

1 GARY L. BOSTWICK (SBN 79000)

2 gbstwick@bstwickjassy.com

3 BOSTWICK & JASSY LLP

4 12400 Wilshire Boulevard, Suite 400

5 Los Angeles, CA 90025

6 Telephone: (310) 979-6059

7 Fax: (310) 314-8401

8 SASHA G. RAO (SBN 244303)

9 sasha.rao@ropesgray.com

10 ANDREW J. KONING (SBN 263082)

11 drew.koning@ropesgray.com

12 ROPES & GRAY LLP

13 1900 University Avenue

14 East Palo Alto, CA 94303-2284

15 Telephone: (650) 617-4000

16 Fax: (650) 617-4090

17 CHRISTOPHER J. HARNETT (*pro hac application pending*)

18 chris.harnett@ropesgray.com

19 TODD M. SIMPSON (*pro hac application pending*)

20 todd.simpson@ropesgray.com

21 ROPES & GRAY LLP

22 1211 Avenue of the Americas

23 New York, NY 10036-8704

24 Telephone: (212) 596-9000

25 Fax: (212) 596-9090

26 Attorneys for Defendant

27 GOOGLE INC.

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UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

VEDERI, LLC,
Plaintiff,

v.

GOOGLE, INC.,
Defendant.

Case No. CV10-07747 AK (CWx)

**DECLARATION OF DR. JOHN R.
GRINDON IN SUPPORT OF
GOOGLE'S OPENING CLAIM
CONSTRUCTION BRIEF**

AND RELATED COUNTERCLAIMS

I, Dr. John R. Grindon, declare as follows:

1. I reside in St. Louis, Missouri. I am qualified in all respects to make this declaration, have personal knowledge of the facts set forth herein, and based my opinions on my personal knowledge, except if specifically stated otherwise.

2. I have been retained by Google as an expert consultant in the above-referenced litigation. I submit this declaration in support of Google's Opening Claim Construction Brief. If asked to testify in Court under oath about the matters discussed in the declaration, I could and would so testify.

3. I understand that Plaintiff Vederi has accused Google of infringing certain claims in four patents: U.S. Patent Nos. 7,239,760 ("the '760 Patent"); 7,577,316 ("the '316 Patent"); 7,805,025 ("the '025 Patent"); and 7,813,596 ("the '596 Patent") (collectively, the "patents-in-suit").

4. I have reviewed the claims, specifications, and file histories of the patents-in-suit. I understand these patents have a common disclosure. For ease of reference, all citations to the specification are to the '760 patent, unless stated

1 otherwise. I have also reviewed Provisional Application No. 60/238,490 ("490
2 Provisional"), to which the patents-in-suit claim priority.

3 **I. QUALIFICATIONS**

4 5. I obtained a Bachelor of Science degree in Electrical Engineering
5 from the University of Missouri at Rolla (now Missouri University of Science and
6 Technology) in 1961, a Master of Science degree in Electrical Engineering from the
7 Massachusetts Institute of Technology in 1962, and a Doctor of Science degree in
8 Electrical Engineering from Washington University in St. Louis in 1970.

9 6. I have over 30 years of experience related to the technology at
10 issue in the above-captioned litigation.

11 7. From 1962 to 1987 I worked at McDonnell Douglas Corporation.
12 My work there included leading project teams in digital image processing research
13 and development for Cruise Missile Guidance, correlation matching of sensed and
14 stored reference images, and automatic target recognition. I also led an engineering
15 research and development team to develop scene analysis algorithms for three-
16 dimensional (3-D) imagery for advanced autonomous Cruise Missile Guidance
17 employing imaging laser radars (LIDAR).

18 8. From 1985 to 1990 I worked at Cencit, Inc., where my work
19 included creating and leading an engineering organization in the research and
20 development of three-dimensional electronic imaging systems based upon digital
21 video image processing electronics and software algorithms.

22 9. From 1990 to present I have worked as an independent
23 consultant, consulting for companies on work relating to digital image processing
24 software, calibration of imaging optics, and electronic imaging systems.

