Paper No._____

UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

SONY CORPORATION
Petitioner

v.

Patent of YISSUM RESEARCH DEVELOPMENT COMPANY OF THE HEBREW UNIVERSITY OF JERUSALEM
Patent Owner

_____

Case IPR2013-00326
Patent 6,665,003
Title: SYSTEM AND METHOD FOR GENERATING AND DISPLAYING PANORAMIC IMAGES AND MOVIES

_____

PATENT OWNER'S PRELIMINARY RESPONSE UNDER 37 C.F.R. §§ 42.107

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I. Mandatory Notices (37 C.F.R. § 42.8)

A. Real Party-in-Interest

The real parties-in-interest are Yissum Research Development Company of the Hebrew University of Jerusalem and HumanEyes Technologies Ltd.

B. Related matters

The following are judicial or administrative matters that would affect, or be affected by a decision in this proceeding:

1. IPR2013-00218, *Inter partes* review of U.S. Patent No. 6,665,003.
2. IPR2013-00219, *Inter partes* review of U.S. Patent No. 7,477,284.
3. IPR2013-00327, *Inter partes* review of U.S. Patent No. 7,477,284.
4. *HumanEyes Technologies Ltd. V. Sony Electronics Inc. et al*., 1-12-cv-00398 (D. Del.).

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II. Introduction

Patent Owner Yissum Research Development Company of the Hebrew University of Jerusalem ("YRD") submits the following preliminary response to the Petition filed by Sony Corporation ("Sony") on July 3, 2013, requesting inter partes review of Claims 4, 5, and 34 of U.S. Patent No. 6,665,003 ("the '003 Patent"). YRD respectfully requests that the Board decline to institute *inter partes* review of the '003 Patent because Sony has not satisfied Patent Office regulations: "[t]he petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon." 37 C.F.R. § 42.104(b)(4). The Board should not institute a trial because, for each ground of rejection, at least one claim element is missing. Consequently, Sony has not met the basic threshold required by statute: it has not shown that there is a "reasonable likelihood that [it] would prevail with respect to at least [one] of the claims challenged in the petition." 35 U.S.C. § 314(a).

As discussed herein, there are claim elements from the pending claims that are missing from the references, and are not addressed by the Sony Petition. For example, the Sony Petition fails to address requirements relating to a mosaic image generator module that mosaics series of images strips together to construct stereoscopic panoramic mosaic images that provide a stereoscopic image of a scene. This is clear from the face of the Petition, which either glosses over such

claim elements or makes bare assertions that the prior art references do not support.[1]

In accordance with established principles, it is not the job of the Board to fill in the blanks and correct inadequacies in an inter partes review petition. (*See e.g.*, in the context of interference practice, S.O. ¶ 121.5.2 (which states that "[t]he Board will not take on the role of advocate for a party, trying to make out a case the party has not adequately stated"); *see also DeSilva v. DiLeonardi*, 181 F.3d 865, 866-67 (7th Cir. 1999); *Stampa v. Jackson*, 78 USPQ2d 1567, 1571 (BPAI 2005); *Spears v. Holland, Interf.* No. 104,681, Paper 30, p. 15 (BPAI 2002) ("It is not the role of this board to help party Spears articulate a difference between [claims]. That is the role of Spears' counsel as an advocate, not the role of the board as an unbiased and impartial decision maker. Taking sides to aid one party to the detriment of the other is not what we do.")).

The duty to provide an adequate petition falls squarely on the petitioner Sony, and Sony has failed to perform its duty in a way that justifies proceeding to

[1] The present discussion identifies some of the specific claim elements that are missing from the cited art, and therefore, why the Sony Petition does not show a likelihood that it would prevail in an *inter partes* review. The Patent Owner reserves the right to present additional differences between the cited art and the claims at a later time in the proceeding.

trial. If, nevertheless, a decision is ultimately made to proceed to trial, the Patent Owner requests as a matter of fundamental fairness that the Board provide detailed guidance on how the applied references are being relied upon and where in the references each of the claim elements is alleged to be found.

III. Overview of U.S. Patent No. 6,665,003[2]

The invention disclosed in the'003 Patent addresses the need for generating and displaying a stereoscopically panoramic image. A stereoscopic panoramic image is provided by two images of a scene recorded from slightly displaced positions, which, can be viewed simultaneously by respective eyes of a person to provide a perception of depth. Perception of depth (*i.e*., stereopsis), is the visual perception of differential distances among objects in one's line of sight. That is, one object in an image will be perceived as being closer to the person viewing the image, as compared to another object in the image. A common day example would be a 3D movie a person would view at a movie theater. (*See e.g*., Sony-1101, title.)

[2] Claim terms will be briefly discussed in the present section, and a more complete claim construction of the claim terms is provided below in Section IV, Claim Construction.

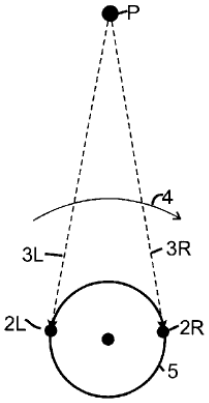
To address the need for generating and displaying stereoscopically panoramic images, the '003 Patent describes an arrangement that generates a series of images strips from other images of portions of images which are mosaiced together to construct a stereoscopic panoramic mosaic image pair of a scene. The '003 Patent, in connection with Figs 1A-1B (reproduced below), notes that the series of image strips must be generated and mosaiced in accordance with the separation and from the perspective of human eyes:

> It will be apparent from FIG. 1A that each the succession of images as seen by the *observer's two eyes* as he or she rotates, can be separated into separate sets of images, with one set of images being associated with each eye…
>
> …
> …to facilitate the viewing of a stereoscopic panoramic image of the scene by a viewer, the images as would be received by each of the *observer's eyes* can be separately recorded and viewed by, or otherwise displayed to, the respective eyes of the viewer."

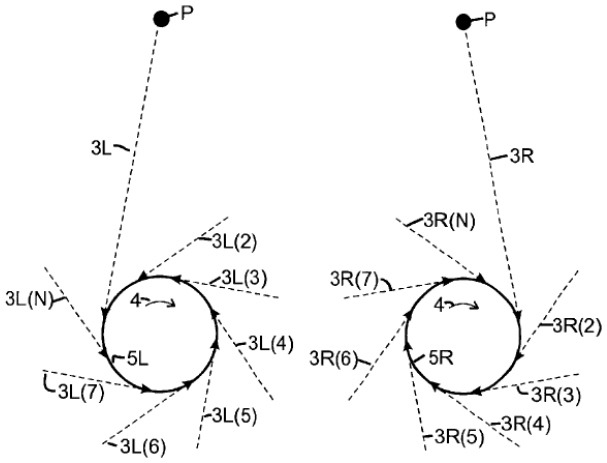
(SONY-1101 at 3:8-31; *see also* 2:55-59 (emphasis added).)

> It will be appreciated that the *left and right panoramic images 31L and 31R conform to what an observer would see through his or her left and right eyes,* respectively, as they revolve through the left and right viewing circles 5L and 5R described above in connection with FIG. 1B.

(SONY-1101 at 6:42-47 (emphasis added).)



F I G. 1A



F I G. 1B

The stereoscopic panoramic mosaic image pair, which was specifically created to conform to what an observer would see through his or her right eyes, can then be displayed to or viewed simultaneously by the left and right eyes of a person to provide a perception of depth.

The '003 Patent describes various embodiments of this technology. In one embodiment, a camera moves along a curved path centered on an axis while recording a series of images of a scene from respective series of positions.[3] Next, image *strips* for left and right eyes are generated from the series of images of a scene. The image strips are then mosaiced in accordance with the separation and from the perspective of human eyes to construct left and right stereoscopic

[3] In alternative embodiments the images can be generated by a computer. (*See. e.g.,* SONY-1101 at 3:43-44; 11:15-18).

panoramic mosaic images. The left and right stereoscopic panoramic mosaic images comprise a stereoscopic panoramic mosaic image pair that can be displayed or viewed by a person to provide the person with a perception of depth.

