

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION

Petitioner

v.

BRADIUM TECHNOLOGIES LLC

Patent Owner

Case IPR2015-01432

Patent 7,139,794 B2

Before BRYAN F. MOORE, BRIAN J. McNAMARA, and
MINN CHUNG, *Administrative Patent Judges*.

McNAMARA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

35 U.S.C. § 318(a) and

37C.F.R. § 42.73

BACKGROUND

On December 23, 2015, we instituted an *inter partes* review of claims 1 and 2 (“the challenged claims”) of U. S. Patent No. 7,139,794 B2 (“the ’794 Patent”). Paper 15 (“Dec. to Inst.”). Patent Owner filed a Patent Owner Response and a Corrected Patent Owner Response, (Paper 24, “PO Resp.”), and Petitioner filed a Petitioner Reply and a Corrected Petitioner Reply (Paper 33, “Pet. Reply”). Petitioner also filed a Motion to Exclude (Paper 43, “Mot. To Exclude”), Patent Owner filed an Opposition to Petitioner’s Motion to Exclude (Paper 45, “Opp. To Mot. To Exclude”), and Petitioner filed a Reply (Paper 45, “Reply to Opp. To Mot. to Exclude”). A transcript of an oral hearing held on September 19, 2015 (Paper 50, “Hr’g. Tr.”) has been entered into the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. §318(a). We base our decision on the preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

Having reviewed the arguments of the parties and the supporting evidence, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

THE ’794 PATENT (EXHIBIT 1001)

The ’794 Patent concerns reducing latency in transmitting full resolution images over the Internet on an “as needed” basis, particularly for “complex images” such as “geographic, topographic, and other highly detailed maps.” Ex. 1001, 1:32–47. According to the ’794 Patent, conventional approaches, such as progressive resolution build-up of the image in the current field of view, presume that client systems have an

excess of computing performance and memory storage that is not available in smaller devices, such as embedded clients, or in limited bandwidth circumstances. *Id.* at 1:48–58, 3:4–29.

The '794 Patent describes an image distribution system having a network image server and a client system, in which a client can input a navigational command to adjust a 3D viewing frustum for the image displayed on the client system. *Id.* at 5:23–53. The '794 Patent describes achieving dynamic visualization of image data provided through a communications channel by a client system including a parcel request system and a parcel rendering system. *Id.* at 3:42–47. Figure 2 of the '794 Patent shown below illustrates the preparation of an image parcel and overlay data set that are to be stored by and served from a network server system in accordance with a preferred embodiment. *Id.* at 4:54–56.

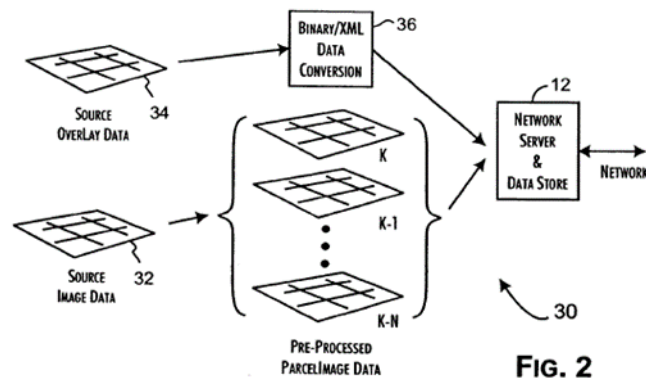


Figure 2 shows image parcel and overlay data stored on a server.

As shown in Figure 2, high resolution image data is pre-processed by the image server into a series K_{1-N} derivative images of progressively lower image resolution. *Id.* at 5:54–6:6. The source image is also subdivided into a regular array of 64 by 64 pixel resolution image parcels, or image tiles, and

each image parcel may be compressed to fit into a single TCP/IP packet for faster transmission. *Id.* at 6:6–22, 7:30–49.

Figure 3 of the '749 Patent shown below is a block diagram of the operation of the parcel request and parcel processing subsystem.

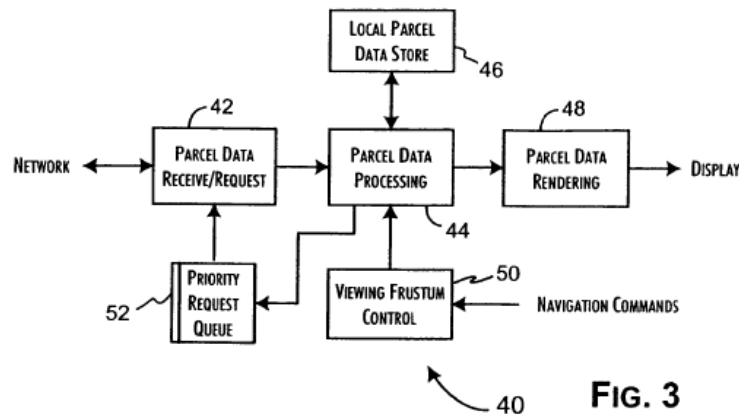


Figure 3 is a block diagram of a client system image presentation system.

