

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NETFLIX, INC.,
Petitioner,

v.

UNILOC 2017 LLC,
Patent Owner.

IPR2020-00044
Patent 6,584,229 B1

Before SALLY C. MEDLEY, BRYAN F. MOORE, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

Netflix, Inc. (“Petitioner” or “Netflix”) filed a Petition requesting *inter partes* review of claims 1, 3, 5, and 6 (the “challenged claims”) of U.S.

Patent No. 6,584,229 B1 (Ex. 1001, the “’229 patent”). Paper 1 (“Pet.”) at 6. Uniloc 2017 LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). On April 27, 2020, we instituted trial. Paper 7 (“Inst. Dec.”). Patent Owner filed a Response. Paper 23¹ (“PO Resp.”). Petitioner filed a Reply. Paper 12 (“Reply”). Patent Owner filed a Sur-Reply. Paper 16 (“Sur-Reply”). An oral argument was held on February 3, 2021, and a transcript was entered into the record. Paper 22 (“Tr.”).

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 3, 5 and 6 of the ’229 patent are unpatentable.

B. Related Proceedings

The parties identify the following pending district court proceeding involving the ’229 patent: *Uniloc 2017 LLC v. Netflix, Inc.*, No. 8:18-cv-02055 (CD Cal.). Pet. 4; Paper 4, 2.

C. Real Parties-in-Interest

Petitioner identifies Netflix, Inc. as the real party-in-interest. Pet. 3. Patent Owner identifies Uniloc 2017 LLC as the real party-in-interest. Paper 4, 1.

D. The ’229 Patent

The ’229 patent describes a macroblock-based object-oriented coding method of a video (e.g., moving) image sequence that can be coded at a relatively low coding bit rate. Ex. 1001, 1:66–2:2. The image sequence is

¹ The Patent Owner Response was filed as Paper 10 without page numbers. Patent Owner refiled an authorized Patent Owner Response with page numbers as Paper 23.

split into a background region and a foreground object region and encoded into macroblock-based units in a manner that achieves the relatively low coding bit rate. *Id.* at 2:2–8. Figure 1, reproduced below, is a flow chart of the invention.

FIG. 1

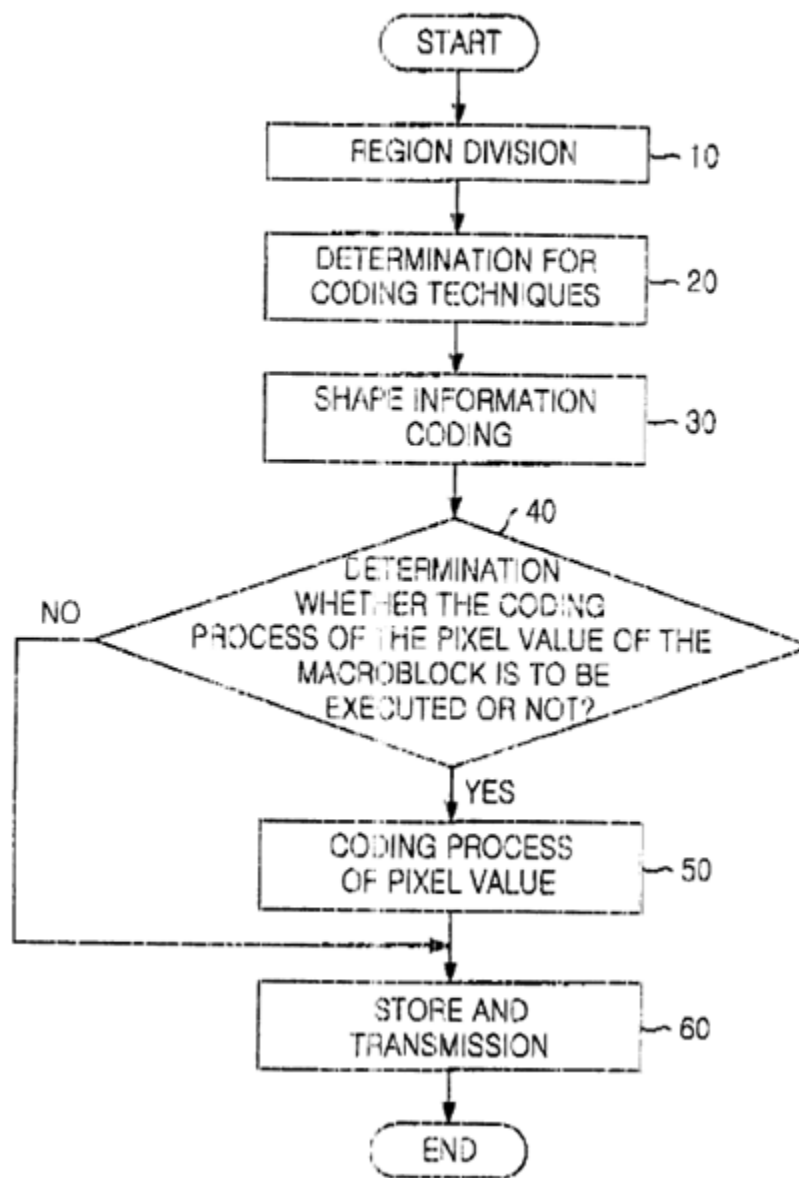


Figure 1, above, is a high level flow chart of the invention. *Id.* at 2:29–32.

E. Illustrative Claim

The '229 patent has six claims. Four claims (1, 3, 5 and 6) are challenged in the Petition. *See supra*. Of the challenged claims, only claim 1 is independent. Claim 1 recites:

1. A method, for use in an macroblock-based object oriented coding of a image signal, wherein the image signal has a stationary background region and an object region and contains a current frame and a previous frame, each frame including a plurality of macroblocks, comprising the steps of:

a) dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame;

b) coding shape information of the object region by using a known coding technique to generate coded shape information;

c) coding pixel information of each macroblock contained in the object region by using a selected known coding technique to generate coded object pixel information;

d) generating coded pixel information of a previous frame macroblock corresponding to each current frame macroblock contained in the stationary background region as coded stationary pixel information; and

e) storing or transmitting coded data coded shape information, coded object pixel information and coded stationary pixel information as coded image signal; and

wherein the step d) includes the step of reusing corresponding coded pixel information macroblock contained in the previous frame without coding the pixel information of each macroblock contained in the current frame when a difference between a pixel value of the macroblock of the current frame and that of the macroblock of the previous frame in the same position is identical to or smaller than a predetermined threshold value.

Ex. 1001, 3:40–4:21.

F. Evidence

The Petition relies on the following references:

Name	Reference	Exhibit
Talluri	Talluri, R., A robust, scalable, object-based video compression technique for very low bit-rate coding, <i>IEEE Transactions on Circuits and Systems for Video Technology</i> , 7(1), 221–233, published Feb. 1997	1003
Lin	US 6,192,148 B1, issued Feb 20, 2001 (filed Nov. 5, 1998)	1006
Monro	WO 98/11730 A1, filed Sept 12, 1997, published Mar. 19, 1998	1007
Chai	Chai, D., Foreground/background video coding scheme, <i>Proceedings of 1997 IEEE International Symposium on Circuits and Systems. Circuits and Systems in the Information Age ISCAS 97</i> , published June 1997	1008

Pet. 5–6.

