

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEARMAP US, INC.,
Petitioner,

v.

PICTOMETRY INTERNATIONAL CORP.,
Patent Owner.

IPR2022-00735
Patent 8,593,518 B2

Before THOMAS L. GIANNETTI, GARTH D. BAER, and
RUSSELL E. CASS, *Administrative Patent Judges*.

CASS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background*

Nearmap US, Inc. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–16 (the “challenged claims”) of U.S. Patent No. 8,593,518 B2 (Ex. 1001, “the ’518 patent”). Paper 2, 1 (“Pet.”). Pictometry International Corp. (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”).

An *inter partes* review may not be instituted unless it is determined that “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4(a) (2021) (“The Board institutes the trial on behalf of the Director.”). The reasonable likelihood standard is “a higher standard than mere notice pleading,” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential).

For the reasons provided below and based on the record before us, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the challenged claims. Patent Owner has not persuaded us that we should exercise our discretion to deny institution of trial. Accordingly, we institute an *inter partes* review on all grounds set forth in the Petition.

B. *Real Parties in Interest*

Petitioner states that Nearmap US, Inc. is the real party in interest. Pet. 1, 55. Patent Owner states that the real parties in interest are Pictometry

International Corp. and Eagle View Technologies, Inc., which are both subsidiaries of EagleView Technology Corporation. Paper 3, 2.

C. Related Proceedings

The parties state that the '518 patent was asserted in *Eagle View Technologies v. Nearmap US*, No. 2-21-cv-00283 (D. Utah) (“the District Court Litigation”). Pet. 55–56; Paper 3, 2.

D. The '518 Patent (Ex. 1001)

The '518 patent is directed to a “computer system for continuously panning oblique images” in which “separate oblique images are presented in a manner that allows a user to maintain an understanding of the relationship of specific features between different oblique images when panning.” Ex. 1001, code (57).

The '518 patent explains that in the remote sensing/aerial imaging industry, imagery is used to capture views of a geographic area, referred to as “geo-referenced images.” Ex. 1001, 1:22–27. According to the '518 patent, such geo-referenced images come in two basic categories—captured images, which have same appearance as when captured by a camera, and projected images, which have been processed and converted to conform to a mathematical projection. *Id.* at 1:27–32. Because “most software cannot geo-reference captured imagery,” captured imagery may be reprocessed to create projected imagery, the most common of which is an “ortho-rectified image,” which “aligns the image to an orthogonal or rectilinear grid.” *Id.* at 1:33–38. “The input image used to create an ortho-rectified image is a nadir image—that is, an image captured with the camera pointing straight down,” the '518 patent explains, and it is often “desirable to combine multiple images into a larger composite image” to cover “a larger geographic area on

the ground.” *Id.* at 1:38–43. One form of this composite image is the “ortho-mosaic image,” which “is an image created from a series of overlapping or adjacent nadir images that are mathematically combined into a single ortho-rectified image.” *Id.* at 1:43–47.

“However,” the ’518 patent explains, because ortho-mosaic images “are captured looking straight down, this creates a view of the world to which we are not accustomed,” and thus “many people have difficulty determining what it is they are looking at in the image.” Ex. 1001, 2:10–15. For example, a school bus may appear as a yellow rectangle, and only roof tops of buildings may be visible. *Id.* at 2:15–22. By contrast, an oblique image, which is captured at an angle, “presents a more natural appearance because it shows the sides of objects and structures,” and is “still in the natural appearance that the camera captures.” *Id.* at 2:26–32. But oblique images, the ’518 patent explains, present an issue because they “are not aligned to a map grid, like ortho-mosaic images,” which “makes them much less intuitive when attempting to navigate or determine direction of an image.” *Id.* Specifically, because an oblique image “can be captured from any direction, the horizon can be in any direction,” which “can cause confusion for someone trying to navigate within the image.” *Id.* at 2:50–58. Additionally, because an oblique image “is still in the original form the camera captured, and has not been re-projected into a mathematical model, it is not necessarily true that the compass directions meet at right angles within the image.” *Id.* at 2:58–65.

The ’518 patent further explains that “[b]ecause oblique images are not grid aligned and can be captured from any direction[,] a feature on one image will not look the same on another image.” Ex. 1001, 3:26–28.

Therefore, “the common practice in the industry is to provide oblique imagery as a series of individual images within which the user can pan.” *Id.* at 3:51–53. That is, “[t]o see beyond the limits of an image[,] the user needs to cause another image to be loaded; they can then pan within that image.” *Id.* at 3:53–55. Thus, the ’518 patent explains, “panning oblique images in a continuous manner is fraught with problems and unlikely to provide a useable means of navigation using the current state of the art.” *Id.* at 9:31–34.

To address these issues, the ’518 patent “allows for separate obliquely captured images to be panned in a continuous fashion.” Ex. 1001, 3:61–62. This approach is illustrated in Figure 2 (reproduced below), which illustrates master image 100, primary oblique image 102, and one or more secondary oblique images 104a–d.

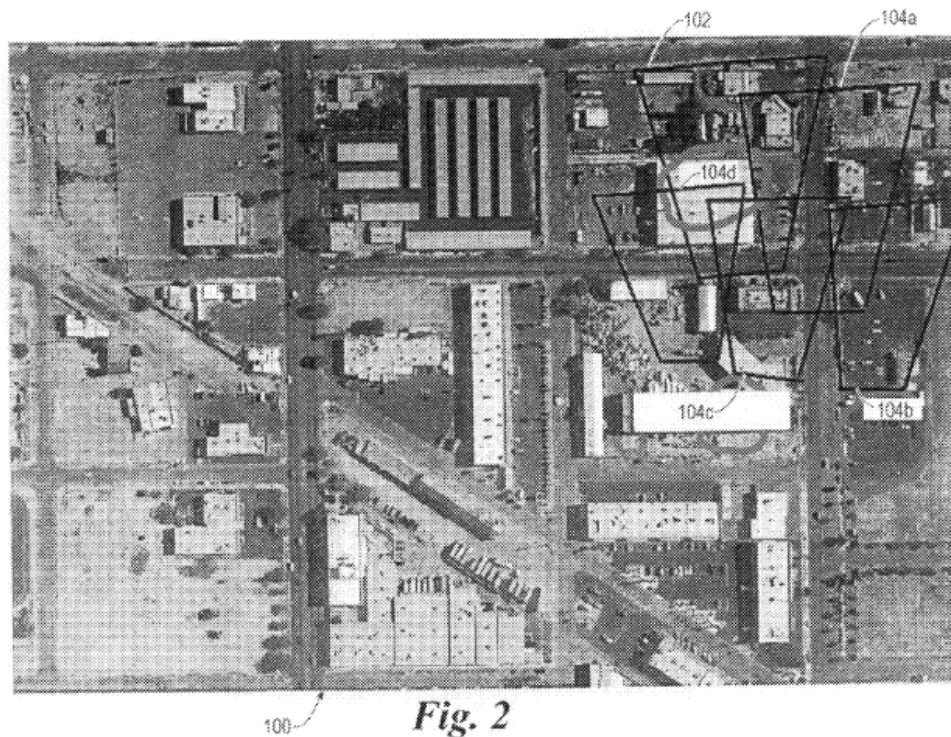


Figure 2 of the ’518 patent shows master image 100, primary oblique image 102, and secondary oblique images 104a–d. Ex. 1001, Fig. 2, 8:50–54.

As shown in Figure 2, “secondary oblique images 104a–d overlap a portion of the primary oblique image 102, such that overlapping portions of the primary image 102 and secondary oblique images 104 a–d represent the same features of the area of interest.” Ex. 1001, 8:61–66. Thus, “the primary oblique image(s) 102 and the secondary oblique image(s) 104a–d are part of a set of adjacent oblique images cooperating to represent the area of interest or a portion of the area of interest.” *Id.* at 8:66–9:2.

The system also allows panning within the primary oblique image 102, detecting a transition event of the primary oblique image 102, selecting at least one adjacent secondary oblique image 104a–d, and displaying the primary oblique image 102 and at least one of adjacent secondary oblique images 104a–d on the same display such that the adjacent primary and secondary oblique images are aligned on the display. Ex. 1001, 9:3–14. The transition events can include: (1) displaying a specific portion of a primary oblique image 102; (2) reaching an edge of the primary oblique image 102 or a pre-selected distance from the edge; (3) a user defined condition; or (4) reaching a region of the display area not covered by primary oblique image 102. *Id.* at 10:19–29.

