

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

VIDEO SOLUTIONS PTE. LTD.,
Patent Owner.

IPR2024-00695
Patent 8,649,426 B2

Before BARBARA A. PARVIS, NORMAN H. BEAMER, and
JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

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

I. INTRODUCTION

On March 15, 2024, Cisco Systems, Inc. (“Petitioner”) filed a Petition (“Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–13 of U.S. Patent No. 8,649,426 B2 (“the ’426 patent”).

Paper 2. On June 27, 2024, Video Solutions Pte. Ltd. (“Patent Owner”) responded by filing a Preliminary Response (“Prelim. Resp.”), pursuant to 35 U.S.C. § 313. Paper 9.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and any Preliminary Response shows that “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons explained below, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we institute an *inter partes* review as to the challenged claims and grounds raised in the Petition.

II. BACKGROUND

A. The ’426 Patent

The ’426 patent is titled “Low Latency High Resolution Video Encoding,” and issued February 11, 2014 from a September 18, 2008 application. Ex. 1001, codes (54), (45), (22). The ’426 patent is directed to low-latency high-resolution videoconferencing and telepresence applications. *Id.* at 1:6–8. The ’426 patent addresses, *inter alia*, the problem that occurs during videoconferencing where the “video component is of poor quality and ‘choppy’ or not precisely synchronized with the audio

component of the communication.” *Id.* at 2:7–9. This is caused in part because of the “need to transmit consistently and in real time a large amount of video data between two or more remote locations via a communications network.” *Id.* at 2:34–36.

Prior art techniques reduced the transmission data load via video compression techniques such as MPEG, which involves coding some video frames as Intra frames (I-frames), which generates all of the data needed to display that frame, and other frames as Predictive frames (P-frames), which contain only the data that have changed from the preceding I-frame. Ex. 1001, 2:36–43, 2:57–59, 2:62–3:9. Because the I-frames contain data for the entire frame, it takes more time to encode an I-frame, and each transmission of an I-frame increases the load on the transmission channel. *Id.* at 3:10–12, 3:21–26, 3:29–38 (“[a] problem that is associated with modern video encoding techniques is the high peak/average data bursts caused by sending the I-frame via the communication network”).

The ’426 patent reduces the I-frame coding time and transmission load problem by separating the video signal data into segments, and encoding each segment independently to result in encoded segment data such that, for each segment, either an I-frame or P-frame is generated during successive frames. Ex. 1001, 3:50–57. Since any one segment is only a portion of a video frame, encoding of a segment I-frame takes less time and generates less data than for a full frame. *Id.* at 5:66–6:7. In one embodiment, during the encoding of a given frame, only one segment is encoded as an I-frame, while the other segments are each encoded as P-frames, and for each subsequent frame a different segment is I-frame

encoded, thus spreading out the transmission of the I-frames to reduce the data burst rate. *Id.* at 4:1–22. As explained in the '426 patent:

[S]ince each segment is encoded separately, the I-frame occurrence of each segment is preferably offset from other segments, such that each segment's I-frame occurs when at least another segment produces a P-frame, thereby reducing the overall peak to average data burst onto the network and likely reducing the packet loss.

Ex. 1001, 6:7–12.

B. Illustrative Claim

Independent claim 1 is representative, and is reproduced below.¹

1. A method of encoding in real time a video signal that is associated with a videoconference or telepresence session, the method comprising:

- [1.1] capturing a stream of video data comprising a series of sequential video frames;
- [1.2] separating the video frames into a plurality of frame segments, wherein each frame segment represents a part of a complete video frame;
- [1.3] encoding each frame segment independently and in parallel to generate parallel encoded data streams, one for each of the plurality of frame segments,
- [1.4] each encoded data stream containing a sequence of frame segment instances each corresponding to a particular frame segment in the video frames, and
- [1.5] each encoded data stream containing I-frame segment instances that carry complete information about a particular frame segment and P-frame segment instances that carry partial

¹ The bracketed letters and paragraph arrangement are taken from the Petition but do not impact our analysis. Pet. 29–52.

information about the particular frame segment,
the partial information representing information
that has changed relative to a previous frame
segment instance in that encoded data stream,
and

[1.6] wherein the encoding of the frame segments for
each frame is performed such that when an
instance of one of the frame segments within a
particular frame is an I-frame segment instance,
at least one of the other frame segment instances
in that particular frame is a P-frame segment
instance,

[1.7] whereby in the respective parallel encoded data
streams in any period of time when an I-frame
segment instance is present in one of the parallel
encoded data streams, a P-frame segment
instance is present in at least one of the other
parallel encoded data streams;

[1.8] transmitting the parallel encoded data streams
independently over a network to a receiver to
permit the receiver to decode each frame
segment and recombine the decoded frame
segments from the different encoded data streams
to reproduce an image:

[1.9] wherein during transmission of I-frame segment
instances of one of the frame segments, P-frame
segment instances of all other frame segments are
transmitted.

Ex. 1001, 7:55–8:26.

C. Asserted Grounds

Petitioner asserts that claims 1–13 are unpatentable based on the
following grounds.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–5, 7–13	103(a)	Perlman ²
6	103(a)	Perlman, Oguz ³

Pet. 25.⁴ In support of its patentability challenge, Petitioner relies on, *inter alia*, the Declaration of Dr. Immanuel Freedman. Ex. 1003 (“Freedman Decl.”)

D. Real Parties in Interest

The parties identify themselves as the real parties-in-interest. Pet. 84; Paper 4, 2.

