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Paper 7
Date March 16, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARRIS SOLUTIONS, INC.,
Petitioner,

v.

REALTIME ADAPTIVE STREAMING LLC,
Patent Owner.

Case IPR2019-01586
Patent 8,929,442 B2

Before GEORGIANNA W. BRADEN, GREGG I. ANDERSON, and KAMRAN JIVANI, *Administrative Patent Judges.*

BRADEN, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner ARRIS Solutions, Inc. requested an *inter partes* review of claims 16–29 of U.S. Patent No. 8,929,442 B2 (Ex. 1001, "the '442 patent"). Paper 1 ("Petition" or "Pet."). Patent Owner Realtime Adaptive Streaming LLC did not file a Preliminary Response.

We have jurisdiction under 37 C.F.R. § 42.4(a) and 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition "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." Having considered the arguments and evidence of record, we decline to institute the requested *inter partes* review because we find Petitioner has failed to account properly for all the limitations of the challenged independent claims, as discussed below.

II. BACKGROUND

A. The Challenged Patent (Ex. 1001)

The '442 patent provides a solution to the existing problems by providing "a system and method for compressing and decompressing based on the actual or expected throughput (bandwidth) of a system employing data compression and a technique of optimizing based upon planned, expected, predicted, or actual usage." Ex. 1001, 7:51–56. The system selects compression routines using a "controller [that] tracks and monitors the throughput (data storage and retrieval) of a data compression system and generates control signals to enable/disable different compression algorithms when, e.g., a bottleneck occurs so as to increase the throughput and eliminate the bottleneck." *Id.* at 9:55–59.

The ’442 patent explains that

> two categories of compression algorithms are defined—an “asymmetrical” data compression algorithm and a “symmetrical[”] data compression algorithms. An asymmetrical data compression algorithm is referred to herein as one in which the execution time for the compression and decompression routines differ significantly. In particular, with an asymmetrical algorithm, either the compression routine is slow and the decompression routine is fast or the compression routine is fast and the decompression routine is slow. Examples of asymmetrical compression algorithms include dictionary-based compression schemes such as Lempel-Ziv.

Ex. 1001, 9:61–10:4.

The ’442 patent then describes “symmetry” and “asymmetry” in the context of compression and decompression:

> [I]n terms of overall effective bandwidth, compression ratio, or time or any combination thereof. In particular, in instances of frequent data read/writes, bandwidth is the optimal parameter for symmetry. In asymmetric applications such as operating systems and programs, the governing factor is net decompression bandwidth, which is a function of both compression speed, which governs data retrieval time, and decompression speed, wherein the total governs the net effective data read bandwidth.

Id. at 10:16–24.

Figure 1 of the '442 patent is reproduced below.