An exemplary flow chart of a method for continually panning oblique images is illustrated in Figure 4, reproduced below.

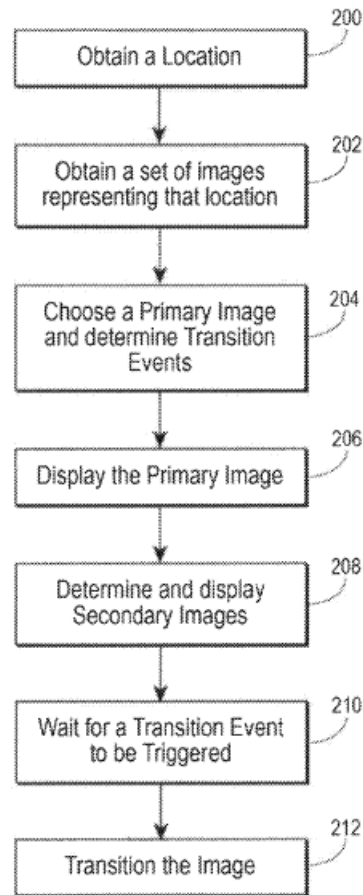


Fig. 4

Figure 4 illustrates an exemplary flow chart for a method for continually panning oblique images. Ex. 1001, Fig. 4, 6:3–5.

As shown in Figure 4, the system first obtains a relevant geographic location (step 200). Ex. 1001, 9:65–66. Next, a set of images representing that location is obtained, for example, from a database server (step 202). Then, the system determines which image from the obtained set best represents the geographic location and makes that image the primary oblique image 102. *Id.* at 10:11–14. In this step, the system also determines one or more transition events. *Id.* at 10:14–19. Next, the system displays the

primary oblique image 102 (step 206) and determines and displays the secondary oblique images 104a–d (step 208). *Id.* at 10:30–32. An algorithm is used to determine the best secondary oblique image for the particular location based on a variety of factors, such as the geographic location of the secondary oblique image, the direction from which the secondary oblique image was taken (*i.e.*, its orientation), the ground sample distance of the pixels within the secondary oblique image, and other selection criteria. *Id.* at 10:42–11:6. The best secondary oblique image 104a–d is displayed so that one or more common geographic locations on both images are adjacent to each other. *Id.* at 11:9–11.

Next, the system waits for a transition event to be triggered (step 210), and transitions the images when a Transition Event occurs (step 212). Ex. 1001, 11:19–21. The system may transition the images by either (1) scrolling the primary oblique image 102 and using secondary oblique images 104a–d as needed to provide sufficient coverage, or (2) causing a new image to be the primary oblique image 102, positioning it appropriately, and providing sufficient coverage as needed with secondary oblique images 104a–d. *Id.* at 11:23–31. The transition to a new primary oblique image may be performed gradually “to allow the user to visually maintain a clear sight of the image features they are using for geographic referencing.” *Id.* at 11:32–48.

E. Illustrative Claims

Of challenged claims 1–16, claims 1 and 13–16 are independent. For purposes of the issues raised at this stage of the proceeding, claim 1 is illustrative and is reproduced below.

1. [preamble] A sequence of instructions stored on at least one non-transitory computer readable medium for running on a

computer system capable of displaying and navigating oblique imagery, comprising:

- [a] instructions for displaying a pixel representation of a primary oblique image depicting a first area, the primary oblique image being part of a set of adjacent oblique images that partially, but not completely, overlap and represent an area of interest;
- [b] instructions for panning within the primary oblique image, the primary oblique image including overlapping data;
- [c] instructions for detecting a transition event, triggered by a user, of the displayed primary oblique image;
- [d] instructions for selecting at least one adjacent secondary oblique image depicting a second area partially overlapping with the first area and from the set of oblique images corresponding to a supplied location coordinate, the second area extending beyond the first area; and
- [e] instructions for displaying the primary oblique image and the at least one adjacent secondary oblique image on a same display such that features in the adjacent primary and secondary oblique images are aligned on the same display;
- [f] wherein the primary and secondary oblique images match the perspectives from which the primary and secondary oblique images were captured.

Ex. 1001, 12:18–43 (bracketed paragraph identifiers added).

F. Applied References

Petitioner relies upon the following references:

Noah Snavely et al., *Photo Tourism: Exploring Photo Collection in 3D*, ACM Siggraph 2006 Papers (July 2006)¹ (Ex. 1004, “Snavely”);

¹ Petitioner’s identification information for Snavely is provided here. Pet. iii. The evidence relating to the publication of Snavely is discussed in Section II.E.1(b) below.

Balfour, US 7,554,539 B2, issued June 30, 2002
(Ex. 1005, “Balfour”);

Yelton, US 7,148,861 B2, issued Dec. 12, 2006
(Ex. 1006, “Yelton”); and

Michael Irani et al., *Video Indexing Based on Mosaic Representations*, Proceedings of the IEEE (Volume: 86, Issue: 5, May 1998), pp. 905–921 (Ex. 1007, “Irani”).

Pet. iii, 2. Petitioner submits declarations from Dr. David Forsyth and Jacob Robert Munford. (Exs. 1003, 1015). Patent Owner submits a declaration from Chandrajit Bajaj, Ph.D. (Ex. 2001).

G. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–16 of the ’518 patent based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 3–16	103(a) ²	Snively, Balfour, Irani
2	103(a)	Snively, Balfour, Irani, Yelton

Pet. 2.

II. DISCUSSION

A. Discretion Under 35 U.S.C. § 314(a) Based on Related District Court Proceeding

Patent Owner asserts that institution should be denied under 35 U.S.C. § 314(a), in deference to the District Court Litigation. *See* Prelim. Resp. 39–42. Petitioner disagrees. Pet. 50–54.

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 103 that became effective after the filing of the application that led to the ’518 patent. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

Under 35 U.S.C. § 314(a), the Director has discretion to deny institution of review. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1351 (2018) (“[Section] 314(a) invests the Director with discretion on the question whether to institute review.” (emphasis omitted)); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

One instance when the Board considers exercising this discretion is when there is an early trial date in related litigation as part of assessing all relevant circumstances, including the merits, to balance considerations such as system efficiency, fairness, and patent quality. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv Order*”); *NHK Spring Co. v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 at 19–20 (PTAB Sept. 12, 2018) (precedential). The Board evaluates six factors when making this assessment. *See Fintiv Order*, at 5–6. Further, “the Board takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* at 6.

On June 21, 2022, the Director issued an Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings With Parallel District Court Litigation (“Interim *Fintiv* Guidance”).³ The Interim *Fintiv* Guidance

³ The Interim *Fintiv* Guidance is available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

provides “several clarifications” to “the PTAB’s current application of *Fintiv* to discretionary denial where there is parallel litigation” in response to comments received from stakeholders in response to a Request for Comments (RFC). Interim *Fintiv* Guidance 2.

Turning to the *Fintiv* factors, Petitioner asserts that “[t]he [c]ourt has not yet set a date for the claim construction hearing, and the scheduling order indicates that it will not set a trial date until 14 days after its claim construction ruling.” Pet. 51 (citing Ex. 1013). Patent Owner does not dispute this. Prelim. Resp. 40. Therefore, the district court trial will likely occur after our final written decision in this proceeding, and factor 2 (timing of trial) weighs against exercising discretion to deny institution. The litigation also is in a relatively early stage because, the parties appear to have just completed exchanging infringement and invalidity contentions and no claim construction hearing has occurred. Pet. 52–53; Prelim. Resp. 40–41. Therefore, factor 3 (investment in the district court litigation) also weighs against exercising discretion to deny institution.

Additionally, because this case is in a relatively early phase, the district court will have the ability to determine whether to stay the District Court Litigation in favor of this IPR (factor 1). Pet. 51–52. Further, because our final written decision will likely occur before trial in the District Court Litigation, the overlap in parties (factor 5) and any overlap in issues (factor 4) does not weigh in favor of exercising discretion to deny institution.. Finally, we determine that the sixth *Fintiv* factor (other circumstances) is neutral. Accordingly, after considering all the factors, we decline to exercise our discretion to deny institution.

B. Claim Construction

A claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b).

