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Paper 50
Date: June 5, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY INTERACTIVE ENTERTAINMENT LLC,
Petitioner,

v.

INTELLECTUAL PIXELS LIMITED,
Patent Owner.

IPR2021-00237
Patent 10,681,109 B2

Before STACY B. MARGOLIES, ROBERT J. WEINSCHENK, and IFTIKHAR AHMED, *Administrative Patent Judges.*

AHMED, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision on Remand
Determining All Challenged Claims Unpatentable
35 U.S.C. §§ 144, 318

I. INTRODUCTION

This case is on remand from the United States Court of Appeals for the Federal Circuit to address the patentability of claims 1–12 of U.S. Patent No. 10,681,109 B2 (Ex. 1001, "the '109 patent"). *Sony Interactive Ent. LLC v. Intell. Pixels Ltd.*, No. 2022-2118, 2023 WL 6773879, at *1 (Fed. Cir. Oct. 13, 2023). For the reasons discussed herein, we determine that Sony Interactive Entertainment LLC ("Petitioner") has shown, by a preponderance of the evidence, that claims 1–12 are unpatentable.

II. BACKGROUND

A. Procedural History

Petitioner requested an *inter partes* review of claims 1–18 of U.S. Patent No. 10,681,109 B2 (Ex. 1001, "the '109 patent"). Paper 3 ("Petition" or "Pet."). Intellectual Pixels Limited ("Patent Owner") filed a Preliminary Response. Paper 11. In its Preliminary Response, Patent Owner informed us that it had disclaimed claims 13–18. *Id.* at 5 (citing Ex. 2001 (Notice of Filing a Statutory Disclaimer of Claims in a Patent under 37 C.F.R. § 1.321(a))). Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of claims 1–12 (the "Challenged Claims")[1] of the '109 patent. Paper 13 ("Inst. Dec.").

After institution, Patent Owner filed a Patent Owner Response (Paper 17, "PO Resp."), Petitioner filed a Reply to Patent Owner's Response (Paper 22, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 26, "PO

[1] Because Patent Owner filed a statutory disclaimer of claims 13–18 of the '109 patent (*see* Ex. 2001) prior to our institution decision, no *inter partes* review was instituted as to those claims. Inst. Dec. 6–7; *see also* 37 C.F.R. § 42.107(e) ("No *inter partes* review will be instituted based on disclaimed claims.").

Sur-reply"). An oral hearing was held on March 10, 2022, and a copy of the transcript was entered in the record. Paper 37 ("Tr.").

We issued a Final Written Decision determining that Petitioner had not proven by a preponderance of evidence that the Challenged Claims are unpatentable. Paper 38 ("Final Written Decision" or "Final Dec."), 34. In particular, our Final Written Decision addressed only one of the arguments raised by Patent Owner—whether Petitioner established that the combination of Wiltshire and Saha teaches or suggests the "generating at least one updated image" limitation of independent claims 1 and 8 of the '109 patent ("the 'generating' limitation"). *Id.* at 16–32.

Petitioner filed a Notice of Appeal of the Final Written Decision with the Federal Circuit. *See* Paper 39. On October 13, 2023, the Federal Circuit issued a decision in the appeal vacating our Final Written Decision and remanding for further proceedings consistent with its decision. *Sony*, 2023 WL 6773879. The Federal Circuit found that our determination that Petitioner's asserted reference Wiltshire does not disclose the "generating" limitation of claims 1 and 8 was not supported by substantial evidence. *Id.* at *2–4. The Court vacated our Final Written Decision and remanded for further proceedings consistent with the Court's opinion. *Id.* at *5.

After the Federal Circuit issued its mandate, we asked the parties to propose a procedure on remand. Ex. 3001, 2. The parties proposed an agreed-upon procedure to allow post-remand briefing with no additional evidence or expert declarations. *Id.* at 1. We issued an Order authorizing each party to file opening and responsive briefs. Paper 43. The parties then filed the following briefs: Petitioner's Opening Brief Pursuant to Paper No. 43 (Paper 47, "Pet. Remand Br."), Patent Owner's Opening Brief on Remand (Paper 46, "PO Remand Br."), Petitioner's Response Brief Pursuant

to Paper No. 43 (Paper 48, "Pet. Remand Resp. Br."), and Patent Owner's Response Brief on Remand (Paper 49, "PO Remand Resp. Br.").

B. Related Proceedings

According to the parties, the '109 patent is asserted in *Intellectual Pixels Ltd. v. Sony Interactive Entertainment LLC*, No. 8:20-cv-01422-JVS-KES (C.D. Cal). Pet. 1; Paper 5, 1. That proceeding has been stayed pending resolution of this *inter partes* review. Paper 7, 2.

C. The '109 Patent (Ex. 1001)

The '109 patent, titled "Image Display System with Visual Server," was filed on June 29, 2017, and claims priority to a provisional application filed on January 24, 2001. Ex. 1001, codes (22), (54), (60), (63). The '109 patent issued on June 9, 2020.[2] *Id.* at code (45). The '109 patent "relates to computer graphics and a graphical image display system that use a visual server to generate and transmit images to a client." *Id.* at 1:30–33.

[2] In our decision to institute *inter partes* review, we determined that the Challenged Claims of the '109 patent have an effective filing of at least November 15, 2011, and was therefore eligible for *inter partes* review on December 4, 2020, the filing date of the Petition. Inst. Dec. 8–9.

Figure 1 of the ’109 patent is reproduced below.

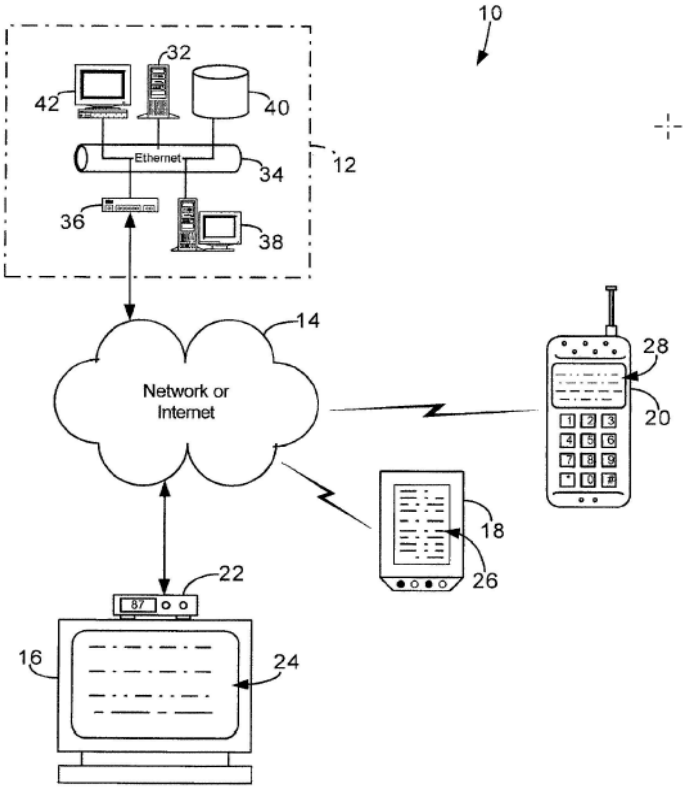


Figure 1 shows image display system 10 including visual server 12 and associated components in communication with a plurality of clients (i.e., set-top box 22, personal digital assistant (“PDA”) 18, and cellular telephone 20). Ex. 1001, 5:36–54. The ’109 patent notes that “for reasons of cost, size, and power consumption, sophisticated three dimensional graphics are not available on common consumer client devices such as personal digital assistants (PDAs)[,] mobile telephones and set-top boxes.” Ex. 1001, 3:26–30; *id.* at 5:51–52 (listing Palm Pilot and Handspring Visor as examples of PDAs).

The ’109 patent describes displaying such graphics on these clients “through the use of the resources of a remote visual server.” Ex. 1001, 3:41–43. The server has image data processing capabilities, receives image-modifying data corresponding to a generated image from a client, generates

a modified image based on that image-modifying data, and transmits the modified image as compressed data back to the client. *Id.* at 3:51–57.

Figures 2B and 2D of the ’109 patent are reproduced below.

