UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

MEMORYWEB, LLC
Patent Owner

Patent No. 10,423,658

Inter Partes Review No. IPR2022-00221

DECLARATION OF PROFESSOR GLENN REINMAN, PH.D

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I, Glenn Reinman, declare as follows:

I. INTRODUCTION

1. I have been retained on behalf of MemoryWeb, LLC, ("MemoryWeb" or "Patent Owner") as an independent expert consultant to provide this declaration concerning the technical subject matter relevant to the *inter partes* review ("IPR") petition of U.S. Patent No. 10,423,658 ("the '658 patent") filed by Samsung Electronics Co., Ltd. ("Petitioner" or "Samsung").

2. I am being compensated at my standard hourly rate of $750 per hour for the time I spend on this matter. My compensation is not related in any way to the outcome of this proceeding, and I have no other interest in this proceeding.

3. In this declaration, I offer my expert opinion regarding the technical subject matter of claims 1-15 ("the challenged claims") of the '658 patent. Specifically, I have considered whether claims 1-15 of the '658 patent are valid under the obviousness standard of 35 U.S.C. § 103. The substance and bases of my opinions appear below.

II. BACKGROUND AND QUALIFICATIONS

4. A copy of my curriculum vitae is appended hereto as Appendix A. I am currently a professor of Computer Science, serving as vice chair of the Computer Science department, at the University of California, Los Angeles (UCLA).

5. I received a Bachelor of Science degree in Computer Science and Engineering from the Massachusetts Institute of Technology (MIT) in June 1996. In March 1999, I received a Master of Science degree in Computer Science from the University of California at San Diego. I received my Doctor of Philosophy degree in Computer Science from the University of California at San Diego in June 2001.

6. In 2001, I became an Assistant Professor at the University of California in Los Angeles (UCLA) in the Department of Computer Science. In 2007, I was promoted to the position of an Associate Professor, and in 2014, I became a Full Professor. From 2016 through 2019, I was the Graduate Vice Chair of the Computer Science department at UCLA, in charge of the Graduate Degree Program. Starting in 2021, I became the Undergraduate Vice Chair of the Computer Science department at UCLA, in charge of the Undergraduate Degree Program.

7. I teach subjects in computer science, such as computer systems architecture, microprocessor design, microprocessor simulation, distributed and parallel systems.

8. I began my career with summer internships at Intel Corporation and Compaq (now HP) in 1998 and 1999, respectively. At Intel I researched issues such as the viability of caching state from the branch predictor, the translation lookaside buffer, and the branch target buffer in the second-level data cache. I also modified SimpleScalar—a system software infrastructure used to build modeling applications

for program performance analysis, microarchitectural modeling, and hardware-software co-verification—to use ITR traces for Windows applications for predictability experiments, as well as running simulations with SimpleScalar to test the effectiveness of this technique. At Compaq, I expanded the CACTI cache compiler (CACTI 2.0), including enhancing CACTI 2.0 to include a fully associative cache model, power modeling, multiple port models, transistor tuning, and tag path balancing.

9. From 1997 through 2001, I served as a research assistant at the University of California at San Diego, where I implemented a profile-based approach to classifying loads for memory renaming, value prediction, and dependence prediction using SimpleScalar and ATOM (Analysis Tools with OM). I also created a fetch unit with a branch prediction structure called FTB, as well as working with SimpleScalar to generate a hybrid predictive technique including renaming, value prediction, address prediction, and dependence prediction.

10. Starting in 2002, I began teaching Computer Science classes at UCLA. During my time at UCLA, I have implemented a flipped classroom in my undergraduate courses, where I provide video content ahead of class with my lectures, and then use the classroom to answer questions and work through sample problems. These undergraduate courses are large, often 400 students or more in a single class. Such large classes require robust and efficient web sites to host the

video content for the students, and I have spent considerable time and effort in designing and maintaining these web sites.

11. From 2011 to 2022, I designed, implemented, and maintained multiple websites outside of UCLA including multi-media content (e.g., photos, videos, etc.) with user interfaces for displaying the content. The websites were built on a Joomla framework, and I added a great deal of custom PHP scripting to implement signup, store, and content delivery functionality. The site hosted multimedia content including video and photos, and needed to be designed for a lay audience.

12. I am a named inventor on two U.S. Patents, and have published around 100 papers, textbook chapters, and reports on such topics as steering behaviors, accelerator-rich architectures, RF interconnects, microarchitecture design, computer animation, 3D integration, 3D architecture modeling, multi-actor simulations, real-time physics simulation, error-tolerance in physics-based animation, micro-architecture pipelining, classifying load and store instructions for memory renaming, predictive techniques for load speculation, and instruction scheduling. I have received awards or other recognition from organizations such as the International Symposium on High-Performance Computer Architecture, the Engineering Society of the University of California, and the National Science Foundation.

13. I have also participated in organizations like the International Symposium on Microarchitecture, Computing Frontiers, the Symposium on

Interactive 3D Graphics and Games (I3D), the Workshop on Memory Systems Performance, the International Symposium on Computer Architecture, and the International Conference on Compilers, Architecture, and Synthesis for Embedded Systems.

14. I have performed research in many computer science areas. For example, I have researched multimedia streaming, compression, and encryption as part of an effort to create application-specific hardware to reduce the latency and power consumption associated with these applications. I have also researched interactive entertainment, specifically focusing on the user's perception of a virtual world. In particular, I surveyed users to gauge how realistic they felt an interactive experience was when using approximate computing to improve processing efficiency. This work included graphics, navigation, and real-time physics. In addition to a number of publications, this research resulted in the creation of SteerSuite, a set of virtual world scenarios that could be used to benchmark the navigation/steering and physics algorithms of other researchers.

15. I have also developed an approximate computing architecture that uses lightweight checking to verify the quality of neural network-based computing elements. I have proposed an accelerator-rich microprocessor design that uses a heterogeneous set of building blocks to dynamically compose different accelerators depending on application demand. I developed a chip multiprocessor design for real-

time physics called "ParallAX," which enhances parallel processing capabilities for reducing demand on the system. Similarly, I researched hierarchical floating point using dynamic precision reduction to reduce the area required at each fine grain core by sharing resources.

16. In 2009, my collaborators and I competed for and received an NSF Expedition award for our proposal that has established the Center for Domain Specific Computing (CDSC) here at UCLA (the lead institution), along with other faculty from Rice University, Ohio State, and UCSB. I am one of four faculty on the executive committee of this Center. I lead the Architecture Thrust of this Center, in charge of designing our customizable hardware platform. This grant had been extended in 2014 to cover further extensions to healthcare including genomics, and is still currently providing funding to the Center. For example, we have targeted medical imaging as one candidate application. We researched best practices in medical imaging (e.g., MRI) for de-blurring, de-noising, image registration, image segmentation, and recognition, and also implemented customized software/hardware solutions to reduce patient wait time.

17. In 2021, I competed for and received a grant from Melinda Gates' Pivotal Ventures to establish a Break Through Tech AI hub at UCLA — part of a national program designed to teach artificial intelligence to a greater diversity of

students — bringing AI education to college students from underserved groups across Southern California. I am now the faculty director of the program at UCLA.

III. MATERIALS CONSIDERED

18. In forming the opinions set forth in this declaration, I have considered and relied upon my education, knowledge of the relevant field, and my experience. I have also reviewed and considered the '658 patent (Ex. 1001) and its file history (Ex. 1002), and at least the following additional materials:

- Petition for *Inter Partes* Review of the '658 Patent ("Petition")
- Declaration of Dr. Philip Greenspun (Ex. 1003)
- Decision Granting *Inter Partes* Review of the '658 Patent (Paper 10) (August 1, 2022) ("Institution Decision")
- U.S. Patent App. Pub. No. 2011/0122153 ("Okamura," Ex. 1005)
- U.S. Patent App. Pub. No. 2010/0058212 ("Belitz," Ex. 1006)
- U.S. Patent App. Pub. No. 2006/0206264 ("Rasmussen," Ex. 1007)
- U.S. Patent App. Pub. No. 2008/0276279 ("Gossweiler," Ex. 1038)
- U.S. Patent App. Pub. No. 2009/0210793 ("Yee," Ex. 1041)
- Certified English Translation of Japanese Unexamined Patent Application Publication No. 2001-160058 ("Fujiwara," Ex. 2002)
- Jennifer Tidwell, *Designing Interfaces*, O'Reilly (1st Ed. 2005) (Ex. 2018)

- Japanese Unexamined Patent Application Publication No. 2007-323544 and Certified English Translation ("Takakura") (Ex. 2019)
- Demonstrative for Greenspun deposition (Ex. 2020)
- U.S. Patent No. 10,621,228 ("the '228 patent") (Ex. 2021)
- Decision Granting *Inter Partes* Review of the '228 Patent (Paper 12) (June 13, 2022) ("Institution Decision")
- Transcript of the deposition of Dr. Philip Greenspun dated August 26, 2022 (Ex. 2022)
- Transcript of Deposition of Philip Greenspun, dated October 21, 2022 (Ex. 2024)
- Cambridge English Dictionary, definition of "responsive" (Ex. 2025)
- Webster's Third New International Dictionary, definition of "responsive" (Ex. 2026)
- Wilbert O. Galitz, "The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques," Wiley Publishing, Inc. (3rd Ed.) (2007) (Ex. 2027)

19. I have also considered the additional materials identified in the paragraphs below to the extent not specifically listed above.

IV. LEGAL STANDARDS

20. I am not a patent attorney nor have I independently researched the law on patentability. I have a general understanding of validity, prior art and priority date based on my discussions with counsel.

A. Claim Construction

21. I understand that claim construction is the process by which a court determines the scope and meaning of terms used in the claims of a patent. I understand that the goal of this process is to give claim terms the ordinary and customary meaning they would have had to a person of ordinary skill in the art ("POSITA") at the time of the invention, after reading the entire patent and its prosecution history.

22. I understand that it is possible that the patent specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise have to a POSITA. In such cases, I understand that the patentee's definition usually controls.

23. I understand that the prosecution history of a patent can inform the meaning of some claim language and must be taken into account in construing the claims.

24. I understand that, in some cases, the court may consider extrinsic evidence, such as dictionaries, treatises, and expert opinions, to understand the

underlying technology and the way in which claim terms would be understood by a POSITA at the relevant time.

25. I understand that a dependent claim incorporates each and every limitation of the claim or claims from which it depends.

B. Anticipation

26. I understand that anticipation analysis is a two-step process. The first step is to determine the meaning and scope of the asserted claims. Each claim must be viewed as a whole, and it is improper to ignore any element of the claim. For a claim to be anticipated under U.S. patent law: (1) each and every claim element must be identically disclosed, either explicitly or inherently, in a single prior art reference; (2) the claim elements disclosed in the single prior art reference must be arranged in the same way as in the claim; and (3) the identical invention must be disclosed in the single prior art reference, in as complete detail as set forth in the claim. Where even one element is not disclosed in a reference, the anticipation contention fails. Moreover, to serve as an anticipatory reference, the reference itself must be enabled, i.e., it must provide enough information so that a person of ordinary skill in the art can practice the subject matter of the reference without undue experimentation.

27. I further understand that where a prior art reference fails to explicitly disclose a claim element, the prior art reference inherently discloses the claim element only if the prior art reference must necessarily include the undisclosed claim

element. Inherency may not be established by probabilities or possibilities. The fact that an element may result from a given set of circumstances is not sufficient to prove inherency. I have applied these principles in forming my opinions in this matter.

C. Obviousness

28. I understand that a patent claim is invalid under 35 U.S.C. § 103 as being obvious only if the differences between the claimed invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in that art. An obviousness analysis requires consideration of four factors: (1) scope and content of the prior art relied upon to challenge patentability; (2) differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art at the time of the invention; and (4) the objective evidence of nonobviousness, such as commercial success, unexpected results, the failure of others to achieve the results of the invention, a long-felt need which the invention fills, copying of the invention by competitors, praise for the invention, skepticism for the invention, or independent development.

29. I understand that a prior art reference is proper to use in an obviousness determination if the prior art reference is analogous art to the claimed invention. I understand that a prior art reference is analogous art if at least one of the following two considerations is met. First, a prior art reference is analogous art if it is from the same field of endeavor as the claimed invention, even if the prior art reference

addresses a different problem and/or arrives at a different solution. Second, a prior art reference is analogous art if the prior art reference is reasonably pertinent to the problem faced by the inventor, even if it is not in the same field of endeavor as the claimed invention.

30. I understand that it must be shown that one having ordinary skill in the art at the time of the invention would have had a reasonable expectation that a modification or combination of one or more prior art references would have succeeded. Furthermore, I understand that a claim may be obvious in view of a single prior art reference, without the need to combine references, if the elements of the claim that are not found in the reference can be supplied by the knowledge or common sense of one of ordinary skill in the relevant art. However, I understand that it is inappropriate to resolve obviousness issues by a retrospective analysis or hindsight reconstruction of the prior art and that the use of "hindsight reconstruction" is improper in analyzing the obviousness of a patent claim.

31. I further understand that the law recognizes several specific guidelines that inform the obviousness analysis. First, I understand that a reconstructive hindsight approach to this analysis, i.e., the improper use of post-invention information to help perform the selection and combination, or the improper use of the listing of elements in a claim as a blueprint to identify selected portions of different prior art references in an attempt to show that the claim is obvious, is not

permitted. Second, I understand that any prior art that specifically teaches away from the claimed subject matter, i.e., prior art that would lead a person of ordinary skill in the art to a specifically different solution than the claimed invention, points to non-obviousness, and conversely, that any prior art that contains any teaching, suggestion, or motivation to modify or combine such prior art reference(s) points to the obviousness of such a modification or combination. Third, while many combinations of the prior art might be "obvious to try," I understand that any obvious to try analysis will not render a patent invalid unless it is shown that the possible combinations are: (1) sufficiently small in number so as to be reasonable to conclude that the combination would have been selected; and (2) such that the combination would have been believed to be one that would produce predictable and well understood results. Fourth, I understand that if a claimed invention that arises from the modification or combination of one or more prior art references uses known methods or techniques that yield predictable results, then that factor also points to obviousness. Fifth, I understand that if a claimed invention that arises from the modification or combination of one or more prior art references is the result of known work in one field prompting variations of it for use in the same field or a different one based on design incentives or other market forces that yields predicable variations, then that factor also points to obviousness. Sixth, I understand that if a claimed invention that arises from the modification or combination of one or more

prior art references is the result of routine optimization, then that factor also points to obviousness. Seventh, I understand that if a claimed invention that arises from the modification or combination of one or more prior art references is the result of a substitution of one known prior art element for another known prior art element to yield predictable results, then that factor also points to obviousness.

32. I understand that each alleged prior art reference in a proposed obviousness combination must be evaluated as an entirety, i.e., including those portions that would argue against obviousness, and must be considered for everything that it teaches, not simply the described invention or a preferred embodiment. I understand that it is impermissible to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art, or to ignore portions of the reference that argue against obviousness. I also understand that all of the supposed prior art to be combined as proposed must also be evaluated as a whole, and should be evaluated for what they teach in combination as well as separately.

D. Method Claims

33. I understand that as a general rule, unless the steps of a method actually recite an order, the steps are not ordinarily construed to require one. However, I understand that such a result can ensue when the method steps implicitly require that

they be performed in the order written. I understand that this determination involves a two-part inquiry: (1) whether the claim language requires an order as a matter of logic or grammar; and (2) if the answer to (1) is in the negative, whether the specification directly or implicitly requires such a narrow construction.

E. Dependent Claims

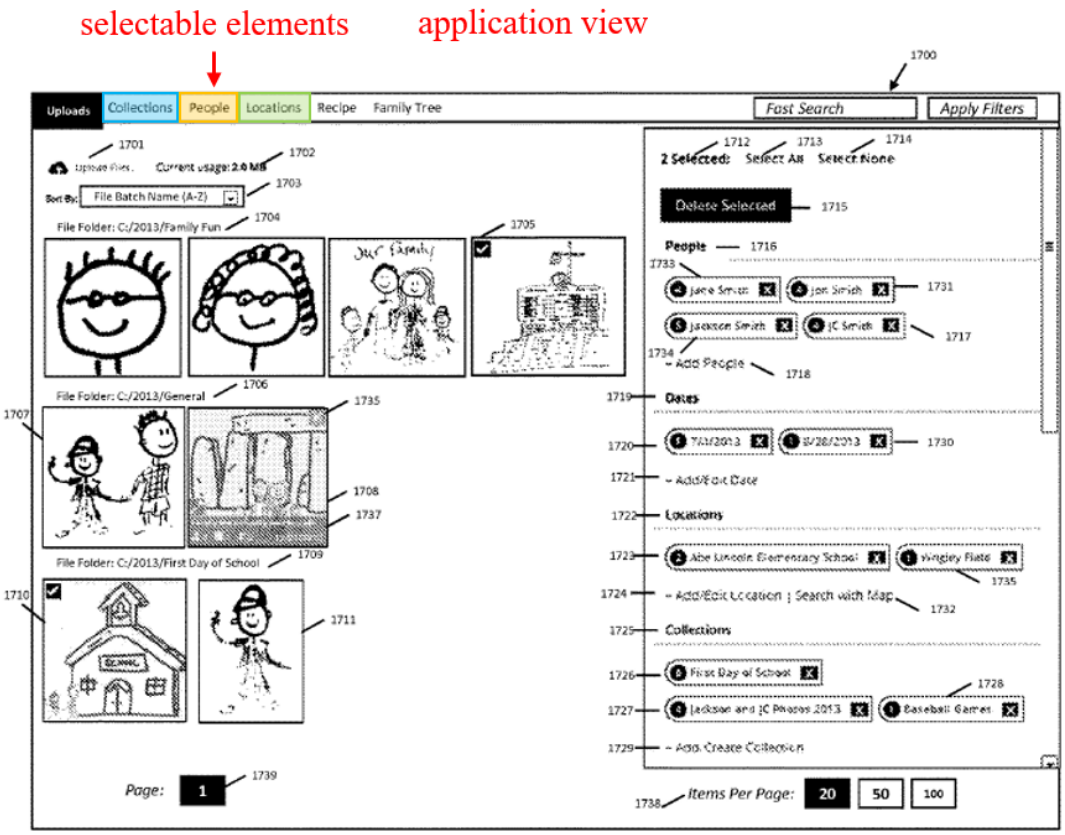
34. I understand that a dependent claim incorporates each and every limitation of the claim from which it depends. Thus, my understanding is that if a prior art reference fails to anticipate an independent claim, then that prior art reference also necessarily fails to anticipate all dependent claims that depend from the independent claim. Similarly, my understanding is that if a prior art reference or combination of prior art references fails to render obvious an independent claim, then that prior art reference or combination of prior art references also necessarily fails to render obvious all dependent claims that depend from the independent claim.

V. OVERVIEW OF THE '658 PATENT

35. The '658 patent is directed to methods for "allow[ing] people to organize, view, preserve these files with all the memory details captured, connected and vivified via an interactive interface." Ex. 1001, 1:56-62. The '658 patent discloses methods that allow users to easily and intuitively arrange and show digital files like photographs and videos. These methods "save[] a user significant time, provide[] significant information with minimal screen space, and provide[] an

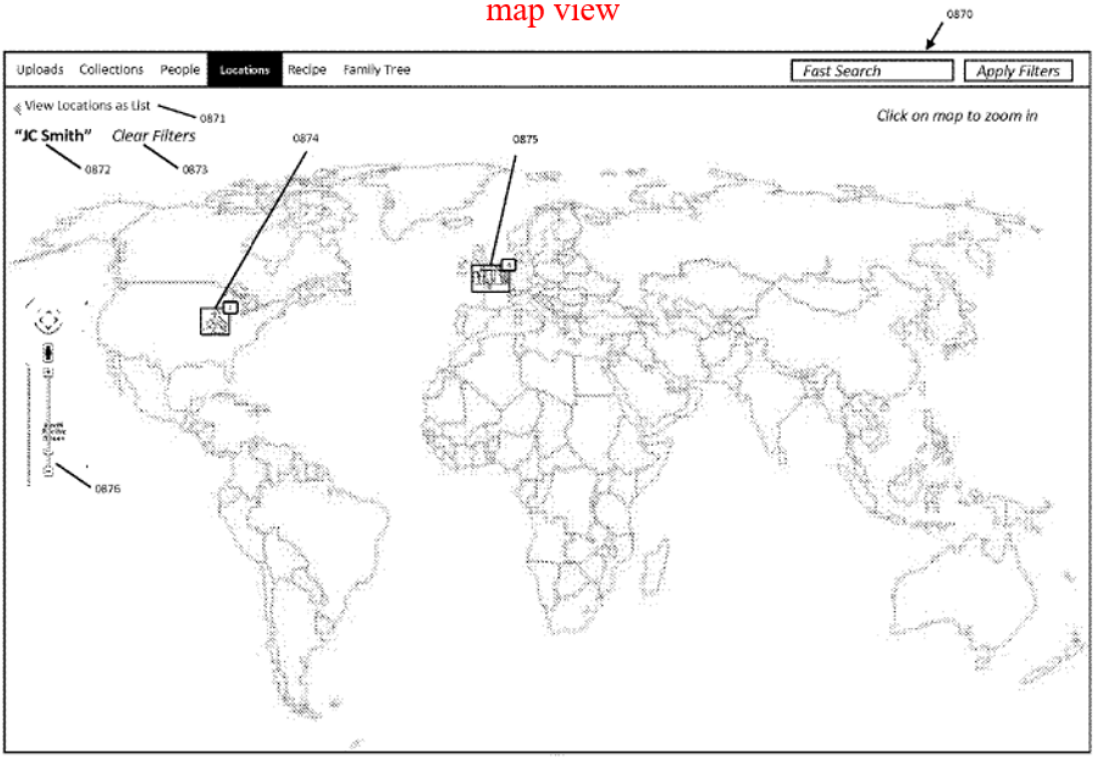
appealing and customizable interface that will enhance the user experience." Ex. 1001, 2:51-55. The '658 patent provides several views that allow the user to arrange and show digital files. A discussion of some of the views is provided below.

36. The '658 patent discloses "People Application Views," "Collection Application Views," "Location Application Views," "Uploads Application Views," and a "Recipe Application View." Ex. 1001, 3:58-62. An example of the Uploads Application view, which includes selectable elements labeled Uploads, Collections, People, Locations, Recipe, and Family Tree, is shown below.



Ex. 1001, FIG. 35 (annotated)

37. The '658 patent discloses a "map view," which is recited in claim 1. Ex. 1001, 29:25-41. An example map view is shown in FIG. 41 below.

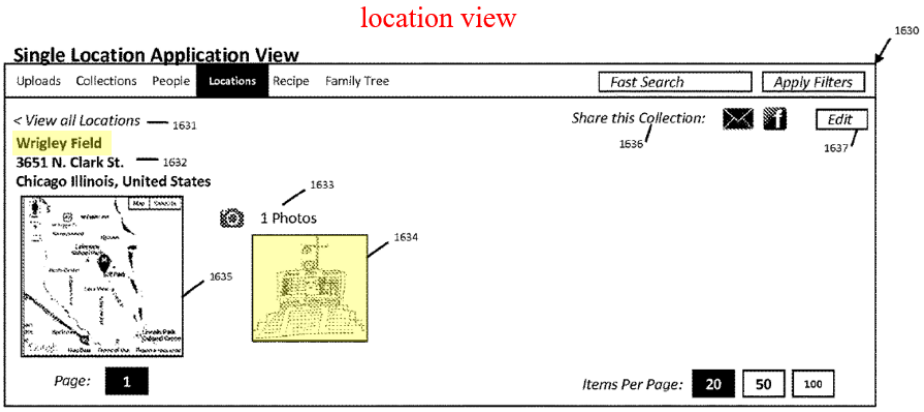


Ex. 1001, FIG. 41

38. The map view includes an interactive map and "individual or groups of Digital Files are illustrated as photo thumbnails (see indicators 0874 and 0875)) on the map." Ex. 1001, 29:32-39. The thumbnails on the map include "the number of Digital Files for that location." *Id.*, 29:39-41. The map is interactive, for example, because the user can "narrow the map view by either using the zoom in/zoom out bar (0876) on the left or simply selecting the map." *Id.,* 29:32-39.

39. Starting from the map view illustrated in FIG. 41, "the user can select the thumbnail to see all the Digital Files with the same location (as seen in FIG. 34

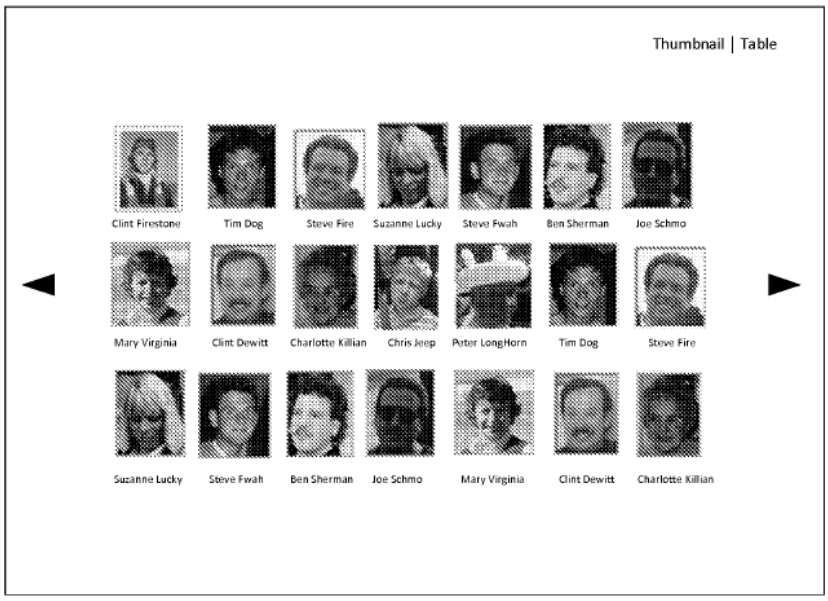
(indicator 1630))." Ex. 1001, 29:34-36. FIG. 34 of the '658 patent illustrates an example of the "[first/second] location view" recited claim 1. Ex. 1001, 24:22-28.



Ex. 1001, FIG. 34 (excerpted and annotated)

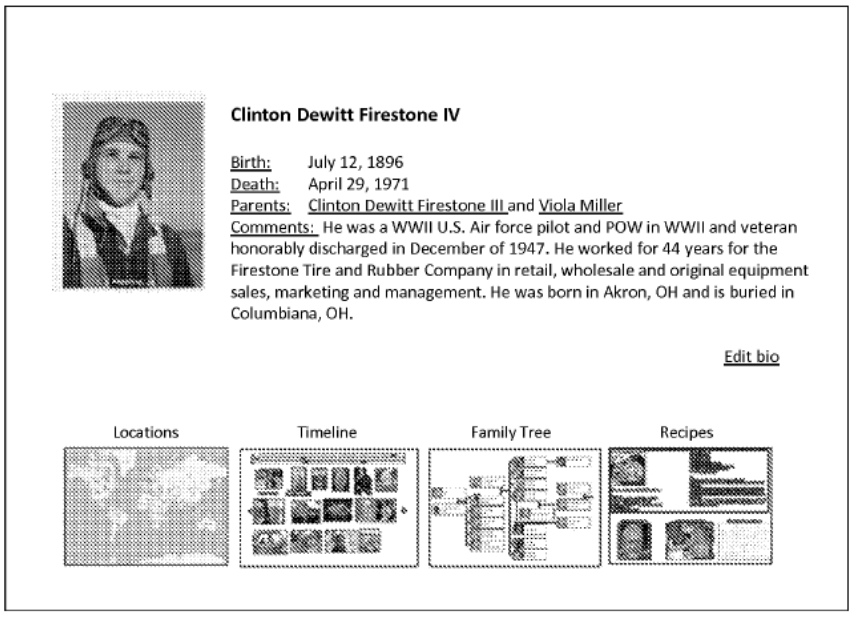
40. In the "location view" shown above, "a single location (1630) is illustrated," which includes "[t]he individual location name" and "[t]humbnails of each Digital File within the specific collection." *Id.,* 24:22-28. By allowing users to arrive at a location view via the map view, the '658 patent allow users to easily and intuitively find and show digital files associated with a particular location.

41. Another one of the views that is described and in claim 5 in the '658 patent is a "people view" for organizing digital files based on people. FIG. 6 includes an example of a "people view," and includes "thumbnail photos of all the people in the system that can be clicked in [sic] for a people profile view." *Id*., 6:20-26.



Ex. 1001, FIG. 6

42. Selecting one of the thumbnails in the "people view" (FIG. 6) causes a "people profile view" to be displayed. The "people profile view" is an example of the claimed first/second person view. FIG. 7, reproduced below, shows an example of the "people profile view."

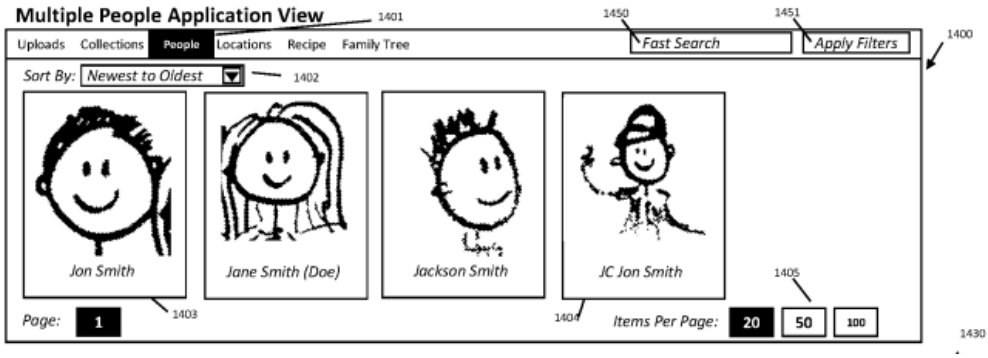


Ex. 1001, FIG. 7

The example in FIG. 7 includes a "profile picture of an individual" and additional information and images associated with that person. Ex. 1001, 6:23. FIG. 7 also includes "links to other views that contain that individual in the system." *Id.*, 6:25-26.

43. FIG. 32 of the '658 patent shows another example of a "people view." The people view 1400 includes "a thumbnail of [each person's] face along with their name." Ex. 1001, 22:43-57.

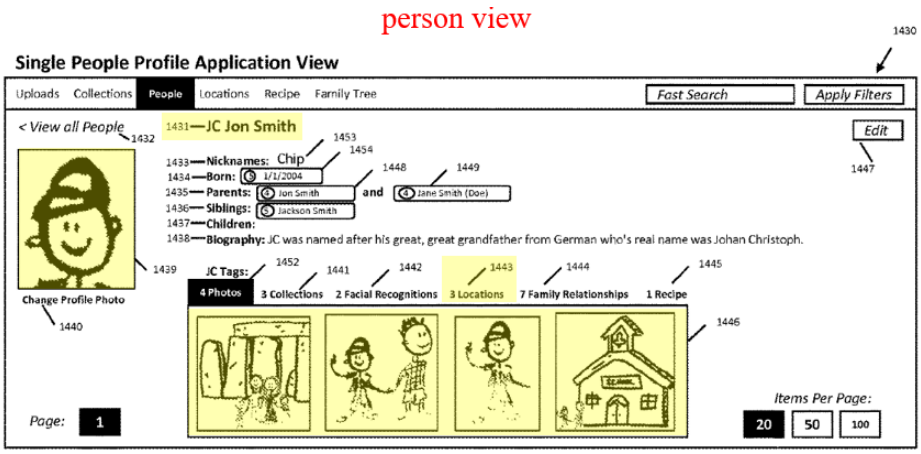
FIG. 32



Ex. 1001, FIG. 32 (excerpted)

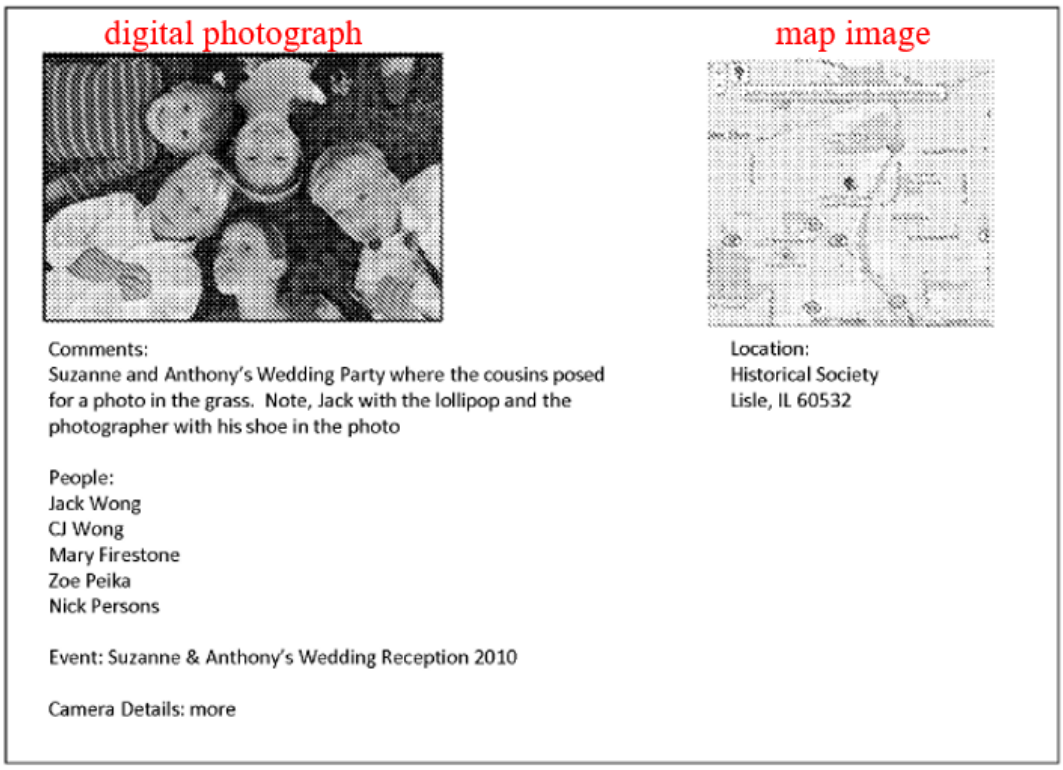
44. The bottom half of FIG. 32, which is called "Single People Profile Application View," is an example of the claimed "[first/second] person view." The "[first/second] person view" includes a person's name 1431, a profile photo 1440, and photos 1452 associated with that person, among other information. Ex. 1001, 22:63-23:20. Within in the "[first/second] person view," the user can see "all of the

Locations that specific person has been tagged within" by selecting the selectable element 1443. *Id*.



Ex. 1001, FIG. 32 (excerpted and annotated)

45. The '658 patent specification discloses that "from any view" a user can select a digital file "to show an enlarged version of the digital media file with all the tags that are assigned to that digital file, as illustrated in FIG. 2." Ex. 1001, 5:64-6:1.



Ex. 1001, FIG. 2 (annotated). The detail view shown above includes a digital photograph and a map image.

46. Independent claim 1 of the '658 patent is shown below. I have added the identifiers in red for ease of reference:

> 1. **[1pre]** A computer-implemented method of displaying at least a portion of a plurality of (i) digital photographs, (ii) videos, or (iii) a combination of (i) and (ii), each of the digital photographs and videos being associated with a geotag indicative of geographic coordinates where the respective digital photograph or video was taken, the method comprising:
>
> **[1a]** displaying an application view on a video display device including displaying a plurality of selectable elements, the plurality of selectable elements including a location selectable element;

[1b] responsive to a click or tap of the location selectable element, displaying a map view on a video display device, the displaying the map view including displaying;

[1c] (i) a representation of an interactive map

[1d] (ii) a first location selectable thumbnail image at a first location on the interactive map, the first location being associated with the geographic coordinates of a first geotag, a first set of digital photographs and videos including all of the digital photographs and videos associated with the first geotag;

[1e] (iii) a first count value image partially overlapping the first location selectable thumbnail image, the first count value image including a first number that corresponds to the number of digital photographs and videos in the first set of digital photographs and videos;

[1f] (iv) a second location selectable thumbnail image at a second location on the interactive map, the second location being associated with the geographic coordinates of a second geotag, a second set of digital photographs and videos including all of the digital photographs and videos associated with the second geotag; and;

[1g] (v) a second count value image partially overlapping the second location selectable thumbnail image, the second count value image including a second number that corresponds to the number of digital photographs and videos in the second set of digital photographs and videos;

[1h] responsive to a click or tap of the first location selectable thumbnail image, displaying a first location view on the video display device, the displaying the first location view including displaying (i) a first location name associated with the first geotag and (ii) a scaled replica of each of the digital photographs and videos in the first set of digital photographs and videos, the displayed scaled replicas of each of the digital photographs and videos in the first set of digital photographs and videos not being overlaid on the interactive map; and

> **[1i]** responsive to a click or tap of the second location selectable thumbnail image, displaying a second location view on the video display device, the displaying the second location view including displaying (i) a second location name corresponding to the second geotag and (ii) a scaled replica of each of the digital photographs and videos in the second set of digital photographs and videos, the displayed scaled replicas of each of the digital photographs and videos in the second set of digital photographs and videos not being overlaid on the interactive map.

VI. THE '658 PATENT'S EFFECTIVE FILING DATE

47. I understand that the application leading to the '658 patent, U.S. Patent Application No. 15/375,927, was filed on December 12, 2016. I also understand that the '658 patent claims priority to U.S. Patent Application No. 14/193,426, filed on February 28, 2014 and U.S. Patent Application No. 13/157,214, filed on June 9, 2011.

48. For purposes of this declaration, I have been asked to assume that the effective filing date or "time of the invention" for claims 1-15 of the '658 patent is June 9, 2011. However, my views and opinions herein will be the same regardless of whether the effective filing date is June 9, 2011 or February 28, 2014.

VII. LEVEL OF SKILL IN THE ART

49. I have been informed and understand that the level of ordinary skill in the relevant art at the time of the invention is relevant to inquiries such as the meaning of claim terms, the meaning of disclosures found in the prior art, and the reasons one of ordinary skill in the art may have for combining references.

50. I have reviewed the definition of the level of ordinary skill in the art proposed by Petitioner and Dr. Greenspun. The Petition states that a person having ordinary skill in the art ("POSITA") with respect to the '658 patent would have had "(1) a bachelor's degree in computer science, computer engineering, electrical engineering, or a related field, and (2) at least one year of experience designing graphical user interfaces for applications such as photo organization systems." Petition, 12; Ex. 1003 ¶ 27.

51. For purposes of this declaration, I have been asked to apply this level of skill in the art in my analysis, but I reserve the right to identify a level of skill in the art for the '658 patent that differs from Petitioner's proposal should I be asked to do so in the future.

52. I was, at the time of invention, and still am, one of at least ordinary skill in the art through my education and experience under Petitioner's proposed definition. Indeed, I am very familiar with people having this level of skill.

VIII. SUMMARY OF PETITIONER'S REFERENCES

A. Okamura (Ex. 1005)

53. Okamura is generally directed to "an information processing apparatus which displays contents such as image files." Ex. 1005, ¶ [0002].