When the viewing point is changed in response to a navigation command, the control block determines the ordered priority of image parcels to be requested from the server to support progressive rendering of the image. *Id.* at 7:19–22. Image parcel requests are placed in a queue and issued by the parcel request subsystem based on priority. *Id.* at 7:22–24, 8:24–36. The priority is determined based on a number of factors, including: whether the image parcel is outside the viewing frustum, *id.* at 9:26–29; the resolution of the client display (to avoid downloading and processing image parcels that cannot provide any perceptible improvement in the displayed image), *id.* at 8:54–9:4; the relative contribution of the parcel to total display quality of the image (e.g., assigning higher priority to parcels near the focal point of the viewer), *id.* at 10:20–38; and completeness of the image (e.g., assigning high priority to lower resolution parcels to

assure a complete image of at least low resolution will be available for fast rendering), *id.* at 10:11–19.

The '794 Patent states that its disclosed technology can achieve faster image transfer by (1) dividing the source image into parcels/tiles (*id.* at 6:1–16), (2) processing the parcels/tiles into a series of progressively lower resolution parcels/tiles (*id.*), and (3) requesting and transmitting the parcels/tiles needed for a particular viewpoint in a priority order, generally lower-resolution tiles first. *Id.* at 3:38–4:42.

After the image parcels are requested and received, an algorithm is applied to select image parcels for rendering and display and overlay data, e.g., street names and landmarks, may be added. *Id.* at 8:37–51.

CHALLENGED CLAIMS

The '749 Patent has two claims. Claim 1 is drawn to a system:

1. A client system for dynamic visualization of image data provided through a network communications channel, said client system comprising:
 - a parcel request subsystem, including a parcel request queue, operative to request discrete image data parcels in a priority order and to store received image data parcels in a parcel data store, said parcel request subsystem being responsive to an image parcel request of assigned priority to place said image parcel request in said parcel request queue ordered in correspondence with said assigned priority;
 - an parcel rendering subsystem coupled to said parcel data store to selectively retrieve and render received image data parcels to a display memory, said parcel rendering system providing said parcel request subsystem with said image parcel request of said assigned priority;

wherein said parcel rendering subsystem determines said assigned priority based on a determined optimal image resolution level;
wherein said display memory is coupled to an image display of predetermined resolution and wherein said determined optimal image resolution level is based on said predetermined resolution;
wherein said assigned priority further reflects the proximity of the image parcel referenced by said image parcel request to a predetermined focal point;
wherein said discrete image data parcels are of a first fixed size as received by said parcel request subsystem and of a second fixed size as rendered by said parcel rendering subsystem; and
wherein said discrete image data parcels each includes a fixed-size array of pixel data.

Claim 2 is drawn to a method:

2. A method of supporting dynamic visualization of image data transferred through a communications channel, said method comprising the steps of:
determining, in response to user navigational commands, a viewpoint orientation with respect to an image displayed within a three-dimensional space;
requesting, in a priority order, image parcels renderable as corresponding regions of said image, each said image parcel having an associated resolution, wherein said priority order is determined to provide a progressive regional resolution enhancement of said image as each said image parcel is rendered;
receiving a plurality of image parcels through said communications channel;
rendering said plurality of image parcels to provide said image;
wherein said step of receiving includes the step of storing said plurality of image parcels in an image store and wherein said step of rendering provides for the selective rendering of said plurality of image parcels

having the highest associated resolutions to the corresponding regions of said image;
wherein said step of rendering limits the selective rendering of said image parcels to image parcels having associated resolutions less than a predetermined level;
wherein said step of rendering selectively renders said plurality of image parcels as the unique textures for the corresponding regions of said image; and
wherein said priority order is re-evaluated in response to a change in said viewpoint orientation.

GROUND OF INSTITUTION

In our Decision to Institute, we instituted trial on the following challenges to patentability:

Claim 1 as obvious under 35 U.S.C. § 103(a) over the combination of Rutledge,¹ Ligtenberg,² and Cooper;³ and

Claim 2 as obvious under 35 U.S.C. § 103(a) over the combination of Rutledge, Ligtenberg, Cooper, and Migdal.⁴

CLAIM CONSTRUCTION

As we noted in our Decision to Institute, neither party proposed any terms be construed. Dec. to Inst. 9. However, in rendering the Decision to Institute, we determined that, for purposes of this proceeding, “image parcel” should be construed to be an element of an image array, with the image parcel being specified by the X and Y position in the image array coordinates and an image set resolution index. *Id.* at 10. Neither party contests our construction of image parcel in this proceeding. H’rg. Tr. 45.