In addition, Petitioner submits the Declaration of Eli Saber, Ph.D. (Ex. 1002). Patent Owner has not submitted an expert declaration.

G. Asserted Grounds of Unpatentability

Petitioner asserts the challenged claims are unpatentable on the following grounds.

Claims Challenged	35 U.S.C. § ²	References/Basis
1, 3, 5, 6	103	Talluri, Lin
1, 5, 6	103	Monro, Chai

Pet. 6.

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including § 103. Because the ’229 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA version of 35 U.S.C. § 103.

II. PRELIMINARY MATTERS

A. Level of Ordinary Skill

Petitioner contends:

As of the Aug. 30, 1999 priority date of the '229 patent, a [person of ordinary skill in the art (“POSA”)] would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a similar field with at least two years of experience with digital video, coding and/or processing. . . . A person with less education but more relevant practical experience may also meet this standard. A POSA would have had basic familiarity with the major MPEG and ITU-T video coding standards and encoding techniques used in the standards.

Pet. 27–28 (citing Ex. 1002 ¶ 21).

“Patent Owner does not offer a competing definition for” a person of ordinary skill in the art. PO Resp. 6. We regard Petitioner’s definition as consistent with the prior art before us. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill). Thus, we adopt Petitioner’s proposal.

B. Claim Construction

Because the Petition was filed after November 13, 2018, we construe the challenged claims by applying the standard used in federal courts, in other words, “the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b),” which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). Further, “[a]ny prior claim construction determination concerning a term of the claim in a civil action, or

a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be considered.” *Id.*

Under the standard set forth in *Phillips*, 415 F.3d at 1312–19, claim terms are given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *See Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365–66 (Fed. Cir. 2012). There is a “heavy presumption,” however, that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

We are also guided by the principle that we only construe claim terms if, and to the extent that, it is necessary for the purpose of the proceeding. *See, e.g., Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

We address four limitations below.

“dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame”

Patent Owner requests that we construe step a) of claim 1, i.e. dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame. PO Resp. 11. Specifically, during its non-obviousness discussion, Patent Owner argues

that the claim language “in a macroblock-by-macroblock basis” limits *how* the division must be done. *Id.*

Petitioner responds, “[n]othing in the language of the ‘dividing’ step mandates a single step approach,” and “[a]s long as the dividing is done on a macroblock-by-macroblock basis and ‘a difference between the previous frame and the current frame’ is used, the limitation is satisfied. Reply 8. Additionally Petitioner’s declarant testifies that “[t]he claim language of step ‘a)’ describes *what* is done: ‘dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis,’ and provides one requirement as to *how*, i.e., ‘using a difference between the previous frame and the current frame.’” Ex. 1027 ¶ 213; Reply 8. We credit Petitioner’s declarant’s testimony on claim construction. Ex. 1027 ¶ 213. The technology in this IPR is complex and the specification is sparse. In complex cases, where obviousness is asserted as a ground of unpatentability, “expert testimony may be critical.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1240 n.5 (Fed. Cir. 2010) (citations omitted).

To resolve these two readings of the claim language, we look to the Specification. The Specification contains one paragraph describing the dividing process. That paragraph starts by reciting that “the video signal is divided into a macroblock-based stationary back ground region and a macroblock-based moving object region by using the difference between a previous frame of the input video signal and a current frame of the input video at step 10.” Ex. 1001, 2:45–49.³ In other words, the Specification describes dividing the video signal into macroblock-based “regions” “by

³ The rest of the paragraph describes a specific method of dividing which is covered by claim 2. Ex. 1001, 2:50–62. Claim 2 is not challenged in this IPR. Pet. 6.

using” the difference between a previous frame of the input video signal. *See* Ex. 1001, 45–49. A fair reading of this sentence, consistent with Petitioner’s contention, suggests that the *how* of this process is by using the “difference” and the *what* (i.e., the result) of the process is creation of macroblock based regions. Thus, the “dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock *basis*” can be read to mean the dividing is done into a macroblock “*based*” stationary background region and a macroblock “*based*” object region using the “difference.” Thus, we adopt a construction that “dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame” means “using a difference between the previous frame and the current frame such that the stationary background region and the object region from an inputted video are divided on a macroblock-by-macroblock basis.”

Patent Owner also argues that the preamble of claim 1 provides antecedent basis to this claim limitation. PO Resp. 11. Specifically, the preamble of claim 1 recites “the image signal . . . contains *a current frame* and *a previous frame*, each frame including a plurality of macroblocks.” Ex. 1001, 3:42–46 (emphasis added). Here Patent Owner argues:

A plain reading of the claim language also reveals that the “dividing” step relies upon the macroblocks of a given frame to be already defined. This understanding is at least reflected in the definitional recitation that the “dividing” step must itself be performed “in a *macroblock-by-macroblock* basis.” This understanding is also reflected in the definitional statements recited in the preamble that the “current frame” and “previous frame” must each include a plurality of macroblocks. The “dividing” step of claim 1 derives antecedent basis from this definitional statement in the preamble by referring to “*the*

previous frame and *the* current frame” and respective macroblocks thereof.

PO Resp. 11. Thus, Patent Owner argues that the fact that the input “current frame” and “previous frame” each include a plurality of macroblocks means that the input to the “dividing” is already in macroblocks so the dividing must be done on a macroblock-by-macroblock basis. *Id.*

It is true that the limitation at issue in the body of claim 1 recites “by using a difference between *the previous frame* and *the current frame*.” And although we agree with Patent Owner that *the previous frame* and *the current frame* in this limitation refer back to the preamble, Patent Owner fails to explain the significance of the preamble to the dividing step. For example, Patent Owner does not explain sufficiently how the preamble provides antecedent basis for “in *a* macroblock-by-macroblock basis,” and we find none. Instead, we read that limitation to mean the dividing is done into a macroblock “based” stationary background region and a macroblock “based” object region using the “difference.”

In fact, although Patent Owner suggests the claim construction in the related District Court proceeding supports its position in this IPR (Sur-Reply 7), the District Court’s decision resolved the issue whether the term “in a macroblock-by-macroblock basis” modifies the “inputted video” or the “dividing” by siding with Netflix (i.e., Petitioner) and deciding that the term “in a macroblock-by-macroblock basis” modifies dividing. Ex. 1030, 25, 26.

