UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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NETFLIX, INC.,
Petitioner,

v.

REALTIME ADAPTIVE STREAMING LLC,
Patent Owner.

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Case IPR2019-00209
Patent 7,386,046 B2

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Before GEORGIANNA W. BRADEN, GREGG I. ANDERSON, and
CHRISTA P. ZADO, *Administrative Patent Judges*.

BRADEN, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I.   INTRODUCTION

A. Background

Netflix, Inc. ("Petitioner") filed a Petition[1] requesting an *inter partes* review of claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 24, 26, 27, 29–32, 34, and 35 of U.S. Patent No. 7,386,046 B2 (Ex. 1001, "the '046 patent"). Paper 2 ("Pet."). Realtime Adaptive Streaming LLC ("Patent Owner") timely filed a preliminary response. Paper 6 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." After considering the Petition, the Preliminary Response, and associated evidence, we conclude Petitioner has demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one claim of the '046 patent. Thus, we authorize institution of an *inter partes* review of claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 24, 26, 27, 29–32, 34, and 35 of the '046 patent.

B. Related Proceedings

Petitioner informs us of multiple pending district court proceedings involving the '046 patent, several of which involve Petitioner. Pet. 72–74. Patent Owner informs us of five pending district court proceedings involving the '046 patent. Paper 3, 2 (Patent Owner's Mandatory Notices).

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[1] Petitioner indicates that "[t]he real parties-in-interest are Hulu, LLC, Netflix, Inc., and Netflix Streaming Services, Inc." Pet. 72.

C. The '046 Patent

The '046 patent was filed on February 13, 2002, and is titled "Bandwidth Sensitive Data Compression And Decompression." Ex. 1001, Title. It describes systems and methods directed to a "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, 7:53–56, 9:12–14. The '046 patent states "dynamic modification of compression system parameters so as to provide an optimal balance between execution speed of the algorithm (compression rate) and the resulting compression ratio, is highly desirable." *Id.* at 1:51–54. The '046 patent also states that it seeks to "provide[] a desired balance between execution speed (rate of compression) and efficiency (compression ratio)." *Id.* at 8:10–12. For example, where the speed of the encoder causes a "bottleneck" because "the compression system cannot maintain the required or requested data rates," "then the controller will command the data compression system to utilize a compression routine providing faster compression . . . so as to mitigate or eliminate the bottleneck." *Id.* at 13:50–54. The '046 patent discloses that it can resolve "bottlenecks" in the throughput of a system by switching between different compression algorithms applied to data. *Id.* at 9:57–60.

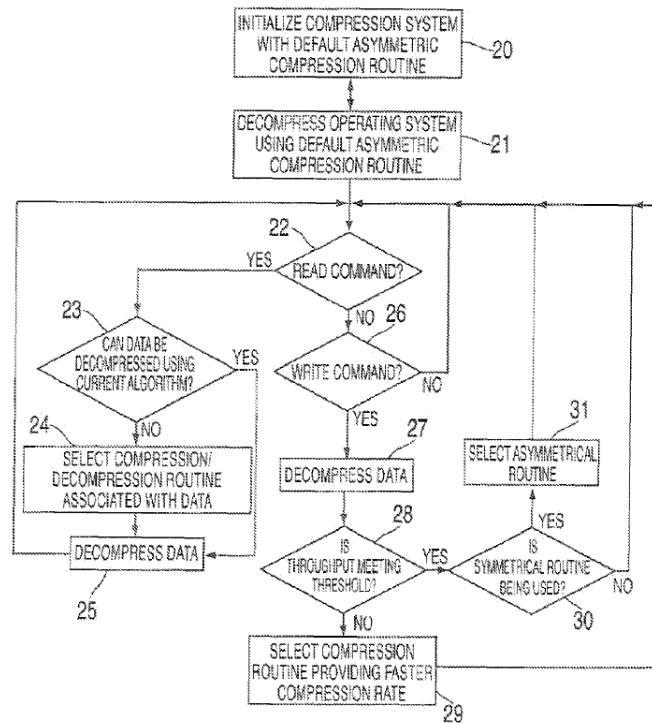One embodiment of the '046 patent is shown in Figure 2, reproduced below.

FIG. 2

Figure 2, above, illustrates a method for providing bandwidth sensitive data compression. *Id.* at 12:65–66. The data compression system is initialized during a boot-up process after a computer is powered on and a default compression/decompression routine is initiated (step 20). *Id.* at 13:4–7. According to the '046 patent, the default algorithm comprises an asymmetrical algorithm, because asymmetric algorithms provide "a high compression ratio (to effectively increase the storage capacity of the hard disk) and fast data access (to effectively increase the retrieval rate from the hard disk)." *Id.* at 13:8–18. According to the '046 patent, depending on the access profile, it "is preferable to utilize an asymmetrical algorithm that provides a slow compression routine and a fast decompression routine so as to provide an increase in the overall system performance as compared to performance that would be obtained using a symmetrical algorithm." *Id.*

at 12:2–6. The '046 patent notes that symmetric routines "compris[e] a fast compression routine." *Id.* at 14:2–4. In one embodiment, the '046 patent discloses a controller "tracks and monitors the throughput . . . of the data compression system 12." *Id.* at 10:40–42. When the throughput of the system falls below a predetermined threshold, the system generates control signals to enable/disable different compression algorithms. *Id.* at 10:42–45.