As shown below, Sony fails to provide any disclosure that amounts to a ***mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***, as claimed in the '003 Patent.[4] In other words, Sony has not carried its burden. *Cf*. 37 C.F.R. § 42.20(c). ("The moving party has the burden of proof to establish that it is entitled to the requested relief."); *Scripps Research Institute v. Nemerson*, 72 USPQ2d 1122, 1123 (BPAI 2004) ("The responsibility for developing and explaining the record for an issue rests with the movant, not with the Board.")

IV. Claim Construction

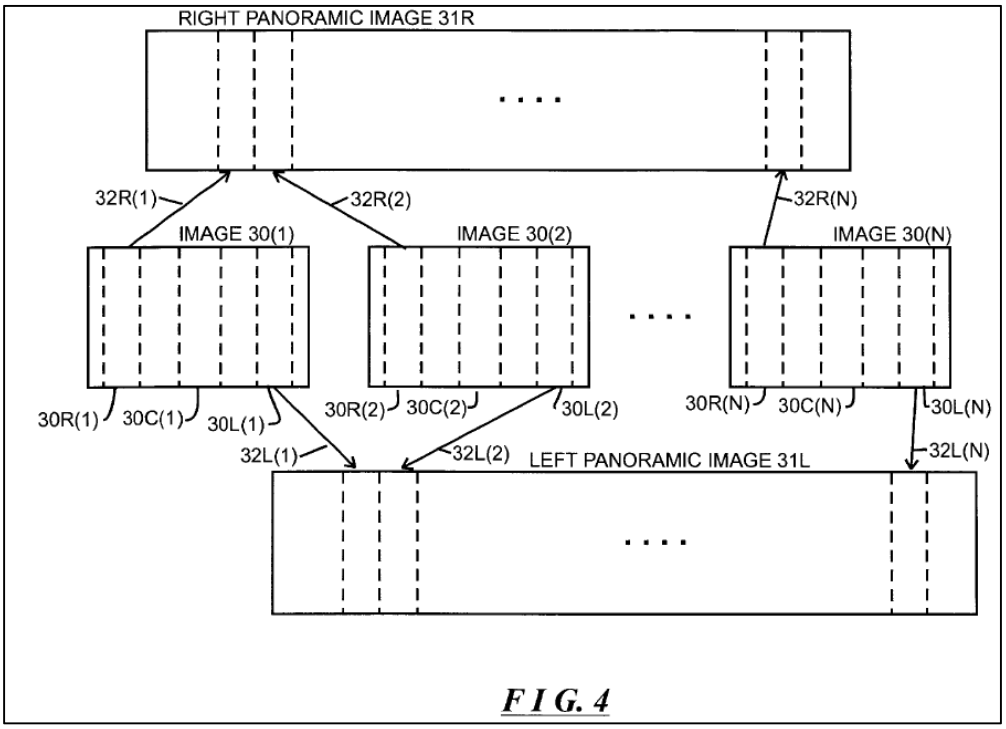
During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." (*See Phillips v. AWH Corp*., 415 F.3d 1303, 1321 (Fed. Cir. 2005) (en banc).) Extrinsic evidence concerning relevant scientific principles, meaning of technical terms, and state of the art may also be relevant. (*Id*. at 1314.)

[4] For the sake of reference, the following paper will present claim language in bold and italics.

Patent Owner proposes construction of certain claim terms below pursuant to the broadest reasonable interpretation consistent with the specification standard. The proposed claim constructions are offered for the sole purpose of this proceeding, and thus do not necessarily reflect appropriate claim constructions to be used in litigation and other proceedings where a different claim construction standard applies.

A. ***image strips*** and ***images of a scene***

The claims separately recite both a ***series of image strips*** and a ***series of images of a scene***. By way of example and not limitation, Fig. 4 (reproduced and annotated below) of the '003 Patent illustrates how ***image strips*** are generated from an ***image of a scene***. (*See also*, SONY-1101 at 6:30-38.) Starting from the left side of the figure, there are three ***image strips*** 30R(1), 30C(1), and 30L(1) generated from ***image*** 30(1), three ***image strips*** 30R(2), 30C(2), and 30L(2) generated from ***image*** 30(2), and so forth.



F I G. 4

As further shown in the figure, all of the right-side ***image strips*** 30R(1), 30R(2), … 30R(N) constitute one ***series of image strips*** used for a right-side panoramic image 31R, and all of the left-side ***image strips*** 30L(1), 30L(2), … 30L(N) constitute another ***series of image strips*** used for a left-side panoramic image 31L.

In accordance with the specification, an ***image strip*** should be construed to mean a portion of an ***image of a scene***. A ***series of image strips*** are a collection of image strips from a ***series of images of a scene.***

B. *mosaic* (verb)

The claims recite a mosaic image generator module configured to ***mosaic*** respective series of images strips together. The verb ***mosaic*** should be construed

to mean assembling an image from other images or portions of images. The specification, in connection with Fig. 4 (reproduced above), indicates that ***mosaicing*** comprises assembling a series of image strips, such as left image strips or right image strips, obtained from a series of images of a scene. For instance, the specification states:

> The panorama mosaic image generator 12 receives the successive images 30(10, 30(2), …30(N) and mosaics the left image portions 30L(1), 30L(2),…30L(N) therefrom together to form the left panoramic image 31L, as indicated by the arrows 32L(1), 32L(2),…32L(N). Similarly, the panorama mosaic image generator 12 mosaics the right image portions 30R(1), 30R(2),…30R(N) therefrom together to form the right panoramic image 31R, as indicated by the arrows 32R(1), 32R(2),…32R(N). The panorama mosaic image generator 12 can generate the left and right panoramic images 31L and 31R using any conventional technique for mosaicing images or portions of images together. It will be appreciated that the left and right panoramic images 31L and 31R conform to what an observe would see through his or her left and right eyes, respectively, as they revolve through the left and right viewing circles 5L and 5R described above in connection with FIG. 1B. The panoramic mosaic image generator 12 can generate the left and right panoramic images 31L and 31R as respective image strips, or it may form the images as respective continuous loops by mosaicing together their respective left and right ends.

(SONY-1101, 6:30-38.)

As illustrated in the above figure and citation from the specification, the mosaicing process comprises assembling respective left image strips (30L) and right image strips (30R) together end to end in order to construct respective left (31L) and right (31R) panoramic images. Thus, the verb ***mosaic*** should be construed as to mean assembling an image from other images or portions of images. As further recited in Claim 1, the ***mosaic*** images provide a ***stereoscopic panoramic mosaic image pair***, which is discussed below.

C. stereoscopic image

The claims recite a ***stereoscopic image***. The specification provides an explicit definition of this term in the section titled "FIELD OF THE INVENTION":

> Stereoscopic images comprise two images recorded of a scene recorded from slightly displaced positions, which, when *viewed simultaneously by the respective eyes*, provides a *perception of depth*.

(SONY-1101 at 2:36-39 (emphasis added).) This citation states that a ***stereoscopic image*** is directed to an image viewed by a person's *eyes*. The citation also states that a ***stereoscopic image*** provides a *perception of depth* to the person. A perception of depth (i.e., stereopsis), is the visual perception of differential distances among objects in a person's line of sight. (YRD - 2003.) That is, a person would perceive one object to be closer than another object. (SONY-1101 at

2:64-65.) Thus, a ***stereoscopic image*** should be construed to mean two images recorded of a scene recorded from slightly displaced positions, which, when viewed simultaneously by the respective eyes of a person, provide a perception of depth, where a perception of depth is the visual perception of differential distances among objects in the person's line of sight.