Nevertheless, the main issue in this IPR, i.e. whether the initial dividing—in a two-step process—must be on a macroblock-by-macroblock basis or the result of the dividing must be on a macroblock-by-macroblock basis was not at issue in the District Court. The District Court construed this

limitation as “the stationary background region and the object region from an inputted video *are divided* on a macroblock-by-macroblock basis,” but in doing so it recognized in doing so that it was *supporting* Petitioner’s construction which was “dividing into regions that are defined as one or more macroblocks.” *Id.* at 26. We find the District Court’s use of the phrase “are divided” suggests that the District Court was referring to the result of the dividing as proposed by Petitioner. Additionally, the District Court makes clear that it is distinguishing between dividing on a pixel basis versus a macroblock basis. *Id.* (“dividing a video not by pixel unit but by macroblock-unit.”) (quoting Patent Owner’s argument before the District Court); *see also* Tr. 14:25–15:12. Thus, we determine that our construction is consistent with the construction in the District Court, i.e. using a difference between the previous frame and the current frame such that the stationary background region and the object region from an inputted video are divided on a macroblock-by-macroblock basis.

“generating coded pixel information of a previous frame macroblock”

Petitioner requests that we construe step d) of claim 1 (“generating coded pixel information of a previous frame macroblock . . .”) in one of two alleged possible alternatives, i.e., step d) refers to “(1) encoding macroblocks of the *previous frame*, or (2) encoding macroblocks of the *current frame*.” Pet. 24 (citing Ex. 1002 ¶¶ 80–85). Nevertheless, Petitioner asserts, “[u]ltimately which interpretation is correct is of little consequence because the prior art clearly discloses encoding both the previous frame and the current frame, making the step obvious under either interpretation.” *Id.* Patent Owner does not respond but asserts “regardless whether the Board adopts the constructions expressly proposed in the Petition, . . . the claim

construction proposals set forth in the Petition do not present dispositive issues here.” PO Resp. 7.

Patent Owner has not offered a construction. *See generally* PO Resp. Because we find below that Petitioner has shown step d) of claim 1 sufficiently under either construction that Petitioner proposes, we decline to construe step d) of claim 1. Pet. 41–44, 66–68; *see* PO Resp. 19–24 (addressing the second clause of step e) (“reusing limitation”) of claim 1, but not addressing whether step d) refers to encoding macroblocks of the previous frame or the current frame).

“coded data coded shape information”

Petitioner also requests that we construe “coded data coded shape information, coded object pixel information and coded stationary pixel information” as if it read “coded data *including* coded shape information, coded object pixel information and coded stationary pixel information.” Pet. 27. Patent Owner does not respond. PO Resp. 7–8.

The United States Court of Appeals for the Federal Circuit has held that a district court can act to correct an error in a patent by interpretation of the patent where no certificate of correction has been issued if “(1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims.” *Novo Indus., L.P. v. MicroMolds Corp.* 350 F.3d 1348, 1354 (Fed. Circ. 2003) (“*Novo Indus.*”); *cf. Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004) (“courts may not redraft claims, whether to make them operable or to sustain their validity”). We have applied this same standard in our proceedings and use our discretion to apply this standard here. *E.g., Research Prods. Corp. v. Honeywell Int’l Inc.*, IPR2018-00976, Paper 6 at

13 (PTAB Nov. 7, 2018) (Institution Decision) (applying *Novo Indus.* and holding “one of more programmable characters” was obvious error; corrected to “one or more programmable characters”); *see also Fitbit, Inc. v. Valencell, Inc.*, 964 F.3d 1112, 1119–20 (Fed. Cir. 2020) (suggesting the standard from *Novo Indus.* extends to corrections the Board may make in post-grant proceedings, and holding it was error to not correct a “conspicuous” and undisputed error related to antecedent basis); *see e.g., Apple Inc. v. Acheson Reference Publ’g, Inc.*, IPR2013-00080, Paper 22 at 10–12 (PTAB June 3, 2013).

According to Petitioner, because the claim phrase “coded data” describes the collection of subsequent elements of the list, the omission of the word “including” is a typographical error that one of ordinary skill would recognize. Pet. 27 (citing Ex. 1002 ¶¶ 86–87). In support of this argument, Petitioner asserts its construction is consistent with the Specification’s “use of ‘coded data’ to refer generically to the encoder output which is stored or transmitted. *Id.* (quoting Ex. 1001, Abstract (‘storing or transmitting the coded data’), *id.* at 3:28–32 (‘Such coded data through these processes can be stored at the media, e.g., CD-Rom, or transmitted via a telecommunication network in accordance with the coding machine’s purpose.’)).

We agree with Petitioner that there is a typographical error in the claim. We find the claim appears to be missing a word such as “including” after “coded data.” We determine that the omission of the word “including” is the kind of error that is considered a drafting error and is not subject to reasonable debate. We do not discern that the claim language was changed during prosecution, nor was the apparent typographical error discussed. *See* Ex. 1023, 1 (original claim); *see also generally* Ex. 1023 (no discussion of

apparent typographical error). Thus, we find treating the omission of the word “including” as an error is consistent with the Specification.

Accordingly, we read the limitation “coded data coded shape information, coded object pixel information and coded stationary pixel information” as if it read “coded data *including* coded shape information, coded object pixel information and coded stationary pixel information,” as Petitioner suggests.

“using a selected known coding technique”

Step c) of claim 1 recites “c) coding pixel information of each macroblock contained in the object region by using a selected known coding technique to generate coded object pixel information.” Patent Owner construes this phrase, as part of a non-obviousness argument, by asserting “the coding technique of step c) must have been ‘selected’ from among available system options.” PO Resp. 9–10. Patent Owner argues, “[t]he Petition is deficient on its face as failing to give any meaningful effect to the ‘selected’ qualifier in step c) of claim 1.” *Id.* at 8.

Step c) recites “coding pixel information of each macroblock contained in the object region by *using a selected known coding technique* to generate coded object pixel information.” In contrast, step b) of claim 1 recites “coding shape information of the object region by *using a known coding technique* to generate coded shape information.” Thus, step b) does not recite “selected,” which suggests, according to Patent Owner, that “selected” in step c) must be given the meaning Patent Owner proposes. *Id.* at 9–10. We disagree. Although the general rule is that the use of two different terms in a patent claim implies that they have different meanings, “that implication is overcome where . . . the evidence indicates that the patentee used the two terms interchangeably.” *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010). Additionally,

“[t]he preference for giving meaning to all terms . . . is not an inflexible rule that supersedes all other principles of claim construction.” *SimpleAir, Inc. v. Sony Ericsson Mobile Commc’ns AB*, 820 F.3d 419, 429 (Fed. Cir. 2016) (citations omitted).

Patent Owner also relies on the Specification which recites that “[a]fter the region distinction is completed, a coding technique is determined for the macroblock belonging to each region at step 20.” *Id.* at 10. Patent Owner asserts the fact “[t]hat a coding technique is determined ‘*after* the region distinction is completed’ (*id.*) confirms that this determination or selection is not based exclusively on the region distinction itself (*e.g.*, whether a given region pertains to a stationary background or, instead, to a moving object).” We disagree. The temporal reference to “after” does not inform the basis upon which the selection is made. Additionally, because the term “selected” is not the same as “determined,” it is not clear that the reference to “determining” in the Specification refers to selecting from available options as suggested by Patent Owner.