D. Illustrative Claims

As noted above, Petitioner challenges claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 24, 26, 27, 29–32, 34, and 35 with claims 1, 8, 11, 14, 17, 19, 23, 24, 26, 27, 29, 34, and 35 being independent. Independent claims 1 and 24 are illustrative of the challenged claims, and are reproduced below:

> 1. A method comprising:
> compressing data using a first compression routine providing a
>   first compression rate, wherein the first compression routine
>   comprises a first compression algorithm;
> tracking the throughput of a data processing system to
>   determine if the first compression rate provides a
>   throughput that meets a predetermined throughput threshold,
>   wherein said tracking throughput comprises tracking a
>   number of pending requests for data transmission; and
> when the tracked throughput does not meet the predetermined
>   throughput threshold, compressing data using a
>   second compression routine providing a second compression
>   rate that is greater than the first compression rate, to increase
>   the throughput of the data processing system to at least
>   the predetermined throughput level, wherein the second
>   compression routine comprises a second compression
>   algorithm.

Ex. 1001, 20:14–32.

> 24. A system comprising:
> a data compression system for compressing and decompressing
>   data input;

a plurality of compression routines selectively utilized by the
data compression system;
a controller for tracking throughput and generating a control
signal to select a compression routine based on the
throughput,
wherein when the controller determines that the throughput
falls below a predetermined throughput threshold, the
controller commands the data compression engine to use one
of the plurality of compression routines to provide a faster
rate of compression so as to increase the throughput; and
a plurality of access profiles, operatively accessible by the
controller, to determine a compression routine that is
associated with a data type of data to be compressed.

Id. at 23:37–53.

E. The Alleged Grounds of Unpatentability and Evidence of Record

The information presented in the Petition sets forth proposed

challenges to the patentability of claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21,

23, 24, 26, 27, 29–32, 34, and 35 of the '046 patent under 35 U.S.C. § 103 as

follows (*see* Pet. 5):[2]

Reference(s)	Basis	Challenged Claim(s)
Imai[3] and Couwenhoven[4]	§ 103	1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 26, 27, 29–32, 34, and 35

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[2] Petitioner supports its challenge with the Declaration of James A. Storer,
Ph.D. ("Dr. Storer"). Ex. 1003.

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

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

Reference(s)	Basis	Challenged Claim(s)
Imai, Couwenhoven, and Ishii[5]	§ 103	24

II. DISCUSSION

A. Claim Construction

In an *inter partes* review, we currently construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear.[6] 37 C.F.R. § 42.100(b) (2017); *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard in an *inter partes* review). Under that standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). To rebut this presumption by acting as a lexicographer, the patentee must give the term a particular meaning in the specification with "reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Limitations, however, are not to be read from the

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

[6] The revised claim construction standard for interpreting claims in *inter partes* review proceedings as set forth in the final rule published October 11, 2018 does not apply to this proceeding because the new "rule is effective on November 13, 2018 and applies to all IPR, PGR and CBM petitions filed on or after the effective date." Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings before the Patent Trial and Appeal Board, 83 Fed. Reg. 51340 (Oct. 11, 2018) (to be codified at 37 C.F.R. pt. 42).

specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). In addition, the Board may not "construe claims during [an *inter partes* review] so broadly that its constructions are *unreasonable* under general claim construction principles." *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015), *overruled on other grounds by Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017). Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

The following determinations do not preclude the parties from arguing proposed constructions of the claims during trial. A final determination as to claim construction will be made at the close of the proceeding, after any hearing, based on all the evidence of record. The parties are expected to assert all their claim construction arguments and evidence in the Petition, Patent Owner's Response, Petitioner's Reply, or otherwise during trial, as permitted by our rules.

1. *"asymmetric" or "asymmetrical algorithm" (claims 5, 11, 34–36)*

Petitioner proposes to construe "asymmetric" or "asymmetrical algorithm" as "an algorithm in which the execution time for the compression and decompression routines differ significantly." Pet. 6. Patent Owner states that "[f]or purposes of this IPR, and at this stage of the proceedings, Patent Owner agrees with [Petitioner's] construction." Prelim. Resp. 6. After our review of the '046 patent and its prosecution history, we agree with Petitioner's construction and adopt it for purposes of this Decision. *See*

Microsoft Corp., 789 F.3d at 1298 ("[t]he [U.S. Patent and Trademark Office] should also consult the patent's prosecution history in proceedings in which the patent has been brought back to the agency for a second review.").

2. *"access profile" (claim 24)*

Petitioner further proposes to construe "access profile" as "information regarding the number or frequency of reads or writes." Pet. 7 (citing Ex. 1001, 11:29–12:50, 8:8–12). Patent Owner disagrees and proposes to construe "access profile" as "information that enables the controller to select a suitable compression algorithm that provides a desired balance between execution speed (rate of compression) and efficiency (compression ratio)." Prelim. Resp. 8. According to Patent Owner, "Petitioner's construction is wrong because it is not the broadest reasonable interpretation and because it improperly imports limitations from the specification into the claims." *Id.* at 7. Patent Owner also argues that is inaccurate because "'number of reads' in isolation is not necessarily an access profile." *Id.* at 9.

We agree with Patent Owner that Petitioner's proposed construction is too narrow based on the information provided in the '046 patent. But Patent Owner's proposed construction also appears to incorporate limitations from the specification that are not necessary given the language of the claims. The specification of the '046 patent provides several examples of access profiles that use the number and/or frequency of reads or writes to enable controller 11 to select a suitable compression algorithm based on data type. *See* Ex. 1001, 11:29–12:50. But the specification does not limit the access profiles to only the number and/or frequency of reads or writes. *See id.* at 11:29–44. Therefore, we decline to include such a limitation in the claim construction.

