EXHIBIT A

Madisetti Declaration (Ex. 1020)	Petition for *Inter Partes* Review (Paper 3)
Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 B. **Claim Construction** 22. I understand that a claim subject to IPR receives the broadest reasonable construction in light of the specification of the patent in which it appears. I also understand that any term that is not construed should be given its plain and ordinary meaning under the broadest reasonable construction. I have followed these principles in my analysis. 1. **"a series of frame images" (claims 1, 3, and 8)** 23. The term "a series of frame images" appears in each of claims 1, 3, and 8. 24. Applicant has identified that "a desire exists for a document imaging system … being capable of producing real-time high resolution zoomable video and being capable of capturing high resolution still images." *Id.*, 3:18-24. The disclosed method includes "acquiring an image of a target to provide an output video image that has a plurality of frame images." *Id.*, 3:43-45. The plurality of still images, which are captured, constitute the video image. For example, "[t]he optical lens 316 and the accompanying electronic components are capable of capturing real-time video at approximately 30 frames per second." *Id.*, 5:39-41. In this example, video is comprised of individual frames (e.g., 30 frames per second). 25. Applicant does not, in any way, limit "a series of frame images" to a video-only construction. In describing the process of "[d]isplaying real-time 7 AVER EXHIBIT 1020 Page 11 of 98	A. **"a series of frame images" (claims 1, 3, and 8)** The broadest reasonable construction of "a series of frame images" is "a plurality of still images." Applicant stated that "a desire exists for a document imaging system…being capable of producing real-time high resolution zoomable video and being capable of capturing high resolution still images." Ex. 1001, 3:18-24. The disclosed method includes "acquiring an image of a target to provide an output video image that has [2] Due to the different claim construction standards in the proceedings, Petitioner identifying any feature as teaching a claim term of the '751 Patent or relying on PO's infringement contentions are not admissions by Petitioner that that claim term is met by any feature for infringement purposes. 8 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 a plurality of frame images." *Id.*, 3:43-45. The plurality of still images, which are captured, constitute the video image. For example, "[t]he optical lens 316 and the accompanying electronic components are capable of capturing real-time video at approximately 30 frames per second." *Id.*, 5:39-41. In this example, video is comprised of individual frames (e.g., 30 frames per second). Applicant does not, in any way, limit "a series of frame images" to a video-only construction. In describing "[d]isplaying real-time video," Applicant uses

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 video," Applicant uses several terms interchangeably, including "continuous stream of frame images," "instantaneous snapshot," "captured images," "captured video frames," etc. *Id.*, 6:11-38. While some of these terms (e.g., "captured video frames") may suggest video-specific context, many others (e.g., "instantaneous snapshot" and "captured images") suggest non-video context. For this reason, a video-only construction of the term "a series of frame images" is inappropriate. 26. One of ordinary skill in the art would understand "a series of frame images" to be "a plurality of still images." This understanding is consistent with both non-video contexts (e.g. "high resolution still images") and video-specific contexts (e.g., "real-time video at approximately 30 frames per second"). *See id.*, 3:18-24, 5:39-41. 2. **"a series of real-time images" (claim 18)** 27. Similarly, one of ordinary skill in the art would understand "a series of real-time images" to be "a plurality of real-time still images." 3. **"in the case of …" (claims 1, 3, and 18)** 28. The term "in the case of …" appears in each of claims 1, 3, and 8. As I understand, this claim term should be construed as a condition precedent. 29. Because the term is a condition precedent, for the purposes of satisfying obviousness, each of claims 1, 3, and 18 are disclosed in the prior art if all remaining claim limitations, besides the "in the case of …" limitations, are 8 AVER EXHIBIT 1020 Page 12 of 98	only construction. In describing "[d]isplaying real-time video," Applicant uses several terms interchangeably, including "continuous stream of frame images," "instantaneous snapshot," "captured images," "captured video frames," etc. *Id.*, 6:11-38. While some of these terms (e.g., "captured video frames") may suggest video-specific context, many others (e.g., "instantaneous snapshot" and "captured images") suggest non-video context. For this reason, a video-only construction of the term "a series of frame images" is inappropriate. Ex. 1020, ¶¶23-26. Petitioner's proposed construction is consistent with the intrinsic record. Specifically, "a plurality of still images" is consistent with both non-video contexts (e.g. "high resolution still images") and video-specific contexts (e.g., "real-time video at approximately 30 frames per second"). Ex. 1001, 3:18-24, 5:39-41. **B. "a series of real-time images" (claim 18)** The term "a series of real-time images" appears in claim 18. For reasons similar to those given above with regard to the term "a series of frame images," the 9 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 broadest reasonable construction of "a series of real-time images" is "a plurality of real-time still images." *See* Section VII.A; Ex. 1020, ¶27. **C. "in the case of…" (claims 1, 3, and 18)** The term "in the case of…" appears in each of claims 1, 3, and 8. This claim term should be construed as a condition precedent. The PTAB has recently clarified that the broadest reasonable interpretation of a method claim that has claim limitations including conditions precedent encompasses those instances where the condition is not met. *See Ex Parte Schulhauser*, Appeal 2013-007847 (PTAB April 28, 2016), 7-8. Only the remaining limitations (i.e., the limitations without the conditions precedent) need to be disclosed in the prior art for the claim to be obvious. *See id.*, 7-10 (*citing Applera Corp. v. Illumina, Inc.*, 375 Fed. Appx. 12, 21 (Fed. Cir. 2010)). Therefore, the term "in the case of…" should be construed as a condition precedent. For the purposes of satisfying obviousness, each of claims 1, 3, and 18 are disclosed in the prior art if all remaining claim limitations, besides the "in the case of…" limitations, are disclosed in the prior art. *See Ex parte Schulhauser*,

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 disclosed in the prior art. 4. **"annotating" (claims 5, 14, and 16)** 30. One of ordinary skill in the art would understand "annotating" to be "to add a note." *See* https://en.oxforddictionaries.com/definition/annotate (*defining* "annotate" as "add notes to (a text or diagram) giving explanation or comment"). 5. **"a miniaturized digital image sensing unit … comprising optics having an infinite focal length" (claim 18)** 31. The term "miniaturized" is ambiguous as it does not provide a point of reference and one of ordinary skill in the art would not know the boundaries of what constitutes "miniaturized." Nevertheless, one of ordinary skill in the art would understand the term "miniaturized" to include at least CMOS and CCD sensors, since those types of image sensors are praised in the '751 Patent specification as being "highly compact." Ex. 1001, 2:53-65. 32. I understand that Pathway, in a companion ITC case, has taken the position that the limitation "optics having an infinite focal length" can be satisfied if the document camera has a flat glass protective cover, over an optical lens. For the purposes of this IPR petition only, under the broadest reasonable interpretation claim construction standard, I adopt Pathway's interpretation of this claim limitation. Including a flat glass protective cover with an optical lens is a readily apparent design choice to avoid damage to the optical lens. For example, United States Patent No. 6,744,109 discloses the benefits of using a glass cover to protect 9 AVER EXHIBIT 1020 Page 13 of 98	case of…" limitations, are disclosed in the prior art. *See Ex parte Schulhauser*, Appeal 2013-007847, 7-8; Ex. 1020, ¶¶28-29. **D. "annotating" (claims 5, 14, and 16)** The broadest reasonable construction of "annotating" is "adding a note." *See* https://en.oxforddictionaries.com/definition/annotate (*defining* "annotate" as "add 10 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 notes to (a text or diagram) giving explanation or comment"); Ex. 1020, ¶30. The '751 Patent specification does not alter this meaning. **E. "a miniaturized digital image sensing unit…comprising optics having an infinite focal length" (claim 18)** The term "miniaturized" is ambiguous as it does not provide a point of reference and one of ordinary skill in the art would not know the boundaries of what constitutes "miniaturized." Nevertheless, under the broadest reasonable interpretation, the term "miniaturized" should include at least CMOS and CCD sensors since those types of image sensors are praised in the '751 Patent specification as being "highly compact." Ex. 1001, 2:53-65; Ex. 1020, ¶31. For the purposes of this Petition, Petitioner proposes construing "miniaturized digital image sensing unit" under the broadest reasonable interpretation standard as

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 a lens assembly. One of ordinary skill in the art would understand that a commercially viable product with an optical lens would typically include a flat piece of glass, such as a glass protective cover. 33. Alternatively, Pathway has also proposed that "optics having an infinite focal length" be construed to mean a "focal length ensuring objects appearing under the facing down digital image sensing unit appear focused and sharp even when the digital image sensing unit is substantially far away." Again, for the purposes of this IPR petition only, under the broadest reasonable interpretation claim construction standard, I adopt this interpretation as an alternate meaning of this claim limitation. 6. **"the output frame images" (claims 13 and 14)** 34. The phrase "the output frame images" appears in multiple dependent claims, but the phrase lacks an antecedent basis in any of the independent claims. Nevertheless, for the purposes of this IPR petition, I will adopt the ITC's construction of this phrase is to be "the frame images whose resolution was adjusted to correspond to the reference resolution." 35. As discussed further below, certain references teach or suggest every feature recited in claims 1-5, 7-10, 12-14, 16, 18, and 20 of the '751 patent. **VII. THE PRIOR ART TEACHES OR SUGGESTS EVERY FEATURE OF THE CHALLENGED CLAIMS OF THE '751 PATENT** 10 AVER EXHIBIT 1020 Page 14 of 98	**F. "the output frame images" (claims 13 and 14)** The phrase "the output frame images" appears in multiple dependent claims, but the phrase lacks an antecedent basis in any of the independent claims. Nevertheless, solely for the purpose of this Petition, Petitioner interprets this [3] The ITC has ruled that "optics having an infinite focal length" means "optics having a focal point at an infinite or effectively infinite distance." Ex. 1014, 34-38. PO has interpreted the ITC construction to mean that having a flat protective glass cover over a lens is enough to satisfy the ITC's construction. Ex. 1016. Petitioner also addresses this PO interpretation in analyzing claim 18 below. 12 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 ambiguous phrase as "the frame images whose resolution was adjusted to correspond to the reference resolution." This proposed construction is analogous to the construction adopted in the ITC. Ex. 1014, 48; Ex. 1020, ¶¶34-35.

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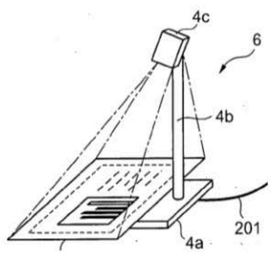
A. **Overview of the Prior Art References**

1. **U.S. Patent Publication No. 2005/0078052 ("*Morichika*") (Ex. 1002)**

36. United States Patent Publication No. 2005/0078052 to Kazumasa Morichika ("Morichika," Ex. 1002) was published on April 14, 2005 and is therefore prior art to the '751 patent under 35 U.S.C. § 102(b).

37. Morichika discloses an image projection system comprising a laptop personal computer and a camera device. Ex. 1002, ¶0028. The camera device consists of a base, a strut, and a digital camera as illustrated below. *Id.*, ¶0030; Fig. 1.



The camera device and the PC laptop computer are connected by USB cable 201. *Id.*, ¶0028. The digital camera in the camera device contains a high resolution CCD sensor with four million pixels. *Id.*, ¶0044. The image produced by the CCD sensor is sent to the laptop computer via the USB cable. *Id.*, ¶0045.

38. After receiving the image data from the camera device, the laptop PC

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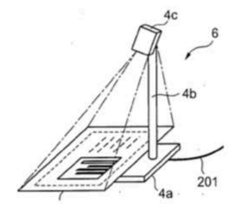
VIII. OVERVIEW OF PRIOR ART

A. Morichika

United States Patent Publication No. 2005/0078052 to Morichika ("Morichika," Ex. 1002) was published on April 14, 2005 and is prior art to the '751 Patent under 35 U.S.C. §102(b).

Morichika discloses an image projection system comprising a laptop personal computer and a camera device. Ex. 1002, ¶0028; Ex. 1020, ¶¶36-40. The camera device consists of a base, a strut, and a digital camera as illustrated below. Ex. 1002, ¶0030; Fig. 1.



The camera device and the PC laptop computer are connected by USB cable 201. *Id.*, ¶0028. The digital camera in the camera device contains a high resolution CCD

sensor with four million pixels. *Id.*, ¶0044. The image produced by the CCD sensor is sent to the laptop computer via the USB cable. *Id.*, ¶0045.

After receiving the image data from the camera device, the laptop PC can

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 can perform various imaging processing steps and then outputs a video signal to be displayed by a projector. *Id.*, ¶¶0049, 0039. 39. Before display, the PC scales the image data to fit the display resolution. *See id.*, Fig. 7. The PC determines the resolution of the image and the resolution of the PC monitor. *Id.*, Fig. 7 at SB1 and SB4. The PC then scales the image data to match the resolution of the PC monitor. *Id.*, Fig. 7 at SB6-8, ¶¶0051-0057. 40. Morichika also discloses the ability of the system to magnify, i.e., zoom, the video signal that is displayed. *Id.*, ¶¶0058-0062. A user first indicates a to-be-magnified area by selecting a point on the displayed image. *Id.*, ¶0059. The PC then determines the corresponding point in the image data. *Id.*, ¶¶0059-0060. Based on the selected magnification rate and selected point, the PC determines a region of the image data to be displayed. *Id.*, ¶0060. The PC then scales that region to match the resolution of the PC monitor and displays the magnified image. *Id.*, ¶0062. 2. **U.S. Patent No. 7,239,338 (“*Krisbergh*”) (Ex. 1003)** 41. United States Patent No. 7,239,338 to Hal M. Krisbergh, et al. (“Krisbergh,” Ex. 1003) was granted on July 3, 2007 and is therefore prior art to the ’751 patent under 35 U.S.C. § 102(b). 42. Krisbergh discloses a video telephone system comprising a plurality 12 AVER EXHIBIT 1020 Page 16 of 98	After receiving the image data from the camera device, the laptop PC can perform various imaging processing steps and then outputs a video signal to be displayed by a projector. *Id.*, ¶¶0049, 0039. Before display, the PC scales the image data to fit the display resolution. *See Id.*, Fig. 7. The PC determines the resolution of the image and the resolution of the PC monitor. *Id.*, Fig. 7 at SB1 and SB4. The PC then scales the image data to match the resolution of the PC monitor. *Id.*, Fig. 7 at SB6-8, ¶¶0051-0057. Morichika also discloses the ability of the system to magnify, i.e., zoom, the video signal that is displayed. *Id.*, ¶¶0058-0062. A user first indicates a to-be-magnified area by selecting a point on the displayed image. *Id.*, ¶0059. The PC then determines the corresponding point in the image data. *Id.*, ¶¶0059-0060. Based on the selected magnification rate and selected point, the PC determines a region of the image data to be displayed. *Id.*, ¶0060. The PC then scales that region to match the resolution of the PC monitor and displays the magnified image. *Id.*, ¶0062. 14 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **B. Krisbergh** United States Patent No. 7,239,338 to Hal M. Krisbergh, et al. (“Krisbergh,” Ex. 1003) was granted on July 3, 2007 and is therefore prior art to the ’751 Patent under 35 U.S.C. §102(b). Krisbergh discloses a video telephone system comprising a plurality of

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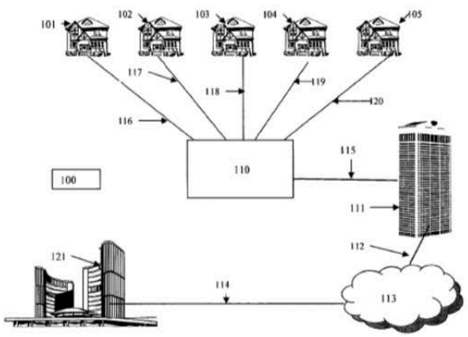
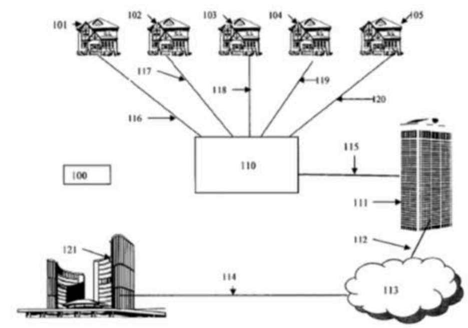
Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 of subscribers with videophones which are configured to communicate via a communications network. Ex. 1003, 3:3-6. The communications network may communicate with at least one headend facility which may communicate with at least one network operations center as illustrated below. *Id.*, 3:15-17, 5:10-12; Figure 1.  43. Krisbergh also discloses a videophone comprising a fixed camera having a wide-angle lens. *Id.*, 9:47. The videophone provides digital zoom capability that allows each person on a video call to zoom, pan, and tilt the camera of the party they are calling. *Id.*, 9:15-17. 44. The camera is capable of providing a zoomed out image by taking the entire high-resolution image and converting it to the desired lower target resolution. *Id.*, 9:51-53. A zoomed-in image can be provided by taking a portion of 13 AVER EXHIBIT 1020 Page 17 of 98	Krisbergh discloses a video telephone system comprising a plurality of subscribers with videophones which are configured to communicate via a communications network. Ex. 1003, 3:3-6; Ex. 1020, ¶¶41-44. The communications network may communicate with at least one headend facility which may communicate with at least one network operations center ("NOC") as illustrated below. Ex. 1003, 3:15-17, 5:10-12; Figure 1.  Krisbergh also discloses a videophone comprising a fixed camera having a wide-angle lens. *Id.*, 9:47. The videophone provides digital zoom capability that 15 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 allows each person on a video call to zoom, pan, and tilt the camera of the party they are calling. *Id.*, 9:15-17. The camera is capable of providing a zoomed out image by taking the entire high-resolution image and converting it to the desired lower target resolution. *Id.*, 9:51-53. A zoomed-in image can be provided by taking a portion of the high-

