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Paper 72
Entered: October 2, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

PRISUA ENGINEERING CORP.,
Patent Owner.

Case IPR2017-01188
Patent 8,650,591 B2

Before BARBARA A. PARVIS, MATTHEW R. CLEMENTS, and TERRENCE W. McMILLIN, *Administrative Patent Judges.*

CLEMENTS, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Samsung Electronics America, Inc. ("Petitioner") challenges claims 1–4, 8, and 11 ("the challenged claims") of U.S. Patent No. 8,650,591 B2 (Ex. 1001, "the '591 patent"), owned by Prisua Engineering Corp. ("Patent Owner"). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claim 11 is unpatentable, but Petitioner has not shown by a preponderance of the evidence that claims 1–4 and 8 are unpatentable. Patent Owner's Motion to Exclude is *dismissed*.

A. Procedural History

Petitioner filed a Petition requesting an *inter partes* review of claims 1–4, 8, and 11 of the '591 patent. Paper 3 ("Pet."). Patent Owner filed a Corrected Preliminary Response. Paper 21. On October 11, 2017, we instituted *inter partes* review of only claim 11 of the '591 patent as unpatentable under 35 U.S.C. § 103[1] as anticipated by Sitrick.[2] Paper 22 ("Inst. Dec."), 38. With respect to claims 1–4 and 8, which were not instituted originally, we stated:

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[1] The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '591 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

[2] U.S. Patent Publication No. 2005/0151743 A1 (Ex. 1007, "Sitrick").

> Because, on this record, we determine that claim 1 covers more than one subject matter class—an apparatus and a method of using that apparatus—we cannot determine the scope of claim 1 and we, therefore, cannot determine if the limitations of claim 1 are disclosed or taught by the prior art, or the combinations of prior art, identified by Petitioner. For the same reasons, we also cannot determine if claims 2–4 and 8, which depend from independent claim 1, are unpatentable.
>
> Even if one were to contend the claim 1 limitations are merely written in functional language, the Petition lacks the analysis required by 37 C.F.R. § 42.104(b)(3). For example, at least the "digital processing unit" limitation would invoke § 112, sixth paragraph. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (*en banc*) (in the absence of word "means," the presumption that means-plus-function does not apply may be overcome if "the claim fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function'"); Manual of Patent Examining Procedure § 2181 (9th ed. 2014, rev. July 2015) (identifying "device for" and "unit for" as non-structural generic placeholders); *Ex parte Lakkala*, Appeal No. 2011-001526, slip op. at 9–13 (PTAB March 13, 2013) (determining that a "processor in communication with the memory device and configured with the program to" perform certain functions is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph); *Ex parte Erol*, Appeal No. 2011-001143 slip op. at 14–18 (PTAB March 13, 2013) (determining that a "processor adapted to" perform several steps is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph); *Ex parte Smith*, Appeal No. 2012-007631 slip op. at 12–16 (PTAB March 14, 2013) (determining that a "processor in communication with the memory and programmed to" perform certain functions is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph).

Dec. 14–15 (footnote omitted).

Thereafter, Patent Owner filed a Corrected Patent Owner Response (Paper 26, "PO Resp."), to which Petitioner filed a Reply (Paper 35, "Pet. Reply").

On May 3, 2018, following the Supreme Court's decision in *SAS Inst., Inv. v. Iancu*, 138 S. Ct. 1348 (2018), we issued an Order (Paper 36) modifying our Institution Decision to include review of all challenged claims and all grounds presented in the Petition, including those grounds on which we had previously not instituted (Pet. 4; Dec. 9, 38):

References	**Basis**	**Claim(s) challenged**
Senftner[3]	§ 102	1, 2, and 8
Best and Levoy[4]	§ 103	3 and 4
Sitrick	§ 103	1, 2, and 8
Sitrick and Levoy	§ 103	3 and 4

Following a conference call with the parties on May 15, 2018, we authorized additional briefing to address the newly-added grounds. Paper 38.

Patent Owner filed, with authorization, a Supplemental Patent Owner Response (Paper 50, "Supp. POR"), to which Petitioner filed a Supplemental Reply (Paper 51, "Supp. Reply"). Patent Owner also filed, with authorization, a List Identifying Petitioner's Improper Supplemental Reply Arguments (Paper 60), to which Petitioner filed a Response (Paper 62).

Patent Owner filed a Motion to Exclude (Paper 57, "Mot. to Exclude"), Petitioner filed an Opposition (Paper 61, "Opp. to MTE"), and Patent Owner filed a Reply (Paper 63, "Reply ISO MTE").

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[3] U.S. Patent 7,460,731 B2 (Ex. 1006, "Senftner").

[4] U.S. Patent Publication No. 2009/0309990 A1 (Ex. 1008, "Levoy").

On August 22, 2018, we held a hearing and a transcript of the hearing is included in the record. Paper 69 ("Tr.").

On September 27, 2018, Patent Owner filed a Sur-Reply (Paper 71, "Sur-Reply").

B. Related Proceedings

The '591 patent is involved in *Prisua Engineering Corp. v. Samsung Electronics Co., Ltd et al.*, Case No. 1:16-cv-21761 (S.D. Fla.). Pet. 1; Paper 27, 2.

C. The '591 patent (Ex. 1001)

The '591 patent, titled "Video Enabled Digital Devices for Embedding User Data in Interactive Applications," issued February 11, 2014, from U.S. Patent Application No. 13/042,955. Ex. 1001 at [54], [45], [21]. The '591 patent generally relates to "a method for generating an edited video data stream from an original video stream wherein generation of said edited video stream comprises a step of: substituting at least one object in a plurality of objects in said original video stream by at least a different object." *Id.* at 1:40–47. Figure 3 is reproduced below.

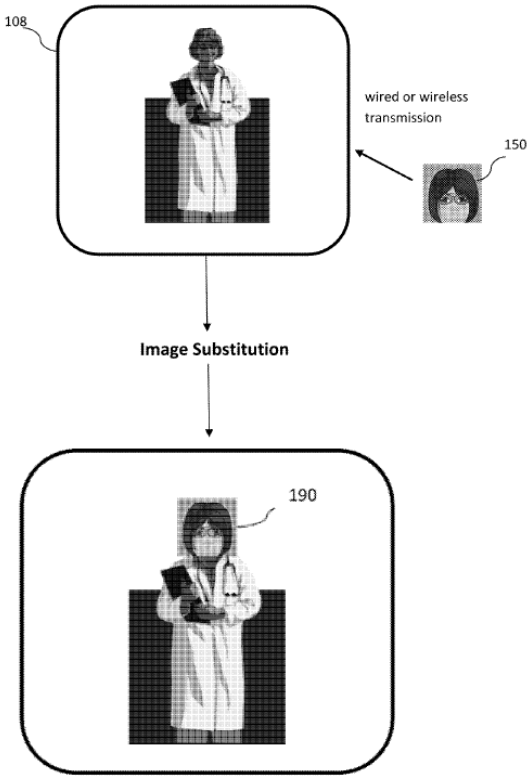

FIG. 3

Figure 3 shows a simplified illustration of a video image substitution according to one embodiment. *Id.* at 1:63–65. Figure 3 shows "a user input 150 of a photo image of the user used to replace the face of the image shown on the device 108." *Id.* at 2:66–3:1. "The user transmits the photo image 150 by wired or wireless means to the device 108." *Id.* at 3:1–3. "The image substitution is performed and the device 108 shows the substituted image 190." *Id.* at 3:3–4.

Figure 1 is reproduced below.