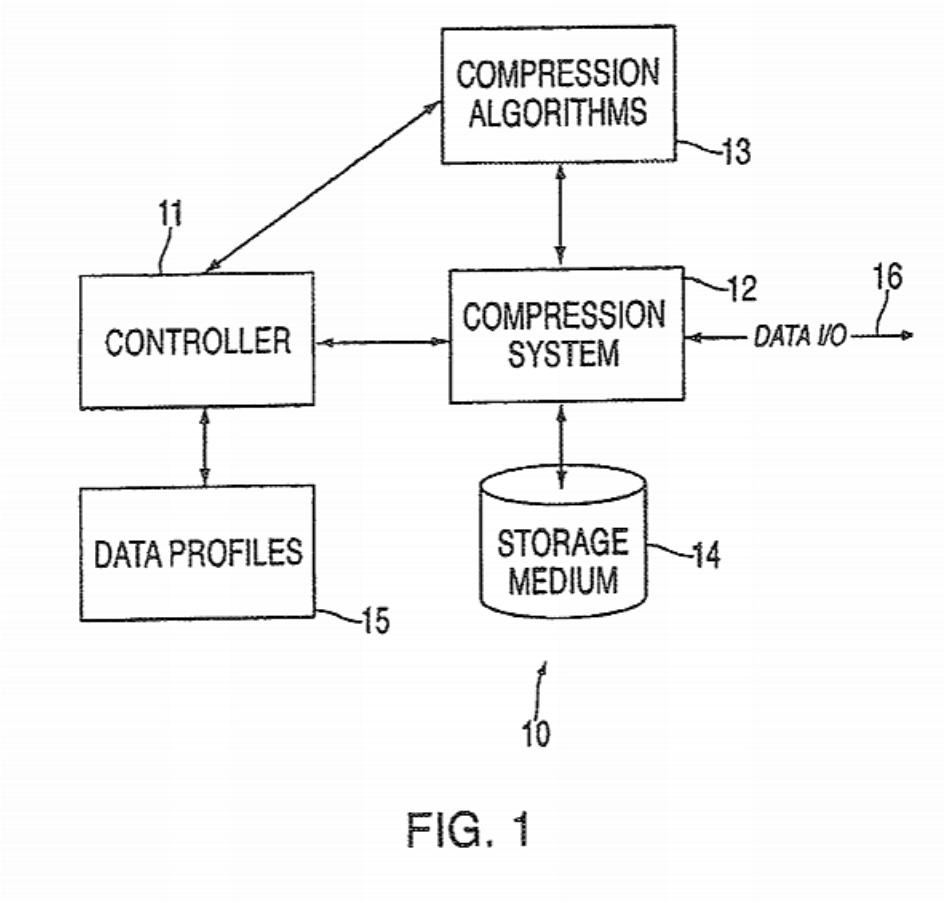


FIG. 1

Figure 1, shown above, is "a high-level block diagram [that] illustrates a system for providing bandwidth sensitive data compression/decompression according to an embodiment of the present invention." Ex. 1001, 10:31–34. Figure 1 illustrates "a host system 10 comprising a controller 11 (e.g., a file management system), a compression/decompression (or data compression) system 12, a plurality of compression algorithms 13, a storage medium 14, and a plurality of data profiles 15." *Id.* at 10:34–38. The "controller tracks and monitors the throughput (e.g., data storage and retrieval)" of the system and when the throughput of the system falls below a predetermined threshold, the system generates control signals to enable/disable different compression algorithms. *Id.* at 10:38–43. "In one embodiment, the system

throughput that is tracked by the controller 11 preferably comprises a number of pending access requests to the memory system." *Id.* at 10:43–45.

Still referring to Figure 1, "[t]he data compression system 12 is operatively connected to the storage medium 14 using suitable protocols to write and read compressed data to and from the storage medium 14." Ex. 1001, 10:46–48. "The data compression system 12 may maintain the compressed data to be stored on the storage medium 14 and the decompressed data that is retrieved from the storage medium 14 for subsequent data processing, storage, or transmittal." *Id.* at 10:64–11:1. Data compression system 12 may receive compressed or uncompressed data via I/O (input/output) port 16 from a remote location or transmit the data to another network device for remote processing or storage. *Id.* at 11:1–8.

"The controller 11 utilizes information comprising a plurality of data profiles 15 to determine which compression algorithms 13 should be used by the data compression system 12." Ex. 1001, 11:8–11. The access profile of a given data set is determined "prior to compression so that the optimum category of compression algorithm can be selected." *Id.* at 12:45–48. "[T]he decision regarding which routines will be used at compression time (write) and at decompression time (read) is preferably made before or at the time of compression" so that "only the matching decompression routine can be used to decompress the data, regardless of how much processing time is available at the time of decompression." *Id.* at 12:48–57.

B. The Challenged Claims

As noted above, Petitioner challenges claims 16–29 of the '442 patent, of which claims 16 and 23 are independent. Claims 16 and 23 are illustrative of the claimed subject matter and are reproduced below:

> 16. A method, comprising:
> decompressing a compressed data block,
> wherein at least portion of a first data block having video or audio data was compressed with one or more compression algorithms selected from among a plurality of compression algorithms based upon a frequency of access of at least a portion of a second compressed or uncompressed data block to create at least the compressed data block, and
> wherein at least one of the plurality of compression algorithms is asymmetric; and
> storing at least a portion of the decompressed data block.

Ex. 1001, 21:18–29.

> 23. An apparatus, comprising:
> a data decompression system configured to decompress a compressed data block,
> wherein at least a portion of a first data block having video or audio data was compressed with one or more compression algorithms selected from among a plurality of compression algorithms based upon a frequency of access of at least a portion of a second compressed or uncompressed data block to create at least the compressed data block, and
> wherein at least one of the plurality of compression algorithms is asymmetric; and
> a storage medium configured to store at least a portion of the decompressed data block.

Id. at 22:8–20.

C. Asserted Challenges to Patentability

Petitioner asserts the following challenges to patentability:

Claims Challenged	35 U.S.C. §[1]	References/Basis
16, 17, 21–24, 29	§ 103(a)	Imai,[2] Ishii[3]
18–20, 25–28	§ 103(a)	Imai, Ishii, Couwenhoven[4]

Pet. 5, 16–72. Petitioner submits the Declaration of James A. Storer, Ph.D. (Ex. 1003) in support of its arguments.

D. Related Matters

Petitioner identifies the following proceedings challenging the '442 patent before this Board: (1) *ARRIS Solutions, Inc. et al. v. Realtime Adaptive Streaming* LLC, IPR2019-01222; (2) *Sony Corporation v. Realtime Adaptive Streaming LLC*, IPR2018-01439; and (3) *Adobe Inc. v. Realtime Adaptive Streaming LLC*, IPR2019-00712. Pet. 73–74.

Concurrently with the instant Petition, Petitioner filed an additional petition challenging claims 16–29 of the '442 patent before this Board. *See*

[1] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the '442 patent issued from an application with an effective filing date earlier than March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability. Therefore, while Petitioner does not specify a subsection of 35 U.S.C. § 103 in its Petition, we apply 35 U.S.C. § 103(a).

[2] Japanese Patent Application Publication No. H11331305, published Nov. 30, 1999 (Ex. 1004, with corresponding English translation Ex. 1005, "Imai").

[3] U.S. Patent No. 5,675,789, issued Oct. 7, 1997 (Ex. 1007, "Ishii").

[4] U.S. Patent No. 5,596,602, issued Jan. 21, 1997 (Ex. 1008, "Couwenhoven").

ARRIS Solutions, Inc. v. Realtime Adaptive Streaming LLC, IPR2019-01585, Paper 1 (petition).

