “for simplification of explanation”, and the depicted matrices in fact pertain to “three-dimensional voxel data”. EX1005, 6:19-24 (“The actual object of the present invention is multi-value three-dimensional voxel data; however, for simplification of explanation, description will now be given of the operations accomplished for two-dimensional binary data.”).

68. Given that Sekiguchi is entitled “method of and apparatus for region extraction in *three-dimensional voxel data*”, the techniques disclosed in Sekiguchi involve processing and displaying three-dimensional voxel data.

69. The '374 Patent discloses that the spatial matrix does not require any physical structure. EX1001, 14:17-20 (“[i]t will also be appreciated that, while the spatial matrix 500 is depicted as a three-dimensional structure that maps to the volume of a scan space, no such physical structure is required.”), Figure 7.

70. The '374 Patent discloses that “[t]he spatial matrix 500 may include *any* memory or combination of memories capable of storing and retrieving information according to voxels within the scan space, and *all* such variations that would be apparent to one of ordinary skill in the art are intended to fall within the scope of this invention”. EX1001, 14:21-26 (emphasis added). For the reasons discussed above, Sekiguchi discloses memory capable of storing and retrieving

information according to voxels within the scan space, and thus discloses a spatial matrix.

71. Further, an exemplary spatial matrix 500 is depicted in Figure 5 of the '374 Patent:

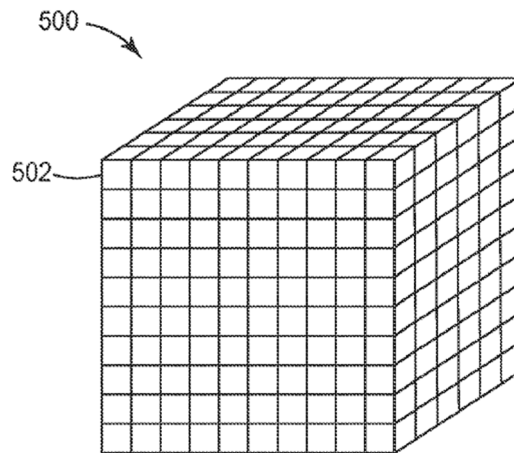


Figure 5 of the '374 Patent

72. The memory, voxel data space, and matrices of Figures 1-2, 4, and 6-12 disclosed by Sekiguchi (again, which pertain to three-dimensional voxel data, *see* EX1005, 6:19-24) are encompassed by the claimed “spatial matrix”. For example, while the depictions in Figures 1-2, 4, and 6-12 of Sekiguchi are in two dimensions, the matrices are in fact three-dimensional matrices resembling the matrix shown in Figure 5 of the '374 Patent, given the above disclosures of Sekiguchi (*see, e.g.,* EX1005, 6:19-24).

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73. The '374 Patent discloses that the voxels are not limited to a cubic shape and “any shape or size of volume may be suitably employed” and that “in one aspect, the mesh of the scan space is subdivided into voxels having a substantially cubic shape”. EX1001, 14:24-39

74. The '374 Patent also discloses that a scan space relates to the space in which a scan is conducted (*see, e.g.*, EX1001, the “scan space” is element 606 in Figure 6), and Sekiguchi discloses such a scan space given that Sekiguchi discloses that the three-dimensional digital data is “attained through a shooting operation by an MRI, an X-ray CT, and the like”. EX1005, 1:26-29.

75. The '374 Patent discloses that the “spatial matrix 500 may define a mesh of voxels” as depicted in Fig. 5 (EX1001, 14:26). Sekiguchi’s spatial matrix (*e.g.*, depicted in Figs. 1-2, 4, and 6-12) similarly defines a mesh of voxels of a scan space. Further, Sekiguchi discloses that a rendering processor “continuously references data of the extraction history data 104 updated in the step 204 to generate a three-dimensional display image of the extraction region at the current extraction stage in the VRAM 107, thereby displaying the image on the CRT 108”, and the rendering of the 3D data also results in generating a mesh of scan space. EX1005, 11:45-53. Thus, Sekiguchi discloses Element [1.1].

**2. [1.2]: obtaining three-dimensional data from an object
within the scan space using a scanner;**

76. Sekiguchi discloses Element [1.2]. Sekiguchi discloses “use of three-dimensional digital data attained through a shooting operation by an MRI, an X-ray CT, and the like.” EX1005, 1:22-29. Similarly, the ’374 Patent discloses that its technique “may be used to improve any three-dimensional acquisition” such as “x-ray computed tomography”. EX1001, 3:18-19.

77. Sekiguchi discloses obtaining the three-dimensional data “from an object within the scan space” as claimed, *e.g.*, data associated with an object such as an “individual internal organ”. EX1005, 1:25-26, 10:22-27. Sekiguchi’s processes relate to an “objective region” associated with the scanned object. EX1005, 4:56-6:15.

78. Sekiguchi discloses techniques for “conducting an individual internal organ extraction”. EX1005, 1:22-26.

79. The three-dimensional data is obtained from scanning internal organs. EX1005, 1:26-29 (“three-dimensional display of individual internal organs by use of three-dimensional digital data attained through a shooting operation by an MRI, an X-ray CT, and the like.”). *See also* EX1005, 10:22-27 (“three-dimensional voxel data attained through a three-dimensional image shooting operation of an MRI apparatus to extract an image of a particular internal organ therefrom”). The object

is within the scan space given that Sekiguchi discloses scanning the object and obtaining voxel data associated with the object, as explained above.

80. Sekiguchi discloses that “FIG. 1 shows an example of original image data on which the extraction processing is to be conducted” and “[t]he actual object of the present invention is multi-value three-dimensional voxel data”. EX1005, 6:19-22.

81. Sekiguchi discloses “using a scanner” as claimed. Sekiguchi discloses “**scanning** the three-dimensional voxel data”. EX1005, 16:10-13 (emphasis added). Sekiguchi discloses that the three-dimensional data is “attained through a shooting operation by an MRI, an X-ray CT, and the like”. EX1005, 1:22-29. *See also* EX1005, 10:23-27 (“This apparatus processes three-dimensional voxel data attained through a three-dimensional image shooting operation...”).

82. The ’374 Patent discloses that the scanner “may include **any** camera or camera system suitable for capturing images from which a three-dimensional point cloud may be recovered” such as “x-ray computed tomography”. EX1001, 4:65-67 (emphasis added), 3:18-19. *See also* EX1008, [0005], [0028] (X-ray and MRI systems are “scanners”); EX1009, [0026]-[0027] (MRI and CT systems provide “scan” data). Thus, the scanner of the ’374 Patent encompasses camera systems such as x-ray computed tomography and MRI systems like that disclosed by Sekiguchi.

EX1005, 1:22-29, 6:19-22. The “scanner” of the ’374 Patent is nothing new as further evidenced by EX1008 which discloses a “scanner” (*see* [0028]-[0029], Fig. 1) used in “any imaging technology” including X-ray and MRI (*see* [0005], [0021]) like Sekiguchi. Thus, Sekiguchi discloses Element [1.2].

3. [1.3]: identifying a one of the plurality of voxels in the mesh that is unoccupied;

83. Sekiguchi discloses Element [1.3]. Sekiguchi discloses that an “overflow region *is indicated* in the three-dimensional display image”. EX1005, 5:7-8 (emphasis added).

84. Sekiguchi discloses “*specifying* an overflow region in a three-dimensional display image”. EX1005, 3:61-63 (emphasis added). *See also* EX1005, Fig. 3.

85. In Sekiguchi, the overflow region corresponds to voxels that are “unoccupied” by the object of interest (*e.g.*, the internal organ to be extracted). EX1005, 1:22-29 (“conducting an individual internal organ extraction”), 10:22-27 (“to extract an image of a particular internal organ therefrom”). Indeed, as explained above, the purpose of temporarily displaying the data in the overflow region as taught by Sekiguchi is to confirm that such data is not of the internal organ to be extracted. EX1005, 5:7-26, 6:57-65, 9:4-24, 12:57-60.

86. The '374 Patent discloses that an “unoccupied” voxel may contain data points:

Thus while terms such as occupied or unoccupied are used in this description, these terms should not be understood as a direct proxy for whether data points are or can be obtained from a voxel, or whether a voxel is permitted (that is, receiving unmodified processing) or forbidden (that is, receiving modified processing).

EX1001, 15:31-36.

87. According to the '374 Patent, “unoccupied” voxels encompass voxels that are unoccupied by the “surface of interest”. EX1001, 15:67-16:3 (“any suitable techniques for characterizing a voxel as containing or not containing the surface of interest may be suitably employed to identify prohibited space as contemplated herein.”). Sekiguchi similarly discloses identifying “unoccupied” voxels given that Sekiguchi identifies an overflow region that is unoccupied by the organ that is intended to be extracted (*e.g.*, “the surface of interest”), as explained above. EX1005, 5:7-8, 3:61-63.

88. Sekiguchi discloses that “[t]he operator visually checks the three-dimensional display image to delete the region if the extracted region is actually the overflow region”. EX1005, 5:9-11.

89. Sekiguchi further discloses that “a point belonging to the region other than the objective region ***is specified*** in a three-dimensional display image to execute deletion of the overflow region”. EX1005, abstract (emphasis added).

90. Sekiguchi discloses that “the region extracted by the function of operation (8) ***is clearly indicated*** in the three-dimensional display image so that the operator confirms the region thus indicated by observing the displayed region” and “[i]f the overflow region is appropriate, the deletion processing of operation (10) below is carried out”. EX1005, 9:4-24. Sekiguchi discloses that “the overflow region is deleted” or “an attribute of an invisibility region is assigned to the pixel without deleting the data. That is, the pixel data is retained, but it is not displayed.” EX1005, 9:4-24. For the reasons explained above, the “pixel data” discussed in Sekiguchi pertains to three-dimensional voxel data given that Sekiguchi discloses that “[t]he actual object of the present invention is multi-value three-dimensional voxel data”. EX1005, 6:19-24.