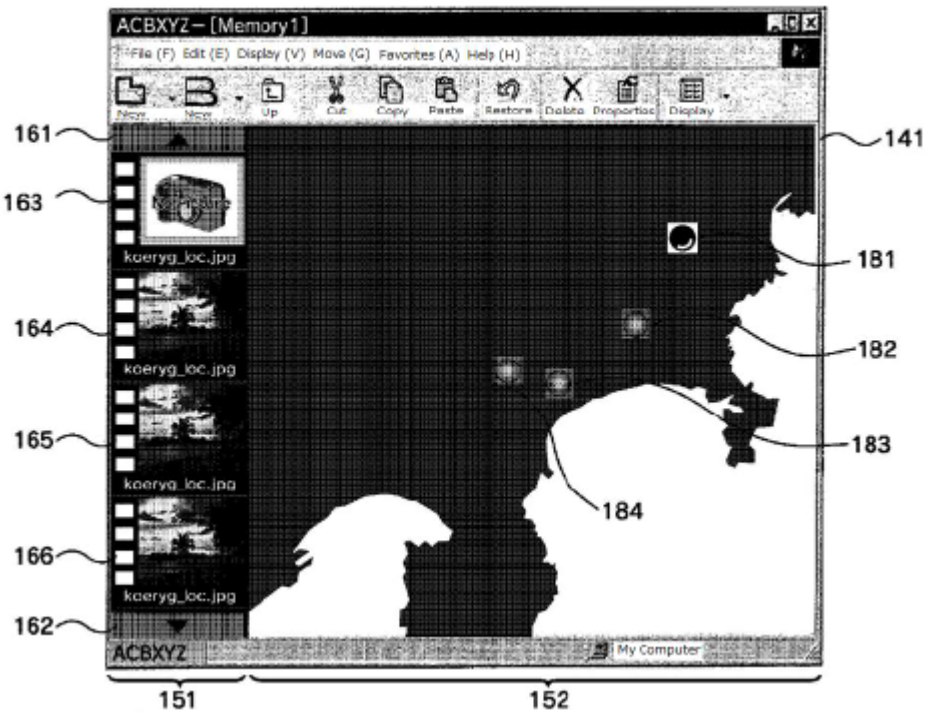
54. In a section entitled "Description of the Related Art," Okamura explains that prior systems which incorporated a large map view made it difficult to associate

the relationship between the locations at which images were taken. Specifically, Okamura explains that in prior systems, content can be associated "with positional information on the position where the image is captured." Ex. 1005, ¶ [0004]. In these systems, "the generated positions of the contents identified by their positional information are displayed in association with the contents." *Id*. Okamura provides two examples of such systems. *See id*., ¶¶ [0005]-[0006].

55. As a first example, Okamura identifies Japanese Unexamined Patent Application Publication No. 2001-160058 ("Fujiwara") as an "apparatus which arranges thumbnail icons of images side by side in time series . . . [and] displays position icons indicating the shooting locations of these images in a map window." Ex. 1005, ¶ [0005]. The Fujiwara system is configured so that when a user clicks a thumbnail icon, "a position icon indicating the shooting location of an image corresponding to the clicked thumbnail icon is displayed at the center of the map window." *Id*.

56. I have reviewed a certified English translation of Fujiwara. Ex. 2002. Okamura specifically refers to FIG. 12 of Fujiwara, which shows location icons 181-184 displayed on map window 152 and a thumbnail icon 163 corresponding to the highlighted location icon 181. Ex. 2002, ¶ [0071].

[Fig. 12]



Ex. 2002, FIG. 12

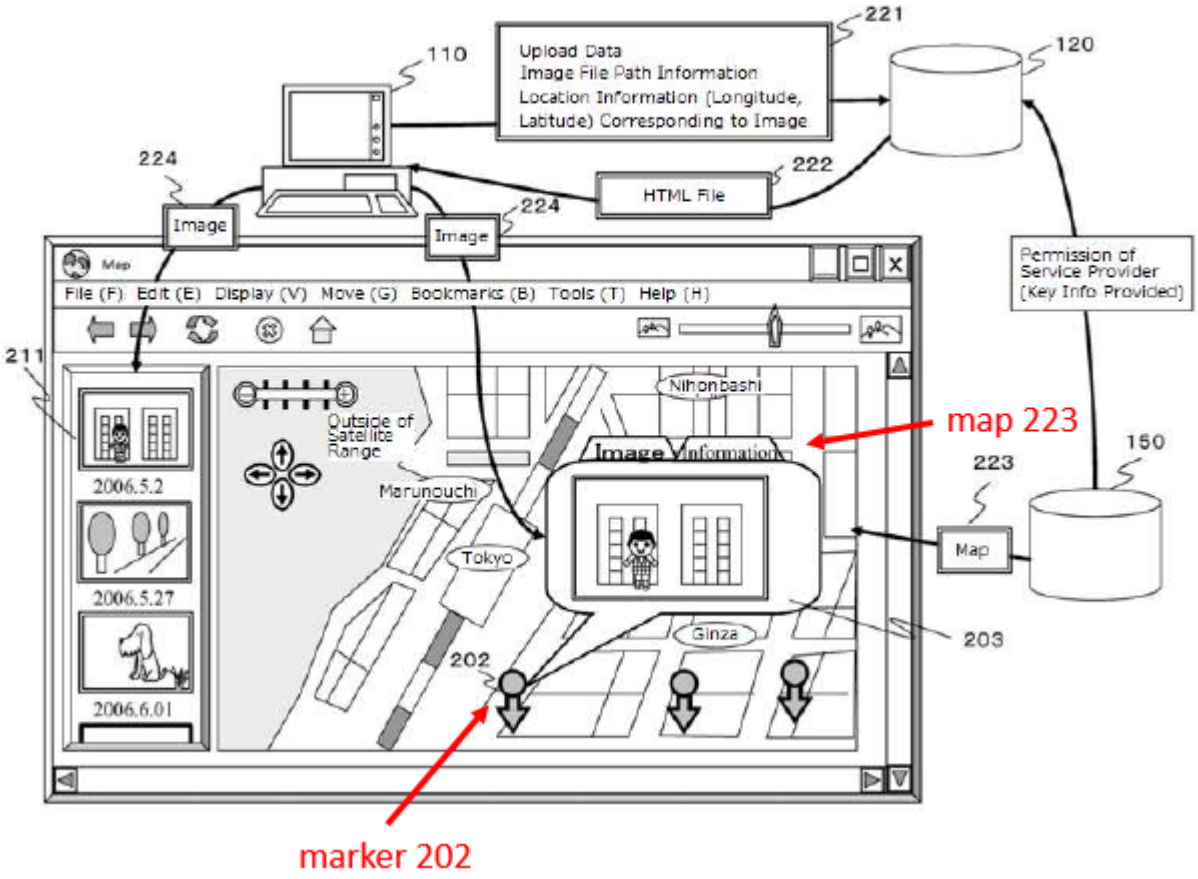
57. Fujiwara states that when one of the various location icons 181-184 is selected, the latitude/longitude associated with the selected icon is used to query a database to obtain images to display in the film window 151. Ex. 2002, ¶¶ [0074]-[0077]. Thus, "the relationship between location on a map and photographic image data can be represented in an easy-to-understand manner" and "makes it possible to easily retrieve image data . . . using the location as a key." *Id.*, ¶ [0085].

58. As a second example, Okamura identifies Japanese Unexamined Patent Application Publication No. 2007-323544 ("Takakura") as a system of displaying thumbnail images and "markers at positions on a map corresponding to the shooting locations of these images," and also "displays these images and markers in

association with each other." Ex. 1005, ¶ [0006]. "[W]hen a click operation on a marker displayed on the map is performed by the user, an image associated with the clicked marker is displayed on the map as a pop-up." *Id*.

59. I have reviewed a certified English translation of Takakura. Ex. 2019. Okamura specifically references FIG. 7 of Takakura in its discussion of Takakura. FIG. 7 illustrates a map 223 and "a marker 202 displayed at the location that corresponds to a location set in the attribute information for an image on the map." Ex. 2019, ¶¶ [0085]-[0086].

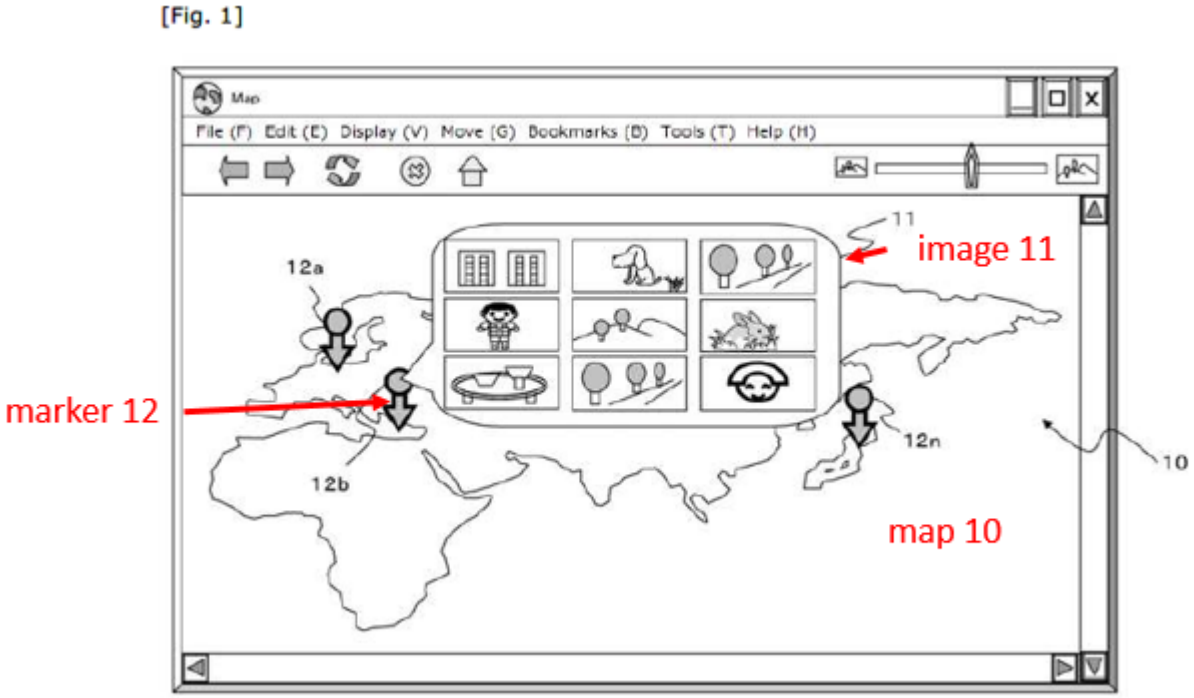
[Fig. 7]



Ex. 2003, FIG. 7 (annotated)

60. "An image 203 corresponding to a photograph taken by the user pops up when each marker is selected." Ex. 2019, ¶ [0064]. The image 203 includes "Image" and "Information" tags. *Id.*, ¶ [0065]. Image data or a thumbnail image is displayed in the "Image" tag. *Id.* "Date and time information indicating when the image was taken, latitude and longitude information indicating where the image was taken, and file path information for original image data are displayed" in the "Information Tag." *Id.*

61. FIG. 1 of Takakura is similar to FIG. 7 and includes a marker 12 "placed at a location indicating, for example, one of the destinations visited by the user on a map 10." Ex. 2019, ¶ [0005].



Ex. 2003, FIG. 1 (annotated)

When one of the marks on the map 10 is selected, "an image 11 corresponding to a photograph taken by the user is displayed." *Id*.

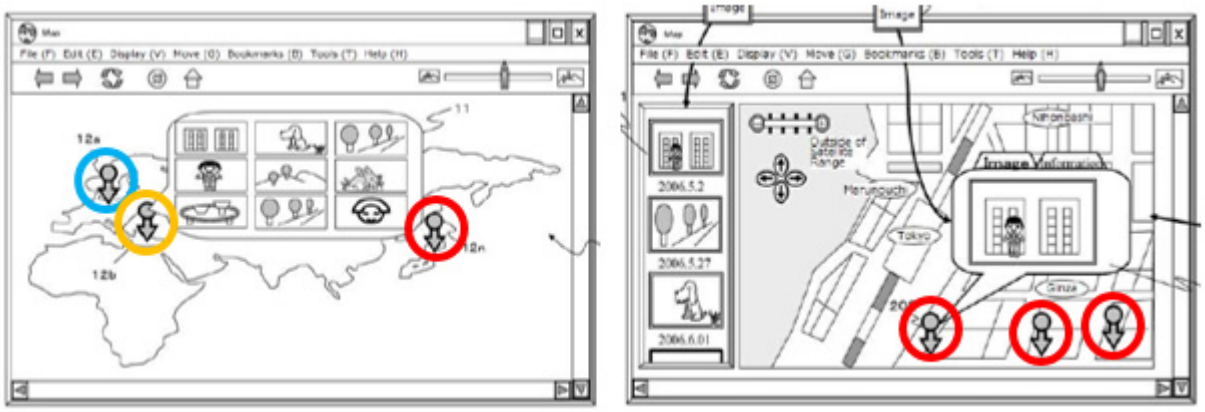
62. Okamura explains that in the related art (e.g., Fujiwara and Takakura), "images representing contents, and marks indicating the generated positions of these contents are displayed relatively far apart from each other," making "it difficult to intuitively grasp the geographical correspondence between individual contents." Ex.

1005, ¶ [0008]. Okamura provides two hypotheticals to illustrate the drawbacks and limitations of the related art like Fujiwara and Takakura.

63. First, Okamura provides an example where a person living in Tokyo will likely have "relatively many images of Tokyo and its vicinity" but "relatively few images of other regions (for example, United States or United Kingdom visited by the person on a trip)." Ex. 1005, ¶ [0009]. According to Okamura, this is problematic because "it is necessary to display the map at a scale sufficiently large to show the countries of the world" to convey "correspondence between images taken in Tokyo and its vicinity and images taken in other regions." *Id*. At this scale, "images taken in Tokyo and its vicinity . . . are displayed at substantially the same position on the map, which may make it difficult to grasp the geographical correspondence between the images taken in Tokyo and its vicinity." *Id*.

64. As second, related example, Okamura says that "when the map is displayed at a scale sufficiently small to show regions in the vicinity of Tokyo" the relative positions of the images taken in Tokyo and its vicinity "can be grasped." Ex. 1005, ¶ [0010]. According to Okamura, this scenario is also problematic because at this scale, "it is not possible to display the generated positions of images taken in other regions . . . on the map." *Id*.

65. The two scenarios Okamura describes relating to the scale of the map are illustrated by FIGS. 1 and 7 of Takakura:



Ex. 2019, FIGS. 1 and 7 (annotated)

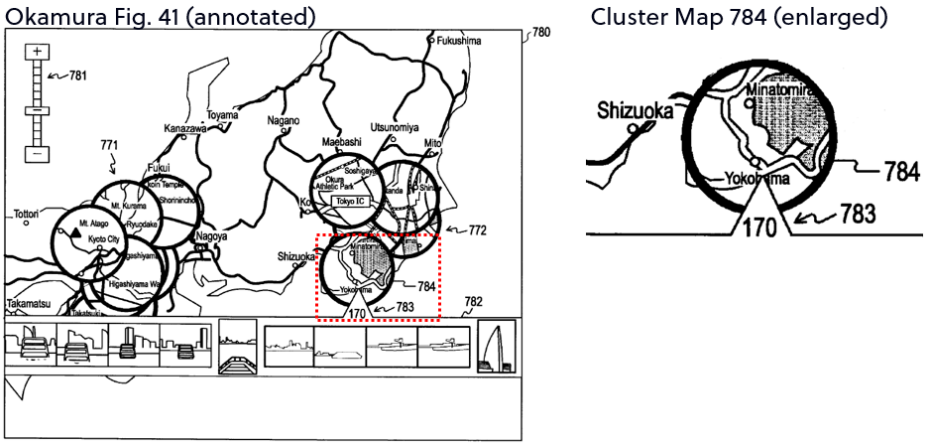
66. FIG. 1 of Takakura shows the map 10 at a scale showing multiple continents with three markers in or around Europe, the Mediterranean Sea, and Japan. FIG. 7 is displayed at smaller scale that shows three markers at three different locations in the Tokyo area, but excludes other locations (e.g., the locations in Europe).

1. Okamura's Cluster Maps

67. Okamura states that "when displaying images representing contents with positions on a map, it is important to be able to easily grasp the correspondence between a plurality of contents on the map, and each individual content." Ex. 1005, ¶ [0011]. Okamura describes "grouping (classifying) together a plurality of pieces of data within a short distance from each other in a data set." *Id.*, ¶ [0139]. The data can include "image contents such as still image files" and the "distance" refers to the distance between geographical positions associated with the images. *Id*. Okamura

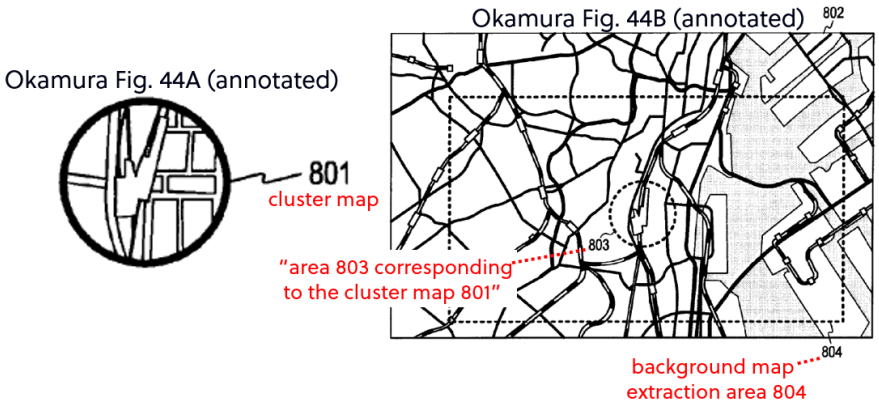
defines a cluster as "a unit in which contents are grouped together by clustering." *Id*.

68. As discussed below, Okamura teaches to generate "maps corresponding to individual clusters" -- namely "cluster maps" to address the identified problems in the related art. Okamura explains that the cluster map "is a map" and "can be used as a map." Ex. 1005, ¶¶ [0213], [0331].



Ex. 1005, Fig. 41 (annotated)

69. To ensure the contents "belonging to each cluster can be … easily grasped by the user," Okamura describes "changing the scale" of individual cluster maps such that multiple cluster maps presented in a single view are displayed with differing scales. Ex. 1005, FIGS. 14, 18, 41, ¶¶ [0215]-[0219], [0410] ("the scale of each cluster map varies … from cluster to cluster"). Also, the scale of a cluster map may vary relative to the scale of a background map. Ex. 1005, ¶¶ [0407]-[0411].



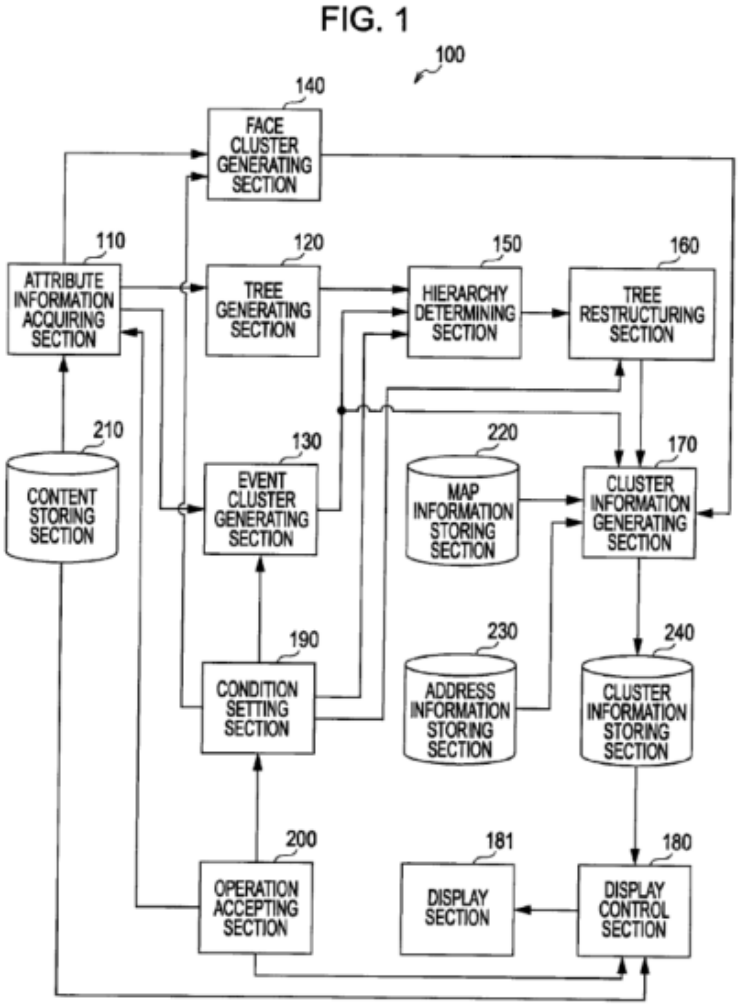
Ex. 1005, FIGS. 44a-44b (annotated)

70. Petitioner and Dr. Greenspun discuss two different embodiments in Okamura, which I discuss in turn below.

a. First Embodiment

71. Okamura's first embodiment is generally directed to "generating cluster information on the basis of positional information." Ex. 1005, ¶¶ [0088], [0312] ("The first embodiment . . . is directed to . . . the case of displaying cluster maps together with contents," for example, "in a matrix fashion"). An example of this matrix of cluster maps is shown in FIG. 18, which is discussed further below.

72. FIG. 1 of Okamura illustrates an information processing apparatus 100 that includes content storing section 210, map information storing section 220, address information storing section 230, cluster information storing section 240, face cluster generating section 140, and cluster information generating section 170. Ex. 1005, FIG. 1, ¶ [0091].



Ex. 1005, FIG. 1

73. The content storing section 210 stores image files, which can include "positional information such as latitude and longitude." Ex. 1005, ¶ [0109]. As the name implies, the map information storing section 220 stores map data. *Id*., ¶ [0093]. The address information storing section 230 stores information used by the cluster information generating section 170 to determine address information based

on the positional information associated with individual content items. *See id*., ¶¶ [0111]-[0127].

74. The tree generating section 120 "generates binary tree structured data on the basis of attribute information (positional information)." Ex. 1005, ¶ [0097]. In particular, the tree generating section 120 calculates the distance between individual content items based on the respective positional information. *Id*., ¶¶ [0140]-[0148], [0152]-[0153]. As shown in FIG. 8, the tree generating section 120 groups contents #1 to #14 into various clusters 321-332 based on the calculated distances. *Id*., ¶¶ [0151]-[0155], FIG. 8.

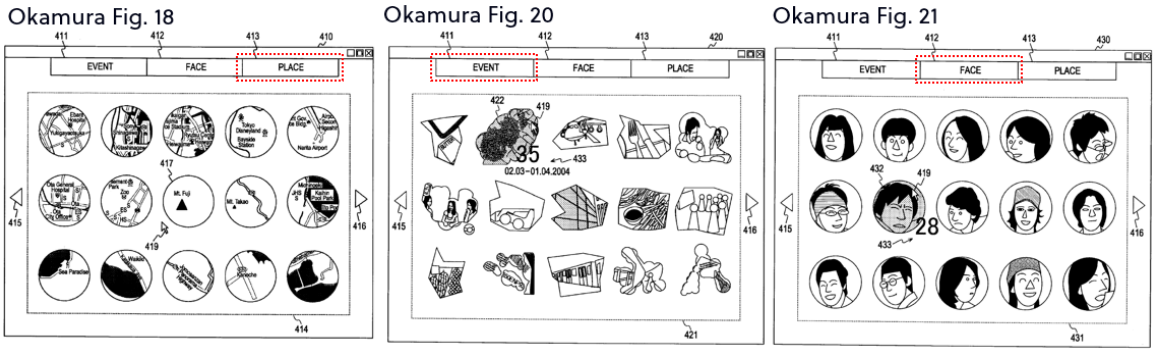
75. Okamura also describes generating "maps corresponding to individual clusters." Ex. 1005, ¶ [0213]. For example, "on the basis of positional information associated with each of [the] contents belonging to a cluster, an area corresponding to the cluster can be identified, and a map covering this identified area can be used as a map (cluster map) corresponding to the cluster." *Id*. In these cluster maps, "the position corresponding to each cluster can be grasped from a map corresponding to each cluster." *Id*., ¶ [0215]. The "scale of a map representing each cluster" can be changed so that "the shooting area or the like of each of [the] contents belonging to each cluster can also be easily grasped by the user." *Id*.

76. FIG. 14 illustrates a table used by the cluster information generating section 170 to generate clusters. Ex. 1005, FIG. 14, ¶ [0216]. Each cluster map

circle has a cluster diameter 171 that corresponds to a map scale 172. *Id*., ¶¶ [0217]-[0221]. Specifically, the cluster information generating section 170 identifies a map scale 172 from FIG. 14 based on positional information, then identifies the corresponding cluster diameter 171. *Id*., ¶ [0220]. Then, the cluster information generating section 170 "identifies the center position of the cluster and extracts from the map information storing section 220 a map covering a predetermined area from the center position," forming the cluster map 247. *Id*., ¶ [0221].

77. Okamura emphasizes that the size/scale of the cluster map is important so that the user can understand what location the cluster corresponds to. Ex. 1005, ¶ [0223]. For example, Okamura contemplates that "[i]f the size of a cluster is small as in this case, when a map is extracted by using the map extraction method described above, a map covering a relatively small area is generated. In the case of such a map covering a relatively small area, a case can be supposed where no landmark (for example, a public facility or a park) is present in the map." *Id*. In that case, "there is a possibility that when a map is displayed as a thumbnail image, although the details of the map can be grasped, it is hard to easily grasp what region the map is showing." *Id*. Thus, Okamura suggests setting a lower limit for the size of the map so that "by using a map covering a relatively large area, the region corresponding to the map can be easily grasped, and the area of the cluster can be also easily grasped." *Id*.

78. Okamura's first embodiment uses three "index screens" – namely, the PLACE, EVENT and FACE index screens 410, 420, 430, shown below:

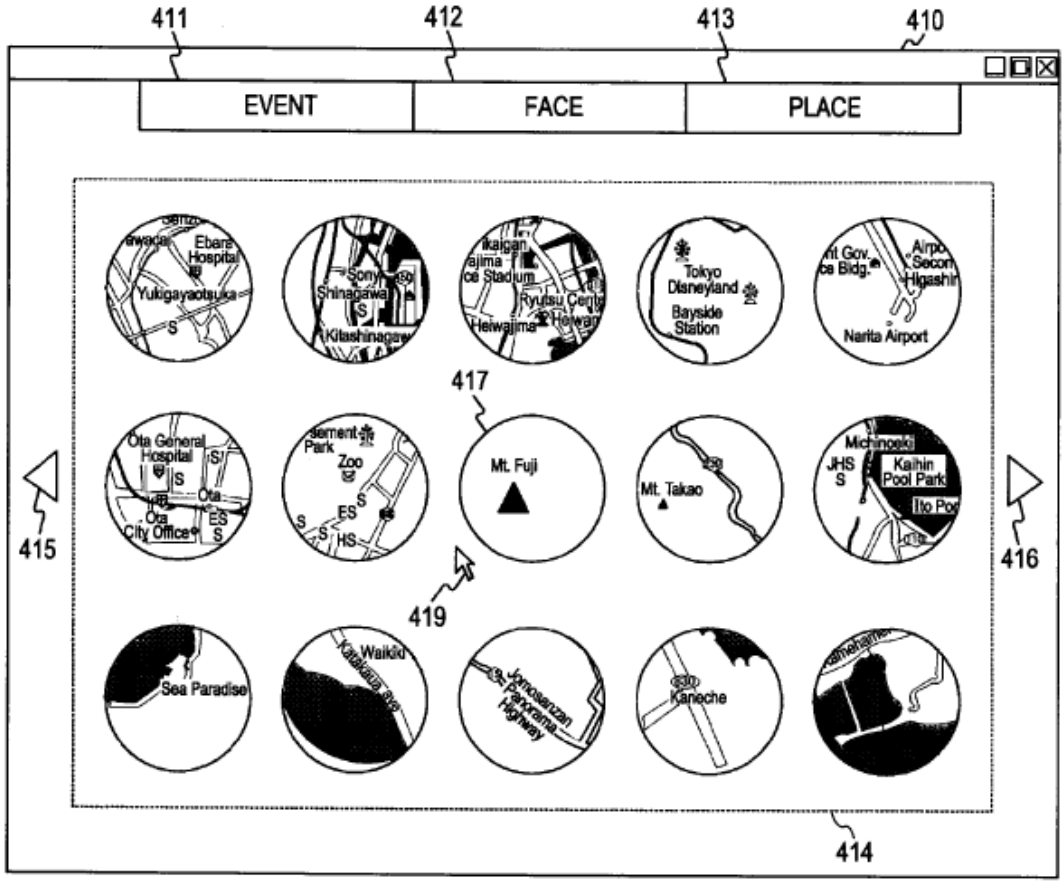


Ex. 1005, FIGS. 18, 20, 21 (annotated)

79. A user selects tabs 413, 411 or 412 (highlighted above) to respectively cause the PLACE, EVENT or FACE index screens to display. Ex. 1005, FIGS. 18, 20, 21, ¶¶ [0234]-[0237], [0244], [0246].

80. FIG. 18 of Okamura shows "a listing of marks (cluster maps)" in a 3 x 5 matrix. Ex 1005, ¶ [0237]; *see also id*., ¶¶ [0240]-[0241].

FIG. 18



Ex. 1005, FIG. 18

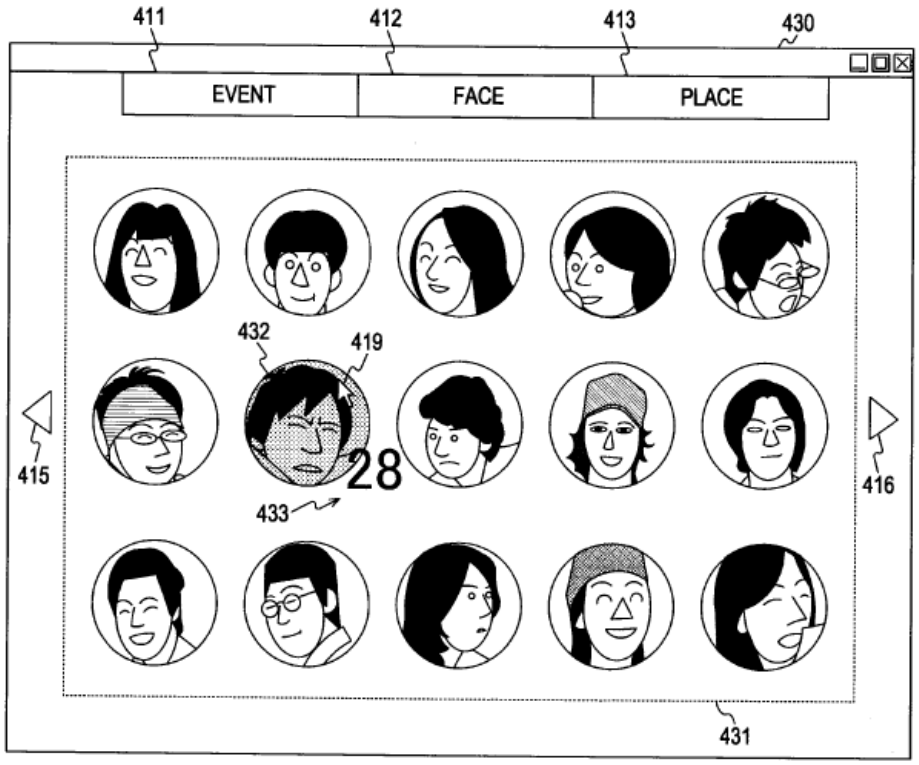
81. FIG. 18 illustrates how Okamura addresses the scaling problems it identified in the related art (e.g., Fujiwara and Takakura) when identifying content on a map. For example, many of the cluster maps in FIG. 18 are associated with the Tokyo vicinity (annotated in yellow below), while at least one cluster map is associated with Waikiki, Hawaii (annotated in red below).

Ex. 1005, FIG. 18 (excerpted and colorized)

82. If this information were conveyed according to the related art (e.g., Fujiwara and Takakura), the map would need to be displayed "at a scale sufficiently large to show the countries of the world" (or at least Japan and the western United States), obscuring the geographical differences in the Tokyo vicinity. Ex. 1005, ¶ [0009]. Conversely, if the map were displayed at a smaller scale to focus on the Tokyo vicinity, other regions (e.g., Hawaii) would be excluded. *Id*., ¶ [0010]. Okamura addresses this scaling issue by generating cluster maps and displaying them in an array as shown in FIG. 18.

83. As part of the first embodiment, FIG. 21 illustrates a face cluster image display area 431 including images of faces arranged in a 3x5 matrix. Ex. 1005, ¶ [0246].

FIG. 21



Ex. 1005 at FIG. 21

84. Okamura explains "when the mouse is placed over a thumbnail image 432 by a user operation on the index screen 430 shown in FIG. 21, the color of the thumbnail image 432 changes, and pieces of information 433 related to the thumbnail image 432 are displayed." Ex. 1005, ¶ [0247].

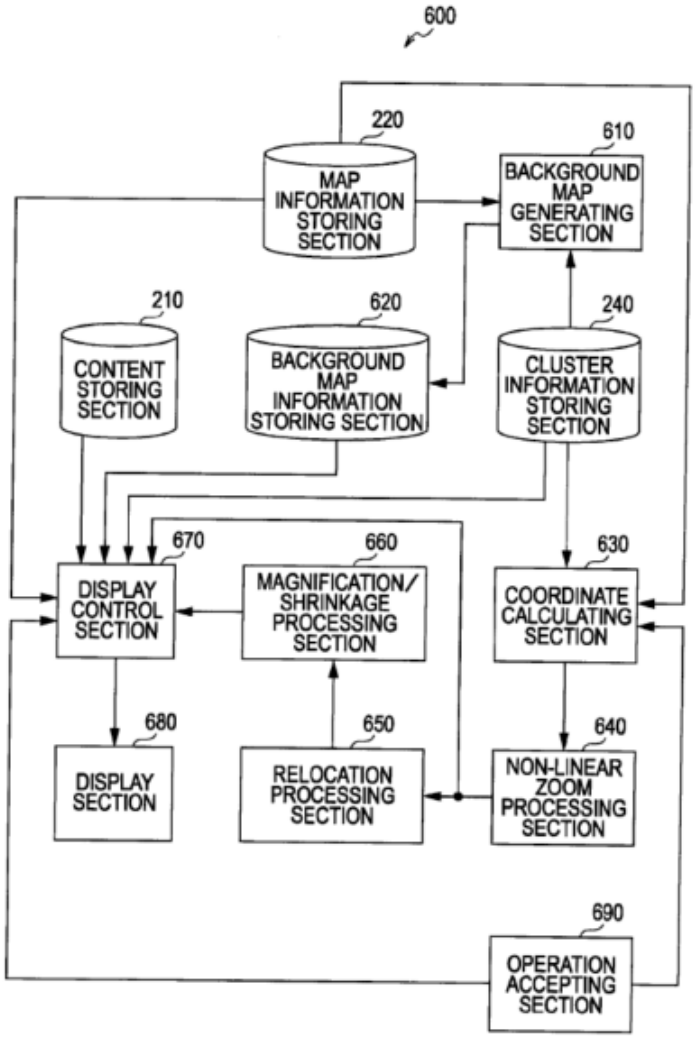
85. FIG. 17 shows how to transition between the index screen 401 (FIGS. 18-21) and a content playback screen 402 (FIGS. 22-27B) in the first embodiment. Ex. 1005, FIG. 17, ¶¶ [0232]-[0234].

b. Second Embodiment

86. In the second embodiment, Okamura explains that when cluster maps are displayed in a matrix as shown in FIG. 18, "there is a fear that it may not be possible to intuitively grasp the geographical correspondence between cluster maps." Ex. 1005, ¶ [0312]. Okamura suggests that the cluster maps can "be placed at their corresponding positions on a map" but notes that "there is a fear that not all the cluster maps can be displayed unless a map of an area corresponding to the cluster maps is displayed." *Id*. Okamura states that "it is conceivable to display a world map so that it is possible to get a bird's eye view of the entire world." *Id*. Even then, Okamura suggests "there is a fear that the cluster maps overlap each other" when presented this way. *Id*. The second embodiment seeks to display the cluster maps so that they are "placed in such a way that the geographic correspondence between the cluster maps can be grasped intuitively." *Id*.

87. FIG. 34 of Okamura is a block diagram for an information processing apparatus 600 according to the second embodiment. Ex. 1005, ¶ [0313], FIG. 34.

FIG. 34



Ex. 1005, FIG. 34

88. The information processing apparatus 600 includes content storing section 210, map information storing section 220, and cluster information storing section 240, which are "substantially the same" as the components with the same reference numbers in FIG. 1 for the information processing apparatus 100 of the first embodiment. *Id.*, ¶ [0313]. Okamura states that "it is assumed that cluster information generated by the cluster information generating section 170 shown in

FIG. 1 is stored in the cluster information string section 240." *Id*. The face cluster generating section 140 of the first embodiment shown in FIG. 1 is not included in the information processing apparatus 600 of the second embodiment shown in FIG. 34. *Compare* Ex. 1005, FIG. 1 and FIG. 34.

89. In FIG. 35, Okamura illustrates an example where a map 760 is displayed at a scale showing Tokyo and Kyoto with cluster maps displayed. Ex. 1005, ¶ [0324]. For these clusters, the "center positions are located within relatively narrow ranges in Tokyo and Kyoto" and thus "the generated cluster maps are displayed in an overlaid manner." *Id*. The scale of the map 760 makes "it difficult to grasp individual cluster maps in regions where the cluster maps are densely concentrated." *Id*., ¶ [0325]. Okamura stresses the necessity of having the cluster maps be "somewhat large for the user to recognize these cluster maps" and discredits making the cluster maps smaller because this makes them "hard to see, making it difficult to grasp the details of the cluster maps." *Id*.

90. Okamura's second embodiment seeks to address these issues by determining the "optimal placement of individual cluster maps on a map which makes it possible to avoid overlapping of cluster maps in regions where the cluster maps are densely concentrated, without changing the size of the cluster maps." Ex. 1005, ¶ [0326]. Okamura specifies three placement criteria:

(1) For cluster maps overlapping each other on the background map, their center positions are to be spaced apart by some interval;

(2) The positional relationship between cluster maps is to be maintained. This positional relationship includes, for example, the distances between the cluster maps, and their orientations; and

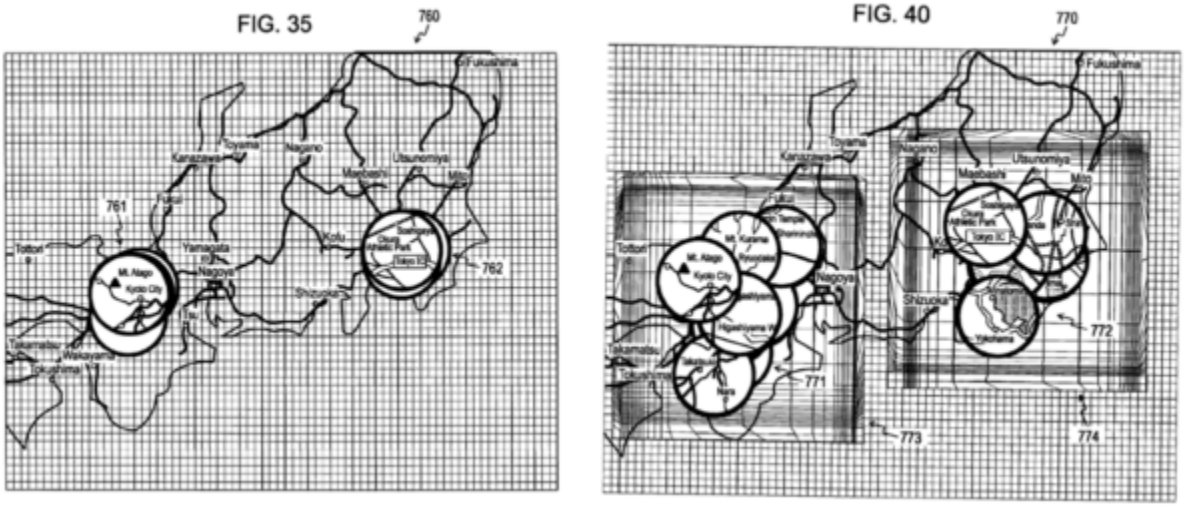
(3) When cluster maps overlap each other, the order (precedence) in which individual cluster maps are overlaid at the upper side are determined in accordance with a predetermined condition.

Id., ¶¶ [0326]-[0329].

91. In describing the second embodiment, Okamura reiterates that "a cluster map is a map related to a location where contents belonging to the corresponding cluster are generated." Ex. 1005, ¶ [0331]. Okamura explains that "if the cluster maps are spaced too far apart, it may become no longer possible to recognize where on the background map the cluster maps correspond to in the first place." *Id*. Okamura states that "it is important to minimize overlaps while still allowing the geographical correspondence to be recognized." *Id*.