25 10. I am a named inventor on seven United States patents, some of
26 which have related foreign patents and/or patent applications. U.S. Patent Nos.
27 4,846,577 and 6,373,963, especially, relate to digital image acquisition and
28 processing systems that process and combine images from multiple viewpoints and

1 directions to generate a composite image and three-dimensional (3D) computer
2 model of an imaged object.

3 11. A detailed record of my professional qualifications, including a
4 list of publications, awards, and professional activities, is set forth in my curriculum
5 vitae attached to this declaration at Tab A.

6 **II. PERSON OF ORDINARY SKILL IN THE ART**

7 12. As presently advised, I have developed an opinion as to the art
8 pertinent to the subject matter of the patents-in-suit: the art of the field of digital
9 image acquisition and processing, including computer software algorithm design, or
10 related fields.

11 13. The original application that led to the patents-in-suit
12 (Application No. 09/758,717) was filed on January 11, 2001. That application states
13 that it claims priority to Provisional Application No. 60/238,490, filed on October 6,
14 2000.

15 14. I have personal knowledge that assists in understanding the level
16 of skill in the art to which the patents-in-suit pertain in or around October 2000,
17 which I have been informed is the date to which Vederi believes the patents claim
18 priority. By October 2000 I had already begun work as an independent consultant
19 and had worked in the industry for over thirty years, as described in more detail
20 above and in the attached curriculum vitae.

21 15. I have not yet considered the issue of whether the asserted claims
22 of the patents-in-suit are supported by the provisional application filed on October
23 2000. My definition of the level of skill in the art would not substantively change
24 even if it is determined that the patents-in-suit are not supported by the October 2000
25 provisional and are only entitled to a later priority date.

26 16. In my opinion, a person of ordinary skill in the art of the patents-
27 in-suit as of October 2000 was a person who has a Bachelor's degree in electrical
28 engineering or computer science with 5 years experience in digital image acquisition

1 and processing, including computer software algorithm design, or an advanced
 2 degree in electrical engineering or computer science and 2-3 years experience in the
 3 field. My opinions provided in this declaration apply this standard. I further base
 4 my opinions on my review of the patents-in-suit and on my direct knowledge of the
 5 level of skill of technical people in the field in 2000.

6 17. I understand that a claim term has the meaning that it would have
 7 to a person of ordinary skill in the art as of the effective filing date of the patent
 8 application.

9 **III. BACKGROUND OF THE TECHNOLOGY**

10 18. In general terms, the purpose of Vederi's claimed inventions is to
 11 allow a user to browse a user-selected location from the user's computer by
 12 providing a certain type of image of that location on the user's computer display
 13 screen.

14 19. The patents-in-suit describe the "Field of the Invention" as
 15 "visual databases, specifically ... the creation and utilization of visual databases of
 16 geographic locations." (1:17-19.) The patents-in-suit are "directed to a computer-
 17 implemented system and method for synthesizing images of a geographic location to
 18 generate composite images of the location" to "allow[] a user to visually navigate the
 19 area from a user terminal." (2:19-22, 47-48.)

20 20. The patents-in-suit acknowledge that "[t]here exist methods in the
 21 prior art for creating visual databases of geographic locations." (1:23-24.) Indeed,
 22 systems have existed since at least the late 1970s that allow users to browse through
 23 a location from a user's computer screen. I am personally acquainted with a number
 24 of such systems since the 1980s, one example being in the aerospace industry for
 25 pilot training systems wherein a visual image database is employed to display a view
 26 of terrain ahead corresponding to flight control inputs by the user.

27 21. Generally, these systems operate by first gathering images of a
 28 geographic area. These images are normally acquired using digital cameras or video

1 recorders. For example, a method using video technology to acquire the images may
2 have used “a vehicle equipped with a video camera and a Global Positioning System
3 (GPS) to collect image and position data by driving through the location.” (1:39-42.)
4 “The video images are later correlated to the GPS data for indexing the imagery” so
5 that the images correspond to the physical location in the geographic area from
6 which they originate. (1:42-43.)