91. Figure 3 of Sekiguchi “is an explanatory diagram for explaining a method of ***specifying an overflow region*** in a three-dimensional display image”:

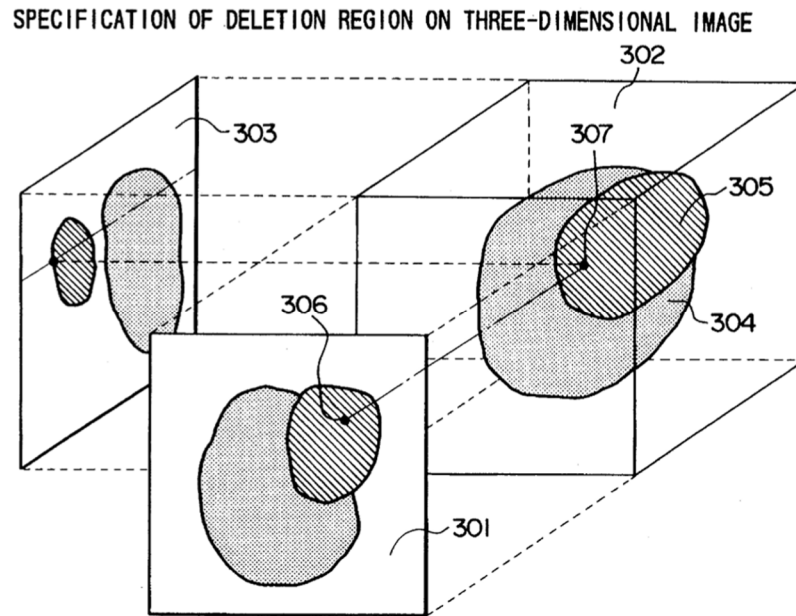


Figure 3 of Sekiguchi

EX1005, 3:61-63 (emphasis added).

92. Sekiguchi also refers to the overflow region as the “deletion region” (see caption in Figure 3). In Figure 3, Element 302 is the 3D display image data space, Element 304 is the objective region, Element 305 is the overflow region (deletion region), and Element 306 is a point within the overflow region. EX1005, 7:22-30. Sekiguchi discloses that “[i]n the overflow region deletion, there is first required means for indicating a deletion objective region.” EX1005, 7:12-13.

93. Sekiguchi also identifies multiple points and voxels that are unoccupied by the object of interest given that Sekiguchi discloses identifying an overflow/deletion “region”. *See, e.g.*, EX1005, 5:7-8, 3:61-63, 11:4-6. Similarly, the

'374 Patent discloses that “identifying the one of the plurality of voxels may include identifying a plurality of points” and “voxels in which points are detected may be forbidden”. EX1001, 1:50-52, 15:27-29. The '374 Patent discloses that this step “may include identifying at least one of the plurality of voxels in the scan space that is unoccupied.” EX1001, 15:44-46. *See also* EX1001, claim 10 (“wherein the prohibited volume includes more than one of the plurality of voxels”). Thus, Sekiguchi discloses Element [1.3].

4. [1.4]: storing an indication in the spatial matrix for a modified processing of data from the one of the plurality of voxels, thereby identifying a prohibited volume within the scan space; and

94. Sekiguchi discloses Element [1.4].¹ Sekiguchi discloses subjecting three-dimensional voxel data to different types of processing depending on the region in which the voxel data is located, like the '374 Patent. EX1005, 5:7-26, 5:62-64, 6:57-65, 6:26-27, 10:49-55, 12:64-65.

95. For voxel data that is present in Sekiguchi's overflow/deletion region, Sekiguchi discloses temporarily displaying the voxel data and visually confirming that the voxel data does not correspond to the organ to be extracted, and processing

¹ This section addresses both the “modified processing” recited in Elements [1.4] and [1.5] as well as the “unmodified processing” recited in Element [1.5].

such voxel data by either deleting the data or rendered the data invisible. *See, e.g.*, EX1005, 5:7-26, 6:57-65. *See also* EX1005, 12:57-60, 4:66-67.

96. This processing disclosed by Sekiguchi corresponds to the claimed “modified processing”, and Sekiguchi’s overflow/deletion region corresponds to the claimed “prohibited volume”.

97. For voxel data that is present in Sekiguchi’s objective region, Sekiguchi discloses extracting and visually displaying this data, *i.e.*, such data is not deleted or rendered invisible. *See, e.g.*, EX1005, 5:62-64, 6:26-27, 10:49-55, 12:64-65. This processing corresponds to the claimed “unmodified processing”, and the objective region corresponds to a volume that is not in the claimed “prohibited volume”. This is discussed below in greater detail.

98. **Sekiguchi discloses the claimed “modified processing”:** Sekiguchi discloses temporarily displaying voxel data that is in the overflow/deletion region to allow the operator to visually check that the voxel data is not associated with the object of interest (*e.g.*, the internal organ to be extracted), and subsequently deleting or rendering invisible the voxel data. EX1005, 4:66-67 (“The extraction process is monitored on the three dimensional display image”); 5:7-8 (“The overflow region is indicated in the three-dimensional display image.”); 5:9-11 (“The operator visually checks the three-dimensional display image to delete the region if the extracted

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region is actually the overflow region”); 5:15-26 (“in a case where the extraction processing is conducted on the three-dimensional voxel data, there is necessitated, as disclosed in reference (3) above, a function for outputting the extraction region as a three-dimensional display image in a real time manner”); 6:57-65 (“In a case where the extraction region overflows into an external region, the extraction is required to be stopped at an appropriate point in time.... There is provided observation means necessary for the operator to conduct the judgement.”); 9:4-24 (“the region extracted by the function of operation (8) is clearly indicated in the three-dimensional display image so that the operator confirms the region thus indicated by observing the displayed region” and “[i]f the overflow region is appropriate, the deletion processing of operation (10) below is carried out” or “an attribute of an invisibility region is assigned to the pixel without deleting the data. That is, the pixel data is retained, but it is not displayed.”); 12:57-60 (“The operator again evaluates the three-dimensional display image after the deletion processing of the step 213 so as to decide presence or absence of any other overflow region therein.”).

99. This processing disclosed by Sekiguchi, which includes temporarily displaying and deleting/rendering transparent voxel data that is in the overflow/deletion region, corresponds to the claimed “modified processing”;

Sekiguchi's overflow/deletion region corresponds to the claimed "prohibited volume". *See also* §X.A.6. (Element [1.6]).

100. **Sekiguchi discloses the claimed "unmodified processing"**: Sekiguchi subjects voxel data that is in the objective region (*i.e.*, not the overflow region) to different (unmodified) processing. For example, Sekiguchi discloses extracting and displaying voxel data that is in the objective region, without subjecting such data to the deletion/rendering invisible processing discussed above. EX1005, 5:62-64 ("displaying ... the three-dimensional image"), 6:26-27 ("region 101 is an objective region to be extracted"), 10:49-55 ("three-dimensional display processor 106 generates ... three-dimensional image data of the extraction region", "[t]he data is displayed as a three-dimensional display image on a CRT 108"). 12:64-65 ("again start the extraction of the objective region").

101. This extracting and displaying of voxel data present in the objective region (*i.e.*, without the modified processing involving deleting data or rendering the data invisible, discussed above) satisfies the claimed "unmodified processing" recited in Element [1.5]. *See* §X.A.5. In this regard, claim 1 of the '374 Patent does not explicitly describe what the "unmodified processing" entails.

102. According to the '374 Patent, the “unmodified processing” encompasses “***any*** processing associated with the acquisition of three-dimensional data” such as “acquisition, display, and refinement”:

[T]he process 700 may include processing a portion of the three-dimensional data that is not in the prohibited volume—or alternatively stated, three-dimensional data that is in the permitted volume of the scan space—according to an unmodified or normal processing. This may include ***any processing associated with the acquisition of three-dimensional data*** such as.... In general, it is contemplated that any three-dimensional process that does not use space carving or the like may be performed in an ‘unmodified’ processing step as that term is used herein, ***including without limitation acquisition, display, and refinement (for example, optimization, error minimization, etc.) of a three-dimensional surface representation*** based on, for example, a sequence of frames of image data or the like from a three-dimensional scanner. [Emphasis added.]

EX1001, 17:3-20. *See also* EX1001, 14:41-43. Thus, Sekiguchi’s extracting/displaying of voxel data that is in the objective region, without subjecting such data to the deletion/rendering invisible processing discussed above, satisfies the claimed “unmodified processing”. Further, the acquisition and/or storage of

voxel data in the objective region as disclosed by Sekiguchi (EX1005, 1:22-29, 10:30-55, 16:10-13) also satisfies the claimed “unmodified processing”. Sekiguchi discloses processing voxel data that is not in the overflow region (*e.g.*, data that is not in the “prohibited volume”) differently from voxel data that is in the prohibited volume, and this distinct type of processing satisfies the claimed “unmodified processing”.