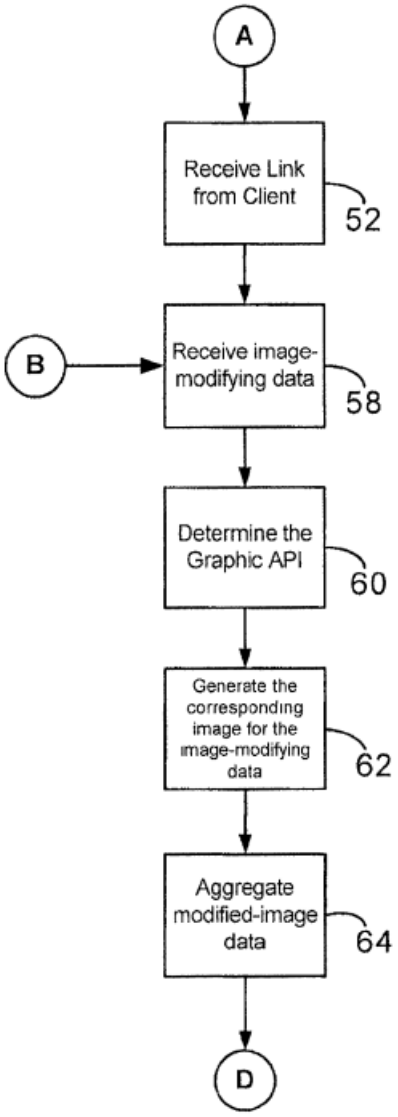


Fig. 2B

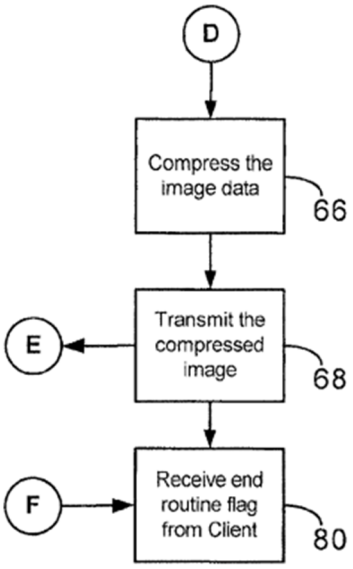


Fig. 2D

Figures 2B and 2D show a flowchart of the process on the server in receiving image-modifying data from the client, and then generating and transmitting a modified client image to the client. Ex. 1001, 5:24–29.

"In generating the image-modifying data at the client and processing the image-modifying data at the visual server, the typical data processing segment is a frame," and "compressed data comprising a frame" is transmitted to the client. Ex. 1001, 4:10–12, 4:48–55, 6:63–7:1. The '109 patent teaches use of "a protocol such as MPEG4" for compressing and transmitting an image to a client. *Id.* at 9:26–28. According to the patent, "[t]he use of an industry standard image compression protocol such as MPEG allows . . . use of facilities that are already present in most clients." *Id.* at 9:32–34. The clients include "processing ability to uncompress the compressed image data . . . and display the image defined by the decompressed data on the client image display." *Id.* at 3:67–4:3.

Figure 3 of the '109 patent is reproduced below.

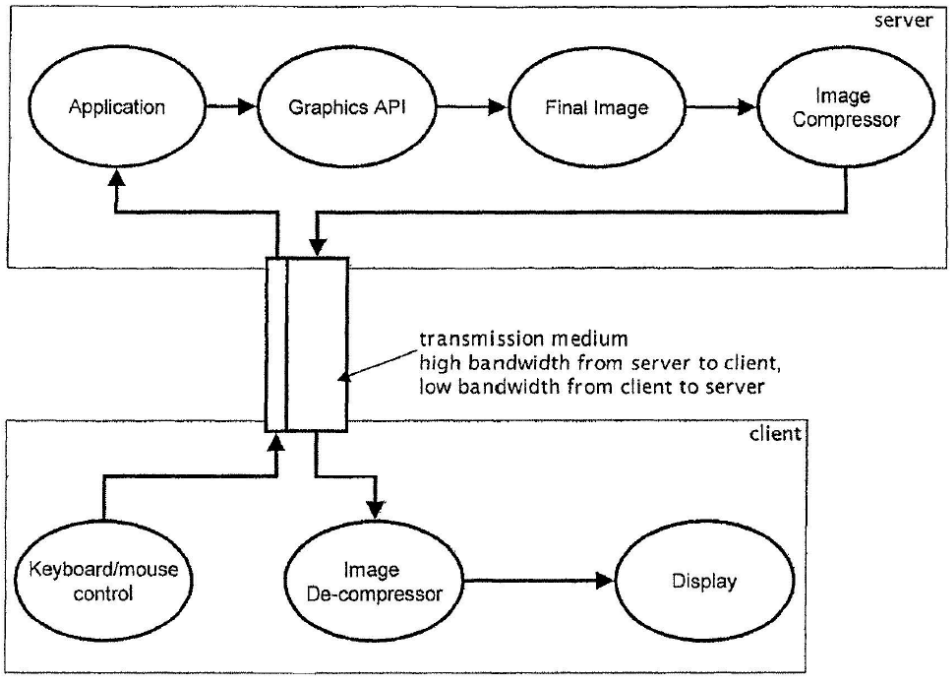


Figure 3 is a schematic of data and procedural flow in an embodiment of the ’109 patent. Ex. 1001, 5:30–31. The ’109 patent describes that image data is compressed at the server and transmitted to the client, where it is decompressed and displayed to the user. *See id.* at 8:1–22; *see also id.* at Figs. 2A–2D (a flowchart illustrating the processes executed on the server as well as the client to facilitate image generation).

D. Challenged Claims

We instituted review of independent claims 1 and 8, and dependent claims 2–7 and 9–12. Claim 1 is reproduced below.

> 1. A method of hosting an interactive software application comprising:
>
> running at a server the interactive software application;
>
> receiving at the server user input signals from a client device, wherein the user input signals are used to control updating of the state of the interactive software application;
>
> generating at least one updated image at the server in response to updating the state of the interactive software application; and
>
> compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a compressed frame that can be decompressed and displayed as an updated image at the client device.

Ex. 1001, 9:55–10:2.

E. The Instituted Grounds of Unpatentability and Declaration Evidence

As against the Challenged Claims, Petitioner asserts the following grounds of unpatentability, relying on the declaration testimony of Dr. Henry Fuchs (Exs. 1002, 1033). Pet. 3–4, 19–73.

Claim(s) Challenged	35 U.S.C. §[3]	References
1, 3–12	103(a)	Wiltshire[4], Saha[5]
2	103(a)	Wiltshire, Saha, Chen[6]
6, 11, 12	103(a)	Wiltshire, Saha, PC Magazine[7]

Patent Owner supports its arguments with a Declaration by John C. Hart, Ph.D. (Ex. 2016).

III. ANALYSIS

A. Principles of Law

"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

[3] Because the Challenged Claims of the '109 patent have an effective filing date before March 16, 2013 (*see supra* n.2), patentability is governed by the pre-AIA version of 35 U.S.C. § 103.
[4] U.S. Patent No. 6,409,602 B1, filed Nov. 24, 1998, issued June 25, 2002 (Ex. 1004, "Wiltshire").
[5] U.S. Patent No. 6,404,817 B1, filed Nov. 20, 1997, issued June 11, 2002 (Ex. 1005, "Saha").
[6] Walter Y. Chen, The Development and Standardization of Asymmetrical Digital Subscriber Line, IEEE COMMUNICATIONS MAGAZINE, Vol. 37, No. 5, 68–72 (May 1999) (Ex. 1006, "Chen").
[7] PC MAGAZINE, Vol. 18:16, Sept. 21, 1999 (Ex. 1007, "PC Magazine").

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).

As set forth in 35 U.S.C. § 103(a),

> [a] patent may not be obtained . . . 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.

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). An obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). However, 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). Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

In the Final Written Decision, we stated the following:

> Petitioner contends that a person of ordinary skill in the art "would have had at least (1) an undergraduate degree in computer science, electrical engineering, or an equivalent

> subject, together with two years of post-graduate experience in computer graphics; or (2) a master's degree in computer science, electrical engineering, or equivalent subject, together with one year of postgraduate experience in computer graphics." Pet. 14 (citing Ex. 1002 ¶ 23). Patent Owner agrees. *See* PO Resp. 10 (citing Ex. 2009 ¶¶ 24–25).
>
> We determine that the parties' agreed level of ordinary skill is consistent with the '109 patent and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). We adopt that level of ordinary skill in determining the patentability of the Challenged Claims.

Final Dec. 9–10. Our finding as to the level of ordinary skill in the art was not disturbed on appeal and we see no reason to reach a different result on essentially the same record. Thus, we again find that one of ordinary skill in the art at the time of the invention "would have had at least (1) an undergraduate degree in computer science, electrical engineering, or an equivalent subject, together with two years of post-graduate experience in computer graphics; or (2) a master's degree in computer science, electrical engineering, or equivalent subject, together with one year of postgraduate experience in computer graphics." *See* Ex. 1002 ¶ 23; Ex. 2009 ¶¶ 24–25.