Similarly, the specification does not indicate that "access profiles" must be correlated with a "balance between execution speed (rate of compression) and efficiency (compression ratio)" as proposed by Patent Owner. Accordingly, we decline to include such that limitation in the claim construction. Therefore, based on our reading of the '046 patent and its prosecution history, we determine that "access profile" encompasses "information, such as the number or frequency of reads or writes, that enables the controller to select a suitable compression algorithm."

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

"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, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (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.

C. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. "The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

Petitioner argues that a person of ordinary skill in the art relevant to the '046 patent would have had "a bachelor's degree in electrical engineering, computer science, or a similar field with at least two years of experience in data compression or a person with a master's degree in electrical engineering, computer science, or a similar field with a specialization in data compression." Pet. 6. Petitioner relies on the Declaration of Dr. Storer to support its contentions. Dr. Storer proffers the same level of skill as that argued by Petitioner but also states that "[a] person with less education but more relevant practical experience may also meet this standard." Ex. 1003 ¶ 65.

At this stage of the proceeding, Patent Owner does not contest Petitioner's definition of a person of ordinary skill in the art. *See generally* Prelim. Resp.

Based on our review of the '046 patent, the types of problems and solutions described in the '046 patent and cited prior art, and the testimony of Dr. Storer, for purposes of this Decision we adopt and apply Petitioner's definition of a person of ordinary skill in the art. Specifically, we find that a person of ordinary skill in the art at the time of the claimed invention would have had "a bachelor's degree in electrical engineering, computer science, or a similar field with at least two years of experience in data compression" or that such a person would have "a master's degree in electrical engineering, computer science, or a similar field with a specialization in data compression." *See* Pet. 6.

>   *D. Alleged Obviousness of Claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19,*
>   *21, 23, 26, 27, 29–32, 34, and 35 of the '046 patent in View of Imai*
>   *and Couwenhoven*

Petitioner contends claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 26, 27, 29–32, 34, and 35 of the '046 patent are unpatentable under 35 U.S.C. § 103 as obvious in view of Imai and Couwenhoven. Pet. 12–66. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 15–27. For reasons that follow, we determine Petitioner has demonstrated a reasonable likelihood of demonstrating that the challenged claims would have been obvious under 35 U.S.C. § 103 in view of Imai and Couwenhoven.

>   *1. Overview of Imai (Ex. 1005)*

Imai is a Japanese Patent Application[7] 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. Ex. 1005 ¶ 1. According to Imai, real time encoding, transmitting, and decoding can present several problems though. *Id.* ¶¶ 3–5. 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

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[7] 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, Preliminary Response, and this Decision are made to Exhibit 1005.

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.

Encoding unit 41m
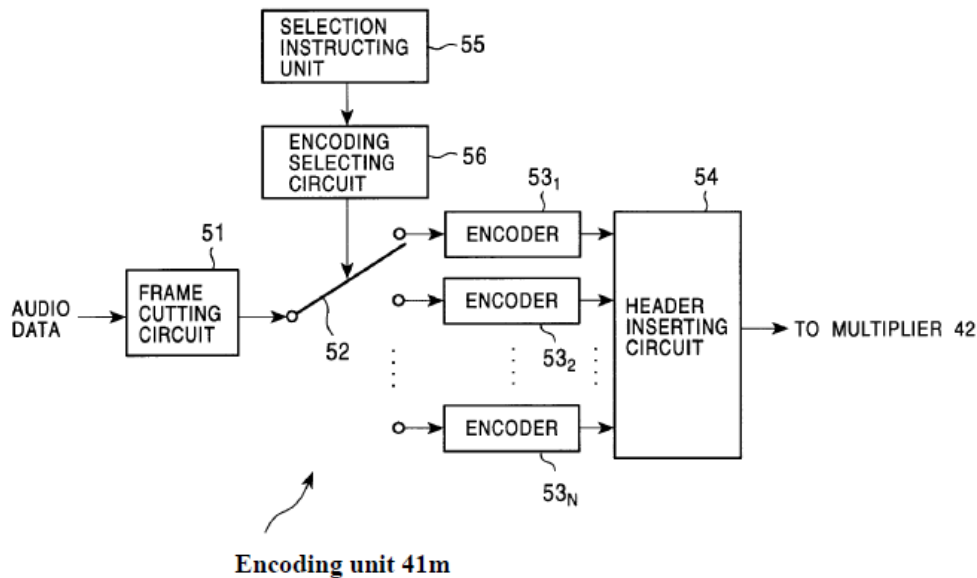
As shown above in Figure 5, audio signals are encoded using a chosen
encoder 53_1-53_N. *Id.* ¶ 66, Fig. 5. According to Imai, the encoders are
constructed to encode the audio signal with different coding methods from

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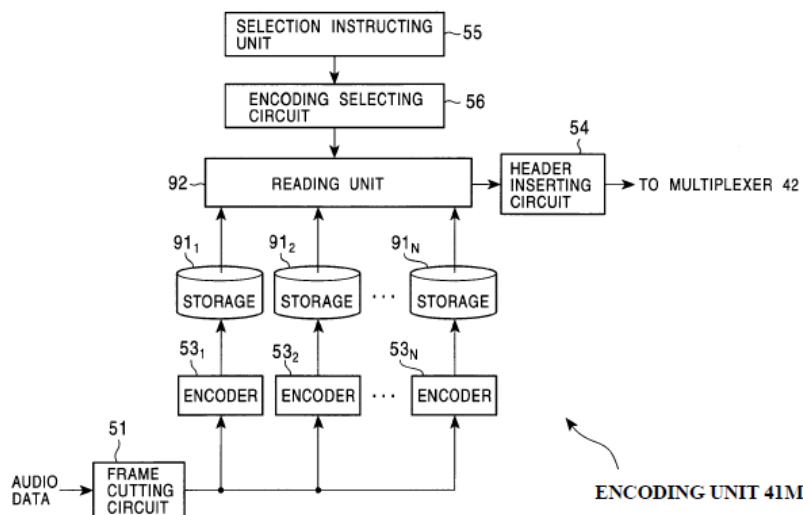
As shown above in Figure 16, the audio signal is encoded into coded date by encoders 53_1–53_N and store in storage 91_1–91_N. *Id.* ¶ 167. According to Imai, when a request for an audio signal is issued from client terminal 3, encoding selecting circuit 56 controls read-out unit 92 in accordance with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

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instructing unit 55. *Id.* ¶ 169. Imai also states the invention described is applicable to other signals, including "video signals." *Id.* ¶ 172.