E. Related Proceedings

The parties identify *Video Solutions Pte. Ltd. v. Cisco Systems, Inc.*, 2:23-cv-00222 (E.D. Tex.) (the “Texas litigation”), as a related proceeding. Pet. 84; Paper 4, 2.

² U.S. Patent Application Publication No. 2009/0118017 A1 (Ex. 1006) (“Perlman”).

³ U. S. Patent Application Publication No. 2008/0151997 A1 (Ex. 1008) (“Oguz”).

⁴ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included amendments to 35 U.S.C. §§ 102 and 103 that became effective after the filing of the ’426 patent application. For present purposes, we apply the pre-AIA version of Section 103, although application of the AIA version would not alter our analysis. *See* Pet. 25, n. 1.

III. ANALYSIS OF PETITIONER'S GROUNDS

A. *Legal Standards*

To ultimately prevail in its grounds for unpatentability, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103 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 ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness (also called secondary considerations), such as commercial success, long-felt but unsolved needs, and failure of others.⁵

⁵ No evidence of objective indicia of non-obviousness is of record concerning the challenged claims.

Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966). We analyze the grounds based on obviousness in accordance with the above-stated principles.

B. Level of Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103(a) requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner asserts that a person of ordinary skill in the art as of September 2008:

[W]ould have been someone knowledgeable and familiar with the video codec arts that are pertinent to the '426 patent. A POSITA would have been familiar with the field of video codecs, including the encoding and transmission of video data, including MPEG and ITU standards that existed as of the late 2000s. A POSITA would have had a bachelor's degree in electrical engineering, computer science, physics, or equivalent training, and approximately two years of experience working in the field of video codecs. Lack of professional experience can be remedied by additional education, and vice versa.

Pet. 16 (citing Freedman Decl. ¶¶ 20–22). Patent Owner does not dispute Petitioner's definition for purposes of its preliminary response. Prelim. Resp. 15.

Petitioner’s proposal is consistent with the level of ordinary skill in the art as reflected by the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579. For purposes of this Decision, we apply Petitioner’s articulation.

C. Claim Construction

In *inter partes* review, a claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). We apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (*en banc*).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). The parties submit that no claim construction is necessary. Pet. 17; Prelim. Resp. 15. However, we find it necessary to consider the interpretation of claim requirements 1.8 and 1.9 (quoted at Section II.B above) in our analysis in Section III.E.2 below.

D. 35 U.S.C. § 314(a)

Patent Owner contends that we should exercise our discretion to deny the Petition in light of the co-pending Texas litigation. Prelim. Resp. 27–42. Petitioner disagrees. Pet. 17–24. For the reasons explained below, we determine that we should not discretionarily deny institution.

The Board considers six factors when determining whether to discretionarily deny institution due to the status of a co-pending proceeding:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;

2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board's exercise of discretion, including the merits.

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). “[I]n evaluating the factors, the Board takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.*; see Trial Practice Guide⁶ 58 & n.2. In addition, our analysis of this issue is informed by the Director’s memorandum that provided “several clarifications . . . to the PTAB’s current application of *Fintiv* to discretionary institution where there is parallel litigation.” *Interim Procedure For Discretionary Denials In AIA Post-Grant Proceedings With Parallel District Court Litigation*, issued June 21, 2022 (“Guidance Memo”)⁷ at 2.

⁶ PTAB Consolidated Trial Practice Guide (Nov. 2019), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

⁷ *Available at* https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

1. Whether a Stay Exists or Is Likely to Be Granted if a Proceeding Is Instituted

Petitioner contends that this factor is neutral because a motion to stay has not yet been filed. Pet. 17–18. Patent Owner argues that this factor strongly favors denying institution because “Petitioner makes no mention that it intends to move for a stay,” Petitioner did not move for a stay even after its previously filed petition challenging another patent asserted in the Texas litigation was instituted, and that it is unlikely the district court would grant a stay even if Petitioner were to move for one, given the advanced state of the litigation. Prelim. Resp. 29–32.

We determine that this factor is neutral because neither party has produced evidence that a stay was requested or that the district court has considered staying the Texas litigation. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative) (“*Fintiv II*”) (“We decline to infer . . . how the District Court would rule should a stay be requested by the parties in the parallel case here.”); *Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative) (“*Sand Revolution*”) (similar).

2. Proximity of the Court’s Trial Date to the Board’s Projected Statutory Deadline

Patent Owner argues, and Petitioner concedes, that trial is currently scheduled for February 10, 2025, around seven months before a final written decision here. Prelim. Resp. 33; Pet. 18 (citing Ex. 1012, 1). There is no indication that the trial will be delayed, and the schedule is consistent with the time-to-trial statistics of the forum. *See* Pet. 18; Prelim. Resp. 33–34;

Guidance Memo 8–9 (providing that “[p]arties may present evidence regarding the most recent statistics on median time-to-trial for civil actions in the district court in which the parallel litigation resides for the PTAB’s consideration”). Patent Owner argues that this schedule weighs heavily against institution. Prelim. Resp. 33–34.

Petitioner argues that this factor should “be tempered by Petitioner’s diligence in quickly seeking *inter partes* review of the ’426 patent [less than four months] after it was first asserted six months into the pending litigation.” Pet. 18 (citing Ex. 1011). We consider this fact in connection with our analysis of the next factor. *See Fintiv*, Paper 11 at 11.

We agree with Patent Owner that the seven month lead time for trial in the Texas litigation weighs heavily against institution.