As Petitioner contends, there is no disclosure in the Specification of selecting a coding technique from “available options.” Reply 3.
Reproduced below is Figure 1 of the ’229 patent.

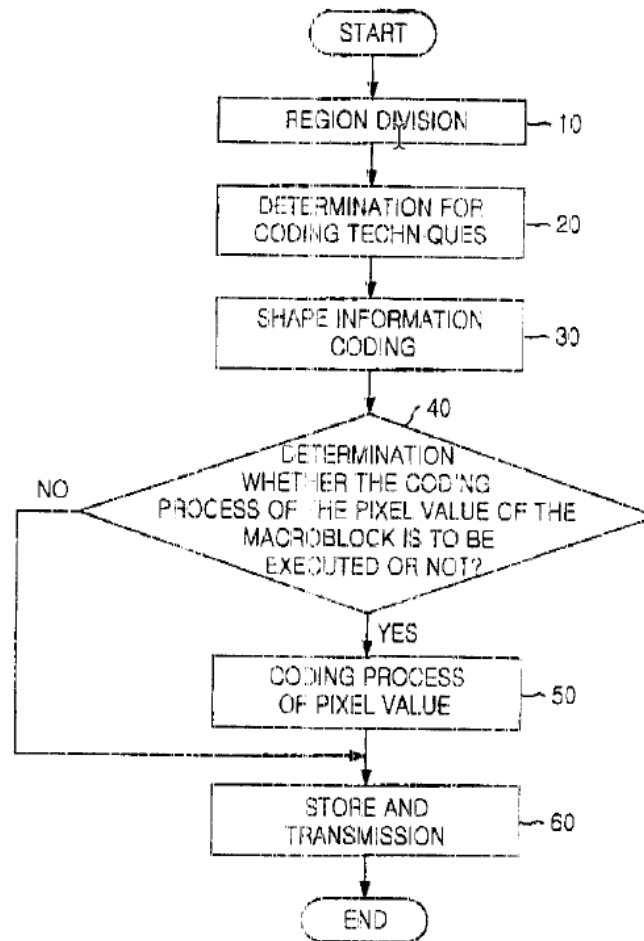


Figure 1 of the '229 patent, reproduced above, shows the steps of the process. Ex. 1001, 2:29–32. Petitioner also contends that the only decision point in the flow chart of the process is step 40—where it is determined whether or not to encode a macro block at all. *Id.* at 4.

Although, step 40 does appear to be the only decision branch in the chart, step 20 appears on its face to be relevant to the “selecting” in the claim because it states “determin[ing]” “coding techniques.” Nevertheless, the Specification’s description of step 20 is confusing. As described above, the Specification states “[a]fter the region distinction is completed, a coding technique is determined for the macroblock belonging to each region at step

20.” Ex. 1001, 2:63–67. To the contrary, however, in the same paragraph, still ostensibly describing step 20, the Specification recites,

[w]hen this difference value is not bigger than the predetermined threshold value, it is determined that the macroblock data of the reconstructed previous frame is to be utilized. On the other hand, when this difference value is bigger than the predetermined threshold value, it is determined that the macroblock data of the current frame is to be coded by well-known macroblock coding technique.

Ex. 1001, 3:2–9. This description clearly refers to the determination being made in step 40, and states when a macroblock needs to be encoded, “[a] well-known macroblock coding technique” is used, therefore suggesting that the coding technique is the one that was previously selected.

Curiously, a few lines down another paragraph begins by stating, “[t]he process for determining whether the coding process of the pixel value of the macroblock is to be executed or not is to be performed at step 40.” (Ex. 1001, 3:20–22). The rest of that paragraph, however, does not describe the process of determining whether or not to execute a coding process. Thus, the Specification is lacks sufficient clarity and thus unhelpful in resolving this issue.

Petitioner also contends that “[t]he term ‘selected’ in step c) is merely an adjective qualifying the ‘known coding technique’ used to encode the object region macroblocks.” Reply 3. We agree. Looking at the words of the claim itself, we note that “selected” is not a verb, such as select or selecting, that would normally denote a step in a method. Thus, we determine that the limitation of “selected” is not a step in the asserted method but, instead, is a characteristic of the known coding method, i.e., it is the one that was previously selected. *See Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1290–91 (Fed Cir. 2015) (finding claim limitation

was “not a step in the claimed method,” but was instead only “a phrase that characterizes the claimed pre-processing parameters,” as the limitation was “not used as a verb . . . , but instead is a part of a phrase that conveys information about” claimed method parameters).

Additionally, nothing in the Specification, the claims, or any extrinsic evidence suggest a plain meaning of “selected” such that a selection must be “from available system options.” *Id.* at 1292. Given that the Specification does not support sufficiently a finding that a selection “from available options” is made and the fact that selected is an adjective rather than a verb, we determine that “selected” simply qualifies the “known coding technique” as one that was previously selected. *Id.*

For the reasons above, we determine that “using a selected known coding technique to generate coded object pixel information,” does not require a separate step of ‘selecting’ from among available system options, as argued by Patent Owner.

C. Description of Prior Art References

Petitioner’s challenge primarily relies on Talluri and Monro. *See* Pet. 6. The remaining references (Lin and Chai) are relied on as additional secondary references to address certain specific limitations in the claims.

1. Talluri (Exhibit 1003)

Talluri is an article titled “A Robust, Scalable, Object-Based Video Compression Technique for Very Low Bit-Rate Coding.” Ex. 1003, 221. Talluri describes an encoding scheme for MPEG-4. *Id.* at Abstract, 222. Talluri describes an object-based video compression technique for very low bitrate coding of a video stream that “achieves efficient compression by separating coherently moving objects from stationary background and compactly representing their shape, motion, and the content.” *Id.* at 221.

Talluri discloses a five-step encoding process. The first step—“moving object detection”—involves “segment[ing] the images in the video sequence into moving objects and stationary background.” *Id.* The background and foreground objects are then tiled with macroblocks so as to generate macroblock-based regions. *Id.* at 225 (tiling of moving object). The second step—“shape representation”—involves coding the shape of the object region. *Id.* at 225. Talluri describes a “bitmap mask” which uses bits (0s and 1s) to indicate whether or not macroblocks are part of the region. *Id.*

In the third step, “motion estimation is used to predict the contents of the segmented regions from the previous images.” *Id.* at 226. “[T]he goal [of this step] is to remove temporal redundancies of the video signal.” *Id.* The fourth and the fifth steps apply additional processing to portions of the image that are not efficiently coded using motion compensation alone (e.g., “areas of rapid change”). *Id.* at 226. Talluri discloses encoding residual signals using a “DCT approach” that involves a DCT transform, and then scalar quantization, and variable length coding of the DCT coefficients using run-length and Huffman coding. *Id.*

2. *Lin (Ex. 1006)*

Lin is a patent titled “Method For Determining To Skip Macroblocks In Encoding Video.” Ex. 1006, code (54). Lin’s “Background” section explains that during encoding, certain macroblocks can be skipped:

According to the MPEG-2 standard, it is not strictly necessary to encode each macroblock. Rather, if a prediction error macroblock has a zero spatial offset motion vector, and only zero valued quantized block data, no data need be provided in the bitstream for the macroblock. Instead, indicator information is placed in the bitstream to indicate that a macroblock has been skipped.