7 22. After the images are gathered, they are typically loaded into
8 memory storage. Such storage could be any of the typical forms, for example, a
9 database on a hard drive or CD-ROM. An end-user application is then provided that
10 allows the users to input a desired geographic location, typically using the street
11 address of that location. Images associated with the geographic location are then
12 retrieved by the user’s computer and shown to the user. Many systems would
13 provide the user the opportunity to then navigate using arrows, by clicking another
14 location on a map, or by inputting one or more desired geographic locations.

15 23. Presenting a single image frame “contains a narrow field of view
16 of a locale (e.g. a picture of a single store-front) due to the limited viewing angle of
17 the video camera.” (1:48-51.) To provide more geographical context to the user, the
18 patents-in-suit discuss different methods that prior art systems used to generate
19 composite images that, for example, provide a wider field of view.

20 24. For example, composite images could be made by pasting images
21 onto a 3D model of a geographic location. The patents-in-suit state that the “prior art
22 for creating visual databases of geographic locations” includes methods wherein
23 “individual photographs” and images derived from video recordings are
24 “electronically past[ed] ... on a polygonal mesh that provide[s] the framework for a
25 three-dimensional (3D) rendering of the location.” (1:23-30.) Such methods,
26 according to the patents-in-suit, are “time consuming and inefficient for creating
27 large, comprehensive databases covering a substantial geographic area such as an
28 entire city, state, or country.” (1:31-33.)

1 25. Additionally, as the patents-in-suit explain, the prior art includes
2 projecting images on an imaginary sphere to provide a 360 degree view, stating that
3 the prior art “teaches the dense sampling of images ... in two dimensions either
4 within a plane, or on the surface of an imaginary sphere surrounding the
5 object/scene.” (1:63-67.) The patents-in-suit state that such a method “is
6 computationally intensive and hence cumbersome and inefficient in terms of time
7 and cost.” (2:1-2.)

8 26. When creating a spherical projection, multiple images taken from
9 different, overlapping views are typically recorded using specialized camera systems.
10 Such camera systems typically have multiple cameras facing in different directions
11 and mounted in close proximity in order to approximate an expanded or full range of
12 views from a single position. These images are then combined to create a panoramic
13 view. Because the multiple images are taken at or near the same time, motion or
14 lack of motion of the platform holding the camera is not a factor. Further, because
15 images are taken in different directions from the same position, the camera is not
16 required to move in order to generate the images that are used to form the panorama.
17 Additionally, position information is not required in order to properly combine the
18 images when forming a panorama.

19 27. This spherical projection approach to creating a panoramic image
20 has the advantage that three-dimensional scenes, that is, scenes with multiple,
21 unaligned objects or features which may be at different distances from the camera,
22 can be properly “stitched” to create a panoramic image. Further, the panoramic
23 image can encompass as much of the surrounding “sphere” as desired, up to and
24 including a full sphere of 360° azimuth, and 180° elevation.

25 28. Vederi’s claimed invention sacrifices image quality in order to
26 reduce computational complexity. Indeed, the provisional patent application states
27 that “[t]he present method is a compromise between quality of the synthetic image
28 and algorithmic complexity.” (Declaration of Sasha G. Rao In Support Of Google’s

1 Opening Claim Construction Brief, Exhibit H at 8; exhibits to the “Rao Declaration”
 2 are hereinafter cited as “Rao Ex. ____.”) Vederi acknowledged that “[m]uch more
 3 sophisticated and computationally intensive techniques for 3 dimensional
 4 reconstruction of the scene are available in the prior art.” *Id.* But for Vederi’s
 5 “proposed application, the quality of the panoramic images is sufficient even in
 6 presence of some distortion.” *Id.*

7 29. The patents-in-suit purport to invent and claim something
 8 different that can be performed in a “more time and cost efficient manner,” and that
 9 “should not require the reconstruction of 3D scene geometry nor the dense sampling
 10 of the locale in multiple dimensions.” (2:5-7.)

11 **IV. THE ACCUSED STREET VIEW SERVICE**

12 30. I understand that Vederi has alleged that Google’s Street View
 13 Service infringes the patents-in-suit. I have personally used Street View on a
 14 number of occasions over at least the past several years. End-users access Street
 15 View through Google Maps to view locations of their choice. Google has had to
 16 gather a massive amount of image data in order to provide Street View to users.