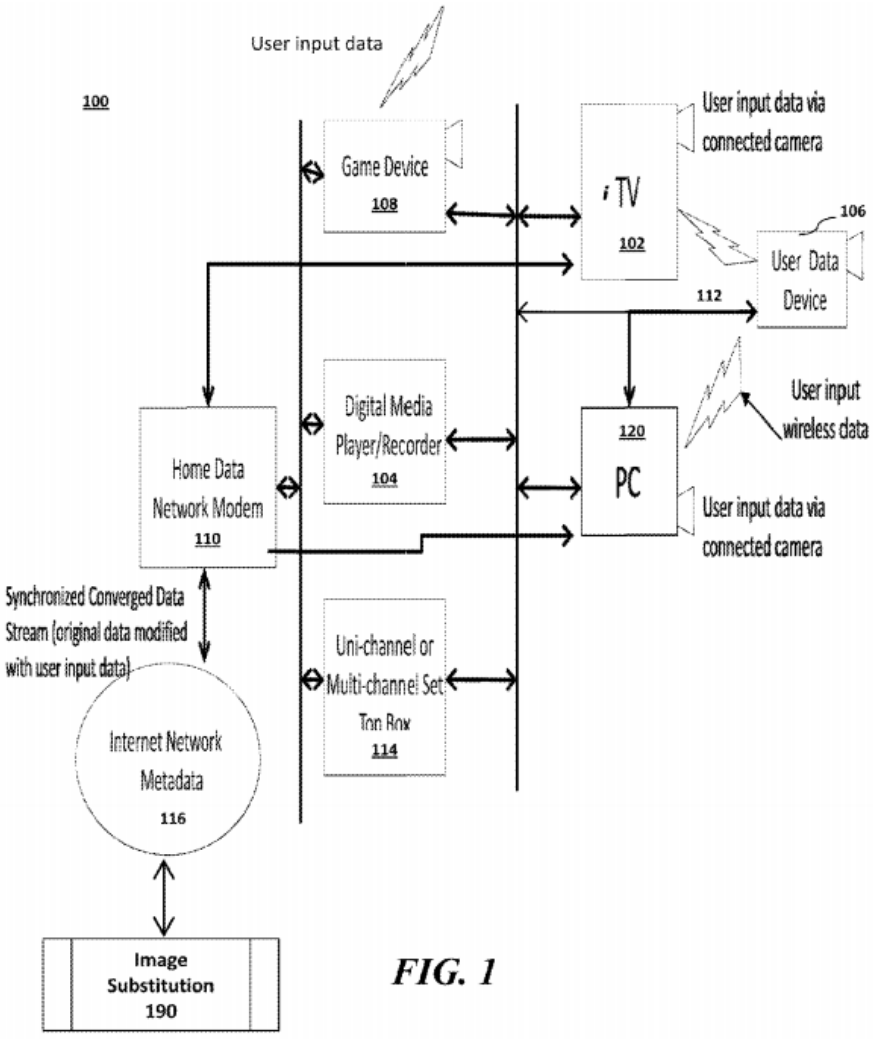

FIG. 1

Figure 1 shows a block diagram of a digital system according to one embodiment. *Id.* at 1:59–60. System 100 includes interactive television 102, camcorder 104, camera-enabled personal device 106, gaming device 108, and "is operable for taking a captured video to be uploaded, or inputted by a user, for the purpose of inserting the video content into another video, graphics, image sequence selected by the user." *Id.* at 2:10–16. "This produces a new video sequence 190 which is subsequently broadcasted or played by the digital device." *Id.* at 2:16–18.

"User Data Device (UDD) 106 is an image capable digital device" whose "input can be image or video data." *Id.* at 3:41–49. The image or video data captured by UDD 106 can be transmitted to television 102 along with "instructions regarding which actor, actress, or structure item he desires to replace or substitute in the original program." *Id.* at 4:4–10. The embedding instructions and user input video data are then transmitted to internet network devices that "have the capability of processing the user image or video data and the set of instructions that indicate how said user input data is to be embedded into the metadata 116 to produce a modified broadcast bit stream." *Id.* at 4:18–27.

> To accomplish the embedding process, the internet network devices are capable of performing at least the following functions: receiving user input data and instructions, performing image and video analysis such as face recognition and detection, image and video data portioning, image and video enhancement, filtering, texture analysis, data compression and decompression, motion detection and estimation, motion correction to adapt the motion of the user input sequence with that of the original metadata to be broadcasted, error analysis, etc. Once the user input data has been correctly embedded into the data to be broadcasted, the internet network devices send the resulting modified data to the TV 102 to be broadcast.

Id. at 4:28–40.

D. Illustrative Claims

Of the challenged claims, claims 1 and 11 are independent, claims 2–4 and 8 depend, directly or indirectly, from claim 1. Independent claims 1 and 11 are illustrative of the challenged claims and are reproduced below:

> 1. An interactive media apparatus for generating a displayable edited video data stream from an original video data stream, wherein at least one pixel in a frame of said original video data stream is digitally extracted to form a first image, said first

image then replaced by a second image resulting from a digital extraction of at least one pixel in a frame of a user input video data stream, said apparatus comprising:

an image capture device capturing the user input video data stream;

an image display device displaying the original video stream;

a data entry device, operably coupled with the image capture device and the image display device, operated by a user to select the at least one pixel in the frame of the user input video data stream to use as the second image, and further operated by the user to select the at least one pixel to use as the first image;

wherein said data entry device is selected from a group of devices consisting of: a keyboard, a display, a wireless communication capability device, and an external memory device;

a digital processing unit operably coupled with the data entry device, said digital processing unit performing:

identifying the selected at least one pixel in the frame of the user input video data stream;

extracting the identified at least one pixel as the second image;

storing the second image in a memory device operably coupled with the interactive media apparatus;

receiving a selection of the first image from the original video data stream;

extracting the first image;

spatially matching an area of the second image to an area of the first image in the original video data stream, wherein spatially matching the areas results in equal spatial lengths and widths between said two spatially matched areas; and

performing a substitution of the spatially matched first image with the spatially matched second image to generate the displayable edited video data stream from the original video data stream.

Ex. 1001, 7:14–54.

11. A method for generating a displayable edited video data stream from an original video data stream, wherein at least one pixel in a frame of the original video data stream is digitally extracted to form a first image, said first image then replaced by a second image resulting from a digital extraction of at least one pixel in a frame of a user input video data stream, said method comprising:

capturing a user input video data stream by using a digital video capture device;

using a data entry device operably coupled with the digital video capture device and a digital display device, selecting the at least one pixel in the frame of the input video data stream;

wherein the data entry device is selected from a group of devices consisting of: a keyboard, a display, a wireless communication capability device, and an external memory device; and

using a digital processing unit operably coupled with the data entry device, performing:

identifying the selected at least one pixel in the frame of the input video stream;

extracting the identified at least one pixel as the second image;

storing the second image in a memory device operably coupled with the digital processing unit;

receiving a selection of the first image from the user operating the data entry device;

extracting the first image from the original video data stream;

> spatially matching an area of the second image to an area of the first image in the original video data stream, wherein spatially matching the areas results in equal spatial lengths and widths between said two spatially matched areas;
>
> performing a substitution of the spatially matched first image with the spatially matched second image to generate a the displayable edited video data stream from the original video data stream;
>
> computing motion vectors associated with the first image; and
>
> applying the motion vectors to the second image, wherein the generated displayable edited video data stream resulting from the substitution maintains an overall motion of the original video data stream.

Ex. 1001, 8:28–9:4.

A. Evidence Relied Upon

Petitioner relies upon the following prior art references (Pet. 4–5):

Senftner	US 7,460,731 B2	Dec. 2, 2008	Ex. 1006
Sitrick	US 2005/0151743 A1	July 14, 2005	Ex. 1007
Levoy	US 2009/0309990 A1	Dec. 17, 2009	Ex. 1008

B. Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable based on the following grounds (Pet. 4):

Reference(s)	**Basis**	**Claim(s) challenged**
Senftner	§ 102	1, 2, 8, and 11
Senftner and Levoy	§ 103	3 and 4
Sitrick	§ 103	1, 2, 8, and 11
Sitrick and Levoy	§ 103	3 and 4

II. ANALYSIS

A. Constitutionality of Inter Partes Review

Patent Owner argues that *inter parte* review violates Article III of the Constitution. PO Resp. 10–13 (*citing* Order, *Oil States Energy Servs., LLC v. Greene's Energy Group, LLC*, No. 16–712 (U.S. June 12, 2017) (granting petition for writ of certiorari). The United States Supreme Court has since held, however, that "inter partes review does not violate Article III or the Seventh Amendment." *Oil States Energy Services, LLC v. Greene's Energy Group, LLC*, 138 S. Ct. 1365, 1379 (2018). As a result, Patent Owner's argument is not persuasive.

B. Claim Construction

We interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). We must be careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). Only terms that are in controversy need to be construed, and then only to the

extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

In our Decision on Institution, we construe "digitally extracted" to mean "digitally selected and separated out, such as by copying," and we construe "digital extraction" to mean "digital selection and separation out, such as by copying." Dec. 9–10. Neither party disputes our construction. PO Resp. 6; Pet. Reply 4. Having considered the arguments and evidence, we maintain our construction of "digitally extracted" to mean "digital selection and separation out, such as by copying."

Patent Owner proposes constructions for "user input video data stream," "original video data stream," "spatially matching," "pixel from the user entering data in the data entry display device," and wherein "the digital processing unit is further capable of extracting the at least one pixel from the user pointing to a spatial location in a displayed video frame." PO Resp. 7–9. Petitioner contends that "there are no issues as to these constructions that the Board needs to resolve." Pet. Reply. 5. We agree. We need not construe these terms for purposes of deciding the controversy between the parties.

C. Level of Ordinary Skill in the Art

Petitioner contends that a hypothetical person of ordinary skill in the art, with respect to and at the time of the'591 patent, would have been "at least an engineer with a Bachelor of Science degree and at least three years of imaging and signal processing experience or would have earned a Master's Degree in Electrical Engineering and at least two years of professional experience in signal, image, and video processing." Pet. 8; Ex. 1003 ¶ 25.

Patent Owner's declarant contends that such a person "would need to be knowledgeable in image processing, in image coding and programming, and possess some experience in system and hardware applications as applied to image and video applications" and that such knowledge "may be achieved by an engineer with a Bachelor of Science degree and at least three years of imaging and signal processing experience." Ex. 2012 ¶¶ 27–28[5]. Patent Owner does not otherwise address the level of ordinary skill in the art. *See generally* PO Resp.

We determine that no express finding on a specific corresponding level of technical education and experience is necessary. Here, the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

D. Weight to be given Dr. Prieto's Testimony

Petitioner argues that we should give little or no weight to Dr. Prieto's testimony because (1) "the [Patent Owner Response] and Dr. Prieto's Declaration are essentially identical;" (2) it is "statements by an inventor/owner" that "are not corroborated by documentary evidence;" and (3) it is not credible. Pet. Reply 6–10.

We agree with Petitioner that Dr. Prieto's testimony is essentially identical to the Patent Owner Response and largely reflects uncorroborated statements by an inventor/owner. As such, it is entitled to less weight than it otherwise would be. However, we are not persuaded that those factors and

[5] Dr. Prieto's declaration is labeled "Ex. 2011" in the footer, but was uploaded as Exhibit 2012. We cite to it as Exhibit 2012.