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 the high-resolution image. *Id.*, 9:54-55. 3. **U.S. Patent Publication No. 2001/0012051 ("*Hara*") (Ex. 1004)** 45. United States Patent Publication No. 2001/0012051 to Yoshihiro Hara and Yukio Maekawa ("Hara," Ex. 1004) was published on August 9, 2001 and is therefore prior art to the '751 Patent under 35 U.S.C. § 102(b). 46. The Hara reference relates to a visual telephone system. Ex. 1004, ¶0003. Hara discloses that conventional or prior art visual telephone systems were capable of transmitting highly compressed still or motion pictures. *Id.*, ¶0006. The object of the invention disclosed by Hara was to further reduce the data transmitted by matching the resolution of the transmitted image with the resolution of the display device of the destination terminal. *Id.*, ¶0012. Hara achieved this by using a "display resolution table" to lookup the resolution of the destination terminal display and then matching the transmitted image resolution with that of the destination terminal display resolution. *Id.*, ¶¶0062-0067. 4. **U.S. Patent No. 7,148,911 ("*Mitsui*") (Ex. 1005)** 47. United States Patent No. 7,148,911 to Kenichi Mitsui, et al. ("Mitsui," Ex. 1005) was granted on December 12, 2006 and is therefore prior art to the '751 Patent under 35 U.S.C. § 102(b). 48. The Mitsui reference relates to a video telephone device that transmits/receives image and audio information. Ex. 1005, 1:5-7. Mitsui discloses 14 AVER EXHIBIT 1020 Page 18 of 98	9:51-53. A zoomed-in image can be provided by taking a portion of the high-resolution image. *Id.*, 9:54-55. **C. Hara** United States Patent Publication No. 2001/0012051 to Hara et al. ("Hara," Ex. 1004) was published on August 9, 2001 and is therefore prior art to the '751 Patent under 35 U.S.C. §102(b). The Hara reference relates to a visual telephone system. Ex. 1004, ¶0003; Ex. 1020, ¶¶45-46. Hara discloses that conventional or prior art visual telephone systems were capable of transmitting highly compressed still or motion pictures. Ex. 1004, ¶0006. The object of the invention disclosed by Hara was to further reduce the data transmitted by matching the resolution of the transmitted image with the resolution of the display device of the destination terminal. *Id.*, ¶0012. Hara achieved this by using a "display resolution table" to lookup the resolution of the destination terminal display and then matching the transmitted image resolution with that of the destination terminal display resolution. *Id.*, ¶¶0062-0067. 16 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **D. Mitsui** United States Patent No. 7,148,911 to Kenichi Mitsui, et al. ("Mitsui," Ex. 1005) was granted on December 12, 2006 and is therefore prior art to the '751 Patent under 35 U.S.C. §102(b). The Mitsui reference relates to a video telephone device that transmits/receives image and audio information. Ex. 1005, 1:5-7; Ex. 1020, ¶¶47-50. Mitsui discloses that in prior art video telephone devices it was impossible to

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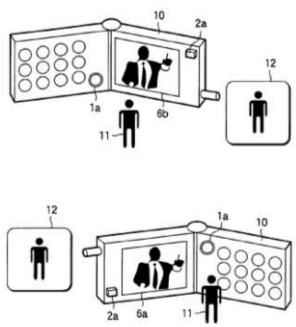
that in prior art video telephone devices it was impossible to change the orientation of an image picked up by image pick-up means, or of an image received from a distant party. *Id.*, 2:23-29. Thus, transmitted images were displayed in unnatural orientations. *Id.*, 2:29-32.

49. The object of the invention disclosed by Mitsui was a video telephone device which always transmits or displays an image in the proper orientation, as displayed below, regardless of which way the video telephone's display is held. *Id.*, 2:34-37; Figures 3A-3B.



50. This object was achieved by including a rotating means for rotating the orientation of a picture signal based on a reference vertical direction. *Id.*, 6:49-58.

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50. Mitsui discloses that in prior art video telephone devices it was impossible to change the orientation of an image picked up by image pick-up means, or of an image received from a distant party. Ex. 1005, 2:23-29. Thus, transmitted images were displayed in unnatural orientations. *Id.*, 2:29-32.

The object of the invention disclosed by Mitsui was a video telephone device which always transmits or displays an image in the proper orientation, shown below, regardless of which way the video telephone's display is held. *Id.*, 2:34-37; Figures 3A-3B.

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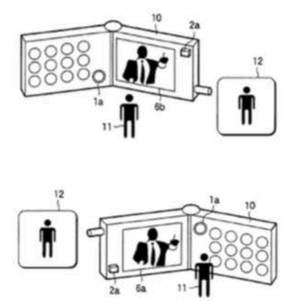

This object was achieved by including a rotating means for rotating the orientation of a picture signal based on a reference vertical direction. *Id.*, 6:49-58.

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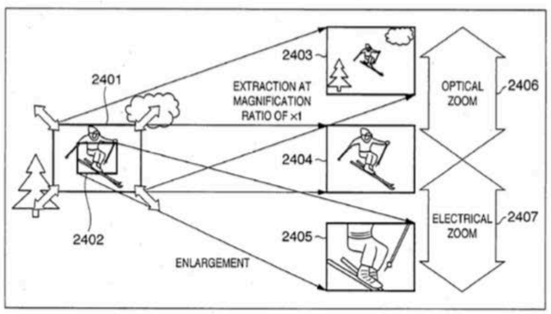
5. **U.S. Patent Publication No. 2004/0174444 ("*Ishii*") (Ex. 1006)**

51. United States Patent Publication No. 2004/0174444 to Yoshiki Ishii ("Ishii," Ex. 1006) was published on September 9, 2004 and is therefore prior art to the '751 Patent under 35 U.S.C. § 102(b).

52. The Ishii reference relates to acquiring image data, which may be either still image data or moving image data, and executing zoom processing on the acquired image data. Ex. 1006, Abstract; Fig. 27.

F I G. 27



53. The Ishii reference discloses two modes of capturing image data: "a still image mode in which a still image is photographed and a moving image mode in which a moving image is photographed." *Id.*, ¶0062.

54. The Ishii reference discloses two modes of zoom processing: optical zoom and digital zoom (referred to as "electrical zoom"). *Id.*, ¶0001. For example,

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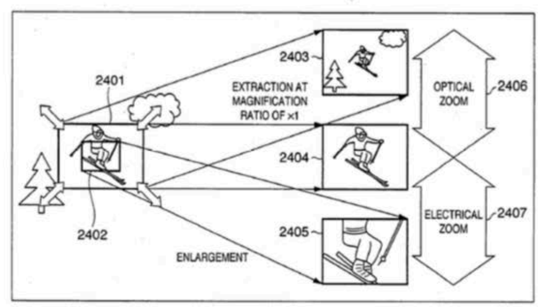
E. Ishii

United States Patent Publication No. 2004/0174444 to Yoshiki Ishii ("Ishii," Ex. 1006) was published on September 9, 2004 and is therefore prior art to the '751 Patent under 35 U.S.C. §102(b).

The Ishii reference relates to acquiring image data, which may be either still image data or moving image data, and executing zoom processing on the acquired image data. Ex. 1006, Abstract; Fig. 27; Ex. 1020, ¶¶51-54, 148-51.

F I G. 27



The Ishii reference discloses two modes of capturing image data: "a still image mode in which a still image is photographed and a moving image mode in which a moving image is photographed." Ex. 1006, ¶0062.

The Ishii reference discloses two types of zoom processing: optical zoom and digital zoom (referred to as "electrical zoom"). *Id.*, ¶0001. The Ishii reference

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"Fig. 27 is a view showing the optical zoom and electrical zoom operations in the image recording apparatus." *Id.*, ¶0009. Describing optical zoom processing, Ishii explains that "the lens optical system 2301 is controlled to the maximum wide-angle state, the frame 2401 becomes large." *Id.*, ¶0009. Describing digital zoom processing, Ishii explains that "a partial area indicated by a frame 2402 is extracted and enlarged from the image data of the object within the frame 2401 in the maximum telephoto state, thereby obtaining an electrical zoom image 2405." *Id.*, ¶0010. Furthermore, "when the magnification ratio of electrical zoom is high, the image quality largely degrades. To prevent this, the magnification ratio of electrical zoom is generally limited by defining an upper limit value." *Id.*, ¶0011.

B. **Morichika Renders Claims 1-5, 7, 18, and 20 Obvious**

1. **Claim 1**

55. In a previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 1 of the '751 Patent obvious. Ex. 1013, 14.

56. To the extent that the Board decides, in contrast to the decision in IPR2016-00661, that the claim phrase "a series of frame images" in claim 1 requires video images, a person of ordinary skill would have found it obvious to modify the Morichika device to use a video camera. The simple substitution of a still digital camera with a video camera yields a predictable result. By continuously

'751 Patent on the following grounds:

Ground	35 U.S.C.	Relied-On References	Claims
1	§103	Morichika (Ex. 1002)	1-5, 7, 18, and 20
2	§103	Krisbergh (Ex. 1003) and Hara (Ex. 1004)	8-10, 12, 14, and 16
3	§103	Krisbergh (Ex. 1003), Hara (Ex. 1004), and Mitsui (Ex. 1005)	13 and 16
4	§103	Ishii (Ex. 1006)	1-5, 8, and 16

Pursuant to 37 C.F.R. §42.6(c), copies of the relied-on references are marked as exhibits filed herewith. Petitioner also provides the declaration of Dr. Vijay Madisetti in support of its proposed grounds of unpatentability. Ex. 1020, ¶¶1-9, 188.

A. Ground 1: Morichika Renders Claims 1-5, 7, 18, and 20 Obvious

1. Claim 1

In a previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 1 of the '751 Patent obvious. Ex. 1013, 14.

To the extent that the Board decides, in contrast to the decision in IPR2016-00661, that the claim phrase "a series of frame images" in claim 1 requires video images, a person of ordinary skill would have found it obvious to modify the Morichika device to use a video camera. Ex. 1020, ¶¶55-56. The simple

substitution of a still digital camera with a video camera yields a predictable result. By continuously capturing images of a target area using a video camera, a user can

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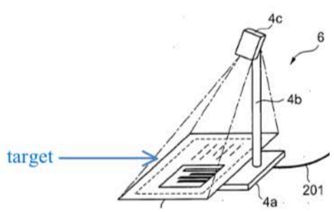
capturing images of a target area using a video camera, a user can avoid having to manually cause a new image to be captured every time the object or document to be displayed was moved. Therefore, one of ordinary skill would have been motivated to use a video camera in the Morichika device and modify the PC's software accordingly. Using a video camera with a PC for image capture, manipulation, and display was well known in the art before the filing date of the '751 patent. Further, one of ordinary skill in the art would have had an expectation of success in modifying the PC's software to allow video image capture by the PC.

a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:

57. The excerpt of Fig. 1 of Morichika shown below shows the system and method of Morichika acquiring an image of a target.



58. The image of the target, "document A," acquired by digital camera 4c is sent to a laptop personal computer and eventually displayed by a projector. Ex. 1002, ¶0032, Fig. 1. The signal sent by the laptop PC to the projector is an output

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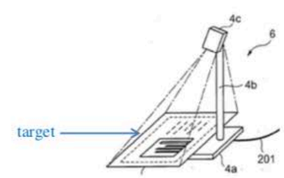
By continuously capturing images of a target area using a video camera, a user can avoid having to manually cause a new image to be captured every time the object or document to be displayed was moved. Therefore, one of ordinary skill would have been motivated to use a video camera in the Morichika device and modify the PC's software accordingly. *Id*. Using a video camera with a PC for image capture, manipulation, and display was well known in the art before the filing date of the '751 Patent. *Id*. Further, one of ordinary skill in the art would have had an expectation of success in modifying the PC's software to allow video image capture by the PC. *Id*.

a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:

This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Morichika discloses the preamble language. *Id*., ¶57. The excerpt of Morichika below shows the system and method of Morichika acquiring an image of a target.



The image of the target, "document A," acquired by digital camera 4c is sent to a laptop personal computer and eventually displayed by a projector. Ex. 1002, ¶0032, Fig. 1; Ex. 1020, ¶57. The signal sent by the laptop PC to the projector is an output video image. Ex. 1002, ¶0039 ("The video adapter 25 generates a video

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 video image. *Id.*, ¶0039 ("The video adapter 25 generates a video signal (RGB signals) for display, and *outputs the video signal* to the display device 27 that comprises an LCD … the VRAM 26 continually stores the *image data for display, that the video adapter 25 generates*.") (emphasis added). 59. As one of ordinary skill in the art would understand, the video signals disclosed by Morichika, i.e., the RGB signals, comprise a plurality of frame images. **b) connecting a slave digital image sensing unit to a master personal processor,** 60. Morichika discloses that camera device 4 is connected to PC2 via a USB cable 201 and USB port 30. *Id.*, ¶¶0028, 0038, Figs. 1 & 2. Camera device 4 containing digital camera 4c and CCD 41 is a digital image sensing unit. *Id.*, ¶¶0042-0044. CCD 41 short for charge-coupled device is an image sensor. PC2 is a personal computer that contains central processing unit 21, i.e., CPU 21. *Id.*, ¶¶0004, 0038. Therefore, CPU 21 is a personal processor. 61. The CPU 21 functions as a "control means." *Id.*, ¶ 0041. Further, the camera device 4 is attached to PC2 via an USB interface. *Id.*, ¶¶ 0028, 0038, 0045. Therefore CPU21 controls camera device 4 and is the "master," while the camera device is being controlled and is the "slave." Since CPU21 is contained within a PC, CPU21 is the master personal processor, and correspondingly, camera device 4 is the slave digital image sensing unit. *Id.*, ¶0038. 19 AVER EXHIBIT 1020 Page 23 of 98	output video image. Ex. 1002, ¶0039 ("The video adapter 25 generates a video signal (RGB signals) for display, and *outputs the video signal* to the display device 27 that comprises an LCD…the VRAM 26 continually stores the *image data for display, that the video adapter 25 generates*.").[4] As one of ordinary skill in the art would understand, the video signals disclosed by Morichika, i.e., the RGB signals, comprise a plurality of frame images. Ex. 1020, ¶58. [4] All emphasis added by Petitioner unless otherwise noted. 22 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 b) connecting a slave digital image sensing unit to a master personal processor, Morichika discloses that camera device 4 is connected to PC2 via a USB cable 201 and USB port 30. Ex. 1002, ¶¶0028, 0038, Figs. 1 & 2. Camera device 4 containing digital camera 4c and CCD 41 is a digital image sensing unit. *Id.*, ¶¶0042-0044. CCD 41 short for charge-coupled device is an image sensor. Ex. 1020, ¶59. PC2 is a personal computer that contains central processing unit 21, i.e., CPU 21. Ex. 1002, ¶¶0004, 0038. Therefore, CPU 21 is a personal processor. The CPU 21 functions as a "control means." *Id.*, ¶0041. Further, the camera device 4 is attached to PC2 via an USB interface. *Id.*, ¶¶0028, 0038, 0045. Therefore CPU21 controls camera device 4 and is the "master," while the camera device is being controlled and is the "slave." Ex. 1020, ¶60-61. Since CPU21 is contained within a PC, CPU21 is the master personal processor, and correspondingly, camera device 4 is the slave digital image sensing unit. *Id.*

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **c) the master personal processor receiving a series of frame images from the slave digital image sensing unit;** 62. As discussed in the claim construction section, the phrase "a series of frame images" is not limited to video. *See* Section VI.B.1. Morichika discloses that PC2 contains an image processing program for carrying out various image processing on "to-be-projected image**s**." Ex. 1002, ¶0040 (emphasis added). The images to be projected form a series of frame images.[1] The image processing program, stored on hard disk 23, runs on CPU 21. Ex. 1002, ¶0041 ("the CPU 21 functions as the … converting means …"). In order to process or convert the images, CPU 21, the master personal processor, must receive the series of frame images from camera device 4. **d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images;** 63. Morichika teaches the ability to zoom in or out using the master personal processor. Morichika discloses a process for "magnifying an image." *Id.*, ¶¶0058-0061. The magnification is accomplished by the PC first determining a [1] In its institution decision in IPR2016-00661, the Board found that the disclosure of "to-be-projected images" satisfies the "series of frame images" limitation. Ex. 1013, 10. 20 AVER EXHIBIT 1020 Page 24 of 98	c) the master personal processor receiving a series of frame images from the slave digital image sensing unit; As discussed in the claim construction section, the phrase "a series of frame images" is not limited to video. *See* Section VII.A. Morichika discloses that PC2 contains an image processing program for carrying out various image processing on "to-be-projected image**s**." Ex. 1002, ¶0040. The images to be projected form a 23 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 series of frame images.[5] The image processing program, stored on hard disk 23, runs on CPU 21. *Id.*, ¶0041 ("the CPU 21 functions as the…converting means…"). In order to process or convert the images, CPU 21, the master personal processor, must receive the series of frame images from camera device 4. Ex. 1020, ¶62. d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images; Morichika teaches the ability to zoom in or out using the master personal processor. *Id.*, ¶63-67. Morichika discloses a process for "magnifying an image." Ex. 1002, ¶¶0058-0061. The magnification is accomplished by the PC first determining a magnifying position (P) in the frame image that corresponds to the selected magnifying position (O) in the display image. *Id.*, Fig. 10 at step SC2, ¶0060. The PC then obtains image data of a region (Q) within the frame image in accordance with a magnifying ratio. *Id.*, Fig. 10 at step SC3, ¶0060. Finally, the PC scales region (Q) to match the display resolution and the magnified image is [5] In its institution decision in IPR2016-00661, the Board found that the disclosure of "to-be-projected images" satisfies the "series of frame images" limitation. Ex. 1013, 10.