103. Sekiguchi discloses “storing an indication in the spatial matrix for a modified processing of data from the one of the plurality of voxels” as claimed. Sekiguchi’s system includes elements for storing and processing three-dimensional voxel data and for carrying out the processes described in Sekiguchi, including deleting/rendering invisible the data in the overflow/deletion region (*i.e.*, “modified processing”), as well as extracting/displaying the data present in the objective region (*i.e.*, “unmodified processing”). For example, Sekiguchi discloses an apparatus (depicted below) including three-dimensional image memory 102, extraction processor 103, extraction history data memory 104, and three-dimensional display processor 106:

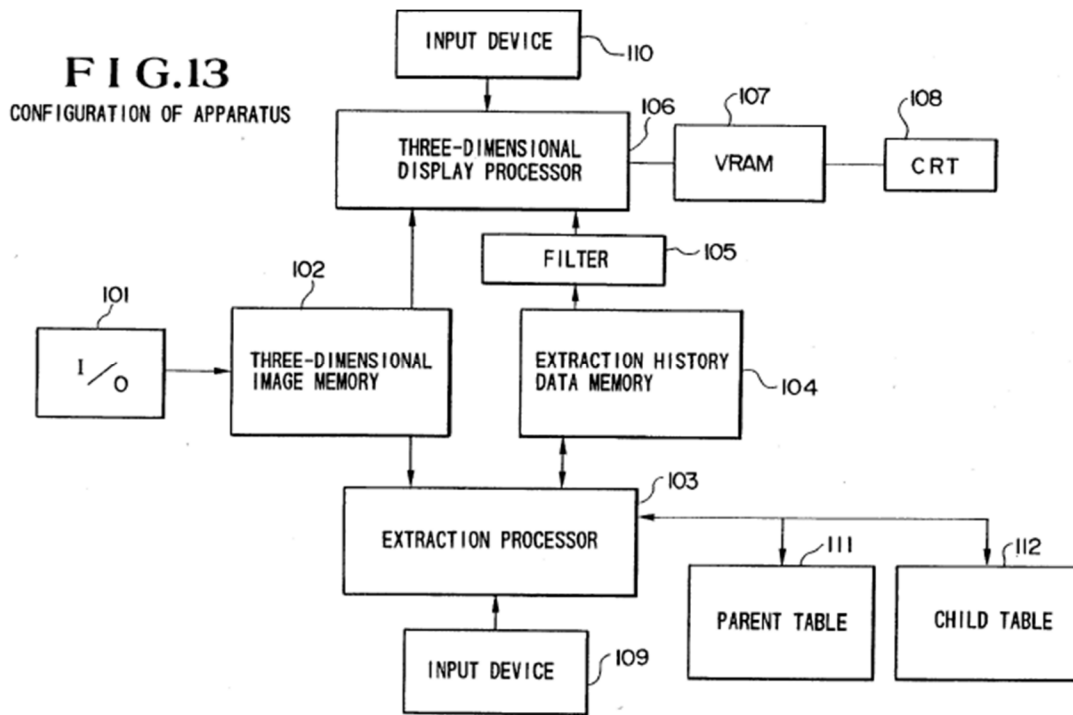


Figure 13 of Sekiguchi

See also §X.A.1. (Element [1.1]). Sekiguchi's extraction history data memory 104 stores "information denoting a serial extraction number for each voxel of the three-dimensional voxel data" (EX1005, 10:39-41), which includes an indication for modified processing of data from the one of the plurality of voxels. Further, the status of the data being stored by the system but not displayed ("data is retained, but it is not displayed", EX1005, 9:20-24) is itself an indication for the modified processing of data from the one of the plurality of voxels. Further, an indication of the overflow region (which, as explained above, is an indication for modified

processing) is stored when the overflow region is specified “in the three-dimensional display image”, as disclosed by Sekiguchi. EX1005, 5:7-8, 3:61-63.

104. To the extent Patent Owner argues that Element [1.4] requires use of a “processing indicator such as a ‘permitted’ or ‘forbidden’ flag” as disclosed at column 16, lines 64-67 of the ’374 Patent, Sekiguchi discloses this subject matter.² Sekiguchi discloses that “a shaded portion has a value ‘1’ and any other portion has a value ‘0’”. EX1005, 6:25-31.

105. As shown in the spatial matrix of Figure 1, region 101 (shaded region with binary flag “1”) indicates that processing is permitted and unshaded regions (binary flag “0”) indicates that processing is forbidden for a corresponding volume of the scan space.

106. Further, Sekiguchi discloses use of “binary data representing whether or not each pixel belongs inside the extraction region”. EX1005, 6:32-36. *See also* EX1005, 6:40-42 (“The number is stored as attribute data for each pixel. The

² Claim 11, which depends from claim 1, expressly recites a “binary flag for each one of the plurality of voxels that indicates whether processing is permitted or forbidden for a corresponding volume of the scan space” and is also disclosed by Sekiguchi as explained below. §X.A.G.

attribute data will be referred to as ‘extraction history data’ hereinbelow.”). As explained above, references to “pixels” are for “simplification of explanation” and in fact refer to 3D voxels given that the “actual object of the present invention is multi-value three-dimensional voxel data”. EX1005, 6:19-24. Sekiguchi’s binary data is a processing indicator such as a flag given that it “represent[s] whether or not each pixel belongs inside the extraction region” (EX1005, 6:32-36), and the extraction region of Sekiguchi corresponds to the claimed “prohibited volume”. Sekiguchi’s voxel data described above constitutes an indication of whether the data is subjected to modified or unmodified processing.

107. As explained above, Sekiguchi discloses identifying certain voxels that are unoccupied (*i.e.*, by identifying an overflow region). *See* §X.A.3. Such identification of the overflow region in Sekiguchi (and storing of the associated indication of modified processing as discussed above in §X.A.4.) thereby results in identifying a prohibited volume within the scan space, given that Sekiguchi’s overflow region constitutes the “prohibited volume” which the operator visually inspects for data that does not relate to the object of interest, and which in turn, is deleted or rendered invisible according to Sekiguchi’s technique as explained above. Thus, Sekiguchi discloses Element [1.4].

5. [1.5]: processing a portion of the three-dimensional data that is not in the prohibited volume according to an unmodified processing and processing a second portion of the three-dimensional data that is in the prohibited volume according to the modified processing,

108. Sekiguchi discloses Element [1.5] for at least the reasons discussed above concerning Element [1.4]. §X.A.4.

109. As explained above, Sekiguchi discloses subjecting three-dimensional voxel data to different types of processing depending on the region in which the voxel data is located, like the '374 Patent. §X.A.4.

110. For voxel data that is present in Sekiguchi's overflow/deletion region (corresponding to "a second portion of the three-dimensional data that is in the prohibited volume"), Sekiguchi discloses visually confirming that the voxel data does not correspond to the organ to be extracted, and processing such voxel data by either deleting the data or rendered the data invisible. *See, e.g.*, EX1005, 5:7-26, 6:57-65. This processing disclosed by Sekiguchi corresponds to the claimed "modified processing".

111. For voxel data that is present in Sekiguchi's objective region (corresponding to "a portion of the three-dimensional data that is not in the prohibited volume"), Sekiguchi discloses extracting and visually displaying this data, *i.e.*, such data is not deleted or rendered invisible. EX1005, 5:62-64, 6:26-27,

10:49-55, 12:64-65. This processing disclosed by Sekiguchi corresponds to the claimed “unmodified processing”.

112. Furthermore, Sekiguchi discloses “a method of and an apparatus for processing multi-dimensional data capable of minimizing human operation”. EX1005, 3:13-16. Sekiguchi seeks to extract and display three-dimensional data associated with an objective region, *e.g.*, three-dimensional data associated with an internal organ. Sekiguchi identifies a certain portion of the three-dimensional data associated with the object to be extracted (“objective region”), and a different portion of the three-dimensional data that does not belong to the object region (“overflow region” or “deletion region”). EX1005, 6:26-27, Figure 1, 4:56-5:14. This is depicted in Figure 1 of Sekiguchi:

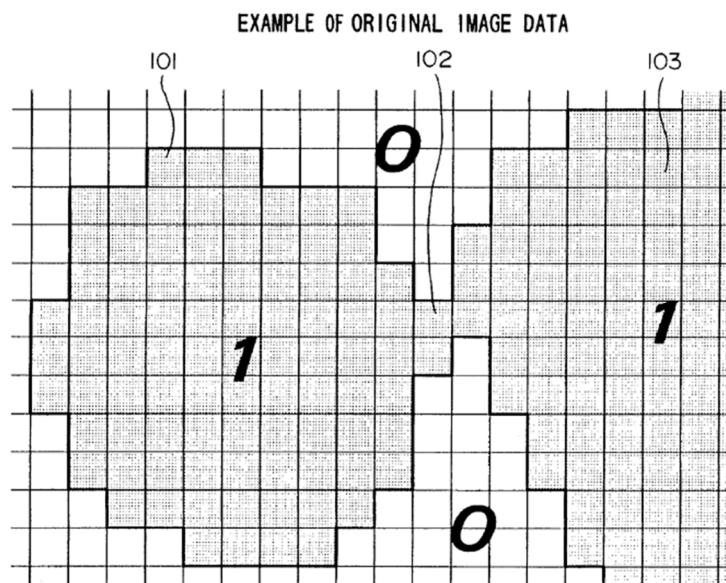


Figure 1 of Sekiguchi

113. The three-dimensional data that is in the objective region (*i.e.*, data that is not in the prohibited volume) is subjected to processing such as acquisition, extraction, and displaying (each and collectively corresponding to the claimed “unmodified processing”). §X.A.4.

114. The three-dimensional data that is in the overflow/deletion region (*i.e.*, data that is in the prohibited volume) is subject to a different type of processing is subject to a different type of processing involving temporarily displaying and deleting/rendering invisible the data (corresponding to the claimed “modified processing”), as explained above. §X.A.4.

115. Element [1.6] of claim 1 further defines the “modified processing”, and Sekiguchi discloses such subject matter of Element [1.6] for the reasons discussed below. Thus, Sekiguchi discloses Element [1.5].

6. [1.6]: wherein the modified processing includes detecting a point in the prohibited volume and displaying the point for a decay time with the second portion of the three-dimensional data.