¹ U.S. Pat. No. 6,650,998 B1, issued Nov. 18, 2003 (Ex. 1003)

² U.S. Pat. No. 5,682,441, issued Oct. 28, 1997 (Ex. 1004)

³ U.S. Pat. No. 6,118,456, issued Sept. 12, 2000 (Ex. 1006)

⁴ U.S. Pat. No. 5,760,783, issued June 2, 1998 (Ex. 1007)

ANALYSIS OF PRIOR ART CHALLENGES

Claim 1 As Obvious Over the Combination of Rutledge, Ligtenberg, Cooper

Claim 1 recites a system for dynamic visualization of image data provided through a network communications channel with a parcel request subsystem and a parcel rendering subsystem. Ex. 1001, claim 1. The parcel request subsystem requests discrete image parcels in a priority order and stores the received image data parcels in a parcel data store. *Id.* The discrete image parcels are of a first fixed size as received by the parcel request subsystem. *Id.* The parcel rendering subsystem provides the parcel request subsystem with image parcel requests of assigned priority that is based on a determined optimal resolution level determined from an image display of predetermined resolution and reflects the proximity of the image parcel request to a predetermined focal point. *Id.* The discrete image data parcels are of a second fixed size as rendered by the parcel rendering subsystem. *Id.*

Rutledge discloses a zoom layer system in which a user can display maps at various scales, each zoom layer corresponding to a predetermined scale, with the maps being stored in a map database and geographical regions available for display being categorized into tiles and zoom layers. Ex. 1005, 5:14–23, 50–53, 6:37–50, Fig. 3.

Ligtenberg discloses decomposing an image into a number of images at various resolutions, subdividing at least some of these images into rectangular arrays (tiles) and storing a block (tile block) representing each of the tiles, along with an index that specifies the respective locations of the tile blocks. Ex. 1004, col. 2, ll. 31–38. Any desired portion of the image file can be retrieved and reconstructed at a desired one of the resolutions that

characterize the reduced images generated during the decomposition process. *Id.* at 3:17–26.

Cooper discloses a method of assessing objects in a 3D graphical scene, in which the most important objects in the scene from the viewer's perspective are identified and reassessed for each scan of the scene, and requests are queued in priority order and sent to the server at a rate determined by available bandwidth. Ex. 1006, Abstract. Only data requests that can be responded to within the next update cycle are sent, in order to reduce latency. *Id.*

Petitioner contends that the combination of Rutledge, Ligtenberg, and Cooper discloses the claimed parcel request subsystem, including a parcel request queue, operative to request discreet image data parcels in a priority order (Pet. 46–47), and a parcel rendering subsystem responsive to an image parcel request of assigned priority coupled to the parcel request data queue to retrieve selectively and render the received image data parcels to a display memory (*id.* at 47–50), wherein the parcel rendering subsystem determines the assigned priority based on a determined optimal resolution level (*id.* at 50–51).

Patent Owner argues that claim 1 would not have been obvious in view of the combination of Cooper with Rutledge and Ligtenberg because (i) the combination does not teach a parcel request queue in which image parcel requests are placed according to a priority order (PO Resp. 41–44); (ii) Cooper does not teach a parcel rendering subsystem that determines an assigned priority based on predetermined resolution of an image display (*id.* at 44–46); and (iii) the Petition does not address the concept of a parcel

request priority order determined on the basis of a predetermined resolution of a display (*id.* at 46–49); *see* Hr’g Tr. 30.

Petitioner cites both Rutledge and Ligtenberg as disclosing map tiles stored at multiple resolutions. Pet. 45. Petitioner argues that Rutledge discloses a user terminal that, corresponding to the user’s viewpoint, downloads maps as image tiles stored in a map database via a communication network. *Id.* According to Petitioner, the visualization is dynamic because a user can pan, zoom, and navigate through the image. *Id.* Petitioner cites Ligtenberg as disclosing a storage format and technique in which image data stored as tiles of multiple resolutions is sent from a server to a client for selective display. *Id.*

As to the limitation in claim 1 that recites storing image data parcels in an image data store, Petitioner cites Ligtenberg as disclosing that the client device downloads image portions and stores them in memory and Cooper as disclosing storing the received visual object at the client device. *Id.* at 47. Petitioner contends that Cooper discloses an object assessment function at a client that maintains a list of visible objects in a priority queue in accordance with an instantaneous viewpoint of a hypothetical viewer and a streaming function that manages the request and receipt of object data from a server by making requests in accordance with the contents of the priority queue, starting with the most important objects. *Id.* at 46–47 (citing Ex. 1006, Abstract, 4:61–62, 5:2–6, 16–19, 7:6–11).