2. *Overview of 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. Ex. 1008, 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.

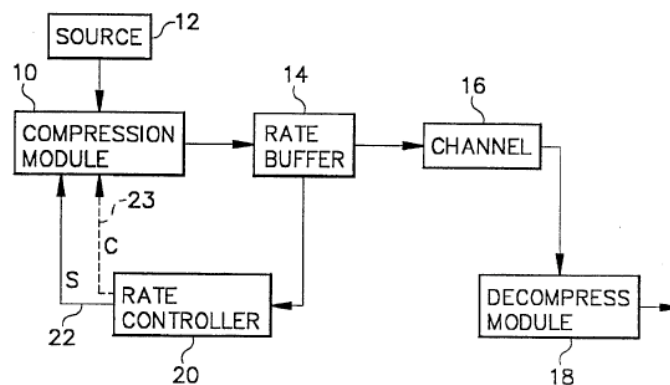One embodiment of Couwenhoven is shown in Figure 1, reproduced below.

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. 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.
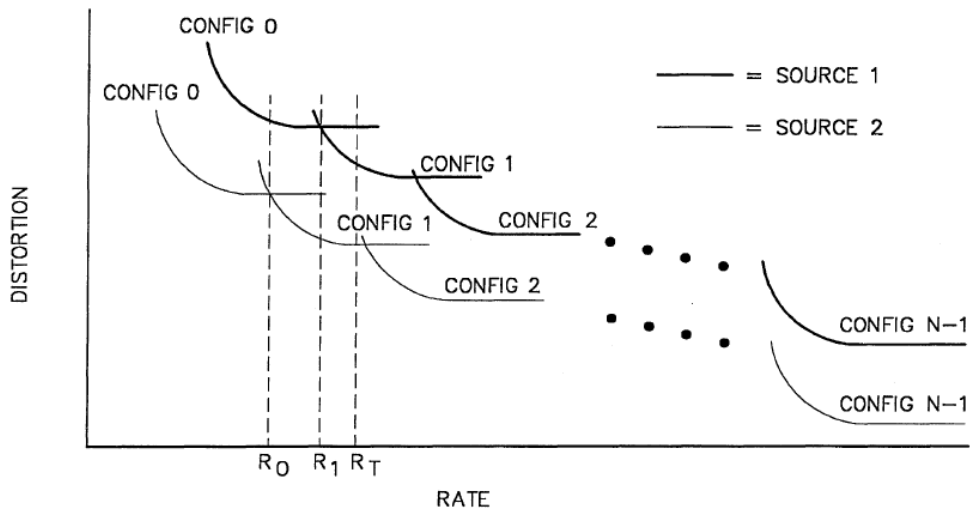
Couwenhoven notes, with reference to Figure 5 above, that "[s]witching
between these configurations based on the fill conditions of the buffer is

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. 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 3:29–35. 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 3:35–40. 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 3:54–57. 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 3:59–61. 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 5:61–65. "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 6:12–17.

3. *Analysis of Cited Art as Applied to Independent Claim 1*

a. *"compressing data using a first compression routine providing a first compression rate, wherein the first compression routine comprises a first compression algorithm"*

Independent claim 1 recites "compressing data using a first compression routine providing a first compression rate, wherein the first compression routine comprises a first compression algorithm." Ex. 1001, 20:15–18.

Petitioner contends Imai teaches this limitation, because Imai discloses "a plurality of coding methods corresponding to the encoders 53_1 to 53_N" and "[a person of ordinary skill in the art] would have understood that Imai's

encoders compress data because they represent data using fewer bits, and because they include MPEG and other well-known compression standards." Pet. 21–22 (citing Ex. 1005, Fig. 5 and ¶¶ 65–72; Ex. 1003 ¶ 118).

Patent Owner does not address specifically this limitation of independent claim 1, but nonetheless the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

At this stage of the proceeding and based on the record before us, we are persuaded Petitioner has shown sufficiently for purposes of institution that Imai's disclosure of "a plurality of coding methods corresponding to the encoders 53_1 to 53_N" satisfies the challenged claim limitation. *See* Ex. 1005 ¶¶ 65–72, Fig. 5.

b. "tracking a number of pending requests for data transmission"

Claim 1 recites "wherein said tracking throughput comprises tracking a number of pending requests for data transmission." Ex. 1001, 20:23–25.

Petitioner contends Couwenhoven teaches this limitation, because Couwenhoven discloses "tracking the number of units in the rate buffer that are pending transmission across the channel" and "[a person of ordinary skill in the art] would have understood that each unit of data in the rate buffer is a request for data transmission because the data was placed in the buffer for the purpose of being transmitted across the channel." Pet. 25 (citing Ex. 1008, Fig. 1, 1:54–62, 4:43–47, 8:1–5; Ex. 1003 ¶ 135). According to Petitioner, "[b]y placing a data unit in the buffer, the system is requesting for the data unit to be transmitted across the channel." *Id.* (citing Ex. 1003 ¶ 135).