116. Sekiguchi discloses Element [1.6].

117. Sekiguchi discloses “wherein the modified processing includes detecting a point in the prohibited volume” as claimed. Sekiguchi discloses that “[t]he operator visually checks the three-dimensional display image to delete the

region if the extracted region is actually the overflow region”. EX1005, 5:9-11. *See also* EX1005, 4:66-67, 5:7-8.

118. Sekiguchi discloses that “***a point*** belonging to the region other than the objective region ***is specified*** in a three-dimensional display image to execute deletion of the overflow region”. EX1005, abstract (emphasis added).

119. Sekiguchi discloses that “the region extracted by the function of operation (8) is clearly indicated in the three-dimensional display image so that the operator confirms the region thus indicated ***by observing the displayed region***” and “[i]f the overflow region is appropriate, the ***deletion processing of operation (10) below is carried out***”, wherein “the overflow region is deleted” or “an attribute of an invisibility region is assigned to the pixel without deleting the data. That is, the pixel data is retained, but it is not displayed.” EX1005, 9:4-24 (emphasis added).

120. Sekiguchi discloses that the modified processing includes “displaying the point for a decay time with the second portion of the three-dimensional data” as claimed.

121. As explained above, Sekiguchi discloses temporarily displaying three-dimensional data in voxels marked as overflow (or for deletion) to allow the operator to visually check that such data is not associated with the object of interest (*e.g.*, the internal organ to be extracted), and the data is subsequently deleted or rendered

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invisible. EX1005, 4:66-67 (“The extraction process is monitored on the three dimensional display image”); 5:7-8 (“The overflow region is indicated in the three-dimensional display image.”); 5:9-11 (“The operator visually checks the three-dimensional display image to delete the region if the extracted region is actually the overflow region”); 5:15-26 (“in a case where the extraction processing is conducted on the three-dimensional voxel data, there is necessitated, as disclosed in reference (3) above, a function for outputting the extraction region as a three-dimensional display image in a real time manner”); 6:57-65 (“In a case where the extraction region overflows into an external region, the extraction is required to be stopped at an appropriate point in time.... There is provided observation means necessary for the operator to conduct the judgement.”); 9:4-24 (“the region extracted by the function of operation (8) is clearly indicated in the three-dimensional display image so that the operator confirms the region thus indicated by observing the displayed region” and “[i]f the overflow region is appropriate, the deletion processing of operation (10) below is carried out” or “an attribute of an invisibility region is assigned to the pixel without deleting the data. That is, the pixel data is retained, but it is not displayed.”); 10:54-55 (“[t]he data is displayed as a three-dimensional display image on a CRT 108.”).

122. Sekiguchi discloses that the three-dimensional data that is in the overflow/deletion region and temporarily displayed (*i.e.*, the data that is in the “prohibited volume” and thus subject to the “modified processing”) includes points. EX1005, abstract (“when a region other than an objective region is extracted as a result of the region extraction, a point belonging to the region other than the objective region is specified in a three-dimensional display image to execute deletion of the overflow region”), 3:20-27, Fig. 14 (“specify point in overflow region”), 11:4-6 (“coordinates of a point or a plurality of points in a region”).

123. Sekiguchi discloses that “[a] point is specified in the overflow region to be deleted”. EX1005, 12:10. Sekiguchi discloses detecting a point in the prohibited volume in order to temporarily display such point, as well as to visually confirm that the data should be deleted/rendered invisible, as explained above. Sekiguchi discloses detecting both “a point” (as noted above) as well as multiple points in the overflow region, given that Sekiguchi discloses detecting any data in the overflow region.

124. Sekiguchi discloses “displaying the point for a decay time” as claimed. The ’374 Patent discloses that the “decay time” relates to a temporary period of time during which data within the prohibited volume is displayed:

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In another aspect, modified processing may include controlling how data in the prohibited volume is displayed. For example, data within the prohibited volume may be excluded from display, or may be displayed temporarily using a brief decay time such as 0.5 seconds or any other short interval.

EX1001, 17:40-44. Sekiguchi discloses displaying the data to be deleted or rendered invisible “for a decay time” because—as explained above—Sekiguchi discloses temporarily displaying such data in overflow voxels to allow the operator to visually confirm that such data belongs to the overflow region (and is not associated with the internal organ to be extracted), prior to deletion or rendering such data invisible. EX1005, 4:66-67, 5:7-8, 5:9-11, 5:15-26, 6:57-65, 9:4-24.

125. Sekiguchi discloses “displaying the point for a decay time” under the District Court’s and Patent Owner’s construction in the Related Litigation. The District Court determined that the term “displaying the point for a decay time” is to take on its plain and ordinary meaning (EX1012, pp. 3-4), and Sekiguchi discloses the term under the District Court’s construction for the reasons discussed above. Further, I understand that Patent Owner asserted that “displaying the point for a decay time” under its plain and ordinary meaning need not be “brief” or “predetermined”:

The plain meaning of this term is consistent with the use of the term in the claims, which recite that a “point in a prohibited volume” is “displayed” for the duration of “a decay time.”... Similarly, here, the specification’s single reference to a “brief decay time” does not mean that every instance of a “decay time” is inherently “brief” (or “short”)... [T]he ’374 patent ... is completely silent as to whether predetermination is or is not associated with displaying data, including when it is displayed for a decay time.

EX1013, pp. 24-26. As discussed above, Sekiguchi discloses temporarily displaying the data for a duration of time (*i.e.*, prior to deletion or being rendered invisible) and thus satisfies the District Court’s (and Patent Owner’s) construction in the Related Litigation.

126. Sekiguchi discloses displaying the point for a decay time “with the second portion of the three-dimensional data” as claimed. As explained above, Sekiguchi discloses displaying voxel data in the overflow region with voxel data in the objective region. EX1005, 5:7-26, 5:62-64, 6:26-27, 6:57-65, 10:49-55, 12:64-65. As also explained above, voxel data in Sekiguchi’s overflow region corresponds to the “second portion of the three-dimensional data that is in the prohibited volume” (which in turn includes the “point in the prohibited volume” recited in Element [1.6]), and voxel data in Sekiguchi’s objective region corresponds to the “portion of

the three-dimensional data that is not in the prohibited volume”. EX1005, 5:7-26, 5:62-64, 6:26-27, 6:57-65, 10:49-55, 12:64-65. The purpose of temporarily displaying the “portion” in Sekiguchi is for the purpose of allowing the operator to visually confirm that such “portion” does not correspond to the organ to be extracted and can be deleted or rendered invisible. EX1005, 5:7-26, 5:62-64, 6:26-27, 6:57-65, 10:49-55, 12:64-65. Displaying both portions simultaneously as disclosed by Sekiguchi further advances this purpose. This is also depicted in Figures 1-2, 4, and 6-9 of Sekiguchi. In addition, Sekiguchi expressly discloses “displaying, in a *superimposed* manner, the overflow region onto the three-dimensional image”. EX1005, 5:61-63 (emphasis added). Thus, Sekiguchi discloses Element [1.6].

B. Claim 3: The method of claim 1 further comprising providing a spatial margin of one or more voxels adjacent to a surface of the object for which processing cannot be prohibited.

127. Sekiguchi discloses the subject matter of claim 3. *See* Section X.A. (claim 1 from which claim 3 depends).

128. In Sekiguchi, a spatial margin is provided that includes voxels that are adjacent to a surface of the objective region 101 (the outline of the objective region 101), for example, as depicted in Figure 1:

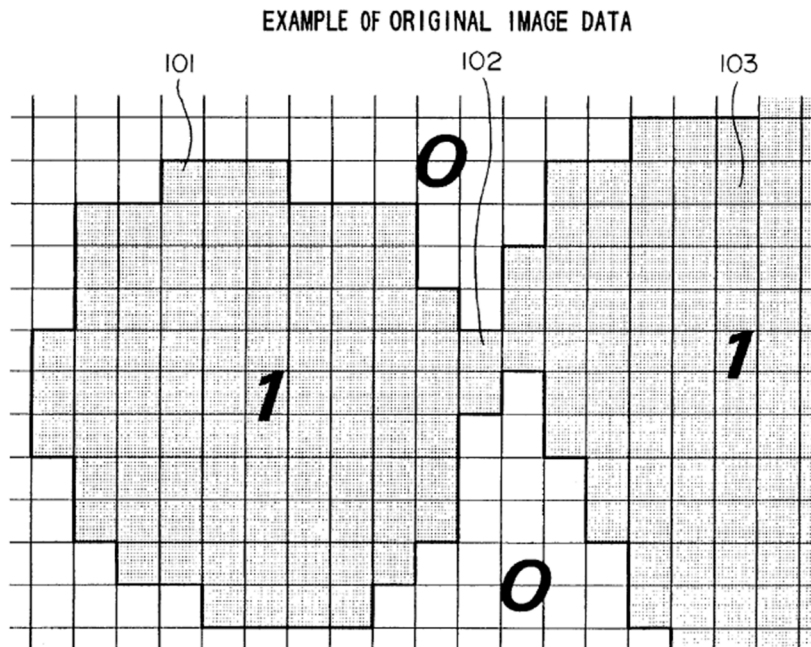


Figure 1 of Sekiguchi

These voxels are voxels for which processing cannot be prohibited because they are included in the extracted and rendered object, as they belong to the objective region 101.

129. Sekiguchi expressly teaches processing (*e.g.*, acquiring, extracting and displaying) such voxels given that they are present in the objective region.