Claim 1 further recites a parcel rendering subsystem coupled to the data store to retrieve and render the image data parcels to a display memory and providing to the parcel request subsystem image parcel requests of assigned priority. Petitioner cites Cooper as disclosing a technique for

retrieving image object data from a server using priorities based on an observer's viewpoint and rendering the image on a user device. *Id.* at 45–46. Petitioner notes that in Cooper, received objects are stored in an object data table and made available to the rendering program and that data parcels are selectively retrieved and imaged based on their importance to the scene from the viewer's current viewpoint. *Id.* at 48–50.

Claim 1 also recites that the parcel rendering subsystem determines the assigned priority based on the resolution level, that the display is coupled to an image display of predetermined resolution and that the optimal resolution is level is determined based on the predetermined resolution. According to Petitioner, Rutledge discloses that a user's viewpoint can be used to select a corresponding user resolution level, for example, by zooming. Pet. 50. Petitioner cites (i) Cooper's object assessment function for determining the order in which visual data is received, i.e. determining the assigned priority, (ii) Rutledge for disclosing displaying computer images at a terminal of known or predetermined resolution, and (iii) Ligtenberg for its disclosure of using the output display resolution, instead of original image resolution, to conserve CPU and I/O resources. *Id.* at 50–51. This also discloses the limitation that the display memory is coupled to an image display of predetermined resolution. *Id.*

Claim 1 further recites that the discrete image data parcels are of a first fixed size as received by the parcel request subsystem. Ligtenberg discloses receiving images in the form of fixed length tile blocks. Pet. 52 (citing Ex 1004 6:51–56, 7:1–20). Claim 1 also recites that the discrete image parcels are of a second fixed size as rendered by the parcel rendering subsystem. Petitioner notes that, recognizing that the size at which images

are rendered can differ from the size at which they were received, Ligtenberg discloses an interpolation technique to expand images to a size suitable for a display. *Id.*

Claim 1 also recites that the discrete image data parcels each include a fixed size array of pixel data. Petitioner cites both Rutledge and Ligtenberg as disclosing that image data is transferred to a client in units of fixed size arrays. *Id.* at 24.

Patent Owner acknowledges that Cooper discloses a type of prioritization, in general. Hr’g. Tr. 31. However, Patent Owner argues that the combination of Cooper with Ligtenberg and Rutledge does not teach a parcel request queue in which image parcel requests are placed in priority order. PO Resp. 41. The basis of Patent Owner’s argument is that Cooper does not disclose image parcels, as we have construed that term. Patent Owner notes that we have construed “image parcel” to be an element of an image array, with the image parcel being specified by the X and Y position in the image array coordinates and an image set resolution index. *Id.* at 42. Patent Owner states that Cooper teaches only prioritization of independent 3D polygonal objects that are not consolidated into an array representing a form. *Id.* at 42. According to Patent Owner, because each polygonal object of Cooper is a tessellated object consisting of numerous polygons that represent real world objects, Cooper’s 3D polygons are not visually interdependent elements consolidated into an array, i.e., they are not “image parcels” as we have construed that term. *Id.* at 42–43.

Petitioner responds that Patent Owner’s arguments directed solely to prioritization in Cooper fail to address Petitioner’s citation of Rutledge and Ligtenberg as teaching image parcels, a matter that Patent Owner does not

dispute explicitly. Pet. Reply 19–20. Petitioner argues that Patent Owner attacks the references individually, but not in combination, as presented in the Petition. *Id.* at 19; Hr’g. Tr. 30.

Petitioner’s challenge is based on its contention that it would have been obvious to apply Cooper’s prioritization to the image parcels of Rutledge and Ligtenberg. Patent Owner contends that Petitioner cites Cooper as disclosing a priority feature, but that Cooper does not determine priority based on the predetermined resolution of an image display, as recited in claim 1. PO Resp. 44. Instead, according to Patent Owner, Cooper determines priority based on the importance of a visible object as calculated by evaluating object associated bounding boxes. *Id.* at 44–46. Patent Owner argues that values that vary in accordance with their contribution to the visual richness of the scene (distance, screen area, message, focal point, movement, and frames ignored) are based exclusively on bounding boxes that have no resolution because they contain only information that describes the volume and position of the object. *Id.* at 48 (citing Ex. 1006, 6:35–38). According to Patent Owner, to the extent resolution plays any role at all, it is limited to filtering out an object that already can be rendered fully, so that an object in data deficit is passed along to an object assessment function where its importance is determined on the basis of its associated bounding box, rather than a predetermined resolution. *Id.* at 46.