92. Okamura describes in detail how to coordinate-transform cluster maps using a non-linear zoom processing section 640. Ex. 1005, ¶¶ [0317], [0338]-[0353], FIGS. 38-39. Compared to FIG. 35, the cluster maps in FIG. 40 are coordinate transformed such that "the individual cluster maps belonging to the cluster map

groups 761 and 762 shown in FIG. 35 can be placed in such a way that these cluster maps are scattered apart from each other, thereby forming new cluster map groups 771 and 772." *Id*., ¶ [0352]. Okamura explains that "by placing cluster maps in the manner as shown in FIG. 40, for example, cluster maps displayed in an overlaid manner can be scattered apart from each other" and "[t]herefore, even those cluster maps which are not visible in their entirety become partially visible, thereby making it possible to recognize cluster maps placed on the map." *Id*., ¶ [0353].



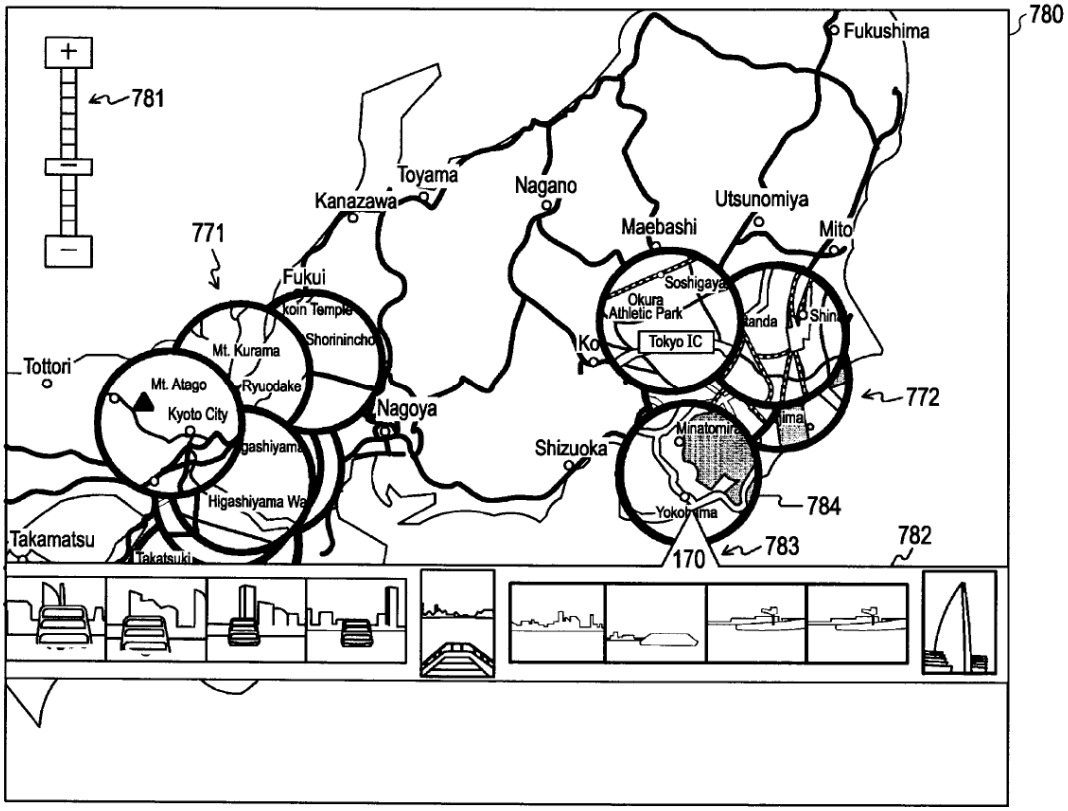
Ex. 1005, FIGS. 35 and 40

93. Referring back to the block diagram in FIG. 34, "[t]he background map generating section 610 generates a background map (cluster wide-area map) corresponding to each cluster on the basis of cluster information stored in the cluster information storing section 240." Ex. 1005, ¶ [0314], FIG. 34. As described in connections with FIGS. 44 and 45, the background map generating section 610

generates a background map (which Okamura calls a cluster wide-area map) based on the size and position of a cluster map. *Id*., ¶¶ [0405]-[0417].

94. FIG. 41 of Okamura shows a map view screen "that displays a map in which cluster maps coordinate-transformed by a non-linear zoom process are placed." Ex. 1005, FIG. 41, ¶ [0354].

FIG. 41

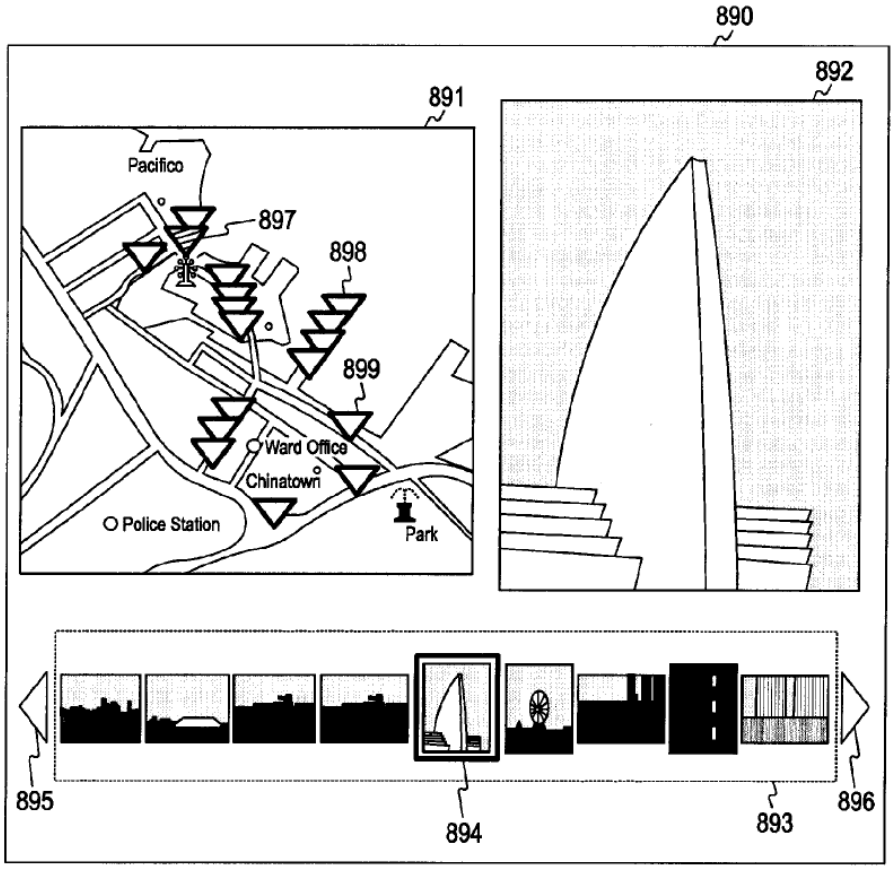


Ex. 1005, FIG. 41

95. According to Okamura, by placing cluster maps on the map in the way shown in FIG. 41, "the geographical correspondence between contents can be intuitively grasped." Ex. 1005, FIG. 41, ¶ [0358].

96. FIG. 50 of Okamura shows a play view screen that is displayed when a cluster map shown from the map view screen is selected. Ex. 1005, FIG. 50, ¶ [0440].

FIG. 50



Ex. 1005, FIG. 50

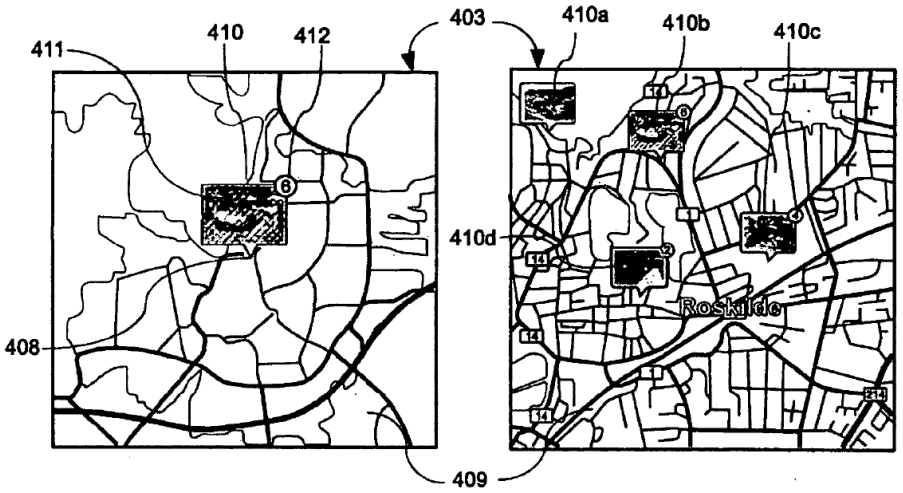
97. The play view screen includes three display areas: a map display area 891, a magnified image display area 892 and a content listing display area 893. Ex. 1005, FIG. 50, ¶ [0441]. The map display area 891 displays a map related to the selected cluster with marks (inverted triangles) indicating the positions of contents

belonging to the selected cluster. *Id*., FIG. 50, ¶ [0442]. Content corresponding to the cluster is displayed as thumbnails in the content listing display area 893. *Id*., FIG. 50, ¶ [0444]. A magnified image of a selected thumbnail is displayed in the magnified image display area 892. *Id*., FIG. 50, ¶¶ [0443]-[0444].

98. FIG. 49 shows transitions between a map view screen (FIG. 41), a scatter view screen (FIGS. 46 and 47), and a play view screen (FIG. 50) in the second embodiment. Ex. 1005, FIG. 49, ¶¶ [0429]-[0438].

B. Belitz (Ex. 1006)

99. Belitz describes a user interface for displaying a map and at least one marked location on the map using a graphical object. Ex. 1006, Abstract. Examples of this user interface are shown in Figs. 4a-4b of Belitz:



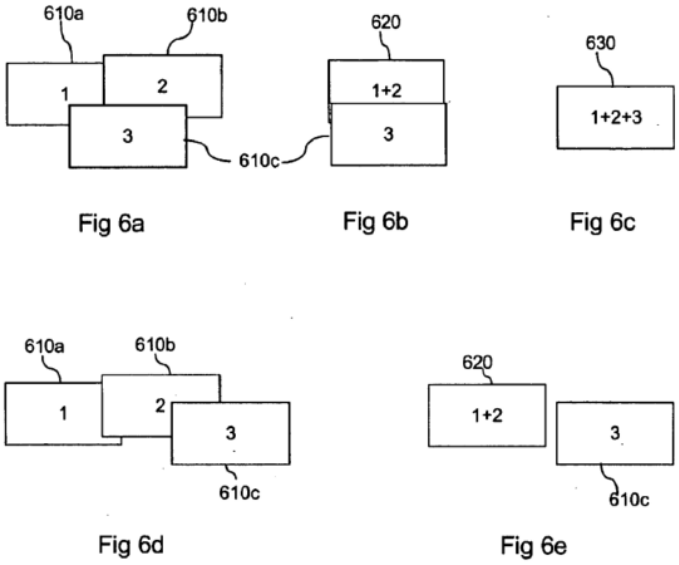
Ex. 1006, FIGS. 4a-4b

100. As shown in Figs. 4a-b, Belitz discloses placing graphical objects 410a, 410b, 410c, and 410d (also referred to as "thumbnail[s]") on the map 409. Ex. 1006, Figs. 4a-b, ¶¶ [0011], [0062].

101. As shown by a comparison between Figs. 4a and 4b, the map 409 can be displayed at different zoom levels. Belitz notes that if there were multiple graphical objects for close locations and they were displayed separately, this "would clutter the view and be confusing to a user." Ex. 1006, ¶ [0054].

102. Belitz explains that a controller can determine "whether two graphical objects 410 would overlap when rendered on the display 403 and if so the two graphical objects are stacked or grouped into one graphical object 410." Ex. 1006, ¶ [0054]. For example, the graphical objects 410a, 410b, 410c, and 410d shown in Fig. 4b would overlap if shown at the zoom level of the map 409 in Fig. 4a, so they are stacked together in Fig. 4a as group graphical object 410. *Id*., ¶ [0055].

103. FIGS. 6a-6e show how graphical objects that overlap can be stacked so that there is no overlap on the screen. Ex. 1006, ¶¶ [0068]-[0069].



Ex. 1006, FIGS. 6a-6e

C. Rasmussen (Ex. 1007)

104. Rasmussen is directed to a "combined map scale and measuring tool … that can be used in a digital mapping system." Ex. 1007, ¶ [0021]. "The combined map scale and measuring tool has two general modes of operation: scale mode and tool mode." *Id.*, ¶ [0023]. When in scale mode, "the scale is updated with every pan, zoom or resize operation the user performs." *Id.* "The scale 205a can be drawn on the map with distinct endpoints." *Id.*, ¶ [0046]. In tool mode, the user can measure "the distance between two user selected points." *Id.* For example, "once the tool 205b is positioned on the map, the distance between the tool 205b endpoints is displayed in the current units of scale/measuring tool." *Id.*, ¶ [0050]. Fig. 2 of Rasmussen displays the digital map, the scale 205a, the tool 205b, and information window 215.

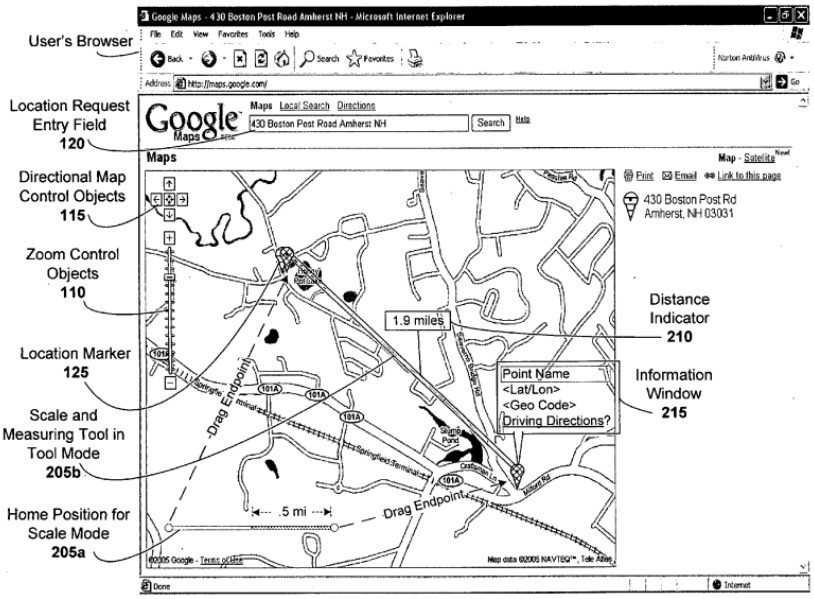


Fig. 2

Ex. 1007, FIG. 2

105. As shown above in Fig. 2, the information window 215 provides information about the user selected endpoints, such as, "latitude/longitude and geocode information." Ex. 1007, ¶ [0050].

D. Gossweiler (Ex. 1038)

106. Gossweiler is directed to a method of finding and delivering content to a television display and sharing the content with others. Ex. 1038, ¶ [0035]. The display includes "audio-visual programs that have been associated with friends, or acquaintances, of the owner of the television." *Id*., ¶ [0041]. Content is displayed in a shelf model where, for example, "a horizontal row of still frames from the relevant content … having a superimposed image of the friend that shared the content." *Id*., [0042]. In the shelf model, "[p]eople can be sorted by frequency of

contact (sharing or messaging) or alphabetically." *Id.*, ¶ [0060]. "[A] user may enter terms to search for a particular friend." *Id.* The user can then communicate with that particular friend "by various simple mechanisms such as chat or e-mail." *Id.*, ¶ [0061]. Fig 1D of Gossweiler is a display of the user searching for a particular friend, Tina Lindsay.

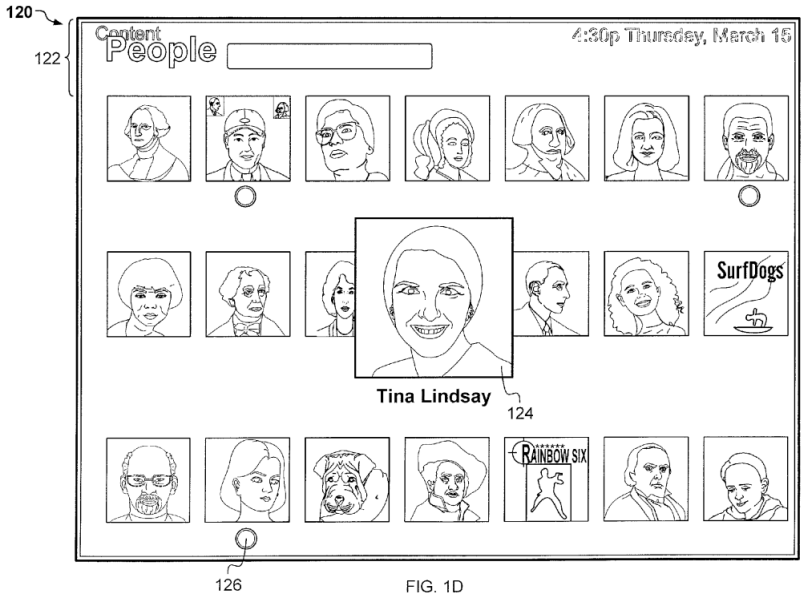


FIG. 1D

Ex. 1038, FIG. 1D

107. Fig. 1E of Gossweiler displays Tina's Lindsay profile and her communication history with the user.

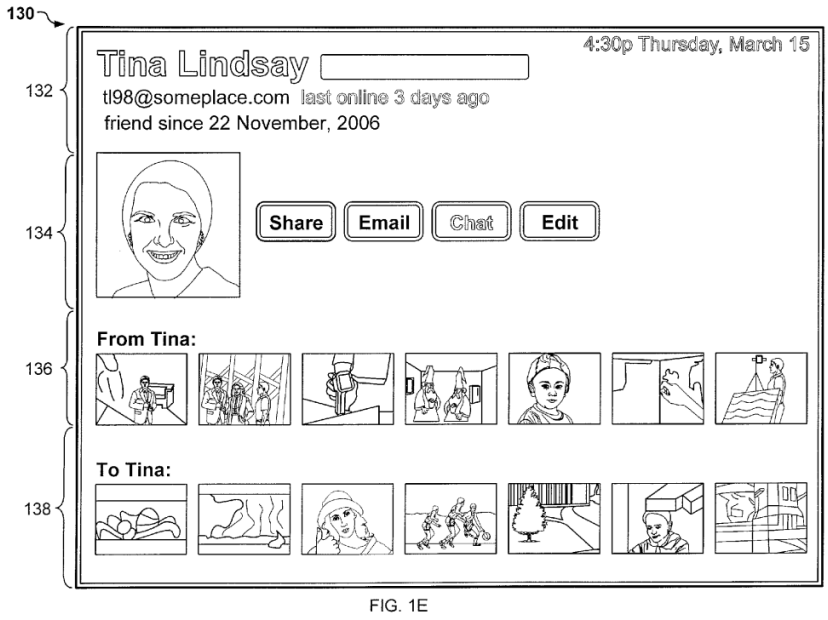


FIG. 1E

Ex. 1038, FIG. 1E

E. Yee (Ex. 1041)

108. Yee is directed to "a system that allows a user to traverse digital records based on multiple dimensional attributes." Ex. 1041, ¶ [0001]. Digital records include certain "dimensional attributes," including People, Place, Entity, or Event. *Id*., ¶ [0026]. Yee discloses that "the user can designate at least one dimension as a focal attribute, the value of which is fixed" and "designate at least another dimension as a sliding attribute, the value of which can be changed dynamically by the user when viewing the records." *Id*., ¶ [0028]. Additionally, "[t]he user can further designate one or more dimensions as annotated attributes, the values of which are overlaid on the display of the sliding attribute." *Id*.

109. In Yee, the "system hinges on conceptualizing a digital record as the intersection of multiple dimensional attributes." Ex. 1041, ¶ [0024]. In other words, Yee organizes digital records using a plurality of dimensional attributes – not just one.

110. FIG. 1 of Yee illustrates an example including a world map 102, a timeline 104, a focal attribute field 108, a zoom control 110, a sliding indicator 112, and a strip of photographs 106. Ex. 1041, ¶ [0044]. In this example, the focal attribute is specified as "Bob." *Id*., ¶ [0045].

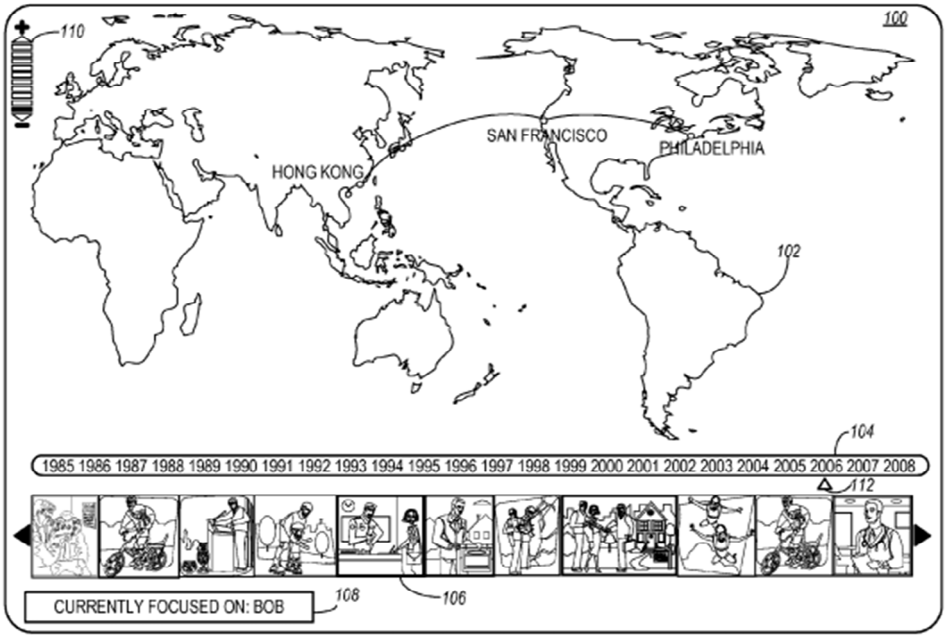


FIG. 1

Ex. 1041, FIG. 1

111. Yee explains that after selecting "Bob," "[t]he user also moves sliding indicator 112 to point to 2006 along timeline 104" and "[i]n response, the system displays all the photographs associated with Bob and the year 2006 in thumbnail

strip 106 in chronological order." Ex. 1041, ¶ [0045]. The user can "change the level of abstraction for the Time attribute." *Id*. Yee states that "when the sliding attribute is Time, the user can specify hours, days, weeks, months, years, or decades as the time unit." *Id*., ¶ [0032].

112. The world map 102 "indicates the places associated with the photographs displayed in strip 106." Ex. 1041, ¶ [0046]. In FIG. 1, "the Time attribute is the sliding attribute and the Place attribute is the annotated attribute." *Id*. Additionally, "the user can use zoom control 110 to change the zoom level of the map 102." *Id*. Each of the locations associated with "Bob" and the year 2006 are represented by a dot on the world map 102. *Id*., ¶ [0047].

IX. CLAIM CONSTRUCTION

113. I have been asked to offer my views regarding what a POSITA would understand from reading the words of the claims in view of the specification. My views as to particular claim limitations I understand may be in dispute are provided below.

A. Claim 1: "application view"

114. Claim 1 of the '658 patent recites "displaying an application view on a video display device including displaying a plurality of selectable elements, the plurality of selectable elements including a location selectable element."

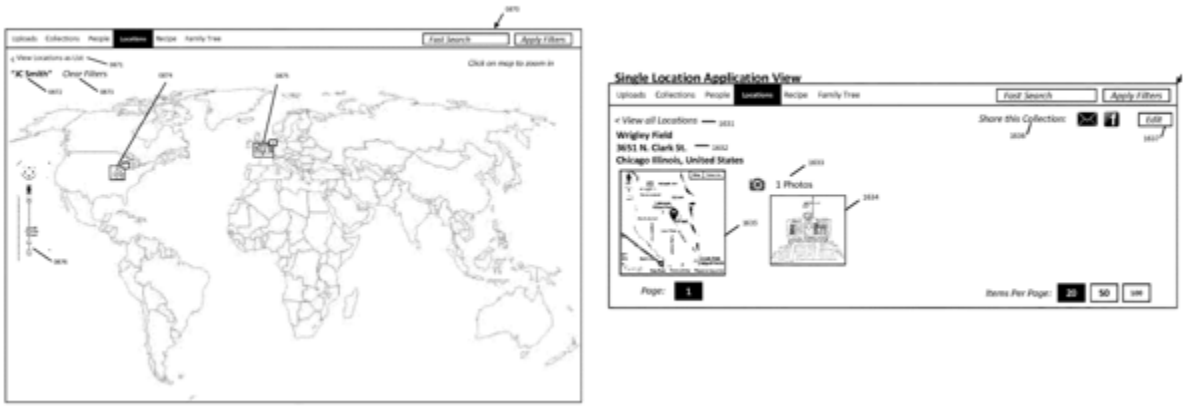
115. A POSITA would understand the claimed "application view" refers to a "view" that is distinct from the other views recited in the claims of the '658 patent. Claim 1 recites, among other things, a "map view," a "first location view," and a "second location view," each of which refer to a view that is different than the "application view."

116. The claimed "application view" includes "a plurality of selectable elements," including a "location selectable element." Claim 1 recites "responsive to a click or tap of the location selectable element, displaying a map view." Thus, the map view is displayed responsive to the "location selectable element" in the "application view" being clicked or tapped. This confirms that the "application view" and "map view" are not the same thing because the "application view" includes the location selectable element that is clicked/tapped to display the "map view."

117. Claim 5 recites a "people view," which is also different than the "application view" in claim 1. Claim 5 also adds a person selectable element in the "application view," which is clicked or tapped to cause the "people view" to be displayed. This reinforces the conclusion that the "application view" and "people view" are different views. Claims 7 and 10 recite, respectively, a "first person view" and a "second person view," which are different views than the "application view."

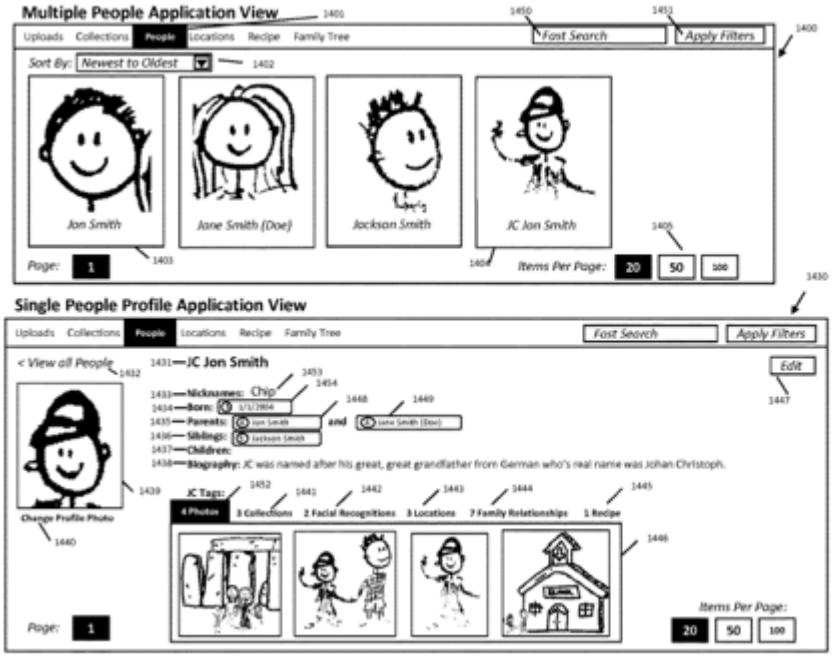
118. Claim 13 recites an "album view," claim 14 recites a "first album view," and claim 15 recites a "second album view," which are different views than the "application view." Claim 13 adds an "album selectable element" to the "application view," which is clicked or tapped to display the "album view," also reinforcing that the "application view" and "album view" are different views.

119. The '658 patent discloses several views for organizing and displaying digital files, including "People Application Views," "Collection Application Views," "Location Application Views," "Uploads Application Views," and an "Recipe Application View." Ex. 1001, 3:58-62. Examples of the claimed "map view" and the claimed "[first/second] location view" are shown below in FIGS. 41 and 33.



Ex. 1001, FIGS. 41 and 33 (annotated)

120. An example of the claimed "people view" and the claimed "[first/second] person view" are shown in FIG. 32 and reproduced below.

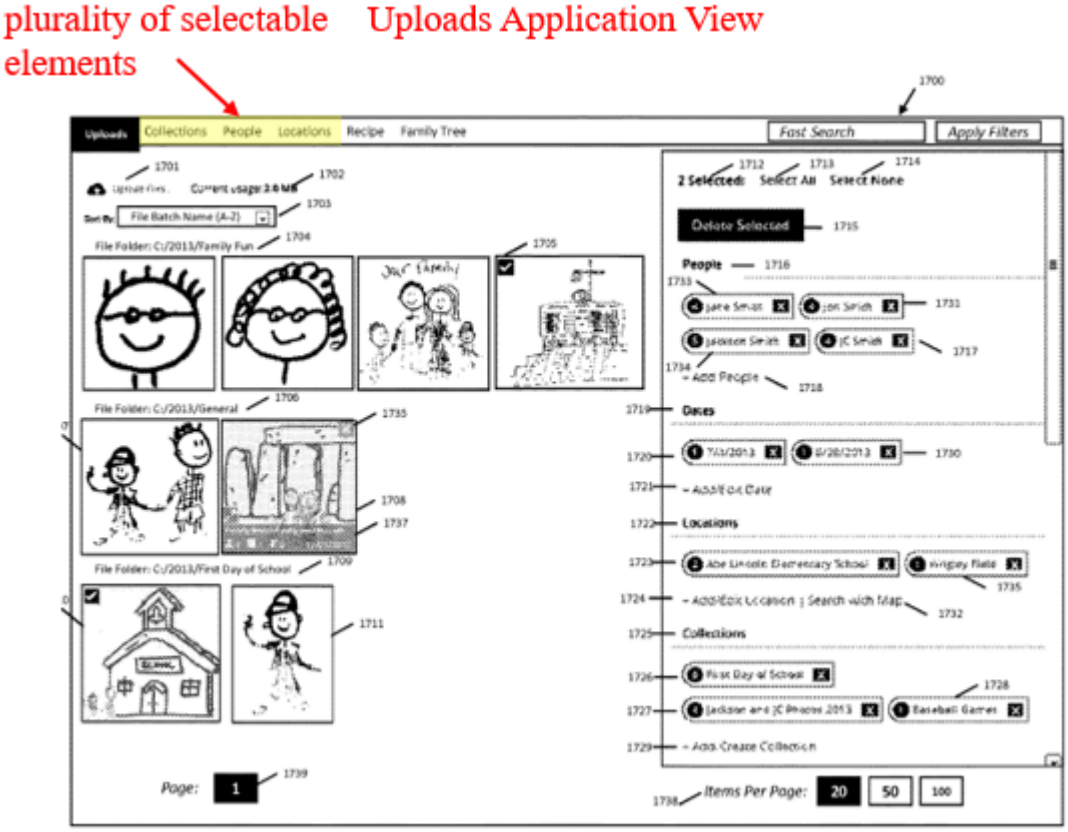


Ex. 1001, FIG. 32 (annotated)

121. FIG. 33 includes examples of the claimed "album view" in claim 13 and "[first/second] album view" in claims 14-15.

Ex. 1001, FIG. 33 (annotated)

122. FIG. 35 includes an "Uploads Application View," which is an example of an application view including selectable elements that is distinct from the other views described above. For example, FIG, 35 shows the "Locations" selectable element and the "People" selectable element. Ex. 1001, 3:61, 24:40-46.



Ex. 1001, FIG. 35 (annotated)

123. The "Recipe Application View" shown in FIG. 36 includes a plurality of selectable elements and is another example of an "application view" that is different from the other views in the claims, like the map view, location views, people view, person views, etc. Ex. 1001, 3:62, 27:20-27.

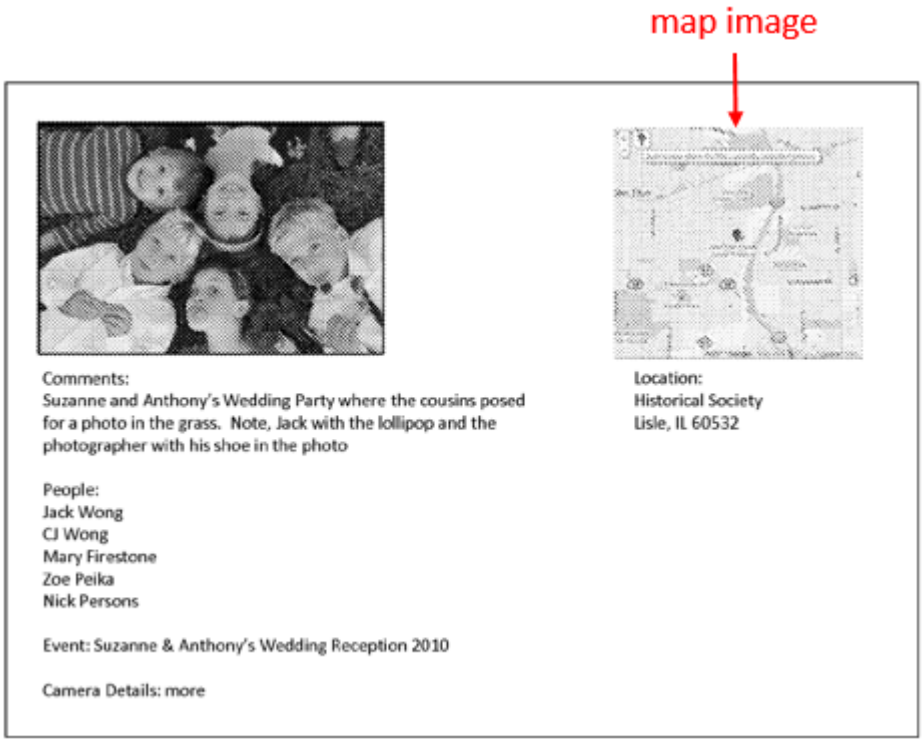
B. Claims 3-4: "responsive to a click or tap of a first one of the displayed scaled replicas in the [first/second] location view, displaying a first digital photograph associated with the first scaled replica in the [first/second] location view and a [first/second] map image"

124. Claim 3 of the '658 patent depends from claim 1 and recites "responsive to a click or tap of a first one of the displayed scaled replicas in the first location view, displaying a first digital photograph associated with the first scaled replica in the first location view and a first map image indicating the geographic coordinates of the first geotag."

125. Claim 4 depends from claim 3 and recites "responsive to a click or tap of a first one of the displayed scaled replicas in the second location view, displaying a first digital photograph associated with the first scaled replica in the second location view and a second map image indicating the geographic coordinates of the second geotag."

126. In my opinion, a POSITA would understand based on the words of the claim that there is a cause-effect relationship between a click or tap of a first one of the displayed scaled replicas in the [first/second] location view and displaying a first digital photograph and a [first/second] map image. The phrase "responsive to" requires a causal connection between clicking or tapping a first one of the displayed scaled replicas in the [first/second] location view and displaying the [first/second] map image.

127. This understanding of the phrase "responsive to" is confirmed by the specification, which discloses that from "any view" (e.g., a first/second person view), a click or tap of an image will "show an enlarged version of the digital media file with all the tags that are assigned to that digital file, as illustrated in FIG. 2." Ex. 1001, 2:64-65, 5:64-6:1. In this example, there is a direct causal connection between selecting an image in a prior view and causing the digital photograph and map image to be displayed. The specification does not disclose any additional inputs or views between selecting an image from any view and causing the digital photograph and map image to be displayed.



Ex. 1001, FIG. 2 (annotated)

128. I have reviewed certain dictionary definitions of the word "responsive" that further confirm that the phrase "responsive to" requires a cause-effect relationship. The Cambridge English Dictionary defines "responsive" as "saying or doing something as a reaction to something or someone, especially in a quick or positive way." Ex. 2025. The Webster's Third New International Dictionary (Unabridged) defines the word "responsive" as "giving or serving as an answer: constituting a response or made in response to something." Ex. 2026. This dictionary also provides an example where the word "responsive" is used in the following context: "prairie fires sprang up [responsive] to the drought." *Id*. Here, the phrase "responsive to" refers to a cause-effect relationship: the drought is the cause and the prairie fires are the effect.

C. Claim 5: "responsive to a click or tap of the people selectable element, displaying a people view … the people view including: . . . a name associated with the first person … [and] a name associated with the second person"

129. Claim 5 of the '658 patent depends from claim 1 and recites "wherein the plurality of selectable elements further includes a people selectable element, the method further comprising responsive to a click or tap of the people selectable element, displaying a people view." The people view includes "(i) a first person selectable thumbnail image," "(ii) a name associated with the first person," "(iii) a second person selectable thumbnail image," and "(iv) a name associated with the second person."

130. In my opinion, a POSITA would have understood that claim 5 requires that the "people view" be displayed responsive to a click or tap of the people selectable element and must include both a "name associated with the first person" and a "name associated with the second person."

131. Claim 5 requires that the "people view" includes the "name associated with the first person" and the "name associated with the second person." Claim 5 does not recite that the "people view" includes the "name associated with the first person" or the "name associated with the second person." A view that does not include both the "name associated with the first person" and the "name associated with the second person" (e.g., only the name associated with the first person and not the name associated with the second person, or vice versa) is not the claimed "people view."

132. Claim 5 specifies that the name associated with the first person is "displayed adjacent to" the first person selectable thumbnail image and that the name associated with the second person is "displayed adjacent to" the second person selectable thumbnail image. A name cannot be displayed "adjacent to" a thumbnail unless the thumbnail is also displayed. Thus, the words of the claim expressly require the simultaneous display of the name and the thumbnail. Nothing in claim 5 suggests that only one name/thumbnail pair needs to be displayed in the view at a

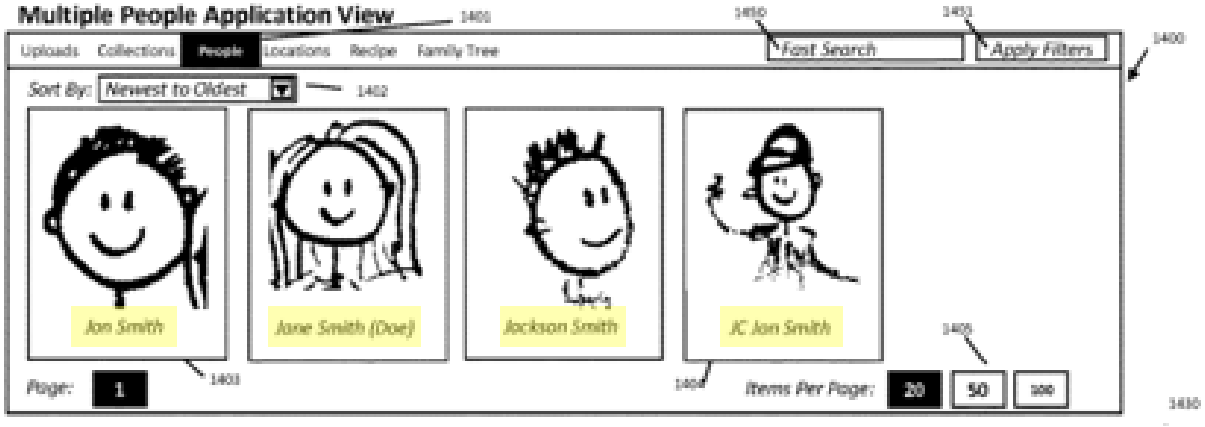
given time. To the contrary, claim 5 expressly requires two names and two selectable thumbnail images.

133. Examples of the claimed "people view" in the '658 patent specification confirm this understanding of the words of the claim. For example, the example "people view" shown in FIG. 6 includes a name displayed adjacent to each thumbnail image.

Ex. 1001, FIG. 6 (annotated)

134. As another example, the specification states that "selecting 'People' (1401)" causes the people view shown in FIG. 32 to be displayed. Ex. 1001, 22:43-48. As shown below, a name of each person is displayed adjacent to a thumbnail image (e.g., Jon Smith, Jane Smith (Doe), Jackson Smith, and JC Jon Smith). The

specification does not disclose that any further user interaction is required to display the names or that only certain names are displayed.