17 31. I understand that Google creates composite images using a curved
 18 or spherical projection method.¹ A website provided by Google to assist
 19 programmers with interacting with the system (e.g. by creating custom panoramas)
 20 shows an example panorama projected onto a sphere:

21
 22
 23
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 27 ¹ See, for example, [http://code.google.com/apis/maps/documentation/javascript/](http://code.google.com/apis/maps/documentation/javascript/services.html#CustomStreetView)
 28 [services.html#CustomStreetView](http://code.google.com/apis/maps/documentation/javascript/services.html#CustomStreetView).



The same website also provides an example “full wrap-around panorama”:



32. By creating images using this method, Google is able to provide a very high quality service to its users. The patents-in-suit call the spherical projection

1 method computationally intensive, cumbersome, and inefficient. Indeed, creating
 2 composite images in this manner involves complex algorithms and the collection and
 3 processing of an enormous amount of data. Other processing methods might be less
 4 cumbersome, but would lead to lower quality composite images.

5 33. Specifically, using a spherical projection method creates a high
 6 quality service because the composite images suffer from less distortion and wider
 7 viewing ranges than composite images created using the method taught by the
 8 patents-in-suit (discussed further below).

9 **V. THE DISCLOSED SYSTEMS AND METHODS** 10 **OF THE PATENTS-IN-SUIT**

11 34. The patents-in-suit teach a process for allowing users to browse
 12 through a geographic area similar to processes available in the prior art. For
 13 example, the patents-in-suit disclose that “an image recording device moves along a
 14 path recording images of objects along the path” in order to initially collect the data.
 15 (2:26-28.) The image recording devices “preferably tak[e] the form of digital video
 16 cameras.” (3:56-57.) For example, the data acquisition cameras may consist of
 17 “four cameras 10 mounted on top of a moving motor vehicle.” (4:64-65; Figure 1.)
 18 The patents-in-suit refer to these single image frames acquired by the image
 19 recording device as *acquired* images.

20 35. As was taught in the prior art, in the disclosed system location
 21 data is saved as images are being acquired, the location data provided by a “GPS
 22 receiver and/or inertial navigation system.” (2:28-30; *see also* 3:66-4:8.) In order to
 23 retain the correspondence between the images and their original geographic location,
 24 “[t]he image and position information is provided to a computer to associate each
 25 image with the position information.” (2:31-32.) Specifically, the video cameras
 26 “provide a frame number and time information” and the GPS receiver and/or inertial
 27 navigation system provide position information, and then, in certain embodiments,
 28

1 this information is stored and used “by a post-processing system 38 to create the
2 composite images.” (4:14-29.)

3 36. In those embodiments where the disclosed system creates
4 composite images that will be shown to the user on the user terminal, “[t]he
5 computer synthesizes image data from the acquired images to create a composite
6 image depicting a view of the objects” (2:33-35.) One advantage of these
7 images is that “[p]referably, the composite image provides a field of view of the
8 location that is wider than the field of view provided by any single image acquired
9 by the image recording device.” (2:35-38.) In other words, “the composite images
10 help provide a panoramic view of the location.” (5:53-54.)

11 37. The post-processing system preferably includes a computer with
12 a video acquisition card and a processor “programmed with instructions to take the
13 image and position data and create one or more composite images for storing into an
14 image database 32.” (4:36-38.) “The image database 32 is preferably a relational
15 database that resides in a mass storage device.” (4:38-40.)

16 38. However, the patents-in-suit disclose an alternative embodiment
17 for the formation of composite images. In this embodiment, “the images are
18 transferred directly to the data acquisition computer 34 as the images are being
19 recorded,” eliminating the post-processing system 38 which includes the image
20 database storage 32. (4:44-46; Figure 1.) In this embodiment, the data acquisition
21 computer 34 is “preferably equipped with the video acquisition card and includes
22 sufficient storage space for storing the acquired images.” (4:46-48.) Because “the
23 data acquisition computer 34 preferably contains program instructions to create the
24 composite images from the acquired images” it can form the composite images itself
25 without the need for the post-processing system 38. (4:48-51.) Images may be
26 stored and then processed to form composite images, but one of ordinary skill in the
27 art would recognize that images may be processed “on-the-fly” as they are being
28 received and originally stored into permanent memory as composite images.