Petitioner proposes that “no formal claim constructions are necessary” in this proceeding. Pet. 5. Patent Owner also does not include a section addressing claim construction. *See* Prelim. Resp. However, in the course of its argument, Patent Owner points to Dr. Forsyth’s statement that “[t]he ’518 patent describes that the oblique images ‘match the perspectives’ from which they ‘were captured,’” and that “[m]atching the perspectives ‘means that image pixels are not aligned on a rectangular grid [on the ground] but are aligned to the perspective that matches the perspective the camera has captured.’” *Id.* at 19 (citing Ex. 1003 ¶ 15) (emphasis omitted). At this stage, Patent Owner does not appear to dispute Dr. Forsyth’s statement. *Id.* at 19–22.

For purposes of this decision, we adopt the understanding set forth by Dr. Forsyth, and interpret the language requiring that oblique images “match the perspectives from which” they “were captured” to mean that “image pixels are not aligned on a rectangular grid on the ground but are aligned to the perspective that matches the perspective the camera has captured.” Ex. 1003 ¶ 15 (brackets omitted).

We determine that it is not necessary to provide an express interpretation of any other claim terms at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented 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 having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence of non-obviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b) (2020). The burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

⁴ At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

D. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention would have had “at least a Bachelor’s Degree in an academic area emphasizing the design of electrical, computer, or software technologies, or a similar discipline, and at least two years of experience related to computerized image analysis and three-dimensional modeling.” Pet. 5 (citing Ex. 1003 ¶ 16). Petitioner further asserts that “[s]uperior education could compensate for a deficiency in work experience and vice-versa.” *Id.* Patent Owner does not address the level of ordinary skill at this stage of the proceeding. *See generally* Prelim. Resp.

For purposes of this Decision, we adopt Petitioner’s assessment of the level of ordinary skill in the art.

E. Ground 1A⁵: Asserted Obviousness of Claims 1 and 3–16 Based on Snavelly in view of Balfour and Irani

Petitioner contends that claims 1 and 3–16 would have been obvious over Snavelly in view of Balfour and Irani. Pet. 2, 6–35. Patent Owner disagrees. Prelim. Resp. 15–39.

1. Snavelly (Ex. 1004)

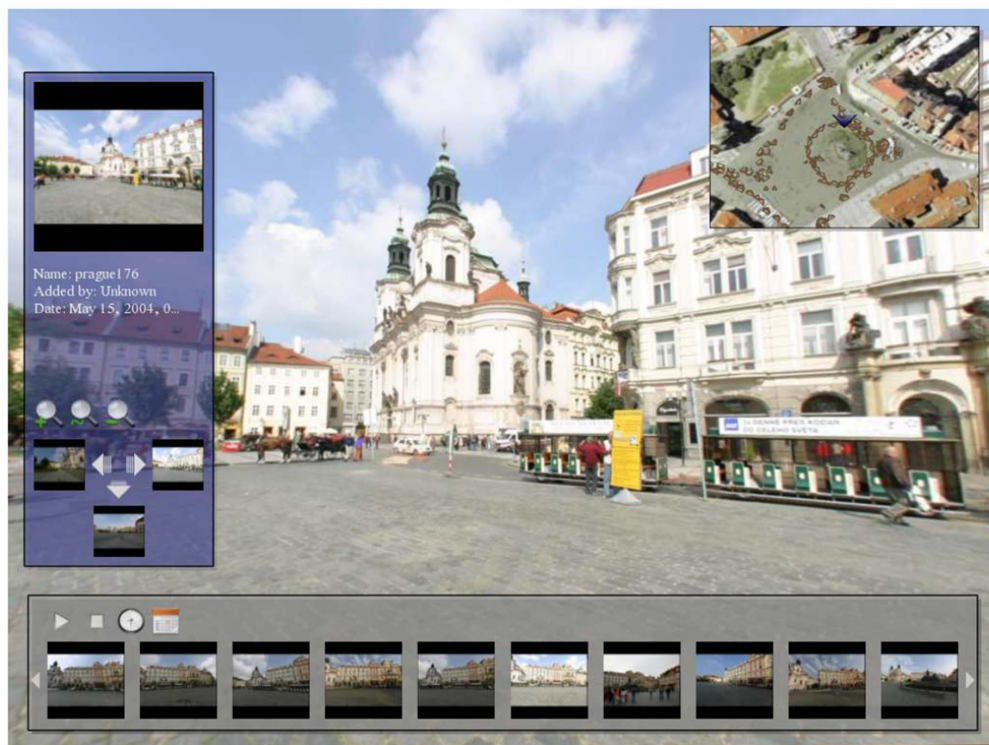
a) Overview of Snavelly (Ex. 1004)

Snavelly is an article entitled “Photo Tourism: Exploring Photo Collections in 3D,” and “present[s] a system for interactively browsing and

⁵ Here, and elsewhere in the Decision, the identification of the grounds using designations such as “Ground 1” and “Ground 2” refers to the designation of the grounds as presented in the Petition.

exploring large unstructured collections of photographs of a scene using a novel 3D interface.” Ex. 1004, 1. The system “consists of an image-based modeling front end that automatically computes the viewpoint of each photograph as well as a sparse 3D model of the scene and image to model correspondences.” *Id.*, Abstr. Snavelly also includes a “photo explorer” that “uses image-based rendering techniques to smoothly transition between photographs, while also enabling full 3D navigation and exploration of the set of images and world geometry.” *Id.* (emphasis omitted).

Snavelly illustrates “a screen shot from the main window of our photo exploration interface” in Figure 5, reproduced below.



Snavelly’s Figure 5 illustrates a screen shot from the main window of the system’s photo interface. Ex. 1004, Fig. 5, 5–6.

As Snavelly explains, the components of the window of Figure 5 include “the main view, which fills the window, and three overlay panes: an information and search pane on the left, a thumbnail pane along the bottom, and a map

pane in the upper-right corner.” Ex. 1004, 5. The main view “shows the world as seen from a virtual camera controlled by the user,” the information and search pane “contains controls for searching for other photographs with certain geometric relations to the current photo,” and the thumbnail pane “shows the results of search operations as a filmstrip of thumbnails.” *Id.*

Snively also discloses that the user interface “generate[s] transitions when the user moves between photos in the explorer,” by using “geometric information we infer about the photographs” and “camera motion and view interpolation to make transitions more visually compelling and to emphasize the special relationship between the photographs.” Ex. 1004, 6. During camera transitions, the system also “display[s] in-between images” by “morphing between the start and destination photographs.” *Id.* For example, a morph can be created between two images by projecting them onto a common plane and cross-fading between the projected images as the camera moves from one position to another. *Id.*

b) Whether Snively Is Prior Art

Petitioner submits the Declaration of Jacob Munford to support its assertion that Snively qualifies as prior art. Pet. 2; Ex. 1015. Mr. Munford states that he has reviewed Exhibit 1004 “as published in *ACM Transactions on Graphics*, July 2006,” and attaches what he refers to as “a true and correct copy of the MARC record⁶ for *ACM Transactions on Graphics* as held by the Penn State University library,” which he secured “from the

⁶ A MARC record is a “library catalog record” created to describe material in a library that is “typically written in Machine Readable Catalog (herein referred to as ‘MARC’) code and contain[s] information such as a physical description of the material, metadata from the material’s publisher, and date of library acquisition.” Ex. 1015 ¶ 5.

library's public catalog." Ex. 1015 ¶¶ 7–8. Mr. Munford further states that, comparing Exhibit 1004 to the MARC record, "it is my determination that Exhibit 1004 is a true and correct copy of 'Photo Tourism: Exploring Photo Collections in 3D' by Noah Snaveley, Steven M. Seitz and Richard Szeliski as published in *ACM Transactions on Graphics* July 2006." *Id.* ¶ 8.

Additionally, according to Mr. Munford, the 008 field⁷ of the MARC record "indicates the Penn State University library first acquired this journal as of February 12, 1999 and held the journal in perpetuity until 2010." Ex. 1015 ¶ 9. Thus, Mr. Munford testifies, "it is my determination that *ACM Transactions on Graphics* July 2006" and the article "Photo Tourism: Exploring photo Collections in 3D" was "made available to the public shortly after its initial release in July 2006." *Id.*

Patent Owner responds that Snaveley "does not include any information regarding its publication or a publication date," and argues that there is "no identifiable information from Snaveley regarding if, when, where, or how it may have ever been published." Prelim. Resp. 31. Patent Owner also asserts that Mr. Munford's testimony that Snaveley was published in "ACM Transactions on Graphics" conflicts with the citation in the Petition's exhibit list indicating that Snaveley was published in the "ACM Siggraph 2006 Papers." *Id.* at 31–32. Patent Owner further contends that "there is nothing in the MARC record to indicate that the July 2006 edition of *ACM Transactions on Graphics* included any version of Snaveley, let alone the

⁷ Mr. Munford states that "the 008 field of the MARC record is reserved for denoting the date of creation of the library record." Ex. 1015 ¶ 5. According to Mr. Munford, because "this typically occurs during the process of preparing materials for public access, it is my experience that an item's MARC record indicates the date of an item's public availability." *Id.*

particular version of Snavely provided by Petitioner” as Exhibit 1004. *Id.* at 33–34.