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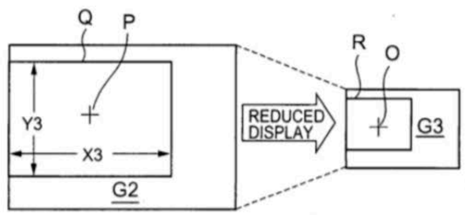
magnifying position (P) in the frame image that corresponds to the selected magnifying position (O) in the display image. *Id.*, Fig. 10 at step SC2, ¶0060. The PC then obtains image data of a region (Q) within the frame image in accordance with a magnifying ratio. *Id.*, Fig. 10 at step SC3, ¶0060. Finally, the PC scales region (Q) to match the display resolution and the magnified image is displayed. *Id.*, Fig. 10 at steps SC4 and SC5, ¶0062. The step of obtaining the magnified or zoomed in portion of the image, Q, is shown in Fig. 11B.

FIG. 11B



64. Morichika also teaches zooming out by disclosing the ability to carry out "reducing processing of setting the region having a size which corresponds to the reducing rate designated by the user." *Id.*, ¶0063.

65. Morichika teaches that the process of magnifying and reducing the image as illustrated in Fig. 10 is executed on PC2. *Id.*, ¶0058. Therefore, the master personal processor is used to manipulate the series of frame images, including zooming in or out.

66. Finally, the zooming manipulation is done on the frame image

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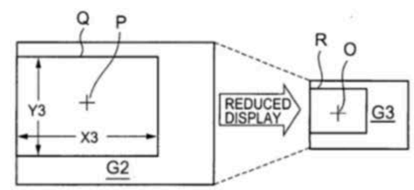
determining a magnifying position (P) in the frame image that corresponds to the selected magnifying position (O) in the display image. *Id.*, Fig. 10 at step SC2, ¶0060. The PC then obtains image data of a region (Q) within the frame image in accordance with a magnifying ratio. *Id.*, Fig. 10 at step SC3, ¶0060. Finally, the PC scales region (Q) to match the display resolution and the magnified image is

[5] In its institution decision in IPR2016-00661, the Board found that the disclosure of "to-be-projected images" satisfies the "series of frame images" limitation. Ex. 1013, 10.

displayed. *Id.*, Fig. 10 at steps SC4 and SC5, ¶0062. The step of obtaining the magnified or zoomed in portion of the image, Q, is shown below.

FIG. 11B



Morichika also teaches zooming out by disclosing the ability to carry out "reducing processing of setting the region having a size which corresponds to the reducing rate designated by the user." *Id.*, ¶0063.

Morichika teaches that the process of magnifying and reducing the image as illustrated in Fig. 10 is executed on PC2. *Id.*, ¶0058. Therefore, the master personal processor is used to manipulate the series of frame images, including zooming in or out.

Finally, the zooming manipulation is done on the frame image "without

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 "without changing resolution of the frame images." In other words, when the manipulation is done, the original frame image is not altered or destroyed and in particular the resolution of the original frame image is not changed. This is illustrated in Fig. 11 where the original resolution, G2, remains and is unaltered in zooming manipulations shown. Rather, a display region (Q) is obtained from the original frame image G2 and is scaled to the display resolution to output magnified image G4. *Id.*, ¶¶0060-0062. The frame image G2 itself is not affected. 67. Similarly, Morichika explains that the scrolling process requires the PC processor to re-obtain a display region Q and to repeat steps SC3 to SC5 of Fig. 10. *Id.* As one of ordinary skill in the art would understand, re-obtaining the display region Q and repeating steps SC3 to SC5 requires that the original G2 image exist in its original resolution even after PC2 performs the magnifying process. Therefore, the zooming processing was done without changing the resolution of the frame images, e.g., the resolution of the G2 image. **e) in the case of the manipulated series of frame images having a higher resolution than a reference resolution, reducing the resolution of each of the manipulated series of frame images to that of the reference resolution;** 68. As discussed in the claim construction section, this limitation is a conditional limitation. *See* Section VI.B.3. If one takes the "reference resolution" as the resolution of the display device, then this condition limitation is simply 22 AVER EXHIBIT 1020 Page 26 of 98	Finally, the zooming manipulation is done on the frame image "without changing resolution of the frame images." In other words, when the manipulation is done, the original frame image is not altered or destroyed and in particular the resolution of the original frame image is not changed. Ex. 1020 ¶66-67. This is illustrated in Fig. 11 where the original resolution, G2, remains and is unaltered in zooming manipulations shown. *Id.* Rather, a display region (Q) is obtained from 25 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 the original frame image G2 and is scaled to the display resolution to output magnified image G4. Ex. 1002, ¶¶0060-0062. The frame image G2 itself is not affected. Further, Morichika comports with PO's proposed construction of this term in co-pending litigation. PO has argued that the resolution does not change for the "acquired frame images." Ex. 1011, 6-7. PO suggests that a "scaling event occurs *after* the acquired frame images…forming the live bitmap stream [are] rendered on the screen. Thus, the acquired frame images resolution is not changed, since the acquired frame images are displayed live." *Id.* at 7. Similarly, Morichika explains that the scrolling process requires the PC processor to re-obtain a display region Q and to repeat steps SC3 to SC5 of Fig. 10. Ex. 1002, ¶¶0060-0062. As one of ordinary skill in the art would understand, re-obtaining the display region Q and repeating steps SC3 to SC5 requires that the original G2 image (i.e., the acquired frame image per PO's argument) exist in its original resolution even after PC2 performs the magnifying process. Ex. 1020, ¶¶63-67. Therefore, the zooming processing was done without changing the resolution of the frame images, e.g., the resolution of the G2 image. 26 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 e) in the case of the manipulated series of frame images having a higher resolution than a reference resolution, reducing the resolution of each of the manipulated series of frame images to that of the reference resolution; As discussed in the claim construction section, this limitation is a conditional limitation. *See* Section VII.C. If one takes the "reference resolution" as the resolution of the display device, then this condition limitation is simply

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 claiming a step of scaling the resolution of the frame images to that of the display resolution in the case where the resolution of the frame images is higher than the resolution of the display resolution. 69. Morichika teaches performing a scaling step where the resolution is reduced to match the display resolution. Morichika discloses that after the selection of the display region Q, the PC performs the process of matching the resolution of Q with the resolution of the PC monitor. Ex. 1002, ¶0062. In the specific example given by Morichika, the resolution of Q, i.e., the manipulated frame image, is 1200x1600, which is higher than the resolution of the display device, i.e., the reference resolution, which is 768x1024. *Id.*, ¶¶0052, 0061. The resolution 768x1024 is the standard XGA resolution and therefore a "reference resolution." *Id.*, ¶0052. 70. And since the resolution of Q is higher than the standard XGA resolution, the resolution of Q is reduced to match the XGA resolution of the PC monitor, i.e., G4 in Fig. 11. *Id.*, ¶0062. **f) displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images,** 71. Morichika discloses displaying manipulated frame images as an output video image. Morichika discloses that the zoomed image, i.e., the manipulated frame image, is displayed on the PC monitor, which is a projector. *Id.*, 23 AVER EXHIBIT 1020 Page 27 of 98	claiming a step of scaling the resolution of the frame images to that of the display resolution in the case where the resolution of the frame images is higher than the resolution of the display resolution. Ex. 1020, ¶68. Morichika teaches performing a scaling step where the resolution is reduced to match the display resolution. *Id.*, ¶69. Morichika discloses that after the selection of the display region Q, the PC performs the process of matching the resolution of Q with the resolution of the PC monitor. Ex. 1002, ¶0062. In the specific example given by Morichika, the resolution of Q, i.e., the manipulated frame image, is 1200x1600, which is higher than the resolution of the display device, i.e., the reference resolution, which is 768x1024. *Id.*, ¶¶0052, 0061. The resolution 768x1024 is the standard XGA resolution and therefore a "reference resolution." *Id.*, ¶0052. 27 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 And since the resolution of Q is higher than the standard XGA resolution, the resolution of Q is reduced to match the XGA resolution of the PC monitor, i.e., G4 in Fig. 11. *Id.*, ¶0062; Ex. 1020, ¶70. f) displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images, Morichika discloses displaying manipulated frame images as an output video image. Ex. 1020, ¶71. Morichika discloses that the zoomed image, i.e., the manipulated frame image, is displayed on the PC monitor, which is a projector. Ex.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 ¶0062. The projector is a video device which accepts video RGB signals at its input terminal. *Id.*, ¶¶0035, 0039 ("The video adapter 25 generates a video signal (RGB signals) for display, and *outputs the video signal* to the display device 27 that comprises an LCD …") (emphasis added). Therefore, Morichika discloses displaying the zoomed image as an output video image. 72. In addition, there is no suggestion in Morichika that the step of displaying the zoomed image as an output video image in any way would change the resolution of the zoomed image. In particular, after manipulating the G2 image by selecting display region Q and scaling Q to match the display resolution, no further changes in resolution are needed to display the zoomed image. **g) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.** 73. Morichika discloses that camera device 4 is connected to PC2 via a USB cable 201 and a USB port on PC2. *Id.*, ¶¶0028, 0038, Figs. 1 & 2. One of ordinary skill in the art would understand that a USB cable is removably connected to a USB port. Therefore, Morichika discloses the slave digital image sensing unit, i.e., camera device 4, removably connected, via USB, to the master personal processor, i.e., CPU 21, via a master personal processor port, i.e., the USB port on PC2. 24 AVER EXHIBIT 1020 Page 28 of 98	1002, ¶0062. The projector is a video device which accepts video RGB signals at its input terminal. *Id.*, ¶¶0035, 0039 ("The video adapter 25 generates a video signal (RGB signals) for display, and *outputs the video signal* to the display device 27 that comprises an LCD…"). Therefore, Morichika discloses displaying the zoomed image as an output video image. In addition, there is no suggestion in Morichika that the step of displaying the zoomed image as an output video image in any way would change the resolution of the zoomed image. In particular, after manipulating the G2 image by selecting display region Q and scaling Q to match the display resolution, no further changes in resolution are needed to display the zoomed image. Ex. 1020, ¶72. 28 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 g) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port. Morichika discloses that camera device 4 is connected to PC2 via a USB cable 201 and a USB port on PC2. Ex. 1002, ¶¶0028, 0038, Figs. 1 & 2. One of ordinary skill in the art would understand that a USB cable is removably connected to a USB port. Ex. 1020, ¶73. Therefore, Morichika discloses the slave digital image sensing unit, i.e., camera device 4, removably connected, via USB, to the master personal processor, i.e., CPU 21, via a master personal processor port, i.e., the USB port on PC2. *Id.*

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 2. **Claim 2** 74. Claim 2 recites "The method of claim 1, further comprising executing the manipulation in response to a user request in real time." In the previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 2 of the '751 Patent obvious. Ex. 1013, 14. 75. Morichika teaches that the image captured by the camera device can be projected in "real-time." Ex. 1002, ¶0065. Morichika also discloses that the zooming function and subsequent image manipulation is performed in response to a user request. For example, Morichika teaches that the "operation for magnifying an image that the PC 2 executes, when there is an instruction to enlarge the display image G3 from the user, by operation of operation keys or the infrared remote control unit 5, while the display image G3 is projected by the projector 1." *Id.*, ¶0050. One of ordinary skill in the art would find it obvious that the zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system with a infrared remote control unit. 3. **Claim 3** 76. In the previous IPR2016-00661 institution decision, the Board was not persuaded that Petitioner Qomo Hitevision, LLC ("Qomo") provided adequate reasoning with rational underpinning to support its obviousness challenge for claim 25 AVER EXHIBIT 1020 Page 29 of 98	**2. Claim 2** Claim 2 recites "The method of claim 1, further comprising executing the manipulation in response to a user request in real time." In the previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 2 of the '751 Patent obvious. Ex. 1013, 14. Morichika teaches that the image captured by the camera device can be projected in "real-time." Ex. 1002, ¶0065. Morichika also discloses that the zooming function and subsequent image manipulation is performed in response to a user request. For example, Morichika teaches that the "operation for magnifying an image that the PC 2 executes, when there is an instruction to enlarge the display image G3 from the user, by operation of operation keys or the infrared remote 29 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 control unit 5, while the display image G3 is projected by the projector 1." *Id.*, ¶0050. One of ordinary skill in the art would find it obvious that the zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system with a infrared remote control unit. Ex. 1020, ¶74-75. **3. Claim 3** In the previous IPR2016-00661 institution decision, the Board was not persuaded that Petitioner Qomo Hitevision, LLC ("Qomo") provided adequate reasoning with rational underpinning to support its obviousness challenge for claim

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 3 based on the Morichika and Hara references. Ex. 1013, 16. Current Petitioner believes that Morichika alone renders claim 3 obvious. This was not an argument presented by Petitioner Qomo. *Id.*, 5. **a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:** 77. This limitation is the same as for claim 1. *See* Section VII.B.1.a. **b) connecting a slave digital image sensing unit to a master personal processor,** 78. This limitation is the same as for claim 1. *See* Section VII.B.1.b. **c) the master personal processor receiving a series of frame images from the slave digital image sensing unit;** 79. This limitation is the same as for claim 1. *See* Section VII.B.1.c. **d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images,** 80. This limitation is the same as for claim 1. *See* Section VII.B.1.d. **e) wherein the manipulation of the series of frame images is executed in response to a user request in real time;** 81. This limitation is the same as for claim 2. *See* Section VII.B.2. **f) identifying a first resolution for the received plurality of frame images;** 82. Morichika teaches image G2 having a resolution of 1500x2000 pixels. Ex. 1002, ¶0061. The resolution of the G2 image is "for" a frame image received 26 AVER EXHIBIT 1020 Page 30 of 98	3 based on the Morichika and Hara references. Ex. 1013, 16. Current Petitioner believes that Morichika alone renders claim 3 obvious. Ex. 1020, ¶76. This was not an argument presented by Petitioner Qomo. Ex. 1013, 5. a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising: This limitation is the same as for claim 1. *See* Section IX.A.1.a; Ex. 1020, ¶77. b) connecting a slave digital image sensing unit to a master personal processor, This limitation is the same as for claim 1. *See* Section IX.A.1.b; Ex. 1020, ¶78. 30 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 c) the master personal processor receiving a series of frame images from the slave digital image sensing unit; This limitation is the same as for claim 1. *See* Section IX.A.1.c; Ex. 1020, ¶79. d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images, This limitation is the same as for claim 1. *See* Section IX.A.1.d; Ex. 1020, ¶80. e) wherein the manipulation of the series of frame images is executed in response to a user request in real time; This limitation is the same as for claim 2. *See* Section IX.A.2; Ex. 1020, ¶81. f) identifying a first resolution for the received plurality of frame images; Morichika teaches image G2 having a resolution of 1500x2000 pixels. Ex. 1002, ¶0061. The resolution of the G2 image is "for" a frame image received from

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 from the slave digital image sensing unit, i.e., camera device 4. 83. One of ordinary skill in the art would understand that a "first resolution for" the received frame images does not require the first resolution be the resolution of the frame image as it was received by the master personal processor. Instead, the phrase "first" is only used to differentiate this resolution from the "second" resolution claimed. Therefore, the G2 image resolution is a first resolution for the received frame images sent by camera device 4. 84. To the extent that "a first resolution for the received plurality of frame images" means the actual resolution of the frame image as received by the master processor, Morichika identifies the resolution of image G1. *See id.*, Fig. 6A. Image G1 refers to the image frame sent from the camera device. *Id.*, ¶0050. Morichika identifies the resolution of G1 as slightly greater than the resolution of G2, i.e., the resolution of G1 is the resolution of G2 plus the resolution of Ga. *Id.* **g) identifying a second resolution for the reference resolution;** 85. One of ordinary skill in the art would understand that the phrase "second" resolution is used to distinguish this resolution from the "first" resolution, as discussed above. Therefore, "second resolution" does not imply the existence of multiple resolutions. In addition, "the reference resolution" in this claim limitation does not have an antecedent basis. 86. One can take the "reference resolution" to be the resolution of the 27 AVER EXHIBIT 1020 Page 31 of 98	the slave digital image sensing unit, i.e., camera device 4. Ex. 1020, ¶82. Petitioner believes that under the broadest reasonable interpretation a "first resolution for" the received frame images does not require the first resolution be the resolution of the frame image as it was received by the master personal processor. Instead, the phrase "first" is only used to differentiate this resolution from the "second" resolution claimed. Therefore, under the broadest reasonable 31 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 interpretation, the G2 image resolution is a first resolution for the received frame images sent by camera device 4. *Id.*, ¶83. To the extent that "a first resolution for the received plurality of frame images" means the actual resolution of the frame image as received by the master processor, Morichika identifies the resolution of image G1. Ex. 1002, Fig. 6A. Image G1 refers to the image frame sent from the camera device. *Id.*, ¶0050. Morichika identifies the resolution of G1 as slightly greater than the resolution of G2, i.e., the resolution of G1 is the resolution of G2 plus the resolution of Ga. *Id.*, ¶0050; Ex. 1020, ¶84. g) identifying a second resolution for the reference resolution; Petitioner believes that under the broadest reasonable interpretation, the phrase "second" resolution is used to distinguish this resolution from the "first" resolution, discussed above. Therefore, under the broadest reasonable interpretation, "second resolution" does not imply the existence of multiple resolutions. In addition, "the reference resolution" in this claim limitation does not have an antecedent basis. Nevertheless, solely for the purpose of this Petition, Petitioner interprets this ambiguous "the reference resolution" phrase as meaning "a reference resolution." Ex. 1020, ¶¶85-86. One can take the "reference resolution" to be the resolution of the display