Dr. Prieto's admission on cross-examination are sufficient to give no weight to her testimony. Rather, it is within our discretion to assign the appropriate weight to be accorded evidence. *See* 37 C.F.R. § 42.65(a); *see also, e.g.*, *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding the Board has discretion to give more weight to one item of evidence over another "unless no reasonable trier of fact could have done so"); *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) ("[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations."); and *Velander v. Garner*, 348 F.3d 1359, 1371 (Fed. Cir. 2003) ("In giving more weight to prior publications than to subsequent conclusory statements by experts, the Board acted well within [its] discretion."). Based on the record before us, we are not persuaded that we should give the entirety of Dr. Prieto's testimony no weight.

E. Claims 1–4 and 8

Petitioner argues that (1) claims 1, 2, and 8 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Senftner; (2) claims 3 and 4 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Senftner and Levoy; (3) claims 1, 2, and 8 are unpatentable under 35 U.S.C. § 103(a) as obvious over Sitrick; and (4) claims 3 and 4 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Sitrick and Levoy. Claims 2–4 and 8 all depend from independent claim 1, which purports to recite an apparatus claim. For the reasons described below, Petitioner has not persuaded us that we can determine whether Petitioner has established, by a preponderance of the evidence, that the prior art teaches claim 1 and the claims that depend therefrom.

1. Principles of Law

The definiteness requirement of 35 U.S.C. § 112, second paragraph, mandates that a claim "particularly point[s] out and distinctly claim[s] the subject matter which the applicant regards as his invention." A claim that covers more than one subject matter class—e.g., "an apparatus and method of using that apparatus"—fails to meet this requirement. *Microprocessor Enhancement Corp. v. Tex. Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008) ("*MEC*"). The rationale for holding such a claim indefinite is that "it is unclear whether infringement . . . occurs when one creates a[n infringing] system, or . . . when the user actually uses [the system in an infringing manner]." *UltimatePointer, L.L.C. v. Nintendo Co.*, 816 F.3d 816, 826 (Fed. Cir. 2016) ("*UltimatePointer*") (quoting *IPXL Holdings, LLC v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005) ("*IPXL*")) (alterations in original).

Nonetheless, an apparatus claim may employ functional language without being indefinite for claiming both an apparatus and a method of using that apparatus. *Id*. Specifically, "[i]f an apparatus claim 'is clearly limited to a[n apparatus] possessing the recited structure and *capable* of performing the recited functions,' then the claim is not . . . indefinite." *Id.* (quoting *MEC*, 520 F.3d at 1375) (alteration in original).

2. Analysis

Claim 1 purports to recite an apparatus ("an apparatus comprising"), but each element of that apparatus is recited as performing an action. Claim 1 recites, for example, "an image capture device capturing," "an image display device displaying," "a data entry device . . . operated by a user to select the at least one pixel . . . and further operated by the user to select the

at least one pixel," and "a digital processing unit . . . performing" a series of recited steps. Ex. 1001, 7:21–54.

In our Decision on Institution, we stated that these limitations are analogous to the limitation at issue in *IPXL*. When analyzing a system claim that recited "and the user uses the input means to either change the predicted transaction information or accept the displayed transaction type and transaction parameters," the Federal Circuit held that

> it is unclear whether infringement of claim 25 occurs when one creates a system that allows the user to change the predicted transaction information or accept the displayed transaction, or whether infringement occurs when the user actually uses the input means to change transaction information or uses the input means to accept a displayed transaction. Because claim 25 recites both a system and the method for using that system, it does not apprise a person of ordinary skill in the art of its scope, and it is invalid under section 112, paragraph 2.

IPXL at 1384. We indicated in our Decision on Institution, based on the record before us, that it is similarly unclear whether claim 1 covers, for example, an apparatus that includes a data entry device *capable of* being operated by a user to select the at least one pixel, or covers only the user actually operating the data entry device to select the at least one pixel. It is similarly unclear whether claim 1 covers, for example, an apparatus that includes a data processing unit *capable of* performing the recited steps, or only covers only using the data processing unit to perform the recited steps.

Additionally, in our Decision on Institution, we stated that the limitations of claim 1 also are analogous to those in *In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303 (Fed. Cir. 2011) ("*Katz*"). In *Katz*, the Federal Circuit held that the claim recitations "wherein . . . callers digitally enter data" and "wherein . . . callers provide . . . data" were,

like the claim limitation at issue in *IPXL* ("wherein . . . the user uses"), "directed to user actions, not system capabilities." *Id.* at 1318. In this proceeding, based on the record before us, at least the claim limitation "a data entry device . . . operated by a user to select the at least one pixel. . . and further operated by the user to select the at least one pixel," is similarly directed to user actions, not to system capabilities.

We further indicated in our Decision on Institution that, based on the record before us, the limitations of claim 1 also are distinguishable from those in *MEC*, *HTC Corp. v. IPCom GmbH & Co., KG*, 667 F.3d 1270 (Fed. Cir. 2012) ("*HTC*") and *UltimatePointer*, in which the Federal Circuit held that the claims-at-issue were *not* indefinite. We stated that, unlike the apparatus claim at issue in *MEC*, the elements of claim 1 are not merely written in functional language—e.g., an element "for" performing a function—or directed to capability—e.g., an element "configured to" perform a function—but are instead written to require performance of the function. *See MEC*, 520 F.3d at 1375. We also stated that, unlike the method claim at issue in *MEC* and the claims at issue in *HTC*, claim 1 is not written in a "'preamble-within-a-preamble' format." *HTC*, 667 F.3d at 1277–78. Specifically, the functional language in claim 1 is not contained in the preamble preceding "the apparatus comprising." To the contrary, every element of the apparatus is recited either as performing a function or as being operated by a user. Finally, unlike the claim limitations at issue in *UltimatePointer* ("an image sensor generating data"), at least the claim limitation "a data entry device . . . operated by a user to select the at least one pixel. . . and further operated by the user to select the at least one pixel," does not merely indicate that the associated structure has this capability

(*Ultimate Pointer*, 816 F.3d at 827–28), but instead, based on the record before us, is like the limitations in *IPXL* and *Katz* where the structure is used by a user to enter data—i.e., "to select at least one pixel."

In its Supplemental Reply, Petitioner contends that the lack of clarity "does not hinder the Board's ability to address patentability" because "the uncertainty in claim scope involves only two potential species (apparatus claim elements or method steps), both of which can be measured against the prior art." Supp. Reply 1 (citing *Vibrant Media, Inc. v. General Electric Co.*, Case No. IPR2013-00172, Paper 50 at 9–11 (PTAB July 28, 2014).[6] At the hearing, Patent Owner cited *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010) for the proposition that

> a claim cannot be both indefinite and anticipated. A determination that a claim is anticipated involves a two-step analysis: "the first step requires construing the claim," and "[t]he

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[6] Patent Owner argues that those arguments in Petitioner's Supplemental Reply exceed the proper scope of the reply authorized in our Order (Paper 38). Paper 60. Petitioner counters that its argument is responsive to Patent Owner's argument, in its Supplemental Patent Owner Response, that we should terminate this review because we cannot address invalidity under 35 U.S.C. § 112. Paper 62. We have considered Patent Owner's listing, but disagree that the cited portions of Petitioner's Supplemental Reply are beyond the scope of what is appropriate for a reply. Replies are a vehicle for responding to arguments raised in a corresponding patent owner response. Petitioner's arguments are not beyond the proper scope of a reply because we find that they fairly respond to Patent Owner's arguments raised in Patent Owner's Supplemental Response. *See Idemitsu, Kosan Co. v. SFC Co. Ltd.*, 870 F.3d 1376, 1381 (Fed. Cir. 2017) ("This back-and-forth shows that what Idemitsu characterizes as an argument raised 'too late' is simply the by-product of one party necessarily getting the last word. If anything, Idemitsu is the party that first raised this issue, by arguing—at least implicitly—that Arkane teaches away from non-energy-gap combinations. SFC simply countered, as it was entitled to do.").

> second step in the analysis requires a comparison of the properly construed claim to the prior art . . . ." *Power Mosfet Techs., LLC v. Siemens AG*, 378 F.3d 1396, 1406 (Fed. Cir. 2004). If a claim is indefinite, the claim, by definition, cannot be construed. Without a discernable claim construction, an anticipation analysis cannot be performed. *See Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1342 (Fed. Cir. 2003) (vacating finding of infringement entered after claims were properly held to be indefinite).

Tr. 23:14–24:2. Patent Owner also argued at the hearing that, although *Vibrant Media* was affirmed under Rule 36 by the Federal Circuit (*General Electric Co. v. Vibrant Media, Inc.*, 626 Fed. Appx. 1010 (Fed. Cir. 2015), the issue of whether it was proper for the panel to determine the patentability of claims 9–11, which had *IPXL*-like issues, was not briefed and, therefore, the Rule 36 affirmance should not be seen as overruling *Enzo Biochem*. Tr. 25:8–17.