D. stereoscopic panoramic mosaic image pair

The claims recite a ***stereoscopic panoramic mosaic image pair***. The term ***stereoscopic panoramic mosaic image pair*** should be construed, consistent with the term ***stereoscopic image*** discussed above, as two ***panoramic*** mosaic images of a given scene which, when viewed by a person's left and right eyes, provide a perception of depth, where a perception of depth is the visual perception of differential distances among objects in a person's line of sight.

This proposed construction is consistent with the specification which notes that "[t]he panoramic image pair *may be displayed or viewed* by a user…to provide the user with a stereoscopic image of the scene as recorded by the camera." (SONY-1101 at 4:35-38 (emphasis added).) The proposed construction makes clear that the image pair themselves are capable of being displayed to or viewed by a person to provide a visual perception of differential distances among objects in the line of sight.

V. The Kawakita Reference is Not a "Printed Publication", and the Corresponding Grounds Should Not Be Adopted

Ground A of Sony's Petition relies on the Kawakita reference. The Board should decline to institute *inter partes* review on this Ground because Sony's Petition fails to show that Kawakita is a printed publication. Specifically, Sony alleges that 30 copies of Kawakita were distributed at a conference less than a year before the earliest priority date of the '003 Patent. (SONY-1113 at 5.) An alleged copy of Kawakita distributed at the conference included the following restriction: "*Duplication and reproduction prohibited*." (SONY-1104 at 48 (emphasis added).) The Federal Circuit has recently ruled that distribution to a limited number of entities with restrictions from copies or further distribution prevents a finding that a distribution is a "printed publication."

> We have held that where a distribution is made to a limited number of entities, a binding agreement of confidentiality may defeat a finding of public accessibility. But we have also held that such a binding legal obligation is not essential. We have noted that "[w]here professional and behavioral norms entitle a party to a reasonable expectation" that *information will not be copied or further distributed, "we are more reluctant to find something a `printed publication*.'"

(*Cordis Corp. v. Boston Scientific Corp*., 561 F.3d 1319, 1333-1334 (CAFC 2009)(citations omitted)(emphasis added).)

Sony's declarant, Mr. Kouichi Matsuda, alleges that additional copies of Kawakita were provided to a university, supposedly for eventual distribution. (SONY-1113). However the '003 patent's priority date is only a few months after the previously-mentioned conference, and Sony provides no evidence that Kawakita was provided to or actually distributed by the university before the '003 priority date.

Such a finding is consistent with well-established precedent. When documents are only potentially available to the public, the question of accessibility hinges on whether interested members of the public would be aware of and able to locate the document. (*See, e.g., In re Bayer*, 568 F.2d 1357 (CCPA 1978); *In re Cronyn*, 890 F.2d 1158, 1161 (Fed. Cir. 1989).) Here, the interested members of the public would not be able to locate the document prior to the priority date of the '003 patent.

Since insufficient evidence has been provided to establish that the Kawakita reference is a printed publication, Patent Owner respectfully requests that the Board decline to institute *inter partes* review on Ground A. Additional reasons why Kawakita does not read on the claims are provided in Section VII of the present paper.

VI. In General, Ishiguro, Asahi, and Hofmann are not Directed to Stereoscopic Images, and the Corresponding Grounds Should Not Be Adopted

In addition to Kawakita, Sony's Petition refers to three other primary references: Ishiguro, Asahi, and Hofmann. The three references are relied on in Grounds B-D of Sony's Petition. However, and as will be described below, none of these references are directed to generating ***stereoscopic images*** (that is, two images recorded of a scene recorded from slightly displaced positions, which, when viewed simultaneously by the respective eyes of a person, provides a perception of depth.) Even further, Sony has not asserted that generating ***stereoscopic images*** – let alone the claimed invention as a whole – would have been obvious in light of these references.

Specifically, Ishiguro is directed to identifying a specific distance, or range, of objects for directing a robot to move about a room. (SONY-1105 at 55, Section 5 Conclusion; *see also* Summary and Introduction.) For example, Fig. 13 of Ishiguro, reproduced below, identifies an "observation point" where the robot is located. The robot includes two single slit 1-pixel width imagers that rotate about an axis, and accordingly, can identify the distance to various points of objects in the room, labeled as points 1-19 in the figure.

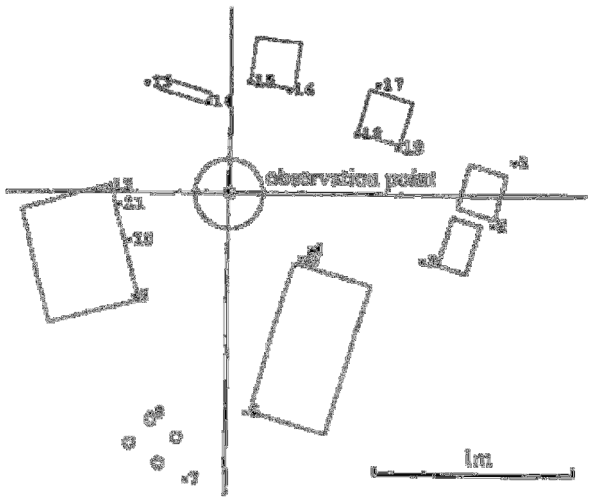
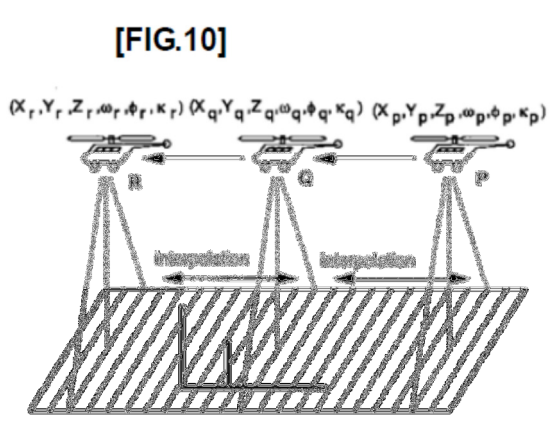
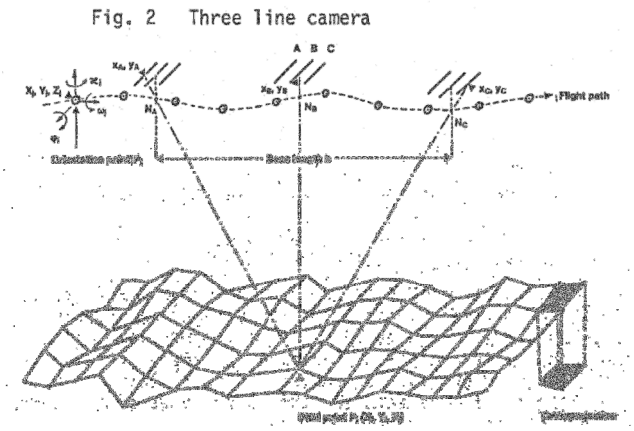


Fig. 13. Position of 3-D vertical lines.

As discussed above, a ***stereoscopic image*** is an image viewed by a person, and from which a person can perceive depth. Calculating the distances to various points in a room for use by a robot is not providing a ***stereoscopic image***, under the broadest reasonable interpretation of this term, in light of the specification.

Asahi and Hofmann are also not directed to generating ***stereoscopic images***. Both of these references are directed to flying aircraft for making contour maps of the terrain. Fig. 10 from Asahi (left) and Fig. 2 from Hofmann (right) are reproduced below. Neither of these references teach or discuss generating a ***stereoscopic image*** for view by a person. (*See* SONY-1107 at ¶ 0087 and SONY-1108 at 209-210.)