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 display device, which in Morichika is 768x1024. *Id.*, ¶0052. The resolution 768x1024 is the standard XGA resolution and therefore a "reference resolution." *Id.* Therefore, Morichika identifies a second resolution which is a reference resolution. **h) in the case of a manipulated frame image having a higher resolution, as manipulated, than the second resolution, reducing the resolution of the frame image to that of the second resolution;** 87. This limitation is essentially the same limitation as in claim 1. *See* Section VII.B.1.e. This limitation uses the term "second resolution" whereas claim 1 uses the phrase "reference resolution," but since the second resolution is a reference resolution, the limitation and the corresponding limitation in claim 1 are equivalent. In addition, the limitation in claim 1 is directed to the series of frame images whereas this limitation is directed to a single manipulated frame image. But since the Morichika reference treats each to-be-projected image similarly, arguments that apply to a single image apply equally well to the series of images and vice versa. *See* Section VII.B.1.e. **i) in the case of the manipulated frame image having a lower resolution, as manipulated, than the second resolution, using the processor to further manipulate the frame image to reduce pixilation;** 88. This is another conditional limitation. *See* Section VI.B.3. This conditional limitation is the complement to the previous conditional limitation. 28 AVER EXHIBIT 1020 Page 32 of 98	One can take the "reference resolution" to be the resolution of the display device, which in Morichika is 768x1024. Ex. 1002, ¶0052. The resolution 32 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 768x1024 is the standard XGA resolution and therefore a "reference resolution." *Id.*, ¶0052. Therefore, Morichika identifies a second resolution which is a reference resolution. h) in the case of a manipulated frame image having a higher resolution, as manipulated, than the second resolution, reducing the resolution of the frame image to that of the second resolution; This limitation is essentially the same limitation as in claim 1. *See* Section IX.A.1.e. This limitation uses the term "second resolution" whereas claim 1 uses the phrase "reference resolution," but since the second resolution is a reference resolution, the limitation and the corresponding limitation in claim 1 are equivalent. In addition, the limitation in claim 1 is directed to the series of frame images whereas this limitation is directed to a single manipulated frame image. But since the Morichika reference treats each to-be-projected image similarly, arguments that apply to a single image apply equally well to the series of images and vice versa. *See* Section IX.A.1.e; Ex. 1020, ¶87. i) in the case of the manipulated frame image having a lower resolution, as manipulated, than the second resolution, using the processor to further manipulate the frame image to reduce pixilation; This is another conditional limitation. *See* Section VII.C. This conditional limitation is the complement to the previous conditional limitation. Whereas the

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 Whereas the previous conditional limitation claimed the case of the manipulated frame image having a higher resolution than the second resolution, this limitation claims the case of the manipulated frame image having a lower resolution than the second resolution. 89. The zooming embodiment of Morichika does not present the case of having the manipulated frame image with a lower resolution than the standard XGA resolution, i.e., the second resolution. In Morichika, the manipulation of the frame image during the zoom process results in display region Q, which has a resolution of 1200x1600. Ex. 1002, ¶0061. The resolution of display region Q is not lower than the standard XGA resolution. At no point in the process of zooming does the resolution of the manipulated frame image drop lower than the standard XGA resolution. Indeed, Morichika explicitly discloses that the resolution of camera device 4 exceeds the resolution of projector 1, i.e., the second resolution, and that the magnification rate is set within a predetermined range so that degradation of image quality does not occur. *Id.*, ¶0064. In other words, Morichika discloses a system specifically designed to prevent the occurrence of pixilation by preventing the manipulated frame image from having a lower resolution than the resolution of the projected image. **j) displaying and/or storing the manipulated series of frame images as an output video image without** 29 AVER EXHIBIT 1020 Page 33 of 98	limitation is the complement to the previous conditional limitation. Whereas the previous conditional limitation claimed the case of the manipulated frame image 33 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 having a higher resolution than the second resolution, this limitation claims the case of the manipulated frame image having a lower resolution than the second resolution. Ex. 1020, ¶88. The zooming embodiment of Morichika does not present the case of having the manipulated frame image with a lower resolution than the standard XGA resolution, i.e., the second resolution. In Morichika, the manipulation of the frame image during the zoom process results in display region Q, which has a resolution of 1200x1600. Ex. 1002, ¶0061. The resolution of display region Q is not lower than the standard XGA resolution. At no point in the process of zooming does the resolution of the manipulated frame image drop lower than the standard XGA resolution. Indeed, Morichika explicitly discloses that the resolution of camera device 4 exceeds the resolution of projector 1, i.e., the second resolution, and that the magnification rate is set within a predetermined range so that degradation of image quality does not occur. *Id.*, ¶0064. In other words, Morichika discloses a system specifically designed to prevent the occurrence of pixilation by preventing the manipulated frame image from having a lower resolution than the resolution of the projected image. Ex. 1020, ¶89. 34 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 j) displaying and/or storing the manipulated series of frame images as an output video image without changing the resolution of the manipulated series of frame images,

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **changing the resolution of the manipulated series of frame images,** 90. This limitation is the same as for claim 1. *See* Section VII.B.1.f. **k) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.** 91. This limitation is the same as for claim 1. *See* Section VII.B.1.g. 4. **Claim 4** 92. Claim 4 recites "The method of claim 3, wherein the personal processor is housed in an external personal computer, further comprising using an external personal computer to provide the processor used to manipulate the series of frame images." 93. Morichika discloses that camera device 4 is connected to PC 2 via a USB cable 201 and USB port 30. Ex. 1002, ¶¶0028, 0038, Figs. 1 & 2. The personal processor, CPU 21, is housed in personal computer, PC 2. *Id.*, ¶0038. The personal computer is external to camera device 4, the image sensing unit. *See id.*, Fig. 1. PC2 provides the processor, CPU 21, used to manipulate the series of frame images since CPU 21 functions as a "converting means" and PC 2 "executes" the instructions to magnifying the image. *Id.*, ¶¶0041, 0058. 5. **Claim 5** 94. Claim 5 recites "The method of claim 4 wherein the manipulation further comprises at least one of the operations selected from the group consisting 30 AVER EXHIBIT 1020 Page 34 of 98	j) displaying and/or storing the manipulated series of frame images as an output video image without changing the resolution of the manipulated series of frame images, This limitation is the same as for claim 1. *See* Section IX.A.1.f; Ex. 1020, ¶90. k) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port. This limitation is the same as for claim 1. *See* Section IX.A.1.g; Ex. 1020, ¶91. **4. Claim 4** Claim 4 recites "The method of claim 3, wherein the personal processor is housed in an external personal computer, further comprising using an external personal computer to provide the processor used to manipulate the series of frame images." Morichika discloses that camera device 4 is connected to PC 2 via a USB cable 201 and USB port 30. Ex. 1002, ¶¶0028, 0038, Figs. 1 & 2. The personal processor, CPU 21, is housed in personal computer, PC 2. *Id.*, ¶0038. The personal computer is external to camera device 4, the image sensing unit. *See id.*, Fig. 1. PC2 provides the processor, CPU 21, used to manipulate the series of frame images since CPU 21 functions as a "converting means" and PC 2 "executes" the instructions to magnifying the image. *Id.*, ¶¶0041, 0058; Ex. 1020, ¶92-93. 35 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **5. Claim 5** Claim 5 recites "The method of claim 4 wherein the manipulation further comprises at least one of the operations selected from the group consisting of: re-

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 of: re-sizing the image; panning the image in a selected direction; rotating the image in a selected direction; and annotating the image." 95. Morichika discloses the ability to scroll or move the displayed image while in the zoomed in state. *Id.*, ¶0063. One of ordinary skill in the art would understand scrolling or moving the displayed image from one part of the image to another part of the image as "panning the image." Morichika discloses that a user can provide scrolling instruction by use of operation keys or the infrared remote control. *Id.*, ¶0063. As shown in Fig. 1, infrared remote control 5 provides arrow keys. One of ordinary skill in the art would find it obvious that the arrow keys could be used to allow the user to instruct the system to pan in a selected direction. 6. **Claim 7** 96. Claim 7 recites "The method of claim 5 wherein the at least one operation is conducted without changing a resolution of the output frame images." 97. Morichika discloses re-sizing and annotating the image without changing the resolution of the output frame images. The output frame images are the frame images displayed on projector 1. The resolution of the output frame images is fixed at the XGA resolution as that resolution is determined by the hardware of the projector. *Id.*, ¶0051. One of ordinary skill in the art would understand that the manipulations performed by the PC would not affect the resolution of the image that is projected by the projector. Therefore, the 31 AVER EXHIBIT 1020 Page 35 of 98	comprises at least one of the operations selected from the group consisting of: re-sizing the image; panning the image in a selected direction; rotating the image in a selected direction; and annotating the image." Morichika discloses the ability to scroll or move the displayed image while in the zoomed in state. Ex. 1002, ¶0063. One of ordinary skill in the art would understand scrolling or moving the displayed image from one part of the image to another part of the image as "panning the image." Ex. 1020, ¶¶94-95. Morichika discloses that a user can provide scrolling instruction by use of operation keys or the infrared remote control. Ex. 1002, ¶0063. As shown in Fig. 1, infrared remote control 5 provides arrow keys. One of ordinary skill in the art would find it obvious that the arrow keys could be used to allow the user to instruct the system to pan in a selected direction. Ex. 1020, ¶95. **6. Claim 7** Claim 7 recites "The method of claim 5 wherein the at least one operation is conducted without changing a resolution of the output frame images." Morichika discloses re-sizing and annotating the image without changing the resolution of the output frame images. The output frame images are the frame images displayed on projector 1. The resolution of the output frame images is fixed 36 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 at the XGA resolution as that resolution is determined by the hardware of the projector. Ex. 1002, ¶0051. One of ordinary skill in the art would understand that the manipulations performed by the PC would not affect the resolution of the image that is projected by the projector. Ex. 1020, ¶¶96-97. Therefore, the

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 manipulation of resizing the image during zooming and the manipulation of annotation is done without changing the resolution at which the image that is projected by the projector, i.e. the resolution of the output frame images. 7. **Claim 18** 98. In the previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 18 of the '751 Patent obvious. Ex. 1013, 14. To the extent that the Board decides, in contrast to the decision in IPR2016-00661, that the claim phrase "a series of real-time images" in claim 18 requires video images, a person of ordinary skill would have found it obvious to modify the Morichika device to use a video camera. *See* Section VII.B.1. **a) A document imaging apparatus comprising** 99. Morichika discloses the preamble language. Morichika teaches an apparatus that provides an image of document "A". Ex. 1002, ¶0048; Fig. 1. **b) a personal computer containing a software programming unit;** 100. Morichika discloses a laptop personal computer, PC 2. *Id.*, ¶0028; Fig. 1. PC 2 contains hard disk 23 which stores an image processing program for carrying out various imaging processing. *Id.*, ¶0040. Since this processing program is software, the image processing program is a software programming unit. 32 AVER EXHIBIT 1020 Page 36 of 98	manipulation of resizing the image during zooming and the manipulation of annotation is done without changing the resolution at which the image that is projected by the projector, i.e. the resolution of the output frame images. **7. Claim 18** In the previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 18 of the '751 Patent obvious. Ex. 1013, 14. To the extent that the Board decides, in contrast to the decision in IPR2016-00661, that the claim phrase "a series of real-time images" in claim 18 requires video images, a person of ordinary skill would have found it obvious to modify the Morichika device to use a video camera. *See* Section IX.A.1; Ex. 1020, ¶98. a) A document imaging apparatus comprising This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Morichika discloses the preamble language. Morichika teaches an apparatus that provides an image of document "A". Ex. 1002, ¶0048; Fig. 1; Ex. 1020, ¶99. 37 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 b) a personal computer containing a software programming unit; Morichika discloses a laptop personal computer, PC 2. Ex. 1002, ¶0028; Fig. 1. PC 2 contains hard disk 23 which stores an image processing program for carrying out various imaging processing. *Id.*, ¶0040. Since this processing program is software, the image processing program is a software programming unit. Ex. 1020, ¶100.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **c) a miniaturized digital image sensing unit externally coupled to the personal computer comprising optics having an infinite focal length;** 101. Morichika discloses the use of a CCD image sensor. *Id.*, ¶0044. The CCD sensor is contained within digital camera 4 which is connected to PC 2 via a USB cable. *Id.*, ¶¶ 0028, 0044, Fig. 1. Therefore the CCD sensor is externally coupled to the personal computer, i.e., the CCD sensor is external to the personal computer. *See id.*, Fig. 1. 102. One of ordinary skill in the art would appreciate implementing a flat piece of glass, as a protective element over the CCD image sensor. This obvious design choice renders the CCD image sensor in Morichika as "comprising optics having an infinite focal length." Furthermore, Morichika discloses that the "CCD sensor [has] four million pixels." *Id.*, ¶0044. One of ordinary skill in the art would understand that a four million pixel sensor, such as the CCD image sensor in Morichika, has a "focal length ensuring objects appearing under the facing down digital image sensing unit appear focused and sharp even when the digital image sensing unit is substantially far away." 103. For these reasons, the CCD image sensor in Morichika qualifies as a "miniaturized digital image sensing unit … comprising optics having an infinite focal length." *See* Section VI.B.5. 33 AVER EXHIBIT 1020 Page 37 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 b) a personal computer containing a software programming unit; Morichika discloses a laptop personal computer, PC 2. Ex. 1002, ¶0028; Fig. 1. PC 2 contains hard disk 23 which stores an image processing program for carrying out various imaging processing. *Id.*, ¶0040. Since this processing program is software, the image processing program is a software programming unit. Ex. 1020, ¶100. c) a miniaturized digital image sensing unit externally coupled to the personal computer comprising optics having an infinite focal length; Morichika discloses the use of a CCD image sensor. Ex. 1002, ¶0044; Ex. 1020, ¶101. The CCD sensor is contained within digital camera 4 which is connected to PC 2 via a USB cable. Ex. 1002, ¶¶0028, 0044, Fig. 1. Therefore the CCD sensor is externally coupled to the personal computer, i.e., the CCD sensor is external to the personal computer. *See id.*, Fig. 1. Further, a CCD image sensor qualifies as a "miniaturized digital image sensing unit…comprising optics having an infinite focal length." *See* Section VII.E. In particular, under PO's proposed construction of "optics having an infinite focal length," Morichika renders the limitation obvious because it discloses a system where a CCD sensor positioned relatively far away from the document to be imaged can display the document clearly. *Id.*, ¶¶28, 44, Ex. 1020, ¶¶31-33, 101-03. In addition, under PO's interpretation of the ITC's construction of "optics 38

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d) wherein the personal computer is configured to control all actions of the miniaturized digital image sensing unit and

104. The CPU 21 in PC 2 functions as a "control means." Ex. 1002, ¶0041. Further, the camera device 4 is attached to PC2 via an USB interface. *Id.*, ¶¶0028, 0038, 0045. One of ordinary skill in the art would have found it obvious that the camera device acts as the USB slave unit while PC2 acts as the USB master unit because the PC generally serves as the master device whereas a peripheral such as camera device 4 serves as a slave device. One of ordinary skill in the art would understand that the master device is the controlling device.

e) cause the digital imaging unit to zoom in or zoom out in real-time while maintaining a resolution of a series of real-time images;

105. Morichika teaches the ability to zoom in or out. Morichika discloses a process for "magnifying an image," i.e., zoom in. *Id.*, ¶¶0058-0061. Morichika also teaches the process of reducing the image, i.e., zoom out. *Id.*, ¶0063. The zoom in and out process is executed by PC 2. *Id.*, ¶0058.

106. Morichika also discloses that the zooming function is performed in response to a user request. For example, Morichika teaches the "operation for magnifying an image that the PC 2 executes, when there is an instruction to enlarge the display image G3 from the user, by operation of operation keys or the infrared remote control unit 5, while the display image G3 is projected by the projector 1."

d) wherein the personal computer is configured to control all actions of the miniaturized digital image sensing unit and

The CPU 21 in PC 2 functions as a "control means." Ex. 1002, ¶0041. Further, the camera device 4 is attached to PC2 via an USB interface. *Id.*, ¶¶0028, 0038, 0045. One of ordinary skill in the art would have found it obvious that the camera device acts as the USB slave unit while PC2 acts as the USB master unit because the PC generally serves as the master device whereas a peripheral such as camera device 4 serves as a slave device. Ex. 1020, ¶104. One of ordinary skill in the art would understand that the master device is the controlling device. *Id.*

e) cause the digital imaging unit to zoom in or zoom out in real-time while maintaining a resolution of a series of real-time images;

Morichika teaches the ability to zoom in or out. Morichika discloses a process for "magnifying an image," i.e., zoom in. Ex. 1002, ¶¶0058-0061; Ex. 1020, ¶105. Morichika also teaches the process of reducing the image, i.e., zoom out. Ex. 1002, ¶0063. The zoom in and out process is executed by PC 2. *Id.*, ¶0058.