We disagree with Petitioner that we are able to address patentability of claim 1. In particular, even if one were to contend that claim 1 is an apparatus claim whose limitations are merely written in functional language, the Petition lacks the analysis required by 37 C.F.R. § 42.104(b)(3). For example, as we stated in our Decision on Institution, at least the "digital processing unit" limitation would invoke § 112, sixth paragraph. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (*en banc*) (in the absence of word "means," the presumption that means-plus-function does not apply may be overcome if "the claim fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function'"); Manual of Patent Examining Procedure § 2181 (9th ed. 2014, rev. July 2015) (identifying "device for" and "unit for" as non-structural generic placeholders); *Ex parte*

Lakkala, Appeal No. 2011-001526, slip op. at 9–13 (PTAB March 11, 2013) (determining that a "processor in communication with the memory device and configured with the program to" perform certain functions is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph); *Ex parte Erol*, Appeal No. 2011-001143 slip op. at 14–18 (PTAB March 11, 2013) (determining that a "processor adapted to" perform several steps is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph); *Ex parte Smith*, Appeal No. 2012-007631 slip op. at 12–16 (PTAB March 12, 2013) (determining that a "processor in communication with the memory and programmed to" perform certain functions is a means-plus-function recitation under 35 U.S.C. § 112, sixth paragraph).[7]

In its Supplemental Reply, Petitioner contends that the "digital processing unit" limitation does not use the word "means" and "is sufficiently structural under the broadest reasonable interpretation" to avoid invoking § 112, sixth paragraph. Supp. Reply 3 n.1. Petitioner's contentions do not respond persuasively to our preliminary analysis in the Decision on Institution. For example, similar to the "distributed learning control module" considered in *Williamson*, here, "digital processing unit" does not recite sufficiently definite structure. For the reasons given in our Decision on Institution, we maintain our determination that at least the "digital processing unit" limitation would invoke § 112, sixth paragraph.

[7] These three Board decisions were designated "Informative" on April 1, 2014, and are accessible by link posted on the Board's website under the heading "Decisions" and subheading "Key Decisions Involving Functional Claiming."

Petitioner acknowledges it has not identified structure corresponding to the functions recited in claim 1. Supp. Reply 3. As a result, we cannot determine whether the prior art includes the corresponding structure or its equivalents. Without ascertaining the proper claim scope, we cannot conduct a necessary factual inquiry for determining unpatentability of claim 1. *See BlackBerry Corp. v. MobileMedia Ideas, LLC*, Case IPR2013-00036, slip op. at 19–20 (PTAB Mar. 7, 2014) (Paper 65). For the same reasons, we also cannot determine if claims 2–4 and 8, which depend from independent claim 1, are unpatentable.

3. Conclusion

On this record, Petitioner has not established, by a preponderance of the evidence, claims 1–4, and 8 are unpatentable under any of the asserted grounds.

F. Claim 11: The Parties' Post-Institution Arguments

In our Decision on Institution, we concluded that the arguments and evidence advanced by Petitioner demonstrated a reasonable likelihood that claim 11 of the '591 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Sitrick. Inst. Dec. 38. We subsequently instituted on the remaining grounds asserted by Petitioner. Paper 36. We must now determine whether Petitioner has established by a preponderance of the evidence that claims 1–4, 8, and 11 are unpatentable over the cited prior art. 35 U.S.C. § 316(e).

We previously instructed Patent Owner that "any arguments for patentability not raised in the [Patent Owner Response] will be deemed waived." Paper 23, 3; *see also* 37 C.F.R. § 42.23(a) ("Any material fact not specifically denied may be considered admitted."); *In re Nuvasive, Inc.*, 842

F.3d 1376, 1379–1382 (Fed. Cir. 2016) (holding Patent Owner waived an argument addressed in Preliminary Response by not raising the same argument in the Patent Owner Response). Additionally, the Board's Trial Practice Guide states that the Patent Owner Response "should identify all the involved claims that are believed to be patentable and state the basis for that belief." Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

With a complete record before us, we note that we have reviewed arguments and evidence advanced by Petitioner to support its unpatentability contentions where Patent Owner chose not to address certain limitations in its Patent Owner Response or Supplemental Patent Owner Response. In this regard, the record now contains persuasive, unrebutted arguments and evidence presented by Petitioner regarding the manner in Sitrick teaches corresponding limitations of claim 11. Based on the preponderance of the evidence before us, we conclude that Sitrick teaches or suggests all uncontested limitations of claim 11. The limitations that Patent Owner contests in the Patent Owner Response are addressed in more detail below.

G. Claim 11: Anticipation by Senftner

Petitioner argues that the claim 11 is unpatentable under 35 U.S.C. § 102(b) as anticipated by Senftner. Pet. 11–37. In light of the arguments and evidence of record, we are not persuaded that Petitioner has established a reasonable likelihood that the claim 11 is unpatentable as anticipated by Senftner.

1. Principles of Law

To establish anticipation, "all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim."

Karsten Mfg. Corp. v. Cleveland Golf Co., 242 F.3d 1376, 1383 (Fed. Cir. 2001). When evaluating a single prior art reference in the context of anticipation, the reference must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). "'[T]he dispositive question regarding anticipation[, therefore, i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference's] teaching' that every claim element was disclosed in that single reference." *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (alterations in original) (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991)). We analyze this asserted ground based on anticipation with the principles stated above in mind.

2. Senftner Overview (Ex. 1006)

Senftner is directed to "[p]rocesses and apparatus for personalizing video through partial image replacement." Ex. 1006, Abstract. "Personalization may include partial or full replacement of the image of an actor, an object, or both." *Id.* "Personalization may also include insertion or replacement of an object, and full or partial replacement of the background and/or sound track." *Id.*

3. Analysis

Claim 11 recites "computing motion vectors associated with the first image" and "applying the motion vectors to the second image." Petitioner relies upon Senftner's disclosure of capturing the "key motions" of a new actor and then "referenc[ing]" them when substituting the new actor for the

original actor. Pet. 37 (citing analysis of claim 2 at Pet. 29–31 (quoting Ex. 1006, 2:41–54, 6:8–14, 17:10–23)).

Patent Owner argues that motion vectors represent an amount by which a block is offset from a current frame to a reference frame, and Senftner does not use motion vectors because it does not use reference frames; instead, Senftner determines the position, orientation, and expression of the selected target for *each* frame. Prelim. Resp. 26–27 (citing Ex. 2010, titled "H.264 and MPEG-4 Video Compression").

Patent Owner's argument about the meaning of "motion vectors" has no basis in the claims or in the Specification. The term "motion vector" is not used in the '591 patent apart from the claims, the claims are not limited to MPEG-encoded video, and the Specification does not even mention MPEG. Moreover, Patent Owner's reliance on Exhibit 2010, which explains "motion vectors" in the context of MPEG-based video encoding (Prelim. Resp. 26), appears to directly contradict its later argument that "[t]he computation of motion vectors for the first and second image is not the same as the computation of MPEG motion vectors in *encoded video*" (*id.* at 55). As a result, we give little weight to Patent Owner's argument that Senftner does not use motion vectors.

Nevertheless, based on our review of the cited portions of Senftner, we do not find any explicit disclosure of computation or application of motion vectors. Even assuming that "key motions are preserved," as Senftner discloses (*see, e.g.*, Ex. 1006, 6:11–12), Petitioner identifies nothing in Senftner that discloses or implies that they are computed as vectors. Moreover, Petitioner does not argue that computing and applying motion vectors is inherent in the process of preserving the key motions of a

new actor and referencing them in the process of substituting the new actor for the original actor. As a result, we are not persuaded that Senftner discloses "computing motion vectors associated with the first image" and "applying the motion vectors to the second image," as recited in claim 11.

4. Conclusion

Petitioner has not established, by a preponderance of the evidence, that claim 11 is unpatentable as anticipated by Senftner.

H. Claim 11: Obviousness over Sitrick

Petitioner argues that claim 11 is unpatentable under 35 U.S.C. § 103(a) as obvious over Sitrick. Pet. 46–66. In light of the arguments and evidence of record, we are persuaded that Petitioner has established a reasonable likelihood that claim 11 is unpatentable as obvious over Sitrick.

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze this asserted ground based on obviousness with the principles identified above in mind.

2. Sitrick Overview (Ex. 1007)

Sitrick is directed generally to "a system and method for processing a video input signal providing for tracking a selected portion in a predefined audiovisual presentation and integrating selected user images into the selected portion of the predefined audiovisual presentation." Ex. 1007, Abstract. Figure 1 of Sitrick is reproduced below.

Fig. 1

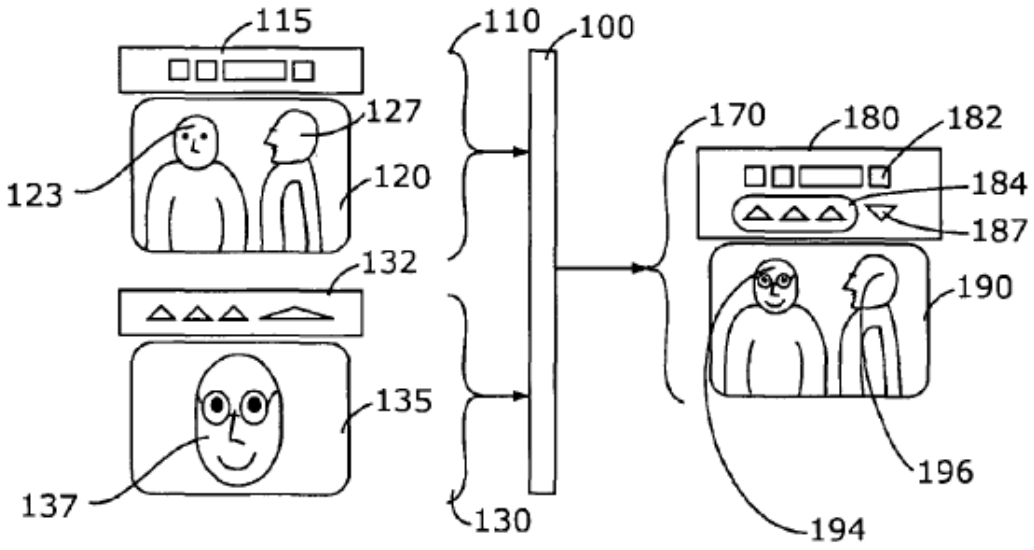

Figure 1 shows a system block diagram of an embodiment of Sitrick, including user image video processing and integration subsystem 100. *Id.* ¶ 31. External source of program content 110 includes program video 120, in which first person 123 and second person 127 are visible. *Id.* External source of user image content 130 includes user image data 135, in which user specified image 137 is visible. *Id.* Subsystem 100 processes sources 110 and 130 to produce output content 170, which includes output video 190. *Id.* Output video 190 consists of a processed version of program video 120 such that first person 123 has been replaced by user specified image 137. *Id.*

Figure 13, reproduced below, is a detailed block diagram of a preferred embodiment of Sitrick in which subsystem 100 is implemented on a general purpose computer. *Id.* ¶ 121.