C. Claim Construction

In this *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art at the time of the invention. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). In construing

claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17. Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy"); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

Petitioner initially asserts that it "does not believe the claim terms need to be construed to resolve the issues presented in this Petition." Pet. 18–19. Patent Owner proposes two claim terms for construction: the term "frame" in independent claims 1 and 8, and the term "mobile device" in dependent claims 6, 11, and 12. PO Resp. 10–21. In its Reply, Petitioner disagrees with Patent Owner's proposed constructions for both of those terms. Pet. Reply 1–12; PO Sur-reply 2–12. In the Final Written Decision, we determined that it was not necessary to provide an express interpretation of these or any other claim term. Final Dec. 11.

On remand, we consider whether it is necessary to construe the term "frame." In our Institution Decision, we rejected Patent Owner's argument that the term "frame" should be construed narrowly to mean "a single instance of the display." Inst. Dec. 13–14. We now determine that it is not necessary to address Patent Owner's claim construction arguments or to expressly construe the term "frame" because, as discussed below (§ III.E.1), even under Patent Owner's proposed construction, we determine that

Petitioner has shown that the combination of Wiltshire and Saha teaches a frame, as recited in claims 1 and 8.

We address the term "mobile device" below.

1. "mobile device"

a) Patent Owner's Contentions

Patent Owner contends that the term "mobile device" recited in challenged claims 6, 11, and 12 means "handheld computing device." PO Resp. 19. Patent Owner seeks to distinguish a laptop computer, which Petitioner relies on for its obviousness arguments, from the claimed "mobile device." *Id.* at 18–19 (citing Pet. 40).

Patent Owner asserts that the specification provides two examples of such devices, PDAs and mobile telephones, which are both "handheld computing devices." *Id.* (citing Ex. 1001, 3:26–30, 5:51–59; Ex. 2009 ¶ 53). Relying on certain district court claim constructions as to unrelated patents, Patent Owner contends that the ordinary meaning of the term "mobile device" is "handheld computing device." *Id.* at 20 (citing *U.S. Auto. Ass'n v. Wells Fargo Bank, N.A.*, No. 2:18-cv-366-JRG, 2019 WL 3423652, at *11-12 (E.D. Tex. July 29, 2019); *Uniloc 2017 LLC v. Google LLC*, No. 2:18-CV-00493-JRG-RSP, 2020 WL 339802, at *21 (E.D. Tex. Jan. 20, 2020); Ex. 2009 ¶ 54). According to Patent Owner, "[t]his ordinary meaning is confirmed by computer textbooks, such as Discovering Computers: Fundamentals, which distinguishes between mobile devices and mobile computers like laptops." *Id.* (citing Ex. 2007, 24–26; Ex. 2009 ¶ 55). Patent Owner points out that the textbook classifies laptop computers as portable, personal computers designed to fit on your lap. *Id.* (citing Ex. 2007, 24–25). Patent Owner further contends that even Petitioner's asserted PC Magazine reference refers to the iBook laptop as a "portable" computer, not a mobile

device. *Id.* at 20–21 (citing Ex. 1007, 10; Ex. 1002 ¶ 216; Ex. 2009 ¶ 56). Patent Owner contends that "[t]here is no evidence in this record, intrinsic or extrinsic, from which the Board could conclude that a 'mobile device' includes a portable laptop computer." *Id.* at 21.

b) Petitioner's Reply

Petitioner responds that "the claim language recites a 'mobile device'—not a handheld computing device," and that "[i]f the applicant wanted to limit 'mobile device' to handhelds like PDAs or mobile phones, it could have done so, just as it did in an earlier patent in the same patent family." Pet. Reply 8 (citing Ex. 1001, 10:19–20; Ex. 1034 (U.S. Patent No. 8,131,826 B2), claims 5, 6). Petitioner contends that the specification lacks any "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope" to limit "mobile device." *Id.* Petitioner further contends that the specification generally refers to "common consumer client devices," and that "[b]oth sides' experts agree that laptops were 'common consumer devices' in 2001." *Id.* (citing Ex. 1001, 3:26–33, 5:49, 9:13, 9:42; Ex. 1025, 23:8–25:11; Ex. 1033 ¶ 35). Petitioner argues that PDAs and cellular telephones mentioned in the specification are mere exemplary clients and it is improper to use examples from the specification to import limitations into the claims. *Id.* at 9 (citing Ex. 1001, 5:51–59).

As to Patent Owner's cited textbook, Petitioner points out that the textbook was published in 2008, seven years *after* the '109 patent's priority date, and is not probative of a person of ordinary skill's understanding of "mobile device" at the time of the claimed '109 patent invention, i.e., January 2001. *Id.* at 11 (citing Ex. 1033 ¶ 37). Instead, Petitioner points us to other references that list laptops as examples of mobile devices. *Id.* (citing Ex. 1026, 4; Ex. 1027, 36; Ex. 1028, 27; Ex. 1033 ¶¶ 38–39). For

example, Petitioner cites an FCC Report that states that "[m]obile data devices include . . . laptop computers equipped with wireless modems," as well as an Encyclopedia of Computer Science that lists laptops as examples of mobile devices. *Id.* (citing Ex. 1027, 36)

Petitioner further points to Patent Owner's positions taken in the parallel district court litigation as contrary to its arguments presented in this proceeding. *Id.* at 7 (citing Ex. 1031, 20–21).

c) Patent Owner's Sur-reply

Patent Owner responds that the specification's reference to "common consumer client devices" is irrelevant to whether a laptop is a "mobile device" within the meaning of the claims. PO Sur-reply 9. Patent Owner contends that Petitioner's cited FCC Report actually corroborates Patent Owner's cited textbook distinguishing "handheld devices" from devices such as "laptop computers." *Id.* (citing Ex. 1027, 9; Ex. 2007). Patent Owner argues that "the FCC Report does not state that laptop computers are mobile devices, but instead says that '[m]obile *data* devices' include 'laptop computers *equipped with wireless modems*.'" *Id.* at 11 (citing Ex. 1027, 36). According to Patent Owner, wireless modems refers to cellular modems and "the 'mobile data' sector addressed in the report focuses on cellular and satellite technology." *Id.* (citing Ex. 1027, 6 n.8). Patent Owner also contends that Petitioner's remaining extrinsic evidence either does not support Petitioner's position or does not reflect a widely held view of persons of ordinary skill in the art. *Id.* at 12 (citing Ex. 1026; Ex. 1028, 27).

d) Our Analysis

In our Institution Decision, we preliminarily rejected Patent Owner's proposal to construe "mobile device" as "handheld computing device." *See*

Inst. Dec. 14–15. For the reasons discussed below, based on our review of the full trial record, we maintain our claim construction.

"In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005 (Fed. Cir. 2006). We begin our analysis with the claim language. Independent claims 1 and 8 recite "a client device," and dependent claims 6, 11, and 12 recite "wherein the client device is a *mobile device*." The claims do not provide any further guidance on the meaning of a mobile device.

The phrase "mobile device" is not used in the specification. The specification, however, provides some guidance regarding examples of *client devices*. *See* PO Resp. 19 (citing Ex. 1001, 3:26–30, 5:51–59). Specifically, the specification states that

> for reasons of cost, size, and power consumption, sophisticated three dimensional graphics are not available on common consumer client devices such as personal digital assistants (PDAs), mobile telephones and set-top boxes used to decode cable and satellite television signals. Consequently, it would be advantageous to display complex three dimensional graphics, such as those used by games, on these consumer client devices.

Ex. 1001, 3:26–33; *see also id.* at 5:51–59 ("Another [sic] exemplary clients are PDA 18, such as a Palm Pilot or a Handspring Visor, which has a display screen 26, and cellular telephone 20, which includes a display screen 28."), 9:4–9. Although we agree with Patent Owner that the specification provides examples of client devices that may have been handheld computing devices, the '109 patent also makes clear that these are mere examples of client devices. *See id.* at 5:51–53 ("Another [sic] *exemplary* clients are PDA 18 . . . and cellular telephone 20 . . . ." (emphasis added)), 3:26–30 ("consumer

client devices *such as* personal digital assistants (PDAs), mobile telephones" (emphasis added)). The Federal Circuit has warned against importing exemplary embodiments from the specification into broader claim terms. *See Phillips*, 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments."); *see also SIPCO, LLC v. Emerson Electric Co.*, 980 F.3d 865, 872 (Fed. Cir. 2020) (holding that "the Board did not err in declining to import exemplary embodiments of 'instruction code' from the specification into the broader claim term 'instruction data'").