Patent Owner contends Petitioner fails to support its position. Prelim. Resp. 16–19. According to Patent Owner, "Couwenhoven never describes or defines a 'unit of data' in the rate buffer." *Id.* at 16. Patent Owner further

contends "units of data and the number of pending transmission requests are different concepts, and there is no necessary relationship between the two." *Id.* at 17. According to Patent Owner, "a buffer could contain a single unit of data and be subject to many pending transmission requests" and "a buffer could contain many units of data and be subject to a single pending transmission request." *Id.* Patent Owner cites to the '046 patent to support its position, because the specification describes that "the controller may track the number of pending disk accesses (access requests) to determine whether a bottleneck is occurring." *Id.* at 18 (citing Ex. 1001, 13:44–47). Patent Owner argues "[t]he Petition makes no showing that separate units of data necessarily requires pending transmission requests – or even that they are related." *Id.*

We understand Patent Owner's position that "a buffer could contain a single unit of data and be subject to many pending transmission requests" but at this stage of the proceeding, we credit the testimony of Dr. Storer that states "[a person of ordinary skill in the art] would have understood that each unit of data in the rate buffer is a request for data transmission because the data was placed in the buffer for the purpose of being transmitted across the channel." *Id.* at 17; *see* Ex. 1003 ¶ 135. Accordingly, based on the current record before us, we are persuaded Petitioner has shown adequately for purposes of institution that Couwenhoven's disclosure of "tracking the number of units in the rate buffer that are pending transmission across the channel" satisfies the challenged claim limitation. The parties are welcome to develop their positions more fully during the course of the proceeding, especially in view of the '046 patent's teachings regarding controller 11 (*see* Ex. 1001, 9:53–60, 10:40–45) and Couwenhoven's disclosure of compression

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module 10 being responsive to signals generated by rate controller 20 to change the compression rate (*see* Ex. 1008, 4:49–52, 5:35–37, 7:37–8:2).

      c. *"when the tracked throughput does not meet the predetermined throughput threshold, compressing data using a second compression routine providing a second compression rate that is greater than the first compression rate, to increase the throughput of the data processing system to at least the predetermined throughput level"*

Claim 1 recites "when the tracked throughput does not meet the predetermined throughput threshold, compressing data using a second compression routine . . . ." Ex. 1001, 20:25–32. Petitioner contends this limitation is met by "at least three disclosures" in Couwenhoven. Pet. 27 (citing Ex. 1003 ¶¶ 138–154).

(1) Couwenhoven's prior art teachings

First, Petitioner contends Couwenhoven's discussion of the prior art meets the above limitation of claim 1. According to Petitioner, Couwenhoven discloses that "[i]f the tracked throughput did not meet a predetermined throughput threshold, the compression rate was increased to compress data at a faster rate." *Id.* (citing Ex. 1008, 1:59–2:4). Petitioner maintains that "[a person of ordinary skill in the art] would have found it obvious to implement Couwenhoven's rate and configuration changes by selecting an appropriate encoder from Imai's plurality of encoders." *Id.* at 30 (citing Ex. 1003 ¶ 144). According to Petitioner, "[w]hen throughput is insufficient and the number of pending transmission requests in the rate buffer falls below a predetermined throughput threshold (e.g., the number of pending requests is less than a predetermined threshold *n*), it would have been obvious to select one of Imai's encoding units with a *higher* rate of

compression to increase throughput up to that threshold." *Id.* at 31 (citing Ex. 1003 ¶ 143).

(2) Couwenhoven's disclosed rate controls

Second, Petitioner contends Couwenhoven's disclosed rate controls also meet the above limitation. *Id.* at 33–34 (citing Ex. 1008 4:43–54, 5:24–30, 32:9–26, 3:36–38). Petitioner maintains that Couwenhoven's "compression rate change is accomplished by 'determining thresholds on the feedback control signals, the thresholds being used to determine when to switch in or out of each configuration.'" *Id.* at 34 (quoting Ex. 1008, 3:36–38). According to Petitioner, "[w]hen applied to Imai, a POSITA would have found it obvious for this configuration change to result in the selection of a different encoder based on its compression rate, as explained above for the prior art teachings." *Id.* at 35 (citing Ex. 1003 ¶ 150).

On this record, Couwenhoven's feedback control systems teaches what the '046 patent describes as the structure, which calculates the "predetermined threshold." *See* Ex. 1001, 10:40–45, Fig. 1 (controller 11 as part of control system). As noted below, the parties' positions on this issue remain for further development during the course of the proceeding.

(3) Couwenhoven's disclosed danger thresholds

Third, Petitioner contends Couwenhoven's disclosed danger thresholds to guard against overflow and underflow meet the above limitation. *Id.* (citing Ex. 1003 ¶ 151). According to Petitioner, "[i]t would have been obvious to [a person of ordinary skill in the art] for this danger configuration to compress and make data available at a lower bitrate when the buffer approaches the possibility of overflow." *Id.* at 36 (citing Ex. 1003 ¶ 151). Petitioner also maintains that "[a person of ordinary skill in the art] would

have found it obvious to implement underflow similar to overflow: using a lower-limit threshold instead of an upper limit." *Id.* (citing Ex. 1003 ¶ 152). According to Petitioner:

> with the combined teachings of Imai and Couwenhoven, it would have been obvious to increase the compression rate by selecting an encoder with a higher bitrate, meaning data is compressed using a second compression routine (the newly selected encoder) providing a second compression rate that is greater than the first compression rate (which is the basis for its selection), to increase the throughput of the data processing system to at least the predetermined throughput level (bringing the rate buffer fullness above the lower limit danger threshold D_{in}).