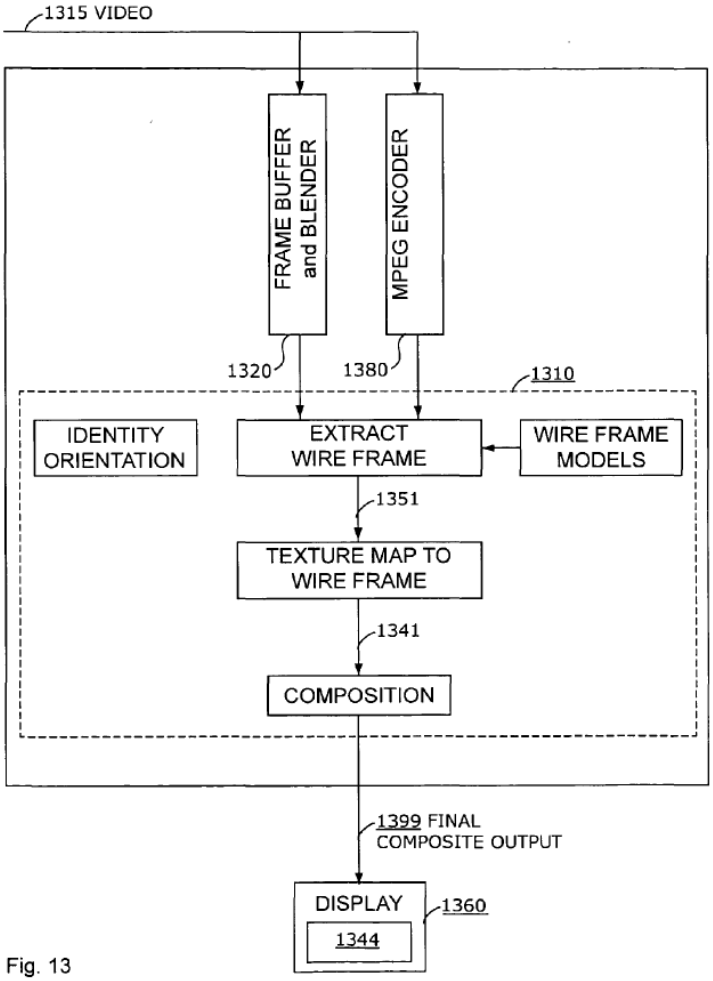

Fig. 13

As shown in Figure 13, the system comprises frame buffer 1320, MPEG encoder 1380, and general purpose computer 1310. *Id.* at 121. In operation,

> The general purpose computer 1310 comprises an extract wire-frame means, a wire-frame model database, an orientation identification means, a mapping means, and a compositing means. The wire-frame model database comprises user geometric object information. An output of wire-frame model data is supplied to the extract wire-frame means. An output of the orientation identification means is supplied to the extract wire-frame means. The extract wire-frame means transforms the

> wire-frame model data, responsive to information from at least one of the frame buffer 1320 and the MPEG encoder 1380, and supplied transformed wire-frame model data 1351 to the mapping means. In a preferred embodiment, the functions of the extract wire-frame means, the orientation identification means, the mapping means, and the compositing means may be performed by software executing on the general purpose computer 1310.
>
> The mapping means maps user replacement object images onto the transformed wire-frame model data 1351 producing a texture mapped output replacement object image 1341. The replacement object image 1341 is provided from the mapping means to the compositing means. The compositing means combines the replacement object image 1341 with data from the frame buffer 1320 producing final composited output 1399. The final composited output 1399 is representative of the first audiovisual presentation with selected portions being replaced by user object image content. In a preferred embodiment, the final composited output 1399 is provided as an input signal to display unit 1360, where it may be displayed as a display presentation 1344.

Id. ¶¶ 122, 123.

3. Analysis

Petitioner contends that claim 11 of the '591 patent would have been obvious over Sitrick. Pet. 46–66. We have reviewed the Petition, Patent Owner's Response, and Petitioner's Reply, as well as the relevant evidence discussed in those papers and other record papers, and are persuaded that the record establishes Petitioner's contentions for claim 11, and we adopt Petitioner's contentions discussed below as our own. We address the parties' contentions with respect to each limitation of claim 11 in turn.

a. Preamble

The preamble of claim 11 recites "[a] method for generating a displayable edited video data stream from an original video data stream."

Petitioner relies upon Sitrick's teaching of subsystem 100 performing a "method for processing a video input signal providing for tracking a selected portion in a predefined audiovisual presentation and integrating selected user images into the selected portion of the predefined audiovisual presentation." Pet. 66 (citing Pet. 48–49)[8]; Ex. 1007, Abstract, ¶ 31. Patent Owner does not argue the preamble. *See generally* PO Resp. We are persuaded by Petitioner's showing and find that Sitrick teaches a method for generating a displayable edited video data stream from an original video data stream.

The preamble of claim 11 further recites "wherein at least one pixel in a frame of the original video data stream is digitally extracted to form a first image, said first image then replaced by a second image resulting from a digital extraction of at least one pixel in a frame of a user input video data stream." Petitioner relies upon Sitrick's teaching of a "mask" as the recited first image (Pet. 49–51) and, alternatively, relies upon Sitrick's teaching to use image recognition to identify an image of a reference object (*id.* at 51–55). Specifically, Petitioner contends that "a POSITA would understand that Sitrick discloses forming the first image at least (1) when the mask is produced, or (2) when the image of the reference object is created to be used

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[8] On page 66 of the Petition, Petitioner argues that "Claim 11 includes the same limitation as claim 1, but is written as a method claim instead of an apparatus claim. . . . For the same reasons Sitrick makes obvious claims 1-2, Sitrick also renders obvious claim 11." With respect to other claim 11 limitations that are said to correspond to claim 1 or claim 2 limitations, Petitioner similarly relies on the discussion and evidence cited in the pages of the Petition pertaining to the claim 1 or claim 2 limitations. For convenience, going forward, we cite only to the pages of the Petition in which Petitioner's analysis for the corresponding claim 1 or claim 2 limitations appear.

by the tracking subsystem." *Id.* at 53. Patent Owner does not argue the preamble. *See generally* PO Resp. We are persuaded by Petitioner's showing and find that Sitrick teaches this part of the preamble.

b. "Capturing a user input video data stream . . ."

Claim 11 recites "capturing a user input video data stream by using a digital video capture device." Petitioner relies upon Sitrick's teaching of a "video camera" and "digital camera." Pet. 55 (citing Ex. 1007 ¶¶ 12, 139). Patent Owner does not argue this limitation. *See generally* PO Resp. We are persuaded by Petitioner's showing and find that Sitrick's video camera or digital camera is a digital video capture device that captures a user input video data stream.

c. "Using a data entry device operably coupled with the digital video capture device and a digital display device. . ."

Claim 11 recites "using a data entry device operably coupled with the digital video capture device and a digital display device, selecting the at least one pixel in the frame of the input video data stream." Petitioner relies upon Sitrick's teaching of an embodiment implemented using a general purpose computer which, Petitioner argues, "would necessarily have a 'data entry device,' such as a keyboard." Pet 56 (citing Ex. 1003 ¶¶ 98, 105). Petitioner argues that a person of ordinary skill in the art would have recognized that Sitrick's general purpose computer, with its data entry device, would be operably coupled to a digital video capture device and to a digital display device. Pet. 57–59.

Patent Owner argues that Sitrick does not "necessarily" have a "data entry device," as Petitioner contends, because its disclosure a general purpose computer could be, for example, "a mainframe with remote terminal

access but not keyboard input." PO Resp. 18–20. Petitioner counters that Patent Owner's argument ignores what a person of ordinary skill in the art would have understood "general purpose computer" to mean and argues that "Dr. Prieto admitted that Sitrick discloses using a PC with a data entry device." Pet. Reply 18.

Patent Owner's argument is not persuasive because this is an obviousness ground, not an anticipation ground, and Petitioner therefore need not establish that Sitrick "necessarily" has a keyboard. Moreover, we are persuaded that a person of ordinary skill in the art would have understood Sitrick's disclosure of a "general purpose computer" to include a keyboard. As Petitioner points out, Dr. Prieto conceded as much in deposition:

> Q. Sure. That the general purpose computer of Paragraph 42 including the disclosure of the standard commodity personal computer, that person of ordinary skill in the art would understand that has an input device such as a keyboard and a display; right?
>
> A. Yes, the personal computer that is available, yes, definitely.