Id. at 1:41–48.

In determining whether to skip or encode a macroblock, Lin discloses that, for a given macroblock in the current frame, its luminance values are compared to macroblocks in the reference picture. *Id.* at 4:54–59. If the best match is in the same location in the reference picture, a check is performed to determine if the luminance difference between the blocks is below a first threshold. *Id.* at 5:24–28.

This would indicate that the luminance of the current macroblock of the current picture is nearly identical to the luminance of the prediction macroblock in the previous picture at the same spatial row and column coordinates. In such a case, it is possible that the current macroblock has not changed from the previous picture. This typically happens if the macroblock contains a portion of the image that is static.

Id. at 5:33–39.

Lin further discloses that, if the luminance values sufficiently match, a similar comparison is performed based on the chrominance data. *Id.* at 5:48–6:5. “[I]f the chrominance MAD is less than a second threshold, the processor 12 skips the current macroblock in step 120 by inserting an indication into the bitstream that indicates that the macroblock is skipped.” *Id.* at 6:7–11.

III. ANALYSIS OF THE CHALLENGED CLAIMS

A. Obviousness

A claim is unpatentable under 35 U.S.C. § 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) where in evidence, so-called “secondary considerations” may be found, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966) (“the *Graham* factors”).

B. Challenge to Claims 1, 3, 5, and 6 based on Talluri and Lin

Petitioner contends claims 1, 3, 5, and 6 would have been obvious over the combination of Talluri and Lin. Pet. 28–54. Petitioner supports this assertion with testimony from its expert, Dr. Saber. Ex. 1002 ¶¶ 94–154.

Petitioner begins its analysis by arguing that a person of ordinary skill would have been motivated to combine Talluri and Lin. Pet. 31–34. Talluri and Lin relate to video coding techniques for use with MPEG video encoding standards, i.e. Talluri relates to MPEG-4 and Lin relates to MPEG-1 and MPEG-2. Pet. 31–32 (citing Ex. 1003, Abstract, 223; Ex. 1006, 3:15–19; Ex. 1013 [unasserted reference], 77 (noting MPEG-4 would “include most technical features of the prior video and still-picture coding standards”)).

Petitioner argues, based on disclosures in Talluri and Lin and based on a person of ordinary skill in the art’s general familiarity with skipping blocks, that “a [person of ordinary skill in the art] would have found it obvious to use Lin’s technique for determining when to skip macroblocks to efficiently encode Talluri’s ‘stationary background’ regions.” Pet. 33 (citing Ex. 1002 ¶ 107). Additionally, Petitioner asserts that Talluri “does not describe all the steps involved in performing motion estimation and motion compensation,” and suggests a person of ordinary skill in the art would have been motivated to look to Lin’s description of skipping macroblocks for

those details to “achieve greater efficiency” and “reduce computation.” *Id.* at 33–34 (citing Ex. 1003, 226; Ex. 1006, 3:15–19; Ex. 1002 ¶¶ 107–108).

Moreover, Petitioner demonstrates sufficiently that the skilled artisan would have had a reasonable expectation of success in making the combination. *Id.* at 34. Petitioner’s declarant states, “Lin notes that its method is generally applicable to standard, block-based coders.” Ex. 1002 ¶ 108.

Patent Owner does not argue against the combination. *See generally* PO Resp. In summary, based on the information set forth in the Petition and the testimony of Dr. Saber, we are persuaded that Petitioner has demonstrated sufficiently both the motivation to combine these references and the reasonable expectation of success for an ordinary skilled artisan.

1. Claim 1

Petitioner’s element-by-element analysis of independent claim 1 in relation to Talluri and Lin appears at pages 34–50 of the Petition. Petitioner supports its analysis with testimony from Dr. Saber. Ex. 1002 ¶¶ 109–145.

Petitioner demonstrates that each element of claim 1 is disclosed or suggested by the combination of Talluri and Lin.

a. Preamble

“[a] method, for use in an macroblock-based object-oriented coding of a[n] image signal, wherein the image signal has a stationary background region and an object region and contains a current frame and a previous frame, each frame including a plurality of macroblocks, comprising the steps of,”

Petitioner identifies the claim term “[a] method, for use in an macroblock-based object-oriented coding of a[n] image signal, wherein the image signal has a stationary background region and an object region and contains a current frame and a previous frame, each frame including a

plurality of macroblocks, comprising the steps of,” as recited in the preamble of claim 1 in Talluri’s teaching of macroblocks that are in the MPEG-4 frames. Pet. 34 (citing Ex. 1003, 223; Ex. 1002 ¶ 113). Petitioner also identifies Talluri’s moving object detection step that “segment[s] the images in the video sequence into moving objects and stationary background.” *Id.* at 35 (citing Ex. 1003, 224). Petitioner also identifies Talluri’s image signals that include a current frame and a previous frame. Pet. 35 (citing Ex. 1003, 224 (“the absolute difference of the current and previous images”)); Ex. 1002 ¶¶ 115–116).

We have reviewed the record, and find that Petitioner provides sufficient evidence that the prior art teaches the preamble of claim 1.⁴ Patent Owner makes no arguments contesting the prior art teachings of these claim limitations. *See generally*, PO Resp.

b. step a)

“dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame”

Petitioner identifies step a)—the claim term “dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame”—recited in claim 1 in Talluri’s motion segmentation block of Figure 2 (not shown). *Id.* at 36–37 (citing Ex. 1003, 224, Fig. 2; Ex. 1002 ¶¶ 117–119). For example, Petitioner also identifies

⁴ We need not determine whether the preamble of claim 1 is limiting because Petitioner has shown Talluri discloses the preamble. *See Nidec*, 868 F.3d at 1017.

step a) in Talluri's calculating and tiling of rectangles with macroblocks in the regions in the frames and background. *Id.* at 36 (citing Ex. 1003, 225, 226, 231). Petitioner also identifies step a) in Talluri's "thresholding the absolute difference of the current and previous images." *Id.* at 37 (citing Ex. 1003, 224, 225; Ex. 1002 ¶¶ 117–119) (emphasis omitted).

Petitioner admits that Talluri performs a two-step process to divide the foreground and background region. Reply 7. Specifically,

Talluri discloses a two-step process that is used to divide a video into background and object regions composed of macroblocks. First, "a segmentation mask is generated for the current image using image differencing, morphology, and connected components analysis." Talluri at p. 224. This step identifies image regions detected as moving objects. *Id.*; *id.* at p. 225, Fig. 4(a). Next, a bounding rectangle is calculated for each moving object region and the rectangle is "tile[d] ... with 16 X 16-pixel macroblocks." *Id.* at p. 225. This step generates macroblock-based regions from the earlier-detected image regions. Ex. 1027 (Saber) ¶ 212.