130. In addition, Figure 9 of Sekiguchi depicts a spatial margin of one voxel designated “x” (thus satisfying the claimed “one or more voxels”) that is adjacent to a surface of the object (*e.g.*, the outline of the objective region 101 (shaded portion), which is expressly labeled in Figure 1 above):

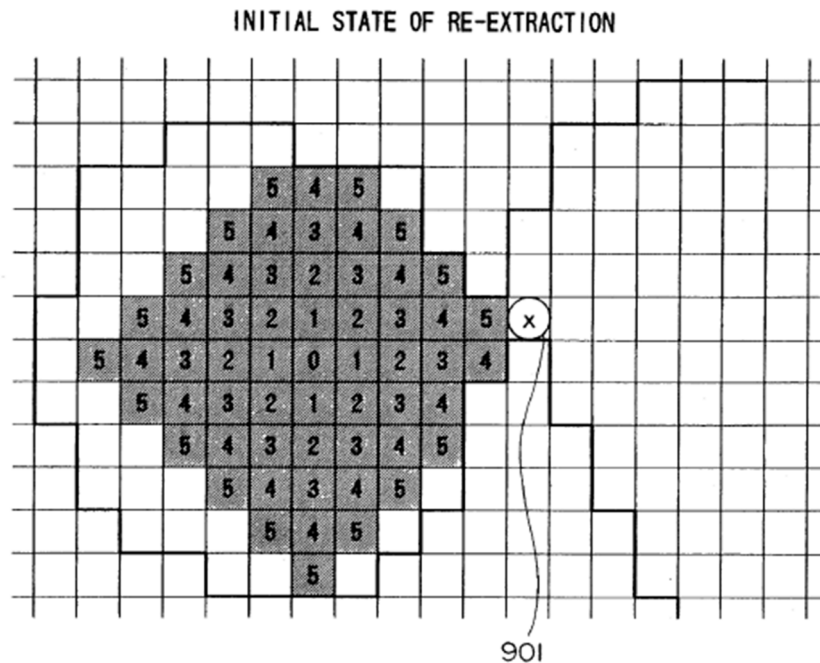


Figure 9 of Sekiguchi

Processing cannot be prohibited for this voxel given that Sekiguchi expressly discloses processing the voxel by, for example, designating it as “x” and assigning such voxel “with the expansion inhibition attribute”. EX1005, 15:21-30.

C. Claim 5: The method of claim 1 wherein the modified processing includes omitting any points in the prohibited volume from a surface mesh of the object created with the three-dimensional data.

131. Sekiguchi discloses the subject matter of claim 5. *See* Section X.A. (claim 1 from which claim 5 depends).

132. As discussed above in Section X.A.6., Sekiguchi discloses deleting voxel data in the overflow region (corresponding to the “prohibited volume”) or

retaining but not displaying the voxel data associated with the overflow region. Sekiguchi discloses that after confirming the overflow region, “the overflow region is deleted” or “an attribute of an invisibility region is assigned to the pixel without deleting the data” wherein “the pixel data is retained, but it is not displayed”. EX1005, 9:18-25. *See also* EX1005, abstract (“when a region other than an objective region is extracted as a result of the region extraction, a point belonging to the region other than the objective region is specified in a three-dimensional display image to execute deletion of the overflow region”). Thus, Sekiguchi omits any points associated with the overflow region from further processing including any generation of a surface mesh of the object created with the three-dimensional data, given that such data is deleted or otherwise not displayed.

133. Further, for example, Sekiguchi discloses that “[w]hen there exist a plurality of overflow regions, the extraction processing of the objective region described in operation (1) and the overflow region extraction and deletion of operations (2) to (10) are repeatedly carried out to sequentially delete overflow regions” (EX1005, 9:25-30). The data that was previously deleted or rendered invisible in an earlier iteration is omitted from subsequent iterations of the data refinement process. EX1005, 9:25-30.

134. Sekiguchi discloses a rendering processor that “generate[s] a three-dimensional display image of the extraction region at the current extraction stage in the VRAM 107, thereby displaying the image on the CRT 108”. EX1005, 11:45-53. Sekiguchi discloses generating a surface mesh for the reasons discussed above concerning Element [1.1], and the surface mesh is also created from the three-dimensional data when, for example, the data is rendered onto a display. EX1005, 11:45-53. Sekiguchi omits points in the extraction region (corresponding to the “prohibited volume”) from such a surface mesh because such data is deleted or rendered invisible, as explained above.

D. Claim 7: The method of claim 1 wherein the modified processing includes omitting any points in the prohibited volume from a high-accuracy refinement of the three-dimensional data.

135. Sekiguchi discloses the subject matter of claim 7. *See* Section X.A. (claim 1 from which claim 7 depends). For at least the reasons discussed above with respect to claim 5 (Section X.C.), Sekiguchi discloses wherein the modified processing includes omitting any points in the prohibited volume from a high-accuracy refinement of the three-dimensional data.

136. As discussed above in Section X.A.6., Sekiguchi discloses deleting voxel data in the overflow region or retaining but not displaying the data associated with the overflow region. Sekiguchi discloses that after confirming the overflow

region, “the overflow region is deleted” or “an attribute of an invisibility region is assigned to the pixel without deleting the data” wherein “the pixel data is retained, but it is not displayed”. EX1005, 9:18-25. *See also* EX1005, abstract (“when a region other than an objective region is extracted as a result of the region extraction, a point belonging to the region other than the objective region is specified in a three-dimensional display image to execute deletion of the overflow region”). Thus, Sekiguchi omits any points associated with the overflow region from further processing including any high-accuracy refinement of the three-dimensional data.

137. For example, Sekiguchi discloses that “[w]hen there exist[s] a plurality of overflow regions, the extraction processing of the objective region described in operation (1) and the overflow region extraction and deletion of operations (2) to (10) are repeatedly carried out to sequentially delete overflow regions” (EX1005, 9:25-30). The data that was previously deleted or rendered invisible in an earlier iteration is omitted from subsequent iterations of Sekiguchi’s data refinement process for increasing accuracy. EX1005, 9:25-30. In addition, to the extent Patent Owner (incorrectly) argues that Sekiguchi does not disclose a high-accuracy refinement, the points are nevertheless omitted from any such refinement given that the refinement does not even occur.

E. Claim 8: The method of claim 1 wherein the mesh of the scan space is subdivided into voxels having a substantially cubic shape.

138. Sekiguchi discloses the subject matter of claim 8. *See* Section X.A. (claim 1 from which claim 8 depends).

139. Sekiguchi relates to a “method of and apparatus for region extraction in three-dimensional voxel data”. EX1005 (title). Figures 1, 2, 4, and 6-12 of Sekiguchi depict the voxels as square-shaped areas. Figures 1 and 8 of Sekiguchi are reproduced below:

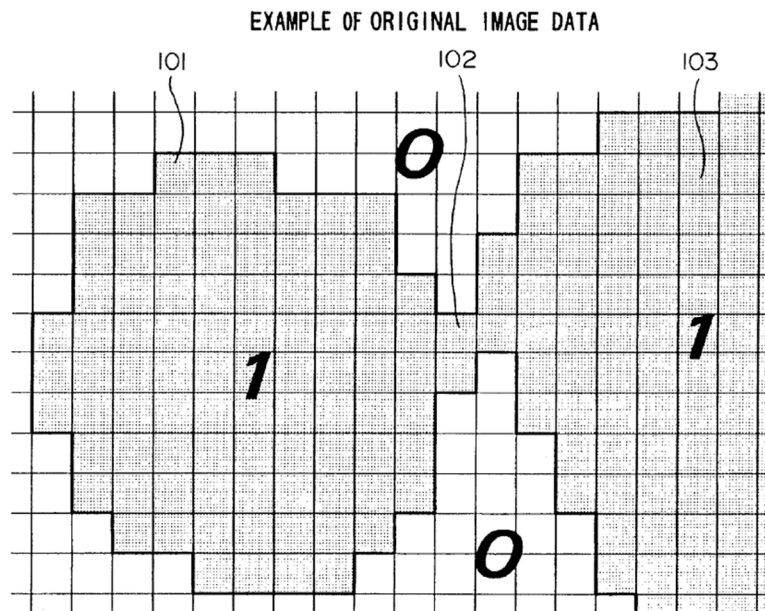


Figure 1 of Sekiguchi

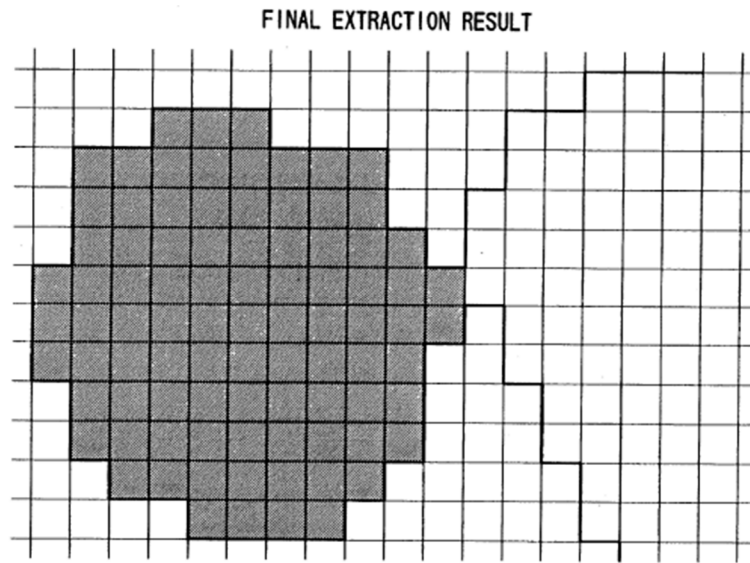


Figure 8 of Sekiguchi

140. Sekiguchi discloses that embodiments including Figures 1, 2, 4, , and 6-12 are depicted in two dimensions (*e.g.*, including the subdivided square-shaped areas) merely “for simplification of explanation”, and that the data described in Sekiguchi in fact pertains to “three-dimensional voxel data”. EX1005, 6:20-24 (“The actual object of the present invention is multi-value three-dimensional voxel data; however, for simplification of explanation, description will now be given of the operations accomplished for two-dimensional binary data.”). Thus, the subdivided square-shaped areas in Figures 1, 2, 4, and 6-12 are simplified representations of cubic voxels disclosed by Sekiguchi. Sekiguchi’s disclosed use of cubic voxels is consistent with well-known, routine, and conventional practices in the art. *See, e.g.*,

EX1006, 8:58-60, abstract; EX1007, 10:23-25 (“the resultant 3D region is expressed in terms of volumetric cells or voxels that are shaped as cubes”).