1 39. The patents-in-suit, in seeking to improve upon the so-called
 2 “computationally intensive” and “cumbersome” methods of forming composite
 3 images in the prior art, teach a single way to form composite images that seeks to
 4 minimize this computational burden. This process is illustrated by Figure 2 (see
 5 below, ¶ 58).

6 40. Essentially, a computer identifies optical rays that would
 7 originate from an assumed synthetic viewpoint, referred to as a “fictitious camera”,
 8 and also identifies the corresponding optical rays from the actual camera, and
 9 extracts portions of acquired image frames to piece together and form a composite
 10 image. (5:55-6:4.) The computer pieces a sequence of composite images together
 11 “on a column-by-column basis by extracting the corresponding optical column from
 12 each image frame.” (6:6-9; *see also* 9:19-10:35 and Figures 10-12.) The final step
 13 of Figure 10, which describes the formation of composite images, is to “[s]tack all
 14 columns side by side to generate one single image bitmap” (i.e., a composite image).
 15 The composite images “depict[] a view of the objects from a particular location
 16 outside of the path” (2:34-35) because a person must move off of the path on which
 17 the images were taken in order to achieve a wider panoramic view like the one
 18 shown in the composite image. The composite images are stored in the image
 19 database and an association is created in order to maintain the correspondence
 20 between the composite pictures and the original geographic location. (6:19-23.)

21 41. The way of generating composite images taught by the patents-in-
 22 suit suffers from a distortion problem because it requires moving the camera along a
 23 path, i.e. along a trajectory, taking pictures along the way, each picture taken at a
 24 different position of the camera. These individual pictures are then combined to
 25 form a composite image. This method, in general, suffers from attempting to
 26 combine images from different positions, which produce different perspective views.
 27 This is not possible to do for three-dimensional scenes containing multiple,
 28 unaligned objects at different distances, without substantial distortions. Thus, the

1 method of generating composite images by combining images taken from different
 2 positions, such as taught in the patents, has limited use in practice, primarily for flat
 3 or nearly flat surfaces, such as for document scanning. For example, a moving
 4 imaging sensor is used in digital copy machines, and in flatbed scanners such as were
 5 popular in the days of film photography. Generation of composite images using a
 6 moving camera has also seen use in aerial and satellite photography, wherein the
 7 carrying platform moves along a trajectory as images are acquired in a swath below.
 8 Unlike the spherical projection approach distinguished in the patent specification, in
 9 order for the approach described in the patent to work, the carrying platform must be
 10 in motion, and it must move along a known or determined path. Thus, the claims of
 11 the patents-in-suit have the limitation of “image frames acquired by an image
 12 recording device moving along a trajectory” (*see, e.g.*, ‘760 patent, claim 1) because
 13 forming composite images using the method of the patents-in-suit requires the
 14 combination of a series of images taken from a sequence of positions along a known
 15 path of travel. As discussed further above, the method of forming spherical
 16 projections is accomplished by combining images taken in multiple directions from a
 17 single location and, accordingly, does not require a moving camera. Furthermore,
 18 the composite images formed by the spherical projection method depict a view from
 19 the location where the original acquired images were taken. The patents-in-suit
 20 explicitly require that the claimed composite images, instead, “depict[] a view of the
 21 objects from a particular location *outside* the path” from which the acquired images
 22 were taken.

23 42. One of the several distortion problems that applies to the method
 24 taught in the patents-in-suit, but not to the spherical approach, is that of distortions in
 25 those portions of the composite image that do not lie along a horizontal line from the
 26 camera. This and other distortion problems are not well-discussed in the
 27 specification of the issued patents, but are described in the provisional patent
 28 application upon which the issued patents are based. Thus, it is helpful to review the

1 ‘490 Provisional. Particularly, pages 6 through 8 of the ‘490 Provisional (*see* Rao
2 Ex. H) describe these distortions.