Ex. 1020, 101:4–23. As a result, we are persuaded that Sitrick teaches a "data entry device."

d. "Selecting the at least one pixel in the frame of the [user] input video data stream"

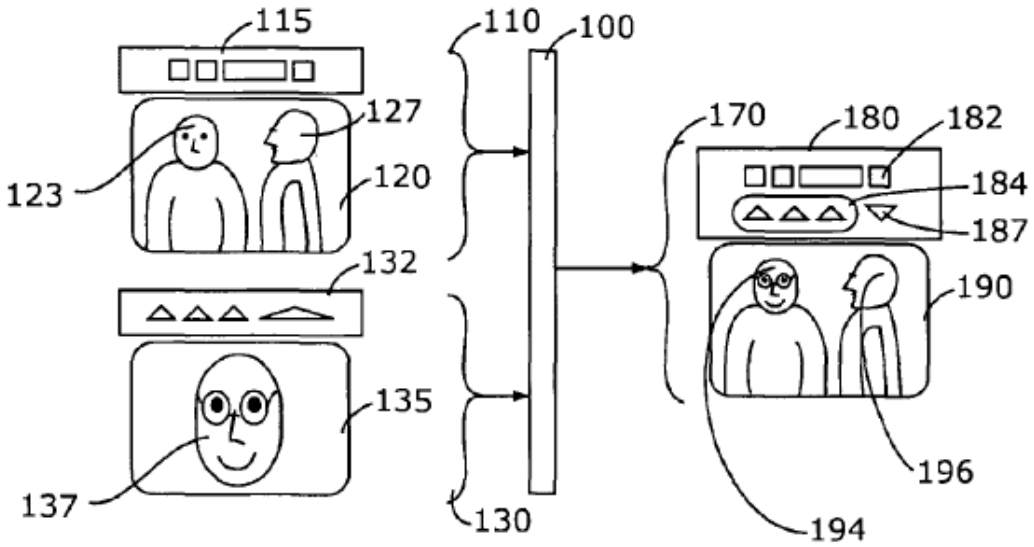
Claim 11 recites "selecting the at least one pixel in the frame of the [user] input video data stream." Petitioner relies upon Sitrick's teaching of "a user selected image" (Pet. 32 (citing Ex. 1007 ¶ 11)) and argues that "a user operating the Sitrick system would necessarily have to 'select' at least one pixel in . . . the user input video data stream in order for the system to analyze . . . 'the user selected image' (the second image)." Pet. 57–58.

Patent Owner argues that Sitrick does not disclose this limitation because "what is actually inputted to the substitution block[] is not the user selected image," arguing that processing subsystems 500 and 600, shown in Figures 5 and 6, respectively, receive as inputs either a texture map (Figure 5, 570) or a series of images (Figure 6, 670), neither of which are "at least one pixel" extracted from a frame of the user input video data stream PO Resp. 20–21.

Petitioner counters that Sitrick discloses that the second image is "a user selected image" extracted from a "digitization scan of an external object such as of a person by video camera or a photograph or document." Pet. Reply 19 (quoting Ex. 1007 ¶¶ 11–12).

We agree with Petitioner. Sitrick states repeatedly that face 137 is a "user specified image" and that a "user selected" image is substituted into a predefined audiovisual presentation. Ex. 1007 ¶¶ 3, 6, 11, 13, 31. Figure 1 illustrates the process unambiguously:

Fig. 1



Ex. 1007, Fig. 1. Even if Figure 6 shows a number of variations of face 137 that have been extracted from a video, each of those is nevertheless the

result of a selection of at least one pixel—i.e., face 137—by the user. And even assuming that user-specified image 137 is a texture map by the time it is an input 570 into subsystem 500, that is not sufficient to show that an image was not originally selected, as the claim requires. Contrary to Patent Owner's argument, claim 11 does *not* require using the second image in the substitution step. Instead, claim 11 recites performing substitution "with the *spatially matched* second image," which is not necessarily identical to the "second image." As a result, even assuming that Sitrick modifies the selected image 137 prior to substitution, that is consistent with the language of claim 11, which requires a possibly-modified ("spatially matched") second image being used in the substitution step.

e. "Wherein the data entry device is selected from a group . . ."

Claim 11 recites "wherein the data entry device is selected from a group of devices consisting of: a keyboard, a display, a wireless communication capability device, and an external memory device." Petitioner relies upon Sitrick's teaching of a general purpose computer and argues that "[a] general purpose computer necessarily includes a data entry device, such as a keyboard." Pet 59. Patent Owner does not argue this limitation. *See generally* PO Resp. For the reasons discussed above with respect to the "using a data entry device . . ." limitation, we are persuaded that a person of ordinary skill in the art would have understood Sitrick to teach, or at least suggest, a keyboard.

f. "Using a digital processing unit . . ."

Claim 11 recites "using a digital processing unit operably coupled with the data entry device." Petitioner relies upon Sitrick's disclosure of an implementation on a general purpose computer 1310, which would include a

central processing unit (CPU). Pet 59 (citing Ex. 1007 ¶ 115). Although paragraph 115 describes general purpose computer 1110 in Figure 11, rather than general purpose computer 1310 in Figure 13, we are persuaded that general purpose computer 1310 would similarly comprise a CPU.

Patent Owner argues that Sitrick does not teach this limitation because, according to Patent Owner, a person of ordinary skill in the art "would understand that a CPU will have a narrower definition" than the digital processing unit ("DPU") recited in the claims and, therefore, "the CPU will be considered a subset of a DPU." PO Resp. 21–22. According to Patent Owner, a DPU "is a fully functional data processing system," unlike a CPU, and Sitrick's CPU would not be capable of performing the functions that a DPU can perform. *Id.* at 22–23.

Petitioner counters that "digital processing unit" is not defined in the '591 patent, has no special meaning, and therefore is met by any processor capable of performing the recited functions. Pet. Reply 20. Petitioner points out that Patent Owner's argument "appears to be an admission that a CPU (a species) discloses a DPU (a genus)." *Id.* (citing *In re Slayter*, 276 F.2d 408, 411 (CCPA 1960)). Petitioner also accuses Patent Owner of trying to narrowly define DPU by requiring it to be capable of additional functions that are not recited in the claims. *Id.* at 21.

We agree with Petitioner. The '591 patent does not define "digital processing unit," or even use that term apart from the claims. The '591 patent does not describe a "processor" or "processing unit" at all. As a result, we are not persuaded by Patent Owner's contention that "digital processing unit" has a narrower definition than CPU. Sitrick discloses a general purpose computer with a CPU that is capable of performing all of

the functions recited in claim 11. As a result, we are persuaded that Sitrick's CPU teaches the recited "digital processing unit."

g. "Identifying the selected at least one pixel in the frame of the input video stream"

Claim 11 recites "identifying the selected at least one pixel in the frame of the input video stream." According to Petitioner, "Sitrick discloses selecting a user's face (second image) from the user's image data for overlaying on the mask/reference object (first image) of the program video." Pet. 59–60 (citing Ex. 1007, Fig. 1, Fig. 5, ¶¶ 11, 31, 40, 87). Petitioner argues that "[t]o complete the overlaying, pixel(s) of the user image data must necessarily be identified and selected." *Id*. at 60 (citing Ex. 1003 ¶ 108).

Patent Owner argues that Sitrick does not teach this limitation because what is substituted, in processing subsystems 500 and 600, is not the selected "second image" but rather a texture map (Figure 5, 570) or a series of images (Figure 6, 670). PO Resp. 23–25. According to Patent Owner, "what is actually inputted to the composite and mask subsystem block 640 Fig. 6 is a transformed image of the selected view 632," which "is not the same in structure to the second image and cannot therefore be considered a second image."

Petitioner counters that Patent Owner appears to be arguing limitations other than what is recited in the "identifying" step. Pet. Reply 22. Nevertheless, Petitioner points out that

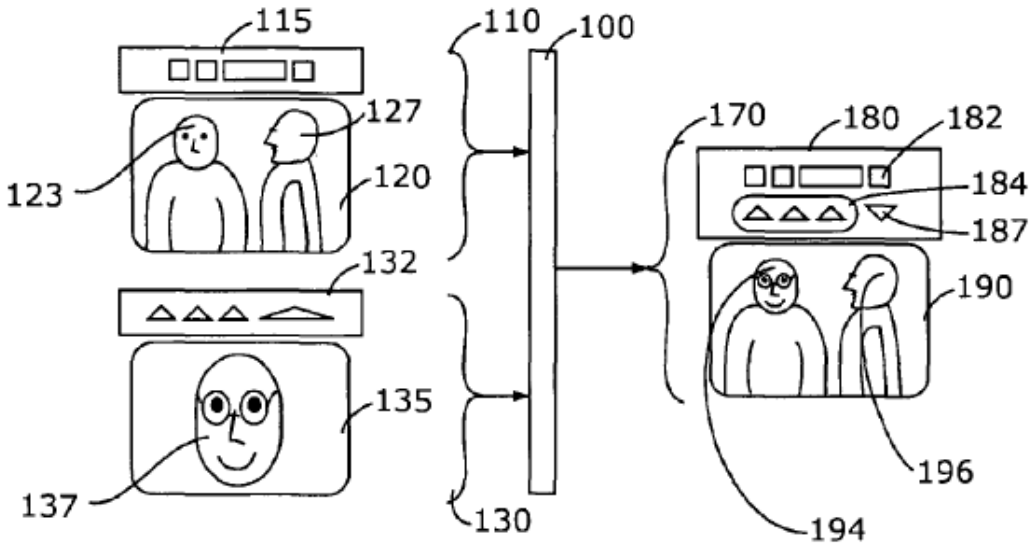
> in the embodiment where "user selected image 137" replaces a "selected portion of the predefined audiovisual presentation" (*id*. at ¶13), the computer associates the replacement object image (user selected image 137) with a reference object (the selected portion of the audiovisual presentation), which shows that the

> computer has identified both images for use in the replacement process. (Ex. 1017-Delp at ¶¶43-45.)