Patent Owner argues that "a patent applicant need not expressly state 'my invention does not include X' to indicate his exclusion of X from the scope of his patent because 'the patentee's choice of preferred embodiments can shed light on the intended scope of the claims.'" PO Sur-reply 8–9 (quoting *Trustees of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1364 (Fed. Cir. 2016)). Although we agree with Patent Owner on the cited authority, we find nothing in the specification indicating that the term "mobile device" is limited to a handheld computing device, especially given that the specification does not even mention that term. *See, e.g.*, *Trustees of Columbia Univ.*, 811 F.3d at 1366 (noting "the overwhelming evidence" in the specification demonstrating the intended definition of the disputed term). In fact, the *only* mention of "mobile" in the specification is in reference to "mobile telephone," which is listed as an example of a consumer client device. *See, e.g.*, Ex. 1001, 3:26–30. The Federal Circuit has repeatedly "cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification." *See Williamson v. Citrix Online,*

LLC, 792 F.3d 1339, 1346–47 (Fed. Cir. 2015) (quoting *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002)).

Instead, the specification refers to "consumer client devices" and generally discloses addressing the problem that such devices do not support three dimensional graphics "for reasons of cost, size, and power consumption." *See* Ex. 1001, 3:26–33. We are not persuaded that consumer client devices such as laptops that also are portable would fall outside the scope of the claimed "mobile device," as Patent Owner argues. *See* PO Resp. 20–21, 44–45. As Petitioner points out, Dr. Fuchs and Dr. Hart agree that laptops were in fact considered "common consumer devices" in 2001. Pet. Reply 8 (citing Ex. 1025, 23:8–25:11; Ex. 1033 ¶ 35). Patent Owner argues that the fact that laptops were common consumer devices "is irrelevant to whether a laptop is a 'mobile device' within the meaning of claims 1 and 8." PO Sur-reply 9. But the discussion and examples of "common consumer client devices" are the most relevant disclosures found in the specification, and those are also the portions of the specification that Patent Owner itself points us to as supporting its construction. *See* PO Resp. 19 (citing Ex. 1001, 3:26–30, 5:51–59). And as explained above, those descriptions in the specification are not definitional or limiting. We therefore determine that the specification does not support Patent Owner's proposed limiting construction of the claim term.

Patent Owner also does not point us to, and we do not find, anything in the prosecution history that supports construing the term "mobile device" in the manner argued by Patent Owner. *See generally* Ex. 2004.

Turning to extrinsic evidence, we determine that the evidence offered by Patent Owner also does not support Patent Owner's interpretation of the term "mobile device" as "handheld computing devices." The textbook

proffered by Patent Owner as distinguishing mobile devices from portable devices was in fact published *seven* years *after* the '109 patent's priority date, and is not probative of a person of ordinary skill's understanding of "mobile device" at the time of the invention. *See* Pet. Reply 11 (citing Ex. 2007, 6; Ex. 1033 ¶ 37). Even if we were to consider that textbook to be relevant, we are not persuaded that it supports the clear distinction between laptop computers and mobile devices that Patent Owner seeks to draw. *See, e.g.*, Ex. 2007, 24–25 (referring to laptop computers as "*mobile* computers").

Petitioner, on the other hand, points us to an FCC Report from September 2000 that states that "*[m]obile devices* include . . . *laptop computers* equipped with wireless modems." Pet Reply 11 (citing Ex. 1027, 36). Patent Owner responds that that FCC Report discusses mobile data services using wireless or cellular modems, and classifies "laptop computers *equipped with wireless modems*" as "mobile *data* devices." PO Sur-reply 11 (citing Ex. 1027, 6 n.8, 36, 69). We find Patent Owner's distinction irrelevant to the issue at hand given that the reference at least demonstrates that laptop computers would have been considered mobile devices in certain contexts at the time of the invention. Similarly, Patent Owner's arguments distinguishing two other references that teach laptops as examples of mobile devices are also not persuasive. *See id.* at 12 (arguing that the Wang reference is "merely a research paper," and that the Encyclopedia of Computer Science is not clear enough in identifying laptop computers as mobile devices) (citing Ex. 1026; Ex. 1028, 27). Patent Owner cites no authority to support its contention that a research paper from a reputable university is not relevant extrinsic evidence. *See* Ex. 1026, 20 (stating also that the research described in the paper "was sponsored in part by the Defense Advanced Research Projects Agency"). And although the

Encyclopedia of Computer Science does not expressly list laptops as examples of mobile devices, the cited portion discusses types of displays in mobile devices, including laptop computers. *See* Ex. 1028, 27 (repeatedly referring to "mobile devices" in the same paragraph). We are thus persuaded that Petitioner's proffered extrinsic evidence further supports our interpretation that "mobile devices" are not limited to "handheld computing devices," or exclude laptop computers, as argued by Patent Owner.

We also do not find persuasive the cases cited by both parties (*see* PO Resp. 20; Pet. Reply 9–11; PO Sur-reply 10) involving claim construction of "mobile device" terms in various patents, unrelated to the '109 patent, because each of those constructions is specifically based on the disclosures of the construed patent in that case. *See, e,g.*, *Rothschild Mobile Imaging Innovations, LLC v. Mitek Sys., Inc.*, IPR2016-00457, Paper 8, 9–10 (PTAB July 27, 2016) (construing the term "mobile device" based primarily on statements in specification of the challenged patent in that case).

For these reasons, we decline to adopt Patent Owner's proposed construction of the term "mobile device." We need not further construe the term other than to conclude that it encompasses a laptop computer.

D. Overview of the Asserted Prior Art

1. Wiltshire (Ex. 1004)

Wiltshire discloses a "slim terminal gaming system" that claims to "drastically reduce[] the cost and substantially increase[] the tamper resistance of individual gaming stations" by "allow[ing] concurrent access to multiple computer gaming programs from individual gaming stations by a patron." Ex. 1004, code (54), 2:21–28.

Figure 1D of Wiltshire is reproduced below.

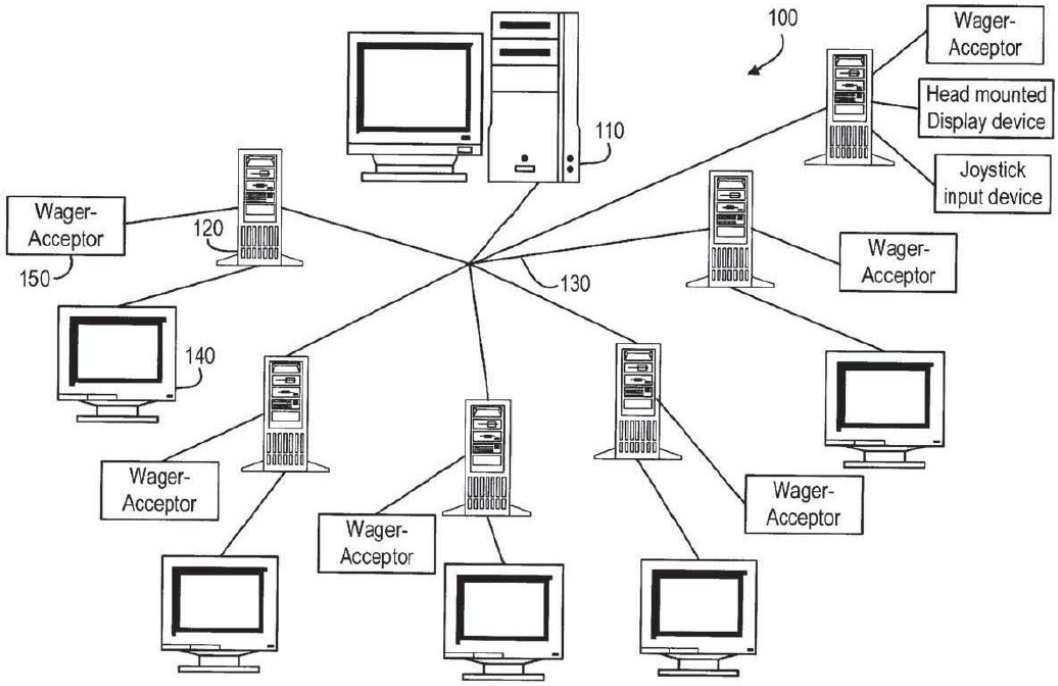


Figure 1D shows an overview of Wiltshire's system, with "server/host computer 110 connected to a plurality of remote client/terminal computers 120." Ex. 1004, 3:62–66. The client computers may have minimal storage, memory, and processing power because "the overwhelming majority of the gaming related and regulated processing is performed on the server/host computer." *Id.* at 5:17–23. The game program running on the server determines which images are to be displayed on the display connected to each client computer (e.g., display devices 140) and also processes any input commands detected by the client computer. *Id.* at 5:50–65.

Figure 2 of Wiltshire is reproduced below.