F. Claim 10: The method of claim 1 wherein the prohibited volume includes more than one of the plurality of voxels.

141. Sekiguchi discloses the subject matter of claim 10. *See* Section X.A. (claim 1 from which claim 10 depends).

142. As explained above in Sections X.A.3. to X.A.6., Sekiguchi discloses that the prohibited volume includes more than one of the plurality of voxels. EX1005, 5:7-8, 3:61-63. The overflow region is a “region” and thus corresponds to a plurality of voxels. Sekiguchi pertains to processing of “three-dimensional voxel data” (title) which encompasses both one and multiple voxels. Further, Figures 1-4 and 6-12 of Sekiguchi depict an overflow region (“prohibited volume”) containing more than one voxel. *See also* EX1005, 9:25-30, Fig. 3 (overflow region 305 contains more than one voxel).

G. Claim 11: The method of claim 1 wherein the spatial matrix includes a binary flag for each one of the plurality of voxels that indicates whether processing is permitted or forbidden for a corresponding volume of the scan space.

143. Sekiguchi discloses the subject matter of claim 11. *See* Section X.A. (claim 1 from which claim 11 depends).

144. Sekiguchi discloses that “a shaded portion has a value ‘1’ and any other portion has a value ‘0’”. EX1005, 6:25-31.

145. As shown in the spatial matrix of Figure 1, region 101 (shaded region with binary flag “1”) indicates that processing is permitted and unshaded regions (binary flag “0”) indicates that processing is forbidden for a corresponding volume of the scan space.

146. Sekiguchi further discloses that “[i]n a region extraction by the conventional concatenated region expansion method, a result therefrom is expressed by **binary data** representing whether or not each pixel belongs inside the extraction region or by probability of belonging thereof to the extraction region.” EX1005, 6:32-36.

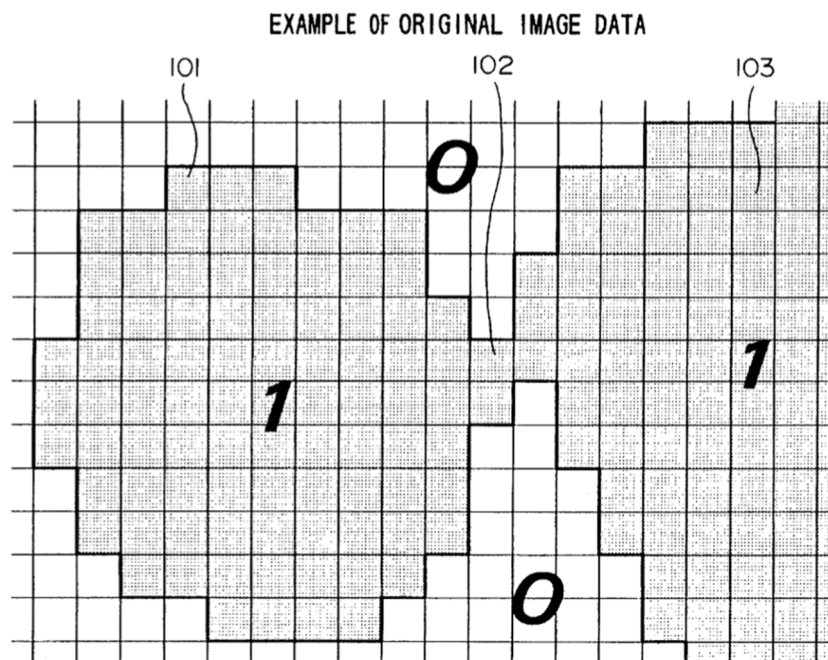


Figure 1 of Sekiguchi

H. Claim 12 (Preamble): A computer program product comprising computer executable code embodied on a non-transitory computer readable medium that, when executing on one or more computing devices, performs the steps of:

147. Sekiguchi discloses the preamble of Claim 12 for at least the reasons discussed above with respect to the preamble of Claim 1. *See* Section X.A.

148. Further, Sekiguchi discloses a computer system including, *inter alia*, three-dimensional image memory 102, extraction processor 103, extraction history data memory 104, three-dimensional processor 106, VRAM 107, CRT 108, and input devices 109 and 110. EX1005, Fig. 13, 10:30-63.

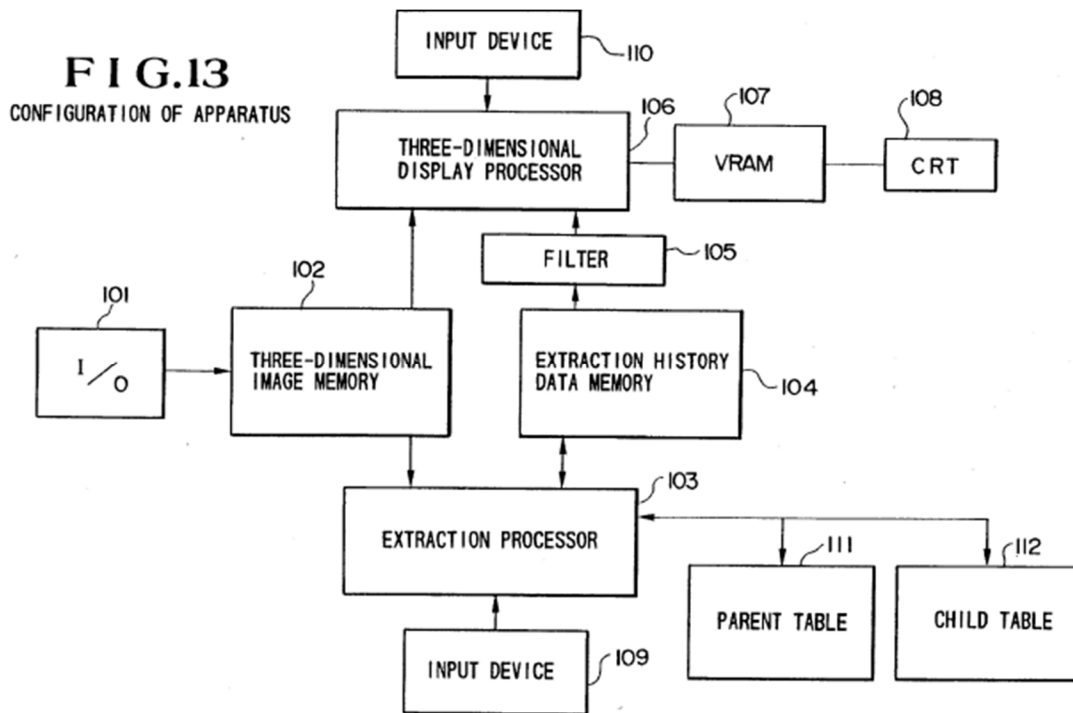


Figure 13 of Sekiguchi

149. Sekiguchi discloses that its system processes digital three-dimensional voxel data. EX1005, 9:25-30, 1:28 (“three-dimensional digital data”), 3:22 (“multi-dimensional digital data”), 10:23-27 (“three-dimensional voxel data”).

150. The system of Sekiguchi is a computer system utilizing a computer program product in view of the nature of its components and the data that is processed. EX1005, 9:25-30. *See also* EX1005, 9:25-30, 10:27-29 (“data transmission path”, “direction of data flowing between the respective units”).

151. The process steps described in Sekiguchi are performed using such computer system, *e.g.*, depicted in Figure 13. EX1005, 4:20-21 (“Fig. 13 is a diagram

showing an example of the constitution of a system to which the present invention is applied”).

152. Given that Sekiguchi’s system is a computer system and its processes are performed using same, Sekiguchi discloses use of a computer program product comprising computer executable code embodied on a non-transitory computer readable medium for performing the steps of its techniques, as further evidenced by the fact that software implementation of 3D data processing was well known. *See, e.g.,* EX1007, 2:60-64 (3D data processing performed using “computer readable medium containing program code”), 21:40-60 (“computer readable medium for storing computer program instructions for automatically generating a fully textured 3D model of an object ... comprising ... program code”); EX1008, [0079], (3D data processing techniques “may be realized in hardware, software, or any combination”, “realization in one or more microprocessors, microcontrollers, embedded microcontrollers, programmable digital signal processors or other programmable devices, along with internal and/or external memory”, “computer executable code”), Fig. 1, [0028]; EX1009, claim 17 (3D data processing techniques performed using a “computer program product comprising a computer usable medium having computer readable program”). A POSITA would have understood that Sekiguchi’s memory is

non-transitory given that its purpose is to store the computer program product and code.

1. [12.1]: storing a spatial matrix in a memory, the spatial matrix storing information for a plurality of voxels in a mesh of a scan space;

153. Sekiguchi discloses Element [12.1] for at least the reasons discussed above with respect to Element [1.1]. *See* Section X.A.1.

2. [12.2]: obtaining three-dimensional data from an object within the scan space using a scanner;

154. Sekiguchi discloses Element [12.2] for at least the reasons discussed above with respect to Element [1.2]. *See* Section X.A.2.

3. [12.3]: identifying one of the plurality of voxels in the mesh of the scan space that is unoccupied;

155. Sekiguchi discloses Element [12.3] for at least the reasons discussed above with respect to Element [1.3]. *See* Section X.A.3.