Grounds B-D of Sony's Petition rely on Ishiguro, Asahi, and Hofmann. Since these references are not directed to ***stereoscopic images*** for view by a person, nor is it suggested that such would be obvious, the Board should decline to institute *inter partes* review on these Grounds. Additional reasons why Ishiguro, Asahi, and Hofmann do not read on the claims are provided in the following section.

VII. Additional, Specific Reasons Why the Prior Art Does Not Invalidate the Claims, and Why *Inter Partes* Review Should Not Be Instituted

A. The Petition Includes Cumulative Grounds

As an initial matter, it is noted that Sony's Petition fails to facilitate "just, speedy, and inexpensive resolution" as required by C.F.R. § 42.1(b), because it relies on cumulative teachings. As noted above, the Petition asserts that Claims 4, 5, and 34 are anticipated by each of Kawakita, Ishiguro, Asahi, and Hofmann. (Petition at 18, 23, 28, and 35.) The Petition, however, makes no attempt to articulate a meaningful distinction in terms of relative strengths and weaknesses

with respect to applying these references to the various claim elements. Accordingly, these grounds are redundant, and if a trial is instituted the Board should only institute an *inter partes* review based on one of these grounds. (*See Liberty Mutual Ins. Co. v. Progressive Casualty Ins. Co.,* CBM2012-00003 (Paper No. 7), at 2 (PTAB Oct. 25, 2012) (Patent Review Processing System); *see also Oracle Corp. v. Clouding IP, LLC*, IPR2013-00088 (Paper No. 13), at 4-5 (PTAB June 13, 2013).)

B. The Petition Fails to Establish a Reasonable Likelihood that the References Anticipate the Claims of the '003 Patent

The Petition asserts that each of Claims 4, 5, and 34 are anticipated under 35 U.S.C. §102, by each of Kawakita, Ishiguro, Asahi, and Hofmann. A finding of invalidity under 35 U.S.C. §102 requires a showing that a single references teaches every limitation of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (M.P.E.P. § 2131, *quoting Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).) Further, an anticipatory reference must not only "disclose all elements of the claim within the four corners of the document," it must disclose those elements "arranged as in the claim." *Net MoneyIN, Inc. v. VeriSign, Inc.,* 545 F.3d 1359, 1369 (Fed. Cir. 2008).

As shown below, because the cited references of Sony's Grounds fail to teach *exactly* what is recited in independent Claims 1 and 34, the references are not

anticipatory under 35 U.S.C. §102. Further, because independent Claim 1 is not anticipated, dependent Claims 4 and 5, which include the features recited in the independent claim, are also not anticipated by the cited references.

C. No Trial Should Be Instituted for Ground A

Ground A of Sony's Petition asserts that each of Claims 4, 5, and 34 are anticipated by Kawakita under 35 U.S.C. §102. In addition to Sony's failure to show that Kawakita is prior art to the '003 Patent, as already discussed above in Section V, there is another explicit and fundamental flaw with Kawakita that prevents it from reading on these claims. Namely, and as shown below, the mosaic processing of Kawakita does not result in mosaic images that are stereoscopic. As such, Sony's Petition has not presented a reasonable likelihood that it will prevail with respect to Ground A.

Claim 1 of the '003 Patent recites:

> ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***.

Claims 4 and 5 depend on Claim 1, and therefore include the same element. Independent Claim 34 recites a similar element.

Sony's Petition asserts that Kawakita discloses the claimed ***mosaic image generator module that mosaics image strips*** to allegedly ***construct a stereoscopic***

panoramic mosaic image pair, illustrated in Fig. 5 (reproduced below). (Petition at 20-21.) Sony's arguments are unsupported and fail for two reasons.

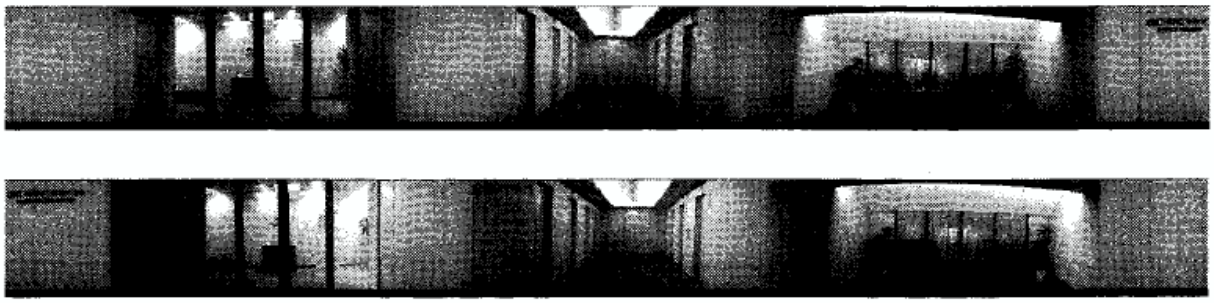


Fig. 5: Panoramic Images of an Elevator Hallway

(i) The two images in Fig. 5 are not a stereoscopic image pair – further processing is required. Contrary to Sony's contention, the images of Fig. 5 are not a ***stereoscopic image pair***. Instead, Kawakita clearly states with respect to the left (top) and right (bottom) images of Fig. 5 that "the positions representing the left and right panoramic images *must be adjusted*…this process is *necessary*…." (SONY-1104 at 17 (emphasis added).) If the images are not adjusted when the panoramic images are viewed simultaneously, "objects appear to overlap or [have] some other fault, *making faithful stereoscopic viewing impossible*." (SONY-1104 at 17 (emphasis added).) As such, it is "impossible" for the two images of Fig. 5 to produce a ***stereoscopic image***. Although the Kawakita presenters recognized and admitted to this fault in their system, Sony's petition fails to address it.

Kawakita goes on to explain that the images of Fig. 5, must be adjusted by changing the position of objects using parallax angles in order to make stereoscopic viewing of the panoramic image possible.

> Fig. 7 presents an example of rotating the left and right panoramic images for display according to the depth parallax angle. In Fig. 6(a), assuming that the camera began rotation for capture from position G (this position is referred to as the reference position for the panoramic image), in the left eye panoramic image, object A is recorded to the left by an angle of only θ from the reference position (position D). For its part, in the right eye panoramic image, object A is recorded to the right by an angle of only θ from the reference position (position C). In addition, by rotating the left eye panoramic image clockwise by θ' and the right eye panoramic image counterclockwise by θ ' with the viewpoint as the center, the recorded object A can be viewed as located at the correct position.
>
> …
>
> …By *recording this depth parallax angle in correspondence to the panoramic image and applying it to the left and right panoramic images*, alignment of the left and right panoramic images can be dynamically controlled, making stereoscopic viewing of the panoramic image possible.

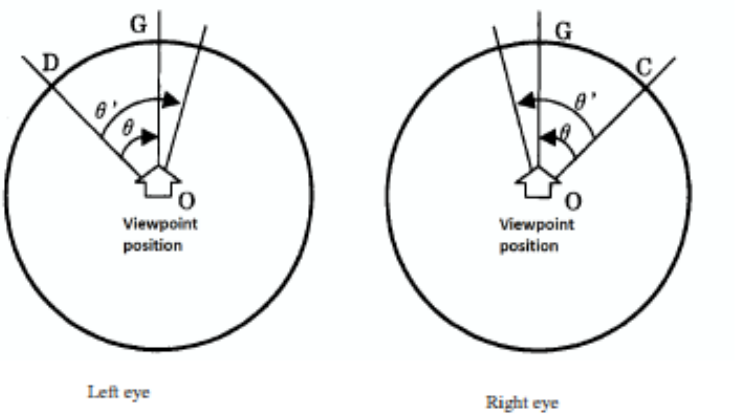


Fig. 7: Rotation of the Left and Right Panoramic Images According to the Depth Parallax Angle

(SONY-1104 at 17-18 (emphasis added).) Thus, the alleged mosaic image generator of Kawakita does not ***mosaic*** image strips together to construct a ***stereoscopic panoramic mosaic image pair*** because the resulting images (identified by Sony's Petition as the images of Fig. 5) must be further adjusted using parallax angles in order to make stereoscopic viewing possible.