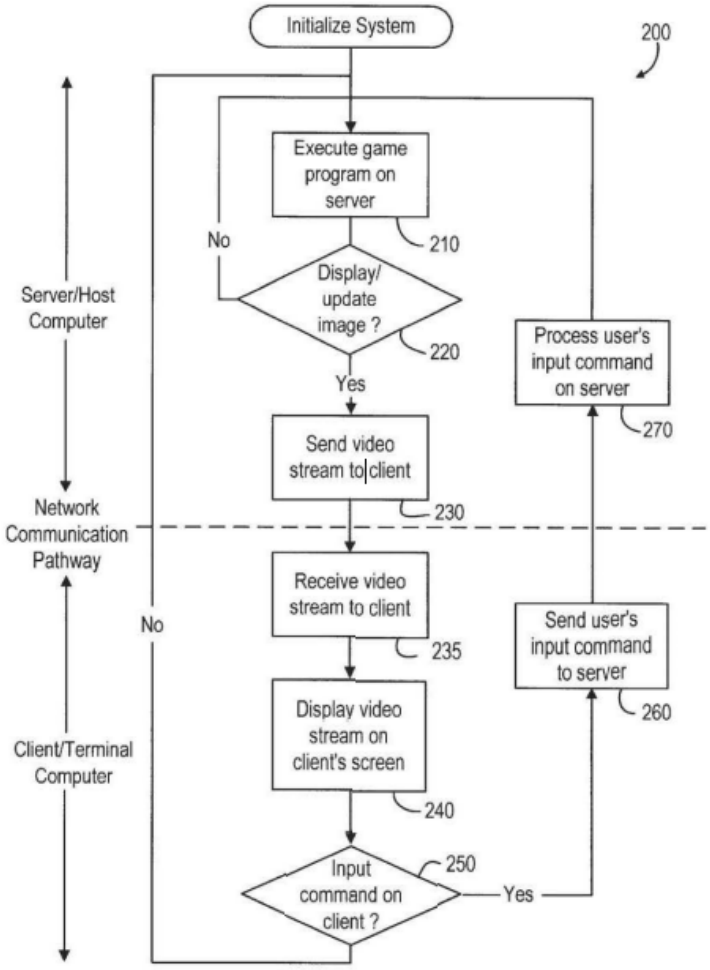


Figure 2 is a flow diagram showing the operation of Wiltshire's system. Ex. 1004, 7:7–8. Wiltshire explains that "an image is sent from server/host computer 110 to client/terminal computer 120," where the "image may include any type of graphical information including a bitmap, a JPEG file, a TIFF file or even an encoded audio/video stream such as a compressed video MPEG stream." *Id.* at 7:11–18. The image transmitted to the client/terminal computer 120, where "program 122 then causes the image to be displayed on a screen of client/terminal computer 120 in stage 240." *Id.* at 7:18–27. If an input command, such as a keystroke or a mouse click, is detected at stage

250, that command is transmitted back to the server at stage 260. *Id.* at 7:27–38.

2. Saha (Ex. 1005)

Saha "relates to the field of video compression, and in particular to a video decoder which provides robust error detection and concealment." Ex. 1005, 1:6–8, 5:66–67. Saha describes that, in contrast to intraframe or still image compression techniques, "video compression algorithms for motion video use a concept referred to as interframe compression to remove temporal redundancies between frames." *Id.* at 1:24–28, 1:44–47. Saha discloses that the "compression standard referred to as MPEG (Moving Pictures Experts Group) compression is a set of methods for compression and decompression of full motion video images[,] which uses the interframe and intraframe compression techniques." *Id.* at 1:64–2:1. Saha explains

> Interframe compression methods such as MPEG are based on the fact that, in most video sequences, the background remains relatively stable while action takes place in the foreground. The background may move, but large portions of successive frames in a video sequence are redundant. MPEG compression uses this inherent redundancy to encode or compress frames in the sequence.
>
> An MPEG stream includes three types of pictures, referred to as the Intra (I) frame, the Predicted (P) frame, and the Bi-directional Interpolated (B) frame. The I (intra) frames contain the video data for the entire frame of video and are typically placed every 10 to 15 frames . . . and are generally only moderately compressed. Predicted frames are encoded with reference to a past frame, i.e., a prior Intraframe or Predicted frame. Thus P frames only include changes relative to prior I or P frames [and] receive a fairly high amount of compression.

Id. at 2:14–30.

3. Chen (Ex. 1006)

Chen discusses the development and standardization of asymmetrical digital subscriber line ("ADSL"), one of a variety of digital subscriber line ("DSL") systems built upon the existing twisted-pair telephone technology. Ex. 1006, Abstract, 68.[8] Chen discusses that ADSL can provide higher speed download bandwidth to a user along with lower speed upload bandwidth from the user, making it "well suited to the concept of a video-on-demand service." *Id.* at 69. The video, audio channel, and associated overhead can be transmitted within a 1.5 Mb/s downstream channel, sufficient to receive on-demand MPEG video. *Id.* An upstream channel of 16–64 kb/s is provided to send back control signals for interactive commands such as pause, play, and so forth. *Id.*

4. PC Magazine (Ex. 1007)

PC Magazine is a magazine article that provides details about Apple's then newly-announced iBook portable computer. Ex. 1007, 9. The article describes the iBook as weighing 6.6 pounds, with a 12.1 inch display, a 300 MHz G3 processor, and a battery life of over six hours. *Id.* According to the article, iBook users can roam up to 150 feet from base stations using Apple's AirPort wireless technology that supports a data-transfer rate of 11 Mbps. *Id.*

E. Obviousness of Claims 1 and 3–12 over Wiltshire and Saha

Petitioner contends that claims 1 and 3–12 are unpatentable as obvious over the combination of Wiltshire and Saha. Pet. 13–58. For the reasons that follow, we are persuaded that Petitioner has established by a

[8] Page numbers cited in this Decision are the underlying page numbers of the references themselves.

preponderance of the evidence, including Dr. Fuchs's testimony, that claims 1 and 3–12 are unpatentable under § 103(a) as obvious over Wiltshire and Saha.

1. Independent Claim 1

a) "A method of hosting an interactive software application comprising:"

Petitioner contends Wiltshire teaches the preamble because it discloses hosting gaming programs on its server. Pet. 19 (citing Ex. 1004, code (57), 1:26–43, 2:35–44, 7:8–9; Ex. 1002 ¶ 56). Petitioner contends that users interact with the gaming programs by sending input commands "such as mouse movements, mouse clicks or keystrokes" from the client computer to the server running the gaming program, and these input commands are used by the gaming program to "determine[] which images are to be displayed on a screen of the client/terminal computer." *Id.* at 20 (citing Ex. 1004, 5:57–65; Ex. 1002 ¶ 57).

Patent Owner does not specifically respond to these arguments. *See generally* PO Resp. We find Petitioner's arguments persuasive as to the preamble of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Wiltshire teaches the preamble of claim 1.

b) "running at a server the interactive software application;"

Petitioner contends that Wiltshire discloses this limitation because Wiltshire's server "exclusively" executes the gaming programs, and the gaming program is an interactive software application because a player interacts with the gaming program. Pet. 20–21 (citing Ex. 1004, 2:35–39, 3:62–66, 7:8–9, Figs. 1A, 2; Ex. 1002 ¶¶ 60–63).

Patent Owner does not specifically respond to these arguments. *See generally* PO Resp. We find Petitioner's arguments persuasive as to this limitation and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Wiltshire teaches this limitation.

c) "receiving at the server user input signals from a client device, wherein the user input signals are used to control updating of the state of the interactive software application;"

Petitioner contends that Wiltshire teaches this limitation because Wiltshire discloses input commands detected at the client device that are transmitted back to the server. Pet. 21–23 (citing Ex. 1004, 7:27–41, Fig. 2; Ex. 1002 ¶¶ 65–67). Petitioner further contends that Wiltshire teaches that the user input signals received by the server are passed to the game program at the server for updating the state of the game program. *Id.* at 23–24 (citing Ex. 1004, 5:57–65, 7:42–43, 8:61–63, 12:44–51, 13:51–59, Fig. 2; Ex. 1002 ¶¶ 65–68).

Patent Owner does not specifically respond to these arguments. *See generally* PO Resp. We find Petitioner's arguments persuasive as to this limitation and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Wiltshire teaches this limitation.

d) "generating at least one updated image at the server in response to updating the state of the interactive software application;"

(1) Petitioner's Contentions

Petitioner contends that Wiltshire teaches this limitation because it discloses that at stage 270 of Wiltshire's method, the game program processes the input command and updates the state of the game accordingly.