Id. at 23.

We agree with Petitioner. As an initial matter, Patent Owner's arguments are not persuasive because they are predicated on the erroneous assertion that claim 11 requires performing a substitution with the "second image." In fact, claim 11 recites performing a substitution with "the spatially matched second image," which is not necessarily identical to the "second image." Moreover, we are persuaded that Sitrick teaches "identifying" the selected at least one pixel in the user image data 135. As shown in Figure 1 of Sitrick, "at least one pixel"—i.e., face 137—is identified and substituted for face 123 in output video 190.

Fig. 1



h. "extracting the identified at least one pixel as the second image"

Claim 11 recites "extracting the identified at least one pixel as the second image." Petitioner relies upon Sitrick's teaching to extract user specified image 137 from user image data 135. Pet. 60–61 (citing Ex. 1007,

Fig. 1, ¶¶ 31, 101). Sitrick teaches that "I[f] the external source of user image content 130 is further comprised of other user data 132 and user image data 135, the user image data 135 is further comprised of a user specified image 137." Ex. 1007 ¶ 31.

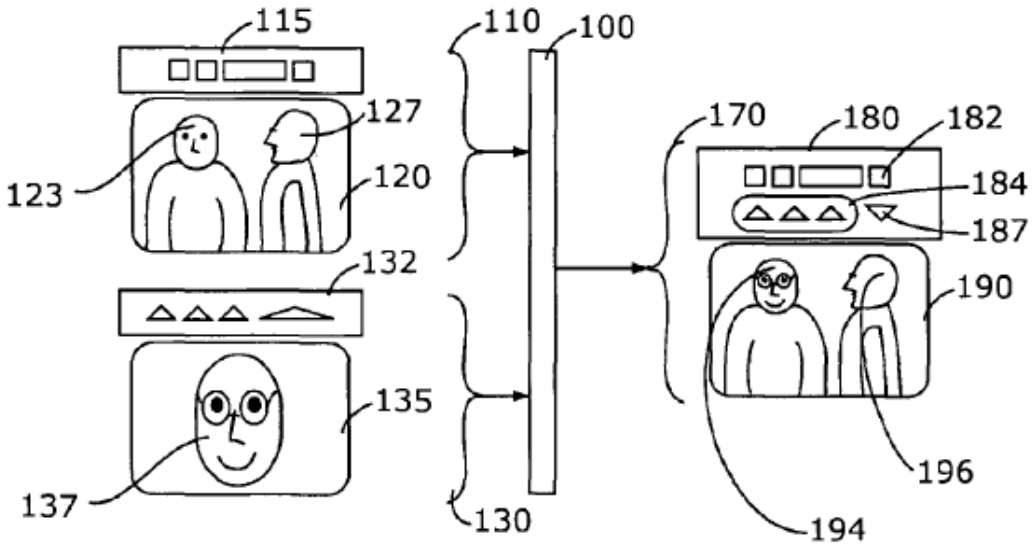
Patent Owner argues Sitrick does not teach this limitation because Sitrick's processing subsystems 500 and 600, shown in Figures 5 and 6, respectively, receive as inputs either a texture map (Figure 5, 570) or a series of images (Figure 6, 670), neither of which are "at least one pixel" extracted from a frame of the user input video data stream. PO Resp. 16–18.

Petitioner counters that Sitrick explicitly describes facial image 137 as a "user-specified" image (Ex. 1007 ¶ 31) and elsewhere describes a "user selected image" that "can be provided by any one of a number of means, such as by . . . digitization scan of an external object such as of a person by video camera or a photograph or a document" (*id.* ¶¶ 11–13). Pet. Reply 14–15. As Petitioner points out, Sitrick illustrates this clearly in Figure 1, where image 137 of user input content 130 is "extracted"—which we have construed to mean "selected and separated out"—from user image data 135 so that it can be substituted for face 123. *Id.* at 15. Petitioner rebuts Patent Owner's characterization of Sitrick's description of subsystems 500 and 600, arguing that images are extracted from an "external source of user image content 570" and, likewise, that individual images 671, 672, 673, 674, 675, 676, and 677 shown in Figure 6 are extracted from user input content 130. *Id.* at 15–16.

We agree with Petitioner. Sitrick states repeatedly that face 137 is a "user specified image" and that a "user selected" image is substituted into a

predefined audiovisual presentation. Ex. 1007 ¶¶ 3, 6, 11, 13, 31. Figure 1 illustrates the process unambiguously:

Fig. 1



Ex. 1007, Fig. 1. Moreover, we agree with Petitioner that, even if Figure 6 shows a number of variations of face 137 that have been extracted from a video, each of those is nevertheless the result of a selection of at least one pixel—i.e., face 137—by the user. Finally, even assuming that the user-specified image is a texture map by the time it is an input 570 into subsystem 500, that is not sufficient to show that the image was not originally extracted as "at least one pixel in the frame of the user input video data stream," as the claim requires.

i. "Storing the second image . . ."

Claim 11 recites "storing the second image in a memory device operably coupled with the digital processing unit." Petitioner relies upon Sitrick's teaching that, "[t]he data for the user replacement object image may reside in either or both of the storage subsystem 1140 or the memory subsystem 1150." Pet. 61–62 (citing Ex. 1007, Fig. 11, ¶¶ 111, 115, 116). Patent Owner does not argue this limitation. *See generally* PO Resp.

Although this disclosure relates to Figure 11, we are persuaded that a person of ordinary skill in the art would have understood the system of Figure 13 to similarly store image data in similar storage or memory subsystems.

j. "Receiving a selection of the first image"

Claim 11 recites "receiving a selection of the first image from the user operating the data entry device." Petitioner relies upon Sitrick's teaching to replace an identified reference object in an audiovisual presentation, and argues that "the Sitrick system, which may be implemented on a general purpose computer, necessarily receives the selection of the first image in order to carry out the disclosed replacement process." Pet. 62–63 (citing Ex. 1003 ¶ 111; Ex. 1007 ¶¶ 13 ("the selected portion of the predefined audiovisual presentation"), 84, 115). Patent Owner does not argue this limitation. *See generally* PO Resp. We are persuaded by Petitioner's showing and find that Sitrick teaches receiving a selection of the first image from the user operating the data entry device.

k. "Extracting the first image from the original video data stream"

Claim 11 recites "extracting the first image from the original video data stream." Petitioner states

> Sitrick extracts a first image, such as a mask or reference object image. (*Id*. at, *inter alia*, Fig. 7 and ¶¶ 48–49, 54 (shows extraction of the mask image); Figs. 7-8, ¶¶ 49, 57, 71–72, 82 (shows extraction of a reference object image).) (Ex. 1003 at ¶¶ 112–114 (explaining Sitrick's extraction of the mask and reference object images).).

Pet 63. Sitrick describes an embodiment of a tracking subsystem, which "accepts a first audiovisual presentation comprised of visual picture image 710 and performs processing on that presentation." Ex. 1007 ¶ 48. "The tracking subsystem 700 may compute a[] mask 750[,] which represents the

region of the reference object within the visual picture image 710, in this example the face 711." *Id.* ¶ 54. Sitrick also describes a tracking subsystem that works with a first audiovisual presentation "comprised of a time-ordered sequence 810 of visual picture images." *Id.* ¶¶ 55–61 (describing embodiment of Figure 8). Sitrick teaches that, "[i]n an embodiment where the reference object is embedded within the visual picture, the present invention includes means to analyze the visual picture to detect the embedded reference object" and that "[t]his may be accomplished by image recognition means." *Id.* ¶ 71. Notwithstanding Patent Owner's argument, which we address below, we are persuaded that this step is taught by Sitrick's teaching of using image recognition to identify a reference object from the original video data stream.

Patent Owner argues Sitrick does not teach this limitation because its tracking subsystem "does not output an image (first image)." PO Resp. 15–16 ("the output of such an analysis is not an image."). This argument is not persuasive because it is not commensurate with the claims, which do not require outputting an image. Pet. Reply 12–13. The claims recite "extracting" the first image. Sitrick's tracking subsystem "extracts" the first image by creating a mask (e.g., mask 750 or mask 860) "which represents the region of the reference object within the visual picture image 710, in this example face 711." Ex. 1007 ¶ 54. "In another preferred embodiment, the mask is opaque in the region of the reference object and clear elsewhere." *Id.* "In another embodiment, the mask is clear in the region of the reference object and opaque elsewhere." *Id.* Thus, Sitrick teaches that its tracking subsystem create masks that are used to "extract"—which we have

construed to mean "select and separate out"—face 711, for example, from the first audiovisual presentation.

l. "Spatially matching . . ."

Claim 11 recites "spatially matching an area of the second image to an area of the first image in the original video data stream, wherein spatially matching the areas results in equal spatial lengths and widths between said two spatially matched areas." Petitioner relies upon Sitrick's teaching of "several methods of matching an area of the second image to an area of the first image—*e.g.*, mapping, stretching, rotating, scaling, zooming, curling, shearing, distorting, and morphing of the size of a replacement image (second image) to obtain the best results." Pet. 63–64.