Petitioner argues that Patent Owner fails to recognize that Rutledge and Ligtenberg disclose that, in order to conserve CPU and I/O resources, the resolution needed for data display can be used for data retrieval. Pet. Reply 20–21. According to Petitioner, Rutledge and Ligtenberg provide the

motivation to specify a desired zoom level, particularly one that is appropriate for the screen resolution without needing to waste bandwidth to retrieve data that cannot be displayed on the screen. *Id.* at 22.

As noted above, Petitioner argues that Patent Owner opposes its challenge to claim 1 by attacking references individually, rather than as a combination. Pet. Reply 19; Hr’g Tr. 30. Much of the preceding discussion demonstrates that the focus of the parties’ arguments is on whether or not it would have been obvious to a person of ordinary skill to apply the object priority approach of Cooper to the image parcel techniques disclosed in Rutledge and Ligtenberg. *See also* Hr’g. Tr. 14–21. Thus, we resolve the issues in this case by addressing whether a person of ordinary skill in the art would have been motivated to combine the teachings of Rutledge, Ligtenberg, and Cooper.

Person of Ordinary Skill in the Art

Obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination—obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Unigene Labs v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir 2011). Petitioner contends that, in addition to his educational background, a person of ordinary skill in the art would have at least five years of experience in a technical field related to geographic inform systems (GIS). Pet. 11–12. The Patent Owner Response does not dispute explicitly Petitioner’s description of a person of ordinary skill in the art. Nevertheless, Petitioner contends there is a dispute as to the level of

ordinary skill in the art because Patent Owner's expert, Dr. Chandrajit Bajaj, ignores the teachings in the '794 Patent concerning the relevance of geographic information systems (GIS) and that, unlike Petitioner's expert, Dr. William Michalson, there is no suggestion on the record that Dr. Bajaj has any experience in GIS systems. Pet. Reply. 2; Hr'g. Tr. 6–8. Petitioner undermines its position that qualifying as a one of ordinary skill requires five years of experience in GIS by arguing the even a person without GIS experience would consider GIS highly relevant to the problem presented in the '794 Patent and would not ignore this issue. Pet. Reply 2. Thus, although Petitioner attacks the credibility of Dr. Bajaj based on his testimony concerning the applicability of the references, we do not discern any genuine dispute as to the level of ordinary skill in the art.

Motivation to Combine

Petitioner contends that a person of ordinary skill would have recognized that the map and image browsing technique of Rutledge would benefit from the file format of Ligtenberg and that the combined technique of Rutledge and Ligtenberg would benefit from Cooper's data requests based on prioritization. *Id.* at 43. Petitioner argues that a person of ordinary skill would have been motivated to combine these references because each of the references teaches incrementally sending data at multiple resolutions, based on the observer's viewpoint, from a server to a client, i.e., (1) Rutledge teaches incrementally sending visual data from a server as map tiles based on a zoom layer; (2) Ligtenberg teaches sending tile blocks based on a layer of given resolution; and (3) Cooper teaches incrementally sending polygons representing the object in a priority based scheme. *Id.* at 43–44.

Patent Owner argues that a person of ordinary skill would not have modified Rutledge or Ligtenberg in accordance with the Cooper priority queue because a person of ordinary skill would understand that 2D based methods, such as those disclosed in Rutledge and Ligtenberg, are fundamentally different from 3D polygonal based methods, such as those described in Cooper. PO Resp. 4–7. According to Patent Owner, a person of ordinary skill would have recognized that a 3D scene display as described in Cooper assumes “frame continuity,” i.e., it relies on the scene not changing much from frame to frame. *Id.* at 4. Patent Owner contrasts this characteristic of Cooper’s 3D system with the 2D systems of Rutledge and Ligtenberg, in which a user pans to a new x-y location on the image, or zooms in and out, such that an entirely new set of tiles is displayed, often pushing old tiles out of view. *Id.* at 4–5. Patent Owner points out that in the 2D systems of Rutledge and Ligtenberg the new tiles are displayed all at once, and there is no description that the display of new tiles gradually increases in resolution. *Id.* at 5.