At the institution stage, the relevant issue is whether the record includes “evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu*, Paper 29 at 13. As *Hulu* explains, the reasonable likelihood standard is “a higher standard than mere notice pleading,” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Id.* *Hulu* additionally observes that, after institution, certain limited opportunities are available for a petitioner to present new evidence in support of its position, including in a motion to file supplemental information under 37 C.F.R. § 42.123. *Hulu* at 14–16.

Based on the present record, we find that there is a reasonable likelihood that Snavely was publicly accessible before the critical date of the ’518 patent. Petitioner identifies Snavely as being published in ACM Siggraph 2006 Papers in July 2006. A brief search on the Internet also resulted in a web page from the ACM Digital Library listing what appears to be the Snavely article and identifying it as being published in “SIGGRAPH ’06: ACM SIGGRAPH 2006 Papers July 2006 pages 835–846.” *See* <https://dl.acm.org/doi/10.1145/1179352.1141964> (web page); Ex. 3001 (printout of web page). The web page also includes a link to a pdf version of the Snavely article which appears identical to Exhibit 1004. A related ACM webpage also identifies SIGGRAPH as “the annual conference on computer graphics (CG) convened by the ACM SIGGRAPH organization that “is

attended by tens of thousands of computer professionals.” See [SIGGRAPH Conference - Home \(acm.org\)](https://www.siggraph.org/conference).

We acknowledge that Mr. Munford’s testimony may not, by itself, be sufficient evidence of public accessibility of the Snively article. However, taken together with the publicly available information concerning the Snively article discussed above, we find that there is a reasonable likelihood that it was publicly available to the relevant public as of July 2006, which is before the ’518 patent’s earliest potential priority date of February 2, 2007. Pursuant to 37 C.F.R. § 42.123, we authorize Petitioner to submit supplemental information concerning the public availability of Snively within one month of this institution decision, which will give Patent Owner an opportunity to examine witnesses based on that information and address it in the Patent Owner Response.

2. *Balfour (Ex. 1005)*

Balfour is a U.S. Patent titled “System for Viewing a Collection of Oblique Imagery in a Three or Four Dimensional Virtual Scene,” and generally relates to “selecting oblique images from a collection of geo-referenced oblique images and viewing them within the context of a virtual, three- or four-dimensional (3D space and time) geographic scene.” Ex. 1005, code (54), code (57). The preferred embodiment of Balfour’s invention “works within the context of a 3D or 4D viewer computer program which provides the rendering of and user interaction with a computer-generated virtual scene.” *Id.* at 2:16–19. “The user, preferably using a pointing device . . . maneuvers through a 3D virtual (i.e. computer-generated) scene presented to the user on a display device.” *Id.* at 2:41–45. The system “automatically selects and retrieves the ‘best fit’ oblique image

from an image warehouse for the user[’s] current viewpoint” and “presents the oblique image to the user geo-registered within the context of the 3D virtual scene.” *Id.* at 2:34–40. If, at a future point, “the best fit determination identifies a new image,” the “current oblique image is set to this new oblique image.” *Id.* at 7:8–10 (reference numerals omitted).

3. *Irani (Ex. 1007)*

Irani is directed to “a new approach for efficient access, storage, and manipulation of video data,” which is “based on the fact that a video sequence contains many views of the same *scene* taken over time.” Ex. 1007, 905, col. 2. The proposed system “transform[s] the video data from a *frame-based* representation, in which this common scene information is *distributed* over many frames, into a single common *scene-based* representation to which each frame can be *directly* related.” *Id.* “This representation then allows *direct* and *immediate* access to the *scene* information, such as static locations and dynamically moving objects” and “eliminates the redundancy between the different views of the scene contained in the frames.” *Id.* Irani explains that this technique results in “a highly efficient and compact representation of the video information” which allows “direct and efficient access to and manipulation of the video information” as well as “efficient storage and transmission of the video data.” *Id.*

As part of the proposed system, Irani generates a “panoramic mosaic image” that “captures an extended spatial view of the entire scene visible in the video clip in a single (or sometimes a few) ‘snapshot images,’” creating an image that “captures the appearance of the *static* portions of the scene.” Ex. 1007, 907, col. 1. The mosaic image “is constructed by first aligning all

the frames with respect to the common coordinate system” and then “integrating all these frames to form a single image.” *Id.* This mosaic representation “removes the redundancy contained in the overlay between successive frames and represents each spatial point only once.” *Id.*

The construction of this mosaic image is illustrated in Irani’s Figure 1, reproduced below.

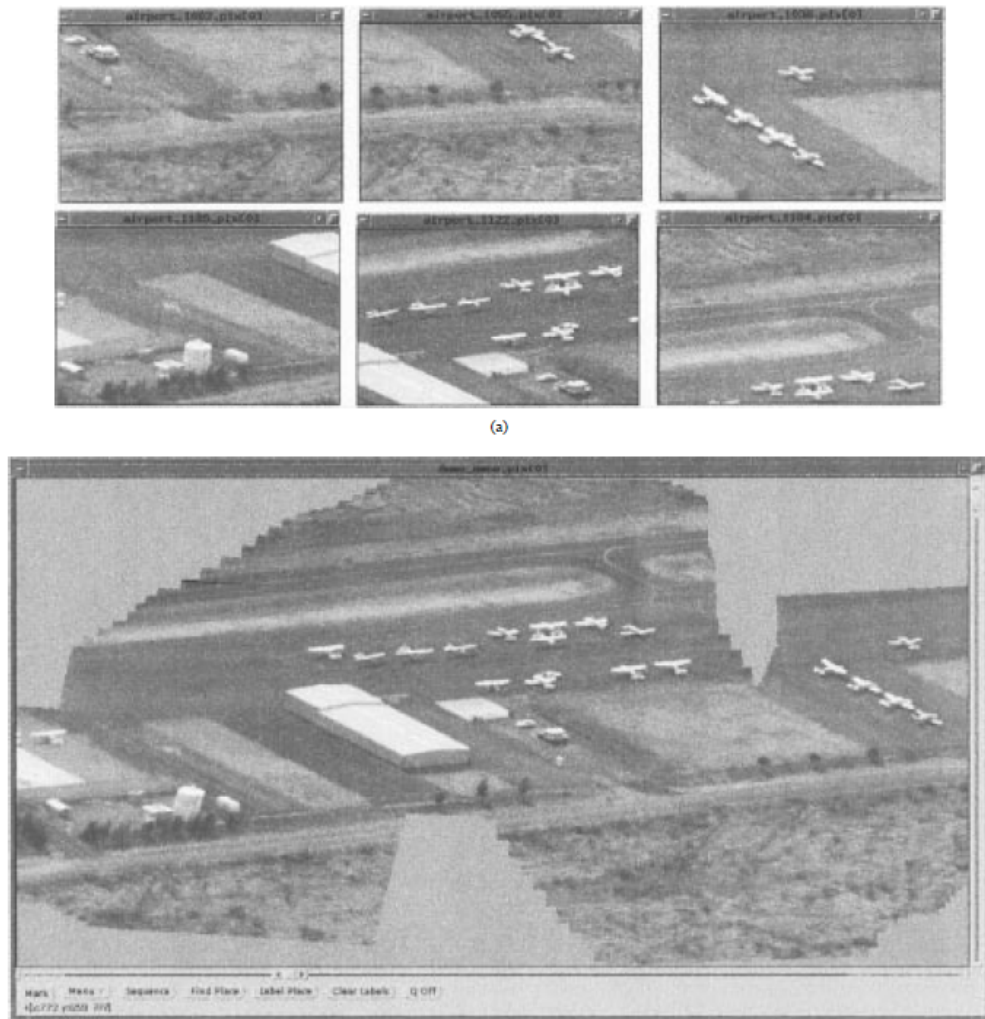


Figure 1 illustrates a “[s]tatic background mosaic of an airport video clip. Ex. 1007, 908, Fig. 1. Figure 1(a) shows “[a] few representative frames from [a] minute-long video clip” that “shows an airport being imaged from the air with a moving camera” in a static scene with no moving objects. *Id.*