Ex. 1001, FIG. 32 (excerpted and annotated)

135. Nothing in the '658 patent's specification contemplates requiring a user input beyond a click or tap of the people selectable element to cause the display of the "people view," including multiple names. The specification does not disclose an example of a people view displaying multiple thumbnails without names displayed adjacent to each thumbnail. The dictionary definitions I discussed above also support this understanding of the claim language.

136. I understand that the '658 patent and U.S. Patent No. 10,621,228 ("the '228 patent") are related patents. I understand Samsung has also petitioned for *inter partes* review of the '228 patent, and I have authored a declaration offering certain opinions regarding the '228 patent. Claim 1 of the '228 patent recites, among other things, "responsive to a second input that is subsequent to the first input, causing a

people view to be displayed on the interface, the people view including," among other things, "a first name associated with the first person" and "a second name associated with the second person." The "people view" in claim 1 of the '228 patent is very similar to the "people view" in claim 5 of the '658 patent.

137. I understand that in the Institution Decision for the '228 patent, the Board questioned whether claim 1 requires "simultaneous" inclusion of the first and second names. In my view, a POSITA would have understood that the term "including" requires that all elements of the people view must be present, including both thumbnail images and both names.

138. Some software applications use fields or forms where certain text could be present or optionally left blank. Had Patent Owner chose to claim such an embodiment, Patent Owner could have drafted the claims broad enough to cover name fields that could be populated or left blank. However, that is not what claim 5 says. Claim 5 states that the "people view" includes both the name associated with the first person and the name associated with the second person.

139. I understand the Institution Decision for the '228 patent also stated that the second name may be displayed "at some unspecified time" after the first name. I disagree. In my opinion, a POSITA would not have understood that claim 5 refers to including only parts of the claimed people view at different times. Instead, claim

5 states "causing a people view to be displayed." A POSITA would have understood that all parts of the people view would be included in the same view.

140. I understand that claims in a related patent may be relevant to claim construction. Claim 1 of the '228 patent recites "responsive to a second input that is subsequent to the first input, causing a people view to be displayed on the interface." This language requires that (1) the second input is "subsequent to" the first input and (2) causing the people view to be displayed is "responsive to" the second input. A POSITA would recognize there is a difference between "responsive to" and "subsequent to." The claim does not recite that the "people view" (including the names) is displayed "subsequent to" the second input – the "people view" is displayed "responsive to" the second input. The differing usage of the phrase "subsequent to" and "responsive to" would signal to a POSITA that "responsive to" means more than simply displaying certain information subsequent to a click or tap. Instead, "responsive to" requires a causal connection between a click or tap of the people selectable element and displaying the first and second names.

141. Additionally, I disagree with the Board's statement that the second name may be displayed "at some unspecified time" after the first name in the claim because it conflicts with a purpose of the invention. The '658 patent recognized a need for "a medium that allows people to organize, view, navigate, search, preserve and share . . . [digital] files with all the memory details captured, connected and

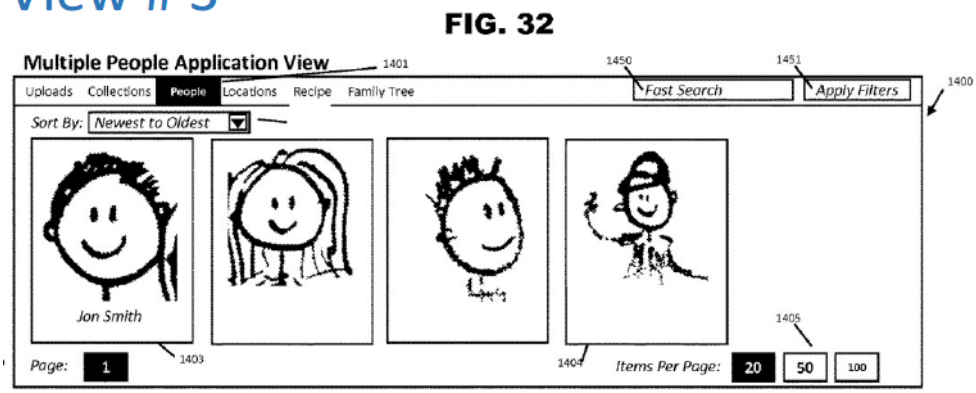
vivified via an interactive interface." Ex. 1001, 13:12-16. The claimed invention "provides the much needed platform that saves a user significant time, provides significant information with minimal screen space, and provides an appealing and customizable interface that will enhance the user experience." *Id*., 13:19-23. Displaying the first name and then the second name at some unspecified time in the future (e.g., 1 minute later, 1 hour later, 1 year later, etc.) is contrary to the purposes of saving a user significant time and providing significant information to the user.

142. Displaying the first name and the second name in the same "people view" allows the user to clearly associate each thumbnail image with a particular person. While the person selectable thumbnail images include a face of the corresponding person, the user may not recognize the face or know the person. Thus, providing the first name and second name adjacent to the first and second person selectable thumbnail images, respectively, conveys significant information and saves the user time. A construction where the "name associated with the second person" can be displayed at some unspecified time after displaying the "name associated with the first person" and never needs to be displayed at the same time as the "name associated with the first person" conflicts with the stated purposes of the invention.

143. I understand that Dr. Greenspun testified at his deposition that claim 5 requires that both names and thumbnail have "to be available within" the people

view, but not necessarily displayed together. Ex. 2024, 96:12-20. I understand Dr. Greenspun testified that the example below could be the claimed "people view" if second name could be displayed after a mouse-over operation. Ex. 2024, 104:6-16, 105:4-106:5.

View # 3



Ex. 2020

144. I disagree. In the example above, there is only a name associated with the first person (Jon Smith) displayed adjacent to a thumbnail. Claim 5 requires that the people view includes a second name associated with the second person displayed adjacent to a thumbnail. The '658 patent does not describe the "mouse-over operation" referenced by Dr. Greenspun. Moreover, the mouse-over would only allow one name to be shown at a time, whereas claim 5 requires two names adjacent to respective thumbnails.

D. Claims 7-12: "responsive to a click or tap of the [first/second] person selectable thumbnail image, displaying a [first/second] person view"

145. Claim 7 depends from claim 5 and recites "responsive to a click or tap of the first person selectable thumbnail image, displaying a first person view, the displaying the first person view including displaying (i) the name associated with the first person and (ii) a scaled replica of each of the digital photographs and videos in the third set of digital photographs." Claim 8 depends from claim 7 and recites "the displaying the first person view further includes displaying a first-person-location selectable element."

146. Claim 10 depends from claim 7 and recites "responsive to a click or tap of the second person selectable thumbnail image, displaying a second person view, the displaying the second person view including displaying (i) the name associated with the second person and (ii) a scaled replica of each of the digital photographs and videos in the fourth set of digital photographs." Claim 11 depends from claim 10 and recites "the displaying the second person view further includes displaying a second-person-location selectable element."

147. In my opinion, a POSITA would understand based on the words of the claim that there is a cause-effect relationship between (1) a click or tap of the [first/second] person selectable thumbnail image in the people view and (2) displaying a [first/second] person view. The phrase "responsive to" requires a causal

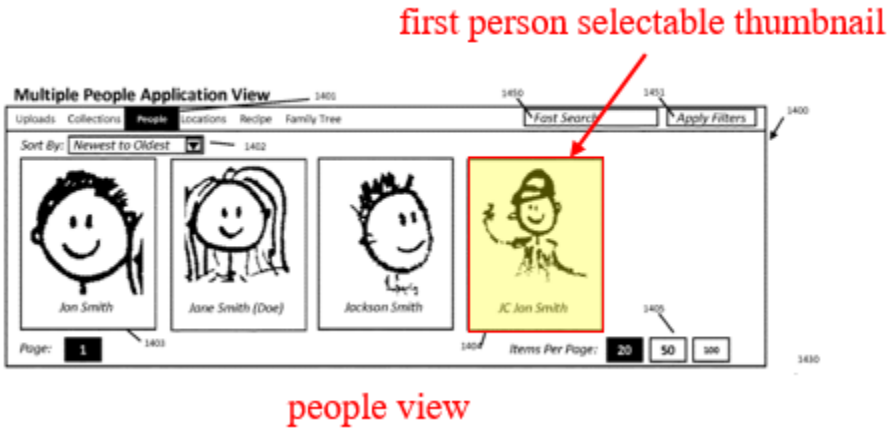
connection between clicking or tapping the [first/second] person selectable thumbnail image in the people view and displaying the [first/second] person view.

148. This conclusion is reinforced by the surrounding claim language. The first person selectable thumbnail image in the people view is associated with a first person and the second person selectable thumbnail image in the people view is associated with a second person. This association is made clear through displaying the name of the [first/second] person adjacent to the [first/second] person selectable thumbnail image. The first person view is associated with the first person and the second person view is associated with the second person. All of this taken together confirms that selecting the first person selectable thumbnail image causes the first person view for the first person to be displayed. Likewise, selecting the second person selectable thumbnail image causes the second person view for the second person to be displayed. Selecting a person selectable thumbnail image in the people view directly causes the corresponding person view to be displayed.

149. A POSITA would recognize that a system in which selecting a person selectable thumbnail image in the people view does not cause the corresponding person view to be displayed would be illogical and confusing to the user of the system.

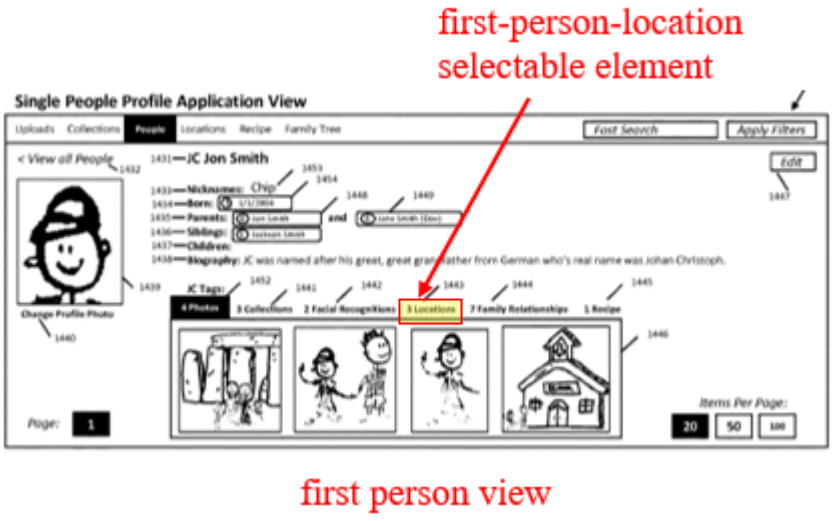
150. This understanding of the claim language is confirmed by the specification. For example, FIG. 32 illustrates an exemplary "people view"

including a first person selectable thumbnail image associated with JC Jon Smith. This is shown below.



Ex. 1001, FIG. 32 (excerpted and annotated)

151. Selecting the first person selectable thumbnail image labeled JC Jon Smith causes a person view to be displayed for JC Jon Smith. As shown, the person view includes, among other things, a first-person-location selectable element.



Ex. 1001, FIG. 32 (excerpted and annotated)

152. The specification does not disclose that there are any intervening views between a click or tap of a thumbnail in the people view and displaying a person view. The dictionaries I discussed above also support this understanding of the claim language.

153. Dependent claims 8 and 10 recite "wherein the displaying the [first/second] person view further includes displaying a [first/second]-person-location selectable element." A POSITA would understand that the "[first/second]-person-location selectable element" in the "[first/second] person view" is also displayed "responsive to" a click or tap of the [first/second] person selectable thumbnail image in the people view. In other words, the phrase "responsive to" requires a cause-effect relationship between clicking or tapping the [first/second] person selectable thumbnail image in the people view and displaying the [first/second]-person-location selectable element in the [first/second] person view.

154. Claim 7 and 10's requirement that the "[first/second] person view" be displayed directly in response to a click or tap of the [first/second] person selectable thumbnail image in the people view is consistent with the purposes of the invention. As discussed above, the claimed invention "provides the much needed platform that saves a user significant time, provides significant information with minimal screen space, and provides an appealing and customizable interface that will enhance the user experience." Ex. 1001, 13:19-23. For example, causing the first person view

to be displayed responsive to clicking or tapping the first person selectable thumbnail image conveys significant information and saves a user significant time because the user does not need to take any additional action to view the first person view. This also creates a clear association between the person selected in the people view and the resulting view. For example, when the user selects the JC Jon Smith thumbnail in FIG. 32, the next "view" they will see on the interface is the person view for JC Jon Smith.

E. Claim 13: "displaying an album view" including "a first album name" and "a second album name"

155. Claim 13 depends from claim 1 and recites that "the plurality of selectable elements further includes an album selectable element." Claim 13 also recites "responsive to a click or tap of the album selectable element, displaying an album view." The displaying the "album view" includes displaying: "(i) a first album selectable thumbnail image," "(ii) a first album name associated with the first album, the first album name being displayed adjacent to the first album selectable thumbnail image," "(iii) a second album selectable thumbnail image," and "(iv) a second album name associated with the second album, the second album name being displayed adjacent to the second album selectable thumbnail image."

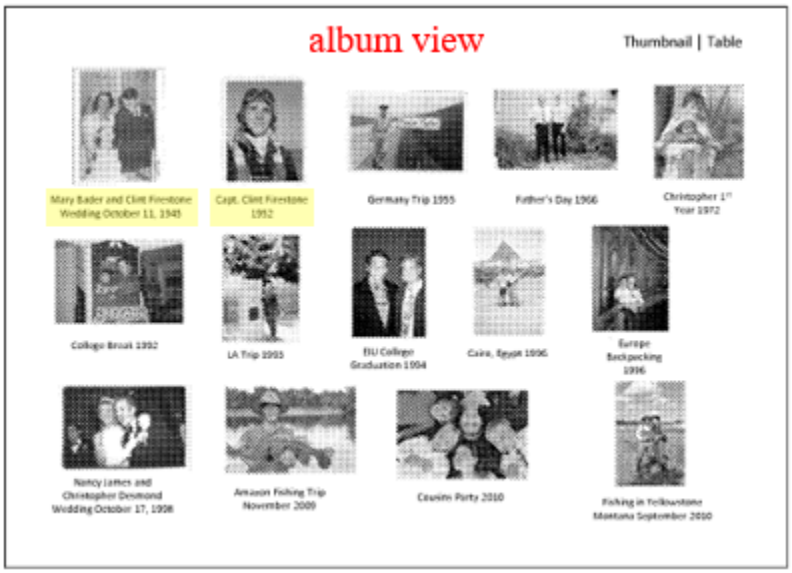
156. Similar to the discussion above for claim 5 and the "name associated with the first person" and the "name associated with the second person" in the "people view," the language of claim 13 requires that the "album view," including

the "first album name" and "second album name," is displayed "responsive to" a click or tap of the album selectable element. That is, the phrase "responsive to" in the claim requires a cause-effect relationship between (i) the click or tap of the album selectable element and (ii) displaying the first album name and the second album name. This understanding of the claim language is also supported by the dictionary definitions of "responsive" discussed above.

157. Additionally, a POSITA would understand that the claimed "album view" that is displayed includes both the "first album name" and the "second album name." A view that only includes one of these (e.g., only the "first album name" and not the "second album name") is not the claimed "album view." Claim 13 does not recite displaying an album including a first album name or a second album name. Additionally, claim 13 requires the first album name is "displayed adjacent to the first album selectable thumbnail image" and the second album name is "displayed adjacent to the second album selectable thumbnail image." As with the names in the people view, an album name cannot be displayed "adjacent to" a selectable thumbnail image unless both the thumbnail image and the album name are displayed, reinforcing that all elements of the album view are displayed at the same time.

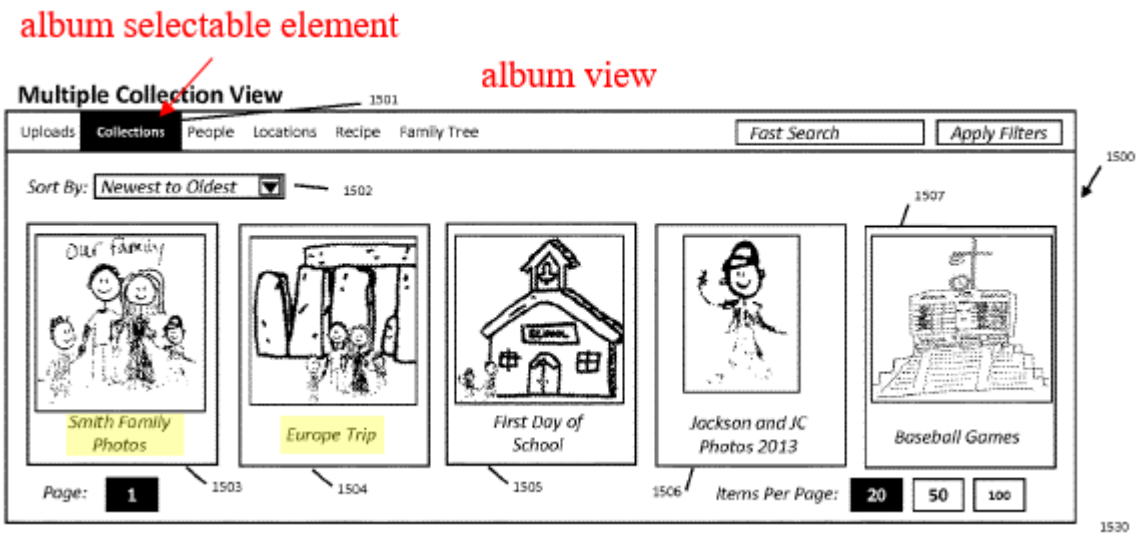
158. The claim language is consistent with the specification. FIG. 3 of the '658 patent is an example of the claimed "album view" including [first/second] album selectable thumbnail images and [first/second] album names (e.g., "Mary

Bader and Clint Firestone Wedding October 11, 1945" and "Capt. Clint Firestone 1952").



Ex. 1001, FIG. 3 (annotated)

159. As another example, FIG. 33 illustrates another example of the claimed "album view." This view is caused to be displayed by selecting the "Collections" tab 1501, which is an example of the claimed album selectable element. Ex. 1001, 23:38-40. As shown, this exemplary album view includes [first/second] album selectable thumbnail images and [first/second] album names (e.g., "Smith Family Photos" and "Europe Trip").



Ex. 1001, FIG. 33 (excerpted and annotated)

The specification does not disclose any additional inputs or views between selecting the album selectable element and displaying the album view. Nor does the specification disclose any example "album view" that only includes one album name.

160. Claim 13's requirement that the "album view" including the "first album name" and "second album name" be displayed directly in response to a click or tap of the album selectable element is consistent with the purposes of the invention. As discussed above, the claimed invention "provides the much needed platform that saves a user significant time, provides significant information with minimal screen space, and provides an appealing and customizable interface that will enhance the user experience." Ex. 1001, 13:19-23. For example, causing the album view—including the first album name and second album name—to be

displayed responsive to clicking or tapping the album selectable element conveys significant information and saves a user significant time because the user does not need to take any additional action to view the first person view.

161. Displaying the "first name" and the "second name" in the same "album view" allows the user to clearly associate each album selectable thumbnail image with a corresponding album. The user may not readily understand what albums are available based solely on the thumbnail images. For example, a user might have two albums with photos and/or videos from Christmas from two different years. In that case, there might be two different album selectable thumbnail images each including a picture of a Christmas tree, leaving the user to guess which thumbnail image corresponds to what album. Displaying the first album name and second album name (e.g., Christmas 2010 and Christmas 2015) clearly conveys significant information (i.e., which album is which) and saves the user time (e.g., having to click through each thumbnail to determine what album the thumbnails correspond to). As another example, unlike the Christmas tree example, the thumbnails themselves may not give the user a hint as to the content of the corresponding album. In that case, displaying the album name adjacent to each album selectable thumbnail image provides significant information and saves the user time. A contrary construction where, for example, the "second album name" need not be displayed with the "first

album name" in the "album view" would be inconsistent with the purposes of the invention.

162. I understand Dr. Greenspun testified during his deposition that the elements of the "album view" merely need to be "displayable" and then "displayed eventually," but that "it's an open question as to whether the claim requires that they all be displayed immediately and simultaneously." Ex. 2024, 183:20-185:17. I disagree. As I explain above, the claim language requires that displaying the album view includes displaying four things. An element that is theoretically "displayable," but not actually displayed in the "people view," does not satisfy the plain claim language. Dr. Greenspun's assertion that the claim is met so long as everything required for the album view is "displayed eventually" conflicts with claim 13's requirement that the album view is displayed "responsive to" a click or tap of the album selectable element and also conflicts with a purpose of the invention.

F. Claims 14-15: "responsive to a click or tap of the [first/second] album selectable thumbnail image, displaying a [first/second] album view"

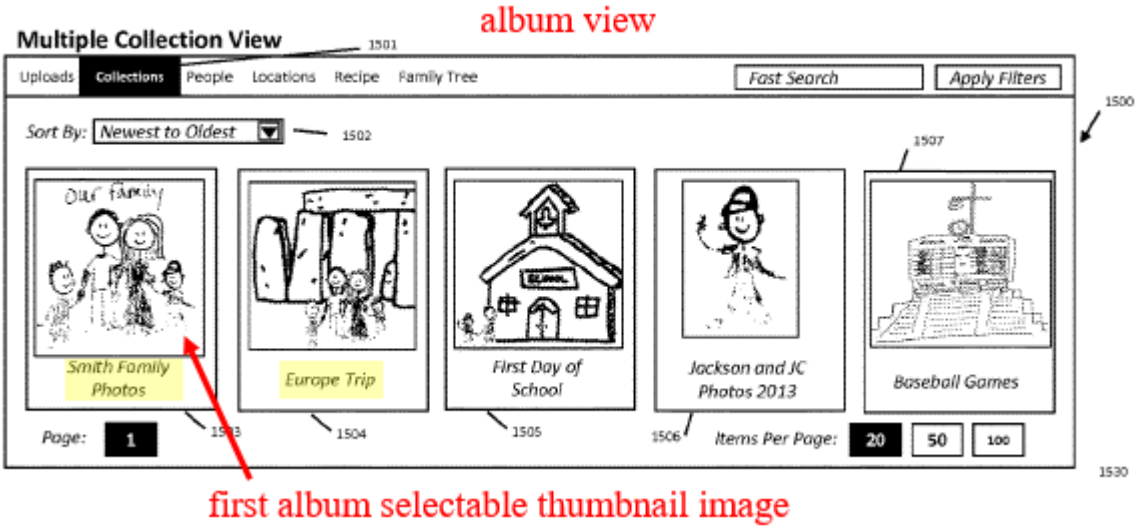
163. Claims 14 and 15 recite: "responsive to a click or tap of the [first/second] album selectable thumbnail image, displaying a [first/second] album view, the displaying the [first/second] album view including displaying (i) the [first/second] album name associated with the [first/second] album and (ii) a scaled

replica of each of the digital photographs and videos in the [third/fourth] set of digital photographs and videos."

164. Similar to the discussion above, the plain meaning of the phrase "responsive to" in these claims requires a cause-effect relationship between a click or tap of the [first/second] album selectable thumbnail image and displaying a [first/second] album view.

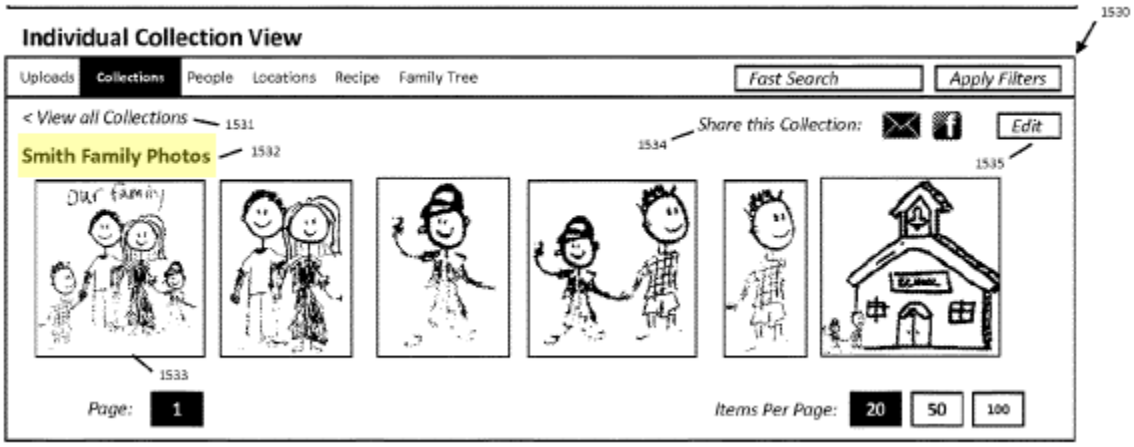
165. A POSITA would recognize that a system in which selecting an album selectable thumbnail image in the album view does not cause the corresponding album view to be displayed would be illogical and confusing to the user. This understanding of the claim language is also supported by the dictionary definitions I discussed above.

166. This understanding of the claim language is confirmed by the specification. For example, FIG. 33 illustrates an exemplary album view including a first album selectable thumbnail image associated with the Smith Family Photos album.



Ex. 1001, FIG. 33 (excerpted and annotated)

167. Selecting the first album selectable thumbnail image labeled Smith Family Photos causes an album view to be displayed for Smith Family Photos.



Ex. 1001, FIG. 33 (excerpted and annotated)

168. The specification does not disclose that there are any intervening views between a click or tap of a thumbnail in the album view and displaying an individual album view.

X. NON-OBVIOUSNESS OPINIONS

169. I understand Petitioner and Dr. Greenspun assert that (1) claims 1-15 of the '658 patent are rendered obvious by Okamura in view of Belitz, (2) claims 3-4 are obvious over Okamura and Belitz in further view of Rasmussen, (3) claims 6-12 are obvious over Okamura and Belitz in further view of Gossweiler, (4) claims 8-9 and 11-12 are obvious over Okamura and Belitz in further view of Yee, and (5) claims 8-9 and 11-12 are obvious over Okamura and Belitz in further view of Gossweiler and Yee. For the reasons set forth below, I disagree.

A. Claim 1

170. Claim 1 recites "displaying a map view on a video display device, the displaying the map view including displaying: (i) a representation of an interactive map; (ii) a first location selectable thumbnail image at a first location on the interactive map . . . (iii) a first count value image partially overlapping the first location selectable thumbnail image . . . (iv) a second location selectable thumbnail image at a second location on the interactive map . . . and (v) a second count value image partially overlapping the second location selectable thumbnail image."

171. Petitioner does not argue that Okamura's map view screen 780 (the alleged interactive map) includes first and second thumbnail images and first and second count value images "on the interactive map" as required in claim 1 of the '658 patent. *See* Petition, 55-56. Instead, Petitioner relies on combining Okamura

and Belitz. Petitioner and Dr. Greenspun identify multiple proposed combinations of Okamura and Belitz. I address these proposed combinations below.

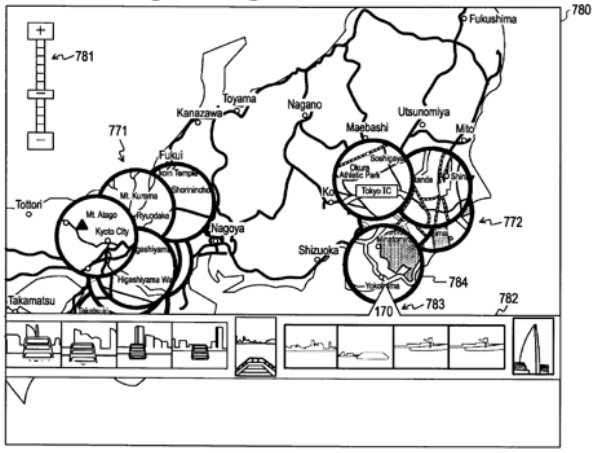
1. Petitioner's First Proposed Combination of Okamura-Belitz

172. For its first proposed combination, Petitioner and Dr. Greenspun allege that it would have been obvious to replace the cluster maps in Okamura's FIG. 41 with the graphical objects 410a-410d used in Belitz. Petition, 22-23; Ex. 1003, ¶¶ 85-86. This modification is shown below.

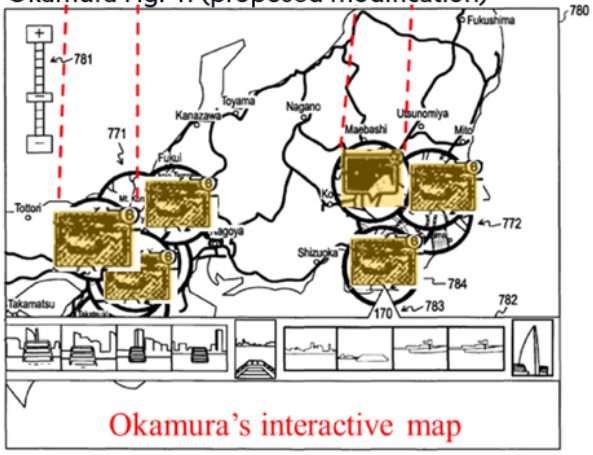
Petition, 23, 47; Ex. 1003, ¶ 86

173. A comparison of Okamura Fig. 41 to Petitioner's representation of its proposed modification (copied directly from the Petition) is shown below:

Okamura Fig. 41 (original)



Okamura Fig. 41 (proposed modification)



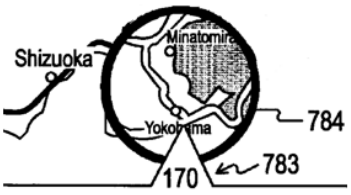
Ex. 1005, Fig. 41 (original); Petition, 23, 47 (thumbnails and highlighting supplied by Petitioner); Ex. 1003, ¶ 86.

174. As shown in Petitioner's representation of modified Okamura Fig. 41 above, Petitioner proposes to replace the cluster maps themselves (e.g. "cluster map 784") rather than any so called "location based clusters." Petition, 22-23. While the terms "cluster maps" and "clusters" carry different meanings in Okamura's disclosure, Petitioner and Dr. Greenspun use these terms synonymously in discussing its first combination.

175. Okamura states that the term "cluster map" refers to a user interface element appearing in a view (e.g. Fig. 41), while the term "cluster" refers to the underlying "pieces of data" chosen to be "grouped together." Ex. 1005, ¶¶ [0139], [0331] ("a cluster map is a map related to a location where contents belonging to the corresponding cluster are generated").

176. For example, the Petition states that "Okamura displays selectable cluster maps (e.g., cluster map 784) on the interactive map (e.g., map view screen 780)." Petition, 43. The item Petitioner refers to, "cluster map 784," is a selectable user interface element:

Okamura Fig. 41 (partial)



Ex. 1005, Fig. 41 (excerpted).

177. Dr. Greenspun confirmed that Petitioner contemplated replacing the cluster maps in Okamura with the thumbnail images and counts from Belitz. Ex. 2024, 47:5-48:6; *see also* Ex. 2022, 70:21-73:6 (referring to "replacing … the cluster map 784 user interface element, rather than the concept of a cluster").

a. A POSITA Would Not Have Been Motivated To Replace Okamura's Cluster Maps With Images That Are Not Maps

178. I disagree that Okamura suggests or provides any motivation to replace its cluster maps with image elements that are not maps because doing so would entirely defeat Okamura's stated purpose of using cluster maps.

179. Okamura states that "**a cluster map is a map**." Ex. 1005, ¶ [0331] (emphasis added). Okamura also states that its system should generate a cluster maps that **"can be used as … map[s]":**

> [O]n the basis of positional information associated with each of contents belonging to a cluster, an area corresponding to the cluster can be identified, and a **map** covering this identified area **can be used as a map (cluster map) corresponding to the cluster**.

Ex. 1005, ¶ [0213] (emphases added).

180. Okamura notes that the scale of its cluster maps can be adjusted to accurately capture "buildings, roads, and the like" and teaches to make "cluster maps … somewhat large" to avoid "making it difficult to grasp the details." Ex. 1005, ¶¶ [0241]; [0325].

181. Okamura's Fig. 41 (corresponding to Okamura's second embodiment) places cluster maps on a "background map" to allow users to "grasp the geographical relationship between individual cluster maps." Ex. 1005, ¶¶ [0312], [0331].

182. In the second embodiment, both the background map, and individual cluster maps themselves are generated to be used as maps. Okamura provides dozens of paragraphs and numerous figures dedicated to selecting cluster map contents, choosing zoom settings and ensuring cluster map "contents … can be … easily grasped." *See e.g.* Ex. 1005, Figs. 6a-9, 14, 44a, 44b, ¶¶ [0019], [0138]-[0157], [0215]-[0223], [0231], [0325], [0407]-[0411].

183. But the comparison below shows that Petitioner's first proposed combination would eliminate all of these objectives by replacing cluster maps with images that are not maps. The visual below compares (i) a cluster map from Okamura Fig. 41; (ii) thumbnail image from Belitz Fig. 4b, and (iii) a representation

of the first combination prepared by Petitioner's (understanding the cluster map circle below would be eliminated):

Ex. 1005, Fig. 41 (partial); Ex. 1006, Fig. 4b (partial); Petition, 23, 47 (excerpted); Ex. 2022, 80:9-81:19.

184. In the example above, the cluster map from Fig. 41 identifies geographical items by name, including "Okura Athletic Park" and "Tokyo IC" and shows the relative geographic positioning between them. *See* Ex. 1005, Fig. 41.

185. Okamura's second embodiment also places each cluster map on a background map so a user can "grasp the geographical relationship between individual cluster maps" and "show the relationship between a background map and a cluster map." Ex. 1005, Fig. 41, ¶¶ [0312], [0331], [0334].

186. The example below illustrates how a user can easily determine that "Okura Athletic Park" and "Tokyo IC" (shown in a zoomed-in cluster map) are positioned between Maebashi to the north (shown in the background map) and Yokohama to the south (shown in another cluster map).

Ex. 1005, Fig. 41 (excerpted), ¶¶ [0312], [0331], [0334].

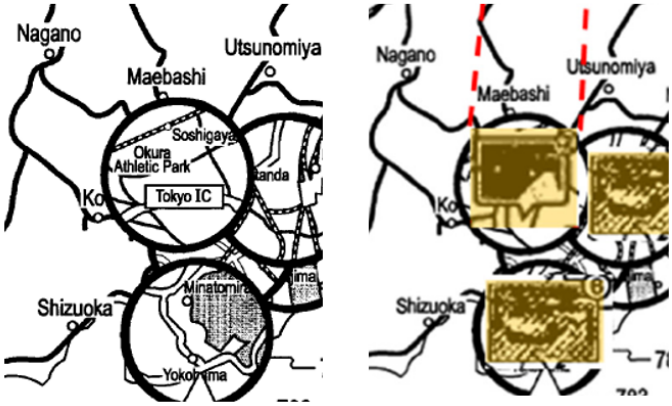
187. But, unlike the cluster maps in Okamura, none of Belitz's thumbnails 410a-410d convey geographical information to enable it to be used as a map. Instead, Belitz's thumbnail merely shows a "minimization of a photograph." Ex. 1006, ¶ [0011]. Nowhere does Belitz state that its thumbnail provides information beyond that.

188. Replacing the cluster maps in FIG. 41 of Okamura with Belitz's thumbnails 410a-410d entirely eliminates all cluster map information and the cluster map's utility as a geographic map.

189. As shown in the comparison below (comparing a portion of Fig. 41 to a portion of Petitioner's illustration of the first combination), a user would not be able to easily identify "Okura Athletic Park" and "Tokyo IC" and their geographic positioning relative to each other and to other items (e.g. Yokohama) that would

have been shown in a neighboring cluster map. This is contrary to the entire purpose of Okamura's use of cluster maps.

Okamura Fig. 41 (partial) First Combination



Ex. 1005, Fig. 41 (partial); Petition, 23, 47 (partial).

190. I understand Dr. Greenspun testified during his deposition that he is "kind of an icon hater" that strongly prefers using words instead of icons in a user interface. Ex. 2024, 24:12-25:10, 66:4-10. As discussed above, the Okamura cluster maps contain text that tells the user of the interface what location that cluster map corresponds to (e.g., Tokyo IC). If a POSITA preferred words over icons to convey information, they would not have entirely removed the cluster maps with textual information with Belitz's thumbnail images, none of which having any descriptive text.

191. For these reasons I disagree that a POSITA would have been motivated to **replace** Okamura's **cluster maps with thumbnail images that are not maps.**

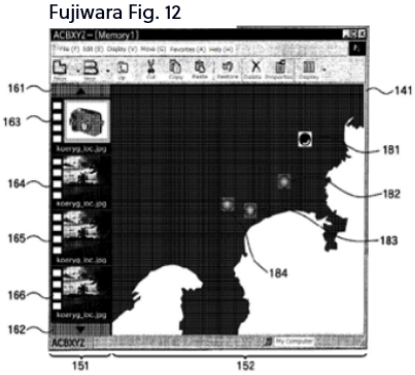
b. Petitioner's First Combination is Analogous to "Related Art" Discredited by Okamura

192. Further, it is my opinion that a POSITA reviewing Okamura would be discouraged from turning to Belitz and the first combination because the first combination carries the same noted disadvantages as the "related art" references (Fujiwara and Takakura) associated with presenting a single map using the same scale everywhere on the map. Ex. 1005, ¶¶ [0004]-[0010] (citing Ex. 2002, Ex. 2019).

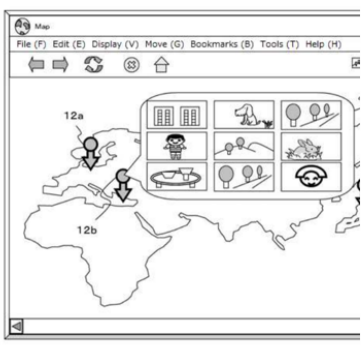
193. Because Petitioner's first combination eliminates cluster maps, the first combination presents the user with only a single map, namely the background map. A user can change the scale of the background map with Okamura's scale-changing bar 781. However, whether the user selects a small scale or large scale, the user sees only a single background map having a single / uniform scale everywhere on that map at any given time. Ex. 1005, ¶ [0355].

194. According to Okamura, the same applies to the "related art," such as Fujiwara and Takakura:

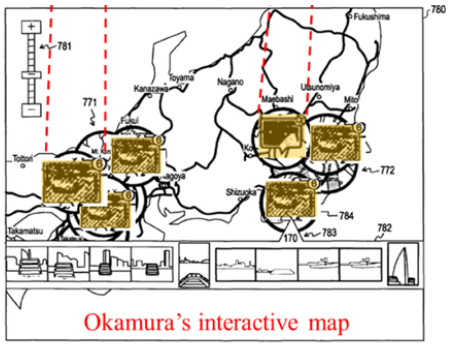
Fujiwara Fig. 12



Takakura Fig. 1 (partial)



Okamura Fig. 41 (proposed modification)



Ex. 2002, Fig. 12; Ex. 2019, Fig. 1; Petition, 23, 47. Whether the scale is "sufficiently large to show the countries of the world" or "sufficiently small to show regions in the vicinity of Tokyo," the user is limited to a single map having a single / uniform scale everywhere on that map. Ex. 1005, ¶¶ [0009]-[0010].

195. Okamura explains the disadvantages associated with this scenario. Ex. 1005, ¶¶ [0004]-[0010] (citing Ex. 2002, Ex. 2019).

196. According to Okamura, when it is necessary to display the map at a scale sufficiently large to show the countries of the world:

> [M]arks indicating the generated positions of the images taken in Tokyo and its vicinity … **are displayed at substantially the same position on the map, which may make it difficult to grasp the geographical correspondence** between the images taken in Tokyo and its vicinity.

Ex. 1005, ¶ [0009] (emphasis added).