Both Petitioner and Patent Owner state that the '442 patent is related to the following district court litigations: *Realtime Adaptive Streaming, LLC v. ARRIS Solutions, Inc.*, No. 1-19-cv-00585 (D. Colo.); *Realtime Adaptive Streaming LLC v. Haivision Network Video Inc.*, No. 6:19-cv-00441 (W.D. Tex.); and *Realtime Adaptive Streaming v. Adobe Systems Inc.*, No. 2-18-cv-09344 (C.D. Cal). Pet. 73–74; Paper 5, 1–2 (Patent Owner's Mandatory Notice). Furthermore, Petitioner identifies several other district court litigations involving the '442 patent: *Realtime Adaptive Streaming LLC v. Amazon.com, Inc. et al*, No. 6-17-cv-00549 (E.D. Tex.); *Realtime Adaptive Streaming LLC v. Cisco Systems, Inc.*, No. 6-17-cv-00591 (E.D. Tex.); *Realtime Adaptive Streaming LLC v. Brightcove Inc. et al*, No. 1-17-cv-01519 (D. Del.); *Realtime Adaptive Streaming LLC v. Haivision Network Video Inc.*, No. 1-17-cv-01520 (D. Del.); *Realtime Adaptive Streaming LLC v. Polycom, Inc.*, No. 1-17-cv-02692 (D. Colo.); *Realtime Adaptive Streaming LLC v. Sony Electronics Inc.*, No. 1-17-cv-01693 (D. Del.); *Realtime Adaptive Streaming LLC v. Apple Inc.*, No. 1-17-cv-02869 (D. Colo.); *Realtime Adaptive Streaming LLC v. Adobe Systems Incorporated*, No. 1-18-cv-10355 (D. Mass.); and *Realtime Adaptive Streaming LLC v. Samsung Electronics Co., Ltd. et al*, No. 6-18-cv-00113 (E.D. Tex.). Pet. 73–74.

III. ANALYSIS

A. Principles of Law

Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent

Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). At this stage of the proceeding, Petitioner must establish that there is a reasonable likelihood that it will prevail with respect to at least one of the challenged claims. 35 U.S.C. § 314(a).

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 of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective evidence of non-obviousness, i.e., so-called secondary considerations such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co*., 383 U.S. 1, 17–18 (1966). The obviousness inquiry further requires an analysis of "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")).

"In an [*inter partes* review], 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) (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 Patent Owner. *See Dynamic Drinkware*, 800 F.3d at 1378 (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

Thus, to prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. Additionally, the Supreme Court held that a decision to institute under 35 U.S.C. § 314(b) may not institute review on less than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Moreover, in accordance with USPTO Guidance, "if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition." *See Guidance on the Impact of SAS on AIA Trial Proceedings* (April 26, 2018) (available at https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial) ("USPTO Guidance"). At this preliminary stage, we determine whether the information presented in the Petition shows there is a reasonable likelihood that Petitioner would prevail in establishing that one of the challenged claims is unpatentable.

E. Claim Construction

Because the Petition was filed after November 13, 2018, we construe the challenged claims 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) (as amended Oct. 11, 2018).[5] This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their "ordinary and customary meaning," which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13.

Our analysis below focuses on one particular limitation of the challenged independent claims. Petitioner does not seek our construction of this limitation (*see generally* Pet.) and Patent Owner did not file a Preliminary Response. Thus, the parties do not dispute the construction of this limitation in the record before us. Additionally, our review does not identify any term whose construction would alter our analysis. Accordingly, we decline to construe any claim terms of the '442 patent. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'").

F. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John*

[5] *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (final rule).

Deere Co., 383 U.S. 1, 17–18 (1966)); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

Petitioner argues that one of ordinary skill in the art at the time of the invention of the '442 patent would have had "bachelor's degree in electrical engineering, computer science, or a similar field with at least two years of experience in data compression or with a master's degree in electrical engineering, computer science, or a similar field with a specialization in data compression." Pet. 8 (citing Ex. 1003 ¶ 67).

Patent Owner did not file a preliminary response, and therefore, at this stage, does not identify a level of skill one would have had at the time of the invention of the '442 patent. For purposes of this Decision on Institution, and based on the current record, we adopt Petitioner's assessment of the level of skill in the art because it is consistent with the '442 patent and the asserted prior art, and we apply it in our analysis below.

G. Overview of the Asserted Prior Art

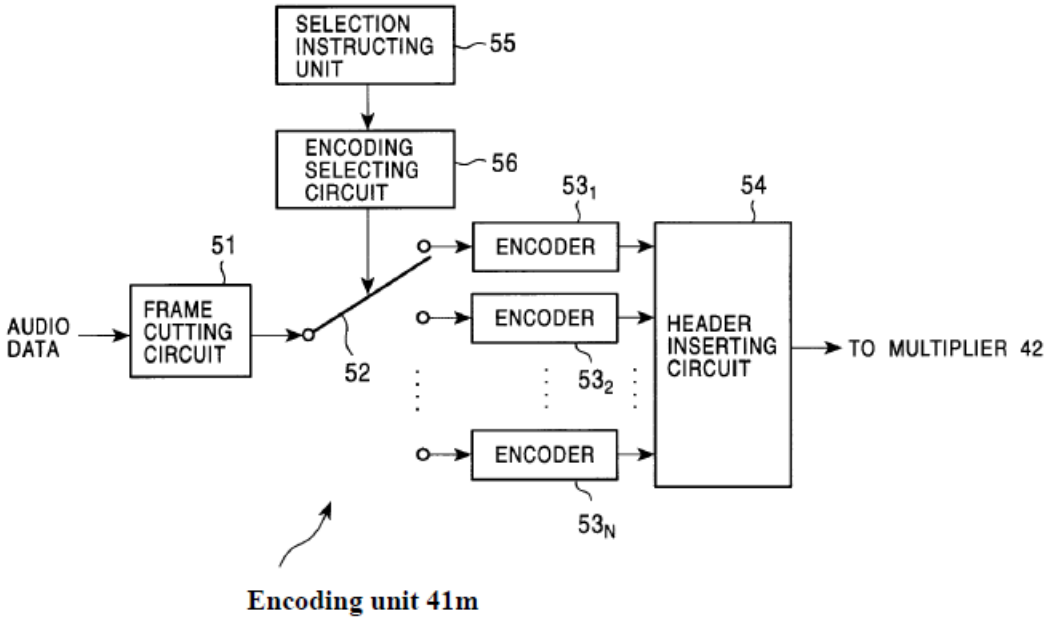
1. Imai (Ex. 1005)