(ii) The ten researchers were not viewing the two images of Fig. 5. There is a section in Kawakita in which the author discusses "ten researchers." (SONY-1104 at 17.) Sony refers to this section and incorrectly asserts: "[a]ccording to Kawakita, 'stereoscopic viewing' of the left and right panoramic images was performed for ten researchers, and the result showed that a 'sense of depth was faithfully reproduced.'" (Petition at 7.)

However, this section of Kawakita actually supports the conclusion that the images of Fig. 5 are not a ***stereoscopic image pair.*** Kawakita makes it abundantly clear that the researchers were not viewing the two images of Fig. 5, but rather two

different images that had already been further processed and adjusted. Specifically, Kawakita notes that with the research personnel, there was no noticeable double images "[a]s a *result* of stereoscopic viewing with *alignment control* of the panoramic images *using the calculated depth parallax angles*." (SONY-1104 at 17 (emphasis added).) The preceding section discusses how "calculated depth parallax" refers to the additional processing performed on the images of Fig. 5 to produce two different images, which were viewed by the researchers. Thus, the two images of Fig. 5 – like other images generated by the Kawakita system – are *not a* ***stereoscopic image pair*** because the images had to be manually adjusted by changing the position of objects using parallax angles in order to make stereoscopic viewing possible.

The distinction between the claimed stereoscopic panoramic mosaic image pair *vs*. image pairs that require further processing before being stereoscopic is consistent with the prosecution history. During prosecution, the examiner rejected Claim 28 (issued as Claim 1) over a prior art reference referred to as "Kumar." In response, the Applicant successfully distinguished over Kumar noting that Claim 28 (issued as Claim 1) precludes such art:

> Kumar's generation of the shape mosaic requires processing to generate "the three-dimensional" description of the scene represented by the shape mosaic, which processing is not contemplated by or even required by the system recited in claim 28. The system in claim 28

> goes *directly* from input images to images that provide the stereoscopic "three dimensional effect."

(YRD -2004, '003 File History, Response dated February 11, 2003, at 22 (emphasis added).) Sony's Petition ignores the prosecution history which makes clear that the claimed ***stereoscopic panoramic mosaic image pair*** is constructed *directly* from input images by the mosaic image generator. In other words, the mosaic image generator constructs panoramic mosaic images which are stereoscopic and have no need of further processing to become stereoscopic, as required by Kawakita.

Under § 102, Kawakita must teach *exactly* what is recited in the claim, and because Kawakita at least fails to teach ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***, it cannot anticipate Claims 4, 5, and 34 of the '003 Patent (Sony has not asserted obviousness). Thus, Sony has failed to demonstrate a reasonable likelihood that any claim is unpatentable over Kawakita. Accordingly, no trial should be ordered as to Ground A.

D. No Trial Should Be Instituted for Ground B

Ground B of Sony's Petition asserts that Claims 4, 5, and 34 are anticipated by Ishiguro under 35 U.S.C. §102. There is an explicit and fundamental flaw with

Ishiguro that prevents it from reading on these claims. That is, Ishiguro is not directed to generating a stereoscopic image, as that term is properly construed. Specifically, nothing within Ishiguro teaches or suggests a stereoscopic image that can be viewed by the eyes of a person to provide a perception of depth. As such, Sony's Petition has not presented a reasonable likelihood that it will prevail with respect to Ground B.

Claim 1 of the '003 Patent recites:

> ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***.

Claims 4 and 5 depend on Claim 1, and therefore include the same element. Independent Claim 34 recites a similar element.

In the Petition, Sony argues that because the images of Ishiguro's Fig. 5 can "be used for stereovision" the images "comprise a stereoscopic panoramic mosaic image pair of the scene as recorded over the path." (Petition at 26.) As shown below, this is merely an empty attorney argument without any support.

(i) Ishiguro never mosaics the images to construct a stereoscopic panoramic mosaic image pair that provides a perception of depth. Within the context of Ishiguro, using the pair of omnidirectional images for "stereovision," means using

the images for a robot to obtain navigational *distance* information of a point. Specifically, regarding stereovision, Ishiguro states the following:

> For example, the *stereovision* using a pair or two omnidirectional images (feature (3) in (A)) is useful for determining both structure of the wide environment and *positions of objects* in it.

(SONY-1105 at 48 (emphasis added).)

> A *stereovision* system using two cameras is a well-known method to *obtain the distance information* from images.

(SONY-1105 at 49 (emphasis added).)

With respect to the two images of Fig. 5, identified by Sony as reading on the claimed stereoscopic panoramic mosaic image pair, Ishiguro *only* teaches that the two images are used in "[e]xperiments to obtain the omnidirectional distance information." (SONY-1105 at 54, Section 4.2, Acquisition of distance information.) The result of the experiments is provided at Figs. 13 and 14 (reproduced below). (SONY-1105 at 54-55, Section 4.2, Acquisition of distance information.) Fig. 13 shows positions on the room floor of vertical lines estimated by the omnidirectional stereo method and Fig. 14 shows the error of that estimate. (SONY-1105 at 54-55, Section 4.2, Acquisition of distance information.)

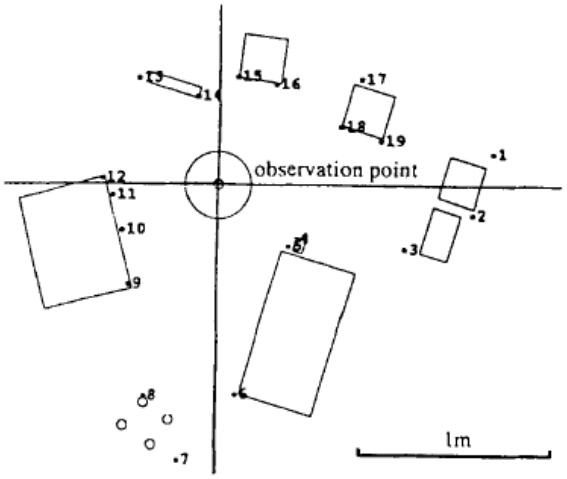


Fig. 13. Position of 3-D vertical lines.

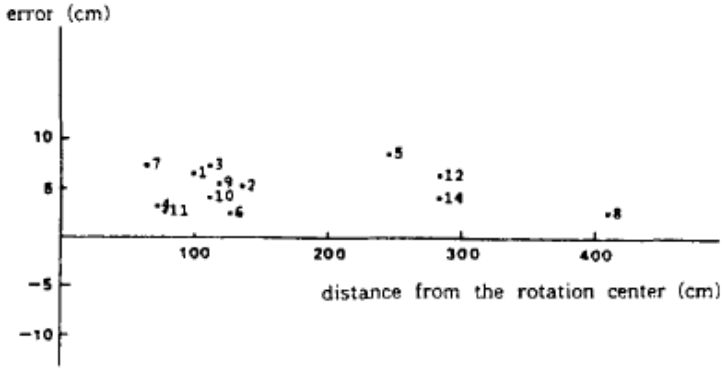


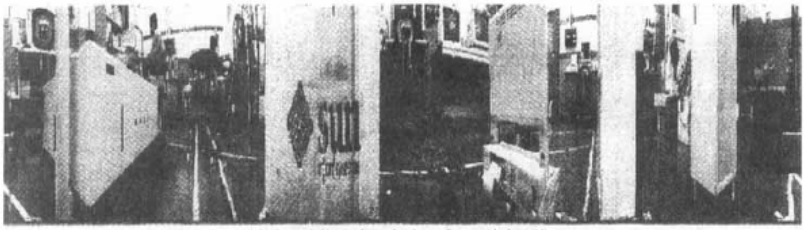
Fig. 14. Error of heights.