3 43. For example, size distortion is created. (*See, e.g.*, Rao Ex. H at
4 Fig. 6 and associated text.) Additionally, because the patents’ method of creating
5 composite images “relies on an assumption that the vehicle path is along a straight
6 line,” a “wavy effect on the synthetic panorama” will be created if the vehicle
7 deviates from a straight line. (*See, e.g.*, Rao Ex. H at Figs. 8-9 and associated text.)

8 44. The distortions that occur in the method taught in the patents for
9 composite views at angles above or below the horizontal from the camera become
10 increasingly serious at increasingly greater angles above or below the horizontal.
11 Accordingly, the method of the patent can only tolerate a small amount of deviation
12 from the horizontal to the extent that distortion is tolerable. This type of distortion is
13 not a problem of the prior art spherical projection method, e.g. using a cluster of
14 cameras located at the same position to take a plurality of images in different
15 directions to generate a composite panoramic image. Note that Fig. 2 of the patent
16 specification depicts a relatively narrow range of elevations, nothing like the curved
17 spherical view provided by the prior art spherical projection method.

18 45. Using the vertical, flat method of creating composite images
19 described in the Vederi patents creates substantial distortions for three-dimensional
20 scenes containing objects at different distances. The patents-in-suit recognize the
21 distortion created by the disclosed method of forming composite images, and
22 suggests some possible ways to attempt to reduce this distortion (i.e., through the
23 computing and using of optical flow, or using additional cameras). (15:27-39.) For
24 Vederi’s “proposed application, the quality of the panoramic images is sufficient
25 even in presence of some distortion.” (Rao Ex. H at pg. 8.)

26 46. In the disclosed system, “[t]he composite images and association
27 information are then stored in an image database.” (2:42-44.)
28

1 47. Optionally, a “map of the location may also be displayed to the
2 user” that contains information about static objects / landmarks in the geographic
3 area. (2:53-54.) For example, “[i]f the objects are business establishments, the
4 information displayed ... may include the name, address, and phone number [] of the
5 establishment.” (12:61-64.)

6 48. The end-goal of the system is to show these composite images to
7 the user on a user’s computer to allow a user to virtually browse through a
8 geographic location. The user chooses the location, for example, “the user may enter
9 an address of the location, enter the geographic coordinates of the location, select the
10 location on a map of the geographic area, or specify a displacement from the current
11 location” using a “remote terminal that communicates with a host computer.”
12 (11:56-61.) The host computer then retrieves a composite image and sends it to the
13 user’s computer for the user’s computer to display to the user. (11:61-12:2.) A
14 typical user terminal would be a personal computer. (12:3-5.) Figure 16 is an
15 illustration of a graphical user interface that is displayed on a user terminal and
16 allows the user to input requests and receive information. (12:29-41.)

17 49. The patents-in-suit do not disclose that a request is placed by
18 anyone or anything other than a user, and also do not disclose anything that includes
19 a display for the user other than the user terminal.

20 **VI. CLAIM CONSTRUCTION DISPUTES**

21 50. I understand that the full text of the asserted claims is attached as
22 Joint Ex. A to the Declaration of Sasha G. Rao In Support Of Google’s Opening
23 Claim Construction Brief, a list of disputed terms along with the parties’ proposed
24 constructions is attached thereto as Joint Ex. B, and that a list of terms for which the
25 parties have agreed upon constructions is attached thereto as Joint Ex. C.

26 51. I agree with Google’s proposed constructions of the disputed
27 terms. Below, I provide my detailed opinions on two of the terms in dispute --
28

1 “depicting views ... the views being substantially elevations” and “image source”
 2 from the viewpoint of a person of ordinary skill in the art.

3 **A. “depicting views ... the views being substantially elevations”**

4 52. “Substantially elevations” does not appear to make grammatical
 5 sense in the claims of the Vederi patents and does not have an accepted meaning to a
 6 person of ordinary skill in the art of the patents-in-suit.