Imai is a Japanese Patent Application[6] titled "Transmitting apparatus and transmitting method, receiving apparatus and receiving method, as well as providing medium." Ex. 1005, Title. Imai is related to encoding and transmitting digital signals to the receiving side where they are decoded and reproduced in real time. *Id.* ¶ 1. According to Imai, real time encoding, transmitting, and decoding can present several problems though. *Id.* ¶¶ 3–5.

[6] The original application is in Japanese and provided in the record as Exhibit 1004. A certified English language translation of Imai is provided in the record as Exhibit 1005. All citations to Imai in the Petition and this Decision are made to Exhibit 1005.

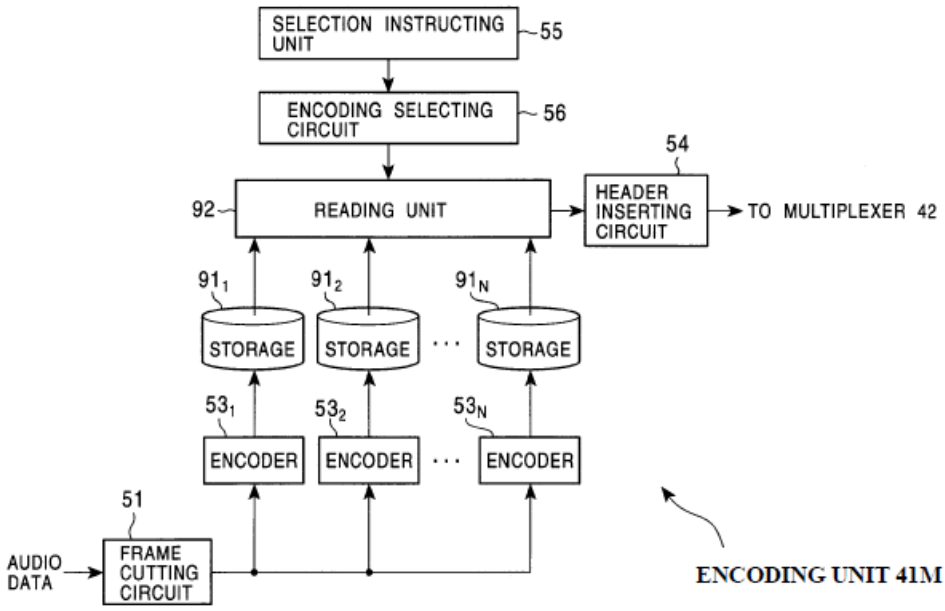
For example, the transmission rate of the network can vary and drop below the data rate of the coded data which leads to the encoded digital signals arriving too late. *Id.* ¶ 3. The hardware capabilities or decoding method of the receiving device can also slow down real time decoding of the received signals. *Id.* ¶ 4. To address these problems, Imai includes a plurality of coding methods and selects the appropriate coding method to encode the digital signals, or part of the digital signals, based on certain relevant factors. *Id.* ¶ 7. The digital signals Imai is particularly concerned with are audio signals, and the plurality of coding methods can include PCM, ADPCM, layers 1, 2, 3, of MPEG, ATRAC, ATRAC2, and HVXC. *Id.* ¶ 67. The factors that can affect which coding method is used include the processing capability of the receiving device (*see id.* at Fig. 9, ¶¶ 88–99), transmission rate of the network (*see id.* ¶¶ 145–166), and the audio content of the audio signals (*see id.* ¶¶ 101–102). For example, Imai describes a situation where the audio signal is predominantly voice, in which case HVXC may be appropriately used as the coding method. *Id.* ¶ 102. On the other hand, if the audio signal is predominantly instrument sounds, then ATRAC may be used as the coding method. *Id.*

One embodiment of a coding unit in Imai is illustrated in Figure 5, reproduced below.



As shown above in Figure 5, audio signals are encoded using a chosen encoder 53_1–53_N. *Id.* ¶¶ 65–66, Fig. 5. According to Imai, the encoders are constructed to encode the audio signal with different coding methods from each other. *Id.* ¶ 67. Selection instructing unit 55 then decides the appropriate coding methods corresponding to encoders 53_1 to 53_N, and instructs encoding selecting circuit 56 to select the decided coding method. *Id.* ¶ 70. Imai discloses that switch 52 may be changed midway through a sequence of continued encoding of the audio signal, so one portion of the audio signal is encoded with one coding method while another part of the audio signal is encoded with another coding method. *Id.* ¶ 72. Imai further discloses that header inserting circuit 54 adds to the coded data of each frame, an ID indicating the coding method selected to encode the frame. *Id.* The coded data added with the ID in header inserting circuit 54 is supplied to multiplexing unit 42 and transmitted to a client. *Id.* ¶ 74.