It is very important to note that nothing within Ishiguro teaches or suggests that the two images of Fig. 5 (which are *only* disclosed as being used for distance estimation as shown in Figs. 13 and 14) can be displayed to or viewed simultaneously by the respective eyes of a person to provide a perception of depth. Thus, and contrary to Sony's assertion, the using the images of Ishiguro's Fig. 5 for "stereovision" distance calculation does not disclose that the images are the claimed ***stereoscopic panoramic mosaic image pair*** that can be displayed to or viewed simultaneously by a person to provide a perception of depth.

(ii) The images of Fig. 5 are *not* a ***stereoscopic pair*** that can be displayed to or viewed simultaneously by the respective eyes of a person to provide a perception of depth. It is readily apparent by inspecting the images of Fig. 5 (reproduced below), that there is significant disparity between the alignment of the objects in image (a) from the left slit and the objects in image (b) from the right

slit. This misalignment of the images of Fig. 5 is a direct result of arranging the setup and vertical slit distances to optimally allow a robot to estimate the distance of objects rather than to allow a person to view a stereoscopic image pair that provide a perception of depth. (*See e.g.*, SONY-1105 at 54-55, Section 4.2, Acquisition of distance information, where the setup for producing the images of Fig. 5 is disclosed.)

(a) Omnidirectional view from left slit



(b) Omnidirectional view from right slit

Fig. 5. Two omnidirectional views for stereo method.

In contrast, the specification of the '003 Patent makes clear that to construct the ***stereoscopic image pair*** the camera[5] and the mosaic image generator are arranged in a specific way to generate and mosaic the image strips in accordance with the separation and from the perspective of human eyes. (*See e.g.,* SONY-1101 at 2:55-59 and 3:8-31.) Ishiguro completely fails to recognize this

[5] In other embodiments, the '003 Patent discloses using a computer.

fundamental relationship—and rightly so—because Ishiguro is *only* concerned with estimating the distance of objects as accurately as possible. Consequently, the images of Ishiguro's Fig. 5 are not ***stereoscopic*** because they are *not* properly aligned and if the two images were to be viewed simultaneously by the respective eyes of a person, they would appear to overlap – making it impossible to provide a perception of depth.

Because the images of Ishiguro's Fig. 5 are not constructed in accordance with the separation and from the perspective of human eyes, they are not a ***stereoscopic panoramic mosaic image pair*** that can be displayed to or viewed simultaneously by the respective eyes of a person to provide a perception of depth.

Thus, Ishiguro at least fails to teach ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct … stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***. On this basis, Sony has failed to demonstrate a reasonable likelihood that Claims 4, 5, and 34 are anticipated by Ishiguro (Sony has not asserted obviousness). Thus, no trial should be ordered as to Ground B.

E. No Trial Should Be Instituted for Ground C

Ground C of Sony's Petition asserts that Claims 4, 5, and 34 are anticipated by Asahi under 35 U.S.C. §102. Asahi is also not directed to generating a stereoscopic image, as that term is properly construed, and therefore cannot read

on these claims. Specifically, nothing within Asahi teaches or suggests a stereoscopic image that can be viewed by the eyes of a person to provide a perception of depth. As such, Sony's Petition has not presented a reasonable likelihood that it will prevail with respect to Ground C.

Claim 1 of the '003 Patent recites:

> ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***.

Claims 4 and 5 depend on Claim 1, and therefore include the same element. Independent Claim 34 recites a similar element.

Sony's Petition at 33-34, relies on Asahi's Figs. 17 and 18 (reproduced below), to meet the above claimed feature. Specifically, Sony asserts that "Figure 18 illustrates a series of four stereoscopic image pairs of a scene (represented by the truncated pyramid in Fig. 17)." (Petition at 32.) Sony's arguments about Asahi, and its reliance on these figures, however, is misplaced.

(i) Asahi, in general, is not directed to a stereoscopic panoramic mosaic image pair. Asahi is directed to generating a number that indicates the height of objects. In more detail, Asahi's "Effect of the Invention" section states:

> As can be easily understood from the above description, by virtue of the present invention, basic data can be collected from video imaging

> while moving, and *height data can be collected* by way of image processing thereof.

(SONY-1107 at ¶ 0087.) Further, the whole disclosure of Asahi is replete with emphasis on generating a number that indicates the height of objects (and deftly silent on providing a perception of depth):

> …stereo images needed for stereo matching are obtained from images resulting from video imaging, and by which *heights are calculated*.

(SONY-1107 at ¶ 0010 (emphasis added).)

> Note that lenses of short focal length may be used to emphasize *height*, which is to say, to increase resolution.

(SONY-1107 at ¶ 0055 (emphasis added).)

> A template image (for example, NxN pixels) *for calculating height* is set on the forward view image of the matching images that were obtained by the above processing.

(SONY-1107 at ¶ 0035 (emphasis added).)

> …the *height can be calculated* from the parallax difference according to the following formula.

(SONY-1107 at ¶ 0063 (emphasis added).) Thus, Asahi does not teach constructing a ***stereoscopic mosaic image pair*** that can be displayed to or viewed simultaneously by the respective eyes of a person to provide a perception of depth.

(ii) The images in Figs. 17 and 18 are not a stereoscopic panoramic mosaic image pair. Contrary to Sony's assertion, the images of Figs. 17 and 18 are not ***stereoscopic panoramic mosaic image pairs*** that provide a perception of depth. Specifically, images (1)-(4) of Fig. 18 simply illustrate performing stereo matching *computations* using partial intermediate images for detecting a point (A) in order to overcome the effect of occlusion (i.e., when a point is obstructed by an object). In more detail, Asahi states:

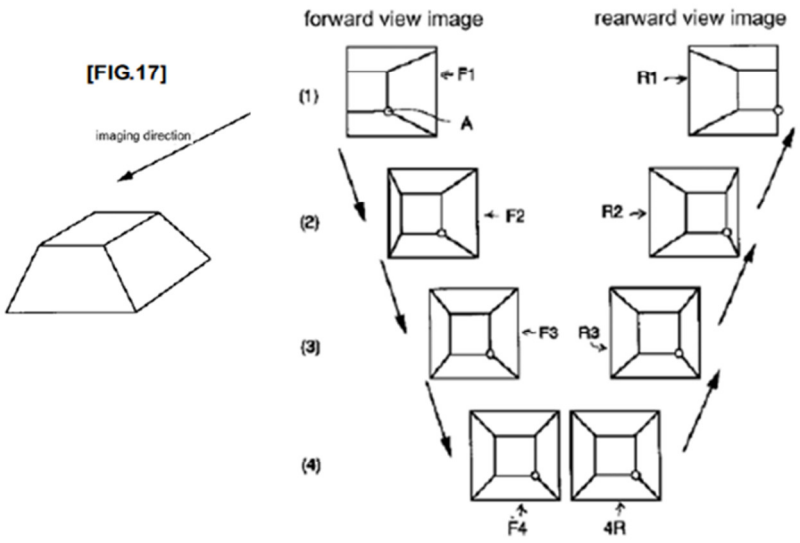
> …stereo matching *computation* is successively performed for image F4, image R4, image R3, image R2, and image R1. In this way, the point corresponding to point A in image F1 can be detected in the image R1 with high precision. If image F1 and image R1 were stereo-matched directly, *because of the effect of occlusion, it would be impossible to avoid large errors caused by objects, but in this working example the effect of occlusion can be completely removed by such successive searching*.

(SONY-1107 at ¶ 0060 (emphasis added).) Asahi further notes that only portions of the intermediate images need be generated and stored for matching computations:

> In any case, *for the intermediate images, one may form only the parts that are needed* for matching computation. In this manner, the time for matching computation can be shortened, and a small memory capacity will suffice for storing intermediate image data.