197. Okamura adds that when the map is displayed at a scale "sufficiently small to show regions in the vicinity of Tokyo":

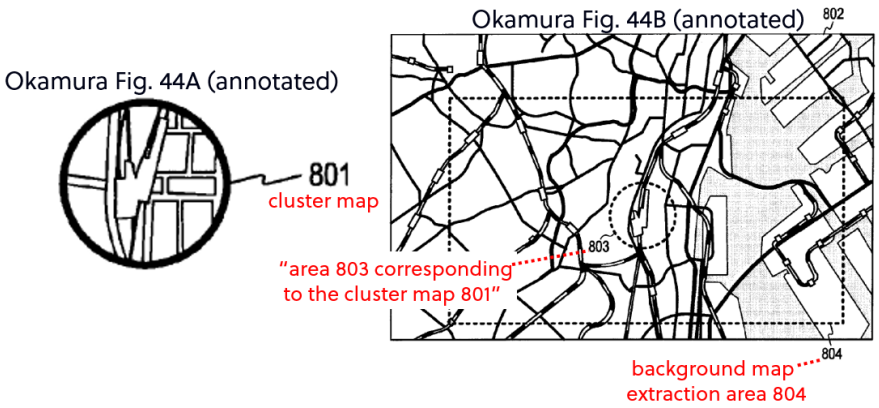
> it is not possible to display the generated positions of images taken in other regions (for example, the United States or United Kingdom) on the map, **making it difficult to grasp the generated positions of individual images**.

Ex. 1005, ¶ [0010] (emphasis added).

198. Okamura solves this problem by "changing the scale" of individual cluster maps such that multiple cluster maps are displayed in a single view with differing scales to ensure the contents "belonging to each cluster can be … easily

grasped by the user." Ex. 1005, Fig. 14, ¶¶ [0215]-[0219], [0410] ("the scale of each cluster map varies … from cluster to cluster").

199. Further, the scale of a cluster map may vary relative to the scale of the background map:



Ex. 1005, Figs. 44A-44B, ¶¶ [0407]-[0411]

200. As shown above, the cluster map 801 of Fig. 44A (corresponding to area 803 of background map area 804) shows more detail by using a different scale than that that of the background map. The same can be seen in Fig. 41. Incorporating Belitz's static thumbnails on a single generic map (with a uniform scale) diverges from this purpose.

201. Okamura paragraphs 0019, 0093, 0215, and 0219 pertain to the creation of cluster maps from which "contents … can be … easily grasped." *See e.g.* Ex. 1005, ¶ [0215] (describing how maps are used in the creation of each individual cluster map, including how the "scale … is changed in accordance with the size of a circle corresponding to each cluster").

202. Okamura stresses the necessity of having the cluster maps be "somewhat large for the user to recognize these cluster maps" and discredits making the cluster maps smaller because this makes them "hard to see, making it difficult to grasp the details of the cluster maps." Ex. 1005, ¶ [0325].

203. Okamura describes setting a lower limit for the cluster map size so that it is clear what region the cluster map corresponds to. Ex. 1005, ¶ [0223] ("when a map is displayed as a thumbnail image … it is hard to easily grasp what region the map is showing").

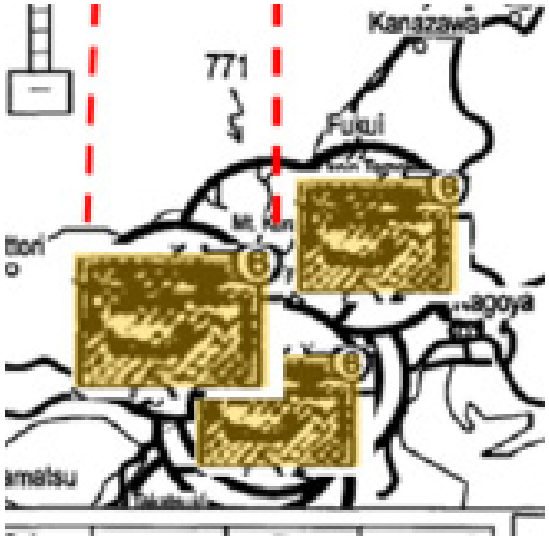
204. Okamura also teaches that its second embodiment is directed to optimal placement of individual cluster maps on a map which makes it possible to avoid overlapping of cluster maps in regions where the cluster maps are densely concentrated, without changing the size of the cluster maps. Ex. 1005, ¶ [0326].

205. Okamura explains that "if the cluster maps are spaced too far apart, it may become no longer possible to recognize where on the background map the cluster maps correspond to in the first place." Ex. 1005, ¶ [0331].

206. These teachings would have indicated to a POSITA a strong preference for using cluster maps rather than presenting a view where the user is limited to a single map having the same scale at any given time.

c. Petitioner's First Combination Also Conflicts with Belitz's Objectives

207. The first combination also conflicts with Belitz's stated objectives. In the first combination, at least one of the images highlighted in yellow overlaps one of the other images highlighted in yellow, as shown below.



Petition, 23, 47 (excerpted)

208. As discussed above, Belitz explicitly states that that the graphical objects should not overlap one another or even be close to one another to avoid cluttering the view and confusing the user. Ex. 1006, ¶¶ [0054]-[0058]. Petitioner's proposed combination, however, does the opposite and overlaps graphical objects, obscuring a portion of at least one of them. Belitz expressly discourages a POSITA from making Petitioner's proposed combination because it "would clutter the view and be confusing to a user." Ex. 1006, ¶ [0054]. Belitz's teaching that the graphical objects should be sufficiently spaced apart would be understood by a POSITA as a

requirement, not merely a general preference. *Id*., ¶¶ [0054]-[0058]. Thus, Belitz would discourage a POSITA from combining Okamura and Belitz in the manner that Petitioner proposes.

d. Petitioner's Alleged "Motivations" Behind its First Combination

i. Belitz's Thumbnails Reduce the Ability to Provide a View of "What Location Is Associated With What"

209. Petitioner and Dr. Greenspun argue that Okamura's First Combination would have been obvious because the "combination enhances a user's experience of 'discern[ing] between the various objects' by providing 'a good view of what location is associated with what.'" Petition, 24 (quoting Ex. 1006, ¶ 2). I disagree with Petitioner's assertion that a POSITA would be motivated to modify Okamura with Belitz to provide "a good view of what location is associated with what." Petition, 24.

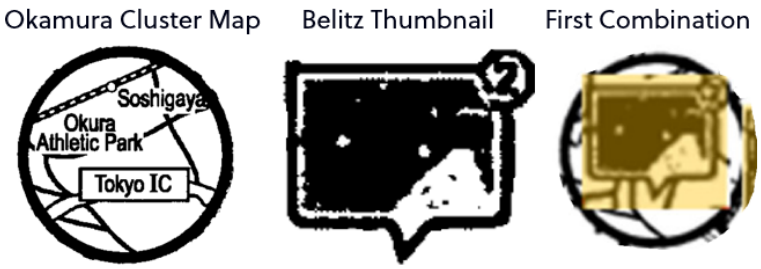
210. For the map view screen 780 in FIG. 41 in Okamura's second embodiment, Okamura states that when the cluster map 784 is selected, the content listing area 782 is displayed, which shows which content is associated with that location. Ex. 1005, ¶ [0356], FIG. 41. Thus, Okamura already provides "a good view of what location is associated with what," so a POSITA would not see a need to modify Okamura to do so.

211. I also disagree with Petitioner's assertion that modifying Okamura with Belitz "enhances a user's experience of 'discern[ing] between the various objects.'"

Petition, 24 (quoting Ex. 1006, ¶ [0002]). Petitioner does not explain how the combination would enhance a user's experience of discerning between the various objects. Replacing the cluster maps in FIG. 41 of Okamura with the graphical objects from Belitz would not enhance a user's experience in discerning between various objects on the underlying map in FIG. 41. As discussed above, Belitz teaches that it is necessary to avoid overlapping graphical objects to prevent cluttering and confusing the user. Ex. 1006, ¶¶ [0054]-[0057]. A POSITA would not seek to modify Okamura with Belitz to "enhance[] a user's experience of 'discern[ing] between the various objects'" because Belitz specifically teaches that the overlapping in Petitioner's combination does not enhance a user's experience in discerning between various objects on a map. Petition, 24 (quoting Ex. 1006, ¶ [0002]).

212. Petitioner and Dr. Greenspun also state that both references seek to improve the user experience, such that "'each of contents belonging to each cluster can be also easily grasped by the user.'" Petition 24 (quoting Ex. 1005, ¶ [0215]).

213. However, as discussed above, compared to thumbnail images, the cluster maps themselves convey far more information regarding what is associated with a particular location.



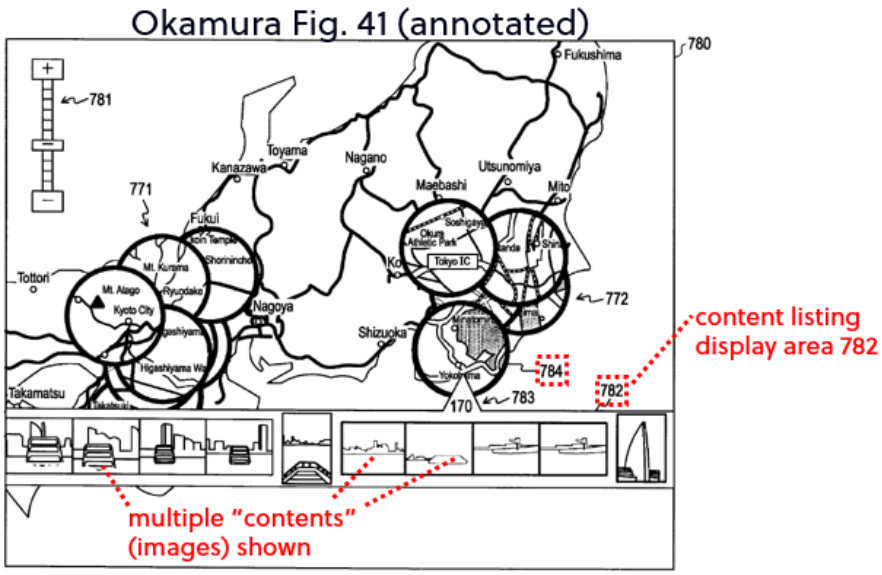
Ex. 1005, Fig. 41 (partial); Ex. 1006, Fig. 4b (partial); Petition, 23, 47 (excerpted).

214. Okamura's cluster maps are generated to ensure "contents belonging to each cluster can also be easily grasped by the user." Ex. 1005, ¶ [0215]. In the example shown above, the cluster map from Fig. 41 identifies items by name, including "Okura Athletic Park" and "Tokyo IC." *See* Ex. 1005, Fig. 41. Belitz's thumbnail images, however, merely show a single flat image, thereby reducing the ability to provide "'a good view of what location is associated with what.'" Petition, 24 (quoting Ex. 1006, ¶ [0002]).

215. Using a thumbnail would also conceal multiple city names, landmarks and other contents that would have otherwise been shown in the background map.

216. Also, if the "motivation" relates to displaying an image associated with a particular location to provide a "a good view of what location is associated with what," the embodiment of Okamura Fig. 41 already achieves that objective.

217. When the cluster map 784 is selected in FIG. 41 of Okamura, a "listing of contents [images] belonging to the selected cluster map is displayed in a content listing display area 782"



Ex. 1005, ¶ [0356], FIG. 41.

ii. Okamura Already Allows a User to "Preview Pictures"

218. Petitioner and Dr. Greenspun also assert that "[i]t would have been obvious to a POSITA to incorporate Belitz's thumbnail images . . . to provide added functionality that allows a user to preview pictures associated with a given location." Petition, 24-25; Ex. 1003, ¶ 88. I disagree with Petitioner and Dr. Greenspun's assertion that a POSITA would modify Okamura for this reason.

219. As noted above, Okamura already allows a user to preview pictures associated with a given location in the second embodiment (FIG. 41) via the content listing area 782, which connected by the area 783 to the cluster map 784, that is displayed when selecting the cluster map 784. Ex. 1005, ¶ [0356], FIG. 41.

220. In fact, Okamura provides a user a better preview of pictures associated with a given location because the content listing area 782 shows multiple pictures,

whereas the graphical objects 410a-410d in Belitz only show one picture prior to the popup window 413 being displayed. Ex. 1005, ¶ [0356], FIG. 41; Ex. 1006 at FIGs. 4b-4c, ¶ 60. I understand Dr. Greenspun testified that it is preferable to reduce the number of clicks required for a user to get the information sought. Ex. 2024, 16:22-19:18. If Dr. Greenspun is correct about this, a POSITA would recognize that Okamura allows one to preview pictures associated with a given location just by placing the cursor over a cluster map, i.e., with no clicks. And, when the popup window 413 is displayed to show multiple pictures, the popup window 413 covers more of the underlying map 409 in Fig. 4c of Belitz than the content listing area 782 covers the underlying map in Okamura. Compare Ex. 1005, FIG. 41 and Ex. 1006, Fig. 4c. In Petitioner's proposed combination of Okamura and Belitz, there is no "added functionality" in this regard because Okamura already has "preview" functionality.

iii. Thumbnail Images Are Not "Functionally Equivalent" or "Known and Predictable Alternative[s]" To Cluster Maps

221. Petitioner and Dr. Greenspun assert that a "POSITA would have understood that Belitz's thumbnail images displayed on the interactive map are functionally equivalent to Okamura's location-based clusters," and provide three reasons why this is allegedly so. Petition, 24; Ex. 1003, ¶ 88. I disagree.

222. The graphical objects 410a-410d in Belitz are not functionally equivalent to the cluster maps in Okamura. In Okamura, the function of the cluster

maps shown in FIGS. 18 and 41 is to show a portion of a map so that (1) "the position corresponding to each cluster can be grasped from a map corresponding to each cluster" and (2) based on the scale of the cluster maps, "the shooting area or the like of each of [the] contents belonging to each cluster can also be easily grasped by the user." Ex. 1005, ¶ [0215]. Okamura explains that "a cluster map is a map" that "can be used as … map." *Id*., ¶¶ [0331], [0213]. The graphical objects 410a-410d in Belitz do not show a map and therefore do not have the same function as the cluster maps in Okamura.

223. Placing the graphical objects 410a-410d on top of the map in FIG. 41 of Okamura, as Petitioner suggests, would at least partially obscure the underlying map (especially given the overlap shown in Petitioner's combination), so even more geographical information is lost. This is contrary to Okamura's statement that "when displaying images representing contents with positions on a map, it is important to be able to easily grasp the correspondence between a plurality of contents on the map, and each individual content." Ex. 1005, ¶ [0011].

224. Petitioner argues that Belitz's graphical objects 410a-410d were a "known and predictable alternative to Okamura's clusters" and that "certain users preferred interactive maps that used thumbnails to identify the locations of photos," citing Ex. 1022. Petition, 25-26. Ex. 1022, however, does not mention cluster maps, or say that thumbnails are an alternative for cluster maps like those in Okamura. Ex.

1022. Ex. 1022 states that "[w]here Picasa has the edge over Flickr and SmugMug is in showing thumbnails of each image on the map." Ex. 1022, 4. Petitioner also asserts that using Belitz's thumbnails was "an obvious option" in view of "multiple applications (e.g., Picasa, Panoramio; shown below) that displayed thumbnail images on a map." Petition, 25-26; Ex. 1003, ¶¶ 90-91.

225. The pictures from "Picasa" and "Panoramio" that Petitioner and Dr. Greenspun cite to show many images on a map.

SAMSUNG-1022 (left); SAMSUNG-1023 (right)

226. Both Okamura and Belitz teach that this kind of cluttering is undesirable and can confuse the user. *See, e.g.*, Ex. 1005, ¶¶ [0312], [0324]-[0325]; Ex. 1006, ¶¶ [0054]-[0057]. Okamura also discredits small images on a map as they are "hard to see." Ex. 1005, ¶ [0325]. In view of these teachings in Okamura and

Belitz, a POSITA would be discouraged from modifying Okamura based on features in "Picasa" and "Panoramio."

227. Petitioner also cites to Ex. 1021 and argues that it shows "a POSITA would have understood that selectable graphical clusters would have been obvious to replace with 'smaller version of the captured images (e.g., thumbnail images).'" Petition, 25 (quoting Ex. 1021, ¶ 30). Paragraph 30 in Ex. 1021 does not suggest that cluster maps in Okamura, which as described above serve one or more particular purposes, are replaceable with "thumbnail images." Ex. 1021, ¶ 30. This paragraph merely suggests that graphical pins can be placed on a map (similar to the related art discussed in Okamura) or that images can be placed on a map (similar to Belitz).

228. In view of these teachings in Okamura and Belitz, I disagree that a POSITA would be motivated to modify Okamura based on alleged features in "Picasa" and "Panoramio."

iv. Petitioner's Combination Changes Hallmark Aspects of Okamura

229. Petitioner asserts that the Okamura-Belitz "combination does not change the hallmark aspects of either of these references." Petition, 28-29. I disagree. One of the hallmark aspects of both embodiments of Okamura is the generation of cluster maps, and a hallmark of the second embodiment is displaying the cluster maps (e.g., cluster map groups 771 and 772 and cluster map 784 shown in FIG. 41) on a map. *See, e.g.*, Ex. 1005, ¶¶ [0213]-[0231], [0354], FIGS. 14, 15A-

15B, 16A-16B, 18, 41. In the First Combination, Petitioner proposes to completely eliminate the cluster maps, thereby changing (completely eliminating) one of the hallmark aspects of Okamura. Petition, 22-23, 40 (stating that the combination replaces Okamura's location-based clusters with Belitz's thumbnail images.)

e. Combining Okamura's First and Second Embodiments

230. I disagree with Petitioner and Dr. Greenspun's assertion that a POSITA would have understood that the map view in FIG. 41 from the second embodiment replaces the index views in FIGS. 18 and 19 in the first embodiment. Petition, 33; Ex. 1003, ¶ 98. There is no connection between the map view screen 780 in FIG. 41 and any of the screens in the first embodiment. As discussed above, FIG. 49 shows how the second embodiment transitions between the map view screen 811 (corresponding to FIG. 41), the scatter view screen 812, and the play view screen 816. Ex. 1005, ¶¶ [0429]-[0438]; *see also* Petition, 41-42; Ex. 1003, ¶ 113. There is no mention in the second embodiment of transitioning from the map view screen in FIG. 41 to another of the views shown in FIGS. 18-21 of the first embodiment. The FACES and EVENTS tabs shown in FIGS. 18-21 of the first embodiment are not present in FIG. 41 of the second embodiment, which further suggests that the map view screen 780 in FIG. 41 of the second embodiment is not merely to replace the index screen 410 with cluster maps in FIG. 18 of the first embodiment.

231. Similarly, FIG. 17, which shows transitioning between index screen 401 (FIGS. 18-21) and content playback screen 402 (FIGS. 22-27B) does not suggest additionally transitioning to a map view screen like in FIG. 41. Ex. 1005, FIG. 17, ¶¶ [0232]-[0234].

232. The lack of any disclosed relationship between Okamura's first and second embodiments reinforces my opinion that Petitioner's first combination (relying on Okamura's second embodiment) would not have been obvious. The same applies to Petitioner's additional combinations (discussed below) that rely on Okamura's second embodiment.

2. Petitioner's Second Proposed Okamura-Belitz Combination

233. Petitioner's second proposed Okamura-Belitz Combination involves replacing "Okamura's map view screen shown in FIG. 41 with Belitz's geographic map view":

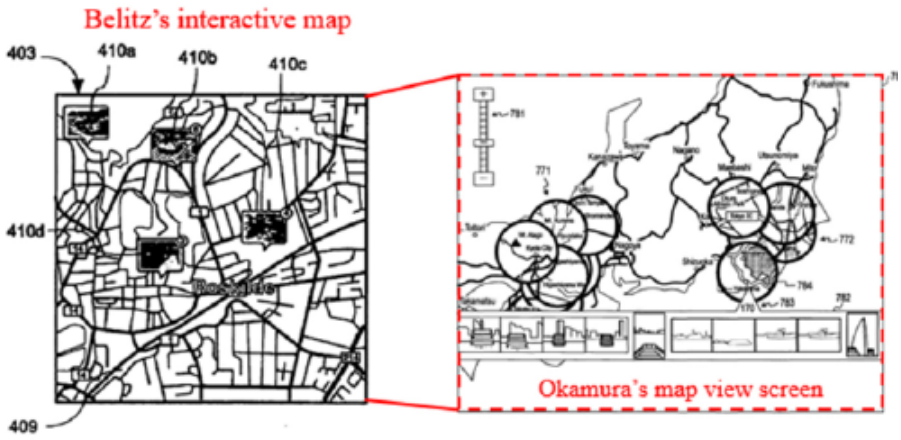


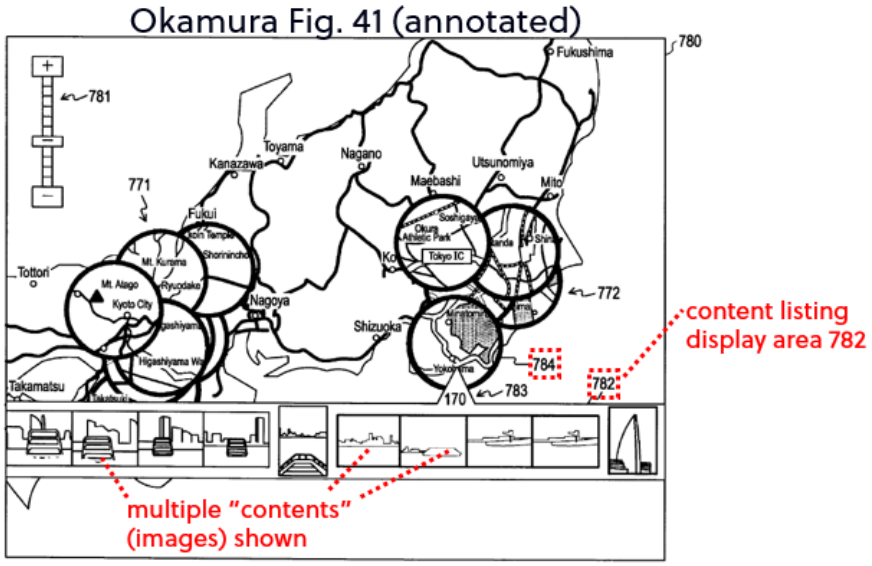
Fig. 4b

Petition, 27 (annotations in Petition); Ex. 1003, ¶

234. While the second combination places thumbnail images on Belitz's map rather than Okamura's background map, the second proposed combination nevertheless replaces Okamura's cluster maps with Belitz's thumbnail images.

235. This combination carries the same problems as Petitioner's first combination because the second combination proposes replacing cluster maps with thumbnail images that are not maps.

236. Also, the second combination carries an additional disadvantage beyond those associated with the first combination. The second combination contemplates replacing not only the cluster maps, but also the entire content listing display area 782 comprising multiple "contents" (i.e. images).



Ex. 1005, Fig. 41 (annotated)

As Dr. Greenspun acknowledged, the second combination contemplates placing thumbnail images on a single map, but, unlike the first combination, the content listing 782 (a/k/a "film strip") would be eliminated. Ex. 2024, 70:15-21.

237. Thus, the second combination proposes replacing displaying multiple images corresponding to a location (e.g. content listing display area 782) with a single image (e.g. a Belitz thumbnail). This creates additional disadvantages beyond those associated with the first combination.

238. While Belitz discloses functionality for showing multiple images, Belitz does so using a popup window 413. Ex. 1006, Fig. 4c, ¶ [0060]. However, Belitz's popup window feature hides far more of the underlying map 409 than the content listing area 782 in Okamura.

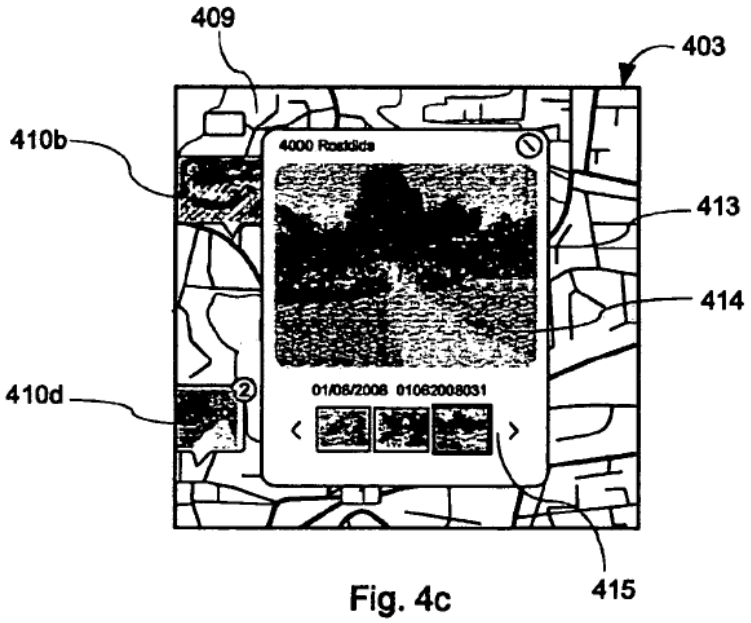


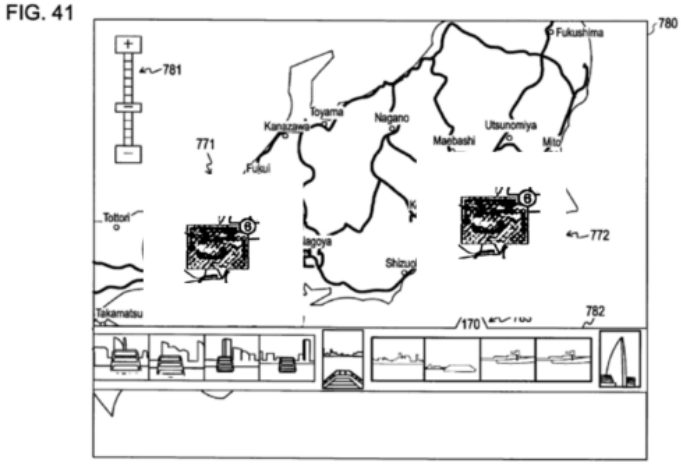
Fig. 4c

Ex. 1006, Fig. 4c; Ex. 1005, FIG. 41

239. In my view, incorporating this feature, rather than Okamura's content listing area 782, would not be desirable to a POSITA reviewing Okamura. Doing so would at least partially limit the amount of information that be displayed or previewed at a given time. As discussed above, this goes against Okamura's objectives.

240. Also much of the information shown in FIG. 41 of Okamura would be lost if it were displayed according to Belitz because of Belitz's stacking feature.

241. In FIG. 41, there are approximately 7 cluster maps on the left side and 5 cluster maps on the right side, all of which either overlap or are very close together. Ex. 1005, FIG. 41. Belitz teaches that in this situation, it is necessary to stack pictures together. Ex. 1006, ¶¶ [0054], [0065]. The resulting map would look like the image below, where instead of many clusters being shown as in Okamura, perhaps only two graphical objects would appear:



Ex. 1005, FIG. 41 (modified)

242. Applying the stacking described by Belitz would result in a loss of much of the geographic information shown in Okamura Fig. 41. *See, e.g.*, Ex. 1005, ¶ [0011] ("when displaying images representing contents with positions on a map, it is important to be able to easily grasp the correspondence between a plurality of contents on the map, and each individual content").

3. Petitioner's Third Proposed Okamura-Belitz Combination

243. Petitioner and Dr. Greenspun's third proposed combination[1] replaces the 3 x 5 matrix of cluster maps in FIG. 18 of Okamura (the first embodiment) with Belitz's map:

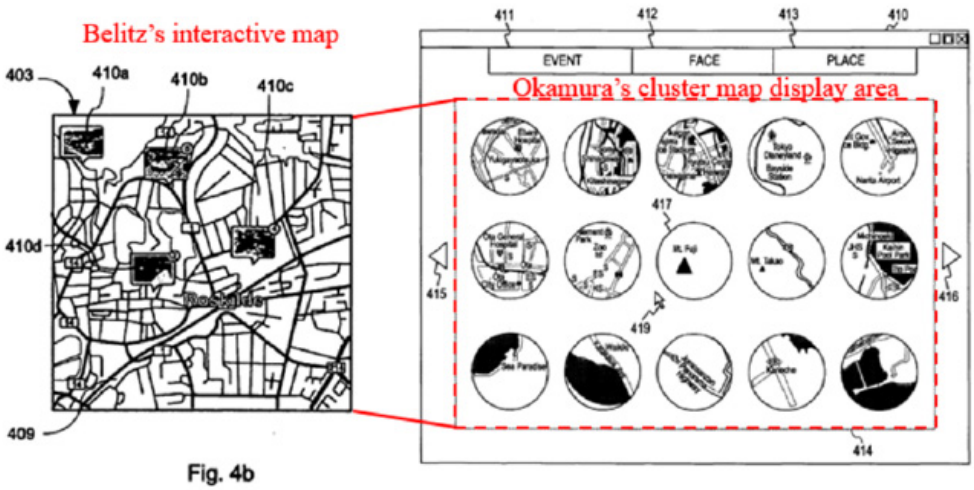


Fig. 4b

[1] Petitioner refers to both the second and third combinations discussed here as a "second" combination. Petition, 18-19. For ease of reference, this declaration refers to three proposed combinations, first, second and third.

Petition, 27; Ex. 1003, ¶ 91

244. As I state above, a POSITA reading Okamura would not replace the cluster map display area 414 in FIG. 18 with Belitz because this would completely eliminate cluster maps. Okamura uses cluster maps for particular reasons, including so that (1) "the position corresponding to each cluster can be grasped from a map corresponding to each cluster" and (2) based on the scale of the cluster maps, "the shooting area or the like of each of [the] contents belonging to each cluster can also be easily grasped by the user." Ex. 1005, ¶ [0215]. A POSITA reading Okamura would not modify Okamura to completely eliminate the cluster maps.

245. Also, as discussed above, a POSITA would be discouraged from making the third combination because Belitz is analogous to the related art, such as Fujiwara and Takakura, that is discredited by Okamura. For example, when Belitz's map shows multiple countries/continents, it is "difficult to grasp the geographical correspondence between the images taken in Tokyo and its vicinity." Ex. 1005, ¶ [0009]. Conversely, if the user zoomed in, "it is not possible to display the generated positions of images taken in other regions . . . on the map." *Id*., ¶ [0010].

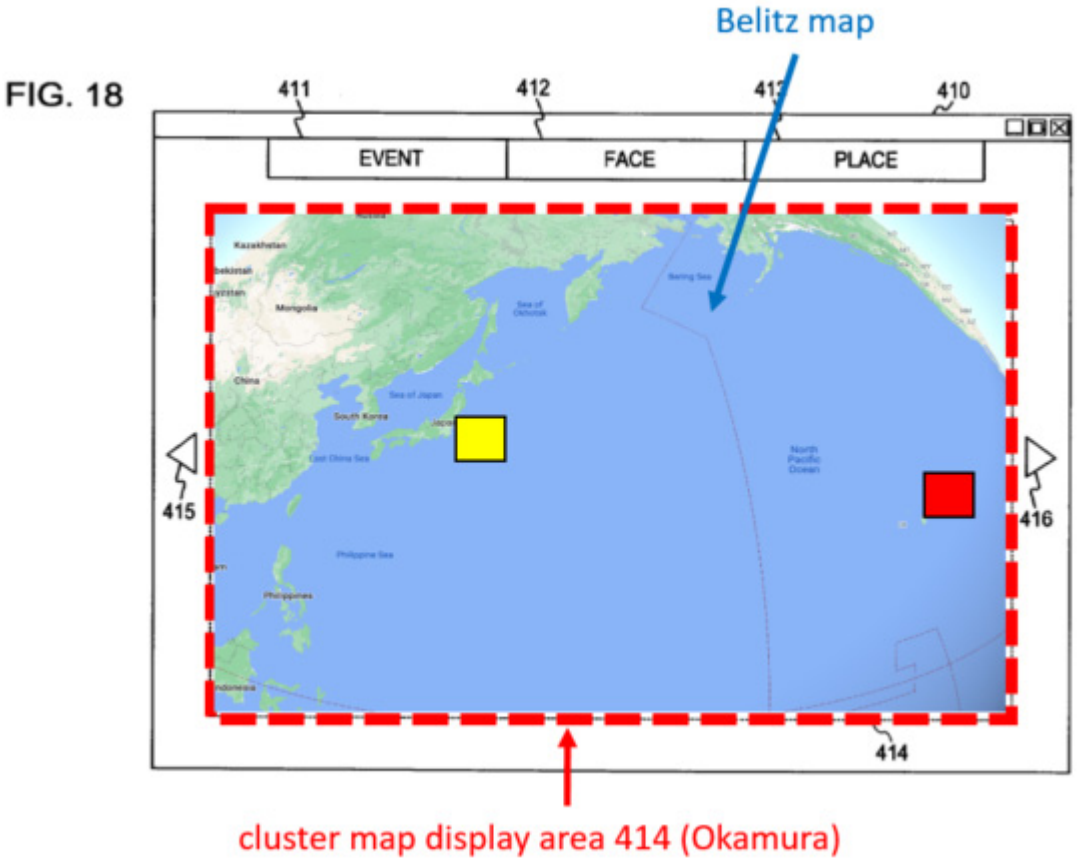
246. The content represented by the cluster maps in FIG. 18 includes, for example, images at several locations in or around Tokyo (annotated in yellow below) and at least one location in Hawaii (annotated in red below).

Ex. 1005, FIG. 18 (excerpted and annotated)

247. If the content from Okamura's FIG. 18 were displayed according to Belitz, the content in Tokyo represented by separate cluster maps in FIG. 18 would be stacked (consolidated) when the map is zoomed out to a scale to show the content from Hawaii. Ex. 1006, ¶ [0054]. Okamura teaches that this scaling of the map makes it "difficult to grasp the geographical correspondence between the images taken in Tokyo and its vicinity." Ex. 1005, ¶ [0009].

248. Conversely, if one were to zoom in on the map to understand the geographical correspondence between the images taken in Tokyo, "it is not possible to display the generated positions of images taken in other regions . . . on the map," including the content in Hawaii. Ex. 1005, ¶ [0010]. This causes the same problems Okamura identified in Fujiwara and Takakura that Okamura seeks to avoid with cluster maps.

249. This scaling issue is illustrated using the exemplary geographic map below that I created using an image from Google maps:

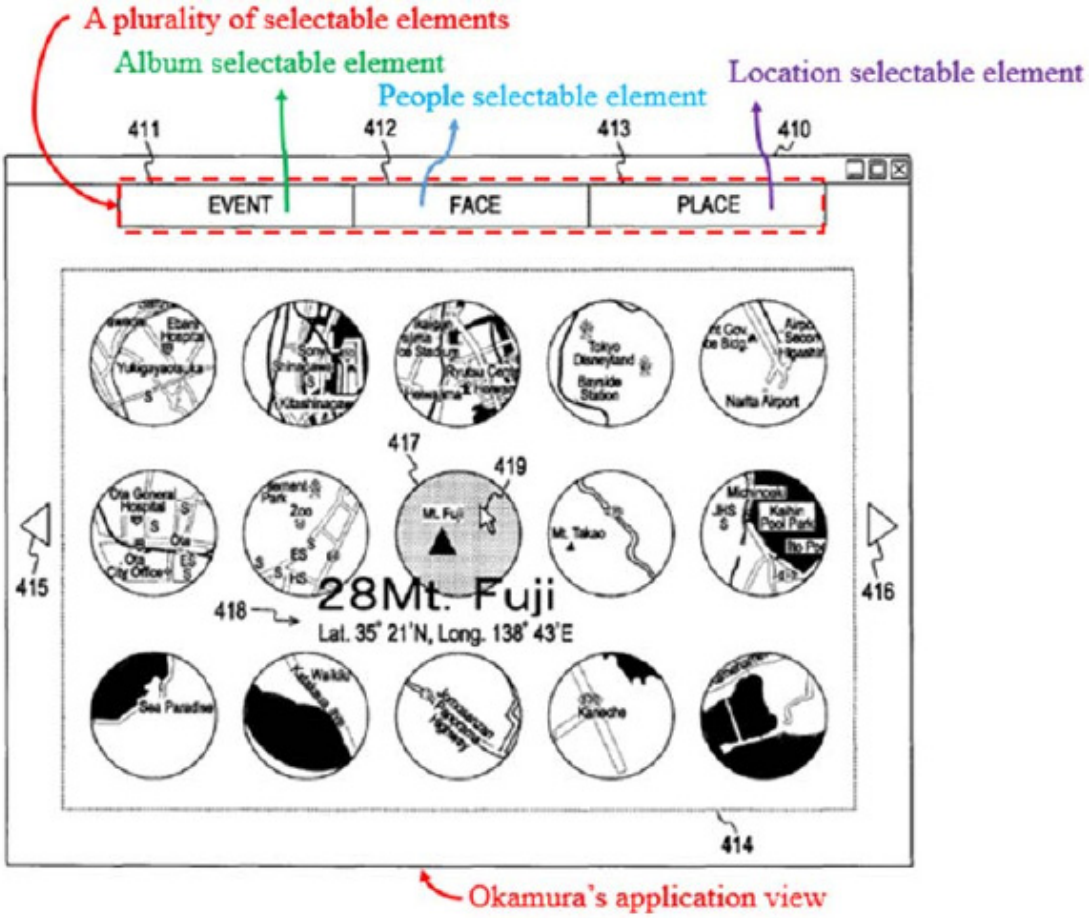


250. For these reasons, it is my opinion that Okamura would discourage a POSITA from making the third combination.

4. Okamura Does Not Disclose an "Application View'

251. As discussed above, claim 1 requires "displaying an application view on a video display device including displaying a plurality of selectable elements, the plurality of selectable elements including a location selectable element." This application view is separate from the map view, first location, and second location view in claim 1. It is also separate from the other "view[s]" in the dependent claims.

252. Dr. Greenspun identifies FIG. 19 of Okamura as the alleged "application view" and the Event 411, Face 412, and Place 410 tabs as the "plurality of selectable elements." Ex. 1003, ¶ 104.



Ex. 1003, ¶ 105 (annotating Ex. 1005, FIG. 19)

253. Dr. Greenspun also identifies FIG. 19 of Okamura as allegedly corresponding to the claimed "map view" when modified in view of Belitz. *See, e.g.*, Ex. 1003, ¶ 106. He also asserts that Okamura FIG. 41 (also an alleged map view) would be displayed by selecting the PLACE 413 tab as described in connection with FIGS. 18-21. *Id.*, ¶ 98.

254. A POSITA would understand that the index playback screen 410 in FIG. 18 of Okamura is a single view. This is confirmed by the fact that Okamura labels the entirety of the window in FIG. 18 as the content playback screen 410 (as opposed to only a part of it). Ex. 1005, ¶¶ [0234]-[0235]. Each of the index playback screen 410 (FIGS. 18-19), the index playback screen 420 (FIG. 20), and the index playback screen 430 (FIG. 21) would be understood by a POSITA as separate views in Okamura's interface.

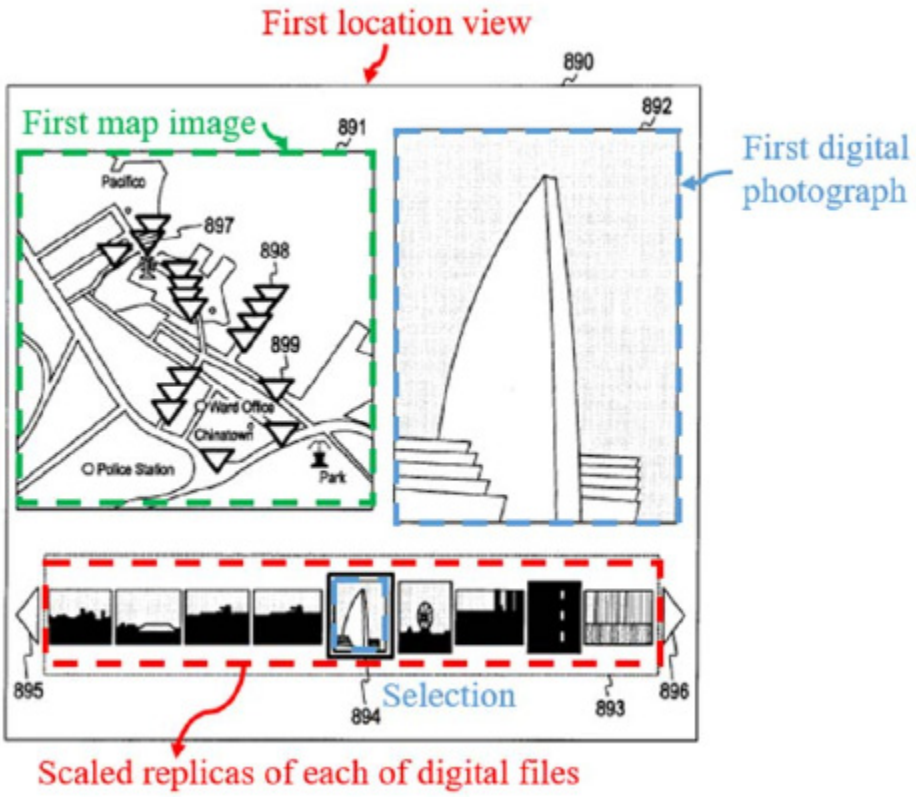
255. Dr. Greenspun identifies FIG. 18 as corresponding to both the "application view" and the "map view" in claim 1. As discussed above, claim 1 requires that the "application view" and "map view" are separate views. FIG. 18 is one view – it cannot be both the "application view" and the "map view." While Dr. Greenspun appears to identify the cluster map display area 414 as the claimed "map view" and the remainder of the content playback screen 410 as the claimed "application view," a POSITA would have understood the entire content playback screen 410 in FIG. 18 is a single view.