3. *Investment in the Parallel Proceeding*

Petitioner contends that this factor weighs against denial because the Texas litigation is in its early stages, with the ’426 patent only “recently added” to the case. Pet. 18–19 (citing Exs. 1011, 1012). Petitioner also argues that it diligently filed its Petition less than four months after the ’426 patent was first asserted in the litigation. *Id.* at 19 (citing *Fintiv*, Paper 11 at 11 (“If the evidence shows that the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under NHK”))).

Patent Owner argues that this factor strongly favors denial of institution and disputes Petitioner’s assertion that the Texas litigation is in its early stages. Prelim. Resp. 34. In particular, Patent Owner submits that the case has been ongoing for 13 months, the parties have responded to

substantial numbers of interrogatories and document requests, five depositions have been conducted, Petitioner has served Letters Rogatory in Canada on four entities, the parties of exchanged in infringement and invalidity contentions. *Id.* at 34–35. Also, by the time of this Decision or shortly thereafter, according to the schedule, claim construction briefing will have been completed and the claim construction hearing will have taken place, and fact discovery completed. *Id.* at 35; *see* Ex. 1012.

We evaluate the investment in the related Texas litigation as of the time of the institution decision. *Fintiv*, Paper 11 at 9–10. The record shows that there has been substantial investment by the parties in the Texas litigation, but not yet by the court. Also, Petitioner filed the petition expeditiously after the ’426 patent was added to the case. Based on that, we determine that this factor only somewhat favors denial of institution.

4. Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

Petitioner contends that this factor weighs against denial, asserting, “[t]here is no present overlap of prior art issues in the district court litigation,” and stipulating that “if trial is instituted, it will not pursue the same grounds in the district court litigation.” Pet. 19 (citing *Sand Revolution II, LLC v. Cont’l Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 12 (PTAB June 16, 2020)).

Patent Owner responds that this factor favors denial of institution because there is substantial overlap of prior art issues with the Texas litigation, given that Petitioner has identified Perlman as a “primary reference” and Oguz as a secondary reference in its invalidity contentions in that case. Prelim. Resp. 36 (citing Exs. 2006–2008). Patent Owner also

argues that Petitioner’s stipulation falls short of a *Sotera*-type stipulation and “does little to cure the overlap,” pointing out that, for example, that Petitioner could still assert the Perlman reference in combination with other secondary references in the Texas case.⁸ *Id.* at 37–38.

We determine that this factor somewhat weighs against discretionary denial because Petitioner’s stipulation “mitigates to some degree the concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions.” *Sand Revolution*, Paper 24 at 11–12.

5. *Whether the Petitioner and the Defendant in the Parallel Proceeding are the Same Party*

Petitioner is the defendant in the Texas litigation (Ex. 1021), and the parties both contend, and we agree, that this factor is neutral. Pet. 20; Prelim. Resp. 41.

6. *Compelling Evidence Of Unpatentability*

The sixth *Fintiv* factor takes into account other circumstances that may bear on the decision to exercise discretion to deny, such as the merits of the patentability challenges. *Fintiv*, Paper 11 at 14–16. Under this factor, “the PTAB will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability.” Guidance Memo 5. Board precedent provides that we should only consider the compelling merits standard if the first five *Fintiv* factors favor discretionary denial. *CommScope Techs. LLC. v. Dali*

⁸ Patent Owner also argues we should give little to no weight to Petitioner’s proposed stipulation given Petitioner’s behavior in IPR2024-00194. Prelim. Resp. 39–40. We are not persuaded. Such concerns should be raised with the district court in the Texas litigation or with the Board in IPR2024-00194.

Wireless, Inc., IPR2022-01242, Paper 23 at 4–5 (PTAB Feb. 27, 2023) (precedential).

The second *Fintiv* factor strongly favors denial, the third *Fintiv* factor somewhat favors denial, the first and fifth factors are neutral, and the fourth factor somewhat weighs against denial. Accordingly, we determine that the first five *Fintiv* factors favor discretionary denial, and thus, we assess compelling merits. *CommScope*, Paper 23 at 5 (“In circumstances where, however, the Board’s analysis of *Fintiv* factors 1–5 favors denial of institution, the Board shall then assess compelling merits.”).

We note that the compelling merits standard is met if “the evidence, if unrebutted in trial, would plainly lead to a conclusion that *one or more claims* are unpatentable by a preponderance of the evidence.” Guidance Memo 4 (emphasis added). Thus, the standard need only be met as to one claim. In this case, we determine, for the reasons explained below in our analysis of Petitioner’s unpatentability challenges, that the Petition presents a compelling challenge based on a single close reference at least for independent claims 1 and 12. Perlman’s disclosure provides clear and robust teachings for the limitations of those claims. Patent Owner’s only arguments on the merits, directed to two limitations common to both independent claims, are premised on an interpretation of “transmitting . . . data streams independently over a network” that has no basis in the record.

“A challenge can only ‘plainly lead to a conclusion that one or more claims are unpatentable’ [Guidance Memo 5] if it is highly likely that the petitioner would prevail with respect to at least one challenged claim.”

OpenSky Indus., LLC v. VLSI Tech. LLC, IPR202101064, Paper 102, 49–50 (PTAB Oct. 4, 2022) (precedential). We have so determined in regard to at

least independent claims 1 and 12, and therefore decline to deny institution based on the *Fintiv* factors.

E. Alleged Obviousness of Claims 1–5 and 7–13 over Perlman

Petitioner challenges claims 1–5 and 7–13 as obvious over Perlman. Pet. 25–78.