Id. Petitioner contends, however, that a person of ordinary skill "would readily appreciate that Talluri's moving object detection and macroblock refinement steps operate together to divide a video into macroblock-based moving object and stationary background regions." *Id.* Patent Owner argues Talluri's segmentation step, which is done over the entire background and foreground region, cannot meet the claim limitation under its construction of the claim language. *Id.* at 12. As explained above, we did not adopt Patent Owner's construction of the "dividing" step; thus, this argument is not commensurate with the proper scope of the claims.

As noted above, Petitioner explains "[n]othing in the language of the 'dividing' step mandates a single step approach," and "[a]s long as the dividing is done on a macroblock-by-macroblock basis and 'a difference

between the previous frame and the current frame’ is used, the limitation is satisfied. Reply 8. We are persuaded by this contention, which is consistent with our construction and with the claim language.

Patent Owner also argues that Talluri does not disclose dividing the background in a macroblock-by-macroblock basis. Sur-Reply 6; Tr. 35:6–19. Specifically, Patent Owner argues that Talluri

discloses, the second step ‘calculates a bounding rectangle **for each of the moving object regions** and tiles the rectangles with 16 16-pixel macroblocks’. [Ex. 1003] at 225 (emphasis added). In other words, in Talluri, the background is never divided or defined in a ‘macroblock-by-macroblock basis’. Talluri **only** divides the ‘bounding rectangle’ of ‘the moving object regions’ with macroblocks.

Sur-Reply 6. Petitioner contends that this is a new argument raised for the first time in the Sur-Reply. Tr. 13:12–17. We agree that this was newly raised in the Sur-Reply because it does not respond to any new argument in Petitioner’s Reply. Nevertheless, we also determine that Petitioner has shown sufficiently that Talluri teaches this limitation. Specifically, Petitioner’s declarant asserts, “The same technique [calculating a bounding rectangle] is applied to the background object.” Ex. 1002 ¶ 118 (citing Ex. 1003 [Talluri], 231 (noting that the shape of the background object is coded using either the block-based or spline-based technique); *see also* Pet. 36 (stating the same thing). At the hearing, Patent Owner suggested that this disclosure in Talluri was “separated by many, many, many pages from their segmenting and calculating tiling of the moving object 15 region [and may not be] related at all.” Tr. 35:6–19. We disagree. We credit Petitioner’s declarant and agree that Talluri discloses defining the background region “in a ‘macroblock-by-macroblock basis.’”

For the reasons above, we determine that Talluri's two-step process of segmentation of the background and foreground regions followed by tiling into macroblocks reads on the limitation of "dividing the stationary background region and the object region from an inputted video in a macroblock-by-macroblock basis by using a difference between the previous frame and the current frame."

c. Step b)

"coding shape information of the object region by using a known coding technique to generate coded shape information."

Petitioner relies on Talluri to meet the step b) limitation of "coding shape information of the object region by using a known coding technique to generate coded shape information." Pet. 37–39. For example, Petitioner relies on Talluri's disclosure of "a macroblock-based shape coding technique which generates 'bitmap masks' of the segmented regions of the video." *Id.* at 38 (citing Ex. 1003, 225).

d. Step c)

"coding pixel information of each macroblock contained in the object region by using a selected known coding technique to generate coded object pixel information."

Petitioner relies on Talluri to meet the step c) limitation of "coding pixel information of each macroblock contained in the object region by using a selected known coding technique to generate coded object pixel information." *Id.* at 39–41. Referring to Talluri's DCT approach and production of motion vectors and coded residual data produced by encoding the object region, Petitioner asserts a person of ordinary skill at the time of the invention would have understood that this information is "coded object pixel information." *Id.* at 39–40 (citing Ex. 1003, 224, 226, Fig. 2; Ex. 1002 ¶ 127).

As explained above, Patent Owner argues that the “Petition makes no mention of the ‘selected’ qualifier apart from its reproduction of claim 1 (Pet. 1) and the inclusion of this term in certain section headings.” PO Resp. 10. We do not adopt Patent Owner’s proposed construction of “selected” as making a “selection from available system options.” Thus, the DCT approach cited by the Petition is the “selected” known coding technique used by Talluri, consistent with the claim limitation. Pet. 39–40; Ex. 1002 ¶ 127 (“the ’229 patent describes using a conventional encoding approach that involves a DCT transformation, quantization, and variable length coding. ’229 patent at 3:24-29. Talluri’s ‘DCT approach’ involves the same 5 steps”).

e. Step d)

“generating coded pixel information of a previous frame macroblock corresponding to each current frame macroblock contained in the stationary background region as coded stationary pixel information.”

Petitioner relies on the combination of Talluri and Lin to meet the step d) limitation of “generating coded pixel information of a previous frame macroblock corresponding to each current frame macroblock contained in the stationary background region as coded stationary pixel information.” *Id.* at 41–44. Petitioner relies on two alternative contentions based on Petitioners two proposed constructions. As to the first construction that requires encoding the previous frame, Petitioner relies on the combination of Talluri and Lin. For example, Petitioner relies on Talluri’s disclosure “that the previous frame is encoded and then decoded to make the reconstructed frame used for motion compensation.” *Id.* at 43 (citing Ex. 1003, 231 (“After all of the objects in the first frame have been coded, a reconstructed

frame is made, combining decoded images of the background and each object into one frame.”)). Petitioner further relies on Lin’s disclosure that

the reference picture is preferably encoded and then decoded (i.e., reconstructed). [Ex. 1006, 4:60–63] (‘Preferably, the reference pictures have been previously encoded, decoded and stored in a picture buffer of the memory 14. This is so that predictions are formed using the same decoded pictures available at the decoder.’).

Id. at 43 (emphasis omitted).

As to the second construction that requires encoding the current frame, Petitioner relies on the combination of Talluri and Lin. For example, Petitioner relies on Talluri’s disclosure that “motion estimation is used to predict the contents of segmented regions [of the current image] from the previous images.” *Id.* at 41–42 (citing Ex. 1003, 226). Petitioner further relies on Lin’s “motion compensation technique whereby the current frame is encoded using coded macroblocks from a previous picture.” *Id.* at 42 (citing Ex. 1006, 1:18–40; 4:5–7 (“The reference picture for a P picture is the immediately preceding I or P picture in the sequence of pictures.”)).

f. Step e)

“storing or transmitting coded data coded shape information, coded object pixel information and coded stationary pixel information as coded image signal”

Petitioner asserts that Talluri discloses step e)—“storing or transmitting coded data coded shape information, coded object pixel information and coded stationary pixel information as coded image signal”—as recited in claim 1. *Id.* at 45–46. For example, as to “coded shape data,” Petitioner relies on Talluri’s disclosure that “as part of transmitting the coded bitstream, coded shape information is transmitted:

‘[i]n transmitting a coded shape [to the decoder], the encoder first sends a 3-b tag identifying the format of the shape data to follow. The decoder reads this tag and decodes the shape data appropriately.’” *Id.* at 46 (quoting Ex. 1003, 225–226, 229; Ex. 1002 ¶ 136). As to coded object pixel data and coded stationary pixel data, Petitioner relies on the same disclosure as it relies on for “coding pixel information” discussed in regard to step c), above. *Id.* at 46 (citing Ex. 1003, 224, 231, Fig. 2; Ex. 1002 ¶¶ 137–38)).

g. Wherein Clause

“wherein the step d) includes the step of reusing corresponding coded pixel information macroblock contained in the previous frame without coding the pixel information of each macroblock contained in the current frame when a difference between a pixel value of the macroblock of the current frame and that of the macroblock of the previous frame in the same position is identical to or smaller than a predetermined threshold value.”