B. Claims 3-4: "responsive to a click or tap of a first one of the displayed scaled replicas in the [first/second] location view, displaying . . . a [first/second] map image"

256. Claims 3 and 4 recite: "responsive to a click or tap of a first one of the displayed scaled replicas in the [first/second] location view, displaying a first digital photograph associated with the first scaled replica in the [first/second] location view

and a [first/second] map image indicating the geographic coordinates of the [first/second] geotag." As discussed above, these claims require that the "[first/second] map image" is displayed "responsive to" a click or tap of a scaled replica in the [first/second] location view.

257. Petitioner and Dr. Greenspun identify FIG. 50 of Okamura as allegedly corresponding to the claimed "[first/second] location view." Petition, 56-70; Ex. 1003, ¶¶ 136-55. In particular, Petitioner and Dr. Greenspun identify Okamura's map display area 891 in FIG. 50 as allegedly corresponding to the claimed "[first/second] map image," as shown below.



Ex. 1003, ¶ 152 (annotating Ex. 1005, FIG. 50)

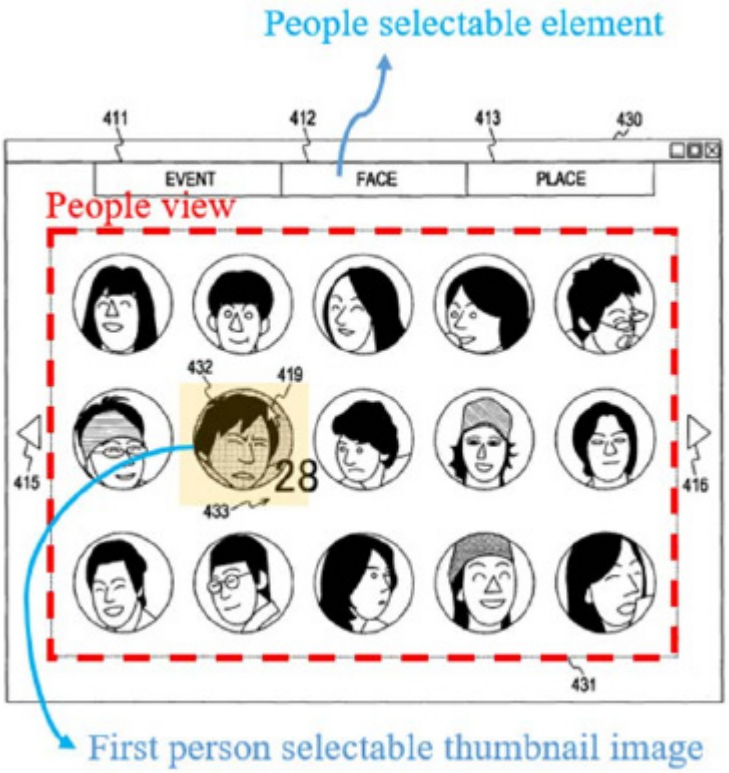
258. Okamura states that the "play view screen 890 shown in FIG. 50 is a screen that is displayed when a left click operation is performed in the state with one of the cluster maps selected on the map view screen or the scatter view screen." Ex. 1005, ¶ [0440]. The map display area 891 (alleged "[first/second] map image") is "a map related to the corresponding cluster (for example, a magnified map of the cluster map corresponding to the cluster)." *Id*., ¶ [0442].

259. The map display area 891 (the alleged "[first/second] map image") is displayed immediately when the view shown in FIG. 50 is displayed. The map display area 891 (the alleged "[first/second] map image") is not displayed "responsive to" a click or tap of a scaled replica below – it is already displayed when a scaled replica is clicked or tapped. An element that is already displayed before a click or tap is not displayed "responsive to" the click or tap.

C. Claim 5: Okamura does not disclose a "people view" including "a name associated with the first person" and "a name associated with the second person"

260. As discussed above, claim 5 requires that the "people view," including the names associated with the first/second person, is displayed "responsive to" a click or tap of the people selectable element. Displaying the claimed people view must include displaying the name associated with the first person and the name associated with the second person.

261. Petitioner and Dr. Greenspun identify the display area 431 in FIG. 21 of Okamura as allegedly corresponding to the claimed "people view" and the Face tab 412 as the claimed "people selectable element." Petition, 70-72; Ex. 1003, ¶¶ 156-57. Dr. Greenspun's annotations of Okamura FIG. 21 are reproduced below.



Ex. 1003, ¶ 156 (annotating Ex. 1005, FIG. 21)

262. With respect to the claimed "name associated with the first person" and "name associated with the second person" in the "people view," while not explicitly shown in FIG. 21, Petitioner and Dr. Greenspun assert that the pieces of information 433 in Okamura can include the name of the person. Petition, 74; Ex. 1003, ¶ 162. Specifically, they assert that this name would be displayed adjacent to the

thumbnails in FIG. 21 and cite the information "0.203-01.04.2004" in FIG. 20 as an example of this. Ex. 1003, ¶ 162. I disagree with Dr. Greenspun's opinion that Okamura discloses the claimed people view for two reasons.

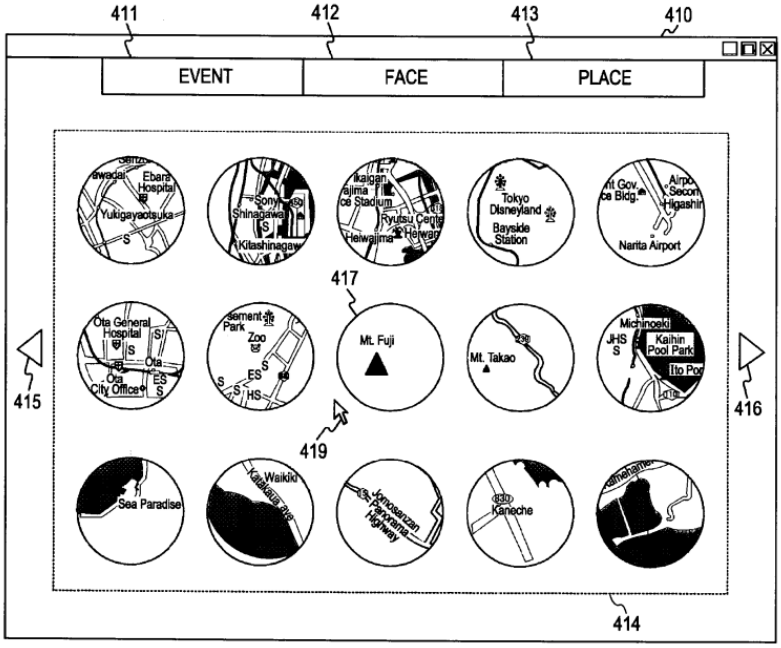
263. First, Okamura does not disclose displaying a "name associated with the first person" or a "name associated with the second person" responsive to a click or tap of a first/second person selectable thumbnail image as required by claim 5 of the '658 patent. Okamura explains that the information 433 (allegedly containing a name) is only displayed "when the mouse is placed over a thumbnail image 432 by a user operation on the index screen 430." Ex. 1005, ¶ [0247]. The only "name" that appears in Okamura only appears when a user places their mouse over a particular thumbnail image in the index screen 430. No "name" is displayed responsive to a click or tap of the Face tab 412 (the alleged people selectable element).

264. Second, Okamura does not disclose any view including both the name associated with the first person and the name associated with the second person as required by claim 5 of the '658 patent. As discussed above, the only possible "name" in Okamura's FIG. 21 appears when placing the mouse over a thumbnail image. Ex. 1005, ¶ [0247]. The mouse can only be placed on one thumbnail image at a time, meaning that at any given time, there can only be one "name" displayed in Okamura. Assuming there are two thumbnails for two different people, there are only two

possible ways to show a "view" with a "name" in Okamura: (1) a view including the name associated with the first person or (2) a view including the name associated with the second person. Neither of these possibilities corresponds to the claimed "people view" because neither view includes both the name associated with the first person and the name associated with the second person as required by claim 5.

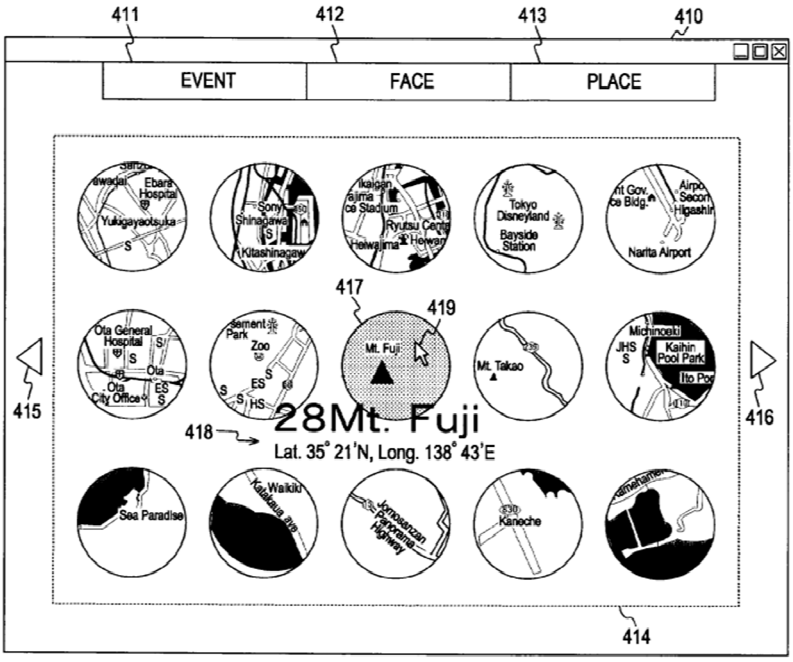
265. FIGS. 18 and 19 of Okamura illustrate how additional information is only displayed when moving the mouse over a thumbnail. In FIG. 18, the mouse cursor 419 is not placed over any of the thumbnails, so no information for any thumbnail is displayed (i.e., only thumbnails are displayed).

FIG. 18



Ex. 1005, FIG. 18

Only when the mouse cursor 419 placed over a thumbnail does additional information appear for a thumbnail.



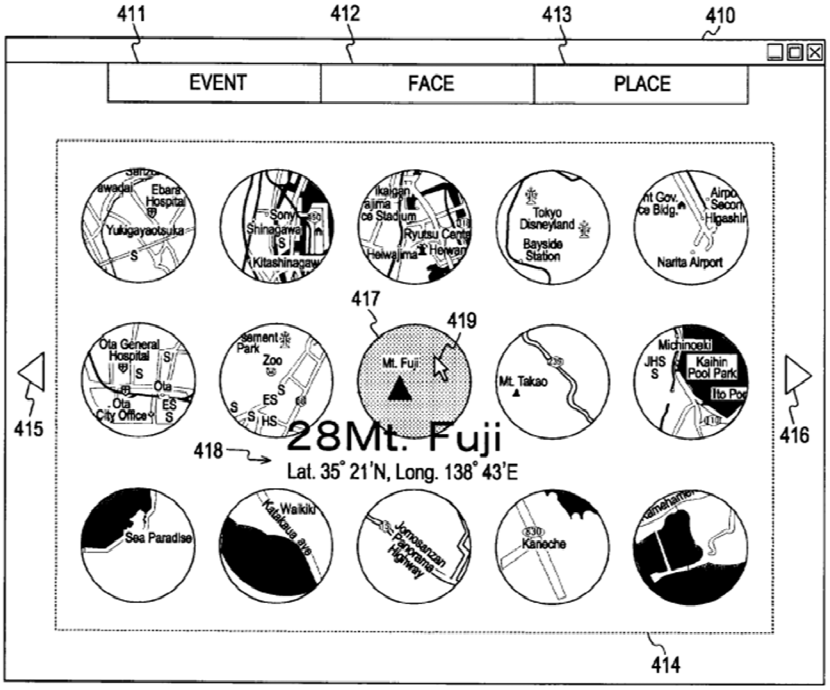
Ex. 1005, FIG. 19

266. Petitioner and Dr. Greenspun do not assert that it would have been obvious to modify Okamura so that the name associated with the first person and the name associated with the second person are displayed responsive to a click or tap of the people selectable element. They also do not assert that it would have been obvious to modify Okamura so that both the name associated with the first person and the name associated with the second person are displayed (as opposed to only one or the other).

267. A POSITA would recognize that Okamura only displays "index images" in a matrix formation in the index screens in FIGS. 18-21, and then only, at most, one name at a time when moving the mouse over one of the index images. Ex. 1005, Figs. 18-21, ¶¶[0234]-[0237], [0244], [0246]. Okamura is clear that there

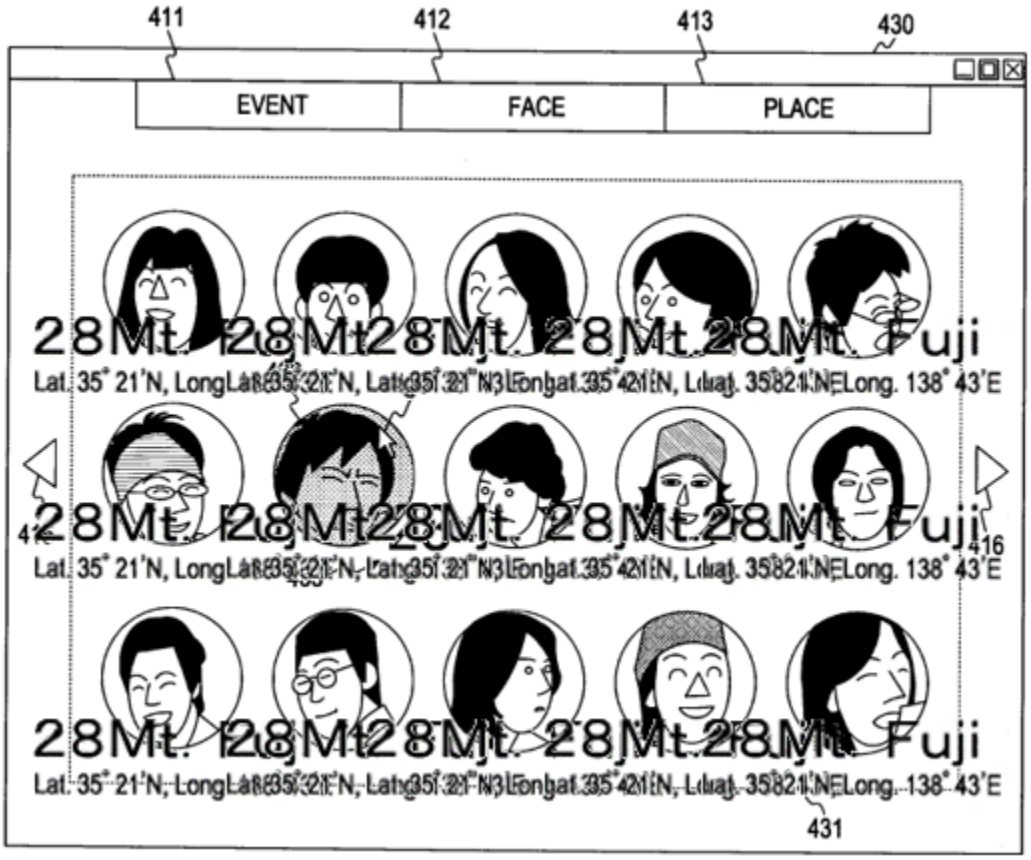
must be a "mouse-over" display additional information for an index image. Ex. 1005, Figs. 18-21, ¶¶[0239]-[0241], [0245], [0247], [0300].

268. A POSITA reviewing Okamura would understand that Okamura's choice to only display information for an index image when there is a mouse-over is intended to reduces or eliminates clutter on Okamura's interface. If Okamura showed the additional information for every thumbnail image, this would likely confuse and disorient the user. FIG. 19 of Okamura shows an example of additional information that can be displayed when placing the mouse over a thumbnail.



Ex. 1005, FIG. 19

If each thumbnail had the same amount of information and that information was displayed simultaneously, Okamura's FIG. 21 would look something like the image below.



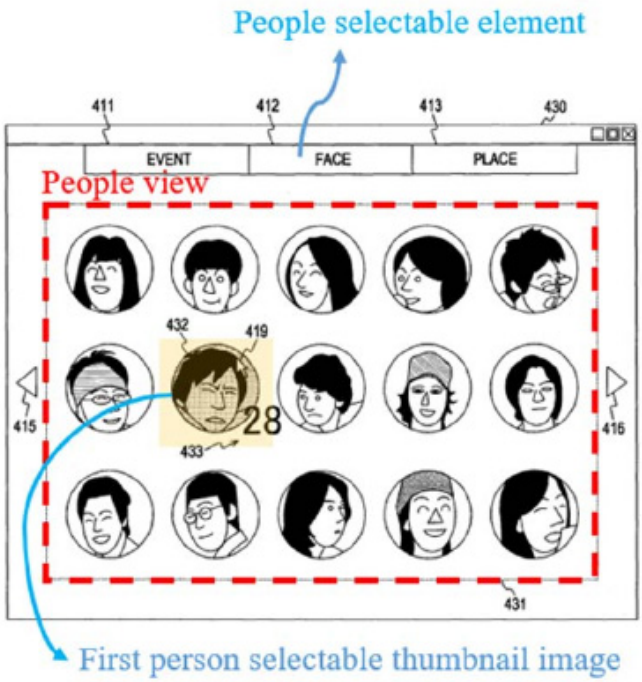
Ex. 1005, FIG. 21 (modified)

As shown above, the interface would be too cluttered to see any meaningful information. This confirms that Okamura's choice to only show information for one thumbnail at a time is an intentional design choice that is different than the claimed invention.

D. Claims 7 and 10: Okamura does not disclose "responsive to a click or tap of the [first/second] person selectable thumbnail image, displaying a [first/second] person view"

269. As discussed above, a POSITA would understand claims 7 and 10 require a click or tap of the "[first/second] person selectable thumbnail image" in the people view" to cause the "[first/second] person view" to be displayed.

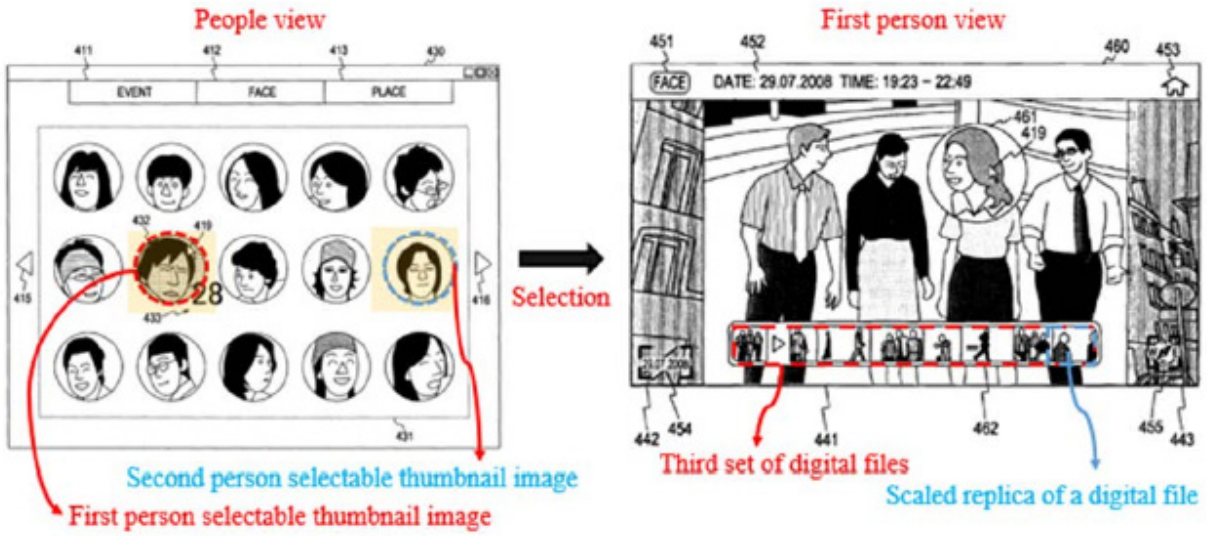
270. In connection with claim 5, Petitioner and Dr. Greenspun identify FIG. 21 of Okamura as allegedly corresponding to the claimed "people view." Petition, 71-72; Ex. 1003, ¶ 156. Dr. Greenspun's annotations are reproduced below:



Ex. 1003, ¶ 156 (annotating Ex. 1003, FIG. 21)

271. For claims 7 and 10, Petitioner and Dr. Greenspun identify FIG. 24 of Okamura as allegedly corresponding to the claimed "first person view." Petition,

80-81; Ex. 1003, ¶¶ 168-69. Dr. Greenspun's annotations of FIG. 21 and FIG. 24 of Okamura are reproduced below.



Ex. 1003, ¶ 168 (annotating Ex. 1003, FIGS. 21 and 24)

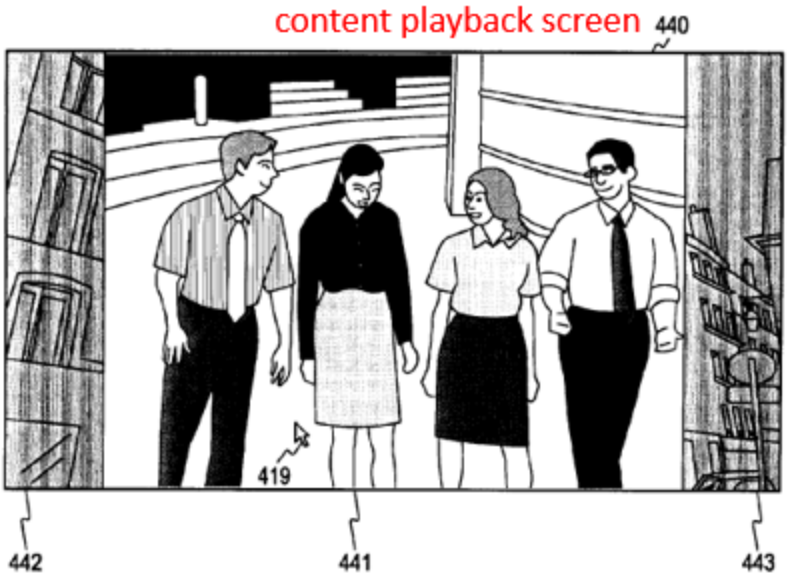
272. Citing FIGS. 21 and 24 of Okamura, Dr. Greenspun asserts that "Okamura describes that selecting, by a click or tap, a face-based thumbnail image ('when a desired cluster is determined by a user operation' … 'for example, a click operation with the mouse') causes the user interface to display 'contents included in the face cluster.'" Ex. 1003, ¶ 168 (quoting Ex. 1005, ¶¶ [0261]-[0262]). I disagree. As explained below, selecting a thumbnail in FIG. 21 of Okamura (the alleged people view) does ***not*** cause the view of FIG. 24 (the alleged first/second person view) to be displayed.

273. Okamura states that "[w]hen a desired cluster is determined by a user operation on the index screen shown in each of FIGS. 18 to 21, the display control

section 180 displays a content playback screen on the display section 181." Ex. 1005, ¶ [0248]. FIGS. 22-26 each show "an example of display of a content playback screen." *Id*., ¶ [0249].

274. In Okamura, "FIG. 22 shows a content playback screen 440 that automatically displays contents belonging to a cluster determined by a user operation in slide show." Ex. 1005, ¶ [0250]. In FIG. 22, the "content playback screen 440 is provided with a content display area 441, a preceding content display area 442, and a succeeding content display area 443." *Id*.

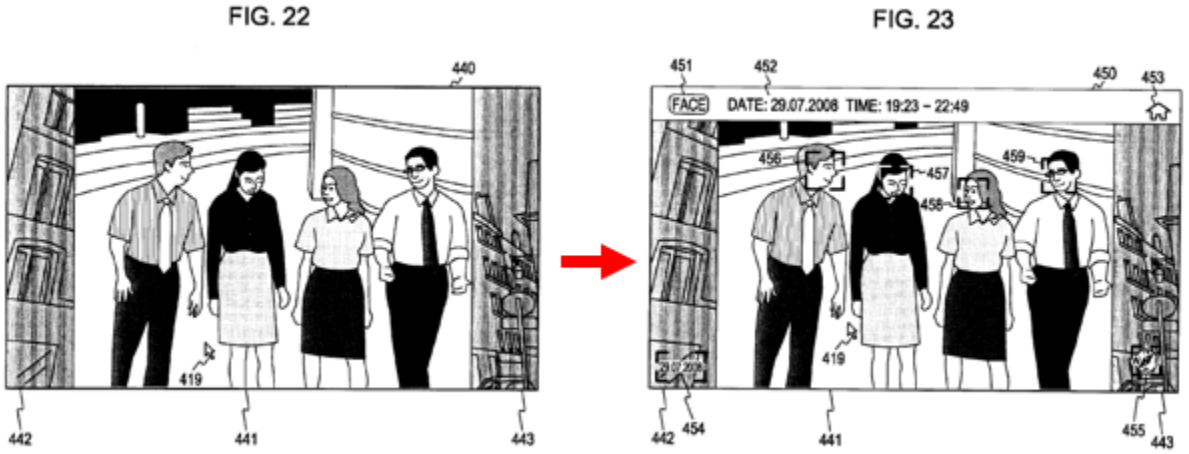
FIG. 22



Ex. 1005, FIG. 22 (annotated)

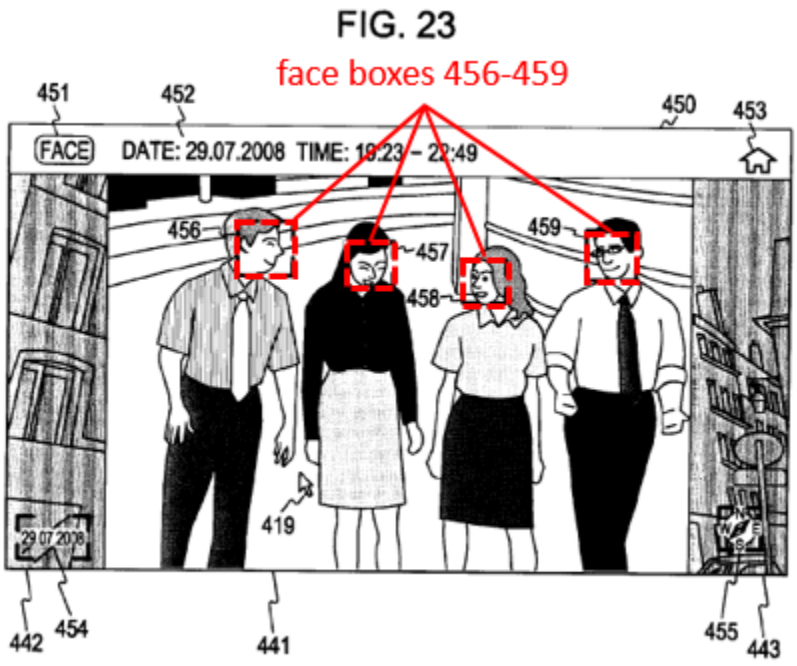
275. Okamura states that "[w]hen a user operation (for example, a mouse operation) is made in the state with the content playback screen 440 displayed on the display section 181, a content playback screen 450 shown in FIG. 23 is displayed."

Ex. 1005, ¶ [0252]. In other words, the user needs to take an action within the content playback screen 440 of FIG. 22 to cause the content playback screen 450 of FIG. 23 to be displayed.



Ex. 1005, FIGS. 22-23

276. Referring to FIG. 23, Okamura explains that "[w]hen a person's face is included in the content displayed in the content display area 441, a face box (for example, a rectangular box indicated by broken lines) is attached to the face and displayed. This face box is used as a button that is depressed when transitioning to the content playback screen for face cluster." Ex. 1005, ¶ [0259]. In FIG. 23, "face boxes 456 to 459 are attached to the respective faces." *Id*. As shown below, there are face boxes for four different people in FIG. 23.



Ex. 1005, FIG. 23 (annotated)

277. Starting from FIG. 23, the view shown in FIG. 24 can be displayed, for example, "when the mouse is placed over the face portion included in the face box 458 on the content playback screen 450 shown in FIG. 23." Ex. 1005, ¶ [0260]. Okamura is clear that the content playback screen 460 of FIG. 24 "is displayed when the mouse is placed over the face portion included in the face box 458 on the content playback screen 450 shown in FIG. 23." *Id.*, ¶ [0261].

278. As shown above, clicking or tapping a thumbnail image in FIG. 21 of Okamura (the alleged people view) does ***not*** cause the content playback screen 460 of FIG. 24 (the alleged first/second person view) to be displayed. There are several additional views and steps between FIG. 21 and FIG. 24: (1) the user selects a thumbnail in FIG. 21 to reach the content playback screen 440 of FIG. 22; (2) the

user does an operation in the content playback screen 440 of FIG. 22 to reach the content playback screen 450 of FIG. 23; and (3) the user moves the mouse over a face box in the content playback screen 450 of FIG. 23 to reach the content playback screen 460 of FIG. 24. The content playback screen 460 of FIG. 24 (the alleged first/second person view) is displayed responsive to moving the mouse over one of the face boxes in FIG. 23. FIG. 24 is ***not*** displayed responsive to a click or tap of anything in FIG. 21 (the alleged people view).

279. Petitioner and Dr. Greenspun do not address FIGS. 22-23 of Okamura in their discussion of the claimed "[first/second] person view." Petition, 80-83; Ex. 1003, ¶¶ 168-71. Petitioner and Dr. Greenspun do not assert that it would be obvious to modify Okamura so that the content playback screen 460 in FIG. 24 (the alleged first/second person view) is displayed responsive to a click or tap of a thumbnail in FIG. 21 (the alleged people view).

280. A POSITA would recognize that this difference between Okamura and the claimed invention is significant in terms of user interface design. As a general design principle, it is preferable to design a user interface to use the least amount of operations (e.g., clicks or taps) to convey relevant information to a user of the interface. Users expect that relevant information will be displayed immediately when they make a selection. Consistent with this expectation, the claimed invention recites that the "[first/second] person view" is displayed "responsive to" a click or

tap of a "[first/second] person selectable thumbnail image" in the "people view." Thus, in the claimed invention, the user makes one decision (choosing the first person) and take one action (clicking or tapping the first person selectable thumbnail image) to cause the first person view to be displayed.

281. By contrast, in Okamura, the user needs to make a first decision (choosing the first person) and take a first action (selecting a thumbnail in FIG. 21) to cause FIG. 22 to be displayed. FIG. 22 is a view with a single image. Then, the user needs to take a second action (e.g., moving the mouse) to cause FIG. 23 to be displayed. FIG. 23 is another view with a single image and certain additional information. Then, the user needs to make a second decision (choosing one of the face boxes in FIG. 23) and take a third action (hovering their mouse over the desired face box) to cause FIG. 24 (the alleged first/second person view) to be displayed. FIG. 23 in Okamura is analogous to FIG. 21 (the alleged people view) in that the user needs to choose one of a plurality of people. There is no indication in FIG. 23 which one of the face boxes corresponds to the person selected in FIG. 21. This requires the user to make another decision to pick the first person to cause the alleged first person view to be displayed on the interface. In sum, Okamura requires the user to make at least two decisions and take at least three actions to cause FIG. 24 (the alleged first/second person view) to be displayed subsequent to displaying FIG. 21

(the alleged people view). Okamura's interface is far less efficient and intuitive compared to the claimed invention.

282. I understand Dr. Greenspun testified during his deposition that his view was that transitioning directly from FIG. 21 (the alleged people view) to FIG. 24 (the alleged [first/second] person view) was the "most likely default" in Okamura. Ex. 2024, 124:13-125:1. I disagree. As set forth above, Okamura is clear that selecting a thumbnail in FIG. 21 causes FIG. 22 to be displayed, then an input in FIG. 22 causes FIG. 23, then selecting a face box in FIG. 23 causes FIG. 24 to be displayed. Okamura does not disclose or suggest navigating directly from FIG. 21 to FIG. 24. Indeed, Dr. Greenspun's declaration cites to paragraphs 261 and 262 of Okamura, neither of which describe transitioning directly from FIG. 21 to FIG. 24. Ex. 1003, ¶ 168; Ex. 1005, ¶¶ [0261]-[0262].

283. I understand Dr. Greenspun testified during his deposition that Okamura lacked a "flow diagram" that foreclosed his view that there is a direct path from FIG. 21 to FIG. 24. Ex. 2024, 123:22-124:9. I disagree. Okamura discloses flow diagrams confirming the description of navigating from FIG. 21 to FIG. 22 to FIG. 23 and then to FIG. 24.

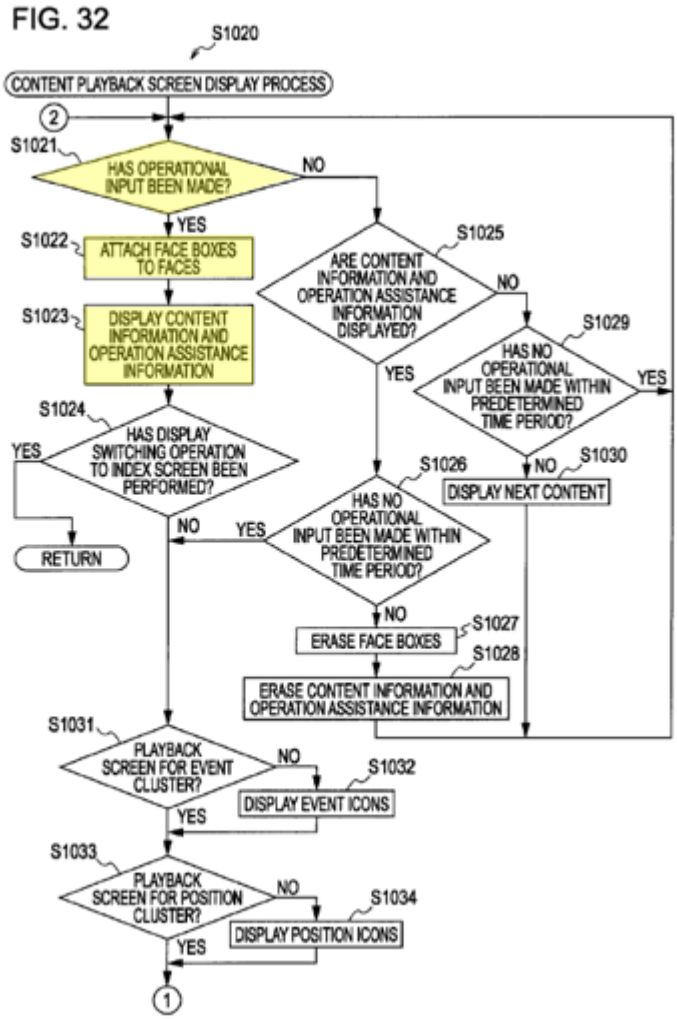
284. FIG. 31 of Okamura "is a flowchart showing an example of the procedure of a content playback process by the information processing apparatus 100." Ex. 1005, ¶ [0297]. In relevant part, Okamura explains that "[i]f the

determining operation has been performed (step S1009), a content playback screen display process is performed (S1020)," which is shown in FIGS. 32-33. *Id*., ¶¶ [0301], [0303].

285. In FIG. 32, step S1021 involves judging "whether or not an operational input (for example, a mouse operation) has been made." Ex. 1005, ¶ [0304]. This corresponds to the description earlier in Okamura about transitioning from FIG. 22 to FIG. 23. *Id*., ¶ [0252] ("When a user operation (for example, a mouse operation) is made in the state with the content playback screen 440 displayed on the display section 181, a content playback screen 450 shown in FIG. 23 is displayed").

FIG. 22

FIG. 23



Ex. 1005, FIG. 32 (annotated)

286. If the answer to step S1021 is yes, the process continues to step S1022, which includes attaching face boxes to faces. Ex. 1005, ¶ [0304]. This corresponds to the earlier description of FIG. 23. *Id.*, ¶ [0259].

287. Referring to FIG. 33, Okamura explains that step S1035 involves judging "whether or not a selecting operation (for example, a mouse-over) on a face has been performed." Ex. 1005, ¶ [0309]. Then, "if the selecting operation on a face

has been performed (step S1035), information related to a face cluster related to the face on which the selecting operation has been performed . . . is displayed (step S1036)." *Id.* Then, "it is judged whether or not a determining operation (for example, a mouse click operation) on the face has been performed (step S1038)." *Id.* If so, "a content playback screen for the face cluster to which the face on which the determining operation has been performed belongs is displayed (step S1039)." *Id.* Step S1039 corresponds to displaying the content playback screen 470 in FIG. 24. *Id.*, ¶ [0261].

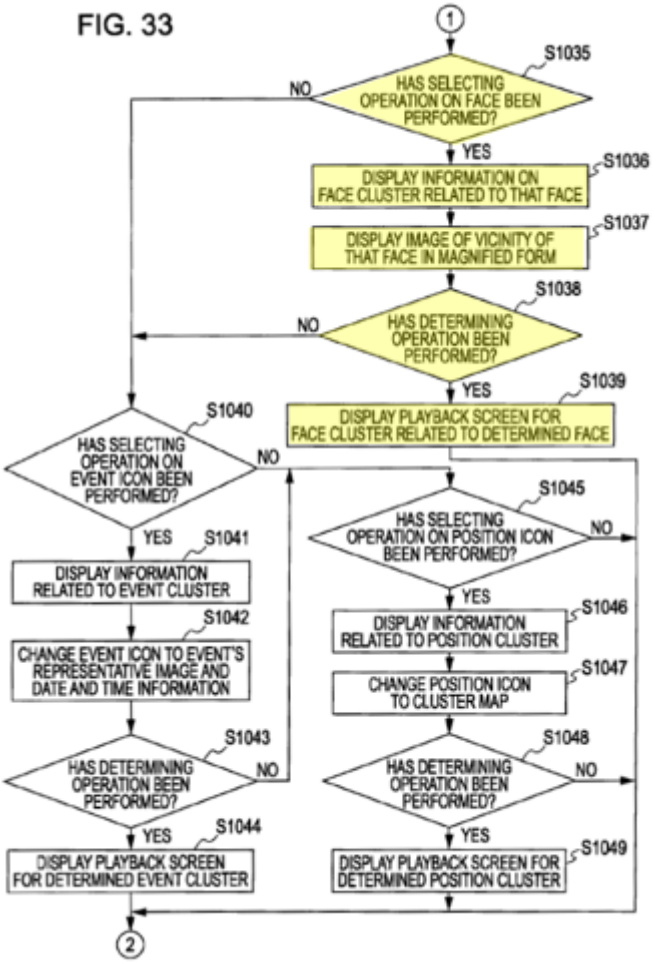


FIG. 24

Ex. 1005, FIG. 33 (annotated)

288. Additionally, claim 7 recites that the "first person view" includes "the name associated with the first person" and claim 10 recites that the "second person view" includes "the name associated with the second person." Okamura does not disclose that the content playback screen 460 of FIG. 24 (the alleged first/second person view) includes a "name associated with the [first/second] person" as required in claims 7 and 10. Dr. Greenspun asserts that "a POSITA would have found it obvious to display the first name (e.g., as part of the content information 452 or next to the image 461 adjacent to the face) to improve recognition of the first person (as similarly done in the people view." Ex. 1003, ¶ 170. It appears that Dr. Greenspun is only proposing to add the name to the content playback screen 460 in FIG. 24 and is not proposing to add the name in any other view (e.g., FIG. 22 or FIG. 23).