Figure 1(b) shows “[t]he static background mosaic image, which provides an extended view of the entire scene imaged by the camera in the one-minute video clip.” *Id.*

4. *Proposed Combination of Snavely, Balfour, and Irani*

a) *Petitioner’s Proposed Combination*

In Petitioner’s proposed combination, “Snavely’s ‘3D interface’ for ‘interactively browsing and exploring’ images of a scene is augmented based on Balfour’s teachings to ‘make[] it possible to automatically select and display oblique images within the’ scene.” Pet. 12 (citing Ex. 1004, Abstr.; Ex. 1004, 1:36–44, 2:14–19; Ex. 1003 ¶ 27) (alteration in original). “In the combination,” according to Petitioner, “Balfour’s techniques ‘work within the context of’ Snavely’s 3D interface, ‘which provides the rendering of and user interaction with a computer-generated virtual scene.’” *Id.* (citing Ex. 1005, 2:17–19; Ex. 1004, Abstr.; Ex. 1003 ¶ 27). Additionally, Petitioner contends, in the proposed combination “Snavely’s photo explorer, [which] uses image-based rendering techniques to smoothly transition between photographs,’ aligns neighboring images ‘with respect to [a] common coordinate system,’” as taught by Irani, “thereby ‘remov[ing] the redundancy contained in the overlap between’ images.” *Id.* at 17 (citing Ex. 1004, Abstr.; Ex. 1007, 905, 907; Ex. 1003 ¶ 36) (alterations in original).

Petitioner argues that one of ordinary skill would have been motivated to modify Snavely with Balfour “because Balfour specifically teaches that its techniques are designed to operate within and improve ‘3D viewer’ applications like the one described in Snavely.” Pet. 13 (citing Ex. 1005, 1:65–2:3; Ex. 1003 ¶ 28). “For example,” Petitioner asserts, “Snavely

describes ‘a system for *interactively browsing and exploring* large unstructured collections of photographs of *a scene using a novel 3D interface*,’ and “Balfour states that the ‘preferred embodiment of’ its ‘invention *works within the context of a 3D . . . viewer computer program* which *provides the rendering of and user interaction with a computer-generated virtual scene*.’” *Id.* (citing Ex. 1004, Abstr; Ex. 1005, 2:16–19; Ex. 1003 ¶ 29). Additionally, according to Petitioner, “Balfour describes that its techniques ‘*provide a natural and easy interface for the user to effectively and efficiently access and analyze oblique imagery from a large image warehouse*,’ and explains that “[e]ntire cities and states are beginning to take inventories of their geographic and cultural features in great detail” which “*information is quite valuable* if the large warehouses of oblique imagery can be easily accessed.” *Id.* at 13–14 (citing Ex. 1005, 1:37–44, 1:59–61; Ex. 1003 ¶ 30). Petitioner contends that one of ordinary skill would “have been further motivated to incorporate Balfour’s techniques into Snavelly’s system to obtain access to this ‘valuable’ information.” *Id.*

Additionally, Petitioner asserts, one of ordinary skill “would have been motivated to incorporate Balfour’s techniques into Snavelly’s system in order to ‘select and retrieve[]’ a specific image type from an image storage device that is a “best-fit” oblique image,” which “would be ‘selected as the best geographic fit based on the user’s current viewpoint and orientation.’” Pet. 14 (citing Ex. 1005, 2:33–37, 2:56–60; Ex. 1003 ¶ 31) (alteration in original). Petitioner further argues that the combination would have “led to predictable results without altering or hindering the functions performed by the combined system,” and one of ordinary skill “would have had a

reasonable expectation of success in making this modification.” *Id.* at 14–15 (citing Ex. 1003 ¶¶ 32–33).

With respect to Irani, Petitioner argues that one of ordinary skill “would have been motivated to modify the Snavelly-Balfour combination to align images to remove redundancy as taught by Irani.” Pet. 18 (citing Ex. 1007, 905, 2:17–26; Ex. 1003 ¶ 38). According to Petitioner, “Irani notes the ‘very high cost’ of image redundancy in overlapping images,” and one of ordinary skill “would have looked to Irani’s teachings to achieve the benefit of ‘remov[ing] . . . redundancy contained in the overlap . . . [to] represent[] each spatial point only once.’” *Id.* at 19 (citing Ex. 1007, 907, 1:17–19; Ex. 1003 ¶ 40) (alterations in original). Petitioner also argues that one of ordinary skill “would have been motivated to modify the combination of Snavelly-Balfour to incorporate Irani’s teachings in order to ‘align each frame of’ a mosaic,” which “would include an alignment of images in order to match the perspectives of adjacent images.” *Id.* at 18 (citing Ex. 1007, 917; Ex. 1003 ¶ 39). According to Petitioner, one of ordinary skill would have recognized that these “image alignment techniques also provide the technological benefit of ‘compensat[ing] for camera-induced motion’ associated with images of a particular scene.” *Id.* Additionally, Petitioner contends, “[b]oth the Snavelly-Balfour combination and Irani relate to types of systems that enable the organization and viewing of collections of images.” *Id.* at 19 (citing Ex. 1007, 905; Ex. 1004, Abstr.; Ex. 1003 ¶ 41).

b) Patent Owner’s Arguments

Patent Owner argues that Petitioner’s proposed reasons for combining Snavelly, Balfour, and Irani are “fatally flawed.” Prelim. Resp. 22. First, Patent Owner argues that Irani “teaches away” from the proposed

combination because “Irani’s techniques for constructing mosaics/panoramic views are not suitable in the context of the collections of unstructured oblique images” in the Snively/Balfour combination. *Id.* at 23 (citing Ex. 2001 ¶ 62). Specifically, Patent Owner points to Irani’s statement that “there are situations for which our current methods for constructing panoramic views may not suffice,” which “require further study and treatment,” including “when a camera is moving around an object (or, equivalently, if an object is rotating in front of the camera) or when the scene contains significant 3-D clutter, with many objects at many different depths.” *Id.* at 23–24 (citing Ex. 1007, 920) (emphasis omitted). According to Dr. Bajaj, “these examples from Irani” are “exactly the types of situations that will be present in the context of Petitioner’s proposed combination of Snively and Balfour” because “there will be oblique pictures with significant 3-D clutter as the result of the picture having many objects at many different depths (e.g., a crowded scene around a statue, monument, or building).” *Id.* at 24 (citing Ex. 2001 ¶ 63). Additionally, Dr. Bajaj contends, there will also be “pictures from around the various sides of the same object (e.g., various[] sides[/]perspectives of a statue, monument, or building), which is considered equivalent to ‘when a camera is moving around an object.’” *Id.* at 24–25 (citing Ex. 2001 ¶ 63). In such situations, Dr. Bajaj asserts, “Irani’s methods for constructing a panoramic mosaic will not work.” *Id.* at 24 (citing Ex. 2001 ¶ 63).

Patent Owner also argues that Petitioner’s proposed combination “would destroy the intended function of Snively” to provide the ability to “more effectively compare scene appearance over different times of day, seasons, or weather conditions.” Prelim. Resp. 25 (citing Ex. 1004, 1–2;

Ex. 2001 ¶¶ 65–66). This, according to Patent Owner, is because the proposed combination “would ‘**align[] all the frames with respect to the common coordinate system[,]** . . . **remove the redundancy contained in the overlap[,]** and . . . **represent[] each spatial point only once.**” *Id.* at 26 (citing Pet. 17) (alterations in original). Relying on Dr. Bajaj, Patent Owner contends that “[c]reating a mosaic by removing the redundancy across images and representing each spatial point only once would entirely destroy the ability of a user to ‘compare scene appearance over different times of day, seasons, or weather conditions,’ as well as the ability “to find other photographs showing the same scene, higher resolution close-ups, zoom-outs or photos that show more surrounding context and associated spatial points.” *Id.* (quoting Ex. 2001 ¶ 66). Patent Owner further contends that the proposed combination would “make the associated tools of Snavely for finding other photographs showing the same spatial points (e.g., close-ups, zoom-outs, and/or similar photos) pointless.” *Id.* at 26–27 (citing Ex. 2001 ¶ 66).