Morichika also discloses that the zooming function is performed in response to a user request. For example, Morichika teaches the "operation for magnifying an image that the PC 2 executes, when there is an instruction to enlarge the display image G3 from the user, by operation of operation keys or the infrared remote control unit 5, while the display image G3 is projected by the projector 1." *Id.*,

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 *Id.*, ¶0058. One of ordinary skill in the art would find it obvious that zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system with an infrared remote control unit. 107. Morichika discloses "to-be-projected images." *Id.*, ¶0040 (emphasis added). These images to be projected form a series of frame images.[2] In addition, Morichika teaches that the image captured by the camera device can be projected in "real-time." Ex. 1002, ¶0065. 108. Finally, the zooming manipulation is done "while maintaining a resolution of a series of real-time images." In other words, when the manipulation is done, the original to-be-projected images are not altered, destroyed, or changed. This is illustrated in Fig. 11 where the resolution of the to-be-projected image G2 remains unaltered during the zooming manipulations shown. Further, Morichika also teaches the ability to scroll or move across the display image after performing the magnifying process. *Id.*, ¶0063. Morichika explains that the scrolling process requires the PC processor to re-obtain a display region Q and to repeat steps SC3 to SC5 of Fig. 10. *Id.* As one of ordinary skill in the art would understand, re- [2] In its institution decision in IPR2016-00661, the Board found that the disclosure of "to-be-projected images" satisfies the "series of real-time images" limitation. Ex. 1013, 10. 35 AVER EXHIBIT 1020 Page 39 of 98	¶0058. One of ordinary skill in the art would find it obvious that zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system with an infrared remote control unit. Ex. 1020, ¶106. 40 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 Morichika discloses "to-be-projected images." Ex. 1002, ¶0040. These images to be projected form a series of frame images.[6] In addition, Morichika teaches that the image captured by the camera device can be projected in "real-time." Ex. 1002, ¶0065; Ex. 1020, ¶107. Finally, the zooming manipulation is done "while maintaining a resolution of a series of real-time images." In other words, when the manipulation is done, the original to-be-projected images are not altered, destroyed, or changed. This is illustrated in Fig. 11 where the resolution of the to-be-projected image G2 remains unaltered during the zooming manipulations shown. Further, Morichika also teaches the ability to scroll or move across the display image after performing the magnifying process. *Id.*, ¶0063. Morichika explains that the scrolling process requires the PC processor to re-obtain a display region Q and to repeat steps SC3 to SC5 of Fig. 10. *Id.* As one of ordinary skill in the art would understand, re-obtaining the a display region Q and repeating steps SC3 to SC5 requires that the to-be-projected G2 image exist in its original resolution even after PC2 performs [6] In its institution decision in IPR2016-00661, the Board found that the disclosure of "to-be-projected images" satisfies the "series of real-time images" limitation. Ex. 1013, 10.

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obtaining the a display region Q and repeating steps SC3 to SC5 requires that the to-be-projected G2 image exist in its original resolution even after PC2 performs the magnifying process. Therefore, the zooming processing was done while maintaining a resolution of a series of real-time images, i.e., the resolution of the G2 images to be projected.

f) in the case of the resolution of the series of real-time images having a higher resolution than a reference resolution, reducing the resolution of each of the series of real-time images to that of the reference resolution;

109. This limitation is essentially the same limitation as in claim 1. See Section VII.B.1.e. The only difference is in the use of "series of real-time images" in this limitation versus "manipulated series of frame images" in claim 1.

110. As with claim 1, the reference resolution is the standard XGA resolution of the projector. Ex. 1002, ¶0052. As discussed above, the series of real-time images are the "to-be-projected image**s**" disclosed by Morichika. *Id.*, ¶0040 (emphasis added). The resolution of these to-be-projected images is either G1 or G2. *Id.*, ¶0050. The resolution of G2 is 1500x2000 pixels and the resolution of G1 is larger. *Id.*, ¶¶0061, 0050, Fig. 6. The resolution of both G1 and G2 is higher than the XGA reference resolution of 768x1024. *Id.*, ¶0052. Morichika teaches reducing the resolution of G1 or G2 to the XGA resolution, i.e., G4. *Id.*, ¶¶0050, 0061-0062, Figs. 6 & 11.

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the magnifying process. Ex. 1020, ¶108. Therefore, the zooming processing was done while maintaining a resolution of a series of real-time images, i.e., the resolution of the G2 images to be projected.

f) in the case of the resolution of the series of real-time images having a higher resolution than a reference resolution, reducing the resolution of each of the series of real-time images to that of the reference resolution;

This limitation is essentially the same limitation as in claim 1. *See* Section IX.A.1.e. The only difference is in the use of "series of real-time images" in this limitation versus "manipulated series of frame images" in claim 1.

As with claim 1, the reference resolution is the standard XGA resolution of the projector. Ex. 1002, ¶0052. As discussed above, the series of real-time images are the "to-be-projected image**s**" disclosed by Morichika. *Id.*, ¶0040. The resolution of these to-be-projected images is either G1 or G2. *Id.*, ¶0050. The resolution of G2 is 1500x2000 pixels and the resolution of G1 is larger. *Id.*, ¶¶0061, 0050, Fig. 6. The resolution of both G1 and G2 is higher than the XGA reference resolution of 768x1024. *Id.*, ¶0052. Morichika teaches reducing the resolution of G1 or G2 to the XGA resolution, i.e., G4. *Id.*, ¶¶0050, 0061-0062, Figs. 6 & 11; Ex. 1020, ¶¶109-10.

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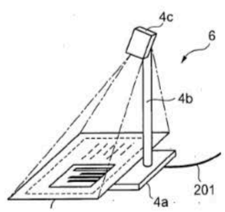
g) a display for displaying the images; and

111. Morichika discloses "display device 27" or "projector 1" with "screen S" for displaying the images. *Id.*, ¶¶0029, 0032, 0048, 0051, Fig. 1, Fig. 5, Step SA6.

h) a suspension arm for supporting the digital imaging unit at a distance from a target to be imaged.

112. Morichika discloses "strut 4b," which is a suspension arm for supporting the digital imaging unit, digital camera 4c comprising a CCD, at a distance from target, document A, to be imaged. *Id.*, ¶¶0030-0032, 0044. The setup Morichika teaches is illustrated in Fig. 1, reproduced below.



113. As shown in the above figure, strut 4b suspends digital camera 4c above base 4a and therefore strut 4b is a "suspension arm" for supporting the digital imaging unit.

8. **Claim 20**

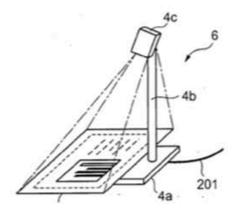
114. In the previous IPR2016-00661 institution decision, the Board found a

g) a display for displaying the images; and

Morichika discloses "display device 27" or "projector 1" with "screen S" for displaying the images. Ex. 1002, ¶¶0029, 0032, 0048, 0051, Fig. 1, Fig. 5, Step SA6; Ex. 1020, ¶111.

h) a suspension arm for supporting the digital imaging unit at a distance from a target to be imaged.

Morichika discloses "strut 4b," which is a suspension arm for supporting the digital imaging unit, digital camera 4c comprising a CCD, at a distance from target, document A, to be imaged. Ex. 1002, ¶¶0030-0032, 0044; Ex. 1020, ¶¶112-13. The setup Morichika teaches is illustrated below.



As shown, strut 4b suspends digital camera 4c above base 4a and therefore strut 4b is a "suspension arm" for supporting the digital imaging unit.

8. Claim 20

In the previous IPR2016-00661 institution decision, the Board found a reasonable likelihood had been shown that Morichika renders claim 20 of the '751 Patent obvious. Ex. 1013, 14.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 reasonable likelihood had been shown that Morichika renders claim 20 of the '751 Patent obvious. Ex. 1013, 14. 115. Claim 20 recites "The document imaging apparatus as recited in claim 18 wherein the processor is housed in an external personal computing system." The phrase "the processor" in this limitation has no antecedent basis. The phrase "external personal computer system" is ambiguous because there is no reference point specified for the term "external." Nevertheless, under any reasonable interpretation of this claim, CPU 21 housed in PC2 satisfies claim 20. Ex. 1002, ¶0038; *see also* Section VII.B.4. C. **Krisbergh in View of Hara Renders Claims 8-10, 12, 14, and 16 Obvious** 116. In the previous IPR2016-00661 institution decision, the Board considered the Hara reference in conjunction with the Morichika and Novak references. Ex. 1013, 15, 19. The Board was not persuaded by Petitioner Qomo's arguments for combining Morichika and Novak with Hara because Petitioner Qomo did not provide a rationale for combining Morichika's still-image processing with Hara's video input. *Id.*, 16, 20. This petition does not combine Morichika and Hara, but instead combines Krisbergh with Hara. Since both Hara and Krisbergh teach the use of video, this petition does not combine still-image processing with video input as was done in the Qomo Petition. As I understand, the Board has never considered the argument that Krisbergh in view of Hara renders 38 AVER EXHIBIT 1020 Page 42 of 98	Claim 20 recites "The document imaging apparatus as recited in claim 18 wherein the processor is housed in an external personal computing system." Petitioner believes that the phrase "the processor" in this limitation has no antecedent basis. Petitioner also believes that the phrase "external personal computer system" is ambiguous because there is no reference point specified for the term "external." Nevertheless, under any reasonable interpretation of this claim, CPU 21 housed in PC2 satisfies claim 20. Ex. 1002, ¶0038; Ex. 1020, ¶114-15; Section IX.A.4. B. **Ground 2: Krisbergh in View of Hara Renders Claims 8-10, 12, 14, and 16 Obvious** In the previous IPR2016-00661 institution decision, the Board considered the Hara reference in conjunction with the Morichika and Novak references. Ex. 1013, 15, 19; Ex. 1020, ¶116. The Board was not persuaded by Petitioner Qomo's arguments for combining Morichika and Novak with Hara because Petitioner Qomo did not provide a rationale for combining Morichika's still-image processing with Hara's video input. Ex. 1013, 16, 20. This Petition does not combine Morichika and Hara, but instead combines Krisbergh with Hara. Since both Hara and Krisbergh teach the use of video, this Petition does not combine still-image processing with video input as was done in the Qomo Petition. Thus, 44 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 the Board has never considered the argument that Krisbergh in view of Hara renders claims 8-10, 12, 14, and 16 of the '751 Patent obvious.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 claims 8-10, 12, 14, and 16 of the '751 Patent obvious. 117. Krisbergh teaches a personal videotelephone system comprising a number of videophones. Ex. 1003, Abstract. The videophones or subscribers are connected via a communications network 110. *Id.*, 3:1-11; Fig. 1. Krisbergh also teaches the use of network operations centers (NOC) also connected to the communications network to store information associated with subscribers. *Id.*, 5:9-40. 118. Hara also discloses a visual telephone system for use in teleconference. Ex. 1004, ¶¶0003-0006. This visual telephone system includes communications terminals, such as portable terminal 12, interconnected by a communications network. *Id.*, ¶0005-0006, 0039-0045, Fig. 1. Further, Hara teaches the use of a communication management center to control data communications. *Id.*, ¶0042. The object of the Hara invention is to reduce data volume transmitted on the communications network by matching the resolution of the transmitted image with that of the display device. *Id.*, ¶ 0012. 119. One of ordinary skill in the art would have found it obvious to incorporate Hara's technique for reducing the volume of transmitted data into the videophone system taught by Krisbergh. Krisbergh specifically mentions that the amount of available bandwidth within the communications network is a concern. Ex. 1003, 17:14-19. Specifically, if sufficient bandwidth in the network is not 39 AVER EXHIBIT 1020 Page 43 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 the Board has never considered the argument that Krisbergh in view of Hara renders claims 8-10, 12, 14, and 16 of the '751 Patent obvious. Krisbergh teaches a personal videotelephone system comprising a number of videophones. Ex. 1003, Abstract; Ex. 1020, ¶117. The videophones or subscribers are connected via a communications network 110. Ex. 1003, 3:1-11; Fig. 1. Krisbergh also teaches the use of NOC also connected to the communications network to store information associated with subscribers. *Id.*, 5:9-40. Hara also discloses a visual telephone system for use in teleconference. Ex. 1004, ¶¶0003-0006. This visual telephone system includes communications terminals, such as portable terminal 12, interconnected by a communications network. *Id.*, ¶¶0005-0006, 0039-0045, Fig. 1. Further, Hara teaches the use of a communication management center to control data communications. *Id.*, ¶0042. The object of the Hara invention is to reduce data volume transmitted on the communications network by matching the resolution of the transmitted image with that of the display device. *Id.*, ¶0012; Ex. 1020, ¶118. One of ordinary skill in the art would have found it obvious to incorporate Hara's technique for reducing the volume of transmitted data into the videophone system taught by Krisbergh. Krisbergh specifically mentions that the amount of available bandwidth within the communications network is a concern. Ex. 1003, 17:14-19. Specifically, if sufficient bandwidth in the network is not available, a 45

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 available, a call cannot be completed or completed with reduced quality. *Id.*, 17:26-43. Hara's technique directly addresses this bandwidth concern by reducing the amount of data that needs to be transmitted to complete a video call; therefore, one of ordinary skill in the art would have found it obvious to employ Hara's technique within the communication system disclosed by Krisbergh to yield a predictable result. In fact, given the disclosures of Hara and Krisbergh, it would have been obvious to try implementing a bandwidth reduction technique, identified in Hara, for a videophone such as that in Krisbergh. Further, one of ordinary skill in the art would have had an expectation of success in combining Krisbergh with Hara since the systems disclosed are quite similar. 1. **Claim 8** **a) A method of acquiring an image of a target comprising:** 120. Krisbergh discloses a method of acquiring an image of a target. Krisbergh discloses a camera for use in a videophone. *Id.*, 2:37-44, 9:30-33. The camera is used to acquire an image of a target. For example, Fig. 3 shows the image of the caller acquired by a videophone camera. **b) determining a reference resolution at which each frame image of a series of frame images will be maintained and** 121. Hara teaches a method of reducing data transmission volume by 40 AVER EXHIBIT 1020 Page 44 of 98	call cannot be completed or completed with reduced quality. *Id*., 17:26-43. Hara's technique directly addresses this bandwidth concern by reducing the amount of data that needs to be transmitted to complete a video call; therefore, one of ordinary skill in the art would have found it obvious to employ Hara's technique within the communication system disclosed by Krisbergh to yield a predictable result. Ex. 1020, ¶119. In fact, given the disclosures of Hara and Krisbergh, it would have been obvious to try implementing a bandwidth reduction technique, identified in Hara, for a videophone such as that in Krisbergh. *Id*. Further, one of ordinary skill in the art would have had an expectation of success in combining Krisbergh with Hara since the systems disclosed are quite similar. *Id*. **1. Claim 8** a) A method of acquiring an image of a target comprising: This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Krisbergh discloses a method of acquiring an image of a target. Krisbergh discloses a camera for use in a videophone. Ex. 1003, 2:37-44, 9:30-33. The camera is used to acquire an image of a target. Ex. 1020, ¶120. For example, Fig. 3 shows the image of the caller acquired by a videophone camera. *Id*. 46 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 b) determining a reference resolution at which each frame image of a series of frame images will be maintained and Hara teaches a method of reducing data transmission volume by matching

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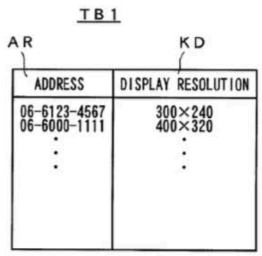
matching the resolution of the transmitted image with the resolution of destination display device. Ex. 1004, ¶0012. Hara accomplishes this reduction by means of a table of display resolutions such as shown in Fig. 5 of Hara. *Id.*, ¶0067.



When calling a destination, a "display resolution is obtained by referring" to the above display resolution table TB1. *Id.*, ¶0069. Therefore, the display resolutions in the above table are "reference resolutions" because they are referred to. Specifically, Hara discloses that the portable terminal is equipped with an LCD display screen, LCD 41, with a resolution of 320x240 pixels. *Id.*, ¶0059, Fig. 2. This 320x240 resolution is a reference resolution because it is the resolution of the display of a portable terminal within the communication system.

122. Hara discloses multiple methods of determining the display resolution within table TB1. For example, the portable terminal determines the display resolution using a protocol when establishing a call, or is manually entered by the user, or is estimated using information transmitted from the destination. *Id.*,

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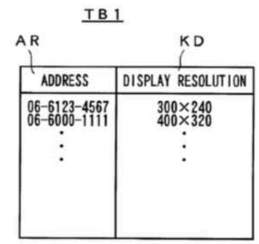
Hara teaches a method of reducing data transmission volume by matching the resolution of the transmitted image with the resolution of destination display device. Ex. 1004, ¶0012. Hara accomplishes this reduction by means of a table of display resolutions such as shown in Fig. 5 of Hara. *Id.*, ¶0067, Ex. 1020, ¶121.



When calling a destination, a "display resolution is obtained by referring" to the above display resolution table TB1. Ex. 1004, ¶0069. Therefore, the display resolutions in the table are "reference resolutions" because they are referred to. Specifically, Hara discloses that the portable terminal is equipped with an LCD display screen, LCD 41, with a resolution of 320x240 pixels. *Id.*, ¶0059, Fig. 2. This 320x240 resolution is a reference resolution because it is the resolution of the display of a portable terminal within the communication system. Ex. 1020, ¶121.