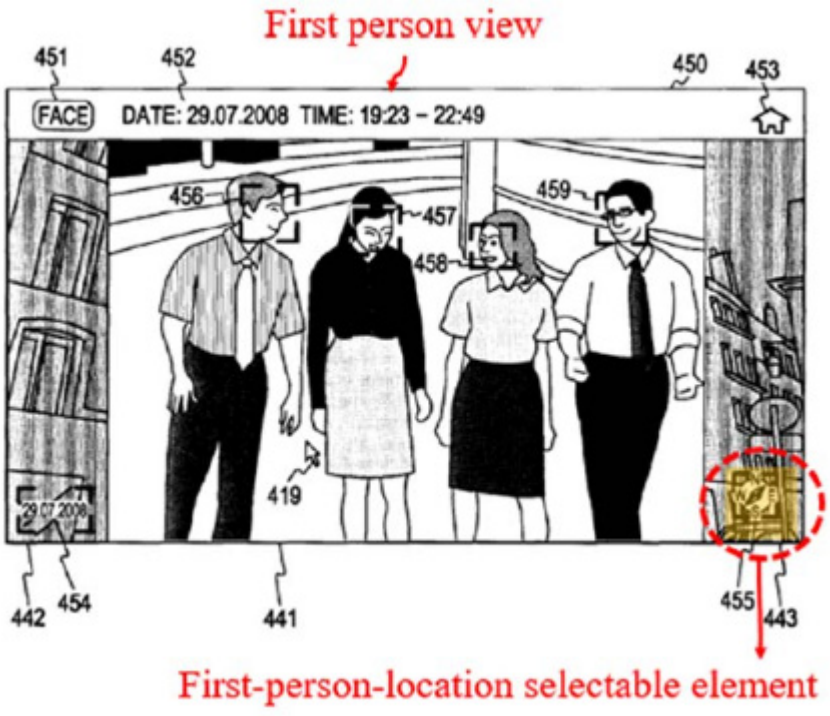
289. Dr. Greenspun's proposed modification would not rectify the issues described above with Okamura. The name would not be displayed responsive to a click or tap of a person selectable thumbnail image in FIG. 21. Further, displaying the name in FIG. 24 would not remove the need for the user make a second decision about which person to select in FIG. 23.

E. Claims 9 and 12: Okamura does not disclose or render obvious "displaying a representation of all locations having a digital photograph or video associated with the [first/second] person

"responsive to a click or tap of the [first/second]-person-location selectable element"

290. Claims 9 and 12 recite "responsive to a click or tap of the [first/second]-person-location selectable element, displaying a representation of all locations having a digital photograph or video associated with the [first/second] person."

291. Petitioner and Dr. Greenspun identify the position cluster transition button 445 in Okamura as allegedly corresponding to the claimed [first/second]-person-location selectable element. Petition, 83-91, 93; Ex. 1003, ¶¶ 172-86, 188-89. The position cluster transition button 445 is shown in the lower right-hand corner in FIG. 23 of Okamura.



Ex. 1003, ¶ 172 (annotating Ex. 1005, FIG. 23)

292. FIG. 23 of Okamura does not correspond to the claimed "first person view," which requires "(i) the name associated with the first person and (ii) a scaled replica of each of the digital photographs and videos in the third set of digital photographs," neither of which are present in FIG. 23. Claim 8 requires that the first-person-location selectable element is displayed in the first person view.

293. Okamura explains that the position cluster transition button 455 is used "for transitioning to the content playback screen for position cluster." Ex. 1005, ¶ [0270]. This button allows the user "to see other contents generated at places close to the place of generation of the content displayed in the content display area 441." *Id*. More specifically, "a determining operation is made" and "contents included in the position cluster to which the content displayed in the content display area 441 belongs are subsequently displayed on the content playback screen 440 shown in FIG. 22, for example." *Id*.

294. In FIG. 26, Okamura shows "a content playback screen 470 that is displayed when the mouse is placed over the position cluster transition button 455 on the content playback screen 450 shown in FIG. 23." Ex. 1005, ¶ [0265]. Specifically, "when the mouse is placed over the position cluster transition button 455 . . . a cluster map 471 corresponding to the position cluster to which the content displayed in the content display area 441 belongs is displayed in magnified form." *Id*. Then, "with the mouse placed over the cluster map 471 on the content playback

screen 470, when a determining operation (for example, a click operation with the mouse) is made on the cluster map 471, the screen transitions to the content playback screen for position cluster." *Id*., ¶ [0266]. Based on the foregoing description, a POSITA would understand that one could not actually click or tap the position cluster transition button 455 because the position cluster transition buttoner 455 would be immediately replaced with the cluster map 471 as soon as the user moved their mouse over the position cluster transition button 455.

295. I understand Dr. Greenspun testified during his deposition that the position cluster transition button 455 in FIG. 23 and the cluster map 471 in FIG. 26 would be understood by a POSITA as the same user interface element. Ex. 2024, 149:22-150:6. I disagree. A POSITA would consider the position cluster transition button 455 and the cluster map 471 to be entirely separate user interface elements. Okamura describes them as separate elements and they are shown separately in the figures. The position cluster transition button 455 is "an icon representing a compass depicted in graphic form." Ex. 1005, ¶ [0258]. The cluster map 471 is a map "corresponding to the position cluster to which the content displayed in the content display area 441 belongs." *Id*., ¶ [0265].

296. Dr. Greenspun states that "a POSITA would have found it obvious to display, in Okamura's first person view, a first-person-location selectable element (e.g., position cluster transition button 455) that, responsive to a click or tap, displays

sub-cluster information that presents locations where images/videos of the first person were taken." Ex. 1003, ¶ 184. For the reasons discussed below, I disagree.

1. Alleged obviousness based on Okamura alone

297. In connection with claim 8, Dr. Greenspun states that "Okamura describes setting a filter using a condition setting section 190 to generate the event, face, and place clusters 'on the basis of various kinds of condition.'" Ex. 1003, ¶ 176 (quoting Ex. 1005, ¶¶ [0098]-[0101], [0204], FIG. 1). Based on these condition settings, Dr. Greenspun asserts that a "POSITA would have found application of a location condition to an existing face cluster to have been obvious from Okamura's condition setting" and that by doing this, "the resulting clusters would display locations having digital content of the person associated with the face cluster." *Id.*, ¶ 177. Specifically, Dr. Greenspun asserts that a "POSITA would have found it obvious to display, from the first person view, the face cluster in the first person view filtered to locations that include content for the first person." *Id*. I disagree.

298. In discussing setting a location condition to a face cluster, Dr. Greenspun cites to paragraphs 98-101 and 204 of Okamura. Ex. 1003, ¶ 176. However, none of these paragraphs discloses or suggests applying a location condition to an existing face cluster. Paragraph 98 describes the "event cluster generating section 130," which generates event clusters. Ex. 1005, ¶ [0098]. Paragraph 99 describes the "face cluster generating section 140," which "generates

face clusters related to faces." *Id*., ¶ [0099]. Paragraph 100 describes the "hierarchy determining section 150," which "calculates the frequency distributions of a plurality of contents with respect to a plurality of groups identified by the event cluster generating section 130." *Id*., ¶ [0100]. Paragraph 101 describes a "tree restructuring section 160." *Id*., ¶ [0101]. Paragraph 204 describes a "minimum cluster size." *Id*., ¶ [0204].

299. Even if a location condition were applied to a face cluster in Okamura, Dr. Greenspun does not explain how this would be implemented or how this would allegedly result in "displaying a representation of all locations having a digital photograph or video associated with the first person" as recited in claim 9. If a location filter or condition (e.g., the UCLA campus) is applied to a face cluster, this would constrain any result to less than "all locations having a digital photograph or video associated with the first person."

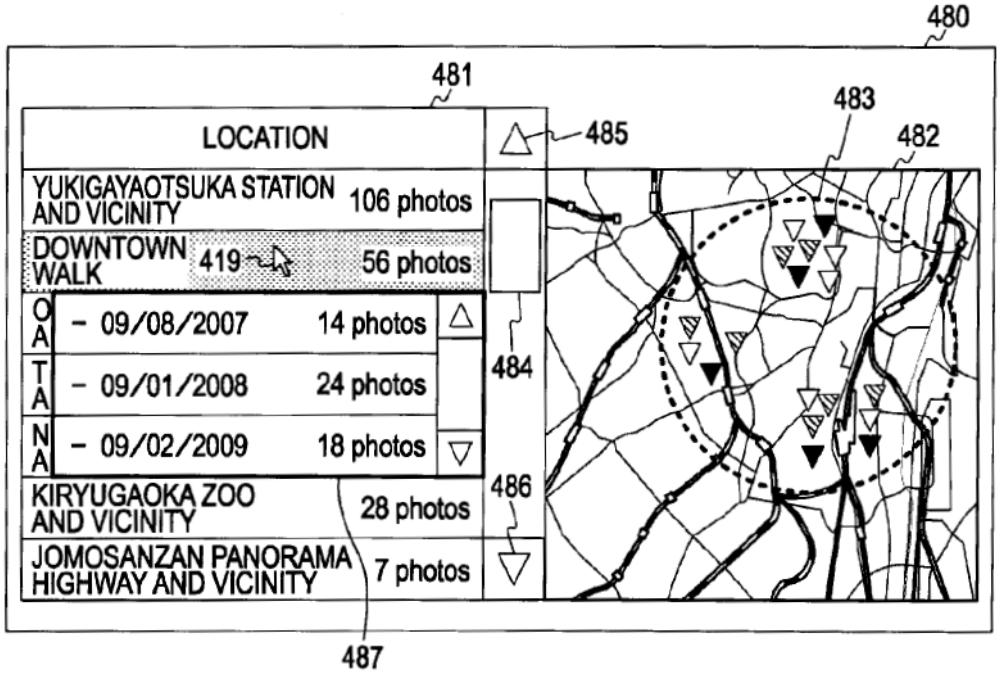
300. In discussing claim 8, Dr. Greenspun refers to "the concept of 'sub-clusters,' which relates to grouping images using multiple cluster types, such as person and location" in Okamura. Ex. 1003, ¶ 178. Based on this concept, Dr. Greenspun asserts that "a POSITA would have understood and found obvious that Okamura contemplates display of other types of sub-cluster information, such as location sub-cluster information for another type of displayed cluster" and "a POSITA would have found it obvious to display location sub-cluster information in

Okamura's first person view to provide users with additional criteria to identify images/videos of interest." Ex. 1003, ¶¶ 178-79.

301. Okamura does not disclose or suggest creating any sub-clusters within a face cluster or creating a position sub-cluster within another type of cluster. The discussion of sub-clusters in Okamura is confined to paragraphs 273-275 and 279-280. Okamura states that "by using event IDs calculated at the time of event clustering, contents belonging to a position cluster can be classified by event within the position cluster to generate sub-clusters." Ex. 1005, ¶ [0273]. Information that can be shown on a sub-cluster basis includes "the range of the times of generation of contents belonging to a sub-cluster (the start time and the end time), the number of the contents, and the center position and radius of a circle corresponding to the sub-cluster." *Id*., ¶ [0274]. These paragraphs describe an event sub-cluster for a position cluster.

302. In FIG. 27B, there is a "sub-cluster attribute information display area 487 is an area in which, when a predetermined operation is made on the cluster title being displayed in the list display area 481." Ex. 1005, ¶ [0280].

FIG. 27B



Ex. 1005, FIG. 27B

303. In FIG. 27B, the "DOWNTOWN WALK" cluster is moused over and three dates are listed in area 487. Okamura does not disclose any other way to display any sub-cluster information other than in a list view as in FIG. 27B.

304. Moreover, even if Okamura's position cluster transition button 455 were modified to display sub-cluster information as in FIG. 27B, Dr. Greenspun does not explain how this would be a representation of all locations having a photograph or video associated with the first person.

305. Dr. Greenspun asserts the following regarding Okamura and the claimed first-person-location selectable element:

> For instance, a POSITA would have found it obvious that users might find it useful to have an option to narrow the first person view to a specific location when the user is searching for images of the first person at the specific location (e.g., on a specific trip). To enable a POSITA would have found it obvious to use a selectable element in the first person view (e.g., cluster transition button 455 or another selectable element) to display sub-cluster information that presents locations where images/videos of the first person were taken.

Ex. 1003, ¶ 180. I disagree. Even if one were to narrow the first person view to a specific location (e.g., a specific trip), claim 9 requires that a click or tap of the first-person-location selectable element causes a representation of ***all*** locations having a digital photograph or video associated with the first person to be displayed. The scenario described by Dr. Greenspun would only relate to ***one*** location associated with the first person. Further, Dr. Greenspun does not explain why a POSITA would narrow the first person view to search for images of the first person at a specific location. Okamura already provides other ways to view images at a specific location or for a specific trip. Okamura explicitly describes creating event clusters for trips. *See, e.g.*, Ex. 1005, ¶ [0178]. As discussed above, Okamura also describes cluster maps to group images by specific locations.

306. In connection with claim 9, Dr. Greenspun asserts that a "POSITA would have found it obvious to display all of the location sub-clusters associated with the first person, enabling users to perceive representations of all locations having a digital photograph or video associated with the first person." Ex. 1003, ¶ 184. I disagree. As an initial matter, I note that Dr. Greenspun does not identify a reason why a POSITA would have modified Okamura to display location sub-clusters (which are not disclosed in Okamura) associated with the first person to show all locations. Ex. 1003, ¶ 184. Instead, I understand Dr. Greenspun states that this would be a mere design choice.

307. In my view, a POSITA would not have been motivated to modify the position cluster transition button 455 in Okamura in the manner proposed by Dr. Greenspun. The position cluster transition button 455 is designed to show the position cluster associated with the photograph displayed in FIG. 23, for example. In other words, the position cluster transition button 455 shows other photographs that are clustered by location with the displayed photograph in FIG. 23. In Dr. Greenspun's proposed modification, the position cluster transition button 455 would no longer allow the user to see other photographs in the same position cluster as the photograph displayed in FIG. 23. Dr. Greenspun does not address the drawbacks to removing that functionality from Okamura in his declaration.

308. The example of FIG. 23 is in the "FACE" display mode. Ex. 1005, FIG. 23, ¶ [0254]. FIG. 23—including the position cluster transition button 455—could also be displayed in the "EVENT" display mode, i.e., FIG. 23 would display photos for an event cluster rather than for a face cluster. *Id*. Dr. Greenspun does not propose modifying the functionality of the position cluster transition button 455 when FIG. 23 is in the "EVENT" display mode. Ex. 1003, ¶¶ 177-82, 184-85; Ex. 2024, 160:3-18. In that case, the position cluster transition button 455 would continue to show the position cluster for the image in FIG. 23 when in the "EVENT" display mode, but would show locations for the first person in FIG. 23 when in the "FACE" display mode.

309. Thus, the type of information that is displayed responsive to selecting the position cluster transition button 455 would be entirely different depending on whether the user is in the "EVENT" display mode or the "FACE" display mode. A POSITA would not modify the position cluster transition button 455 in this way because it leads to inconsistent results. It is a fundamental principle of user interface design that the result of selecting a selectable element should be consistent to avoid confusing the user. Notably, there is no indication (e.g., text or caption) associated with the position cluster transition button 455 that would convey to the user the purpose of the position cluster transition button 455 or the result of selecting it.

310. The Essential Guide to User Interface Design – An Introduction to GUI Design Principles and Techniques, includes a section called "Consistency" which provides that "[t]he same action should always yield the same result" and "[t]he function of elements should not change." Ex. 2027, p. 48. Additionally, "[d]esign consistency is the common thread that runs throughout these guidelines. Consistency is uniformity in appearance, placement, and behavior within the user interface." *Id*. In fact, the Essential Guide to User Interface Design refers to consistency as "the cardinal rule of all design activities." *Id*. Dr. Greenspun's proposed modification violates this cardinal rule because the same action (selecting the position cluster transition button 455) would yield different results in different contexts (whether the user is in the "EVENT" display mode or "FACE" display mode. That is, the position cluster transition button 455 would behave differently within the user interface.

311. Similarly, the Designing Interfaces textbook explains:

> Just as important, though, is consistency within an application. Some applications are evil because they establish an expectation that some gesture will do Action X, except in one special mode, where it suddenly does Action Y. Don't do that. It's a sure bet that users will make mistakes, and the more experienced they are-i.e., the more habituated they are—the more likely they are to make that mistake.

Ex. 2018, p. 35. Dr. Greenspun's proposed modification to the position cluster transition button 455 would cause Action X in event display mode but would cause Action Y in the face display mode. This guidance from the Designing Interface text is consistent with guidelines a POSITA would have followed and further shows that a POSITA would not have modified the position cluster transition button 455 in the way proposed.

2. Alleged obviousness based on Okamura and Yee

312. Dr. Greenspun asserts in connection with claim 8 that "a POSITA would have found it obvious to implement Yee's person-specific map shown in FIG. 1 as a view displayed in Okamura." Ex. 1003, ¶ 182. For claim 9, Dr. Greenspun asserts that "Yee discloses displaying a representation of all locations having a digital photograph or video associated with the first person." Ex. 1003, ¶ 185. As discussed below, I disagree with Dr. Greenspun's opinions that Yee discloses the additional limitations of claims 9 and 12 and that it would have been obvious to combine Okamura and Yee in the manner Dr. Greenspun proposes.

313. Yee does not disclose "displaying a representation of all locations having a digital photograph or video associated with the [first/second] person" as required in claims 9 and 12 of the '658 patent. Yee describes displaying a representation of ***some*** locations having a digital photograph or video associated with the [first/second] person. For example, in FIG. 1—which Petitioner and Dr.

Greenspun rely on in their combination with Okamura—the map is focused on "Bob" as the focal attribute and the year 2006. Ex. 1041, ¶ [0045], FIG. 1. Thus, FIG. 1 of Yee only displays a representation of locations having a digital photograph or video associated with the first person (in this case, Bob) in 2006. Because Yee is filtered by the year 2006, less than ***all*** locations having a digital photograph or video associated with the first person is displayed.

314. Indeed, Dr. Greenspun acknowledges that in Yee, "all displayed locations are also limited to a time period." Ex. 1003, ¶ 185. However, Dr. Greenspun asserts that "this embodiment is sufficient to meet the claimed 'all locations' because the '658 patent similarly describes using time as a filter condition and a POSITA would have understood the display to cover 'all locations' of the current set of digital files, even if that set is time limited." *Id*. I disagree.

315. Claim 9 of the '658 patent does not explicitly refer to a "current set of digital files." Instead, claim 9 recites "displaying a representation of ***all*** locations having a digital photograph or video associated with the first person." In Yee's embodiment, the time filter (in FIG. 1, 2006) necessarily restricts the locations represented on the map in FIG. 1 to less than ***all*** locations having a digital photograph or video associated with the first person. In other words, in Yee, the locations represented on the map are filtered not only by the first person (Bob), but

by year (2006). Yee requires this multi-variable filtering: there is no option to turn off the time filter in the embodiment of FIG. 1. *See* Ex. 1041, ¶¶ [0044]-[0048].

316. Dr. Greenspun also asserts that "a POSITA would have found it obvious for the time period selected in Yee to encompass all images/videos of the selected person." Ex. 1003, ¶ 186. Yee does not expressly describe a scenario where the selected time period would encompass every image and video associated with the selected person. But even if such a scenario is possible in Yee, this would require the user to manipulate the Time attribute via the sliding indicator 112 so that all images/videos were encompassed in the selected timeframe. In fact, Yee states that to show any locations on the map, the user has to move the sliding indicator 112. Ex. 1041, ¶ [0045] ("The user also moves sliding indicator 112 to point to 2006 along timeline 104. In response, the system displays all the photographs associated with Bob and the year 2006 in thumbnail strip 106 in chronological order").

317. Even if the scenario contemplated by Dr. Greenspun is theoretically possible, Yee does not disclose any way for the user to know how to set the Time attribute so that the map will encompass all images/videos for the selected person. The user would not even be able to do this by trial and error because there is no feedback or indication in Yee that a given Time attribute selection has encompassed all images/videos for the selected person. Yee states that the "when the sliding attribute is Time, the user can specify hours, days, weeks, months, years, or decades

as the time unit." Ex. 1041, ¶ [0032]. Yee does not disclose any other time unit for the Time attribute. Accordingly, if the images/videos associated with a user are spread out over more than a decade, it is not possible to set the Time attribute in such a way that Yee displays "a representation of all locations having a digital photograph or video associated with the first person."

318. Claim 9 requires that the "representation of all locations having a photograph or video associated with the first person" is displayed responsive to a click or tap of the first person-location selectable element. Even if Yee were substituted into Okamura as Dr. Greenspun suggests, Yee is clear that representations of locations are only shown responsive to selecting a time unit in the timeline 104 using the sliding indicator 112. And, as discussed above, the only way such a selection would result in "all locations" being represented would be if the user happened to have made a selection that encompasses every photograph or video associated with the person (and again, there is no indication in FIG. 1 to tell the user that is the case). Accordingly, even if it is possible in Yee to have a representation of all locations having a photograph or video associated with the first person, in Dr. Greenspun's proposed combination, such a representation would not be displayed responsive to a click or tap of the position cluster transition button 455 in Okamura – it would be displayed, if ever, responsive to the user setting the sliding indicator 112 on the timeline 104 in such a way that all locations would be captured.

319. Dr. Greenspun asserts that it was "obvious to implement Yee's person-specific map shown in FIG. 1 as a view displayed in Okamura." Ex. 1003, ¶ 182. He also asserts that "a POSITA would have combined Yee and Okamura because both Yee and Okamura overcome the common challenge of 'flat, unstructured organization . . . of travers[ing] a larger number of records'" and that a "POSITA would have seen Yee's person-specific map as a natural extension of Okamura's above-referenced disclosure of condition setting and sub-clustering and would have viewed Yee's person-specific map as an example implementation of the same." *Id.* Greenspun also asserts that "a POSITA would have viewed display of all locations in Yee's map as a matter of obvious design choice and selection of one of a finite number of display options (e.g., all or less than all) that would have been obvious to try." Ex. 1003, ¶ 184. I disagree with these assertions.

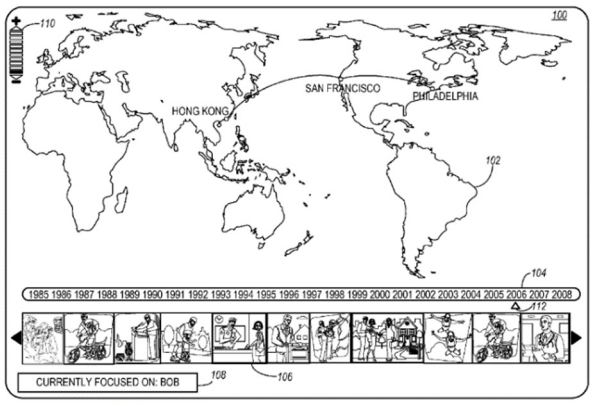
320. As discussed above, a POSITA would not have modified the position cluster transition button 455 in Okamura because it would completely change the purpose of the cluster transition button 455 and remove the ability to see the position cluster corresponding to the currently displayed image. Additionally, as also discussed above, a POSITA would not have modified the position cluster transition button 455 in the FACE display mode because doing so would lead to inconsistent behaviors and results between the FACE display mode and the EVENT display mode.

321. Similar to the discussion above for Belitz, a POSITA would not have modified Okamura with Yee because Yee (in particular, FIG. 1) is substantially the same as the related art disparaged by Okamura (Fujiwara and Takakura). As discussed above, Okamura identifies a problem where a person has many images in the Tokyo area and a smaller number of images elsewhere, which requires a map to be displayed at a sufficiently large scale to show all images and thus makes it "difficult to grasp the geographical correspondence between the images taken in Tokyo and its vicinity." Ex. 1005, ¶ [0009]. Conversely, Okamura states that when the map is zoomed in to show Tokyo, it is not possible to see the positions of other images on the map. *Id*., ¶ [0010].

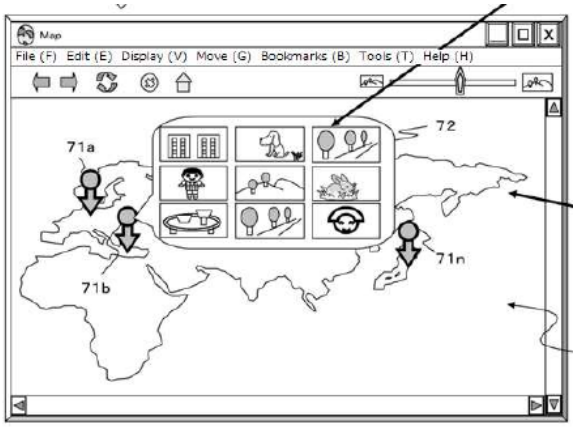
322. Yee has the same drawbacks and limitations of the related art that Okamura disparages and discredits. As shown in FIG. 1 of Yee, there are two markers near Hong Kong, one marker near San Francisco, and another marker near Philadelphia on the world map 102. Ex. 1041, FIG. 1.

Ex. 1041, FIG. 1 (excerpted)

At the scale shown in FIG. 1, it is not possible for the user to understand, for example, where the image(s) in San Francisco were taken. The user could zoom in on Yee's world map 102 using the zoom control 110, but if they zoomed in on San Francisco to see where the image(s) were taken, they would no longer be able to see that there are also image(s) in or around Hong Kong and Philadelphia. A POSITA would not have modified Okamura to include Yee's FIG. 1 because Yee has precisely the problem Okamura identifies and teaches to avoid by using cluster maps. Indeed, as shown below, FIG. 1 of Yee is substantially the same as FIG. 4 of Takakura in that there are markers at various locations on a scalable world map.



Ex. 1041, FIG. 1



Ex. 2019, FIG. 4

323. I understand Dr. Greenspun testified that he is not proposing any modifications to Yee. Ex. 2024, 175:10-14. As discussed above, Yee requires the user to select a time unit (the maximum being a decade) as the sliding attribute. A POSITA would not have modified Yee to remove the sliding time unit attribute

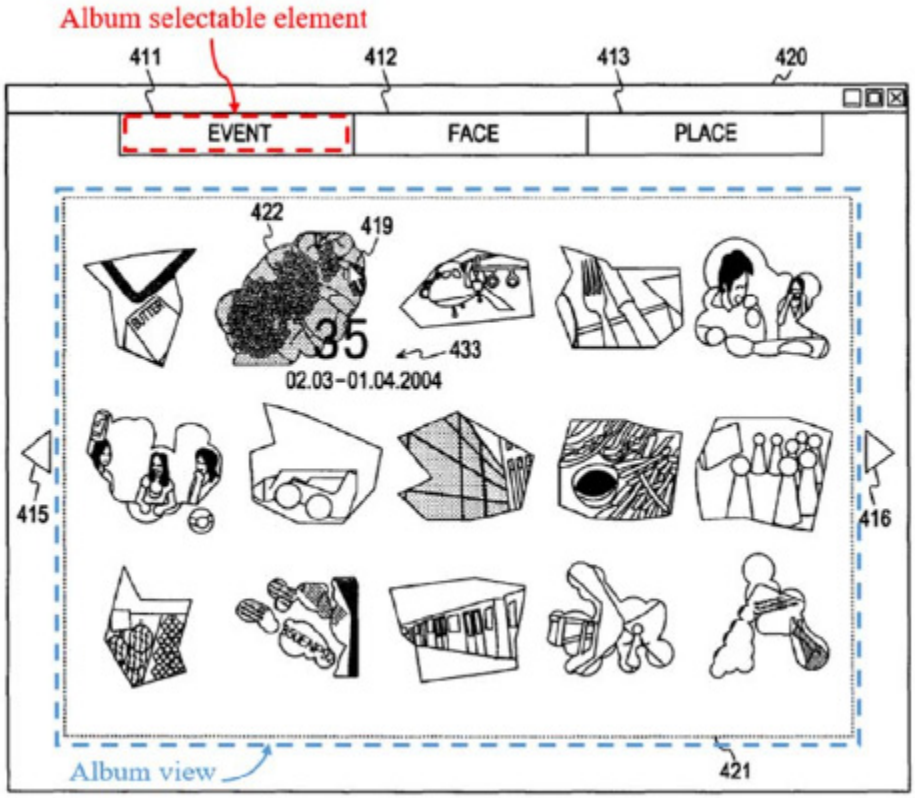
(which will limit the representations on the map to less than "all locations" unless the user happens to make a selection where that is true). Yee is directed to traversing "digital records based on multiple dimensional attributes." Ex. 1041, ¶ [0001]. In fact, Yee states that its system "hinges on conceptualizing a digital record as the intersection of multiple dimensional attributes." *Id*., ¶ [0024].

F. Claim 13: Okamura does not disclose "responsive to a click or tap of the album selectable element, displaying an album view, the displaying the album view including displaying . . . a first album name . . . [and] a second album name"

324. Claim 13 recites: "wherein the plurality of selectable elements further includes an album selectable element, the method further comprising responsive to a click or tap of the album selectable element, displaying an album view, the displaying the album view including displaying: (i) a first album selectable thumbnail image including a scaled representation of at least one digital photograph in a third set of digital photographs and videos that includes all of the digital photographs and videos associated with a first album tag; (ii) a first album name associated with the first album, the first album name being displayed adjacent to the first album selectable thumbnail image; (iii) a second album selectable thumbnail image including a scaled representation of at least one digital photograph in a fourth set of digital photographs and videos that includes all of the digital photographs and videos associated with a second album tag; and (ii) a second album name associated

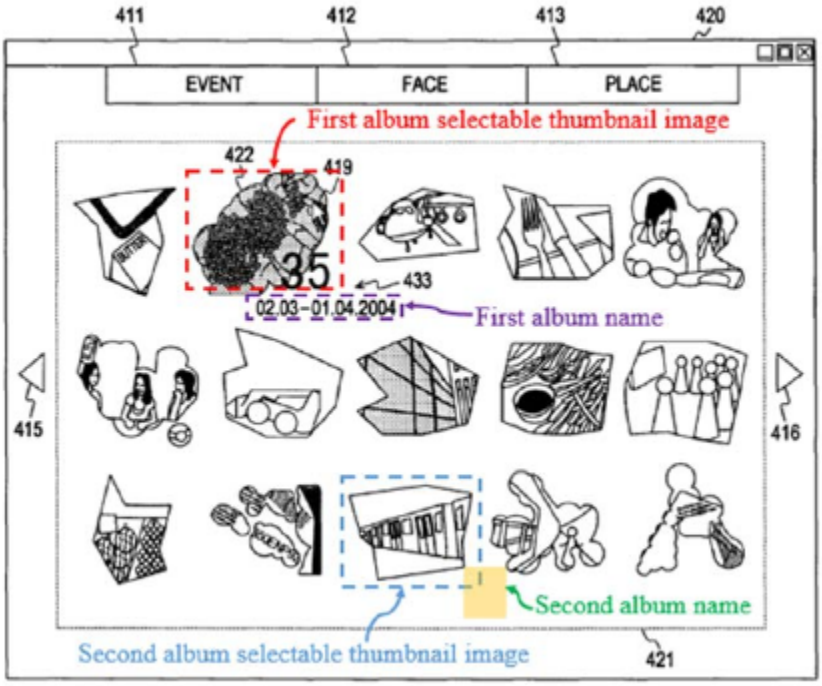
with the second album, the second album name being displayed adjacent to the second album selectable thumbnail image."

325. Petitioner and Dr. Greenspun identify FIG. 20 of Okamura as allegedly corresponding to the claimed "album view," as shown below. Petition, 93-94; Ex. 1003, ¶ 191.



Ex. 1003, ¶ 191 (annotating Ex. 1005, FIG. 20)

326. In particular, Petitioner and Dr. Greenspun identify the "album tag" annotated below as allegedly corresponding to the claimed "first album name."



Ex. 1003, ¶ 198 (annotating Ex. 1005, FIG. 20)

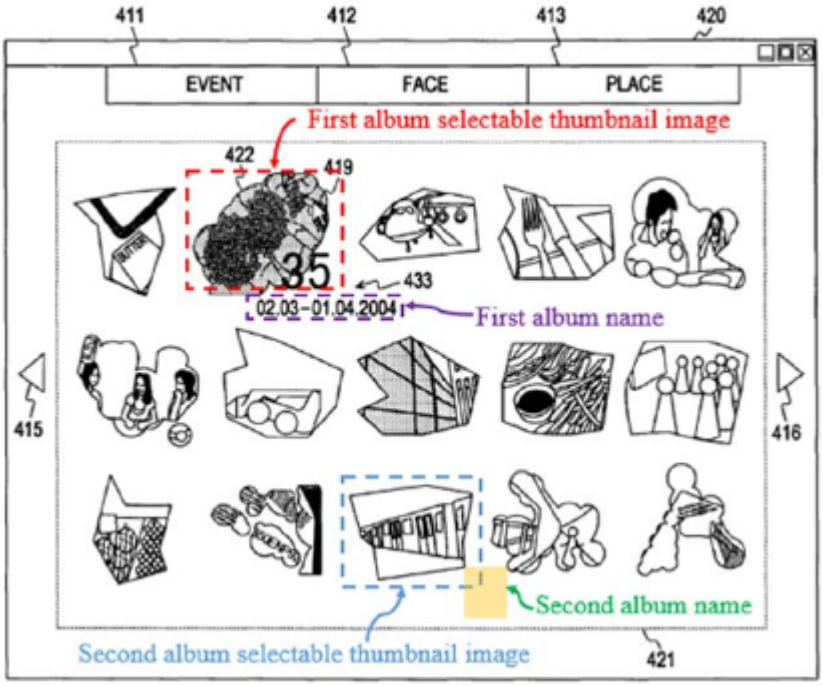
I disagree with Dr. Greenspun's opinion that Okamura discloses the claimed "album view" for two reasons.

327. First, any alleged "first album name" or "second album name" in FIG. 20 of Okamura is not displayed "responsive to" a click or tap of the Event tab 411 (the alleged album selectable element). FIG. 20 of Okamura includes reference number 433, which is described in Okamura as part of FIG. 21 (the alleged people view discussed above). Okamura explains that the information 433 (allegedly containing an album name) is only displayed "when the mouse is placed over a thumbnail image 432 by a user operation on the index screen 430." Ex. 1005, ¶ [0247]. The only possible "album name" that appears in Okamura only appears

when a user places their mouse over a particular thumbnail image. No "name" is displayed responsive to a click or tap of the Events tab 411 (the alleged album selectable element).

328. Second, Okamura does not disclose a view including both the first album name and the second album name as required by claim 13 of the '658 patent. As discussed above, the only possible "name" in Okamura's FIG. 20 appears when placing the mouse over a thumbnail image. Ex. 1005, ¶ [0247]. The mouse can only be placed on one thumbnail image at a time, meaning that at any given time, there can only be one "album name" displayed in Okamura. Assuming there are two thumbnails for two different albums, there are only two possible ways to show a "view" with an "album name" in Okamura: (1) a view including the first album name or (2) a view including the second album name. Neither of these possibilities corresponds to the claimed "album view" because neither view includes both the first album name and the second album name as required by claim 13.

329. The fact that Okamura can only display a view including the first album name or the second album name (but not both) is further evidenced by Dr. Greenspun's annotations of FIG. 20. As shown below, only an "first album name" is displayed and there is no "second album name."



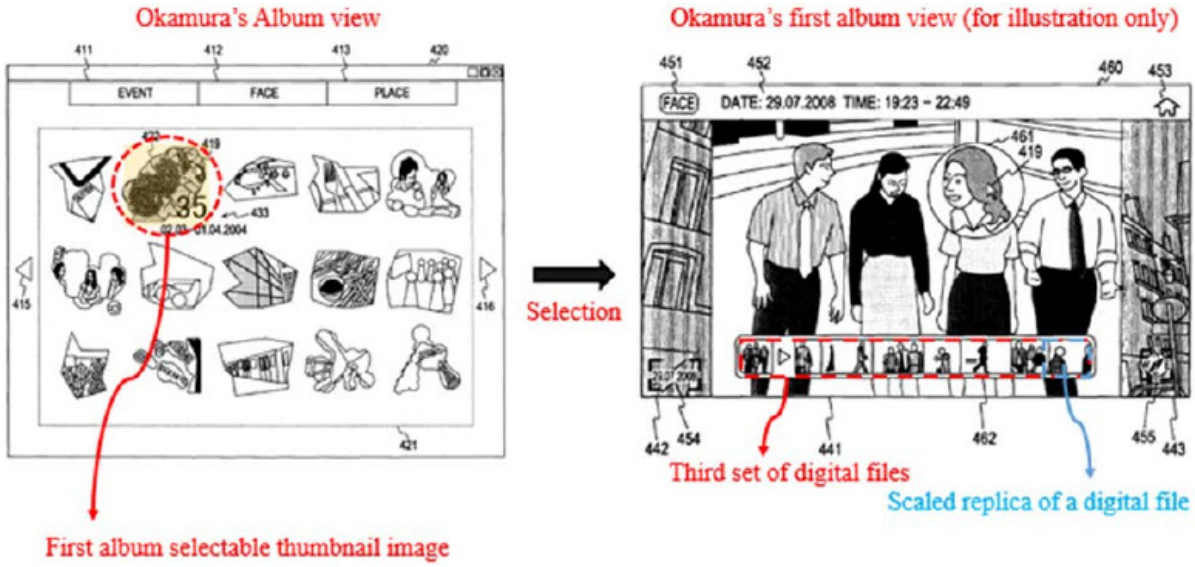
Ex. 1003, ¶ 198 (annotating Ex. 1005, FIG. 20)

330. Petitioner and Dr. Greenspun do not assert that it would have been obvious to modify Okamura so that the first album name and the second album name are displayed responsive to a click or tap of the album selectable element. They also do not assert that it would have been obvious to modify Okamura to include a view where both the first album name and the second album name are displayed (as opposed to only one or the other). In my view, a POSITA would not have done so for the reason I discussed above with respect to the names in the claimed "people view."

G. Claims 14 and 15: Okamura does not disclose "responsive to a click or tap of the [first/second] album selectable thumbnail image, displaying a [first/second] album view"

331. Claims 14 and 15 recite: "responsive to a click or tap of the [first/second] album selectable thumbnail image, displaying a [first/second] album view, the displaying the [first/second] album view including displaying (i) the [first/second] album name associated with the [first/second] album and (ii) a scaled replica of each of the digital photographs and videos in the [third/fourth] set of digital photographs and videos."

332. For claim 14, Dr. Greenspun asserts that based on his earlier description of how Okamura allegedly displays a "[first/second] person view" responsive to a selection in FIG. 20, "a POSITA would have understood and found obvious that Okamura displays a similar album view in response to the selection, by a click or tap, of an album selectable thumbnail image" and that "operations applied to a person selectable thumbnail image can be similarly applied to an album selectable thumbnail image." Ex. 1003, ¶ 199. As an illustration, Dr. Greenspun reproduces FIG. 24 of Okamura.



Ex. 1003, ¶ 201 (annotating Ex. 1005, FIG. 24)

333. As discussed above in connection with claims 7 and 10, Okamura is clear that clicking or tapping a thumbnail in FIGS. 18-21 does ***not*** cause FIG. 24 to be displayed. Instead, the user has to (1) make a selection in one of FIGS. 18-21 to display the content playback screen 440 (FIG. 22); (2) move the mouse within the content playback screen 440 (FIG. 22) to display the content playback screen 450 (FIG. 23); and (3) hover the mouse over a face box within the content playback screen 450 (FIG. 23) to display the content playback screen 460 (FIG. 24). Neither the content playback screen 440 (FIG. 22) nor the content playback screen 450 (FIG. 23) include any scaled replicas or album names. The only arguable "[first/second] album view" identified by Dr. Greenspun is the content playback screen 460 (FIG. 24), but that screen is ***not*** displayed responsive to a click or tap of a thumbnail in the alleged "album view" as required in claims 14 and 15.