Next, Patent Owner argues that “Balfour explicitly teaches away from Petitioner’s proposed combination” by stating that “[i]n the prior art, image mosaics are generally accomplished using ortho-images (i.e, image surfaces taken at a 90 degree angle to the camera lens),” that “[o]blique images **do not lend themselves to being stitched together into a mosaic like ortho images do,**” and that “[t]o complicate things, the same location may be imaged at many different angles, not just one like an ortho image.” Prelim. Resp. 27 (citing Ex. 1005, 1:28–31, 44–47; Ex. 2001 ¶¶ 67–70) (first alteration in original). According to Dr. Bajaj, one of ordinary skill “would understand from this explicit statement from Balfour that oblique images are

not suitable for being stitched together into a mosaic, like ortho-images,” and would not attempt to do so. *Id.* (citing Ex. 2001 ¶ 67).

Finally, Patent Owner argues that “Irani’s teaching of aligning each frame of a mosaic is irrelevant to the display of the individual oblique images of Snavely and Balfour” because “neither Snavely nor Balfour combine multiple oblique images into a mosaic.” Prelim. Resp. 29 (citing Ex. 2001 ¶ 71). Thus, Patent Owner asserts, in the context of Snavely and Balfour, one of ordinary skill “would have no reason to look to Irani’s teaching of aligning each [] frame of a mosaic in order to reduce redundancy.” *Id.*

c) Analysis

Based on the present record, we determine that Petitioner has shown a reasonable likelihood that one of ordinary skill would have been motivated to combine Snavely, Balfour, and Irani, at least for purposes of institution. Although Snavely does not discuss the display of oblique images, Balfour provides reasons to include oblique image with a 3-D geographic image viewer, explaining that “[a] recent addition to the substantial collection of geographic images has been the creation of geo-referenced oblique images,” that “[e]ntire cities and states are beginning to take inventories of their geographic and cultural features in great detail” in the form of oblique images, and that “[t]his information is quite valuable.” Ex. 1005, 1:36–44; *See* Ex. 1003 ¶ 30. Balfour also teaches that its invention “makes it possible to automatically select and display oblique images within a 3D/4D virtual scene” and that the preferred embodiment “works within the context of a 3D or 4D viewer computer program which provides the rendering of and user interaction with a computer-generated virtual scene.” Ex. 1005, 2:14–19;

See Ex. 1003 ¶ 29). Thus, we determine that Petitioner has provided sufficient evidence of a motivation to combine Snively with Balfour for purposes of institution.

Next, we turn to the combination of Irani with Snively and Balfour. Although Irani is directed to a system for combining video image frames into a mosaic, rather than a 3-D scene viewer such as Snively and Balfour, Irani does discuss the benefits of aligning images and reducing redundancy in overlapping images in a collection of related images. Ex. 1007, Abstr., 905, 907; *see* Ex. 1003 ¶ 40. In light of these disclosure, we determine that Petitioner has sufficiently shown for purposes of institution that one of ordinary skill would have considered Irani's teachings to align images and reduce redundancy in a collection of related images to be relevant to the collections of images in the Snively-Balfour combination, and a skilled artisan would have been motivated to align the images in the Snively-Balfour combination.

We now turn to discussing Patent Owner's arguments. First, as discussed above, Patent Owner argues that Irani "teaches away" from the proposed combination by stating that "there are situations for which our current methods for constructing panoramic views may not suffice" which "require further study and treatment," such as when a scene "contains significant 3-D clutter," and that such "3-D clutter" will be present in the Snively-Balfour combination. Prelim. Resp. 23–24. However, even if some uses of the Snively-Balfour combination involved scenes with "significant 3-D clutter," we do not see those references as necessarily being limited to such scenes. Moreover, claim 1 of the '518 patent does not require scenes with "significant 3-D clutter," but rather merely describes a system "capable

of displaying and navigating oblique imagery” with a “primary oblique image depicting a first area” and “at least one secondary oblique image depicting a second area.” Ex. 1001, 12:18–43. Additionally, we do not understand Petitioner to be arguing that the precise method of Irani would be used in the 3-D viewers of the Snavelly-Balfour combination, but rather that Irani would teach one of ordinary skill that it is beneficial to align related images in a common display and combine them to reduce redundancy. *See* Pet. 16–20.

Turning to Patent Owner’s second argument, we do not agree that one of ordinary skill would not make the proposed combination because doing so would destroy Snavelly’s ability to find other images related to the current image in order to “more effectively compare scene appearance over different times of day, seasons, or weather conditions.” Prelim. Resp. 25 (citing Ex. 1004, 1–2, 7). Although Snavelly describes this as one of the features of its system, we do not understand Snavelly’s teachings to be limited to systems that use this particular functionality. For example, Snavelly discusses the system’s ability to provide “scene visualization” by “[f]ly[ing] around popular world sites in 3D by morphing between photos” and providing an “effective 3D visualization of the scene that serves as a backdrop for the photographs themselves.” Ex. 1004, 1–2. Thus, it is logical that one of ordinary skill could make use of Snavelly’s 3-D viewer and virtual scene exploration capabilities without necessarily incorporating the ability to compare the appearance of the scene over different times of day, seasons, or weather conditions.

Third, we turn to Patent Owner’s argument that Balfour teaches away from the combination when it states that “[o]blique images do not lend

themselves to being stitched together into a mosaic like ortho images do” because “the same location may be imaged at many different angles, not just one like an ortho image.” Prelim. Resp. 27–28; Ex. 1005, 1:28–31, 1:44–47; Ex. 2001 ¶ 61. In considering this “teaching away” argument, it is not apparent to us that the difficulty that Balfour discusses corresponds to the particular combination Petitioner is proposing. We do not understand Petitioner to be arguing that the system of the proposed combination would stitch together oblique images into a mosaic in the same manner as is done using ortho images, but rather that the combination would allow oblique images to be displayed, navigated among, and transitioned between in a 3-D image viewer such as the ones that are taught by Snively and Balfour. Pet. 11–20. Therefore, based on the present record does not demonstrate that the cited statements from Balfour necessarily teach away from the proposed combination.

Finally, we consider Patent Owner’s fourth argument that “Irani’s teaching of aligning each frame of a mosaic is irrelevant to the display of the individual oblique images of Snively and Balfour” because “neither Snively nor Balfour combine multiple oblique images into a mosaic.” Prelim. Resp. 29 (citing Ex. 2001 ¶ 71). As discussed above, we do not understand Petitioner to be arguing that the proposed combination would stitch multiple oblique images into a mosaic in the manner that Irani does. Pet. 11–20. Instead, Petitioner appears to argue that the combination would allow oblique images to be displayed, navigated among, and transitioned between in a 3-D image viewer such as the ones that are taught by Snively and Balfour, and to rely on Irani for its teachings about aligning related images and reducing redundancy in such images. *Id.*

For the foregoing reasons, we determine that Petitioner has introduced sufficient evidence at this stage of the proceeding to show a reasonable likelihood that one of ordinary skill would have combined Snavelly, Balfour, and Irani as Petitioner proposes. As noted above, the “reasonable likelihood” standard is “lower than the ‘preponderance’ standard to prevail in a final written decision,” and we express no opinion on whether Petitioner’s evidence would be sufficient under that higher standard. *See Hulu*, Paper 29 at 13. During the trial, the parties may further address whether one of ordinary skill would have had sufficient motivation to combine the references, whether statements in the prior art would have discouraged the proposed combination, and whether any technical obstacles would have stood in the way of making the combination, among other issues.

5. *Analysis of Independent Claim 1*

- a) 1[preamble]: “A sequence of instructions stored on at least one non-transitory computer readable medium for running on a computer system capable of displaying and navigating oblique imagery, comprising:”

Petitioner argues that, to the extent the preamble is limiting, the Snavelly-Balfour-Irani combination renders it obvious. Pet. 20. Petitioner asserts that “Snavelly describes ‘a system for ***interactively browsing and exploring***’ (i.e., ‘displaying and navigating’) ‘large unstructured collections of ***photographs of a scene using a novel 3D interface***,” which “uses image-based rendering techniques to smoothly transition between photographs.” *Id.* (citing Ex. 1004, Abstr.). According to Petitioner, “Balfour describes techniques that ‘make[] it possible to automatically select and display ***oblique images***’ within the context of Snavelly’s system,” and one of

ordinary skill “would have been motivated and found it obvious to adapt Snavelly’s system to enable ‘interactive[] browsing and exploring’ of oblique images, as taught by Balfour.” *Id.* at 21 (citing Ex. 1005, 2:14–19; Ex. 1003 ¶ 43) (alterations in original).