4. [12.4]: storing an indication in the spatial matrix for a modified processing of data from the one of the plurality of voxels, thereby identifying a prohibited volume within the scan space; and

156. Sekiguchi discloses Element [12.4] for at least the reasons discussed above with respect to Element [1.4]. *See* Section X.A.4.

5. [12.5]: processing a portion of the three-dimensional data in the prohibited volume according to the modified processing and processing a second portion of the three-dimensional data that is not in the prohibited volume according to an unmodified processing,

157. Sekiguchi discloses Element [12.5] for at least the reasons discussed above with respect to Element [1.5]. *See* Section X.A.5.

158. Element [12.5] recites a different naming convention of the “portions” of 3D data subjected to “modified” and “unmodified” processing, but Element [12.5] is substantively identical to Element [1.5].

159. Specifically, Element [12.5] uses the term “a portion” to describe the portion of 3D data that is in the prohibited volume and that is subjected to the modified processing, whereas Element [1.5] uses the term “a second portion”. Similarly, Element [12.5] uses the term “a second portion” to describe the portion of 3D data that is not in the prohibited volume and that is subjected to the unmodified processing, whereas Element [1.5] uses the term “a portion”. That is, in both Elements [1.5] and [12.5], the portion (whether referred to as “a portion” or “a second portion”) of 3D data that is in the prohibited volume is processed according to the modified processing, and the portion of 3D data (whether referred to as “a portion” or “a second portion”) that is not in the prohibited volume is processed according to the unmodified processing. As such, Sekiguchi discloses Element

[12.5] for at least the reasons discussed above with respect to Element [1.5], with the understanding claim 12 reverses the naming convention of the recited “portions” of 3D data. *See* Section X.A.5.

6. [12.6] wherein the modified processing includes detecting a point in the prohibited volume and displaying the point for a decay time with the second portion of the three-dimensional data.

160. Sekiguchi discloses Element [12.6] for at least the reasons discussed above with respect to Element [1.6]. *See* Section X.A.6. *See also* Section X.H.5. (concerning Element [12.5], explaining that Sekiguchi discloses the recited “portion” and “second portion”).

I. Claim 14: The computer program product of claim 12 further comprising code for providing a spatial margin of one or more voxels adjacent to a surface of the object for which processing cannot be prohibited.

161. Sekiguchi discloses the subject matter of claim 14 for at least the same reasons discussed above with respect to claim 3. *See* Sections X.B. (claim 3) and X.H. (base claim 12).

J. Claim 16: The computer program product of claim 12 wherein the modified processing includes omitting any points in the prohibited volume from a surface mesh of the object created with the three-dimensional data.

162. Sekiguchi discloses the subject matter of claim 16 for at least the same reasons discussed above with respect to claim 5. *See* Sections X.C. (claim 5) and X.H. (base claim 12).

K. Claim 18: The computer program product of claim 12 wherein the modified processing includes omitting any points in the prohibited volume from a high-accuracy refinement of the three-dimensional data.

163. Sekiguchi discloses the subject matter of claim 18 for at least the same reasons discussed above with respect to claim 7. *See* Sections X.D. (claim 7) and X.H. (base claim 12).

L. Claim 19: The computer program product of claim 12 wherein the mesh of the scan space is subdivided into voxels having a substantially cubic shape.

164. Sekiguchi discloses the subject matter of claim 19 for at least the same reasons discussed above with respect to claim 8. *See* Sections X.E. (claim 8) and X.H. (base claim 12).

M. Claim 21: The computer program product of claim 12 wherein the prohibited volume includes more than one of the plurality of voxels.

165. Sekiguchi discloses the subject matter of claim 21 for at least the same reasons discussed above with respect to claim 10. *See* Sections X.F. (claim 10) and X.H. (base claim 12).

N. Claim 22: The computer program product of claim 12 wherein the spatial matrix includes a binary flag for each one of the plurality of voxels that indicates whether processing is permitted or forbidden for a corresponding volume of the scan space.

166. Sekiguchi discloses the subject matter of claim 22 for at least the same reasons discussed above with respect to claim 11. *See* Sections X.G. (claim 11) and X.H. (base claim 12).

O. Claim 23 (Preamble): A system comprising:

167. Sekiguchi discloses the preamble of Claim 23 for at least the reasons discussed above with respect to the preamble of Claims 1 and 12. *See* Sections X.A. and X.H.

1. [23.1]: a scanner configured to obtain three-dimensional data from an object within a scan space;

168. Sekiguchi discloses Element [23.1] for at least the reasons discussed above with respect to Elements [1.2] and [12.2]. *See* Sections X.A.2. and X.H.2.

2. [23.2]: a memory configured to store a spatial matrix that includes information for a plurality of voxels in a mesh of the scan space; and

169. Sekiguchi discloses Element [23.2] for at least the reasons discussed above with respect to Elements [1.1] and [12.1]. *See* Sections X.A.1. and X.H.1.

3. [23.3]: a processor configured to identify a point in the scan space that is unoccupied,

170. Sekiguchi discloses Element [23.3] for at least the reasons discussed above with respect to Elements [1.3] and [12.3]. *See* Sections X.A.3. and X.H.3. Sekiguchi discloses identifying at least “a point” that is unoccupied given that Sekiguchi identifies an “overflow region” that is unoccupied, as explained above. EX1005, 5:7-8, 3:61-63, Fig. 3. As also explained above, Sekiguchi further discloses that “a point belonging to the region other than the objective region is specified in a three-dimensional display image to execute deletion of the overflow region”. EX1005, abstract.

4. [23.4]: to store an indication in the spatial matrix for a modified processing of data from a one of the plurality of voxels that contains the point, thereby identifying a prohibited volume within the scan space,

171. Sekiguchi discloses Element [23.4] for at least the reasons discussed above with respect to Elements [1.4] and [12.4]. *See* Sections X.A.4. and X.H.4.

5. [23.5]: to process a portion of the three-dimensional data that is not in the prohibited volume according to an unmodified processing, and to process a second portion of the three-dimensional data that is in the prohibited volume according to the modified processing,

172. Sekiguchi discloses Element [23.5] for at least the reasons discussed above with respect to Elements [1.5] and [12.5]. *See* Sections X.A.5. and X.H.5.

6. **[23.6]: wherein the modified processing includes detecting a point in the prohibited volume and displaying the point for a decay time with the second portion of the three-dimensional data.**

173. Sekiguchi discloses Element [23.6] for at least the reasons discussed above with respect to Elements [1.6] and [12.6]. *See* Sections X.A.6. and X.H.6.

XI. CLAIMS 1, 3, 5, 7-12, 14, 16, AND 18-23 WOULD HAVE BEEN OBVIOUS OVER SEKIGUCHI (GROUND 2).

174. Claims 1, 3, 5, 7-12, 14, 16, and 18-23 would have been obvious over Sekiguchi. Patent Owner may argue that one or more of the claimed features are not exactly disclosed. Any such argument is untenable but to the extent that there are any minor differences such differences would have been obvious, *e.g.*, as discussed below.

A. Sekiguchi suggests and teaches applying its techniques to three-dimensional voxel data

175. Patent Owner may argue that Sekiguchi's disclosures (*e.g.*, Figures 1-4 and 6-12) relate to two-dimensional data and that Sekiguchi's disclosures do not relate to processing steps involving "a plurality of voxels" (*e.g.*, as recited in Element [1.1], [1.3], and [1.4]) or "three-dimensional data" (*e.g.*, as recited in Elements [1.2], [1.5] and [1.6]). Such an argument is untenable. As explained above in Section X.A.1., Sekiguchi discloses that embodiments (including, for example, Figures 1-4 and 6-12) are described in two dimensions merely "for simplification of

explanation”, and that Sekiguchi’s techniques in fact pertain to “three-dimensional voxel data”. EX1005, 6:20-24 (“The actual object of the present invention is multi-value three-dimensional voxel data; however, for simplification of explanation, description will now be given of the operations accomplished for two-dimensional binary data.”).

176. At a minimum, it would have been obvious to employ three-dimensional voxel data and a three-dimensional spatial matrix in the embodiments of Sekiguchi, given that Sekiguchi expressly teaches that its disclosures in two dimensions are merely “for simplification of explanation” and that “[t]he actual object of the present invention is multi-value three-dimensional voxel data”. EX1005, 6:20-24. Thus, for example, a POSITA would have readily modified the subject matter depicted in Figures 1-4 and 6-12 of Sekiguchi to be three-dimensional spatial matrices to accommodate the three-dimensional voxel data disclosed by Sekiguchi. To the extent Sekiguchi does not expressly disclose that any of its processing steps involve the use of voxel data, such application to voxel data would have been obvious given that Sekiguchi expressly teaches that “[t]he actual object of the present invention is multi-value three-dimensional voxel data”. EX1005, 6:20-24. Such modifications would have been predictable, and a POSITA would have had

a reasonable expectation of success given that Sekiguchi expressly teaches such modifications.

B. Sekiguchi suggests and teaches “displaying the point for a decay time” under Petitioner’s construction

177. Patent Owner may argue that Sekiguchi does not disclose “displaying the point for a decay time” (claim 1) under Petitioner’s construction.³ This argument is untenable. The District Court determined that such term should be given its plain and ordinary meaning and did not adopt Petitioners’ construction. EX1012, pp. 3-4. Nonetheless, “displaying the point for a decay time”, even under Petitioners’ non-adopted construction, would have been obvious.

178. As explained above, Sekiguchi teaches temporarily displaying the data in the overflow region, *e.g.*, the data is displayed for the purpose of allowing the operator to visually confirm that the data is not associated with the object of interest prior to deletion or being rendered invisible. EX1005, 5:7-26, 6:57-65, 9:4-24, 12:57-60, 4:66-67. *See* §X.A.6.