Pet. 24–25 (citing Ex. 1004, 7:41–45, Fig. 2; Ex. 1002 ¶¶ 73–74). Petitioner further contends that at stage 220 of Wiltshire's method, the determination of whether an image is to be displayed includes deciding whether to update the image on the client in response to updates to the game state. *Id.* at 26 (citing Ex. 1004, 8:61–63). According to Petitioner, a person of ordinary skill in the art would have understood that the game program at the server would determine whether to generate an updated image in response to the updated game state. *Id.* (citing Ex. 1002 ¶ 76). Petitioner contends that it is the server that generates the updated image in Wiltshire. *Id.* (citing Ex. 1004, 2:35–39, 2:45–46, 5:44–46, 7:8–9, 7:18–20; Ex. 1002 ¶¶ 77–78).

(2) Patent Owner's Arguments

Patent Owner argues that Wiltshire does not disclose generating an updated image in response to user input, as required by the claims. *See* PO Resp. 24–32. Patent Owner argues that although Wiltshire discloses sending an image from the server to a client and that the image may include "a compressed video MPEG stream," Wiltshire is entirely silent as to the content or origin of that compressed video MPEG stream, and therefore does not disclose generating an updated image, compressing that updated image, and then transmitting the compressed updated image. *Id.* at 27–28 (citing Ex. 1004, 7:13–18). According to Patent Owner, Wiltshire's failure to teach the generating step is confirmed by Wiltshire's disclosure that "in some embodiments, images for use by computer gaming system 100 are preloaded into a memory of client/terminal computers 120 to further reduce the amount of communication network bandwidth required." *Id.* (quoting Ex. 1004, 8:8–11). Patent Owner argues images that are preloaded onto the client are preexisting images and are not "generated" in response to "updating the state

of the interactive software application" as required by claims 1 and 8. *Id.* at 28–29 (citing Ex. 2009 ¶¶ 61–63).

Patent Owner also faults Petitioner's characterization of step 220 shown in Figure 2 of Wiltshire, arguing that Petitioner simply assumes the single word "update" in Figure 2 means that Wiltshire would generate an "updated image" in response to an updated software state when it could simply mean update the display by choosing a different preexisting image to display, possibly an image that is already resident on the client. PO Resp. 29–30 (citing Ex. 1004, 7:9–12, 8:8–11, Fig. 2); *see also* Tr. 42:3–14, 42:25–43:17.

(3) The Federal Circuit's Remand and Our Analysis

As discussed briefly above, our determination as to this limitation was the focus of the appeal to the Federal Circuit. *Sony*, 2023 WL 6773879, at *2–4. The Federal Circuit found that we erred by interpreting Wiltshire's disclosure narrowly as only disclosing selecting an already available image to display on the client, rather than creating a new image. *Id.* at *1–2. Specifically, the Court explained that we incorrectly interpreted Wiltshire's Figure 2 to just ask the question "display/update image?" without "explain[ing] what 'display/update image?' means." *Id.* at *3. In doing so, we ignored "a portion of the specification which explains that if the answer is yes, '[t]he *image is generated* by game computer program 112,' i.e., a program on the server." *Id.* ((citing Ex. 1004, 7:18–19). The Court also found that Figure 2, the text in Wiltshire describing it, and descriptions of other embodiments in Wiltshire demonstrate that Wiltshire discloses generation of a new image. *Id.* (citing Ex. 1004, 7:7–45, 8:2–7). The Court explained that Dr. Fuchs's testimony that Wiltshire discloses the "generating" limitation was uncontradicted. *Id.*

The Court found that we also incorrectly ignored other examples in Wiltshire, such as the playing of the game Doom, where new images are created:

> The Board erred in its interpretation of Wiltshire as Wiltshire specifically recites "[t]he terms 'game' and 'gaming,' as used herein, include all types of electronic, electromechanical or mechanical gambling and casino game facsimiles . . . video based games such as Doom, Pong, Packman, Myst; [and] video games based on sports . . . ." The use of the phrase "as used herein" signals that this sentence is definitional. The terms "computer gaming program" or "computer gaming system," covers Doom, and Wiltshire recites that "FIG. 2 is a flow diagram of operation 200 of computer gaming system 100." Therefore, as discussed earlier, Wiltshire explicitly discloses that Figure 2 is to be applied to games like Doom.

Id. at *4 (citing Ex. 1004, 1:22–44, 7:7–8; *Kyocera Senco Indus. Tools Inc. v. Int'l Trade Comm'n*, 22 F.4th 1369, 1378 (Fed. Cir. 2022); *Abbott Lab'ys v. Andrx Pharms., Inc.*, 473 F.3d 1196, 1210 (Fed. Cir. 2007)). The Court explained that even if a person of ordinary skill in the art would not be enabled to practice Wiltshire with a game like Doom, "that does not mean that Wiltshire does not disclose applying the system of Wiltshire to a game like Doom." *Id.* (citing *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021); *Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989)). We therefore erred when we "narrowed the disclosure of Wiltshire to exclude Doom and only focused on the more detailed examples," and did not credit "Wiltshire's disclosure of applying its system to video games like Doom, which require 'generating' new images." *Id.*

In light of the Federal Circuit's decision, we determine that Wiltshire teaches this limitation. As the Court explained in detail, Figure 2 and its

accompanying description sufficiently disclose generation of a new image, as required by this limitation. Ex. 1004, 7:7–45, 8:2–7, 8:61–63, Fig. 2; Pet. 24–26; Pet. Reply 12–13. Further, the Court found the following testimony from Dr. Fuchs's to be uncontroverted:

> Wiltshire discloses that the decision to "update" or "modify" an image at the server is in response to the updated game state running on the server, meaning that *the server will, at times, update or modify the image in response to the updated game state*. . . . For example, if the decision at step 220 of Figure 2 is to "update [the] image," Wiltshire's server will do so, as Wiltshire explicitly describes, including at column 8, lines 61–63.

Ex. 1033 ¶ 41.

On remand, we apply Wiltshire's Figure 2 to games like Doom. Petitioner argues that "interactive video games like 'Doom,' . . . generate updated images in response to user inputs in real time." Pet. Reply 13 (citing Ex. 1033 ¶¶ 42–43; Ex. 1025, 52:16–23, 53:19–54:9). Dr. Fuchs provides screenshots from a YouTube video showing an example of gameplay from the game Doom. Ex. 1033 ¶ 42. Dr. Fuchs testifies that in Doom, the player's perspective changes dynamically based on what the user is doing in real time and each image is updated to reflect the current state of the player within the game world. *Id.* ¶ 43. In light of the Federal Circuit's guidance on Wiltshire's disclosure, we find Dr. Fuchs's testimony persuasive. Dr. Hart also agrees that Doom generates images in response to user input. Ex. 1025, 52:16–23; *see also Sony*, 2023 WL 6773879, at *2 (noting Patent Owner's concession that Doom requires generating new images). When Figure 2's question at step 220 "display/update image?" is applied to Doom and the answer to the question is yes, Wiltshire teaches that

the server will generate an updated image in response to the updated game state before sending it to the client at step 230. *See* Ex. 1004, Fig. 2.

In its post-remand briefing, Patent Owner argues that the Federal Circuit found that Wiltshire discloses the "generating" limitation only through what Patent Owner calls "Wiltshire's Doom embodiment." PO Remand Br. 1–2. Patent Owner argues that, in light of the Court's decision, "the Petition would have had to show that all of the other limitations of the Challenged Claims allegedly disclosed by Wiltshire are disclosed in Wiltshire's Doom embodiment." *Id.* at 2. We do not agree with Patent Owner because, as Petitioner argues, "Doom is *not* a separate embodiment from Wiltshire's client-server system upon which the Petition relies." Pet. Remand Resp. Br. 1. As the Court explained, a proper reading of Wiltshire *applies* the disclosure about its system, including Figure 2, to the games like Doom. *Sony*, 2023 WL 6773879, at *4. We are therefore not persuaded that treating the dozens of games listed in Wiltshire as separate embodiments, in the manner argued by Patent Owner, is proper.

Considering the complete record on remand, we determine that Wiltshire teaches this limitation.

e) "compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a compressed frame that can be decompressed and displayed as an updated image at the client device."

(1) Petitioner's Contentions

Petitioner contends that the combination of Wiltshire and Saha teaches this limitation. Pet. 27. Petitioner asserts that at stage 230 of Wiltshire's method, the updated image is sent from the server/host computer to the client/terminal computer. *Id.* (citing Ex. 1004, 7:13–14). Petitioner

further asserts that to reduce bandwidth requirements, Wiltshire discloses that the server may compress the updated images as "a compressed video MPEG Stream." *Id.* at 27–28 (citing Ex. 1004, 7:15–18; 7:62–64). Petitioner adds that, as recognized by the '109 patent, MPEG is an example of compressing an image. *Id.* at 28 (citing Ex. 1001, 6:56–62; Ex. 1002 ¶ 81).