Another embodiment of a coding unit in Imai is illustrated in Figure 16, reproduced below. *See, e.g., id.* ¶¶ 165–171.



As shown above in Figure 16, the audio signal is encoded into coded date by encoders 53_1–53_N and store in storage 91_1–91_N. *Id.* ¶¶ 165, 167. According to Imai, when a request for an audio signal is issued from client terminal 3, encoding selecting circuit 56 controls read-out unit 92 in accordance with an instruction based on the encoding schedule provided from selection instructing unit 55. *Id.* ¶ 169. Imai also states the invention described is applicable to other signals, including "video signals." *Id.* ¶ 172.

2. Ishii (Ex. 1007)

Ishii is related to a file compression processor that records image and text data to a recording media after data compression. Ex. 1007, 1:10–15. Ishii's file compression processor includes a file status monitor that keeps track of the current available capacity on the file unit and a threshold value of available capacity that is always to be ensured. *Id.* at Abstract, 1:56–60. When the current available file capacity is greater than the threshold value,

files are not compressed and, in some embodiments, certain files with high access frequency are decompressed. Ex. 1007, 6:65–7:3. When the current available file capacity is below the threshold, the system searches for files with a lower access frequency and compresses them. Ex. 1007, 5:43– 50. An appropriate data compression method is selected based on access frequency and file type. Ex. 1007, 5:43–50, 5:60–65. For example, a compression method with shorter compression and decompression times is selected for files that are accessed frequently and a compression method with a higher compression ratio (and typically longer compression times) is selected for files with lower access frequency. Ex. 1007, 6:12–17.

3. Couwenhoven (Ex. 1008)

Couwenhoven is a U.S. Patent titled "Data Compression Rate Control Method And Apparatus." Ex. 1008, Title. Couwenhoven is related to data compression, specifically controlling a fixed rate output of a variable rate data compression module that is capable of operating in a number of different configurations, where the bit rate for each configuration may be controlled over some finite range by a control signal supplied by a rate controller. *Id.* at 1:18–24. According to Couwenhoven, "in many applications the transmission channel is a fixed rate link, which means that a method of coupling the output of the variable rate data compression module into the fixed rate channel is required." *Id.* at 1:42–45.

One embodiment of Couwenhoven is shown in Figure 1, reproduced below.

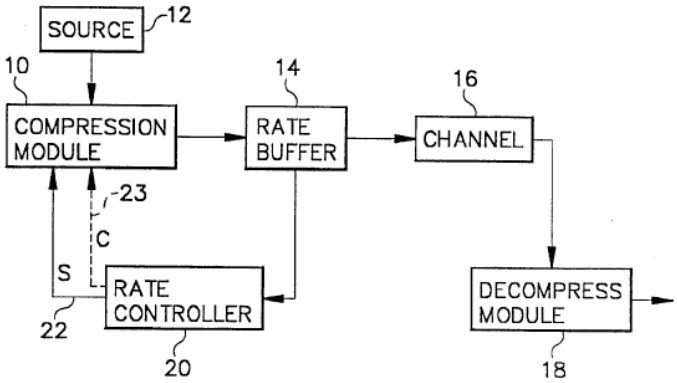
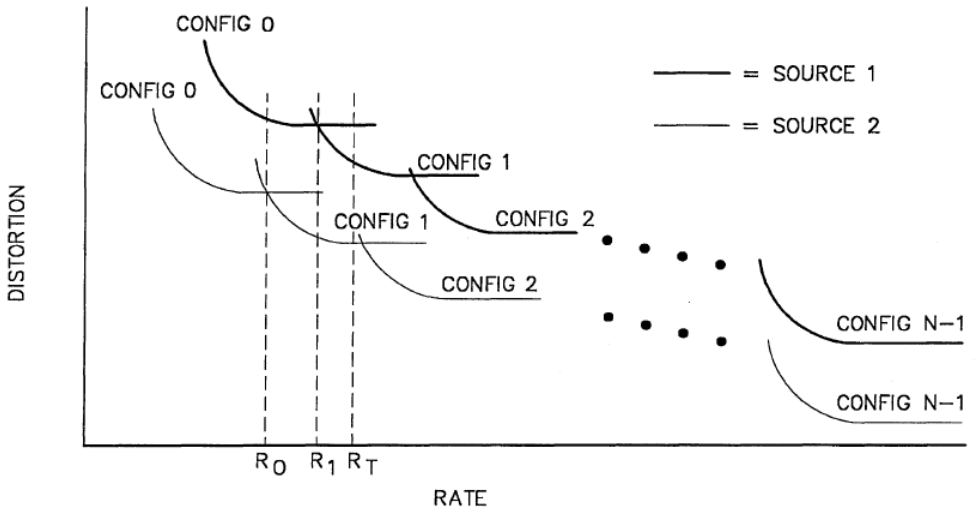


FIG. 1

Couwenhoven discloses, with reference to Figure 1, that a known solution in the prior art is to provide rate buffer 14 and rate controller 20 "which feeds a control signal S on line 22 back to the compression module, modifying its output bit rate." *Id.* at 1:60–62, 4:7–9. Couwenhoven also teaches that the overall performance of a compression technique can be characterized by a rate distortion curve. *Id.* at 2:5–7. "For a rate controlled compression technique, the value of the control signal S is correlated with the bit rate 20 and signal distortion that the compression technique delivers, and hence defines the point on the rate distortion curve where the compression technique will perform." *Id.* at 2:18–22. Couwenhoven further teaches that "more advanced compression techniques will often contain several distinct operating configurations, each of which is designed to achieve a certain average bit rate or distortion level." *Id.* at 2:41–44. Thus, "[t]he task of the rate controller in a more advanced compression technique with multiple configurations now becomes more complex, as the rate controller must determine when it is appropriate to switch between the available configurations as well as modulate the bit rate within a given configuration." *Id.* at 2:57–62.