Hara discloses multiple methods of determining the display resolution within table TB1. *Id.*, ¶122. For example, the portable terminal determines the display

resolution using a protocol when establishing a call, or is manually entered by the user, or is estimated using information transmitted from the destination. Ex. 1004,

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 ¶¶0068-0072. In addition, Hara discloses the communication management center 10 is capable of determining the display resolution, i.e., the reference resolution. *Id.*, ¶¶0080-0081. 123. A display resolution in table TB1 is the resolution of the display of the destination device. *Id.*, ¶¶0067-0068. Therefore, video displayed at the destination device will be "maintained" at the reference resolution. As one of ordinary skill understands, video is a series of frame images. Krisbergh mentions the use of video formatted in various standards including MPEG. Ex. 1003, 4:35-39. One of ordinary skill in the art would understand that MPEG video is composed of a series of "I" frame images. *See id.*, 12:20-22. Therefore, when displaying at the display resolution in table TB1, each frame image of the video is maintained at the display resolution. **c) storing the reference resolution in a non-transitory medium;** 124. Hara discloses that users may manually input data to populate the information contained in table TB1, and that the resolutions of the destination can be "easily and rapidly" obtained from the table. Ex. 1004, ¶0068. Hara does not explicitly disclose how or where the table is stored. However, one of ordinary skill in the art would understand that there are two mutually exclusive choices regarding the nature of the medium in which table TB1 is stored: either the medium is 42 AVER EXHIBIT 1020 Page 46 of 98	¶¶0068-0072. In addition, Hara discloses the communication management center 10 is capable of determining the display resolution, i.e., the reference resolution. *Id.*, ¶¶0080-0081. A display resolution in table TB1 is the resolution of the display of the destination device. *Id.*, ¶¶0067-0068; Ex. 1020, ¶123. Therefore, video displayed at the destination device will be "maintained" at the reference resolution. As one of ordinary skill understands, video is a series of frame images. Ex. 1020, ¶123. Krisbergh mentions the use of video formatted in various standards including MPEG. Ex. 1003, 4:35-39. One of ordinary skill in the art would understand that MPEG video is composed of a series of "I" frame images. *See id.*, 12:20-22; Ex. 1020, ¶123. Therefore, when displaying at the display resolution in table TB1, each frame image of the video is maintained at the display resolution. c) storing the reference resolution in a non-transitory medium; Hara discloses that users may manually input data to populate the information contained in table TB1, and that the resolutions of the destination can be "easily and rapidly" obtained from the table. Ex. 1004, ¶0068. Hara does not explicitly disclose how or where the table is stored. However, one of ordinary skill in the art would understand that there are two mutually exclusive choices regarding 48 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 the nature of the medium in which table TB1 is stored: either the medium is

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 transitory or non-transitory. One of ordinary skill in the art would have found it obvious to store the table in a non-transitory medium because a table stored in transitory medium would be lost every time the device is turned off or the device experiences a loss of power. Such a situation would not accomplish the goal of having the display resolutions easily and rapidly obtainable from the table. 125. Further, Krisbergh teaches the use of directories and personal profiles that have similar characteristics to the resolution table disclosed by Hara. Ex. 1003, 11:11-35; 13:15-25. These directories Krisbergh teaches consist of subscriber names, corresponding telephone numbers, and one or more images associated with the person, place or telephone number. *Id.*, 11:11-17. These directories are stored at the videophone locally in a "smart card." *Id.*, 12:11-16. One of ordinary skill in the art would understand that a smart card is a non-transitory medium. One of ordinary skill in the art would also find it obvious to place the display resolution information within the directory listing as well since the table disclosed by Hara is essentially a directory of subscribers. **d) capturing a video image comprising the series of frame images in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning and** 126. Krisbergh discloses a videophone which includes a video camera to make a video call. *Id.*, 2:37-49; 9:4-5. Krisbergh further teaches the use of 43 AVER EXHIBIT 1020 Page 47 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 the nature of the medium in which table TB1 is stored: either the medium is transitory or non-transitory. Ex. 1020, ¶124. One of ordinary skill in the art would have found it obvious to store the table in a non-transitory medium because a table stored in transitory medium would be lost every time the device is turned off or the device experiences a loss of power. *Id*. Such a situation would not accomplish the goal of having the display resolutions easily and rapidly obtainable from the table. Further, Krisbergh teaches the use of directories and personal profiles that have similar characteristics to the resolution table disclosed by Hara. Ex. 1003, 11:11-35; 13:15-25. These directories Krisbergh teaches consist of subscriber names, corresponding telephone numbers, and one or more images associated with the person, place or telephone number. *Id*., 11:11-17. These directories are stored at the videophone locally in a "smart card." *Id*., 12:11-16. One of ordinary skill in the art would understand that a smart card is a non-transitory medium. Ex. 1020, ¶125. One of ordinary skill in the art would also find it obvious to place the display resolution information within the directory listing as well since the table disclosed by Hara is essentially a directory of subscribers. *Id*. d) capturing a video image comprising the series of frame images in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning and Krisbergh discloses a videophone which includes a video camera to make a video call. Ex. 1003, 2:37-49; 9:4-5. Krisbergh further teaches the use of standards 49

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 standards such as H.264 and MPEG, which are video standards. *Id.*, 4:35-39. Hara also teaches capturing a video image. Hara discloses that a personal computer may be used as a communication terminal and that such personal computer comprises a "video camera" with a "video capture board." Ex. 1004, ¶0045. The video camera in conjunction with the video capture board is capturing a video image. 127. One of ordinary skill in the art would understand that the video image captured by the video capture board would comprise a series of frame images. For example, video in the MPEG format comprises a series of "I" frame images. 128. Krisbergh discloses the use of a "conventional" CCD video camera. Ex. 1003, 9:30-33. Whether a conventional video camera uses a full image snapshot or a line-by-line scanned snapshot is an obvious design choice to those skilled in the art. Therefore, one of ordinary skill in the art would understand that a CCD image sensor will capture each frame image of the video "in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning." **e) using an external processor to compare a resolution of each frame image of the video image with the reference resolution and adjusting the resolution of each frame image to correspond to the reference resolution; and** 129. Hara teaches when transmitting image data, converting the resolution of the image data to a lower resolution corresponding to the resolution of the 44 AVER EXHIBIT 1020 Page 48 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 such as H.264 and MPEG, which are video standards. *Id.*, 4:35-39. Hara also teaches capturing a video image. Hara discloses that a personal computer may be used as a communication terminal and that such personal computer comprises a "video camera" with a "video capture board." Ex. 1004, ¶0045. The video camera in conjunction with the video capture board is capturing a video image. Ex. 1020, ¶126. One of ordinary skill in the art would understand that the video image captured by the video capture board would comprise a series of frame images. *Id.*, ¶127. For example, video in the MPEG format comprises a series of "I" frame images. Krisbergh discloses the use of a "conventional" CCD video camera. Ex. 1003, 9:30-33. Whether a conventional video camera uses a full image snapshot or a line-by-line scanned snapshot is an obvious design choice to those skilled in the art. Ex. 1020, ¶128. Therefore, one of ordinary skill in the art would understand that a CCD image sensor will capture each frame image of the video "in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning." *Id.* 50 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 e) using an external processor to compare a resolution of each frame image of the video image with the reference resolution and adjusting the resolution of each frame image to correspond to the reference resolution; and Hara teaches when transmitting image data, converting the resolution of the image data to a lower resolution corresponding to the resolution of the display

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 display device of the destination. Ex. 1004, ¶0087. The resolution of the destination display device is obtained from the resolution table discussed above in Section VII.C.1.b. *See id.*, ¶0088. The resolution of display device is therefore the reference resolution, e.g. the resolution of LCD 41. Hara teaches that image data can be read out of the image sensor at maximum resolution and be converted to a lower resolution at a resolution conversion section. *Id.*, ¶0090. Hara teaches that the resolution conversion section can use a variety of methods to convert resolution. *Id.*, ¶0065. Therefore, Hara teaches adjusting each frame image to correspond to the reference resolution. *See also id.*, ¶0115 ("the resolution of the image data is converted so as to match the resolution of the LCD 41"). 130. One of ordinary skill in the art would understand that before converting the resolution, a determination should be made to assess whether conversion is necessary. For example, as shown in Fig. 22, step #236 of the process of converting the resolution begins with a preliminary check on whether the image resolution is greater than the display resolution. *Id.*, ¶0128. If the image resolution is greater, the image size is reduced. *Id.*, ¶0128, Fig. 22. Therefore, Hara teaches comparing the resolution of the received image frame with the reference resolution and adjusting the resolution of each frame image to correspond to the reference resolution. 131. Hara teaches that the comparison and resolution conversion can 45 AVER EXHIBIT 1020 Page 49 of 98	image data to a lower resolution corresponding to the resolution of the display device of the destination. Ex. 1004, ¶0087. The resolution of the destination display device is obtained from the resolution table, discussed in Section IV.B.1.b. The resolution of display device is therefore the reference resolution, e.g. the resolution of LCD 41. Hara teaches that image data can be read out of the image sensor at maximum resolution and be converted to a lower resolution at a resolution conversion section. *Id.*, ¶0090. Hara teaches that the resolution conversion section can use a variety of methods to convert resolution. *Id.*, ¶0065; Ex. 1020, ¶129. Therefore, Hara teaches adjusting each frame image to correspond to the reference resolution. Ex. 1004, ¶0115 ("the resolution of the image data is converted so as to match the resolution of the LCD 41"). One of ordinary skill in the art would understand that before converting the resolution, a determination should be made to assess whether conversion is necessary. Ex. 1020, ¶130. For example, as shown in Fig. 22, step #236 of the process of converting the resolution begins with a preliminary check on whether the image resolution is greater than the display resolution. Ex. 1004, ¶0128. If the 51 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 image resolution is greater, the image size is reduced. *Id.*, ¶0128, Fig. 22. Therefore, Hara teaches comparing the resolution of the received image frame with the reference resolution and adjusting the resolution of each frame image to correspond to the reference resolution. Hara teaches that the comparison and resolution conversion can happen at

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 happen at the communication management center, which corresponds to the CATV headend or network operations center (NOC) of Krisbergh. *Id.*, ¶¶0078-0086, 0116, 0126, Figs. 7 & 22; Ex. 1003, 3:37-5:9-63. If the conversion occurs at the communication management center or NOC, the comparison and adjustment of resolution occurs on an external processor, since the communication management center is external to the portable terminal and the video camera of the portable terminal or videophone. Ex. 1004, Fig. 1. It is obvious that the image conversion is performed on some sort of processor at the communication management center, the CATV headend, or NOC. **f) after comparing the resolution of each frame image, storing and/or displaying in real-time each frame image on a display.** 132. The phrase "storing and/or displaying" is satisfied by displaying or storing alone. Hara discloses that after the video frames are converted to match the resolution of LCD 41, the portable terminal displays the video image. *Id.*, ¶¶0097, 0113, Fig. 17. Krisbergh also discloses a display in the form a conventional LCD to display images of the calling and called parties. Ex. 1003, 10:37-43. Krisbergh teaches that the display video is a "live image" of the calling party. *Id.*, 16:51-52. As one of ordinary skill in the art would understand, a live video image is the same as displaying in real-time each frame image. 46 AVER EXHIBIT 1020 Page 50 of 98	Hara teaches that the comparison and resolution conversion can happen at the communication management center, which corresponds to the CATV headend or NOC of Krisbergh. *Id.*, ¶¶0078-0086, 0116, 0126, Figs. 7 & 22; Ex. 1003, 3:37-5:9-63. If the conversion occurs at the communication management center or NOC, the comparison and adjustment of resolution occurs on an external processor, since the communication management center is external to the portable terminal and the video camera of the portable terminal or videophone. Ex. 1004, Fig. 1; Ex. 1020, ¶131. It is obvious that the image conversion is performed on some sort of processor at the communication management center, the CATV headend, or NOC. Ex. 1020, ¶131. f) after comparing the resolution of each frame image, storing and/or displaying in real-time each frame image on a display. The phrase "storing and/or displaying" is satisfied by displaying or storing alone. Hara discloses that after the video frames are converted to match the resolution of LCD 41, the portable terminal displays the video image. Ex. 1004, ¶¶0097, 0113, Fig. 17. Krisbergh also discloses a display in the form a 52 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 conventional LCD to display images of the calling and called parties. Ex. 1003, 10:37-43. Krisbergh teaches that the display video is a "live image" of the calling party. *Id.*, 16:51-52. As one of ordinary skill in the art would understand, a live video image is the same as displaying in real-time each frame image. Ex. 1020, ¶132.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 2. **Claim 9** 133. Claim 9 recites "The method of claim 8 wherein the external processor is housed in a personal computer." According to claim 8, the external processor is used to compare and adjust the resolution of the video frames. Hara teaches that the resolution conversion can occur at the communication management center 10. Ex. 1004, ¶¶0078-0081, 0126, 0133, Figs. 7 & 22. In addition, one of ordinary skill in the art would have found it obvious for the personal computer terminal, labelled 15 in Fig. 1 of Hara, or the videophone interface unit, labelled 210 in Fig. 2 of Krisbergh, to also be able to convert resolutions since that furthers the goal of reducing data transmission volume. 134. Krisbergh discloses that the CATV headend includes a processor housed within a personal computer (PC). Ex. 1003, 5:20-27. One of ordinary skill in the art would find it obvious to use such an external processor to perform resolution conversion. Therefore, Krisbergh in view of Hara teaches the external processor housed in a personal computer. 3. **Claim 10** 135. Claim 10 recites "The method of claim 8 further comprising when displaying each frame image on a display re-sizing the image without changing a resolution of the output frame images." 136. Krisbergh teaches the ability of the videophone to perform "Electronic 47 AVER EXHIBIT 1020 Page 51 of 98	**2. Claim 9** Claim 9 recites "The method of claim 8 wherein the external processor is housed in a personal computer." According to claim 8, the external processor is used to compare and adjust the resolution of the video frames. Hara teaches that the resolution conversion can occur at the communication management center 10. Ex. 1004, ¶¶0078-0081, 0126, 0133, Figs. 7 & 22. In addition, one of ordinary skill in the art would have found it obvious for the personal computer terminal, labelled 15 in Fig. 1 of Hara, or the videophone interface unit, labelled 210 in Fig. 2 of Krisbergh, to also be able to convert resolutions since that furthers the goal of reducing data transmission volume. Ex. 1020, ¶133. Krisbergh discloses that the CATV headend includes a processor housed within a personal computer (PC). Ex. 1003, 5:20-27. One of ordinary skill in the art would find it obvious to use such an external processor to perform resolution conversion. Ex. 1020, ¶134. Therefore, Krisbergh in view of Hara teaches the external processor housed in a personal computer. 53 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **3. Claim 10** Claim 10 recites "The method of claim 8 further comprising when displaying each frame image on a display re-sizing the image without changing a resolution of the output frame images." Krisbergh teaches the ability of the videophone to perform "Electronic Pan

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 Pan Zoom." *Id.*, 9:30-41. In one mode, a "zoomed out image is provided by taking the entire high-resolution image and converting it to the desired lower target resolution." *Id.* One of ordinary skill in the art would find this conversion from high resolution to lower target resolution as a "re-sizing" of the image. 137. This re-sizing operation is done without changing the resolution of the output frame images. The resolution of the output frame images is set to the resolution of the LCD screen, i.e. 320x240 pixels. *See* Ex. 1004, ¶0059. Image processing, including re-sizing, will not change the resolution of output frame image since that resolution is set by the hardware characteristics of the LCD screen. 4. **Claim 12** 138. Claim 12 recites "The method of claim 8 further comprising when displaying each frame image on a display panning the image in a selected direction without changing a resolution of the output frame images." 139. Krisbergh teaches the ability of the videophone to perform "Electronic Pan Zoom." Ex. 1003, 9:30-41. In one embodiment, first the center portion of the high-resolution image is selected and then a user can pan right and tilt upwards on the image to obtain the upper-left portion of the high-resolution image. *Id.* Panning right and tilting upwards are directed "selected" by the user. *Id.*, 9:36-38. These panning and tilting operations do not change the resolution of the output frame 48 AVER EXHIBIT 1020 Page 52 of 98	Krisbergh teaches the ability of the videophone to perform "Electronic Pan Zoom." Ex. 1003, 9:30-41. In one mode, a "zoomed out image is provided by taking the entire high-resolution image and converting it to the desired lower target resolution." *Id*. This conversion from high resolution to lower target resolution is a "re-sizing" of the image under the broadest reasonable interpretation of that claim language. Ex. 1020, ¶135-36. This re-sizing operation is done without changing the resolution of the output frame images. The resolution of the output frame images is set to the resolution of the LCD screen, i.e. 320x240 pixels. Ex. 1004, ¶0059. Image processing, including re-sizing, will not change the resolution of output frame image since that resolution is set by the hardware characteristics of the LCD screen. Ex. 1020, ¶137. **4. Claim 12** Claim 12 recites "The method of claim 8 further comprising when displaying each frame image on a display panning the image in a selected direction without changing a resolution of the output frame images." 54 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 Krisbergh teaches the ability of the videophone to perform "Electronic Pan Zoom." Ex. 1003, 9:30-41. In one embodiment, first the center portion of the high-resolution image is selected and then a user can pan right and tilt upwards on the image to obtain the upper-left portion of the high-resolution image. *Id*. Panning right and tilting upwards are directed "selected" by the user. *Id*., 9:36-38; Ex. 1020, ¶138-39. These panning and tilting operations do not change the resolution of the output frame images, i.e. the 320x200 portion.

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images, i.e. the 320x200 portion. *Id.*

5. **Claim 14**

140. Claim 14 recites "The method of claim 8 further comprising when displaying each frame image on a display annotating the image without changing a resolution of the output frame images." Krisbergh teaches the use of directories that include names, telephone numbers and images. *Id.*, 11:10-32. Krisbergh further teaches that these directories can also contain "notes" associated with various directory entries. *Id.*, 13:34-40. These notes can be displayed as an overlay during a call with a particular party. *Id.*, 13:41-42; 11:3-9. Therefore, Krisbergh teaches annotating the video image during a call with notes stored in the directory. This process of annotating the image does not change the resolution of the out frame image, as the resolution of the output frame image is determined by the physical characteristics of the LCD screen.

6. **Claim 16**

141. Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image." Claim 16 is written in Markush

output frame images, i.e. the 320x200 portion.