Petitioner contends that Wiltshire discloses that the MPEG stream may be transmitted to the client and the client "causes the image[s] to be displayed on a screen of the client/terminal computer." *Id.* (citing Ex. 1004, 7:15–18, 7:26–27). Petitioner argues that a person of ordinary skill in the art would have understood from Wiltshire that the client computer must be capable of decompressing the compressed MPEG stream (including the compressed image frame) because without decompression, the compressed MPEG stream could not be displayed at the client computer. *Id.* (citing Ex. 1002 ¶¶ 83–84). Petitioner further argues that although Wiltshire does not discuss the details of MPEG decompression at the client, an ordinarily skilled artisan would have known those details based on their knowledge of the well-understood MPEG standard, as confirmed by Saha. *Id.* (citing Ex. 1002 ¶¶ 83–85; Ex. 1008; Ex. 1009).

Petitioner points out that Saha provides an overview of the two "predominant MPEG standards" in 1998, and that these MPEG standards "describe an encoder to generate compressed 'frames' (also called 'pictures')" of three types. *Id.* at 28–29 (citing Ex. 1005, 1:64–2:1, 2:5–14, 2:19–35; Ex. 1002 ¶¶ 49, 88). Petitioner further asserts that Saha also discloses MPEG decoders that receive the compressed frames and decompress them for display. *Id.* at 29–30 (citing Ex. 1005, 4:9–13, 4:51–58, 4:63–5:4, 5:43–45; 5:28–37; Ex. 1002 ¶ 90). Petitioner argues that

a person of ordinary skill in the art "would have known that MPEG includes 'compressed frames' and provides a method for both compression and decompression of frames." *Id.* at 30 (citing Ex. 1004, 6:56–62, 7:13–18, 7:25–27, 7:62–64; Ex. 1002 ¶ 91; Ex. 1008; Ex. 1009). Petitioner points out that the '109 patent indicates that MPEG was an industry standard form of video compression that was already present in client devices before the '109 patent. *Id.* (citing Ex. 1001, 9:32–38; Ex. 1002 ¶ 91).

Petitioner next contends that a person of ordinary skill in the art would have been motivated to apply Saha's teaching of MPEG decompression of compressed frames to Wiltshire's client computer. *Id.* (citing Ex. 1002 ¶¶ 92–93). Petitioner argues that Wiltshire provides an express motivation to combine with Saha because Wiltshire teaches that its system may use the MPEG standard for compressing the updated images that are sent to the client and because Saha details the MPEG standards, including decompressing compressed frames. *Id.* at 30–31 (citing Ex. 1004, 7:15–19; Ex. 1005, 2:21–35; 4:9–13; Ex. 1002 ¶ 94). Petitioner further argues that decompressing an MPEG stream at the client is one of just a finite number of identified and predictable solutions known to a person of ordinary skill in the art and that such a person would have recognized that decompressing the stream using MPEG such that the image can be displayed at the client computer would have been an obvious, if not the only, choice. *Id.* at 31–32 (citing Ex. 1002 ¶ 95).

According to Petitioner, there would have been a reasonable expectation of success in applying Saha's teachings of MPEG's decompression of a compressed frame to the teachings of Wiltshire because Saha's teaching of MPEG and compressed frames would be used for its intended purpose of providing compression for various applications and to

reduce the bandwidth requirements. *Id.* at 32–33 (citing Ex. 1004, 7:62–65; Ex. 1005, 2:10–13, 4:9–13, 5:46–56; Ex. 1002 ¶ 96).

(2) Patent Owner's Arguments

Patent Owner responds that neither Wiltshire nor Saha discloses the server transmitting the updated image as a compressed frame, under Patent Owner's proposed construction of "frame"—"a single instance of the display." PO Resp. 33. Patent Owner argues that "Wiltshire only disclose[s] transmitting 'an image'" and that Wiltshire "never disclose[s] or suggest[s] that the 'image' was or even could be a frame." *Id.* (citing Ex. 1004, 7:13–15, 7:18–22; Ex. 2009 ¶¶ 83–85). Patent Owner argues that Wiltshire is "completely silent on what part or component of any display, much less the client display the 'image' comprise[s]." *Id.* In fact, Patent Owner argues, Wiltshire discloses less than the prior art reference Yamada that applicant overcame during prosecution of the '109 patent. *Id.* at 35 (citing Ex. 2004, 235, 273, 289; Ex. 2005, 19:33–35) (noting that Yamada discloses an "MPEG decoder [that] decompresses image data such as a background image and a character image used in the game, supplied from the STB 6 via the wireless communication").

Turning to Saha, Patent Owner argues that "applying MPEG to [Wiltshire's] image is simply a form of compressing the image," and "does not change the nature of the input image into something more than it was before applying compression." *Id.* at 36 (citing Pet. 28–29). Patent Owner asserts that "'frame' in the MPEG context simply means picture." *Id.* at 37 (citing Pet. 29). According to Patent Owner, Saha's disclosure of frames "is not the 'frame' of claims 1 and 8 as the applicant successfully asserted during prosecution when arguing that Yamada's disclosure of MPEG did not disclose the use of frames." *Id.* (citing Ex. 2004, 235, 273). Patent Owner

contends that Wiltshire's disclosure of using a compressed MPEG stream fares no better than Yamada's disclosure of the same because applicant's argument during prosecution "at least establishes that *something more* than transmitting images using MPEG compression is required to show the use of a 'frame.'" *Id.* at 23 (emphasis added).

Separately, Patent Owner argues that Wiltshire does not disclose compressing any updated image, and Figure 2 of Wiltshire "describe[s] moving straight from determining whether an image was to be displayed at the client (step 220) to sending the image (step 230)." PO Resp. 30 (citing Ex. 1004, 7:9–15). Patent Owner contends that "Wiltshire simply state[s] that the transmitted image 'may include' a compressed video MPEG stream" and that Wiltshire does not disclose that any image generated in step 220 should be compressed to reduce bandwidth. *Id.* at 30–31 (citing Ex. 1004, 7:15–18; Ex. 2009 ¶¶ 64–68). According to Patent Owner, "a [person of ordinary skill in the art] would not have thought using MPEG compression for a live transmission, such as an interactive game, was trivial in view of Saha, which discloses offline MPEG encoding." *Id.* (citing Ex. 1005, 2:60; Ex. 2009 ¶¶ 69–79).

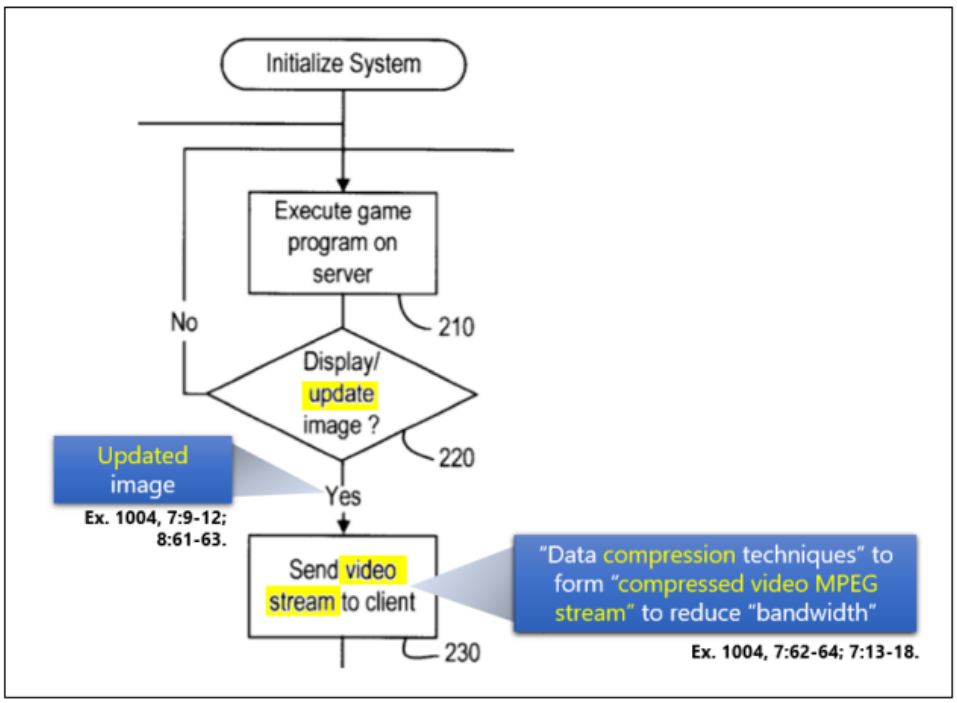
(3) Petitioner's Reply

Petitioner responds that "even under Patent Owner's incorrect construction, Wiltshire and Saha would still disclose a 'frame.'" Pet. Reply 19. Petitioner contends that "Saha discloses 'frames' and compressed 'frames' using MPEG." *Id.* (citing Ex. 1005, 1:64–2:1, 2:19–35; Ex. 1025, 104:21–105:5; Ex. 1033 ¶ 55).