Another embodiment of Couwenhoven is shown in Figure 5, reproduced below.



Couwenhoven notes, with reference to Figure 5 above, that "[s]witching between these configurations based on the fill conditions of the buffer is effective at controlling the rate, but is not optimal from a rate distortion standpoint due to the fact that different sources will produce different sets of rate distortion curves." *Id.* at 3:4–9, 4:18–20. Couwenhoven notes that "discontinuous jumps in the bit rate will make the process more difficult to control, and discontinuous jumps in the reconstructed signal quality are undesirable." *Id.* at 3:14–17.

To address these problems, Couwenhoven provides

> a data compression system that can operate in a number of different configurations, and wherein the bit rate produced by a given configuration can be controlled over some finite range by a control signal from a rate controller for smoothly transitioning between the configurations so that discontinuous jumps in bit rate and distortion are minimized.

Id. at 3:29–36. The system in Couwenhoven accomplishes this "by determining thresholds on the feedback control signals, the thresholds being

used to determine when to switch in or out of each configuration; the thresholds furthermore being determined from the intersection points of the rate distortion curves for the available configurations." *Id.* at 3:36–41.

Couwenhoven discloses two "major advantages" of this solution. "[F]irst, since the output bit rate of the compression technique now varies smoothly across the mode transition boundary, then the controllability of the compression technique is increased." *Id.* at 3:51–54. "Secondly, the distortion level also varies smoothly across the mode transition boundary, so the configuration transition is not perceived as a discontinuous jump in the quality of the reconstructed signal." *Id.* at 3:55–58. This second advantage is especially significant "when the source is image data, as the human observer will not detect the configuration transition as a quality change in the reconstructed image." *Id.* at 3:58–61.

The Couwenhoven system accomplishes this by determining minimum (SMIN) and maximum (SMAX) values of the control signal for each configuration from the intersection points of the rate distortion curves. *Id.* at 5:61–6:6. "If the value of the control signal becomes less than the minimum value or greater than the maximum value, then the rate controller changes the configuration appropriately by changing the value of the configuration select signal C to correspond to the new configuration." *Id.* at 6:8–12. "Coincident with the configuration change, the rate controller changes the value of the control signals so that the performance point of the compression technique remains at the intersection point of the rate distortion curves of the old and new configurations after the configuration change." *Id.* at 6:12–17. According to Couwenhoven, "[t]his ensures that the configuration change will not create discontinuous jumps in the rate or

distortion level of the reconstructed signal, which is advantageous over the methods described in the prior art." *Id.* at 6:39–42.

H. Asserted Obviousness of Independent Claims 16 and 23

Independent claim 16 recites, in relevant part, "a first data block . . . was compressed with one or more compression algorithms selected . . . based upon a frequency of access of . . . a second . . . data block." Ex. 1001, 21:18–29. Independent claim 23 recites a commensurate limitation. *Id.* at 22:8–20. Thus, both challenged independent claims require that a first data block be compressed using an algorithm selected based on the frequency of access of a second data block. For the reasons that follow, we determine Petitioner has failed to show a reasonable likelihood of success on any of its challenges to this limitation. We address each of Petitioner's asserted grounds below.

1. Asserted Obviousness based on Imai and Ishii

Petitioner asserts, and we agree, that (1) Imai teaches a selection instructing unit 55 that selects an appropriate "one from a plurality of coding methods corresponding to the encoders 53_1 to 53_N . . . and then instructs the encoding selecting circuit 56 to select the decided coding method" (Pet. 28–29 (citing Ex. 1005 ¶ 70) (alteration in original)) and (2) Ishii teaches selecting algorithms based on frequency of file access (*id.* at 29 (citing Ex. 1007, 5:62–65)). In particular, Ishii describes file compression portion 105 selects an appropriate data compression method for compression of a file according to the attributes of the file to be compressed, including access frequency. Ex. 1007, 5:62–65, 7:16–21. Petitioner only relies on Ishii for the limitation regarding "a first data block . . . was compressed with one or more compression algorithms selected . . . based upon a frequency of access

of . . . a second . . . data block." Pet. 28–29. Petitioner fails to identify, however, the claimed first and second data blocks and the claimed selection of an algorithm to be used on the first data block *based upon frequency of access of the second data block*.