7 53. Elevation, however, is a term of art in architecture, meaning: “[a]
 8 drawing showing the vertical elements of a building, either exterior or interior, as a
 9 direct projection onto a vertical plane.” American Architecture (1998) (attached at
 10 Tab B). *See also* A Dictionary of Architecture (1999) (“Accurate geometrical
 11 projection, drawn to scale, of a building’s façade or any other visible external or
 12 internal part on a plane vertical (at a right angle) to the horizon.”) (attached at Tab
 13 C); Penguin Dictionary of Architecture and Landscape Architecture (1999) (“The
 14 external faces of a building; also a drawing made in projection on a vertical plane to
 15 show any one face (or elevation) of a building”) (attached at Tab D). Elevation is
 16 also used to refer to the height of a point above a reference level in the mapping and
 17 architecture arts. *See* American Architecture (1998) (“The vertical distance above or
 18 below some established reference level.”) (Tab B).

19 54. Consistent with its meaning in architecture, the plain English
 20 meaning of “elevation” is a front, back, or side view on a vertical plane. *See, e.g.,*
 21 American Heritage (2000) (“[a] scale drawing of the side, front, or rear of a
 22 structure”) (attached at Tab E); Webster’s II New College Dictionary (1995) (“A
 23 scale drawing of the side, front, or rear of a particular structure”) (attached at Tab F).

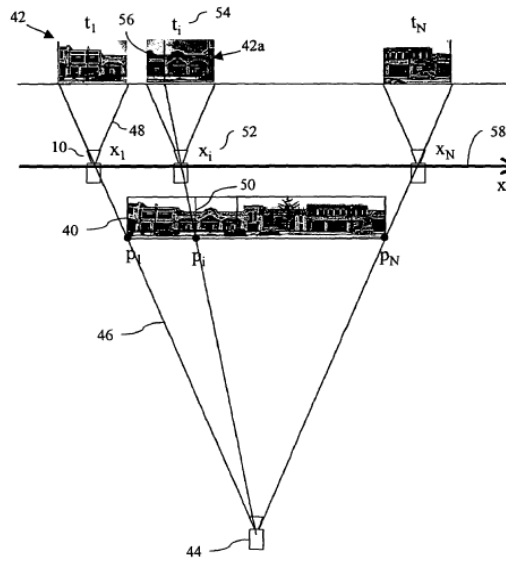
24 55. Based on my review of the file history, Vederi added
 25 “substantially elevations” to the claims in a January 23, 2007 amendment to
 26 overcome the prior art Levine patent (U.S. Patent No. 6,140,943). The Examiner
 27 stated that Levine disclosed “images providing a non-aerial view of objects.” (Rao
 28 Ex. K at 3.) One of ordinary skill in the art would understand that, to overcome that

1 rejection, Vederi replaced “non-aerial views” with the phrase “the views being
2 substantially elevations” to limit the type of view of the object covered by the claims
3 to front, back, or side views.

4 56. I understand that Google’s proposed construction of the claim
5 phrase “depicting views ... the views being substantially elevations” is “vertical flat
6 (as opposed to curved or spherical) depictions of front, back, or side views.” To the
7 extent this term can be understood and a construction can be assigned, I agree with
8 Google’s proposed construction because it properly takes into account Vederi’s
9 description of its invention in the patent specification and the file history.

10 57. One of ordinary skill in the art reading Vederi’s patents would
11 understand them to exclude spherical and curved depictions of views generated by
12 sampling on the “surface of an imaginary sphere surrounding the object/scene”
13 (1:66-67.) The patent characterizes the use of such views as problematic because it
14 says that they are “computationally intensive and hence cumbersome and inefficient
15 in terms of time and cost” (2:1-2) compared to the flat views of the claimed
16 invention.

17 58. One of ordinary skill in the art reading the Vederi patents would
18 understand that all disclosed embodiments of the claimed invention are flat two-
19 dimensional depictions of an object along its vertical plane. For example, Fig. 2
20 shows a flat depiction of an object along a vertical plane.

Fig. 2

59. The specification repeatedly describes creating composite images “on a column-by-column basis” whereby the flat, vertical columns are “extracted and combined” to form a composite image. (6:2-19; *see also* 9:19-10:35 and FIGS. 10-12; Rao Ex. H at FIG. 5 and related text.)