Petitioner asserts that Talluri in combination with Lin discloses the additional limitation “wherein the step d) includes the step of reusing corresponding coded pixel information macroblock contained in the previous frame without coding the pixel information of each macroblock contained in the current frame when a difference between a pixel value of the macroblock of the current frame and that of the macroblock of the previous frame in the same position is identical to or smaller than a predetermined threshold value,” as recited in claim 1. *Id.* at 47–50. For example, Petitioner relies on Lin’s disclosure that in comparing the current block with a previous block “if there is ‘zero spatial offset’ with the best matching block in the previous frame, and the luminance difference falls below a first threshold, and the chrominance difference falls below a second threshold, then a block is coded as a skipped macroblock.” *Id.* at 47–48

(citing Ex. 1006, 5:24–42, 5:38–39, 5:48–6:7; Ex. 1002 ¶¶ 140–41). In particular, “zero spatial offset” means that “it is in the same location as the current block in the current frame.” *Id.* (quoting Ex. 1006, 5:24–42, citing *id.*, 5:38–39).

Patent Owner argues that “Lin relies on comparing the current macroblock against a previous macroblock at an offset relative to the current macroblock.” PO Resp. 22. Patent Owner is correct that Lin compares with macroblocks “at increments of 1/2 pixel row and column *offsets* and compares them to the current macroblock.” Ex. 1006, 4:65–66 (emphasis added). Nevertheless, as explained above, Lin specifically contemplates a case where there is zero spatial offset. *Id.* at 5:24–42. Patent Owner discounts Lin’s use of a zero spatial offset because it is allegedly “only based on no suitable motion vector being found.” PO Resp. 22. Patent Owner does not provide a citation to Lin for this proposition. *Id.* To the contrary, Lin states, in reference to zero spatial offset, that if

the luminance of the current macroblock of the current picture is nearly identical to the luminance of the prediction macroblock in the previous picture at the same spatial row and column coordinates. In such a case, it is possible that the current macroblock has not changed from the previous picture.

Ex. 1006, 5:33–38. Patent Owner does not explain sufficiently how the case in which “no suitable motion vector is found” would prevent Lin from meeting the claim limitation. In sum, Patent Owner does not explain sufficiently why selecting a “prediction macroblock” in the same position as the current macroblock could not meet the claim limitation to “the same position.”

Additionally, Patent Owner asserts,

it is unclear from the teachings of Lin whether the first threshold is used to select a certain candidate prediction macroblock from among multiple candidate prediction macroblocks based on the MAD calculated for each of the candidate prediction macroblock or not. What is known is that Lin never teaches comparing any macroblock from a current picture with another macroblock from a reference picture *in the same position*.

PO Resp. 22–23. Again, Patent Owner does not provide a citation to Lin for this proposition. *Id.* To the contrary, Lin discloses determining “if the luminance MAD generated for *the prediction macroblock* is below a first threshold.” Ex. 1006, 5:26–28 (emphasis added). Patent Owner has provided no independent evidence to support its assertions, such as a citations to Lin to explain certain assertions (e.g., no suitable motion vector found, or MAD calculated for multiple candidate prediction block not for a single block), expert testimony, or scientific publications. An argument made by counsel in a brief does not substitute for evidence lacking in the record. *Estee Lauder, Inc. v. L’Oréal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997); *see also Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

Additionally, in support of the reusing limitation, Petitioner asserts that “[a person of ordinary skill in the art] would have known that where macroblocks are skipped, corresponding macroblocks in the reference picture would be reused.” Pet. 48 (citing Ex. 1002 ¶ 142). As support for this assertion, Petitioner relies on the 1993 MPEG-1 standard document that states, “Any macroblocks thus skipped over are called ‘skipped macroblocks’. The decoder copies them from the previous picture into the current picture.” *Id.* (quoting Ex. 1014, 93). Petitioner admits that in skipping macroblocks Lin expressly states: “no data [is] provided in the bitstream” and, “[i]nstead, indicator information is placed in the bitstream

to indicate that a macroblock has been skipped.” Pet. 29–30 (quoting Ex. 1006, 1:41–48).

Patent Owner argues that “when skipping a macroblock, Lin disclosing providing *no pixel data* and, instead, placing a new ‘indic[a]tor’ into the bitstream . . . is plainly distinguishable from the ‘reusing’ step.” PO Resp. 21.⁵ Petitioner responds that, as stated above, the Petition explains that a person of ordinary skill would have been well-aware of the skipped macroblock technique which was the standard way to signal that previous frame macroblocks should be reused for those portions of the current frame that have not changed. Reply 10 (citing Pet. 10–11; Ex. 1002 ¶¶ 44–50, 101). Petitioner further contends a person of ordinary skill in the art “would regard the notion of duplicating redundant data for every unchanged macroblock between successive frames—Uniloc’s apparent interpretation—as incredibly inefficient and illogical.” *Id.* at 10–11 (citing Ex. 1027 ¶ 217). Petitioner’s declarant also testifies that a person of ordinary skill in the art would have understood the ’229 patent specification as using the skipped macroblock technique. Ex. 1027 ¶ 217 (cited in Petition at 11). We agree with Petitioner that the claim does not recite and is not limited to a “corresponding coded pixel information macroblock contained in the previous frame” that must be retransmitted to be reused. Thus, the issue

⁵ Petitioner argues that “this argument is utterly contrary to Uniloc’s position in district court where its entire infringement argument for the ‘reusing’ limitation is based on skipped macroblocks.” Reply 9–10 (citing Ex. 1025, 14–15). We considered this evidence and acknowledge this apparent inconsistency but also note that the position taken by a party in the District Court is not a final (or even non-final) ruling from the District Court. Thus, we consider the intrinsic and extrinsic evidence and the arguments made in this IPR to arrive at the proper construction of claim terms.

before us is whether Lin discloses reusing coded pixel information of a previous macroblock (whether or not it was retransmitted or simply saved from a previous encoding).