As to the claimed data blocks, Ishii does not teach the use of data blocks, nor does Petitioner contend otherwise. *See generally* Ex. 1007; *see* Pet. 33–34. Rather, Ishii specifically discloses the use of files. *See* Ex. 1007, 5:62–65. Thus, Petitioner relies on Dr. Storer to assert that "Ishii's files include multiple data blocks—including a "first" and "second" data block" because "a [person of ordinary skill in the art] would have understood that compression algorithms generally operate by compressing chunks or blocks of data, such as from an input bitstream." Pet. 34 (citing Ex. 1003 ¶ 132). Petitioner contends "a [person of ordinary skill in the art] would have understood that the types of files discussed in Ishii, such as program or image data, would be more than 8 bits, otherwise no compression could be achieved." *Id.* (citing Ex. 1003 ¶¶ 132–133). Petitioner and Dr. Storer continue

> A [person of ordinary skill in the art] would understand that Ishii's 'user programs' access files by sequentially loading each individual data block in a file into memory for further processing (e.g., execution of sequential program instructions by a processor) because this would have been the customary configuration of memory controllers and memory management software.

Id. at 34 (citing Ex. 1003 ¶ 134). According to Petitioner and Dr. Storer, an ordinarily-skilled artisan "would have understood that only a subset of data blocks of the requested file would have been accessed and loaded into memory at any one time, with the remaining data blocks loaded in as

necessary." *Id.* at 35 (citing Ex. 1003 ¶ 135). "[U]sers requesting image or video data would not always utilize all of the requested content, and would often stop playing a video, skip to a different video, or stop loading an image after receiving only the first few data blocks," assert Petitioner and Dr. Storer, so "a [person of ordinary skill in the art] would have understood Ishii's system to minimize memory usage by only retrieving, decompressing, and loading into memory those data blocks of requested files that are about to be used by the user program." *Id.* (citing Ex. 1003 ¶ 135).

With regard to the claimed selection of an algorithm to compress a first data block based on the frequency of access of a second data block, Petitioner asserts that a person of ordinary skill in the art would

> have understood Ishii's file attribute controller that maintains the 'number of accesses for each file' to increment the number of accesses for the file ***as soon as the first*** data block of the file is accessed, or loaded into memory, without regard to whether the user or server accessed each and every remaining data block in the file.

Id. at 35–36 (citing Ex. 1003 ¶ 136). Therefore, "Ishii's "number of accesses for each file" to refer to the number of accesses of at least the first data block within the file, while subsequent data blocks in the file could often have fewer accesses than the recorded number." *Id.* at 36 (citing Ex. 1003 ¶ 136). According to Petitioner,

> Ishii's teachings to select an algorithm to compress all the data blocks in a file based on the frequency of access of the file teaches identifying a "frequency of access of at least a portion of a second compressed or uncompressed data block" (*i.e.*, the first data block in the file), and compressing a "portion of a first data block" (*i.e.*, the subsequent data blocks in the file) based upon that frequency of access because Ishii teaches selecting a compression algorithm for an entire file (including multiple data

> blocks) based on the frequency of access of the first data block in the file (the claimed "second compressed or uncompressed data block").

Id. at 36 (citing Ex. 1003 ¶ 137).

We disagree with Petitioner's arguments. It is undisputed in the record before us that Ishii does not disclose using data blocks (but rather uses files), the frequency of access of a data block to select a compression algorithm, or the use of the frequency of access of one data block for the selection of an algorithm to be used on another data block, as claimed. Rather, Petitioner's arguments as to these claim limitations—spanning four pages of briefing—rely *exclusively* on Dr. Storer's testimony, without citing any documentary evidence in support. Pet. 28–36 (citing Ex. 1003 ¶¶ 128–37). Dr. Storer, in turn, makes no attempt to base his testimony on Ishii's disclosure. Ex. 1003 ¶¶ 128–37. For instance, Petitioner and Dr. Storer assert that:

- one of ordinary skill in the art would "would have understood that the types of files discussed in Ishii, such as program or image data, would be more than 8 bits, otherwise no compression could be achieved";
- Ishii's system would "access files by sequentially loading each individual data block in a file into memory";
- "loading all the data blocks in a file into memory would have been inefficient";
- "only a subset of data blocks of the requested file would have been accessed and loaded into memory at any one time";

- "users requesting image or video data would not always utilize all of the requested content";
- users "would often stop playing a video, skip to a different video, or stop loading an image after receiving only the first few data blocks"'
- "Ishii's file attribute controller . . . [would] increment the number of accesses for the file as soon as the first data block of the file is accessed, or loaded into memory";
- Ishii's file attribute controller would disregard "whether the user or server accessed each and every remaining data block in the file"; and
- "Ishii's 'number of accesses for each file' refer[s] to the number of accesses of at least the first data block within the file, while subsequent data blocks in the file could often have fewer accesses than the recorded number."

Pet. 28–36 (citing Ex. 1003 ¶¶ 128–37). For each of the foregoing assertions, Dr. Storer provides no analysis or explanation of why the assertion must be as he says. Such *ipse dixit* is an insufficient evidentiary basis and cannot substitute for disclosure in a prior art reference itself. As our Trial Practice Guide explains, "because an *inter partes* review may only be requested 'on the basis of prior art consisting of patents or printed publications,' 35 U.S.C. § 311(b), expert testimony cannot take the place of disclosure from patents or printed publications." Patent Trial and Appeal Board Consolidated Trial Practice Guide 36 (Nov. 2019), *available at* https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf ("TPG").