5. **Claim 14**

Claim 14 recites "The method of claim 8 further comprising when displaying each frame image on a display annotating the image without changing a resolution of the output frame images." Krisbergh teaches use of directories that include names, telephone numbers and images. Ex. 1003, 11:10-32. Krisbergh further teaches these directories can also contain "notes" associated with various directory entries. *Id.*, 13:34-40. These notes can be displayed as an overlay during a call with a particular party. *Id.*, 13:41-42; 11:3-9. Therefore, Krisbergh teaches annotating the video image during a call with notes stored in the directory. Ex. 1020, ¶140. This process of annotating the image does not change the resolution of the out frame image, as the resolution of the output frame image is determined by the physical characteristics of the LCD screen. *Id.*

6. **Claim 16**

Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image." Claim 16 is written in Markush

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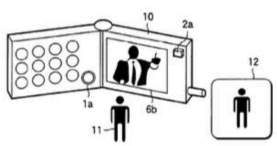
format and requires only one of the image manipulations in the group to be satisfied. Please see Section VII.C.3 for how the "re-sizing the image" limitation is satisfied. Please see Section VII.C.4 for how the "panning the image in a selected direction" limitation is satisfied. Please see Section VII.C.5 for how the "annotating the image" limitation is satisfied.

D. **Krisbergh in View of Hara and Mitsui Renders Claims 13 and 16 Obvious**

142. Mitsui teaches a videophone where the orientation of the video image can be changed. Ex. 1005, Abstract. The videophone of Mitsui includes an "image rotating section 3" that performs rotation processing on the picture so that the picture may coincide with the orientation of the phone. *Id.*, 7:37-49. For example, Fig. 3B of Mitsui illustrates the video image rotated by 180 degrees from a first position shown in Fig. 3a. *Id.*, 8:49-54.



143. Fig. 3C illustrates the video image rotated counterclockwise by 90 degrees as illustrated below. *Id.*, 9:8-11.

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format and requires only one of the image manipulations in the group to be satisfied. Ex. 1020, ¶141. See Section IX.B.3 for how the "re-sizing the image" limitation is satisfied. See Section IX.B.4 for how the "panning the image in a selected direction" limitation is satisfied. See Section IX.B.5 for how the "annotating the image" limitation is satisfied.

C. Ground 3: Krisbergh in View of Hara and Mitsui Renders Claims 13 and 16 Obvious

1. Claim 13

Claim 13 recites "The method of claim 8 further comprising when displaying each frame image on a display rotating the image in a selected direction without changing a resolution of the output frame images."

Mitsui teaches a videophone where the orientation of the video image can be changed. Ex. 1005, Abstract; Ex. 1020, ¶¶142-43, 146-47. The videophone of Mitsui includes an "image rotating section 3" that performs rotation processing on

the picture so that the picture may coincide with the orientation of the phone. Ex. 1005, 7:37-49. For example, Fig. 3B of Mitsui illustrates the video image rotated by 180 degrees from a first position shown in Fig. 3a. *Id.*, 8:49-54.

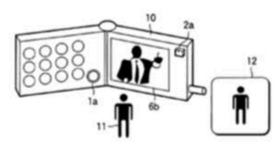

Fig. 3C illustrates the video image rotated counterclockwise by 90 degrees as illustrated below. *Id.*, 9:8-11.

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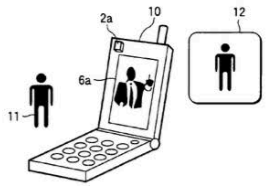

144. The direction of the rotation is selected by the user based on how the user orientates the phone. The orientation of the phone is sensed by the phone by a mercury switch. *Id.*, 7:26-36; Fig. 2. In addition, the resolution of the output frame image does not change when the image is rotated because the resolution of the output frame image is determined by the physical characteristics of the LCD screen. Finally, the image rotation is performed "when displaying" the image. *Id.*, 8:8-24 ("The picture signal that has undergone rotation processing is displayed as an image on the display 6.").

145. One of ordinary skill in the art would have found it obvious to combine the image rotation feature of Mitsui into the videophone disclosed in Krisbergh. Both Mitsui and Krisbergh disclose videophones for use in video telephones. Mitsui teaches that "conventional" video telephones can be used for "hands-free talking" if the video image were properly oriented. *Id.*, 1:66-2:38. One of ordinary skill in the art would have found it obvious to provide the rotation feature of Mitsui in the videophones of Krisbergh. The rotation feature allows the conventional videophone to be used in a hands-free manner, which one of ordinary

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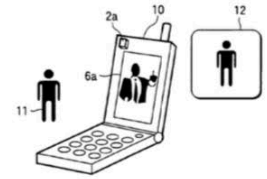

The direction of the rotation is selected by the user based on how the user orientates the phone. The orientation of the phone is sensed by the phone by a mercury switch. *Id.*, 7:26-36; Fig. 2. In addition, the resolution of the output frame image does not change when the image is rotated because the resolution of the output frame image is determined by the physical characteristics of the LCD screen. Ex. 1020, ¶144. Finally, the image rotation is performed "when displaying"

the image. Ex. 1005, 8:8-24 ("The picture signal that has undergone rotation processing is displayed as an image on the display 6.").

One of ordinary skill in the art would have found it obvious to combine the image rotation feature of Mitsui into the videophone disclosed in Krisbergh. Both Mitsui and Krisbergh disclose videophones for use in video telephones. Mitsui teaches that "conventional" video telephones can be used for "hands-free talking" if the video image were properly oriented. Ex. 1005, 1:66-2:38. One of ordinary skill in the art would have found it obvious to provide the rotation feature of Mitsui in the videophones of Krisbergh. Ex. 1020, ¶145. The rotation feature allows the conventional videophone to be used in a hands-free manner, which one of ordinary

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 skill in the art would recognize as a desirable feature to incorporate into the videophones of Krisbergh. Without the rotation feature, users who attempt to place their videophones on a horizontal surface for a hands-free call will be disappointed by the incorrect orientation of the video image. Similarly, as previously mentioned, it would have been obvious to incorporate Hara's technique for reducing the volume of transmitted data. Like in Krisbergh, employing Hara's technique for reducing data to the video telephone in Mitsui yields a predictable result. Further, one of ordinary skill in the art would have had an expectation of success in combining Krisbergh and Mitsui with Hara since the systems disclosed are quite similar. 1. **Claim 13** 146. Claim 13 recites "The method of claim 8 further comprising when displaying each frame image on a display rotating the image in a selected direction without changing a resolution of the output frame images." *See* Section VII.D. 2. **Claim 16** 147. Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a 52 AVER EXHIBIT 1020 Page 56 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **2. Claim 16** Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image." Claim 16 is written in Markush format and requires only one of the image manipulations in the group to be satisfied. See Section IX.C.1 for how the "rotating the image in a selected direction" limitation is satisfied. **D. Ground 4: Ishii Renders Claims 1-5, 8, and 16 Obvious** **1. Claim 1** a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising: This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Ishii discloses the preamble language. The excerpt of Ishii shown below shows the system and method of Ishii acquiring an image of a target in both a "still image mode" and a "moving image mode". Ex. 1006, ¶0062; Fig. 8. 59

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 selected direction, and annotating the image." Claim 16 is written in Markush format and requires only one of the image manipulations in the group to be satisfied. Please see Section VII.D above for how the "rotating the image in a selected direction" limitation is satisfied. E. **Ishii Renders Claims 1-5, 8, and 16 Obvious** 148. Ishii discloses digital camera technology i.e., the relevant field of experience for a person having ordinary skill in the art. 149. As previously noted, Ishii relates to acquiring image data, which may be either still image data or moving image data. Ex. 1006, Abstract. The Ishii reference discloses two modes of capturing image data: "a still image mode in which a still image is photographed and a moving image mode in which a moving image is photographed." *Id.*, ¶0062. 150. Furthermore, Ishii relates to executing zoom processing on the acquired image data in one of two modes: optical zoom and digital zoom (referred to as "electrical zoom"). *Id.*, ¶0001. 151. For example, "Fig. 27 is a view showing the optical zoom and electrical zoom operations in the image recording apparatus." *Id.*, ¶0009. Describing optical zoom processing, Ishii explains that "the lens optical system 2301 is controlled to the maximum wide-angle state, the frame 2401 becomes large." *Id.*, ¶0009. Describing digital zoom processing, Ishii explains that "a partial 53 AVER EXHIBIT 1020 Page 57 of 98	Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **2. Claim 16** Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image." Claim 16 is written in Markush format and requires only one of the image manipulations in the group to be satisfied. See Section IX.C.1 for how the "rotating the image in a selected direction" limitation is satisfied. **D. Ground 4: Ishii Renders Claims 1-5, 8, and 16 Obvious** **1. Claim 1** a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising: This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Ishii discloses the preamble language. The excerpt of Ishii shown below shows the system and method of Ishii acquiring an image of a target in both a "still image mode" and a "moving image mode". Ex. 1006, ¶0062; Fig. 8. 59

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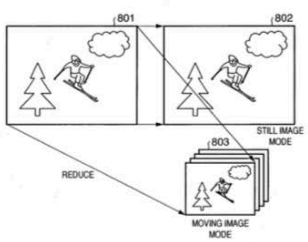
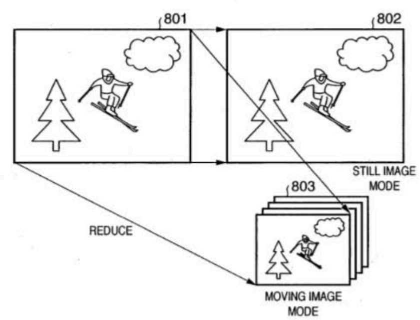
Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 area indicated by a frame 2402 is extracted and enlarged from the image data of the object within the frame 2401 in the maximum telephoto state, thereby obtaining an electrical zoom image 2405." *Id.*, ¶0010. Furthermore, "when the magnification ratio of electrical zoom is high, the image quality largely degrades. To prevent this, the magnification ratio of electrical zoom is generally limited by defining an upper limit value." *Id.*, ¶0011. 1. **Claim 1** **a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:** 152. Ishii discloses the preamble language. The excerpt of Fig. 27 of Ishii shown below shows the system and method of Ishii acquiring an image of a target in both a "still image mode" and a "moving image mode". *Id.*, ¶0062; Fig. 8. FIG. 8  The disclosed camera "has a still image mode in which a still image is 54 AVER EXHIBIT 1020 Page 58 of 98	**D. Ground 4: Ishii Renders Claims 1-5, 8, and 16 Obvious** **1. Claim 1** a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising: This preamble does not limit the scope of the claim under the broadest reasonable interpretation standard. Nevertheless, Ishii discloses the preamble language. The excerpt of Ishii shown below shows the system and method of Ishii acquiring an image of a target in both a "still image mode" and a "moving image mode". Ex. 1006, ¶0062; Fig. 8. 59 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 FIG. 8  The disclosed camera "has a still image mode in which a still image is

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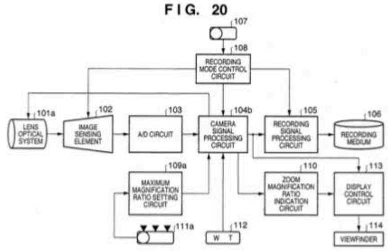
photographed and a moving image mode in which a moving image is photographed." *Id.*, ¶0062. As one of ordinary skill in the art would understand, the moving image mode disclosed by Ishii comprises a plurality of frame images.

153. Furthermore, a person of ordinary skill would have found it obvious to employ Ishii to render the claimed invention as obvious. Ishii implements known techniques (e.g., electric zoom) to similar devices (e.g., still cameras and video cameras). Ishii identifies that "digital video cameras and digital (still) cameras are widely used in the ordinary household" and that many of these devices have "an electrical zoom function." *Id.*, ¶0002. Thus, implementing these devices is known, and is merely a simple substitution of known elements to obtain predictable results.

b) connecting a slave digital image sensing unit to a master personal processor,

154. The excerpt of Fig. 20 of Ishii shown below identifies the various components of the disclosed camera.

F I G. 20



photographed and a moving image mode in which a moving image is photographed." *Id.*, ¶0062. As one of ordinary skill in the art would understand, the moving image mode disclosed by Ishii comprises a plurality of frame images. Ex. 1020, ¶152.

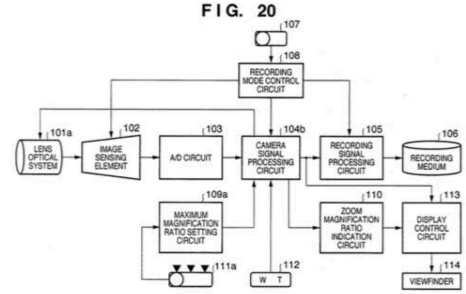
Furthermore, a person of ordinary skill would have found it obvious to employ Ishii to render the claimed invention as obvious. *Id.*, ¶153. Ishii implements known techniques (e.g., electric zoom) to similar devices (e.g., still cameras and video cameras). *Id*. Ishii identifies that "digital video cameras and digital (still) cameras are widely used in the ordinary household" and that many of these devices have "an electrical zoom function." Ex. 1006, ¶0002. Thus,

implementing these devices is known, and is merely a simple substitution of known elements to obtain predictable results.

b) connecting a slave digital image sensing unit to a master personal processor,

The excerpt of Ishii shown below identifies the various components of the disclosed camera.

F I G. 20



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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 155. "The image sensing element 102 converts the optical signal of an image formed on the light-receiving surface by the lens optical system 101 into an electrical signal." *Id.*, ¶0056. Lens optical system 101 and image sensing element 102 are a digital image sensing unit. Ishii explains that "[a]n A/D (Analog/Digital) circuit 103 analog/digital-converts the image sensing signal, which has been converted into an electrical signal by the image sensing element, into digital image sensing data (to be referred to as image sensing data hereinafter)." *Id.*, ¶0056. Responsive to the conversion, "[a] camera signal processing circuit 104 executes various processing operations for converting the image sensing data supplied from the A/D circuit 103 into image data." *Id.*, ¶0057. Camera signal processing unit 104 is a master personal processor. Because camera signal processing unit 104 "executes various processing operations" and "also controls the optical zoom driving mechanism of the lens optical system 101," camera signal processing unit 104 is the "control means" and is the master, while the lens optical system 101 and image sensing element 102 are a digital image sensing unit being controlled and is the "slave." **c) the master personal processor receiving a series of frame images from the slave digital image sensing unit;** 156. Ishii discloses that its camera includes "recording mode switch 107 [that] can be switched by a user … between still image data and moving image 56 AVER EXHIBIT 1020 Page 60 of 98	"The image sensing element 102 converts the optical signal of an image formed on the light-receiving surface by the lens optical system 101 into an electrical signal." Ex. 1006, ¶0056. Lens optical system 101 and image sensing element 102 are a digital image sensing unit. Ex. 1020, ¶¶154-55. Ishii explains that "[a]n A/D (Analog/Digital) circuit 103 analog/digital-converts the image sensing signal, which has been converted into an electrical signal by the image sensing element, into digital image sensing data (to be referred to as image sensing 61 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 data hereinafter)." Ex. 1006, ¶0056. Responsive to the conversion, "[a] camera signal processing circuit 104 executes various processing operations for converting the image sensing data supplied from the A/D circuit 103 into image data." *Id.*, ¶0057. Because camera signal processing unit 104 "executes various processing operations" and "also controls the optical zoom driving mechanism of the lens optical system 101," camera signal processing unit 104 is the "control means" and is the master, while the lens optical system 101 and image sensing element 102 are a digital image sensing unit being controlled and is the "slave." Ex. 1020, ¶155. c) the master personal processor receiving a series of frame images from the slave digital image sensing unit; Ishii discloses that its camera includes "recording mode switch 107 [that] can be switched by a user…between still image data and moving image data." Ex.

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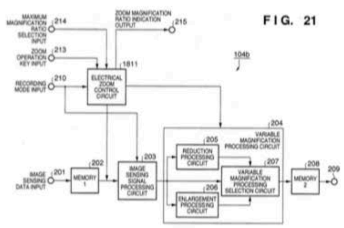
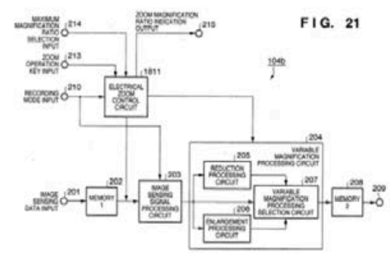
Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 data." *Id.*, ¶0057. Thus, regardless of whether "a series of frame images" encompasses "a plurality of still images" or is limited to video, Ishii teaches this limitation. *See* Section VI.B.1. **d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images;** 157. Ishii discloses an electrical zoom control circuit 1811, as depicted in Fig. 21 below. Ex. 1006, Fig. 21.  FIG. 21 Electrical zoom is generally explained as "electronically variably magnifying photographing image data in additional to conventional optical zoom function[s]." *Id.*, ¶0002. An example is illustrated by Fig. 22 below. 57 AVER EXHIBIT 1020 Page 61 of 98	can be switched by a user…between still image data and moving image data." Ex. 1006, ¶0057. Thus, regardless of whether "a series of frame images" encompasses "a plurality of still images" (as proposed by Petitioner) or is limited to video, Ishii teaches this limitation. *See* Section VII.A; Ex. 1020, ¶156. d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images; Ishii discloses an electrical zoom control circuit 1811, as depicted by Fig 21. Ex. 1006, Fig. 21. 62 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751  FIG. 21 Electrical zoom is generally explained as "electronically variably magnifying photographing image data in additional to conventional optical zoom function[s]." *Id.*, ¶0002. An example is illustrated by Fig. 22.