60. One of ordinary skill in the art would understand that the technique disclosed by the inventors for generating views (*see, e.g.*, Fig. 2) simply would not work for a so-called “computationally intensive” spherical or curved projection. Whereas Vederi teaches adjoining vertical columns from individual image frames together to form a panorama, one of ordinary skill in the art would understand that spherical and curved projections would involve processes that stitch together images by pasting them onto a virtual object. Additionally, as discussed above, vertical, flat composite images require combining a series of images acquired from a recording device moving along a path whereas spherical composite images are formed from images taken in different directions from a single location. Furthermore, as discussed above, vertical, flat composite images depict a view of the objects from outside the path whereas spherical composite images depict a view of the object from the location where the acquired images were taken.

B. “image source”

1 61. “Image source” does not have an accepted, specialized meaning
 2 to a person of ordinary skill in the art. Nor is “image source” defined in the patent
 3 specifications. Based on my review of the file history, I understand that Vederi
 4 added “image source” by amendment to replace the term “image database” to
 5 overcome an anticipation rejection over the prior art Levine patent. (Rao Ex. J at 3.)

6 62. One of ordinary skill in the art would understand that Vederi’s
 7 proposed construction (“a computer accessible storage of images linked to
 8 geographic locations”) is the same as the meaning of “image database.” I disagree
 9 with Vederi’s proposed construction of “image source.”

10 63. To the extent this term can be understood and a construction can
 11 be assigned, Google’s proposal that “image source” means “source of the recorded
 12 images” is consistent with my understanding regarding a person of ordinary skill in
 13 the art because it properly excludes “image source[s]” that only contain processed
 14 images, as opposed to images as originally “recorded.”

15 64. Based on my review of the file history, the Examiner stated that
 16 the prior art Levine patent disclosed, in detail, an image database: “Levine discloses
 17 a system (Figures 1, 3, 13-14) including an image database (memory 21 in Figure 3
 18 and a mass storage 107 in Figure 13 can provide database)....” (Rao Ex. K at 3.)
 19 One of ordinary skill in the art would understand that Levine’s storage includes
 20 “video map images” that are necessarily processed to link them to geographic
 21 locations because they would be shown to travelers while driving. (Rao Ex. L at
 22 Abstract.)

23 65. “Image database” is used by the specifications to describe where
 24 composite images formed by post-processing of individual acquired image frames
 25 are stored. (*See, e.g.*, Abstract, 2:30-45; 6:19-23; 6:49-54; 10:18-25; and 11:61-65.)
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1 66. The patent specifications repeatedly describe the recording of
 2 images from a video camera or other image recording device.² For example, the
 3 patents discuss an embodiment where “the images are transferred directly to the data
 4 acquisition computer 34 as the images are being recorded.” (4:44-46.) In this
 5 embodiment, the computer 34 would have a video acquisition card, sufficient storage
 6 space, and “program instructions to create the composite images from the acquired
 7 images.” (4:46-51.) One of ordinary skill in the art would understand that these
 8 images, taken from the image recording device, could be either (1) originally
 9 recorded into memory as individual images or (2) processed upon receipt and
 10 originally recorded as composite images. (5:16-19; *see supra* ¶ 38.)

11 67. One of ordinary skill in the art would understand that Vederi
 12 distinguished Levine because the database of Levine stored processed map images
 13 rather than actual pictures of the geographic area. (Rao Ex. J at 11-12.) In making
 14 this change, one of ordinary skill in the art would understand that Vederi intended to
 15 claim the alternative disclosed embodiment described above in which images taken
 16 from an image recording device can be either (1) originally recorded into memory as
 17 individual images or (2) processed upon receipt and originally recorded as composite
 18 images. Accordingly, one of ordinary skill in the art would understand that Vederi
 19 changed “image database” to “image source” to exclude databases that merely
 20 included processed images (as Levine did), rather than images as originally recorded.

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 27 ² *See, e.g.*, 2:26-27 (“an image recording device moves along a path recording
 28 images”); Abstract (“A video camera moves along a street recording images of
 objects along the street.”).

1 I declare, under the penalty of perjury, under the laws of the United
2 States, that the foregoing is true and correct.

3
4 Dated: St. Louis, Missouri

5 October 4, 2011

John Grindon

John R. Grindon, D.Sc.