In a further argument against the combination of Cooper with Rutledge and Ligtenberg, Patent Owner contends that Cooper attempts to cure a particular aspect of a visual latency problem that does not arise in Rutledge or Ligtenberg, i.e., in 3D images certain objects, e.g., those that are closer to the viewer assume greater importance than others. *Id.* at 6–7. Patent Owner also notes that the 2D tiles of Rutledge and Ligtenberg present a simpler computational environment because they are viewed perpendicularly to the image plane and can be pre-calculated in advance of the user viewing the tiles. *Id.* at 5 (citing Ex. 1004, 6:7–11; Ex. 2001 ¶¶ 66–67 (Declaration of Chandrajit Bajaj (“Bajaj Decl.”))).

Petitioner responds that numerous examples demonstrate it was well known to apply 3D visualization techniques to provide a perspective view (or “synthetic view”) of 2D views, such as terrain maps or aerial or satellite photography. Pet. Reply 3–5 (citing Ex. 1008 ¶¶ 44, 66–68, 74–76 (Declaration of Dr. William Michalson)). Petitioner cites Migdal as an example of using 3D image rendering techniques to display perspective views of 2D geographic source image data, such as aerial textures or satellite imagery. *Id.* at 3 (citing Ex. 1007, 2:45–51, 2:65–3:3, 5:66–6:5, Fig. 1B). However, the motivation to combine the prioritization scheme disclosed in Cooper with Rutledge and Ligtenberg is unclear because, as Patent Owner notes, neither Rutledge nor Ligtenberg states that its tiles were prone to visual latency complications that erode the visual characteristics of more complex images, as those in Cooper. PO Resp. 35.

Patent Owner contends that a person of ordinary skill would not combine 3D polygonal object prioritization of Cooper with the single composited image display systems of Rutledge and Ligtenberg. PO Resp. 7–17. Patent Owner argues that Petitioner’s attempt to graft Cooper onto Rutledge for its teaching of prioritizing simultaneously displayed 3D polygonal objects applies hindsight, because Rutledge does not teach the display of 3D polygonal objects and Cooper is not pertinent to a 2D map system like Rutledge. *Id.* at 7. According to Patent Owner, Cooper applies only to a viewing system that displays one or more 3D polygonal objects in which the user virtually navigates through the scene, such that polygonal objects visually enter and leave the scene and objects ranked as contributing most to the visual richness of the scene have their polygons downloaded for rendering before less significant objects. *Id.* at 8–9. Patent Owner argues

that a person of ordinary skill would recognize that such object assessment is meaningful only in the 3D environment and that there is no point to applying this approach in a 2D environment where image tiles are arranged together in a single plane to fill a single overall image. *Id.* at 9–10. Patent Owner argues that the zoom feature of Rutledge does not turn Rutledge into a 3D virtual environment because, in Rutledge, all the tiles are in a single plane, i.e., the tiles viewed at any height are coplanar with one another and different portions of a single composited map are not separate objects ranked in relation to one another. *Id.* at 10–11. According to Patent Owner, a map tile in Rutledge visually coheres with other tiles in an array that collectively forms a single image, i.e., a zoom layer of a map at a selected resolution level, such that the tiles are not distinct but are displayed only as individual visual elements of the larger whole. *Id.* at 12. In contrast, in Cooper, a 3D polygonal object is distinct from another 3D polygonal object and may be removed from the scene without altering the appearance of the other 3D polygonal object. *Id.* Patent Owner contends that the tiles of Rutledge and Ligtenberg are individual elements that are consolidated in an array to represent a single composite image, but these are not comparable to an object in Cooper in which an object is visually independent of another object and is sufficient by itself to form an image. *Id.* at 14.

Patent Owner also notes that, although Rutledge and Ligtenberg teach displaying an image at different resolutions, the image is displayed at a single, common resolution at any one time. PO Resp. 15. In contrast, Cooper prioritizes 3D polygonal objects so that the more important ones can be rendered at a higher resolution before the less important ones to make

efficient use of a limited bandwidth data pipe. *Id.* at 15–17 (citing Ex. 1006, 7:6–11; Ex. 1005, 7:48–62; Ex. 1004, 8:60–66). Thus,

whatever benefits in bandwidth preservation are attributable to varying the amount of polygonal object detail at which a particular object is displayed according to visual importance in Cooper are not realizable in a display environment like those of Rutledge and Ligtenberg, where a single map or image object (and not multiple map or images) is displayed according to a single desired resolution at any one time.

Id. at 17.

Petitioner responds that the separate tiles at varying resolutions of Rutledge and Ligtenberg combine to form what appears to the user as a coherent image, just as objects of Cooper combine from the user viewpoint to form a coherent scene. Pet. Reply 10. According to Petitioner, a person of ordinary skill would recognize that the distinction vanishes when a viewpoint dependent priority algorithm is applied to retrieve map tiles at varying levels of detail, as the data object of Cooper. *Id.* at 10–11. However, Petitioner does not address what would have motivated a person of ordinary skill to apply Cooper’s viewpoint dependent priority approach to Rutledge and Ligtenberg.