(SONY-1107 at ¶ 0060 (emphasis added).)

[FIG.18]



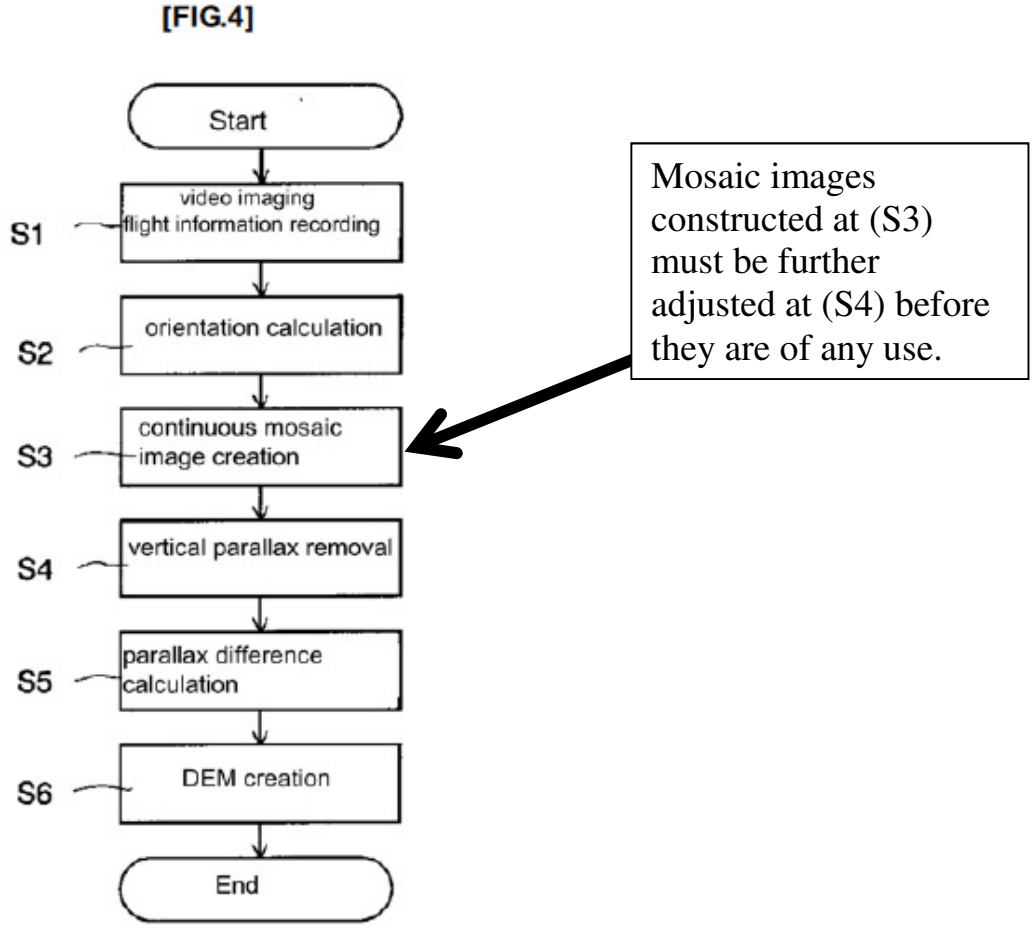
Thus, contrary to Sony's assertion, the images of Fig. 18 merely disclose performing stereo matching *computations* using portions of intermediate images and do not read on the claimed ***stereoscopic panoramic mosaic image pair*** that can be displayed to or viewed by a person to provide a perception of depth.

(iii) Asahi's "stereoscopic viewing" is not the same as the claimed stereoscopic image pair. Asahi uses the phrase "stereoscopic viewing" to describe the process used to *calculate the height of objects*. (*See* SONY-1107 at ¶ 0035.) This should not be confused with the claimed ***stereoscopic mosaic image pair*** that provides a perception of depth to a person. As noted above, the specification of the '003 Patent makes clear that to construct a stereoscopic panoramic mosaic image pair capable providing a perception of depth, image strips must be generated and

mosaiced in accordance with the separation and from the perspective of human eyes. (*See e.g.,* SONY-1101 at 2:55-59 and 3:8-31.) Asahi, however, completely fails to recognize this fundamental relationship in constructing its forward, nadir, and rearward view images because Asahi is *only* concerned with calculating the height of objects – not with generating images that can be viewed by a person to provide a perception of depth.

Because the images of Asahi are not constructed in accordance with the separation and from the perspective of human eyes, they cannot provide a perception of depth when viewed by a person's eyes. Thus, the images of Asahi's Figs. 17 and 18 do not disclose the claimed ***stereoscopic panoramic mosaic image pair***.

(iv) Asahi's mosaic process does not produce a stereoscopic image pair – further adjustment is required. Although Asahi discloses creating mosaic images, the images are not usable for any disclosed purpose *until* they are further adjusted. In more detail, Asahi at Fig. 4 (reproduced below, annotated) provides "a flowchart from measurement to three-dimensional data extraction." (SONY-1107 at ¶ 0087, Brief Description of the Drawings.) As illustrated, *after* mosaic images are created at step (S3) further adjustment including vertical parallax removal (S4) is required before the final images may be utilized for height calculation. (*See also* SONY-1107 at ¶ 0037 and ¶ 0055.)



In the context of the claim, however, it is the mosaicing of the series of images strips together by the mosaic image generator that constructs the claimed stereoscopic panoramic mosaic image pair (i.e., adjustment after mosaicing is not required in order to make the mosaic images stereoscopic). As already noted above, this is consistent with the '003 Patent prosecution files history which makes clear that the claimed system goes *directly* from input images to images that provide the stereoscopic image of the scene as recorded. Thus, not only are the images of Asahi not capable of providing a perception of depth (as discussed above in Section VII E(i)), because Asahi's mosaic images constructed at (S3) must be

further adjusted at (S4) before they are of any use, it cannot be argued that Asahi discloses the claimed ***mosaic image generator*** that is configured to assemble, position or arrange the series of image strips together to construct a stereoscopic panoramic mosaic image pair.

Under § 102, Asahi must teach *exactly* what is recited in the claim, and the Petition fails to provide any evidence that Asahi discloses ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***. With no credible argument as to this claimed feature, Sony has failed to demonstrate a reasonable likelihood that that Claims 4, 5, and 34 are anticipated by Asahi (Sony has not asserted obviousness). Thus, no trial should be ordered as to Ground C.

F. No Trial Should Be Instituted for Ground D

Ground D of Sony's Petition asserts that Claims 4, 5, and 34 are anticipated by Hofmann under 35 U.S.C. §102. Again, Sony fails to specify where all of the claim elements, identified in the independent claims, could be found. As with Ishiguro and Asahi, nothing within Hofmann teaches or suggests a stereoscopic image that can be viewed by the eyes of a person to provide a perception of depth. The following analysis will refer to the same claim element discussed above with reference to Ishiguro and Asahi.

(i) Hofmann, in general, is not directed to a stereoscopic panoramic mosaic image pair. Hofmann has nothing to do with constructing a ***stereoscopic mosaic image pair*** that can be displayed to or viewed simultaneously by the respective eyes of a person to provide a perception of depth. Rather, Hofmann is solely concerned with tracking and determining the elevation of terrain points. For example, Hofmann states:

> As the position of the linear arrays and the pixel intervalls [*sic*] are calibrated the *image coordinates* x_A, y_A, x_B, y_B, x_C, y_C of any imaged and identified *terrain point Pi can be determined*.

(SONY-1108 at 209 (emphasis added).)

> Fig. 7 shows the *elevation errors* σ_Z *of the terrain points* in the middle axis of a long strip (86 km). Only four points in the corners at the beginning and the end of the strip are arranged. The accuracy is remarkable.