Patent Owner argues that "spatially matching" means "aligning a set of pixels in the spatial domain" and that Sitrick does not teach this limitation because "[i]t is not obvious to a [person of ordinary skill in the art] that a shrinking transform, a zooming transform, stretching transform, etc., as cited by Petitioner, that the selected two areas would have equal lengths and widths." PO Resp. 26–27. Patent Owner cites Sitrick's disclosure that these transforms are used to obtain "the best result" (Ex. 1007 ¶ 95).

Petitioner counters that Sitrick's transforms do align pixels in the spatial domain. Pet. Reply 23–24. Petitioner contends that Patent Owner's assertions about how a person of ordinary skill in the art would understand Sitrick are conclusory and unsupported by evidence. *Id.*

Although Dr. Prieto testifies in support of Patent Owner's position, we find the testimony of Dr. Delp more credible on this issue. Ex. 1017 ¶¶ 46–53. Dr. Prieto's declaration merely parrots the Patent Owner Response without providing a persuasive explanation for the assertion that a person of

ordinary skill in the art would not find it obvious to use the transforms to achieve "equal spatial lengths and widths between two spatially matched areas." Ex. 2012 ¶¶ 69–72. Dr. Prieto does not, for example, identify particular obstacles that a person of ordinary skill in the art would have understood to exist and why the transforms disclosed in Sitrick would not have been adequate to overcome those obstacles.

In contrast, Dr. Delp explains that spatial matching does not require any particular technique, and that a person of ordinary skill in the art would understand Sitrick's morphing technique—involving an "exact one to one relationship between the first array of coordinates and the second array of coordinates"—to align the points of the first image into the points of the second image, which would result in equal length and width. *Id.* ¶¶ 47–48 (quoting Ex. 1007 ¶ 97). Dr. Delp further explains that Dr. Prieto's reliance on the phrase "to obtain the best results" in Sitrick is misplaced because that phrase "does not indicate the limitations of Sitrick, but rather, simply indicates that different techniques may be selectively used to obtain a better output that the user would have desired." *Id.* ¶ 49.

As a result, we are persuaded that Sitrick teaches the use of its transforms to perform "spatially matching."

m. "Performing a substitution . . ."

Claim 11 recites "performing a substitution of the spatially matched first image with the spatially matched second image to generate a the [sic] displayable edited video data stream from the original video data stream." Petitioner relies upon Sitrick's teaching of overlaying user image data over a portion of a first audiovisual presentation to create output video 190. Pet. 64 (citing Ex. 1007, Fig. 1, ¶¶ 31, 87, 95, 96, 100). Patent Owner does not

argue this limitation. *See generally* PO Resp. We are persuaded by Petitioner's showing and find that Sitrick's overlaying teaches this limitation.

n. "Computing motion vectors . . ."

Claim 11 recites "computing motion vectors associated with the first image." Petitioner relies upon Sitrick's disclosure of tracking a location of a face, and of a correlation means, that uses motion vector information from encoded video. Pet. 65 (citing Ex. 1007 ¶¶ 57, 65, 67); *see also* Ex. 1007 ¶¶ 66, 76). Petitioner argues that "a [person of ordinary skill in the art] understands Sitrick as disclosing that its computer computes the motion vectors in a video encoded in the MPEG standard to estimate the actual position of the reference object in each frame of the video." *Id.* (citing Ex. 1003 ¶ 119).

Patent Owner argues

> However, assuming, arguendo, that a first and second image area is disclosed in Sitrick, Sitrick teaches computation of motion vectors in an encoder signal using an MPEG encoder, Figs. 11–13. Importantly, Sitrick still fails to teach that the motion vectors are applied to the second image. . . .
>
> . . . . In [0116] Sitrick teaches that the MPEG encoder motion vectors are processed to assist in the task of correlation, recognition and association steps. (Ex. 2011 at ¶75).
>
> Sitrick clearly teaches in [0081] that correlation means are used to determine whether a reference object (within a first audiovisual presentation) is associated or not with a visual picture in the first audiovisual presentation. Again, it is clearly obvious that there is not selection of 'a first image' but a detection of 'a first image'. Therefore, motion vectors computer for the purpose of correlation are again only associated with the first audiovisual presentation (video input signal) and are then only associated with the first image (reference). The use of the

> motion vectors as it is related to the correlation function is solely associated with what may be considered the first image. (Ex. 2011 at ¶ 76).

PO Resp. 28–29. Petitioner counters that Patent Owner "appears not to raise a dispute about" this limitation and "appears to agree, and admits that 'Sitrick teaches computation of motion vectors in an encoder signal using an MPEG encoder.'" Pet. Reply 24–25.

To the extent Patent Owner is arguing that Sitrick fails to teach applying the motion vectors to the *second* image, that argument is not persuasive because it relates to the next limitation and does not show that Sitrick fails to teach "computing motion vectors associated with the *first* image." Patent Owner appears to agree that "motion vectors compute[d] for the purpose of correlation . . . are then only associated with the first image (reference)." PO Resp. 28–29. That is all the claim requires: "computing motion vectors associated with the first image." Thus, notwithstanding Patent Owner's discussion of the limitation, it does not appear to be in dispute.

We are persuaded that Sitrick teaches "computing motion vectors associated with the first image."

o. "Applying the motion vectors . . ."

Claim 11 recites "applying the motion vectors to the second image, wherein the generated displayable edited video data stream resulting from the substitution maintains an overall motion of the original video data stream." Petitioner relies upon Sitrick's teaching of applying the motion vectors to the user specified image by geometrical transformations. Pet. 65–66 (citing Ex. 1003 ¶ 120; Ex. 1007 ¶¶ 100, 104).

Patent Owner argues, in connection with the previous limitation, that "Sitrick still fails to teach that the motion vectors are applied to the second image" (PO Resp. 27) and argues, in connection with this limitation, that "[n]o motion vectors are supplied or obtained from the first audiovisual presentation from which the representation of the first image is obtained." (PO Resp. 29). According to Patent Owner, there would be no point in storing all of the data that Sitrick stores if motion vectors from the first image were to be applied to the substitute image. *Id.* at 29–30 (citing Ex. 2012 ¶ 78).

Petitioner counters that Patent Owner's argument is not commensurate with the scope of the claim, which does not recite "suppl[ying]" or "obtain[ing]," but instead recites "applying." Pet. Reply 26. According to Petitioner, to the extent Patent Owner is arguing that motion vectors associated with the first image are applied to something other than the "second image," that argument is erroneous. *Id.* (citing Ex. 1017 ¶¶ 57–58).

On this issue, we again find the testimony of Dr. Delp more credible than the testimony of Dr. Prieto. Dr. Prieto's testimony merely parrots the Patent Owner Response. Ex. 2012 ¶¶ 77–78. In contrast, Dr. Delp testifies that

> Sitrick describes that "[a]s the correlation means continues to recognize the reference object, the scaling, rotation, and positioning parameters are continually or periodically updated, resulting in updated transformed user object geometric information." (Ex. 1007-Sitrick at ¶ 100.) This updated information, in combination with other information, "permits the reconstruction of the appearance of the user object in the same placement and orientation as the detected reference object." (*Id.* at ¶ 104.) Based on these disclosures, a POSITA thus would understand the motion vectors associated with the first image are

> used by the correlation means in Sitrick to reconstruct the user object that contains the second image. In other words, this application of motion vectors associated with the first image results in maintaining the same placement and orientation of the second image to the detected first image.

Ex. 1017 ¶ 58. This is consistent with Sitrick's disclosure that the correlation means uses motion vector information (Ex. 1007 ¶ 76 ("[T]he correlation means of the present invention uses the motion vector information in the first audiovisual presentation to describe the displacement of identified reference points from a first detected location to another location.") and that the association means, which "associates a detected reference object with one or more replacement object images," "uses the information provided by the correlation means" (*id.* ¶ 84).

Having considered all the arguments and evidence, we are persuaded that Sitrick teaches its correlation means and association means "applying the motion vectors to the second image."

4. Summary

For the foregoing reasons, we are persuaded that Petitioner has established, by a preponderance of the evidence, claim 11 of the '591 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Sitrick.

III. PETITIONER'S MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude (Paper 57, "Mot."). Petitioner filed an Opposition (Paper 61, "Opp."), and Patent Owner filed a Reply in support of its Motion (Paper 63). As movant, Patent Owner has the burden of proof to establish that it is entitled to the requested relief. *See* 37 C.F.R. § 42.20(c).

Patent Owner moves to exclude (1) paragraphs 8–12 of Exhibit 1025, the Supplemental Reply Declaration of Edward J. Delp III, Ph.D. on the grounds that it exceeds the proper scope of reply; and (2) Exhibits 1026, 1027, 1029, 1030, and 1031 under Federal Rules of Evidence 401, 402, and 403 as being misleading, confusing, unfairly prejudicial, and irrelevant. Mot. 2–5.

We decline to assess the merits of Patent Owner's Motion to Exclude. All of the evidence sought to be excluded by Patent Owner was filed with Petitioner's Supplemental Reply and relates solely to Petitioner's challenge to claims 1–4 and 8. Even without excluding the identified evidence, we have concluded that Petitioner has not demonstrated, by a preponderance of the evidence, that challenged claims 1–4 and 8 are unpatentable. Accordingly, Patent Owner's Motion to Exclude as to Exhibit 1025 is dismissed.

IV. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that claim 11 of the '591 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Sitrick. Petitioner has not demonstrated, by a preponderance of the evidence, that claims 1–4 and 8 are unpatentable.

V. ORDER

Accordingly, it is

ORDERED that claim 11 of the '591 patent is held *unpatentable*;

FURTHER ORDERED that Petitioner's Motion to Exclude is *dismissed*; and

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

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