Id. at 37 (citing Ex. 1003 ¶ 153).

Patent Owner does not address specifically this limitation of independent claim 1, except to argue against the rationale for combining the cited art (as discussed in detail below). Nonetheless the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Having reviewed the arguments and evidence in the record before us currently, we are persuaded Petitioner has shown adequately for purposes of institution that the cited portions of Imai and Couwenhoven satisfy the challenged claim limitation. The parties are welcome to develop their positions more fully during the course of the proceeding.

>### d. *wherein the second compression routine comprises a second compression algorithm*

Claim 1 recites "wherein the second compression routine comprises a second compression algorithm." Ex. 1001, 20:32–33.

Petitioner contends Imai teaches this limitation, because Imai discloses "Imai's encoders 53_1 to 53_N employ 'different coding methods from each other' including different algorithms such as MPEG layers 1, 2, 3; ATRAC; ATRAC 2; HVXC; and 'various coding methods.'" and "[a person of ordinary skill in the art] would have understood that Imai's 'encoders' use compression routines to compress data, and that the different encoders include different compression algorithms." Pet. 37–38 (citing Ex. 1005 ¶¶ 67–71, 172; Ex. 1003 ¶¶ 156–159).

Patent Owner does not address specifically this limitation of independent claim 1, but nonetheless the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Having reviewed the arguments and evidence in the record before us currently, we are persuaded Petitioner has shown adequately for purposes of institution that Imai's disclosure of "different algorithms such as MPEG layers 1, 2, 3; ATRAC; ATRAC 2; HVXC" satisfies the challenged claim limitation. *See* Ex. 1005 ¶¶ 67–71, 172

> *4. Analysis of Cited Art as Applied to Independent Claims 8, 11, 14, 17, 19, 23, 26, 27, 29, 34, and 35*

Petitioner contends independent claims 8, 11, 14, 17, 19, 23, 26, 27, 29, 34, and 35 of the '046 patent are unpatentable under 35 U.S.C. § 103 as obvious in view of Imai and Couwenhoven and provides specific arguments for each challenged claim. Pet. 38–66. Patent Owner does not address the additional limitations of independent claims 8, 11, 14, 17, 19, 23, 26, 27, 29, 34, and 35, but the burden nonetheless remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

We have considered carefully all arguments and supporting evidence in light of the limitations recited in challenged independent claims 8, 11, 14,

17, 19, 23, 26, 27, 29, 34, and 35. At this stage of the proceeding, we are persuaded that Petitioner's analysis, as supported by Dr. Storer's testimony, is sufficient for institution regarding the specific limitations recited in these claims. Accordingly, we conclude Petitioner has established a reasonable likelihood it would prevail in showing that challenged independent claims 8, 11, 14, 17, 19, 23, 26, 27, 29, 34, and 35 would have been obvious under 35 U.S.C. § 103 in view of Imai and Couwenhoven.

> 5. *Analysis of Cited Art as Applied to Dependent Claims 4, 10, 13, 16, 21 and 30–32*

Petitioner contends dependent claims 4, 10, 13, 16, 21 and 30–32 of the '046 patent are unpatentable under 35 U.S.C. § 103 as obvious in view of Imai and Couwenhoven and provides specific arguments for each challenged claim. Pet. 51–52, 63–64 (citing Ex. 1003 ¶¶ 163–66, 230–32). Patent Owner does not address the additional limitations of dependent claims 4, 10, 13, 16, 21 and 30–32, but the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

We have considered carefully all arguments and supporting evidence in light of the limitations recited in challenged dependent claims 4, 10, 13, 16, 21 and 30–32. At this stage of the proceeding, we are persuaded Petitioner's analysis, as supported by Dr. Storer's testimony, is sufficient for institution regarding the specific limitations recited in these claims. Accordingly, we conclude Petitioner has established a reasonable likelihood it would prevail in showing that challenged dependent claims 4, 10, 13, 16, 21 and 30–32 would have been obvious under 35 U.S.C. § 103 in view of Imai and Couwenhoven.

6. *Alleged Reasons to Combine the Teachings of Imai and Couwenhoven*

Petitioner contends a person of ordinary skill in the art would have many reasons to combine Imai and Couwenhoven. Pet. 13–18. Petitioner provides distinct rationales to combine Imai with Couwenhoven's "embodiment-related teachings" and "prior art-related teachings." *Id.* at 15. Specifically, Petitioner argues that a person of ordinary skill in the art would have had reason to combine the systems of Imai and Couwenhoven "because they are directed to similar streaming media systems and naturally complement each other." *Id.* at 13 (citing Ex. 1003 ¶ 107). Petitioner relies on the testimony of Dr. Storer to support its position. Specifically, Dr. Storer testifies that "the teachings of both references would have motivated [a person of ordinary skill in the art] to combine the teachings to improve the bit rate control of the combined system." Ex. 1003 ¶ 107 (citing Ex. 1005 ¶ 66; Ex. 1008 3:29–39).