1. Perlman

Perlman, titled “Hosting And Broadcasting Virtual Events Using Streaming Interactive Video,” is an application published May 7, 2009, filed December 5, 2007, and is a continuation-in-part of an application filed December 10, 2002. Ex. 1006, codes (54), (43), (22), (63). Perlman is directed to multicasted streaming of interactive video stream from a hosting service to a plurality of viewers over the Internet. *Id.* at code (57). Figure 7a is reproduced below.

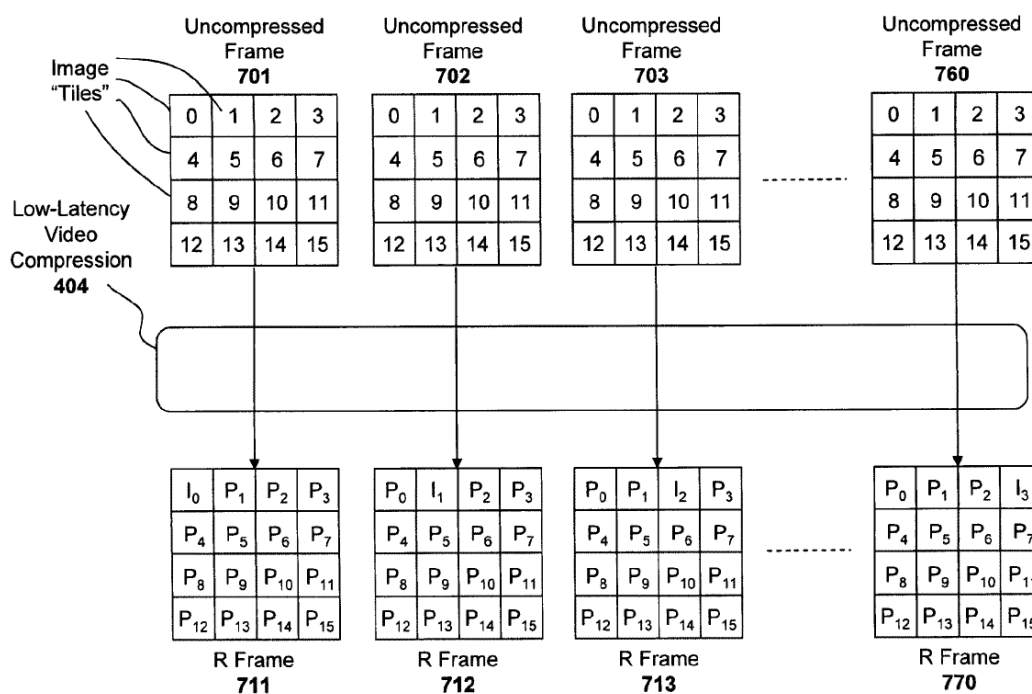


Fig. 7a

Figure 7a depicts a series of uncompressed video frames 701, 702, 703, through 760 which are each divided into Image Tiles 0–15. Ex. 1006 ¶ 168. The frames are processed through Low-Latency Video Compression 404 to generate a sequence of compressed R Frames 711, 712, 713, through 770. *Id.* Each compressed R Frame has one tile processed as an I-tile and the remaining tiles processed as P-tiles. *Id.* ¶ 169. For each successive R Frame, the I-tile is in a different position within the frame — *i.e.*, I₀ in R Frame 711, I₁ in R Frame 712, etc. *Id.* Thus, the I-tiles and P-tiles are progressively interleaved in time over successive frames. *Id.* This R frame technique significantly mitigates the bandwidth peaks typically associated with I-frames because a single I-tile is typically much smaller than a complete I-frame, and any given frame is mostly made up of P-tiles which are typically smaller than I-tiles. *Id.* ¶ 171.

Figure 12 is reproduced below:

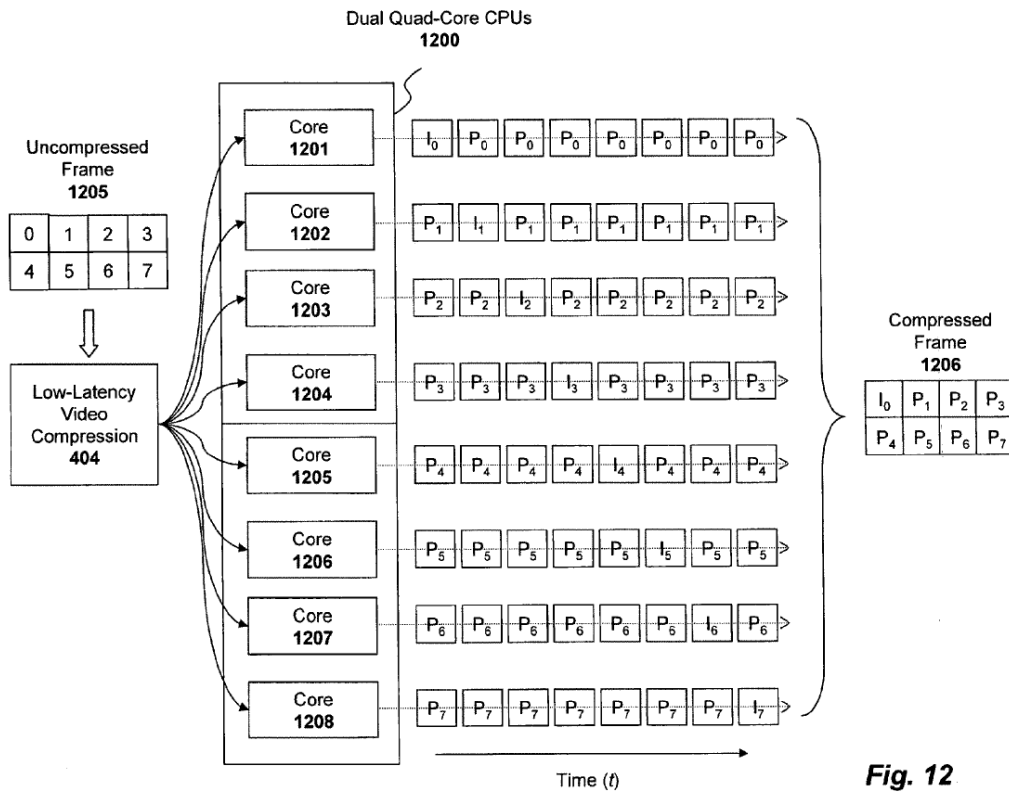


Fig. 12

Figure 12 illustrates an embodiment which uses multi-core processing units for compression. Ex. 1006 ¶ 88. Uncompressed Frame 1205, in this example consisting of 8 tiles, is processed by Low-Latency Video Compression 404, and each tile is processed in parallel via Cores 1201–1208. *Id.* ¶¶ 212–213. As shown in Figure 12, the particular tile processed as an I-tile changes for each frame period, so that over time any given tile is processed as an I-tile followed by seven P-tiles. *Id.* ¶ 213.

2. Independent Claims 1 and 12

For the “videoconferencing or telepresence” method preamble of independent claim 1, Petitioner generally relies on the disclosure in Perlman of a system encoding real time video signals in the context of conference calling and multiple users collaborating while viewing live video.

Pet. 27–31 (citing Ex. 1006, Fig. 19, ¶¶ 153, 169, 257–263; Freedman Decl. ¶¶ 46–50). Patent Owner argues that Perlman is focused on “online fast action or ‘twitch’ video games,” which have latency issues, and that Perlman teaches away from using its technique for such applications as video conferencing, which involve little motion change in the video signal. Prelim. Resp. 2–3. In fact, however, Perlman describes latency problems occurring in videoconferencing applications: “if the camera is panned, resulting in significant scene motion and large peaks, during the panning there may not be enough bits for high-quality image compression, which could result in degraded image quality.” Ex. 1006 ¶ 167. We are also preliminarily persuaded that Perlman describes and illustrates use of video conferencing in the context of video gaming. *Id.* at Fig. 19, ¶ 257.⁹

For claim requirement 1.1 of capturing a stream of video data,¹⁰ Petitioner relies on the disclosure in Perlman of sequences of video images provided to low-latency video compression logic which compresses the sequences of video images, as illustrated in Figure 7a showing Uncompressed Frames 701–760 processed through Low-Latency Video Compression 404 to generate a sequence of compressed R Frames 711, 712, 713, through 770. Pet. 31–33 (citing Ex. 1006, Fig. 7a, ¶¶ 117, 168–169; Freedman Decl. ¶¶ 51–53).

⁹ Based on the present record, we make no determination at this stage of the proceeding as to whether or not the preamble of claim 1 (or of claim 12) is limiting.

¹⁰ For economy of presentation, we refer to the portions of claim 1 identified by numbers (1.1, 1.2, etc.) at Section II.B above, and paraphrase the referenced claim requirement, although the complete language of each claim requirement is the subject of our analysis.

For claim requirement 1.2 of separating the video frames into a plurality of frame segments, Petitioner relies on the disclosure in Perlman of dividing up the video frames into tiles, as shown in Figure 7a with tiles numbered 0 through 15. Pet. 33–35 (citing Ex. 1006, Fig. 7a, ¶¶ 168–169; Freedman Decl. ¶¶ 54–56).

For claim requirement 1.3 of encoding each frame segment independently and in parallel, Petitioner relies on the disclosure in Perlman of individually encoding each tile to create I-tiles and P-tiles making up the R frames, as illustrated in Figure 7a, together with the disclosure in Perlman of multi-core processors to encode the tiles in parallel as illustrated in Figure 12. Pet. 35–38 (citing Ex. 1006, Figs. 7a, 12, ¶¶ 156, 168, 212–213; Freedman Decl. ¶¶ 57–62). Petitioner’s expert Dr. Freedman testifies that a person of ordinary skill in the art would have found it obvious to implement Perlman’s various techniques — including the techniques described with respect to Figure 7a — using parallel processors (or other suitable hardware) to encode different tiles in parallel as Perlman describes with respect to Fig. 12. Freedman Decl. ¶ 59.

For claim requirement 1.4 of each encoded data stream containing a sequence of frame segment instances, Petitioner relies on the sequence of tile instances illustrated in Figures 7a and 12 of Perlman as described above. Pet. 38–40 (citing Ex. 1006, Figs. 7a, 12; Freedman Decl. ¶¶ 63–66).

For claim requirement 1.5 of each encoded data stream containing I-frame and P-frame segment instances, Petitioner relies on the encoding of tiles as I-tiles and P-tiles as illustrated in Figures 7a and 12 of Perlman as described above. Pet. 40–43 (citing Ex. 1006, Figs. 7a, 12, ¶¶ 62, 157, 168; Freedman Decl. ¶¶ 67–72).

For claim requirement 1.6 of, when a segment within a particular frame is an I-frame segment instance, at least one of the other frame segment instances is a P-frame segment instance, Petitioner relies on Figures 7a and 12 of Perlman, which show that when one of the tiles is an I-tile, all the other tiles are P-tiles. Pet. 43–45 (citing Ex. 1006, Figs. 7a, 12, ¶ 169; Freedman Decl. ¶¶ 73–74).