As another basis for disputing a motive to combine, Patent Owner argues that the tiles in Rutledge or Ligtenberg would be incapable of being prioritized by the object assessment function of Cooper because (i) the bounding box primitives essential for Cooper’s object assessment function are not present in Rutledge or Ligtenberg (PO Resp. 18–21), and (ii) a person of ordinary skill would not have employed Cooper’s object assessment function to enhance the visual richness of the image display of Rutledge and Ligtenberg (*id.* at 21–30). In Cooper, a bounding box of a

primitive (a simple geometry) represents the volume of an associated object and its position in the 3D environment, and bounding box information is stored on the client side in an object list. Ex. 1006, 5:50–57. Patent Owner notes that Cooper relies exclusively upon bounding boxes to determine object importance and establish priority by ranking the objects for download, but that these are not present in Rutledge and Ligtenberg, in which the client computer is not pre-loaded with primitives of any kind associated with tiles—instead, tiles are requested from a server. *Id.* at 20–21.

Petitioner responds that there is no fundamental difference between 3D and 2D imagery that would preclude utilizing the viewpoint and priority features of Cooper with image tiles of Rutledge and Ligtenberg. Pet. Reply 5–6. According to Petitioner, the system described in Cooper would not become inoperable simply because the vertices of the polygon or all the polygons themselves were located in the same plane. *Id.* at 5–6 (citing Ex. 1015 ¶¶ 118–121 (Declaration of Dr. William Michalson In Support of Petitioner’s Reply to Patent Owner’s Response)). Petitioner also argues that a person of ordinary skill would not have considered the bounding box of Cooper to be an impediment to combining the asserted references, because Cooper’s bounding box is an expedient implementation detail. *Id.* at 11.

Petitioner’s arguments, drawn to assertions that nothing precludes the combination of the references, do not address what would have motivated a person of ordinary skill to apply the techniques described in Cooper to Rutledge and Ligtenberg. Petitioner notes Cooper’s prioritization to identify the most needed visual data from a viewer’s standpoint. *Id.* at 7. Petitioner points out that Ligtenberg explicitly teaches the need and techniques to optimize bandwidth use by selectively retrieving and rendering images at a

desired resolution. *Id.* at 6–7. Petitioner asserts that a person of ordinary skill would have recognized the benefit of utilizing Cooper’s prioritization algorithm to conserve bandwidth by first requesting map tiles contributing most to the scene, regardless of the bounding boxes used and that a bounding box could easily define the same area as a map tile. *Id.* at 11. However, aside from this general assertion, Petitioner does not explain why a person of ordinary skill would have been motivated to modify Rutledge or Ligtenberg, by incorporating Cooper’s prioritization technique.

Patent Owner contends that Rutledge does not disclose any particular prioritization, but displays layers based on need, rather than priority. Hr’g. Tr. 25, 28. Patent Owner notes that, in Rutledge, when one pans an image left or right, one jumps from one place to another. *Id.* at 25. Patent Owner points out that Cooper concerns a user’s viewpoint as that user moves in the environment, whereas in the flat screen environment of Rutledge, even when a user directs his attention to an area of a large image, there is no system input as to the user’s position and the angle of all the tiles, as well as their size and distance would be the same. *Id.* at 26–27. In short, there is no need or problem in Rutledge that would be solved by Cooper’s object prioritization. *Id.* at 28.

Petitioner argues that Rutledge, Ligtenberg, and Cooper all address the problem of getting images to the user as quickly as possible by breaking down imagery into various levels of resolution instead of sending all the images at once. Hr’g. Tr. 16–17. Petitioner emphasizes that all three of the references focus on the user’s viewpoint, a feature Petitioner characterizes as a “big part of the invention” in the ’794 Patent. *Id.* at 17. For this reason, Petitioner contends that all of the references focus on prioritizing and that

“there is actual some sort of priority being used” in Rutledge and Ligtenberg. *Id.* at 17, 19. As evidence of priority, in Rutledge, Petitioner cites to examples of map zooming and panning; in Ligtenberg, Petitioner cites to examples of allowing desired portions of image data to be retrieved at a desired resolution. Hr’g. Tr. 47 (citing Pet. 42, 45, 47).

Petitioner acknowledges that there is no formal discussion of priority in Rutledge or Ligtenberg and that the Petition does not assert that Rutledge or Ligtenberg discloses a priority system. Hr’g Tr. 48. Although Petitioner contends that Rutledge and Ligtenberg suggest a priority system (*id.*), Petitioner argues “[b]ut the reason we added Cooper is because there was nothing specific as to how you would actually do that or how you could possibly do that” (*id.* at 19). Thus, Petitioner appears to acknowledge hindsight reasoning in its analysis and does not answer our question as to why a person of ordinary skill would have been motivated to apply the priority techniques in Cooper to Rutledge and Ligtenberg.