Patent Owner contests Petitioner's position, arguing that Petitioner fails to provide an adequate rationale as to why a person of ordinary skill in the art would combine the system of Imai with Couwenhoven. Prelim. Resp. 20–24. Patent Owner specifically argues that Couwenhoven never discloses nor suggest using more than one compression routine, specifically DPCM. *Id.* at 21. Therefore, according to Patent Owner, a person of ordinary skill in the art would not have had any reason to modify Couwenhoven from using one compressor form using one compressor in different configurations to a multi-compressor system like Imai. *Id.* Patent Owner further argues that Couwenhoven teaches away from using multiple compressors because of concerns about additional complexity. *Id.* at 21–22 (citing Ex. 1008, 2:57–62). Patent Owner then argues that Couwenhoven and

Imai are directed to different problems and that a person of ordinary skill in
the art faced with Couwenhoven would also not be motivated to look to Imai
because Imai is directed and limited to audio coding. *Id.* at 22 (citing
Ex. 1005, Abstract, ¶ 67). Patent Owner lastly argues that Petitioner fails to
explain *how* Couwenhoven and Imai would actually be combined or how the
proposed combination is supposed to work. *Id.* at 23.

We have considered carefully all arguments and supporting evidence
regarding the rationale for combining Imai and Couwenhoven. At this stage
of the proceeding, we find Petitioner provides an adequate reason that a
person of skill in the art at the time of the invention would have combined the
teachings from the cited prior art to arrive at the inventions recited in the
challenged claims. A rationale to combine may be found "explicitly or
implicitly in market forces; design incentives; the 'interrelated teachings of
multiple patents'; 'any need or problem known in the field of endeavor at the
time of invention and addressed by the patent'; and the background
knowledge, creativity, and common sense of the person of ordinary skill."
ZUP, LLC v. Nash Mfg., Inc., 896 F.3d 1365, 1371 (Fed. Cir. 2018) (quoting
Plantronics, Inc. v. Aliph, Inc., 724 F.3d 1343, 1354 (Fed. Cir. 2013)). As
Petitioner and Petitioner's declarant, Dr. James Storer, argue both references
are used for the same purpose: encoding data for streaming media. Pet. 13
(citing Ex. 1003 ¶ 107). Additionally, we are persuaded they both teach
(1) encoding the data using encoding methods that achieve data compression,
and (2) choosing the encoding method based upon a throughout of the
communications channel connecting the client. *Id.* Based on the current
record, Petitioner appears to bring in Couwenhoven to provide a more
specific teaching of tracking throughput using a throughput threshold for

Imai's system using compression algorithms directed to image data blocks because Couwenhoven teaches use of well-known compression techniques for image data compression. *Id.* We specifically credit the testimony of Dr. Storer that "Imai suggests the rate of compression should be controlled, and Couwenhoven provides numerous teachings for doing so." *See* Ex. 1003 ¶ 109. Given Imai's express teaching of controlling the rate of compression, we are persuaded by Petitioner's position that a person of ordinary skill would have been motivated to turn to Couwenhoven's rate control based on throughput-tracking for use with Imai's system. *See Realtime Data, LLC v. Iancu*, No. 2018-1154, 2019 WL 149835, at *5 (Fed. Cir. Jan. 10, 2019) (finding the Board had sufficient evidence for a motivation to combine references where the second reference was "well known," the techniques taught in the two references "share[d] striking similarities," and one reference "suggests that a wide variety of adaptive compression algorithms could be used and encourages a person having ordinary skill in the art to turn to 'well known' algorithms such as [the other reference's]").

Accordingly, on this record and for purposes of institution, we are persuaded Petitioner presents sufficient evidence to establish a reasonable likelihood it would prevail in showing that claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 26, 27, 29–32, 34, and 35 would have been obvious under 35 U.S.C. § 103 in view of Imai and Couwenhoven.

E. Alleged Obviousness of Claim 24 of the '046 patent in View of Imai, Couwenhoven, and Ishii

Petitioner contends claim 24 of the '046 patent is unpatentable under 35 U.S.C. § 103(a) in view of Imai, Couwenhoven, and Ishii. Pet. 70–71. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 27–34. For

reasons that follow, we determine Petitioner has demonstrated a reasonable likelihood of prevailing as to the challenged claims.

1. Overview of Ishii (Ex. 1007)

Ishii is a U.S. Patent titled "File Compression Processor Monitoring Current Available Capacity And Threshold Value." Ex. 1007, Title (54), Abstract (57). Ishii discloses a file attribute controller that stores "control information" for files "including the last access date, the number of accesses, whether the file is already compressed or not and a search portion which searches for files not yet compressed with low access frequency based on the control information so as to select files to be compressed." *Id.* at Abstract (57).

One embodiment of Ishii's system is illustrated in Figure 4, reproduced below.
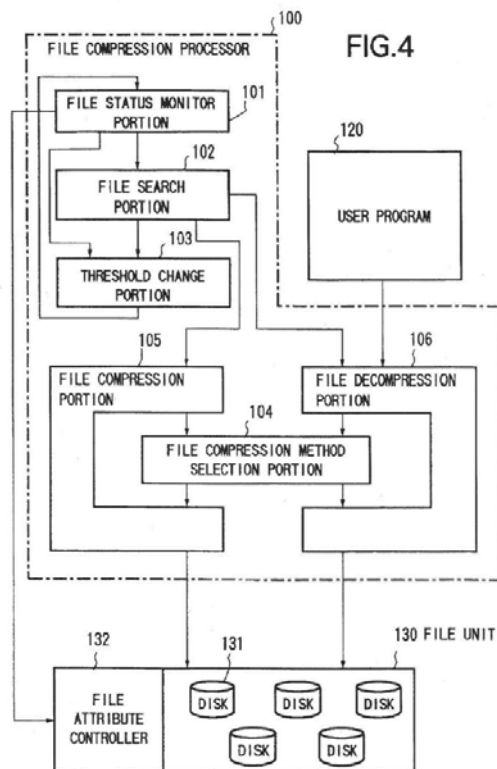
As shown in Ishii's Figure 4, above, the file processing system comprises file compression processor 100, user program 120, and file unit 130. *Id.* at 5:20–22. File compression processor 100 provides automatic file compression and decompression processing asynchronously with user program 120 for disk 131 in the file unit 130. *Id.* at 5:23–26. File compression processor 100 comprises file status monitor portion 101, file search portion 102, file compression method selection portion 104, file compression portion 105, and file decompression portion 106. *Id.* at 5:32–36. Ishii's file unit 130 is controlled by file attribute controller 132. *Id.* at 5:38–39. File attribute controller 132 contains file control information, including a list of file names and directories, last access data, and the number of accesses of each file. *Id.* at 5:51–54. When available capacity in the file unit becomes lower than a threshold value, files are compressed. *Id.* at 7:4–5. At step 220, a search for files to be compressed is conducted based on the file control information of file attribute controller 132. *Id.* at 7:6–8. File compression method selection portion 104 selects the method with suitable compression ratio and compression/decompression speed depending on the file access frequency and data attribute. *Id.* at 7:16–20. Ishii discloses:

> In selecting a data compression method, the file compression method selection portion 104 selects the one suitable for the applicable data attribute by checking the data attribute held by the file attribute controller 132. Next, the access frequency is determined from the last access date and the number of accesses at the file attribute controller 132. The file compression method with a shorter decompression time is selected for files with higher access frequency and the file compression method with a higher compression ratio is selected for files with lower access frequency.

Id. at 7:21–31.

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2. Analysis of Cited Art as Applied to Independent Claim 24

Independent claim 24 recites similar limitations as claim 1 (albeit in system form), with the additional limitation of "a plurality of access profiles, operatively accessible by the controller, to determine a compression routine that is associated with a data type of data to be compressed." Ex. 1001, 23:51–53.

Petitioner contends Ishii teaches this additional limitation because Ishii teaches "select[ing] an appropriate data compression method for compression" based on the "*access frequency* and *file type*" of the file (data type) to be compressed. Pet. 70 (citing Ex. 1007, 5:60–6:6; Ex. 1003 ¶ 255). According to Petitioner, the "*access frequency* of a file [in Ishiee] is determined based on the last access date and the *number of accesses* for that file." *Id.* (citing Ex. 1007, 5:54–6:6; Ex. 1003 ¶ 255). Thus, Petitioner concludes that Ishii's file control information teaches this element. *Id.* (citing Ex. 1003 ¶ 255). Alternatively, Petitioner contends Ishii teaches this limitation because Ishii teaches a classification system that assigns a particular profile to data. *Id.* at 71 (citing Ex. 1007 5:54–59, 6:12–17).

Patent Owner contest Petitioner's position arguing that "it is based on an incorrect claim construction for 'access profile.'" Prelim. Resp. 28.

As discussed previously, *see supra* Section II.A.2, we determine that "access profile" encompasses "information, such as the number or frequency of reads or writes, that enables the controller to select a suitable compression algorithm." At this stage of proceeding, based on the explicit disclosure in Ishii, we are persuaded Petitioner has shown sufficiently for purposes of institution that Ishii satisfies the challenged claim limitation. *See* Ex. 1007, 5:54–6:6.

3. Rationale to Combine Imai, Couwenhoven, and Ishii

As discussed previously in Section II.D.5., Petitioner contends one of ordinary skill would have been motivated to combine the teachings of Imai with Couwenhoven in order to extend Imai's system to select an encoding method based on tracking throughput, as taught by Couwenhoven. Pet. 13–18. Additionally, according to Petitioner, a person of ordinary skill in the art would have been motivated to apply Ishii's teachings related to file control information to the encoder-selection process taught by Imai and Couwenhoven. *Id.* at 66–70.

Patent Owner argues that Ishii does not disclose the "access profiles" limitation, but does not appear to argue against the Petitioner's provided rationale to combine the teachings of Ishii with those of Imai and Couwenhoven. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

We have considered carefully all arguments and cited evidence regarding the rationale for combining the teachings of Imai and Couwenhoven with Ishii. At this stage of the proceeding, we are persuaded by Petitioner's analysis that a person of skill in the art would have had reason to combine the cited prior art and would have arrived at the claimed inventions recited in the challenged claims for the same reasons provided above in Section II.D.5., and because all three references are directed to the same field of data compression and teach improvements for similar compression systems. *See* Ex. 1003 ¶ 247.

Accordingly, on this record and for purposes of this Decision, we are persuaded Petitioner presents sufficient evidence to establish a reasonable

likelihood it would prevail in showing that claim 24 would have been obvious under 35 U.S.C. § 103 in view of Imai, Couwenhoven, and Ishii.

III. CONCLUSION

For the foregoing reasons, we determine Petitioner has demonstrated there is a reasonable likelihood it would prevail in establishing the unpatentability of claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 26, 27, 29–32, 34, and 35 of the '046 patent as obvious in view of Imai and Couwenhoven. We further determine Petitioner has demonstrated there is a reasonable likelihood it would prevail in establishing the unpatentability of claim 24 of the '046 patent as obvious in view of Imai, Couwenhoven, and Ishii.

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim.

IV. ORDER

For the reasons given, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 24, 26, 27, 29–32, 34, and 35 of the '046 patent on all grounds presented in the Petition, namely:

(1) Claims 1, 4, 8, 10, 11, 13, 14, 16, 17, 19, 21, 23, 26, 27, 29–32, 34, and 35 under 35 U.S.C. § 103 as unpatentable over Imai and Couwenhoven;

(2) Claim 24 under 35 U.S.C. § 103 as unpatentable over Imai, Couwenhoven, and Ishii; and

FURTHER ORDERED that 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, the trial commencing on the entry date of this Decision.

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