For claim requirement 1.7 of when an I-frame segment instance is present in one of the parallel encoded data streams, a P-frame segment instance is present in at least one of the other parallel encoded data streams, Petitioner again relies on Figures 7a and 12 of Perlman, which show that when one of the tiles is an I-tile, all the other tiles are P-tiles. Pet. 45–47 (citing Ex. 1006, Figs. 7a, 12, ¶ 169; Freedman Decl. ¶¶ 75–78).

For claim requirement 1.8 of transmitting the parallel encoded data streams independently over a network, Petitioner's expert Dr. Freedman testifies that Perlman's streams are independently transmitted, given the disclosure in Perlman that the separate, independently compressed tiles are each transmitted to their destination and then separately, independently decompressed at the receiving end, and only then combined back into frames. Pet. 47–49, 51–52 (citing Ex. 1006 ¶¶ 117, 170, 214; Freedman Decl. ¶¶ 79–81, 84–87).

For claim requirement 1.9 of during transmission of I-frame segment instances of one of the frame segments, P-frame segment instances of all other frame segments are transmitted, Petitioner relies on Figures 7a and 12 of Perlman, which show that when one of the tiles is an I-tile, all the other tiles are P-tiles. Pet. 52–54 (citing Ex. 1006, Figs. 7a, 12, ¶ 169; Freedman Decl. ¶¶ 88–90).

Independent claim 12 is a system claim counterpart to method claim 1, and includes requirements commensurate with that claim. Ex. 1001, 8:59–10:12. Petitioner’s analysis of that claim substantially tracks that of claim 1, with additional support for the corresponding hardware requirements of the claim (a port, a divider, encoders, and a transceiver) that perform the required functions. Pet. 67–76 (citing Freedman Decl. ¶¶ 122–141).

Patent Owner does not specifically address claim requirements 1.1 through 1.7 or claim requirements 12.1 through 12.7, but for requirements 1.8 and 12.7, Patent Owner argues that Petitioner has not demonstrated that Perlman discloses transmitting the parallel encoded data streams independently over a network. Prelim. Resp. 18–22 (citing Xiong Decl. ¶¶ 62–65, 70).¹¹ Essentially, Patent Owner argues that it is insufficient to show that Perlman independently compresses the tiles, transmits the compressed tiles to a destination, independently decompresses the received tiles, and then combines them into frames. *Id.* Patent Owner argues that Petitioner does not explain how the tiles are transmitted, but rather only cites to disclosures that relate to compression before transmission, and decompression after transmission. *Id.* Patent Owner illustrates its point with an example:

Suppose four people (each representative of a tile of a frame) were to travel (be transmitted) from Dallas (where encoding/compression occurred) to Washington, D.C., where decompression occurs. That the four people arrived in Washington, D.C. says nothing about how they traveled to Washington. They could have traveled in separate cars

¹¹ Patent Owner submits the Declaration of Zixiang Xiong, PhD. (hereafter “Xiong Decl.”), with its Preliminary Response. Ex. 2014.

(packets) on separate roads, or in separate cars on the same road each behind the other. They could have traveled in pairs in two cars. Three could have traveled together and the fourth separately, or all four could have traveled in one car. They could have arrived simultaneously, or one could have arrived before the others and waited (e.g., been buffered/held) while the others arrived. In short, that Perlman decompresses each tile separately and reconstructs the video on the receiving end says nothing about the claims' required *independent transmission* limitation, which is a *separate step from decompression*.

Prelim. Resp. 21–22 (citing Xiong Decl. ¶ 65).

Patent Owner's arguments raise the issue of construction of the requirement, "transmitting the parallel encoded data streams independently over a network to a receiver to permit the receiver to decode each frame segment and recombine the decoded frame segments from the different encoded data streams to reproduce an image." Patent Owner relies on several portions of the '426 specification in support of its arguments regarding the "transmitting . . . independently" requirement, but only one portion references independent transmission: "raw high resolution video signal is divided into a plurality of segments, in the form of segments . . . *each of which is processed, compressed and transmitted independently to the receiving end.*" Ex. 1001, 5:59–63 (emphasis supplied).¹² The original as-filed version of claim 1 merely required, "transmitting the encoded segment data." Ex. 1002, 291. This requirement was amended to its issued form in an October 15, 2012 response, citing the above specification passage

¹² Patent Owner also cites additional portions of the '426 specification describing independent compression and decompression of segments, but which say nothing about independent transmission of segments. Prelim. Resp. 8 (additionally citing Ex. 1001, Abstr., 3:29–3:38).

as support, and arguing that the prior art “fail[ed] to teach transmitting the encoded data streams independently over a network for recombination at the receiver.” *Id.* at 51, 62. However, the basis for distinguishing the prior art was that it did not recombine segments at the receiver — neither that nor any other portion of the file history sheds any additional light on the meaning of “independently.”

Also, Figure 3 of the ’426 specification depicts parallel, and thus independent, compression of video segments, followed by a “transmission” block (taken from the Figure 1 depiction of the prior art approach) that serially transmits the individual segments to their destination to be decompressed and then combined back into a frame. Ex. 1001, Figs. 1, 3, 5:2–3, 3:27–28, 3:55–65.

Based on this record, we determine that the claim requirement at issue requires the parallel encoded data streams to be transmitted such that the encoded tiles arrive at the destination for separate decoding and recombination to reproduce the image. The embodiments described in the ’426 specification describe nothing more. The portions of Perlman on which Petitioner relies amply demonstrate the same behavior. It is not necessary to determine the precise method by which the separately encoded data tiles are transmitted, as long as they are separately received, decoded, and recombined at their destination. Patent Owner’s example illustrates this: whether four people travel from Dallas to Washington, D.C. in one, two, three or four cars does not change the fact that each person retains their individual identity during the journey, just like the encoded tiles of Perlman during transmission. Whatever additional, unexplained requirements Patent

Owner would attach to the term “independently” in this context has no reasonable basis.