Petitioner’s ground is based on obviousness, and we credit Petitioner’s declarant who testifies that one of ordinary skill would have understood that when a macroblock is skipped (not encoded), the previous macroblock in that position would be used. Ex. 1002 ¶ 142. Although knowledge of one of ordinary skill may be properly considered in an obviousness analysis, it “cannot be used as a wholesale substitute for reasoned analysis and evidentiary support, especially when dealing with a limitation missing from the prior art references specified.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361–62 (Fed. Cir. 2016). In recognizing the role of common knowledge, “[the Federal Circuit has] emphasized the importance of a factual foundation to support a party’s claim about *what one of ordinary skill in the relevant art would have known*.” *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (emphasis added)); *see also Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1338 (Fed. Cir. 2020) (finding a limitation at issue was not *missing* from the prior art, stating “here the Board relied on expert evidence, which was corroborated by Hua, in concluding that pipelining was not only in the prior art, but also within the general knowledge of a skilled artisan.”).

Here, Petitioner’s declarant states that the allegedly missing limitation would have been known to one of ordinary skill and provides a reasoned explanation of the basis of that knowledge, which is supported by an underlying reference. Ex. 1002 ¶ 142 (quoting Ex. 1014, 93); *see also* Ex. 1002 ¶ 28 (MPEG-1 standard was published in 1993). In this IPR, Petitioner has asserted that Talluri uses the previously coded macroblock, shown that

an industry standard explains how a macroblock is reused, and has reasoned, based on its declarant's testimony, that an ordinarily skilled artisan would have considered the alternative to be "incredibly inefficient and illogical." Reply 10–11 (citing Pet. 10–11; Ex. 1002 ¶¶ 44–50, 101; Ex. 1027 ¶ 217).

Additionally, Patent Owner did not respond to this argument; instead Patent Owner suggested that Petitioner must rely on inherency. Sur-Reply 16. Specifically, Patent Owner argues in its Sur-Reply that "Petitioner fails to meet the exacting standard to prove inherency." Sur-Reply 16. Because this ground is an obviousness ground and Petitioner has not indicated that it relies on inherency, we do not determine inherency is relevant to this issue. "[W]hat would have been obvious to a skilled artisan is not a valid consideration in an inherency analysis." See *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1555 (Fed. Cir. 1983) ("Inherency and obviousness are distinct concepts.") (citing *In re Spormann*, 363 F.2d 444, 448 (CCPA 1966)).

h. Conclusion

Based on the information set forth in the Petition and the testimony of Dr. Saber, we are persuaded Petitioner has shown by a preponderance of the evidence that claim 1 would have been obvious over Talluri and Lin.⁶

2. Claim 3

This claim depends from claim 1 and further recites "wherein the step c) includes the steps of coding pixel information of each macroblock contained in the current frame when a difference between a pixel value of

⁶ Neither party has argued that secondary considerations or objective evidence of nonobviousness exists. Thus, we do not address secondary considerations or objective evidence of nonobviousness.

the macroblock of the current frame and that of the macroblock of the pr[e]vious frame in the same position is bigger than a predetermined threshold value.” Pet. 50. Petitioner asserts that the combination of Talluri and Lin discloses a motion compensated prediction technique that determines when macroblocks can be skipped. *Id.* Petitioner asserts Lin discloses this limitation because Lin compares the luminance of a macroblock in the current frame with a macro block in a reference frame and if the luminance is greater than or equal to a threshold the macroblock gets encoded. *Id.* at 50–51 (citing Ex. 1006, 5:25–28, 5:45–48, 6:25–50; Ex. 1002 ¶¶ 146–49).

Patent Owner’s Response does not provide a rebuttal to Petitioner’s analysis of this dependent claim in light of the teachings of Talluri and Lin. Based on the information set forth in the Petition and the testimony of Dr. Saber, we are persuaded Petitioner has shown by a preponderance of the evidence that claim 3 would have been obvious over Talluri and Lin.

3. Claim 5

This claim depends from claim 1 and further recites “wherein the known coding technique includes a discrete cosine transformation, a quantum-transformation, and a coefficient variable length transformation.” Pet. 51. Petitioner asserts that Talluri discloses this limitation because Talluri uses Huffman coding which a person of ordinary skill at the time of the invention would know, according to Petitioner, is a type of variable length coding. *Id.* at 52 (citing Ex. 1002 ¶ 151; Ex. 1012 [an unasserted reference describing variable length Huffman codes in MPEG coding], 29); Ex. 1006 [Lin–for “corroboration”], 1:34–40.

Patent Owner’s Response does not provide a rebuttal to Petitioner’s analysis of this dependent claim in light of the teachings of Talluri and Lin.

Based on the information set forth in the Petition and the testimony of Dr. Saber, we are persuaded Petitioner has shown by a preponderance of the evidence that claim 5 would have been obvious over Talluri and Lin.

4. Claim 6

This claim depends from claim 1 and further recites “wherein the storage and transmission are a computer readable media and communication network.” Pet. 53. Petitioner asserts that Talluri’s communication channels and multimedia database meet this limitation. *Id.* (citing Ex. 1003, 222; Ex. 1006 [Lin – for “corroboration”], 3:35–38; Ex. 1002 ¶ 152).

Patent Owner’s Response does not provide a rebuttal to Petitioner’s analysis of this dependent claim in light of the teachings of Talluri and Lin. Based on the information set forth in the Petition and the testimony of Dr. Saber, we are persuaded Petitioner has shown by a preponderance of the evidence that claim 6 would have been obvious over Talluri and Lin.

C. Challenge to Claims 1, 5, and 6 based on Monroe and Chai

Petitioner contends these claims would have been obvious over the combination of Monroe and Chai. Pet. 54–73. Petitioner supports this assertion with testimony from Dr. Saber. Ex. 1002 ¶¶ 160–203. For the reasons discussed above, Petitioner has shown, by a preponderance of the evidence, that claims 1, 3, 5, and 6 are unpatentable as obvious over Talluri and Lin. In addressing this ground, we have addressed all of the challenged claims. *See* 35 U.S.C. § 318(a) (requiring the Board to “issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d)”); *see also SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all

of the claims it has challenged”). Accordingly, we need not and do not decide whether Petitioner has shown by a preponderance of the evidence that claims 1, 5, and 6 are unpatentable as obvious over *Monro* and *Chai*. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

IV. CONCLUSION

For the foregoing reasons, we determine Petitioner has established by a preponderance of the evidence the unpatentability of claims 1, 3, 5 and 6 of the ’229 patent.⁷

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claim(s)	35 U.S.C. §⁸	References/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 3, 5, 6	103(a)	Talluri, Lin	1, 3, 5, 6	
1, 5, 6	103(a)	Monro, Chai		
Overall Outcome			1, 3, 5, 6	

V.ORDER

Accordingly, it is

ORDERED that claims 1, 3, 5, and 6 of U.S. Patent No. 6,584,229 B1 are unpatentable; and

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

⁸ As discussed in Section III.B above, we do not reach the alternate ground raised for claims 1, 5, and 6, as we have determined those claims are unpatentable based on first ground set forth in this table.

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Patent 6,584,229 B1

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