Petitioner further contends that one of ordinary skill “would have understood that the Snavelly-Balfour combination of interactively browsing and exploring photographs of a scene using the aforementioned interface” would have been “implemented using one or more computers of a computer system to execute a sequence of instructions stored on one or more non-transitory computer readable mediums in order to realize the functionality described by the combination.” Pet. 22 (citing Ex. 1003 ¶ 44).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding the preamble. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding the preamble.⁸

- b) 1[a]: “instructions for displaying a pixel representation of a primary oblique image depicting a first area, the primary oblique image being part of a set of adjacent oblique images that partially, but not completely, overlap and represent an area of interest;”

Petitioner argues that the Snavelly-Balfour-Irani combination renders this limitation obvious. Pet. 23. In the context of Snavelly’s Figure 5 display from its 3-D viewer, Petitioner argues that “the primary image is the image

⁸ Because we are persuaded that Petitioner has shown that the preamble would have been obvious based on the Snavelly-Balfour-Irani combination, we need not decide whether the preamble is limiting for purposes of this Decision.

the user is currently ‘visiting’ in the interface,” and that “the bottom portion of the pane includes ‘controls for searching for other photographs with *certain geometric relations to the current photo*.” *Id.* at 25 (citing Ex. 1004 § 5.1). According to Petitioner, Snaveley also “teaches identifying a set of ‘neighbor’ images that depict ‘at least one point’ in the scene that is also depicted in the primary image (an ‘overlap’),” and “identifying a ‘spatial relation’ between the neighbor images, allowing the system to respond to ‘geometric search’ queries like ‘*show me what’s to the left of this photo*’ by transitioning to an image from the set of neighbor images depicting the appropriate view.” *Id.* (citing Ex. 1004 §§ 6.2, 9; Ex. 1003 ¶ 48).

Petitioner also asserts that Snaveley teaches that adjacent images are matched together based on a variety of factors, such as blur or noise, underexposure, or overlap with other photos. Pet. 26 (citing Ex. 1004 § 9). Accordingly, Petitioner contends, “Snaveley teaches ‘a set of adjacent images that partially, but not completely, overlap and represent an area of interest.’” *Id.* (citing Ex. 1003 ¶ 49). Additionally, Petitioner contends, one of ordinary skill “would have been motivated and found it obvious to adapt Snaveley’s system to enable ‘interactive[] browsing and exploring’ of oblique images, as taught by Balfour” and as discussed in Section II.E.4 above. *Id.* (citing Ex. 1003 ¶ 50) (alteration in original).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding limitation 1[a]. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

- c) 1[b]: “instructions for panning within the primary oblique image, the primary oblique image including overlapping data;”

Petitioner argues that “Snavelly teaches panning within a primary image,” and states that, for example, “[w]hen visiting a photograph C_{curr} ’ (a primary oblique image, *see* 1[a]) ‘**the user . . . can pan and zoom to explore the photo.**’” Pet. 27 (citing Ex. 1004 § 6.2; Ex. 1003 ¶ 52) (alteration in original). In addition, Petitioner asserts, as discussed above for limitation 1[a], that “the combination of Snavelly-Balfour-Irani teach panning a set of adjacent images having at least a threshold level of overlap.” *Id.* “Accordingly,” Petitioner contends, one of ordinary skill “would have understood that the portion of an adjacent image that overlaps the image the user is panning is ‘overlapping data.’” *Id.* (citing Ex. 1003 ¶ 52).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding limitation 1[b]. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

- d) 1[c]: “instructions for detecting a transition event, triggered by a user, of the displayed primary oblique image;”

Petitioner argues that “Snavelly describes ‘image-based rendering techniques to **smoothly transition** between photographs” and explains that “the geometric information we infer about the photographs allows us to **use camera motion** and view interpolation **to make transitions more visually compelling** and to emphasize the spatial relationships between the photographs.” Pet. 28 (citing Ex. 1004, Abstr., § 5.3). Petitioner also asserts that, in Snavelly, “the user controls the camera motion,” and “transition

events are detected in response to panning movements within an image by the user that cause a transition between images to occur.” *Id.* (citing Ex. 1004 §§ 5.3, 6.2; Ex. 1003 ¶ 55)).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding limitation 1[c]. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

- e) 1[d]: “instructions for selecting at least one adjacent secondary oblique image depicting a second area partially overlapping with the first area and from the set of oblique images corresponding to a supplied location coordinate, the second area extending beyond the first area; and”

Petitioner argues that Snavely teaches “identifying a ‘spatial relation’ between neighboring images (which overlap, *see* [1a]),” and “allowing the system to respond to ‘geometric search’ queries like ‘*show me what’s to the left of this photo*’ by transitioning to an image from the set of neighbor image depicting the appropriate view (*i.e.*, an ‘adjacent secondary oblique image’).” Pet. 29 (citing Ex. 1004 § 6.2; Ex. 1003 ¶ 58). According to Petitioner, “[t]he arrows shown in the detail of FIG. 5 represent such geometric search queries for neighbor images to the left and right of the primary image (the left and right arrows), and for a ‘zoomed out’ neighbor image (the down arrow).” *Id.* “Further,” Petitioner contends, “the geometric search queries are performed relative to the primary image (*i.e.*, ‘C_{curr},’ a ‘supplied location coordinate’), and thus the area depicted by the new image (the second area) will be shifted relative to that of the primary in the direction specified in the query.” *Id.* (citing Ex. 1004 § 6.2; Ex. 1003 ¶ 58).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding limitation 1[d]. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

- f) 1[e]: “instructions for displaying the primary oblique image and the at least one adjacent secondary oblique image on a same display such that features in the adjacent primary and secondary oblique images are aligned on the same display;”

Petitioner argues that the Snavely-Balfour combination “display[s] primary and secondary oblique images,” and also that Snavely “teaches ‘creat[ion] [of] a morph between cameras C_j and C_k ’ by ‘project[ing] the two images I_j and I_k onto CommonPlane (C_j, C_k).[.]’” Pet. 30 (citing Ex. 1004 § 5.3.2). According to Petitioner, “Snavely then ‘cross-fade[s] between the projected images as the camera moves from C_j to C_k ’ using “***a plane passing through the mean of the points common to both views***, whose normal is the average of the viewing directions.”” *Id.* Petitioner also asserts that “Irani describes aligning features of adjacent primary and secondary images on the same display.” *Id.* at 30–32 (citing Ex. 1007, 907, 2:10–19; Ex. 1003 ¶ 62; Fig. 1).

Other than the arguments discussed above with respect to motivation to combine the references, Patent Owner does not present arguments regarding limitation 1[d]. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

g) 1[f]: “wherein the primary and secondary oblique images match the perspectives from which the primary and secondary oblique images were captured.”

Petitioner makes two alternative arguments for this limitation. Pet. 33–35. First, Petitioner argues that Balfour teaches that “the primary and secondary oblique images match the perspectives from which they were captured.” *Id.* For support, Petitioner quotes the following portion of Balfour:

The ***movement to a new viewpoint*** (17) is also influenced by two other factors. One factor is a geo-referenced oblique image area (11), which preferably also contains information on the oblique angle of the current oblique image from the image warehouse, ***which is referenced to maintain the angle of the viewpoint (17)*** vector relative to the plane of the georeferenced image area (11) within a user-configurable deviation from the actual oblique image angle. ***This is preferably done to minimize any image distortion to a user-selected preference.*** The preferred embodiment keeps this angle deviation at less than 5 degrees.

Pet. 33 (citing Ex. 1005, 5:30–41).

Thus, Petitioner contends, “Balfour teaches that movement to a new viewpoint includes selection of an oblique image in a manner that ‘maintain[s] the angle of the viewpoint’ which, in a preferred embodiment, is ‘less than 5 degrees.’” Pet. 33–34 (citing Ex. 1005, 5:31–40). According to Petitioner, Balfour also “explains that the precise angle of view point perspective between the current image and the selected image is ‘within a ***user-configurable deviation*** from the actual oblique image angle.’” *Id.* at 34 (citing Ex. 1005, 5:30–41). “In view of these teachings of Balfour,” Petitioner argues, one of ordinary skill “would have readily understood the ***user-configurable deviation*** of the angle of viewpoint perspective between a current image and a selected image would have been set to zero degrees in

order to achieve a match in perspective between a current image and a selected image.” *Id.* (citing Ex. 1003 ¶ 67).