On essentially the same basis that it argues for claim requirements 1.8 and 12.7, Patent Owner also argues that Petitioner has not demonstrated that Perlman discloses claim requirements 1.9 and 12.8. Prelim. Resp. 25–27 (citing Xiong Decl. ¶¶ 71–72).¹³ We disagree with this argument for the reasons explained above. Moreover, we observe that neither of these claim limitations require “independent,” and we discern no intrinsic support for importing such a limitation. Indeed, this claim requirement was originally application dependent claim 15, but was incorporated into claim 1 by an Examiner’s amendment. Ex. 1002, 21, 293. Before that incorporation, Applicant explained what claim 15 was directed to in its October 15, 2012 response:

Claim 15 relates specifically to the case where in any given frame one frame segment is encoded in I-frame format and all the other frame segments are encoded in P-frame format. For example, the middle region could be in I-frame format, in which case all the other segments of the same frame would have to be in P-frame format. This arrangement is not suggested by the prior art.

Ex. 1002, 62. The disclosures of Perlman described above on which Petitioner relies conform to this characterization of Applicant.

Accordingly, notwithstanding Patent Owner’s arguments directed to claim requirements 1.8, 1.9, 12.7, and 12.8, based on our analysis set forth

¹³ To the extent Patent Owner also argues that Petitioner fails to show “transmission” of Perlman’s tiles, this argument is unavailing. As the Petition explains (*e.g.*, Pet. 48), Perlman clearly transmits its compressed tiles (*e.g.*, Ex. 1006 ¶¶ 117, 214).

above, we determine, on the current record and for purposes of this Decision, that the information presented in the Petition demonstrates compelling evidence that Petitioner will prevail in establishing that claims 1 and 12 are unpatentable under 35 U.S.C. § 103(a) over Perlman.

3. Claims 2–5, 7–11, and 13

Claim 2 depends from independent claim 1 and additionally requires “the frame segments correspond to predetermined parts of the video frames.” Ex. 1001, 8:27–28. Claim 3 depends from independent claim 1 and additionally requires “each frame segment corresponds to a different predetermined area of the video frames.” *Id.* at 8:29–31. Claim 4 depends from independent claim 1 and additionally requires “the frame segments are uniformly sized geometric shapes.” *Id.* at 8:32–33. For claims 2–4, Petitioner relies on the disclosure in Perlman of the non-overlapping four-by-four grid of tiles, each uniformly sized at 1/16th the size of the full image, illustrated in Figure 7a. Pet. 54–57 (citing Ex. 1006, Fig. 7a, ¶ 169; Freedman Decl. ¶¶ 91–100).

Claim 5 depends from independent claim 1 and additionally requires “at least one of frame segment size and shape is different for one of the frame segments compared to another of the frame segments.” Ex. 1001, 8:34–36. For claim 5, Petitioner relies on the disclosure in Perlman tiles can be broken up into whatever shape best suits the video stream and the application used, and includes an example illustrated in Figure 8 in which different tiles are different sizes. Pet. 57–59 (citing Ex. 1006, Fig. 8, ¶¶ 174, 178; Freedman Decl. ¶¶ 101–103).

Claim 7 depends from independent claim 1 and additionally requires “the frame segments are determined in dependence upon external application

data and indicative of the amount of motion that is expected in different areas of the video frames.” Ex. 1001, 8:40–43. Claim 8 depends from independent claim 1 and additionally requires “the frame segments are determined in dependence upon external prior use data indicative of the amount of motion previously determined in different areas of the video frames.” *Id.* at 8:44–47. For claims 7 and 8, Petitioner relies on the disclosure in Perlman of the example of Figure 8, in which smaller tiles are employed around an area of the frame showing motion or complexity, and on the description of compression logic that controls the allocation of bits to the various tiles in by being preconfigured by settings, based on known characteristics of the video sequence to be compressed, such as prior use data from a game, teleconference, or movie application that indicates where a moving character is currently at within the frame. Pet. 59–65 (citing Ex. 1006, Figs. 7a, 7b, 8, ¶¶ 177–178; Freedman Decl. ¶¶ 104–113). Petitioner relies on an example disclosed in Perlman, related to a racing game, where the front of the player’s car (which is relatively motionless in the scene) takes up a large part of the lower half of the screen, whereas the upper half of the screen is entirely filled with the oncoming roadway, buildings and scenery, which is almost always in motion, which data indicates where motion is expected (based on known characteristics) and is external to the compression logic. *Id.* at 60, 64 (citing Ex. 1006 ¶ 177).

Claim 9 depends from independent claim 1 and additionally requires “a period between regularly spaced I-frame segment instances for one of the frame segments is different than a period between regularly spaced I-frame segment instances for another of the frame segments.” Ex. 1001, 8:48–52. For claim 9, Petitioner relies on the disclosure in Perlman that “certain tiles

may be sequenced with I tiles more often than other tiles if, for example, certain areas of the screen are known to have more motion requiring from frequent I tiles, while others are more static (e.g., showing a score for a game) requiring less frequent I tiles.” Pet. 65–66 (citing Ex. 1006 ¶¶ 172, 175; Freedman Decl. ¶¶ 114–117).