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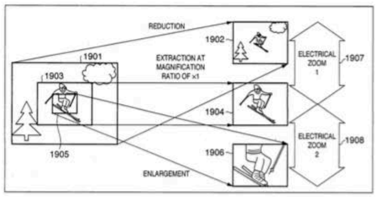
FIG. 22

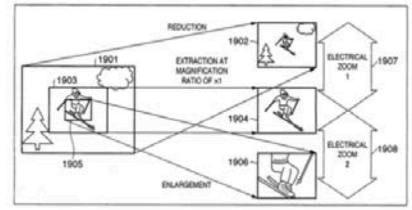


This electrical zoom control circuit provides that "the operator can select a zoom mode in which electronic enlargement processing causes no degradation in image quality." *Id.*, ¶0141. As one of ordinary skill in the art would understand, the disclosed electrical zoom processing is performed without changing the resolution of the frame images. *See* Section VII.B.1.d.

e) in the case of the manipulated series of frame images having a higher resolution than a reference resolution, reducing the resolution of each of the manipulated series of frame images to that of the reference resolution;

158. As discussed above, the term "in the case of …" should be construed as a condition precedent. *See* Section VI.B.3. Thus, for the purposes of satisfying obviousness, claim 1 is disclosed in the prior art if all remaining claim limitations, besides the "in the case of …" limitation, are disclosed in the prior art.

FIG. 22



This electrical zoom control circuit provides that "the operator can select a zoom mode in which electronic enlargement processing causes no degradation in image quality." *Id.*, ¶0141. As one of ordinary skill in the art would understand, the disclosed electrical zoom processing is performed without changing the resolution of the frame images. *See* Section IX.A.1.d; Ex. 1020, ¶157.

e) in the case of the manipulated series of frame images having a higher resolution than a reference resolution, reducing the resolution of each of the manipulated series of frame images to that of the reference resolution;

As discussed above, the term "in the case of…" should be construed as a condition precedent. *See* Section VII.C; Ex. 1020, ¶158. Thus, for the purposes of satisfying obviousness, claim 1 is disclosed in the prior art if all remaining claim limitations, besides the "in the case of…" limitation, are disclosed in the prior art.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **f) displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images,** 159. Ishii discloses that "display control circuit 113 displays an image, which is being photographed … on the basis of image data output from the camera signal processing circuit 104. Ex. 1006, ¶0060. Similarly, Ishii discloses that "the image sensing data having the image size corresponding to the frame 1901 is reduced and recorded. Reference numeral 1902 denotes a reduced recording image and its image size, which is obtained by reducing the image sensing data having the image size corresponding to the frame 1901 to an image size corresponding to the DV format while keeping the view angle unchanged and recorded in a recording medium 106." *Id.*, ¶0132. **g) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.** 160. Ishii discloses that an "image sensing **data input terminal** [] is **connected** to the output terminal of the A/D circuit 103 to receive image sensing data output." *Id.*, ¶0070 (emphasis added). As previously noted, the A/D circuit then passes "digital image sensing data" to the camera signal processing unit 104. *See id.* ¶¶0056-57. One of ordinary skill in the art would understand that the connection described by Ishii could be a removable connection. Therefore, Ishii 59 AVER EXHIBIT 1020 Page 63 of 98	f) displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images, Ishii discloses that "display control circuit 113 displays an image, which is being photographed…on the basis of image data output from the camera signal processing circuit 104." Ex. 1006, ¶0060; Ex. 1020, ¶159. Similarly, Ishii discloses that "the image sensing data having the image size corresponding to the frame 1901 is reduced and recorded. Reference numeral 1902 denotes a reduced recording image and its image size, which is obtained by reducing the image sensing data having the image size corresponding to the frame 1901 to an image size corresponding to the DV format while keeping the view angle unchanged and recorded in a recording medium 106." Ex. 1006, ¶0132. 64 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 g) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port. Ishii discloses that an "image sensing **data input terminal** [] is **connected** to the output terminal of the A/D circuit 103 to receive image sensing data output." *Id.*, ¶0070. As previously noted, the A/D circuit then passes "digital image sensing data" to the camera signal processing unit 104. *Id.*, ¶¶0056-57. One of ordinary skill in the art would understand that the connection described by Ishii could be a removable connection. Ex. 1020, ¶160. Therefore, Ishii discloses the slave digital

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discloses the slave digital image sensing unit i.e., lens optical system 101 and image sensing element 102, being removable connected to the master personal processor, i.e., camera signal processing unit 104, via a master personal processor port.

2. **Claim 2**

161. Claim 2 recites "The method of claim 1, further comprising executing the manipulation in response to a user request in real time."

162. Ishii discloses that "[t]he user can adjust the zoom ratio of the image by selecting the mode. The user can therefore select a zoom mode with a small degradation in image quality in electrical zoom processing." *Id.*, ¶0153. One of ordinary skill in the art would find it obvious that the zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system.

3. **Claim 3**

a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:

163. This limitation is the same as for claim 1. *See* Section VII.E.1.a.

b) connecting a slave digital image sensing unit to a master personal processor,

164. This limitation is the same as for claim 1. *See* Section VII.E.1.b.

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removable connection. Ex. 1020, ¶160. Therefore, Ishii discloses the slave digital image sensing unit i.e., lens optical system 101 and image sensing element 102, being removable connected to the master personal processor, i.e., camera signal processing unit 104, via a master personal processor port. *Id*.

2. Claim 2

Claim 2 recites "The method of claim 1, further comprising executing the manipulation in response to a user request in real time."

Ishii discloses that "[t]he user can adjust the zoom ratio of the image by selecting the mode. The user can therefore select a zoom mode with a small degradation in image quality in electrical zoom processing." Ex. 1006, ¶0153. One of ordinary skill in the art would find it obvious that the zooming manipulation is executed in "real-time" since that is what a user would expect to happen when operating the system. Ex. 1020, ¶¶161-62.

3. Claim 3

a) A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:

This limitation is the same as for claim 1. See Section IX.D.1.a; Ex. 1020, ¶163.

b) connecting a slave digital image sensing unit to a master personal processor,

This limitation is the same as for claim 1. *See* Section IX.D.1.b; Ex. 1020, ¶164.

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **c) the master personal processor receiving a series of frame images from the slave digital image sensing unit;** 165. This limitation is the same as for claim 1. *See* Section VII.E.1.c. **d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images,** 166. This limitation is the same as for claim 1. *See* Section VII.E.1.d. **e) wherein the manipulation of the series of frame images is executed in response to a user request in real time;** 167. This limitation is the same as for claim 2. *See* Section VII.E.2. **f) identifying a first resolution for the received plurality of frame images;** 168. Ishii discloses that in "a digital video format … the image size of moving image data is predetermined." Ex. 1006, ¶0065. For example, "image sensing element 102 and memory 1 (202) process image sensing data having an image size corresponding to frame 1901." *Id.*, ¶0132. One of ordinary skill in the art would understand that identifying the image size corresponding to frame 1901 is identifying a first resolution. **g) identifying a second resolution for the reference resolution;** 169. Ishii discloses that "if the image size of image sensing data is larger 61 AVER EXHIBIT 1020 Page 65 of 98	c) the master personal processor receiving a series of frame images from the slave digital image sensing unit; This limitation is the same as for claim 1. *See* Section IX.D.1.c; Ex. 1020, ¶165. d) using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the frame images, This limitation is the same as for claim 1. *See* Section IX.D.1.d; Ex. 1020, ¶166. e) wherein the manipulation of the series of frame images is executed in response to a user request in real time; This limitation is the same as for claim 2. *See* Section IX.D.2; Ex. 1020, ¶167. 66 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 f) identifying a first resolution for the received plurality of frame images; Ishii discloses that in "a digital video format…the image size of moving image data is predetermined." Ex. 1006, ¶0065. For example, "image sensing element 102 and memory 1 (202) process image sensing data having an image size corresponding to frame 1901." *Id.*, ¶0132. One of ordinary skill in the art would understand that identifying the image size corresponding to frame 1901 is identifying a first resolution. Ex. 1020, ¶168. g) identifying a second resolution for the reference resolution; Ishii discloses that "if the image size of image sensing data is larger than the

than the predetermined size, the image data must be reduced to the predetermined size." Ex. 1006, ¶0065. One of ordinary skill in the art would understand that identifying the predetermined size is identifying a second resolution.

h) in the case of a manipulated frame image having a higher resolution, as manipulated, than the second resolution, reducing the resolution of the frame image to that of the second resolution;

170. This limitation is the same as for claim 1. *See* Section VII.E.1.e.

i) in the case of the manipulated frame image having a lower resolution, as manipulated, than the second resolution, using the processor to further manipulate the frame image to reduce pixilation;

171. This limitation is the same as for claim 1. *See* Section VII.B.3.i.

j) displaying and/or storing the manipulated series of frame images as an output video image without changing the resolution of the manipulated series of frame images,

172. This limitation is the same as for claim 1. *See* Section VII.E.1.f.

k) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.

173. This limitation is the same as for claim 1. *See* Section VII.E.1.g.

4. **Claim 4**

174. Claim 4 recites "The method of claim 3, wherein the personal processor is housed in an external personal computer, further comprising using an

Ishii discloses that "if the image size of image sensing data is larger than the predetermined size, the image data must be reduced to the predetermined size." Ex. 1006, ¶0065. One of ordinary skill in the art would understand that identifying the predetermined size is identifying a second resolution. Ex. 1020, ¶169.

h) in the case of a manipulated frame image having a higher resolution, as manipulated, than the second resolution, reducing the resolution of the frame image to that of the second resolution;

This limitation is the same as for claim 1. *See* Section IX.D.1.e; Ex. 1020, ¶170.

i) in the case of the manipulated frame image having a lower resolution, as manipulated, than the second resolution, using the processor to further manipulate the frame image to reduce pixilation;

This limitation is the same as for claim 1. *See* Section IX.A.3.i; Ex. 1020, ¶171.

j) displaying and/or storing the manipulated series of frame images as an output video image without changing the resolution of the manipulated series of frame images,

This limitation is the same as for claim 1. *See* Section IX.D.1.f; Ex. 1020, ¶172.

k) wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.

This limitation is the same as for claim 1. *See* Section IX.D.1.g; Ex. 1020, ¶173.

4. Claim 4

Claim 4 recites "The method of claim 3, wherein the personal processor is housed in an external personal computer, further comprising using an external

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external personal computer to provide the processor used to manipulate the series of frame images."

175. Ishii discloses that "[t]he functions of various control circuits of the above-described embodiments are also implemented when an operating system (OS) running on a computer performs part or all of actual processing on the basis of instructions of a program read out by the computer." Ex. 1006, ¶0150. One of ordinary skill in the art would understand this to include an external computer such as an external personal computer.

5. **Claim 5**

176. Claim 5 recites "The method of claim 4 wherein the manipulation further comprises at least one of the operations selected from the group consisting of: re-sizing the image; panning the image in a selected direction; rotating the image in a selected direction; and annotating the image."

177. Ishii discloses "the operator can select a zoom mode in which electronic enlargement processing causes no degradation in image quality. In addition, under the control of the electrical zoom control circuit 1811, the extraction image size of image sensing data held in the memory 1 (202) is changed, and the electrical zoom operation for enlargement/reduction corresponding to the variable magnification ratio is executed by the variable magnification processing circuit 204." *Id.*, ¶0141. One of ordinary skill in the art would understand this to

housed in an external personal computer, further comprising using an external personal computer to provide the processor used to manipulate the series of frame images."

Ishii discloses that "[t]he functions of various control circuits of the above-described embodiments are also implemented when an operating system (OS) running on a computer performs part or all of actual processing on the basis of

instructions of a program read out by the computer." Ex. 1006, ¶0150. One of ordinary skill in the art would understand this to include an external computer such as an external personal computer. Ex. 1020, ¶¶174-75.

5. Claim 5

Claim 5 recites "The method of claim 4 wherein the manipulation further comprises at least one of the operations selected from the group consisting of: re-sizing the image; panning the image in a selected direction; rotating the image in a selected direction; and annotating the image."

Ishii discloses "the operator can select a zoom mode in which electronic enlargement processing causes no degradation in image quality. In addition, under the control of the electrical zoom control circuit 1811, the extraction image size of image sensing data held in the memory 1 (202) is changed, and the electrical zoom operation for enlargement/reduction corresponding to the variable magnification ratio is executed by the variable magnification processing circuit 204." Ex. 1006, ¶0141. One of ordinary skill in the art would understand this to constitute re-sizing

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 constitute re-sizing of an image. 6. **Claim 8** **a) A method of acquiring an image of a target comprising:** 178. This limitation is the same as for claim 1. *See* Section VII.E.1.a. **b) determining a reference resolution at which each frame image of a series of frame images will be maintained and** 179. This limitation is the same as for claim 3. *See* Section VII.E.3.f-g. **c) storing the reference resolution in a non-transitory medium;** 180. Ishii discloses that "[t]he memory is constituted by a nonvolatile memory such as a hard disk device, magnetooptical disk device, or flash memory, a recording medium such as a CD-ROM which can only be read-accessed, a volatile memory such as a RAM (Random Access Memory), or a computer-readable or writable recording medium as a combination thereof." Ex. 1006, ¶0149. **d) capturing a video image comprising the series of frame images in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning and** 181. Ishii discloses that the camera "has a still image mode in which a still image is photographed and a moving image mode in which a moving image is 64 AVER EXHIBIT 1020 Page 68 of 98	¶0141. One of ordinary skill in the art would understand this to constitute re-sizing of an image. Ex. 1020, ¶¶176-77. **6. Claim 8** a) A method of acquiring an image of a target comprising: This limitation is the same as for claim 1. *See* Section IX.D.1.a; Ex. 1020, ¶178. 69 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 b) determining a reference resolution at which each frame image of a series of frame images will be maintained and This limitation is the same as for claim 3. *See* Section IX.D.1.f-g; Ex. 1020, ¶179. c) storing the reference resolution in a non-transitory medium; Ishii discloses that "[t]he memory is constituted by a nonvolatile memory such as a hard disk device, magnetooptical disk device, or flash memory, a recording medium such as a CD-ROM which can only be read-accessed, a volatile memory such as a RAM (Random Access Memory), or a computer-readable or writable recording medium as a combination thereof." Ex. 1006, ¶0149; Ex. 1020, ¶180. d) capturing a video image comprising the series of frame images in one instantaneous snapshot of a subject's entire surface area without line-by-line scanning and Ishii discloses that the camera "has a still image mode in which a still image is photographed and a moving image mode in which a moving image is

Madisetti Declaration (Ex. 1020)	Petition for *Inter Partes* Review (Paper 3)
Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 photographed." *Id.*, ¶0062. Whether the camera in Ishii uses a full image snapshot or a line-by-line scanned snapshot is an obvious design choice to those skilled in the art. **e) using an external processor to compare a resolution of each frame image of the video image with the reference resolution and** 182. Ishii discloses that "if the image size of image sensing data is larger than the predetermined size, the image data must be reduced to the predetermined size." *Id.*, ¶0065. "More specifically, as indicated by the electrical zoom 1 region 1907, the electrical zoom effect is obtained by changing the extraction image size in accordance with electronic variable magnification (reduction) processing for a predetermined recording image size." *Id.*, ¶0136. **f) adjusting the resolution of each frame image to correspond to the reference resolution; and** 183. This limitation is the same as for claim 1. *See* Section VII.B.3.i, VII.E.1.e. **g) after comparing the resolution of each frame image, storing and/or displaying in real-time each frame image on a display.** 184. This limitation is the same as for claim 1. *See* Section VII.E.1.f. 65 AVER EXHIBIT 1020 Page 69 of 98	is photographed and a moving image mode in which a moving image is photographed." Ex. 1006, ¶0062. Whether the camera in Ishii uses a full image snapshot or a line-by-line scanned snapshot is an obvious design choice to those skilled in the art. Ex. 1020, ¶181. 70 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 e) using an external processor to compare a resolution of each frame image of the video image with the reference resolution and Ishii discloses that "if the image size of image sensing data is larger than the predetermined size, the image data must be reduced to the predetermined size." Ex. 1006, ¶0065. "More specifically, as indicated by the electrical zoom 1 region 1907, the electrical zoom effect is obtained by changing the extraction image size in accordance with electronic variable magnification (reduction) processing for a predetermined recording image size." *Id.*, ¶0136; Ex. 1020, ¶182. f) adjusting the resolution of each frame image to correspond to the reference resolution; and This limitation is the same as for claim 1. *See* Section IX.A.3.i, IX.D.1.e; Ex. 1020, ¶183. g) after comparing the resolution of each frame image, storing and/or displaying in real-time each frame image on a display. This limitation is the same as for claim 1. *See* Section IX.D.1.f; Ex. 1020,

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Declaration of Dr. Vijay Madisetti *Inter Partes* Review of U.S. Patent No. 8,508,751 **h) connecting a slave digital image sensing unit to a master personal processor,** 185. This limitation is the same as for claim 1. *See* Section VII.E.1.g. 7. **Claim 16** 186. Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image. 187. This limitation is the same as for claim 5. *See* Section VII.E.5. **VIII. CONCLUSION** 188. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made arc punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code. Dated: [signature] 7/14/17 Dr. Vijay Madisetti 66 AVER EXHIBIT 1020 Page 70 of 98	This limitation is the same as for claim 1. *See* Section IX.D.1.g; Ex. 1020, ¶185. 71 Petition for *Inter Partes* Review of U.S. Patent No. 8,508,751 **7. Claim 16** Claim 16 recites "The method of claim 8 further comprising when displaying each frame image on a display, performing an image manipulation selected from the group consisting of: re-sizing the image, re-sizing a selected portion of the frame to provide a visual effect of rotating the image in three dimensions, panning the image in a selected direction, rotating the image in a selected direction, and annotating the image. This limitation is the same as for claim 5. *See* Section IX.D.5; Ex. 1020, ¶186-87. **X. CONCLUSION** Petitioner requests that the Board grant this Petition for *inter partes* review of claims 1-5, 7-10, 12-14, 16, 18, and 20. Respectfully submitted, Date: September 15, 2017 /Jackson Ho/ Jackson Ho (Reg. No. 72,360) K&L GATES LLP