Alternatively, Petitioner argues that this limitation is taught by Irani, which “teaches the use of ‘pure translations’ on a plurality of images including a primary oblique image and a secondary oblique image into a mosaic.” Pet. 34 (citing Ex. 1007, 918, 2:55 – 919, 1:5; Ex. 1003 ¶ 68). According to Petitioner, one of ordinary skill “would have known that such ‘pure translations’ are methods for aligning features that must preserve distances between points, angles between points and the difference vector between any pair of points, and as such cannot change perspective.” *Id.* (citing Ex. 1003 ¶ 68). “Thus,” Petitioner contends, “in the combination, Iran[i] teaches use of ‘pure translations’ that align features of a plurality of adjacent images including a primary oblique image and a secondary oblique image in the same display.” *Id.* at 34–35 (citing Ex. 1007, 918, 2:55 – 919, 1:5; Ex. 1007, Fig. 1; Ex. 1003 ¶ 68).

Petitioner asserts that one of ordinary skill “would have understood that, of the different types of techniques described by Irani for alignment,” the “pure translation model is beneficial” because it “is the most rudimentary” and “does not distort the images in their aligned form in the common coordinate system.” Pet. 35 (citing Ex. 1003 ¶ 69). Therefore, according to Petitioner, in this alternative version of the Snavelly-Balfour-Irani combination, “incorporation of the aforementioned teachings of Irani results in the aligned images matching the perspective the camera has captured.” *Id.* (citing Ex. 1003 ¶ 69).

Patent Owner argues that Balfour fails to teach this limitation because the cited portion “is entirely unrelated to simultaneously displaying a

primary oblique image and at least one adjacent secondary oblique image, let alone matching the perspectives from which the images were captured.” Prelim. Resp. 16 (citing Ex. 2001 ¶ 49). Instead, Patent Owner argues, one of ordinary skill would “understand this portion of Balfour” as merely stating that “moving to a new viewpoint in the system of Balfour is influenced by multiple factors, including a geo-referenced oblique image area that is utilized to maintain the viewpoint within a user-configurable deviation from the actual oblique image angle to minimize image distortion.” *Id.* at 17 (quoting Ex. 2001 ¶ 50).

With respect to Petitioner’s alternative argument based on Irani, Patent Owner argues that the cited portion of Irani “fails to disclose simultaneously displaying a primary oblique image and at least one adjacent secondary oblique image with the displayed images matching the perspectives from which the images were captured.” Prelim. Resp. 17–18 (citing Ex. 2001 ¶¶ 51–52). Instead, according to Patent Owner, one of ordinary skill “would understand that this portion of Irani is simply describing how 2-D parametric camera-induced motion can be computed using a version of a method described in an earlier paper” that “utilizes pure translation at low resolution.” *Id.* at 18–19 (quoting Ex. 2001 ¶ 52).

Patent Owner also argues that Petitioner and Dr. Forsyth define “match the perspectives” from which the oblique images “were captured” “means that image pixels are not aligned on a rectangular grid [on the ground] but are aligned to the perspective that matches the perspective the camera has captured.” Prelim. Resp. 19–20 (citing Pet. 4; Ex. 1003 ¶ 15) (emphasis omitted, alteration in original). Patent Owner asserts that “the Petitioner entirely fails to established how the proposed combination” meets

“this understanding of the claims” because the Petition “makes no attempt to show that ‘the image pixels of the primary and secondary images are not aligned on a rectangular grid [on the ground].’” *Id.* at 20 (citing Pet. 33–35; Ex. 2001 ¶ 53) (alteration in original).

Based on the present record, we determine that Petitioner has made a sufficient showing as to this element for purposes of institution. As to Petitioner’s first alternative argument relying on Balfour, we note that the portion of Balfour cited by Petitioner teaches that “the oblique angle of the current oblique image from the image warehouse” is “referenced to maintain the angle of the viewpoint (17) vector relative to the plane of the geo-referenced image area (11) within a user-configurable deviation from the actual oblique image angle” (for example “less than 5 degrees”) in order “to minimize any image distortion.” Ex. 1005, 5:33–41. Thus, Balfour appears to teach that the current oblique image matches the perspective from which it was captured (the actual oblique image angle from the image warehouse), at least within a small user-configurable deviation, such as less than 5 degrees. *Id.*; Ex. 1003 ¶¶ 65–67.

Based on the present record, we do not agree with Patent Owner’s argument that “the cited section of Balfour” is “unrelated to simultaneously displaying a primary oblique image and at least one adjacent secondary oblique image.” Prelim. Resp. 16. As discussed above, Petitioner has made a sufficient showing that Balfour teaches that it is advantageous for oblique images to “match[] the perspectives from which [they] were captured” in order to “minimize any image distortion” to the viewer. *Id.* As discussed with respect to limitations 1[d] and 1[e], Petitioner relies on Snavely to teach the display of primary and secondary images, and relies on Balfour to teach

the use of oblique images in Snavelly's system. *See* Pet. 11–16, 29–33; Ex. 1003 ¶¶ 25–33, 58–64. Thus we understand the Snavelly-Balfour combination would have both the primary and secondary oblique images “match the perspectives from which [they] were captured” in order “to minimize any image distortion” to the viewer. *Id.* The fact that Balfour alone does not teach simultaneous display of primary and secondary oblique images would not appear to defeat Petitioner's argument based on the combination of those references.

We next turn to Petitioner's second alternative rationale relying on Irani. Petitioner points to Irani's disclosure of using “pure translations” on a plurality of images, and introduces testimony from Dr. Forsyth that one of ordinary skill “would have known that such ‘pure translations’ are method for aligning features that must preserve distances between points, angles between points[,] and the difference vector between any pair of points, and as such cannot change perspective.” Pet. 34; Ex. 1003 ¶ 68. Dr. Forsyth also testifies that “the pure translation model is beneficial” because it “is the most rudimentary alignment of those described by Irani, as this alignment does not distort the images in their aligned form in the common coordinate system.” Ex. 1003 ¶ 69. Thus, according to Dr. Forsyth, “in the alternative implementation of the combination of Snavelly-Balfour-Irani, incorporation of the aforementioned teachings of Irani results in the aligned images matching the perspective the camera has captured.” *Id.*

In opposition, Patent Owner introduces the testimony of Dr. Bajaj that the portion of Irani describing “pure translations” does not “teach[] anything remotely related to simultaneously displaying primary and secondary oblique images that match the perspectives from which [they] were

captured.” Ex. 2001 ¶ 52. Instead, according to Dr. Bajaj, this portion of Irani is “simply describing how 2-D parametric camera-induced motion can be computed using a version of a method described in an earlier paper” that “utilizes pure translation at low resolution.” *Id.*

For the foregoing reasons, and on the record before us, Petitioner has sufficiently shown that this limitation would have been obvious over the prior art for purposes of institution.

h) Summary for Claim 1

For the foregoing reasons, Petitioner’s cited evidence and reasoning demonstrates a reasonable likelihood that Petitioner would prevail in its contentions regarding claim 1.

6. Claims 3–16

Petitioner contends that claims 3–16 are unpatentable over the Snavelly-Balfour-Irani combination. Pet. 36–44. Patent Owner relies on its arguments for claim 1 for each of these claims. *See* Prelim. Resp. 14–30. Based on the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that claims 3–16 are unpatentable over the Snavelly-Balfour-Irani combination.

F. Ground 1B: Obviousness of Claim 2 Based on Snavelly, Balfour, Irani, and Yelton

Petitioner contends that dependent claim 2 would have been obvious over Snavelly in view of Balfour, Irani, and Yelton. Pet. 46–49. Patent Owner relies on the arguments it made with respect to claim 1 for claim 2. *See* Prelim. Resp. 15. Based on the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that claim 2 is unpatentable over the prior art.

III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner has demonstrated a reasonable likelihood of success in proving that at least one of the challenged claims of the '518 patent is unpatentable. Patent Owner has not persuaded us to exercise our discretion to deny institution of trial. We therefore institute trial on all challenged claims and grounds raised in the Petition.

At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or as to the construction of any claim term. Any final determination will be based on the record developed during trial. We place Patent Owner on express notice that any argument not asserted in a timely-filed Response to the Petition, or in another manner permitted during trial, shall be deemed waived, even if that argument was presented in the Preliminary Response.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–16 of the '518 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '518 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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Patent 8,593,518 B2

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