Claim 10 depends from independent claim 1 and additionally requires “the frame segments are encoded in encoders having different encoding characteristics.” Ex. 1001, 8:53–55. Claim 11 depends from independent claim 1 and additionally requires “at least one of the encoders has a bitrate that is greater than a bitrate of the other encoders.” *Id.* at 8:56–58. For claims 10 and 11, Petitioner relies on the disclosure in Perlman of configuring video compression logic to allocate more bits to the tiles in certain areas of the screen exhibiting motion, and thus encoded at a higher bit rate, than for tiles at other areas. Pet. 66–67 (citing Ex. 1006, Figs. 7a, 7b, ¶ 177; Freedman Decl. ¶¶ 118–121).

Claim 13 depends from independent claim 12 and additionally requires “a memory for storing predetermined data defining the frame segments, which correspond to predetermined parts of the video frames.” Ex. 1001, 10:13–16. For claim 13, Petitioner relies on the disclosure in Perlman of a hosting service that includes various types of memory, including flash memory, Redundant Arrays of Independent Disks (RAID), and RAM, and Petitioner’s expert Dr. Freedman testifies that a person of ordinary skill in the art would have found it obvious to store any data used by the compression logic in such memory. Pet. 76–78 (citing Ex. 1006, Fig. 4a, ¶¶ 115, 358; Freedman Decl. ¶¶ 142–145).

Other than its arguments discussed above relating to claims 1 and 12, which we have considered, Patent Owner does not further specifically respond to Petitioner's arguments regarding these claims. *See*, Prelim. Resp. 17. Based on the current record and for purposes of this Decision, we determine that the information presented in the Petition demonstrates a reasonable likelihood that Petitioner will prevail in establishing that claims 2–5, 7–11, and 13 are unpatentable under 35 U.S.C. § 103(a) over Perlman.

F. Alleged Obviousness of Claim 6 over Perlman and Oguz

Petitioner challenges claim 6 as obvious over the combination of Perlman and Oguz. Pet. 78–82. Claim 6 depends from independent claim 1 and additionally requires “at least one of the frame segments comprises a plurality of predetermined non-contiguous areas of the video frames.” Ex. 1001, 8:37–39. Petitioner relies on the disclosure in Oguz of dividing up a video frame into slices in a checkerboard pattern, as shown in Figure 4B reproduced below.¹⁴

¹⁴ Oguz, titled “Techniques for content adaptive Video frame slicing and Non-uniform access unit coding,” is an application published June 26, 2008, and filed Dec. 20, 2007. Ex. 1008, codes (54), (43), (22).

300

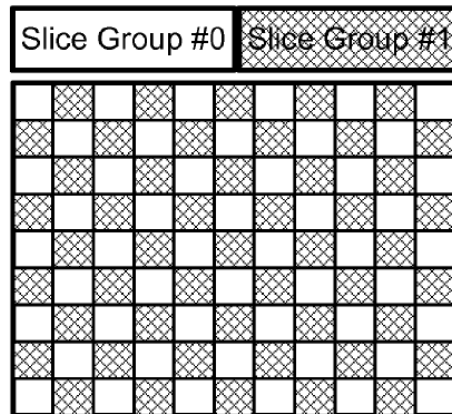


FIG. 4B

Figure 4B illustrates a sample frame 300 which includes a checkerboard pattern for improved error resilience and concealment, with macroblocks that are depicted as white associated with slice group #0, and macroblocks that are depicted as black for slice group #1. Ex. 1008 ¶ 65.

Petitioner argues that it would have been obvious to use the checkerboard pattern of Oguz as a tile arrangement in Perlman, given that Perlman explains that various slice geometries may be used, that one of ordinary skill would have recognized the checkerboard pattern of Oguz as an example of such, and that both Oguz and Perlman discuss using H.264 compression techniques. Pet. 79–82 (citing Ex. 1006, ¶¶ 156, 169, 174; Ex. 1008, Fig. 4B, ¶¶ 65–66; Freedman Decl. ¶¶ 149–156). Petitioner notes that Oguz explains that the checkerboard pattern is useful for the H.264 codec, and that Perlman lists the H.264 codec as one example of a codec that may be used with its teachings, thus motivating one of ordinary skill to divide a frame into two segments positioned in a checkerboard pattern when using the commonly available H.264 codec. Pet. 81 (citing Ex. 1006 ¶ 156; Ex. 1008 ¶ 66; Freedman Decl. ¶ 152).

Patent Owner does not specifically address Petitioner’s arguments regarding the combination of Perlman and Oguz as applied to claim 6. *See*, Prelim. Resp. 17. For purposes of this Decision, we determine that Petitioner has provided sufficiently articulated reasoning with rational underpinnings for the proffered combined teachings of Perlman and Oguz, and determine on the current record that the information presented in the Petition demonstrates a reasonable likelihood that Petitioner will prevail in establishing that claim 6 is unpatentable under 35 U.S.C. § 103(a) over the combination of Perlman and Oguz.

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition and the Preliminary Response, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertion that at least one claim of the ’426 patent is unpatentable. Indeed, as stated above, we determine that the Petition presents a compelling challenge at least for independent claims 1 and 12. Accordingly, we institute an *inter partes* review on all the challenged claims and all of the grounds presented in the Petition. *See* 37 C.F.R. § 42.108(a); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018); *AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1364 (Fed. Cir. 2019) (“[I]f the Board institutes an IPR, it must . . . address all grounds of unpatentability raised by the petitioner.”). At this stage of the proceeding, we have not made a final determination as to the patentability of these challenged claims.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314, *inter partes* review is instituted as to the challenged claims of the '426 patent with respect to all grounds of unpatentability presented in the Petition; and

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

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Patent 8,649,426 B2

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