Petitioner's reliance on Dr. Storer's testimony to substitute for teachings or suggestions in Ishii meeting the claim limitations at hand is misplaced. The United States Court of Appeals for the Federal Circuit has made clear that declarant testimony "cannot be used as a wholesale substitute for reasoned analysis and evidentiary support." *Arendi v. Apple*, 832 F.3d 1355, 1361–62 (Fed. Cir. 2016). Our Trial Practice Guide cautions, "in an obviousness analysis, conclusory assertions from a third party about general knowledge in the art cannot, without supporting evidence of record, supply a limitation that is not evidently and indisputably within the common knowledge of those skilled in the art." TPG at 36 (citing *K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365 (Fed. Cir. 2014).

To the extent Petitioner's argument and Dr. Storer's testimony could be an invocation of "common sense" within the knowledge of an ordinarily skilled artisan, we disagree with such an argument. Our reviewing court cautions that although "'common sense' can be invoked, even potentially to supply a limitation missing from the prior art, it must still be supported by evidence and a reasoned explanation." *Arendi*, 832 F.3d at 1363. The *Arendi* court continues:

> In cases in which 'common sense' is used to supply a missing limitation, as distinct from a motivation to combine, moreover, our search for a reasoned basis for resort to common sense must be searching. And, this is particularly true where the missing limitation goes to the heart of an invention.

Id.

The *Arendi* court's cautions are particularly salient in this proceeding. Here, Dr. Storer's testimony is untethered from underlying facts or data in evidence, including the disclosure of Ishii. *See* Ex. 1003 ¶¶ 128–37.

Petitioner fails to support further the assertions it and Dr. Storer make. In the absence of such support, we find Petitioner's and Dr. Storer's assertions to be, at best, mere speculation of what one of ordinary skill in the art *could* have been able to do, not what one *would* have been motivated to do at the time of the invention. *See Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068–69 (Fed. Cir. 2018) (citing *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (concluding that a party's expert "succumbed to hindsight bias in her obviousness analysis" where such analysis "primarily consisted of conclusory references to her belief that one of ordinary skill in the art *could* combine these references, not that they *would* have been motivated to do so")) (emphasis in original).

In light of the foregoing, we find Petitioner's proffered evidence, consisting of Dr. Storer's unsubstantiated testimony, insufficient to create a preponderance of evidence as required under Petitioner's burden. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). Accordingly, Petitioner fails in the record before us to account properly for the claimed first data block compressed with an algorithm selected based upon a frequency of access of a second data block, as recited in independent claims 16 and 23. We, therefore, determine Petitioner has not demonstrated a reasonable likelihood of prevailing on this challenge to claims 16 and 23. *See Securus Techs. Inc. v. Glob. Tel*Link Corp.*, 701 F. App'x 971, 974–976 (Fed. Cir. 2017) (affirming the Board's determination that conclusory testimony by an expert witness was insufficient to satisfy Petitioner's burden of proving by a preponderance of the evidence that the skilled artisan would have modified the references as asserted).

2. Alternative Alleged Obviousness Based on Imai and Ishii

Petitioner advances two theories for combining various teachings of Ishii and Imai. More specifically, Petitioner frames its challenge based on the combination of Imai and Ishii as follows:

> "Imai's system would have been improved by applying Ishii's teachings in at least two possible ways—(1) by modifying Imai's compress and transmit embodiment (FIG. 5) and compress and store embodiment (FIG. 16) to consider frequency of access when compressing data for transmission to the client while storing the compressed data for faster future access and transmission (the "Transmit and Store Configuration"); and (2) by using Ishii's file storage controller embodiment to manage Imai's server hard disk storage (either backend storage or hard disks 91_1 to 91_N) by compressing files according to their frequency of access to spare server resources when retrieving stored content while maximizing available disk storage space (the "Managed Storage Configuration").

Pet. 17–18. Dr. Storer refers to the same modifications using the same nomenclature. Ex. 1003 ¶ 111. For claims 16 and 23, Petitioner states it would have been obvious to apply Ishii to Imai in the "Transmit and Store Configuration" and the "Managed Storage Configuration" in order to render the claims obvious. Pet. 36, 45.

Accordingly, regardless of how Petitioner proposes Imai is modified by the teachings of Ishii, we determine Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenges to independent claims 16 and 23, and their dependent claims 17–22 and 24–29.

I. Asserted Obviousness of Dependent Claims 18–20, 25–28

Claims 18–20, 25–28 depend directly or indirectly from independent claims 16 and 23. Ex. 1001, 21:33–48, 22:25–44. Petitioner relies on its argument regarding Imai and Ishii for all the limitation of independent

claims 16 and 23. Pet. 61, 70. Dependent claims 18–20, 25–28 additionally recite compression or decompression of a data block based upon a throughput of a communication channel. Ex. 1001, 21:33–48, 22:25–44. Petitioner cites to Couwenhoven to meet the narrowing limitations of claims 18–20, 25–28. Pet. 61–72. We have reviewed Petitioner's arguments and the disclosure of Couwenhoven; we have determined Couwenhoven does not remedy the deficiencies found in the combined teachings of Imai and Ishii. Accordingly, for the reasons stated above, we determine Petitioner has failed to show a reasonable likelihood of success on any of its challenges to this limitation. *See supra* Sections III.H.1 and III.H.2.

IV. SUMMARY

Having reviewed the record before us, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to any one of the challenged claims and, therefore, we do not institute the requested *inter partes* review.

V. ORDER

It is, therefore,

ORDERED that the Petition is *denied*; and

FURTHER ORDERED that the requested *inter partes* review is not instituted with respect to any claim of the '442 patent.

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