179. It would have been obvious for this temporary display of data to be for a predetermined, short time interval. Sekiguchi seeks to provide an “efficient”

³ In the Related Litigation, Petitioners construed this term as “temporarily displaying the point for a predetermined, short time interval.” EX1012, pp. 3-4.

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process “to reduce loads imposed on the operator” and teaches that “automation” and reducing “human” interaction is “most ideal”. EX1005, abstract, 1:22-26, 2:17-20. Sekiguchi teaches that its techniques are “capable of minimizing the human operation to be achieved for the extraction processing to guarantee reliability of extraction”, and a POSITA would have recognized that limiting the display of the data to a predetermined, short time interval, *e.g.*, by use of automation, would help achieve the goal of “minimizing the human operation”. EX1005, 3:14-19. *See also* EX1005, 4:52-55 (“The primary object of the present invention is to attain a high extraction reliability with a minimal amount of support jobs.”).

180. Sekiguchi teaches automating elements of its process to reduce human interaction as discussed above. *See also* EX1005, 6:52-54 (“an overflow region can be automatically extracted”), 15:53-54 (“thereby automatically achieving the extraction of the objective region”).

181. Indeed, it was well known to process models “through a combination of user interaction and automated analysis” and utilize “automated analysis during an evaluation of a digital model” (EX1008, [0062], [0066]), and Sekiguchi suggests and teaches doing so.

182. Automating the time period for displaying the data in question for a predetermined, short time interval would have merely involved applying

Sekiguchi's suggestions and teachings to automate steps of its process to the specific step of temporarily displaying voxel data in an overflow region (EX1005, 5:9-11, 9:4-24). Sekiguchi's disclosure that "it is difficult to automatically decide the interruption time" (EX1005, 6:59-61) specifically relates to automation of interrupting extraction, and does not preclude automation of displaying the overflow region in the process described above.

183. It would have been obvious to modify Sekiguchi to temporarily display the point for a predetermined, short time interval (under Petitioner's construction from the Related Litigation) for several reasons.

184. One, Sekiguchi provides teaching, suggestion, or motivation that would have led a POSITA to modify Sekiguchi to display the point for a predetermined, short time interval via automation, as discussed above. *See, e.g.*, EX1005, 2:17-20, 3:14-19, 4:52-55, 6:52-54, 15:53-54.

185. Two, such modification would have merely constituted use of a known technique (automation of 3D imaging techniques) to improve similar methods/systems (as disclosed by Sekiguchi) in the same way, *e.g.*, to reduce the burden on the human operator as taught by Sekiguchi.

186. Three, such a modification would have merely constituted applying a known technique (automation of 3D imaging techniques) to the known

method/system of Sekiguchi that is ready for improvement to yield predictable results.

187. Four, such a modification would have merely constituted combining prior art elements (the techniques/systems disclosed by Sekiguchi) according to known methods (automation of 3D imaging techniques) to yield predictable results.

188. Five, such modification would have merely involved selection of a predetermined, short time interval from a finite number of identified, predictable time intervals, to improve the techniques/systems of Sekiguchi with a reasonable expectation of success. Again, a POSITA would have had a reasonable expectation of success given that Sekiguchi expressly teaches and suggests automation of its processing steps.

C. Claims 8, 9, and 20 would have been obvious

189. Claim 9 recites “The method of claim 8 wherein the substantially cubic shape measures about 250 microns on each edge.” Claim 20 recites “The computer program product of claim 19 wherein the substantially cubic shape measures about 250 microns on each edge.” Sekiguchi discloses the subject matter of base claims 8 and 19 for the reasons discussed above. *See* Sections X.E. and X.H.

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190. Further, concerning claims 8, 9, and 20, it would have been obvious to employ voxels having a substantially cubic shape measuring about 250 microns on each edge in view of Sekiguchi.

191. The '374 Patent discloses that “any other suitable size according to desired resolution, processing capabilities, and so forth” can be used. EX1001, 14:34-39. Thus, the '374 Patent merely exemplifies a “250×250×250 micron cube for each voxel” (EX1001, 14:34-39), and the '374 Patent asserts no criticality associated with this particular voxel size. In my opinion, use of a 250×250×250 micron cube for each voxel would have been an obvious design choice, for example, given the fact that it was well-known, routine, and conventional to utilize cubic voxel dimensions in ranges encompassing such dimensions. *See* EX1006, 8:58-60, abstract (disclosing general conditions of “voxels with dimensions of 0.4 mm or less in at least two orthogonal directions”), 9:3-12. *See also* EX1007, 10:23-25 (“the resultant 3D region is expressed in terms of volumetric cells or voxels that are shaped as cubes”).

XII. CLAIMS 8, 9, AND 20 WOULD HAVE BEEN OBVIOUS OVER SEKIGUCHI IN VIEW OF PARTAIN (GROUND 3).

A. Claims 8, 9, and 20 Would Have Been Obvious Over Sekiguchi in View of Partain (Ground 3).

192. Sekiguchi alone discloses and suggests the subject matter of claims 8, 9, and 20 for the reasons discussed above. *See* §X. and §XI.

193. In addition, the subject matter of claims 8, 9, and 20 would have been obvious in view of Sekiguchi and Partain for the reasons discussed below.

194. That is, to the extent Patent Owner argues that Sekiguchi does not disclose the additional subject matter recited in claims 8, 9, and 20, such subject matter would have been obvious in view of Partain.

195. Use of cubic voxels was well-known in X-ray and CT imaging. Partain, which relates to X-ray and CT imaging applications, discloses that “[i]n imaging three dimensional volumes, the smallest volume (*often a cube*) that can be resolved is referred to as a voxel.” EX1006, 8:58-60, abstract (emphasis added). *See also* EX1006, 9:3-12. Indeed, use of cubic voxels was well-known and routine in the art. EX1006, 8:58-60, abstract. *See also* EX1007, 10:23-25 (“the resultant 3D region is expressed in terms of volumetric cells or *voxels that are shaped as cubes*”) (emphasis added).

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196. It would have been obvious to employ voxels having a substantially cubic shape given that such cubic shape is standard practice in X-ray and CT imaging applications as evidenced by Partain, and Sekiguchi relates to the same and similar types of imaging technologies. EX1005, 1:22-29, 10:30-32.

197. In addition, Partain demonstrates that it was well known in X-ray and CT imaging to employ “voxels with dimensions of 0.4 mm or less in at least two orthogonal directions”, which encompasses the “about 250 microns on each edge” recited in claim 9. EX1006, abstract, 9:3-12.

198. Partain discloses that the voxels are cubic in shape as noted above, and thus teaches use of cubic voxels having a dimension of each edge of 0.4 mm or less.

199. It would have been obvious to modify Sekiguchi to employ voxels having a substantially cubic shape wherein the substantially cubic shape measures about 250 microns on each edge, in view of Partain. This is true for several reasons.

200. One, the range disclosed by Partain (0.4 mm or less) encompasses the claimed “about 250 microns” and thus renders same obvious.

201. Two, such a modification would have merely constituted applying a known technique (use of cubic voxels having a dimension of each edge of 0.4 mm or less as expressly taught by Partain) to the known method/system of Sekiguchi that is ready for improvement to yield predictable results.

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202. Three, such a modification would have merely constituted combining prior art elements (the techniques/systems disclosed by Sekiguchi) according to known methods (use of cubic voxels having a dimension of each edge of 0.4 mm or less as expressly taught by Partain) to yield predictable results.

203. Four, such modification would have merely involved selection of cubic voxel dimensions as claimed from a finite number of identified, predictable solutions, to improve the techniques/systems of Sekiguchi with a reasonable expectation of success.

204. Such modification would have been predictable—and a POSITA would have had a reasonable expectation of success—at least because both Partain and Sekiguchi relate to use of voxels in three-dimensional imaging for X-ray and CT applications, as discussed above, and Partain merely happens to provide additional details concerning suitable voxel dimensions that can be used in this context.

205. Sekiguchi teaches data processing techniques utilizing three-dimensional voxel data, and Partain demonstrates that in such processing involving voxel data, it was routine and conventional to use cubic voxels having a dimension of each edge of 0.4 mm or less. Partain is in the same field of endeavor as Sekiguchi and the '374 Patent, *e.g.*, data processing relating to medical imaging. Partain is reasonably pertinent to the technical issues and problem addressed in Sekiguchi and

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the '374 Patent, *e.g.*, processing and display of three-dimensional data such as that obtained from X-ray and CT imaging.

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

206. I am currently unaware of any secondary considerations evidence that may be commensurate with the challenged claims of the '374 Patent.

XIV. CONCLUSION

207. For the reasons set forth above, it is my opinion that all elements of Claims 1, 3, 5, 7-12, 14, 16, and 18-23 of the '374 Patent are disclosed or suggested by the prior art. In my opinion, Claims 1, 3, 5, 7-12, 14, 16, and 18-23 of the '374 Patent would have been anticipated and/or rendered obvious by the prior art.

208. 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.

209. 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 14, 2024



Dr. Eli Saber

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)

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- 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

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- 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.
- 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.

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- PTAB decision to institute was reached January 2024.
- Provided a Deposition on July 2nd, 2024.

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).

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Petition for *Inter Partes* Review of U.S. Patent No. 9,245,374

- Provided a Deposition on October 20th, 2023 for IPR2023-00057, IPR2023-00058 and IPR2023-00059
- 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.

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

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.

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- Provided a deposition on May 3rd, 2022
- Case is completed.

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.

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Perfect Corporation v. Lennon Image Technologies, LLC

Sept. 2021 – June 2022

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.

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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 IPR2020-00222) 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

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- 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. 9,245,374

- 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. 9,245,374

- 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. 9,245,374

- 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.