(SONY-1108 at 210 (emphasis added).) Indeed, the Petition fails to identify any portion of Hofmann that discloses using any of the generated images for anything other than to track and determine the elevation of terrain points. Thus, Hofmann *only* deals with tracking and determining the elevation of terrain points – not with providing a perception of depth.

(ii) The images in Figs. 4 and 6 of Hofmann are not a stereoscopic panoramic mosaic image pair. Sony in the Petition relies on the "overlapping

image strips" of Hofmann's Figs. 4 and 6 (reproduced below), to meet the above claimed feature. Specifically, without citing to any portion of Hofmann, Sony makes a bare assertion that "[t]wo of the panoramic mosaic images [of Figs. 4 and 6] are capable of providing a perception of depth when viewed simultaneously by the respective eyes" and then proceeds to conclude that these images "therefore, form a stereoscopic image pair." (Petition at 36.) As detailed below, Sony's bare, unsupported, assertion and conclusory statement are nothing more than a thinly veiled attempt to gloss over the deficiencies of Hofmann.

A proper reading shows that the "overlapping of image strips" of Hofmann's Figs. 4 and 6 are not constructed to provide a perception of depth when viewed simultaneously by the respective eyes of a person. Regarding the overlapping image strips, Hofmann discloses that the images are obtained from an altitude of 8 km (approx. 5 miles above the earth), a strip length of 85 km, strip width of 12 km, update point interval .3 km, focal length 100 mm, and an image error 5 μm. (SONY-1108 at Fig. 7.) What is evident from Hofmann's disclosure is that the overlapping image strips are not generated and mosaiced in accordance with the separation and from the perspective of human eyes. In contrast, the '003 Patent makes clear that producing a ***stereoscopic mosaic image pair*** requires taking into account the separation of human eyes. (*See e.g.,* SONY-1101 at 2:55-59 and 3:8-31.)

Because the overlapping image strips of Hofmann are not constructed in accordance with the separation and from the perspective of human eyes, as a matter of fact, they cannot provide a perception of depth when viewed by a person's eyes. Thus, the overlapping image strips of Hofmann's Figs. 4 and 6 do not disclose the claimed ***stereoscopic panoramic mosaic image pair***.

(iii) Hofmann's "stereo monitor system" of Fig. 8 does not disclose viewing overlapping image strips simultaneously to provide a perception of depth. The Petition asserts that Hofmann's Fig. 8 (reproduced below) depicts a "stereo monitor system" that allegedly discloses a mechanism to view Hofmann's overlapping image strips to thereby provide a perception of depth. (Petition at 39.) This assertion is emblematic of Sony's mischaracterization of the teachings of Hofmann.

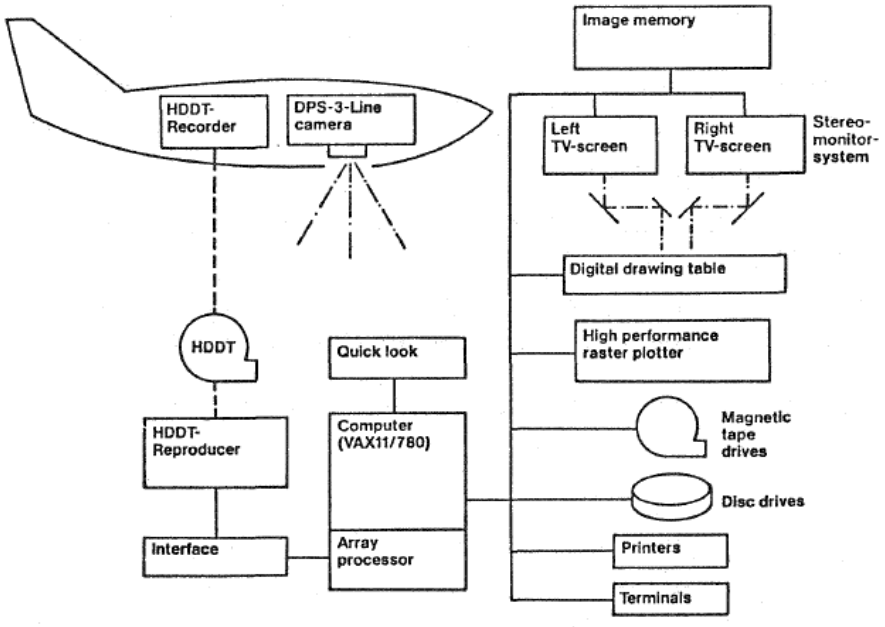


Fig. 8 Hardware system

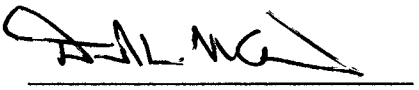
Contrary to Sony's assertion, Hofmann is *completely silent* on providing a perception of depth to a person that views the Left TV-Screen and Right TV-Screen of the stereo monitor system of Fig. 8. Rather, Hofmann merely notes that the stereo monitor system may be used for plotting functions. In more detail, Hofmann states that the stereo-monitor system of Fig. 8 is used for "a) Visual selection and manual setting of first point(s) of correlation; b) Identification and setting of control points; c) Correction and supplements within the correlation process and measurement of terrain points; d) Interpretation, evaluation and measurements for topographic line map production, insertion of legends, coordinates, symbols, etc." (SONY-1108 at 212). Thus, the stereo monitor system of Hofmann's Fig. 8 in no way discloses viewing the claimed ***stereoscopic panoramic mosaic image pair*** to provide a perception of depth.

Under § 102, Hofmann must teach *exactly* what is recited in the claim, and Hofmann fails to disclose ***a mosaic image generator configured to mosaic the respective series of images strips together thereby to construct …stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path***. Therefore, Sony has failed to demonstrate a reasonable likelihood that that Claims 4, 5, and 34 are anticipated by Hofmann (Sony has not asserted obviousness). Thus, no trial should be ordered as to Ground D.

VIII. Conclusion

Because the Sony has failed to meet its burden and the Petition fails to demonstrate a reasonable likelihood that Sony will prevail on any of the claims challenged in each and every Ground (Grounds A-D), *inter partes* review of the '003 Patent should be denied and Claims 4, 5, and 34 of the '003 Patent should be confirmed.

Respectfully submitted,



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Dated: August 13, 2013

IPR2013-00326

Sony Corp.

v.

Yissum Research Development Company of the Hebrew University of Jerusalem

Yissum Research Development Company's Exhibit List

August 13, 2013

YRD-2001	Declaration of Robert Gerrity In Support of Opposition to Joinder
YRD-2002	Declaration of Vered Levy-Ron In Support of Opposition to Joinder
YRD-2003	Depth Perception Defined, http://whatis.techtarget.com/definition/stereoscopy-stereoscopic-imaging
YRD-2004	File History of the '003 Patent, Response dated February 11, 2003

UNITED STATES PATENT AND TRADEMARK OFFICE

SONY CORPORATION
Petitioner
v.
Patent of YISSUM RESEARCH DEVELOPMENT COMPANY OF THE HEBREW UNIVERSITY OF JERUSALEM
Patent Owner

Case IPR2013-00326
Patent 6,665,003
Title: SYSTEM AND METHOD FOR GENERATING AND DISPLAYING PANORAMIC IMAGES AND MOVIES

CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. § 42.205, that service was made on the Petitioner as detailed below.

Date of service August 13, 2013

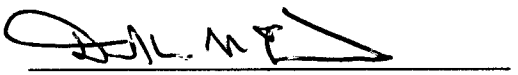
Manner of service Electronic Mail (Sony-HumanEyes@kenyon.com)

Documents served Preliminary Patent Owner Response;

YRD's Exhibit List; and

Exhibit: YRD-2003-2004

Persons served Kenyon & Kenyon LLP
One Broadway
New York, NY 10004



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