Patent Owner argues that Petitioner frames its argument at a level of generality that obscures the incompatibility of Cooper with Rutledge and Ligtenberg. PO Resp. 31. We agree with Patent Owner that the level of abstraction argued by Petitioner is insufficient to overcome the incompatibility issues identified by Patent Owner. *Id.* at 31–32. The Petition does not explain why or how a person of ordinary skill would have applied the importance values Cooper uses to determine priority in a 3D environment to Rutledge and Ligtenberg’s 2D environment. *Id.* at 32–34.

For the reasons discussed above, Petitioner has not demonstrated by a preponderance of the evidence that a person of ordinary skill would have

been motivated to combine the teachings of Rutledge and Ligtenberg with the priority teaching of Cooper.

Claim 2 As Obvious Over the Combination of Rutledge, Ligtenberg, Cooper, and Migdal

Migdal concerns combining a pattern image, referred to as a texture map, with an area or surface of an object, to produce a modified object having added texture detail. Ex. 1007, 1:18–21. Petitioner contends that a person of ordinary skill would have realized that Migdal’s texture mapping techniques would benefit the Rutledge-Ligtenberg-Cooper combination by further reducing memory and processor requirements of a user device for rendering map and image data. Pet. 54. As discussed above, Petitioner has not demonstrated by a preponderance of the evidence that a person of ordinary skill would have been motivated to combine the teachings of Rutledge, Ligtenberg, and Cooper. For at least this reason, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that claim 2 is obvious over the combination of Rutledge, Ligtenberg, Cooper, and Migdal.

MOTION TO EXCLUDE

Petitioner moved to exclude Patent Owner’s Exhibits 2002–2005 and 2010 (“the Subject Exhibits”) as untimely. Mot. to Exclude 1. The Subject Exhibits were introduced during Patent Owner’s cross-examination of Petitioner’s expert, Dr. Michalson, taken after Petitioner submitted its Reply to the Patent Owner Response. *Id.* at 2. Patent Owner elected not to depose Dr. Michalson on his initial declaration (Ex. 1008) before filing its Patent Owner Response. Patent Owner cross-examined Dr. Michalson after Petitioner filed its Reply, which was accompanied by a second declaration

by Dr. Michalson (Ex. 1015). Dr. Michalson's second declaration explicitly incorporated his earlier declaration (Ex. 1008) by reference. Ex. 1015 ¶ 3.

Notwithstanding Dr. Michalson's incorporation of his earlier declaration by reference, Petitioner contends that it was improper for Patent Owner to cross-examine Dr. Michalson on the subject matter of his first declaration, because Patent Owner waived the opportunity to conduct such cross-examination when it filed its Patent Owner Response without taking any testimony from Dr. Michalson and that Patent Owner's cross-examination and Motion for Observations on Cross-Examination (Paper 40) should have been limited only to matters in Dr. Michalson's second declaration submitted in support of Petitioner's Reply. Mot. to Exclude. 2.

This issue is moot because this Final Written Decision does not cite to any of the Subject Exhibits. For that reason, we do not address the matter on the merits and dismiss Petitioner's Motion to Exclude.

As a procedural note, however, Petitioner's Reply raises at least some issues that could be proper subject matter for cross-examination and Motion for Observation by Patent Owner. As discussed above, Patent Owner did not dispute Petitioner's description of a person of ordinary skill. Although Petitioner attempts to frame an issue concerning the level of ordinary skill, Petitioner actually attacks the credibility of Dr. Bajaj, arguing that there is no suggestion Dr. Bajaj has any GIS experience. Pet. Reply 1–2 (citing Ex. 1008 ¶¶ 12–19, Ex. 1015 ¶¶ 11–25). As Petitioner first raised this issue after Patent Owner filed its last paper on the merits, Patent Owner's cross-examination of Dr. Michalson on this issue, introduction of exhibits on which to conduct the cross-examination, and corresponding Motion for

Observations may not have been improper or untimely. Office Trial Practice Guide, 77 Fed. Reg. 48756, 48767–8 (Aug. 14, 2012).

CONCLUSION

In consideration of the above, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that challenged claims 1 and 2 are unpatentable.

ORDER

In consideration of the above, it is

ORDERED that Petitioner has not demonstrated by a preponderance of the evidence that challenged claims 1 and 2 are unpatentable.

FURTHER ORDERED, that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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