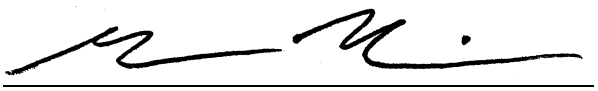
334. Additionally, the claimed "[first/second] album view" includes "a scaled replica of each of the digital photographs and videos in the [third/fourth] set of digital photographs and videos." In Okamura, the content listing display area 462 (alleged scaled replicas) is limited to "a listing of contents included in the face cluster to which the content displayed in the content display area 441 belongs." Ex. 1005, ¶ [0261]. In other words, the images in the content listing display area 462 are limited to the particular person that the mouse is placed over. Okamura does not describe displaying the content listing display area 462 in a case where there is no face in the displayed image. Thus, in a case where the third/fourth set of digital photographs and videos associated with the first/second album does not include a face, no scaled replicas can be displayed in Okamura. And, even if there is a face in a photograph in the third/fourth set of digital photographs and videos, the content of the content listing display area 462 would not contain scaled replicas of "***each*** of the digital photographs and videos in the third set of digital photographs and videos" as required in claims 14 and 15.

XI. CONCLUSION

335. I reserve the right to modify or supplement my opinions, if necessary, based on further review and analysis of the evidence in this case, including review and analysis of information that may be provided to me subsequent to the date of this Declaration.

I declare that all statements made herein of my own knowledge are true and 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.

Dated: October 30, 2022



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Research Interests

Computer architecture, augmented reality, parallel programming, graphics processing, compilers, and systems.

Education

- **University of California - San Diego (San Diego, CA)**
  - Doctor of Philosophy degree in Computer Science, June 2001
  - Master of Science degree in Computer Science, March 1999.
- **Massachusetts Institute of Technology (Cambridge, MA)**
  - Bachelor of Science degree in Computer Science and Engineering, June 1996.

Recent Research Highlights

- **Neurally-Implemented Approximate Computing** – Exploiting error tolerance via accelerators implemented using neural networks
- **Accelerator-Rich Chip Multiprocessors (CMPs)** – energy-efficient high-performance SoC platforms that features both application-specific accelerators and heterogeneous cores. Accelerators can be monolithic, or may be composed from coarse-grain building blocks and fine-grain reconfigurable fabric (e.g. FPGAs).
- **RF Interconnect** – a promising alternative interconnect for both on-chip and off-chip communication for future CMPs. It can be adaptively tuned to the communication needs of an individual application. We have also explored wireless RF interconnect and RF-integrated memory technology.
- **Mobile Augmented Reality** – sensing and guidance framework for real-time critical situations. We are leveraging our work on automated planning engines and our work to accelerate computer vision as the basis for this line of research.
- **Real-Time Physics** – we have proposed a novel physics processor and explored dynamically trading accuracy for improved performance while maintaining believability.

Work Experience

- **University of California – Los Angeles (Los Angeles, CA)**
  - Full Professor (2014-Present)
    - Undergraduate Vice Chair (2021-Present)
    - Graduate Vice Chair (2016-2019)
  - Associate Professor (2007-2014)
  - Assistant Professor (2001-2007)
- **Expert Witness Experience (2007-Present)**
  - Testifying Experience
    - Testified at trial in the ITC on four occasions
    - Testified in district court on three occasions
    - Testified at an arbitration hearing in Japan
    - Deposed in nineteen different matters
    - Presented Markman tutorials on two occasions
  - Written numerous detailed expert reports on infringement, non-infringement, validity, and invalidity, and constructed patent claim charts. Have also written declarations in support of various matters.

- Personally analyzed and traced a variety of source code (both hardware RTL and software source code) to map infringement as part of numerous source code reviews on very large repositories of code. Deciphered decades-old designs from schematics and microcode. Investigated products and systems: profile and tear down of a variety of software and hardware systems, and architectural simulation of patented designs. Uncovered prior work to help anticipate claims.
- Excellent track record of collaboration with lawyers in helping to educate them on technical details.

- **University of California - San Diego, Research Assistant (San Diego, CA)**
  - Implemented a profile-based approach to classifying loads for memory renaming, value prediction, and dependence prediction using SimpleScalar and ATOM. Created an aggressive fetch unit using a two-level branch prediction structure called an FTB. Worked with SimpleScalar to implement a hybrid load prediction mechanism, combining renaming, value prediction, address prediction, and dependence prediction. Explored importance of confidence in value prediction. Used C and C++. (Fall 1997-Spring 2001)
  - Implemented a contention resolution scheme for embarassingly parallel applications (such as the DOT project at the San Diego Supercomputing Center). Worked in MPICH and C. (Spring 1997-Fall 1997)
- **COMPAQ (**now **HP) - Western Research Lab, Summer Internship 1999 (Palo Alto, CA)**
  Expanded the CACTI cache compiler (CACTI 2.0). Enhancements include fully associative cache model, power modeling, multiple port models, transistor tuning, and tag path balancing.
- **Intel Corporation - Microprocessor Research Lab, Summer Intern 1998 (Hillsboro, OR)**
  Studied the viability of caching state from the branch predictor, TLB, and BTB in the second level data cache. Modified SimpleScalar to use ITR traces for Win95 applications for initial predictability experiments. Used out-of-order simulation with SimpleScalar to determine the effectiveness of this technique.

Teaching Experience

- **University of California – Los Angeles, Assistant Professor (Los Angeles, CA)**
  - ***Computer Systems Architecture*** (CSM151B - Upper Division Undergraduate class) - I have taught this class since Winter 2003, covering instruction set architecture design, ALU design, processor datapath and control design, pipelining, caches, virtual memory, IO devices, multithreading, multiprocessors, and multicore architectures.
  - ***Advanced Topics in Microprocessor Design*** (CS259 - Graduate class) - I introduced this class in Spring 2002, covering cutting edge research in general purpose microarchitecture. The processor pipeline is explored in detail, with attention to performance, complexity, cycle time, power, and area. Recent real world architectures are used for illustration, along with on-going research efforts in topics that includes multicore processors, NoC design, cache coherence mechanisms, GPU design and programming, branch prediction, load speculation, simultaneous multithreading, cache design/prefetching, register file design, and various techniques to combat processor scaling trends. Introduction to cycle-accurate microprocessor simulation. Lab intensive class designed to give students practical experience with simulation techniques and tricks. On-going work in architecture and compilers is discussed during class and then integrated into lab assignments using the simulation infrastructure.
  - ***High Performance Computing*** (CS239 - Graduate class) - I introduced this class in Fall 2019, covering advanced topics in high performance computing – it spans topics in areas including applications, compilers, programming languages, operating systems, microprocessor design, and physical design.
  - ***Microprocessor Simulation*** (CS259 - Graduate class) - I introduced this class in Winter 2003, providing a practical application of my Advanced Topics class students make use of execution-driven cycle-accurate processor simulators.
  - ***Parallel and Distributed Systems*** (CS133 - Upper Division Undergraduate class) - I have completely reorganized this class in Winter 2007 to focus on programming in OpenMP, POSIX threads, MPI, and CUDA for both shared and distributed memory multiprocessors. The class also has a component on next generation chip multiprocessors, including design tradeoffs and un-core optimizations.

- ***Computer Organization*** (CS33 - Lower Division Undergraduate class) - I completely reorganized this class in Fall 2009 to make it a gateway systems class using low-level C programming and x86 assembly. It is a practical class, with several labs including an introduction to parallel programming with CUDA as the demonstration vehicle.
- ***Computer Science Seminar Series*** (CS201 - Graduate class)

- **University of California - San Diego, Teaching Assistant (San Diego, CA)**
  - Teaching Assistant - taught discussion sections for classes on data structures, artificial intelligence, and compilers. Recipient of 1996/97 TA Excellence Award.

Publications

Refereed Conference and Workshop Publications:

1. Nazanin Farahpour, Yuchen Hao, Zhenman Fang, and Glenn Reinman. Reconfigurable Accelerator Compute Hierarchy: A Case Study Using Content-Based Image Retrieval. *International Symposium on Workload Characterization (IISWC)*, Oct 2020.
2. Nazanin Farahpour, Zhenman Fang, and Glenn Reinman. WIP: FPGA-based Near Data Processing Platform Selection Using Fast Performance Modeling. *International Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*, Jun 2020.
3. Zhenman Fang, Farnoosh Javadi, Jason Cong, and Glenn Reinman. Understanding Performance Gains of Accelerator-Rich Architectures. *International Conference on Application-specific Systems, Architectures and Processors (ASAP)*, Jul 2019.
4. Jason Cong, Zhenman Fang, Farnoosh Javadi, and Glenn Reinman. AIM: Accelerating Computational Genomics through Scalable and Noninvasive Accelerator-Interposed Memory. *International Symposium on Memory Systems (MEMSYS)*, Oct 2017. **BEST PAPER AWARD**
5. Yuchen Hao, Zhenman Fang, Jason Cong, and Glenn Reinman. Supporting Address Translation for Accelerator-Centric Architectures. *International Symposium on High Performance Computer Architecture (HPCA)*, Feb 2017.
6. Young-kyu Choi, Jason Cong, Zhenman Fang, Yuchen Hao, Glenn Reinman, and Peng Wei. A Quantitative Analysis on Microarchitectures of Modern CPU-FPGA Acceleration Platforms. *Design Automation Conference (DAC)*, Jun 2016.
7. Jason Cong, Zhenman Fang, Michael Gill, and Glenn Reinman. PARADE: A Cycle-Accurate Full-System Simulation Platform for Accelerator-Rich Architectural Design and Exploration. *International Conference on Computer-Aided Design (ICCAD)*, Nov 2015.
8. Jason Cong, Michael Gill, Yuchen Hao, Glenn Reinman, and Bo Yuan. On-chip Interconnection Network for Accelerator-Rich Architectures. *Design Automation Conference (DAC)*, Jun 2015.
9. Beayna Grigorian, Nazanin Farahpour, and Glenn Reinman. BRAINIAC: Bringing Reliable Accuracy Into Neurally-Implemented Approximate Computing. *International Symposium on High-Performance Computer Architecture (HPCA)*, Feb 2015.
10. Beayna Grigorian and Glenn Reinman. Accelerating Divergent Applications on SIMD Architectures Using Neural Networks. *IEEE International Conference on Computer Design (ICCD)*, Oct 2014.
11. Beayna Grigorian and Glenn Reinman. Dynamically Adaptive and Reliable Approximate Computing Using Light-Weight Error Analysis. *NASA/ESA Adaptive Hardware and Systems conference (AHS)*, Jul 2014.
12. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian, Karthik Gururaj, and Glenn Reinman. Accelerator-Rich Architectures: Opportunities and Progresses. *Design Automation Conference (DAC)*, Jun 2014.
13. Beayna Grigorian and Glenn Reinman. Improving Coverage and Reliability in Approximate Computing Using Application-Specific, Light-Weight Checks, *Workshop on Approximate Computing Across the System Stack (WACAS14)*, Mar 2014.

14. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian, Hui Huang, and Glenn Reinman, Composable Accelerator-rich Microprocessor Enhanced for Adaptivity and Longevity, *International Symposium on Low Power Electronics and Design (ISLPED)*, Sep 2013.
15. Hao Wu, Lan Nan, Sai-Wang Tam, Hsieh-Hung Hsieh, Chewpu Jou, Glenn Reinman, Jason Cong, and Mau-Chung Frank Chang. A 60GHz On-Chip RF-Interconnect with **λ**/4 Coupler for 5Gbps Bi-Directional Communication and Multi-Drop Arbitration. *IEEE Custom Integrated Circuits Conference (CICC)*, Sep 2012.
16. Yu-Ting Chen, Jason Cong, Hui Huang, Chunyue Liu, Raghu Prabhakar and Glenn Reinman. Static and Dynamic Co-Optimizations for Blocks Mapping in Hybrid Caches. *International Symposium on Low Power Electronics and Design (ISLPED)*, Jul/Aug 2012.
17. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian and Glenn Reinman. CHARM: A Composable Heterogeneous Accelerator-Rich Microprocessor. *International Symposium on Low Power Electronics and Design (ISLPED)*, Jul/Aug 2012.
18. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Chunyue Liu and Glenn Reinman. BiN: A Buffer-in-NUCA Scheme for Accelerator-Rich CMPs. *International Symposium on Low Power Electronics and Design (ISLPED)*, Jul/Aug 2012.
19. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian, and Glenn Reinman. Accelerator-Rich Architecture for Power-Constrained CMPs. *Dark Silicon Workshop (DaSi - held in conjunction with ISCA)*, Jun 2012
20. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian, and Glenn Reinman. Architecture Support for Accelerator-Rich CMPs. *Design Automation Conference (DAC)*, Jun 2012
21. Yu-Ting Chen, Jason Cong, Hui Huang, Bin Liu, Chunyue Liu, Miodrag Potkonjak and Glenn Reinman. Dynamically Reconfigurable Hybrid Cache: An Energy-Efficient Last-Level Cache Design. *Conference on Design, Automation, and Test in Europe (DATE)*, Mar 2012.
22. Yangkyo Kim, Gyungsu Byun, Adrian Tang, Jason Cong, Glenn Reinman, and M. F. Chang. An 8Gb/s/pin 4pJ/b/pin Single-T-Line Dual (Base+RF) Band Simulataneous Bidirectional Mobile Memory I/O Interface with Inter-Channel Interference Suppression. *International Solid-State Circuits Conference (ISSCC)*, Feb 2012.
23. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Hui Huang, Bin Liu, Raghu Prabhakar, Glenn Reinman, and Marco Vitanza. Compilation and Architecture Support for Customized Vector Instruction Extension. *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan/Feb 2012.
24. Mubbasir Kapadia, Matthew Wang, Glenn Reinman, and Petros Faloutsos. Improved Benchmarking for Crowd Simulations. *Motion In Games (MIG)*, Nov 2011
25. Kanit Therdsteerasukdi, Gyungsu Byun, Jeremy Ir, Glenn Reinman, Jason Cong, and Frank Chang. The DIMM Tree Architecture: A High Bandwidth and Scalable Memory System. *IEEE International Conference on Computer Design (ICCD),* Oct 2011.
26. Yu-Ting Chen, Jason Cong and Glenn Reinman. HC-Sim: A Fast and Exact L1 Cache Simulator with Scratchpad Memory Co-simulation Support. *International Conference on Hardware/Software Co-Design and System Synthesis (CODES+ISSS)*, Oct 2011.
27. Beayna Grigorian, Marco Vitanza, Jason Cong, and Glenn Reinman. Accelerating Vision and Navigation Applications on a Customizable Platform. *International Conference on Application-specific Systems, Architectures and Processors (ASAP)*, Sep 2011.
28. Mubbasir Kapadia, Matthew Wang, Shawn Singh, Glenn Reinman, and Petros Faloutsos. Scenario Space: Characterizing Coverage, Quality, and Failure of Steering Algorithms. *Symposium on Computer Animation (SCA)*, Aug 2011.
29. Jason Cong, Karthik Gururaj, Hui Huang, Chunyue Liu, Glenn Reinman and Yi Zou. An Energy-Efficient Adaptive Hybrid Cache. *International Symposium on Low Power Electronics and Design (ISLPED)*, Aug 2011.
30. Mubbasir Kapadia, Shawn Singh, Glenn Reinman, and Petros Faloutsos. Multi-Actor Planning for Directable Simulations. *Workshop on Digital Media and Digital Content Management*, May 2011.

31. Gyungsu Byun, Yangkyo Kim, Jongsun Kim, Sai-Wang Tam, Jason Cong, Glenn Reinman, and M. F. Chang. An 8.4Gb/s 2.5pJ/b Mobile Memory I/O Interface Using Bi-directional and Simultaneous Dual (Base+RF)-Band Signaling. *International Solid-State Circuits Conference (ISSCC)*, Feb 2011.
32. Jason Cong, Mohammadali Ghodrat, Michael Gill, Chunyue Liu, Glenn Reinman and Yi Zou. AXR-CMP: Architecture Support in Accelerator-Rich CMPs. *Workshop on SoC Architecture, Accelerators and Workloads (SAW-2)*, Feb 2011.
33. Shawn Singh, Mubbasir Kapadia, Billy Hewlett, Glenn Reinman and Petros Faloutsos. A Modular Framework for Adaptive Agent-Based Steering. *Symposium on Interactive 3D Graphics and Games (I3D)*, Feb 2011.
34. Zoran Budimlic, Alex Bui, Jason Cong, Glenn Reinman, Vivek Sarkar. Modeling and Mapping for Customizable Domain-Specific Computing. Workshop on Concurrency for the Application Programmer (CAP), co-located with SPLASH 2010, Oct 2010.
35. Jason Cong, Chunyue Liu, and Glenn Reinman. ACES: Application-specific cycle elimination and splitting for deadlock-free routing on irregular network-on-chip. *Design Automation Conference (DAC)*, Jun 2010.
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38. Suk-Bok Lee, Sai-Wang Tam, Ioannis Pefkianakis, Songwu Lu, M. Frank Chang, Chuanxiong Guo, Glenn Reinman, Chunyi Peng, Mishali Naik, Lixia Zhang, and Jason Cong. A Scalable Micro Wireless Interconnect Structure for CMPs. *International Conference on Mobile Computing and Networking*, Sept 2009.
39. Mubbasir Kapadia, Shawn Singh, Brian Allen, Glenn Reinman, and Petros Faloutsos. An Interactive Framework for Specifying and Detecting Steering Behaviors. *Symposium on Computer Animation (SCA)*, Aug 2009.
40. Jason Cong, M. Frank Chang, Glenn Reinman, and Sai-Wang Tam, Multiband RF-Interconnect for Reconfigurable Network-on-Chip Communications, *System Level Interconnect Prediction (SLIP 2009)*, July 2009.
41. M. Frank Chang, Jason Cong, Adam Kaplan, Mishali Naik, Jagannath Premkumar, Glenn Reinman, Eran Socher, and Sai-Wang Tam. Power Reduction of CMP Communication Networks via RF-Interconnects. *International Symposium on Microarchitecture (MICRO)*, Nov 2008.
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47. Yongxiang Liu, Yuchun Ma, Eren Kursun, Jason Cong, and Glenn Reinman. Fine Grain 3D Integration for Microarchitecture Design Through Cube Packing Exploration. *IEEE International Conference on Computer Design (ICCD)*, Oct 2007.
48. Yongxiang Liu, Yuchun Ma, Eren Kursun, Jason Cong, and Glenn Reinman. 3D Architecture Modeling and Exploration. *VLSI/ULSI Multilevel Interconnection Conference*, Sept 2007.

49. Tom Yeh, Petros Faloutsos, Sanjay Patel, and Glenn Reinman. ParallAX: An Architecture for Real-Time Physics. In *34th Annual International Symposium on Computer Architecture (ISCA),* June 2007
50. Yuchun Ma, Zhuoyuan Li, Jason Cong, Xianlong Hong, Glenn Reinman, Sheqin Dong, and Qian Zhou. Micro-architecture Pipelining Optimization with Throughput-Aware Floorplanning. *12th Asia and South Pacific Design Automation Conference (ASPDAC)*, Jan 2007.
51. Vasily G. Moshnyaga, Hua Vo, Glenn Reinman, and Miodrag Potkonjak. Reducing Energy of DRAM/Flash Memory System by OS-Controlled Data Refresh. In *International Symposium on Circuits and Systems (ISCAS)*, May 2007.
52. Anahita Shayesteh, Glenn Reinman, Norm Jouppi, Suleyman Sair, and Tim Sherwood. Improving the Performance and Power Efficiency of Shared Helpers in CMPs. *International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (CASES),* Oct 2006.
53. Vasily Moshnyaga, Hoa Vo, Glenn Reinman, and Miodrag Potkonjak. Handheld System Energy Reduction by OS-Driven Refresh. *Power and Timing Modeling, Optimization, and Simulation (PATMOS)*, September 2006.
54. Tom Yeh, Petros Faloutsos, and Glenn Reinman. Enabling Real-Time Physics Simulation in Future Interactive Entertainment. *ACM SIGGRAPH Video Game Symposium*, Aug 2006.
55. Jason Cong, Ashok Jagannathan, Yuchun Ma, Glenn Reinman, Jie Wei, and Yan Zhang. An Automated Design Flow for 3D Microarchitecture Evaluation. *11th Asia and South Pacific Design Automation Conference (ASPDAC)*, Jan 2006.
56. Anahita Shayesteh, Eren Kursun, Tim Sherwood, Suleyman Sair, and Glenn Reinman. Reducing the Latency and Area Cost of Core Swapping through Shared Helper Engines. *IEEE International Conference on Computer Design (ICCD),* Oct 2005.
57. Yongxiang Liu, Gokhan Memik, and Glenn Reinman. Reducing the Energy of Speculative Instruction Schedulers. *IEEE International Conference on Computer Design (ICCD),* Oct 2005.
58. Tom Yeh and Glenn Reinman. Fast and Fair: Data-stream Quality of Service. *International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (CASES),* Sep 2005.
59. Jason Cong, Ashok Jagannathan, Glenn Reinman, and Yuval Tamir. Understanding The Energy Efficiency of SMT and CMP with Multi-clustering. *IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED)*, Aug 2005.
60. Yongxiang Liu, Anahita Shayesteh, Gokhan Memik, and Glenn Reinman. Tornado Warning: the Perils of Selective Replay in Multithreaded Processors. *International Conference on Supercomputing (ICS)*, June 2005.
61. Jason Cong, Yiping Fan, Guoling Han, Ashok Jagannathan, Glenn Reinman, and Zhiru Zhang. Instruction Set Extension with Shadow Registers for Configurable Processors. *13th ACM International Symposium on Field-Programmable Gate Arrays,* Feb 2005.
62. Ashok Jagannathan, Hannah Honghua Yang, Kris Konigsfeld, Dan Milliron, Mosur Mohan, Michail Romesis, Glenn Reinman, and Jason Cong. Microarchitecture Evaluation with Floorplanning and Interconnect Pipelining. *Asia South Pacific Design Automation Conference (ASPDAC)*, Jan 2005.
63. Eren Kursun, Glenn Reinman, Suleyman Sair, Anahita Shayesteh, and Tim Sherwood. Low-Overhead Core Swapping for Thermal Management. *Workshop on Power-Aware Computer Systems (PACS'04) held in conjunction with the 37th Annual International Symposium on Microarchitecture*, December 2004.
64. Yongxiang Liu, Anahita Shayesteh, Gokhan Memik, and Glenn Reinman. The Calm Before the Storm: Reducing Replays in the Cyclone Scheduler. *IBM T.J. Watson Conference on Interaction between Architecture, Circuits, and Compilers,* Oct 2004.
65. Jason Cong, Ashok Jagannathan, Glenn Reinman, and Yuval Tamir. A Communication-Centric Approach to Instruction Steering for Future Clustered Processors. *IBM T.J. Watson Conference on Interaction between Architecture, Circuits, and Compilers,* Oct 2004.
66. Yongxiang Liu, Anahita Shayesteh, Gokhan Memik, and Glenn Reinman. Scaling the Issue Window with Look-Ahead Latency Prediction. *International Conference on Supercomputing (ICS)*, June 2004.
67. Fang-Chung Chen, Foad Dabiri, Roozbeh Jafari, Eren Kursun, Vijay Raghunathan, Thomas Schoellhammer, Doug Sievers, Deborah Estrin, Glenn Reinman, Majid Sarrafzadeh, Mani Srivastava, Ben

Wu, Yang Yang. Reconfigurable Fabric: An enabling technology for pervasive medical monitoring. *Communication Networks and Distributed Systems Modeling and Simulation Conference*, Jan 2004.

68. Jason Cong, Ashok Jagannathan, Glenn Reinman, and Michail Romesis. Microarchitecture Evaluation with Physical Planning. *Design Automation Conference (DAC)*, 2003.
69. Gokhan Memik, Glenn Reinman, and William H. Mangione-Smith. Reducing Energy and Delay Using Efficient Victim Caches. *IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED)*, Aug. 2003.
70. Gokhan Memik, Glenn Reinman, and William H. Mangione-Smith. Just Say No: Benefits of Early Cache Miss Determination. *In the proceedings of the 9thIEEE/ACM International Symposium on High Performance Computer Architecture (HPCA)*, Feb. 2003.
71. Glenn Reinman, Brad Calder and Todd Austin. High Performance and Energy Efficient Serial Prefetch Architecture. *In the proceedings of the 4th InternationalSymposium on High Performance Computing*, May 2002, (c) Springer-Verlag.
72. Glenn Reinman, Brad Calder, and Todd Austin. Fetch Directed Instruction Prefetching. In *32nd International Symposium on Microarchitecture (MICRO),* November 1999.
73. Glenn Reinman, Brad Calder, Dean Tullsen, Gary Tyson, and Todd Austin. Classifying Load and Store Instructions for Memory Renaming. In *ACM International Conference on Supercomputing (ICS),* June 1999.
74. Glenn Reinman, Todd Austin, and Brad Calder. A Scalable Front-End Architecture for Fast Instruction Delivery. In *26th Annual International Symposium on Computer Architecture (ISCA),* May 1999.
75. Brad Calder, Glenn Reinman, and Dean Tullsen. Selective Value Prediction. In *26th Annual International Symposium on Computer Architecture (ISCA),* May 1999.
76. Glenn Reinman and Brad Calder. Predictive Techniques for Aggressive Load Speculation. In *31st Annual International Symposium on Microarchitecture (MICRO)*, December 1998.

Refereed Journal Publications:

77. Young-Kyu Choi, Jason Cong, Zhenman Fang, Yuchen Hao, Glenn Reinman, and Peng Wei. In-Depth Analysis on Microarchitectures of Modern Heterogeneous CPU-FPGA Platforms. *ACM Transactions on Reconfigurable Technology and Systems (TRETS)*, Feb 2019.
78. Robert Chen and Glenn Reinman. CHILL: A System for Fine-Grained Mapping of Chained High Impact Long-Latency Load Phases on Tightly Coupled Heterogeneous Multi-cores. *International Journal of High Performance Systems Architecture*, Jan 2017.
79. Beayna Grigorian and Glenn Reinman. Accelerating Divergent Applications on SIMD Architectures Using Neural Networks. *ACM Transactions on Architecture and Code Optimization (TACO)*, Apr 2015.
80. Jason Cong, Mohammad Ali Ghodrat, Michael Gill, Beayna Grigorian and Glenn Reinman. Architecture Support for Domain-Specific Accelerator-Rich CMPs. *ACM Transactions on Embedded Computing Systems (TECS)*, Apr 2014.
81. Chunhua Xiao, Frank Chang, Jason Cong, Michael Gill, Zhangqin Huang, Chunyue Liu, Glenn Reinman, Hao Wu. Stream arbitration: Towards efficient bandwidth utilization for emerging on-chip interconnects. *ACM Transactions on Architecture and Code Optimization (TACO)*, Jan 2013.
82. Mubbasir Kapadia, Shawn Singh, Wiliam Hewlett, Glenn Reinman, and Petros Faloutsos. Parallelized Egocentric Fields for Autonomous Navigation. *The Visual Computer*, Dec 2012.
83. Kanit Therdsteerasukdi, Gyung-Su Byun, Jeremy Ir, Glenn Reinman, Jason Cong, and M.F. Chang. Utilizing Radio Frequency Interconnect for a Many-DIMM DRAM System. *IEEE Journal on Emerging and Selected Topics in Circuits and Systems,* Jun 2012.
84. Yanghyo Kim, Sai-Wang Tam, Gyung-Su Byun, Hao Wu, Lan Nan, Glenn Reinman, Jason Cong, and Mau-Chung Frank Chang. Analysis of Non-Coherent ASK Modulation Based RF-Interconnect for Memory Interface. *IEEE Journal on Emerging and Selected Topics in Circuits and Systems,* Jun 2012.
85. Kanit Therdsteerasukdi, Gyungsu Byun, Jason Cong, Frank Chang, and Glenn Reinman. Utilizing RF-I and Intelligent Scheduling for Better Throughput/Watt in a Mobile GPU Memory System. *ACM Transactions on Architecture and Code Optimization (TACO*), Jan 2012.

86. Mubbasir Kapadia, Shawn Singh, Glenn Reinman, and Petros Faloutsos. A Behavior Authoring Framework for Multi-Actor Simulations. *IEEE Computer Graphics and Applications: Special Issue on Digital Content Authoring*, December 2011
87. Shawn Singh, Mubbasir Kapadia, Glenn Reinman and Petros Faloutsos. Footstep Navigation for Dynamic Crowds. *Computer Animation and Virtual Worlds*, April 2011.
88. Jason Cong, Vivek Sarkar, Glenn Reinman, and Alex Bui. Customizable Domain-Specific Computing. *IEEE Design & Test*, March/April 2011.
89. Tom Yeh, Glenn Reinman, Sanjay Patel, and Petros Faloutsos. Fool me twice: Exploring and exploiting error tolerance in physics-based animation. *ACM Transactions on Graphics (TOG)*, December 2009.
90. Shawn Singh, Mubbasir Kapadia, Petros Faloutsos, and Glenn Reinman. SteerBench: A Benchmark Suite for Evaluating Steering Behaviors. *Journal of ComputerAnimation and Virtual Worlds*, Feb 2009.
91. Yuchun Ma, Yongxiang Liu, Eren Kursun, Glenn Reinman, and Jason Cong. Investigating the Effects of Fine-Grain Three-Dimensional Integration on Microarchitecture Design. *ACM Journal on Emerging Technologies in Computing Systems (JETC)*, Oct 2008.
92. Jason Cong, Guoling Han, Ashok Jagannathan, Glenn Reinman, and Krzysztof Rutkowski. Accelerating Sequential Applications on CMPs Using Core Spilling. In *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, August 2007.
93. Glenn Reinman and Gruia Pitigoi-Aron. Trace Cache Miss Tolerance for Deeply Pipelined Superscalar Processors. In *IEE Proceedings on Computers and Digital Techniques,* September 2006.
94. Eren Kursun, Anahita Shayesteh, Suleyman Sair, Tim Sherwood, and Glenn Reinman. An Evaluation of Deeply Decoupled Cores. In the *Journal of InstructionLevel Parallelism (JILP)*, February 2006.
95. Anahita Shayesteh, Glenn Reinman, Norm Jouppi, Suleyman Sair, and Tim Sherwood. Dynamically Configurable Shared CMP Helper Engines for Improved Performance. In SIGARCH Computer Architecture News, November 2005.
96. Gokhan Memik, Glenn Reinman, and Bill Mangione-Smith. Precise Instruction Scheduling. In the *Journal of Instruction Level Parallelism (JILP),* January 2005.
97. Glenn Reinman. Using an Operand File to Save Energy and to Decouple Commit Resources. In the *IEE Proceedings on Computers and Digital Techniques*, Vol 152, Issue 5, September 2005.
98. Glenn Reinman and Brad Calder. Using a Serial Cache for Energy Efficient Instruction Fetching. In the *Journal of Systems Architecture (JSA),* 2004.
99. Brad Calder and Glenn Reinman. A Comparative Survey of Load Speculation Architectures. In the *Journal of Instruction Level Parallelism (JILP),*May 2000.
100. Glenn Reinman, Brad Calder, and Todd Austin. Optimizations Enabled by a Decoupled Front-End Architecture. *IEEE Transactions on Computing (TOC)*, Vol 50, No 4, February 2000.

Patents:

101. Mau-Chung Chang, Sai-Wang Tam, Gyung-su Byun, Yanghyo Kim, Kanit Therdsteerasukdi, Jeremy Ir, Glenn Reinman, Jingsheng Cong. Multi-band interconnect for inter-chip and intra-chip communications. US 9,178,725. Filing date: Aug 12, 2013. Publication date: Nov 3, 2015.
102. M. Frank Chang, Jason Cong, Adam Kaplan, Mishali Naik, Glenn Reinman, Eran Socher, and Sai-Wang Tam. On-Chip Radio Frequency (RF) Interconnects for Network-On-Chip Designs. US 8,270,316. Filing date: Jan. 30, 2009. Publication date: Sep. 18, 2012.

Textbooks:

103. Yu-Ting Chen, Jason Cong, Michael Gill, Glenn Reinman, and Bingjun Xiao. *Customizable Computing.* Morgan & Claypool Publishers: Synthesis Lectures on Computer Architecture. July 2015.
104. Glenn Reinman. Chapter 2: Instruction Cache Prefetching. *Speculative Execution in High Performance Computer Architectures.* Edited by David Kaeli and Pen Yew. CRC Press, 2005.

Technical Reports:

105. Glenn Reinman and Norm Jouppi. CACTI version 2.0: An Integrated Cache Timing and Power Model. WRL Research Report, 2000/7.

Expert Witness Experience

Patent Infringement Cases:

1. **AMD vs. TCL and Realtek, 2022.**
   Mintz Levin LLP: Analysis of patents, RTL, and source code.
2. **PACT vs. Intel, 2022**
   Quinn Emanuel, LLP. Analysis of patents, RTL, and source code. Authored one report. **Deposed** for one day.
3. **Memory Web LLC vs. Apple et. al., 2021**
   Nixon Peabody, LLP. Investigated and responded to multiple IPRs. **Deposed** for one day.
4. **Consumeron vs. Instacart, 2021**
   Kramer Levin Naftalis & Frankel, LLP. Authored a declaration.
5. **DivX vs. Samsung et. al., 2020**
   Mintz Levin LLP: Analysis of patents, RTL, and source code. Authored one report. **Deposed** for one day. **Testified** at trial in the ITC.
6. **NexStep, Inc. v. Comcast Cable Communications, 2020**
   Kramer Levin Naftalis & Frankel, LLP: Authored three reports. **Deposed** for one day. **Testified** at trial in District Court.
7. **VLSI Technology vs. Intel, 2020**
   Irell and Manella, LLP. Analysis of patents, RTL, and source code. Authored two reports. **Deposed** for one day. **Testified** at trial in District Court.
8. **VLSI Technology vs. Intel, 2020**
   Lowenstein & Weatherwax, LLP. Investigated and responded to an IPR. **Deposed** for one day.
9. **DivX vs. Netflix and Hulu, 2019**
   Robins Kaplan, LLP.
10. **Bot M8 vs Sony, 2019**
    Kramer Levin Naftalis & Frankel, LLP.
11. **AMD vs Vizio et. al., 2017**
    Mintz Levin LLP: Analysis of patents, RTL, and source code. Authored a report. **Deposed** for one day. **Testified** at trial in the ITC.
12. **AST vs BMW et. al., 2016**
    Mintz Levin LLP: Analysis of patents, RTL, and source code. Authored two reports.
13. **Avago vs Asus, 2015**
    Kilpatrick Townsend & Stockton LLP: Analysis of patents, RTL, and source code. Authored one report. **Deposed** for one day.
14. **Parthenon Unified Memory Architecture LLC vs Apple and HTC, 2015**
    AZA Law, LLP: Analysis of patents, RTL, and source code. Authored two reports. **Deposed** for two days.
15. **CallWave vs Google and BroadSoft, 2015.**
    Pepper Hamilton LLP: Source code (Java, C, C++) analysis. **Deposed** for one day.
16. **WARF vs Apple, 2014.**
    Irell and Manella, LLP: Device testing. Authored a report. **Deposed** for one day. **Testified** at trial in District Court.
17. **Enterprise Technologies vs Samsung, HTC, LG, 2014.**
    Mintz Levin LLP: Analysis of patents, technical specifications, and source code (Java, C, C++). Presented a technology tutorial to an Administrative Law Judge in the ITC. Authored an export report on infringement. **Deposed** for one day.
18. **Vantage Point Technology v. Qualcomm, 2014.**
    Gardere Wynne Sewell LLP: Analysis of patents, technical specifications, and source code (Verilog, C driver code).
19. **Helios Software LLC et. al. v. Awareness Technologies Inc. et. al., 2013**
    Robinson Cole LLP. Wrote two expert reports (invalidity and noninfringement). **Deposed** for a day and a half.

20. **GPH vs Toshiba, ASUS, Vizio, and Acer, 2013**
    Mintz Levin LLP: Analysis of patents, technical specifications, and source code (Verilog, VHDL, C driver code). Provided Markman tutorial and report. Drafted two expert reports on infringement (for three patents at issue). **Deposed** for two days. **Testified** at trial in the ITC.
21. **LSI vs Barnes and Noble, 2013**
    Fenwick & West LLP: Analysis of patents, technical specifications, and source code (Verilog). Software profiling. Drafted claim charts.
22. **GPH vs Sony, Samsung, RIM, HTC, and LG, 2012**
    Mintz Levin LLP: Analysis of patents, RTL (VHDL and verilog), C driver code, technical documents, and prior art. Hardware testing on various devices (phones and tablets). Wrote two expert reports supporting infringement (for three patents at issue), and was **deposed** for two and a half days.
23. **Realtime Data vs FactSet, IDCO, Penson/Nexa, C.A. No. 6:10-cv-425, 2012**
    Irell and Manella, LLP: Analysis of patents and software. Wrote expert reports supporting invalidity and non-infringement, and was **deposed** for a day.
24. **LSI vs Funai, 2012**
    Irell and Manella LLP (first) --- Kilpatrick Townsend & Stockton LLP (later): Analysis of patents, RTL and driver source code, and technical specifications. Construction of claim charts. Software profiling. Wrote report on infringement and was **deposed** for one day. **Testified** at trial in the ITC.
25. **Softview LLC v. Apple Inc., et al., C.A. No. 10-389-LPS, 2011**
    Irell and Manella LLP: Analysis of patents, technical specifications, and Java/C++/C source code. Conducted device testing. Construction of claim charts, drafted a declaration.
26. **Microlinc vs Intel, 2011**
    ***Wilmer Hale LLP*:** Analysis of patents and prior art. Drafted a declaration. **Deposed** for one day.
27. **WARF vs Intel, 2009-2010**
    ***Irell and Manella LLP*:** Analysis of patents and technical specifications. Implemented designs on simulation framework to analyze performance impact of various patents.
28. **Broadcom vs SiRF, 2008-2011**
    ***Simpson Thatcher & Bartlett LLP*:** Analysis of patents and detailed technical specifications including a large repository of verilog source code. Wrote four detailed expert reports, and supporting statements for a number of motions. Was **deposed** for over a day and a half to testify about both infringement and invalidity of two asserted patents.
29. **Intergraph Hardware Technologies Company vs Toshiba, 2007**
    ***Foley and Lardner LLP*:** Analysis of patents and technical specifications involving cache coherency and chip multiprocessors. Prepared an expert witness report after analyzing a significant amount of design drawings and microcode.

Other Litigation:

30. **LongRun Technology vs. Sony Corporation, 2014**
    Pepper Hamilton LLP: Arbitration case where I authored two reports on my analysis of technical documentation and testing. **Testified at an arbitration hearing in Japan.**
31. **Alki David et al vs CBS Interactive et al, 2013**
    Kendall Brill & Klieger LLP: Authored report on file sharing technology that lead to a denial of a preliminary injunction and dismissal of the case.

Awards and Grants

- Test of Time Award, *International Symposium on Microarchitecture*, 2020.
- Best Paper Award, *International Symposium on Memory Systems*, Oct 2017.
- NSF InTrans Grant. *Accelerator-Rich Architectures with Applications to Healthcare*, 2014-2017.

- *Center for Future Architectures Research (C-FAR).* Part of the Semiconductor Technology Advanced Research network (STARnet) sponsored by the Semiconductor Research Corporation (SRC) and the Defense Advanced Research Projects Agency (DARPA), 2013-2015
- NSF Expedition Grant (CO-PI) to establish the *Center for Domain Specific Computing (CDSC)*, 8/2009-7/2015
    - Architecture Thrust Leader (one of four members of the Executive Committee for the Center)
- Semiconductor Research Corp 2008-HJ-1796 (PI) - *Network-On-Chip Design with RF-Interconnects for Future Chip Multiprocessors* – 4/2008-5/2011
- Best Paper Award, *International Symposium on High-Performance Computer Architecture*, Feb 2008.
- Voted Professor of the Year by the Engineering Society of the University of California, 2006
- UCLA Faculty Career Development Award 2004
- Northrop Grumman Excellence in Teaching Award 2004
- DARPA SA5430-79952 (CO-PI) - GSRC-MARCO, 9/2006-8/2007
- Semiconductor Research Corp 2005-TJ-1317 (CO-PI) - *Design and Evaluation of Power-Efficient High-Performance Heterogeneous Multi-Core Processors w/Programmable Fabric*, 6/2005-5/2008
- UC MICRO Program (CO-PI) – *MEVA: Microarchitectural Evaluation with Physical Planning*, 7/2003-12/2004
- NSF ITR (CO-PI) – *Reconfigurable Fabric*, 9/01/2002-8/31/2005
- NSF CAREER Award (PI) – *The Evaluation and Design of a Scalable, High-Performance, and Energy-Efficient Microprocessor Architecture*, 9/01/2001-8/31/2006