Petitioner also contends that "Wiltshire provides multiple examples of 'images' that are '*displayed on a screen* of a client/terminal computer,'" and "[e]ach of these images are full displays." *Id.* at 19–20 (citing Ex. 1004,

3:23–57, 8:38–41, Figs. 4–9; Ex. 1033 ¶ 59). Petitioner further contends that Wiltshire's primary embodiment uses "full screen refreshes" on the client display because Wiltshire discloses "alternative embodiments that may use partial screen updates." *Id.* (citing Ex. 1004, 8:1–7; Ex. 1033 ¶¶ 56–58).

With regard to compressing, Petitioner responds that Wiltshire's text and Figure 2 disclose compressing an updated image for transmission. *Id.* at 14–15 (citing Ex. 1004, 7:15–18, 7:57–64, Fig. 2; Ex. 1033 ¶¶ 44–47). Petitioner's annotated version of Wiltshire's Figure 2 is reproduced below.



Petitioner's annotated version of Figure 2 shows what Petitioner contends is the sum of Wiltshire's text and Figure 2 disclosing compressing an updated image for transmission. *Id.* at 14.

As to Patent Owner's argument that Saha's MPEG is limited to off-line encoding and that a person of ordinary skill in the art would not have understood how to use MPEG for Wiltshire's interactive games,

Petitioner responds that "the '109 patent also does not disclose details of how to use MPEG for live, realtime interactive games" because "the details of real-time image compression (including by using MPEG) were already well known" to a person of ordinary skill in the art. *Id.* at 16–18 (citing Ex. 1001, Fig. 2D; Ex. 1002 ¶ 27; Ex. 1004, 7:13–17; Ex. 1016, 21; Ex. 1025, 146:17–149:5; Ex. 1033 ¶¶ 51–53).

(4) Patent Owner's Sur-reply

Patent Owner responds that Petitioner provides no support for its assertion that Wiltshire's Figures 4–9 are *full* displays. PO Sur-reply 15. Further, Patent Owner argues, Wiltshire mentions "full screen refreshes" but "Wiltshire [is] silent about other embodiments (including any embodiments with full screen refreshes), and silence cannot establish the presence of a limitation." *Id.* at 16 (citing EX1025, 55:15–57:9). Patent Owner reiterates that Wiltshire's "reference to 'compressed video MPEG stream' says nothing about any image allegedly generated in step 220 being compressed to reduce bandwidth." *Id.* at 13. Patent Owner distinguishes the use of MPEG compression in the '109 patent arguing that the specification includes "more specific disclosure regarding how to apply compression to a live stream of rendered images." *Id.* at 14–15 (citing Ex. 2009 ¶¶ 74, 82).

(5) Our Analysis

Based on our review of the complete record, and in view of the Federal Circuit's guidance as to Wiltshire's disclosure, we are persuaded that Petitioner has shown that the combination of Wiltshire and Saha teaches this limitation.

We agree with Petitioner that "Wiltshire provides multiple examples of 'images' that are '*displayed on a screen* of a client/terminal computer,'" and "[e]ach of these images are full displays." Pet. Reply 19–20 (citing

Ex. 1004, 3:23–57, 8:38–41, Figs. 4–9; Ex. 1033 ¶ 59). As Petitioner points out, Wiltshire expressly discloses "full screen refreshes" on the client display because Wiltshire discloses "alternative embodiments that may use partial screen updates." *Id.* (citing Ex. 1004, 8:1–7; Ex. 1033 ¶¶ 56–58). At stage 230 (Figure 2) of Wiltshire's method, the updated images are sent from the server/host computer to the client/terminal computer and Wiltshire discloses that the server may compress updated images as "a compressed video MPEG Stream." Ex. 1004, 7:13–18; 7:62–64. Wiltshire further discloses that the MPEG stream may be transmitted to the client and the client "causes the image[s] to be displayed on a screen of the client/terminal computer." *Id.* at 7:26–27; Fig. 2 (steps 235, 240). We agree with Petitioner that the combination of Wiltshire's disclosure with Saha's disclosure relating to MPEG— "encod[ing] or compress[ing] frames in the sequence," including frames (or pictures) of three types—teaches "the server transmit[ing] the updated image as a compressed frame," as claimed. Ex. 1005, 1:64–2:1, 2:5–14, 2:19–35; Ex. 1002 ¶¶ 49, 88. Saha further discloses MPEG decoders that receive the compressed frames and decompress them for display. Ex. 1005, 4:9–13, 4:51–58, 4:63–5:4, 5:43–45; 5:28–37; Ex. 1002 ¶ 90. Petitioner argues, and we agree, that a person of ordinary skill in the art "would have known that MPEG includes 'compressed frames' and provides a method for both compression and decompression of frames." Pet. 30 (citing Ex. 1004, 6:56–62, 7:13–18, 7:25–27, 7:62–64; Ex. 1002 ¶ 91; Ex. 1008; Ex. 1009). Petitioner persuasively shows that a person of ordinary skill in the art would have been motivated to apply Saha's teaching of MPEG decompression of compressed frames to Wiltshire's client computer. Ex. 1002 ¶¶ 92–93. We are therefore

persuaded that Petitioner has shown that the combination of Wiltshire and Saha teaches this limitation.

Turning to Patent Owner's arguments, even under Patent Owner's proposed construction that the claim term "frame" should be limited to "a single instance of the display," the combination of Wiltshire and Saha teaches transmitting such a "frame." Saha expressly discloses transmitting an image as a compressed frame that can be decompressed and *displayed* as an image at the client device. Ex. 1005, 2:14–17 (discussing "[i]nterframe compression methods such as MPEG"), 2:21–23 ("An MPEG stream includes three types of pictures, referred to as the Intra (I) frame, the Predicted (P) frame, and the Bi-directional Interpolated (B) frame."). Saha also expressly discloses that "[t]he I (intra) frames contain the video data for the *entire frame of video* and are typically placed every 10 to 15 frames." *Id.* at 2:24–26 (emphasis added). Saha discloses that "Intraframes provide entry points into the file for random access" and explains that without such complete frames (or single instances of the display), frames that come later, such as P-frames, which only include the relative changes to prior frames, could not be decoded. *Id.* at 2:26–46 ("Predicted frames are encoded with reference to a past frame."), 2:47–49 ("encoder generally first creates the I-frames").[9] *See* Tr. 65:22–69:5.

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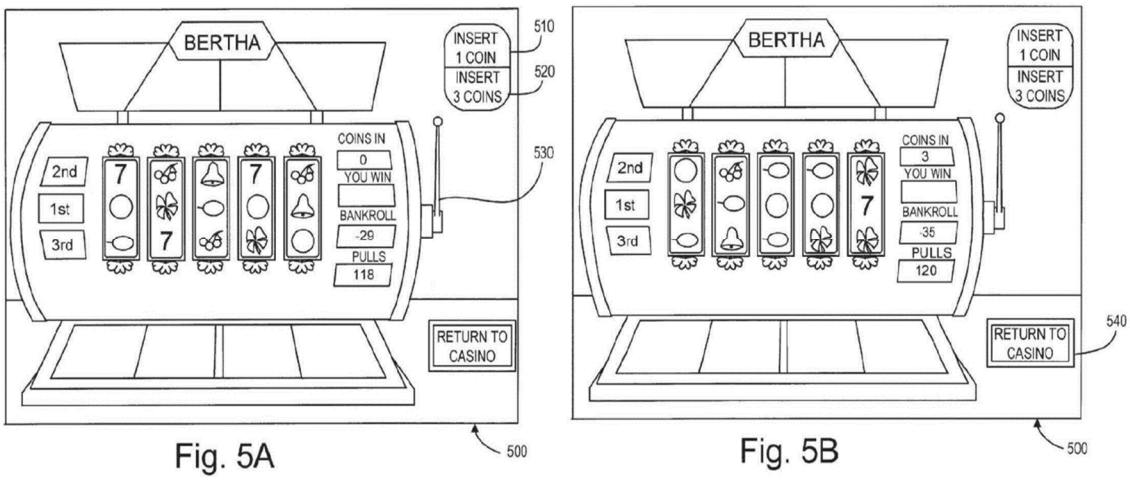
[9] We also are not persuaded by Patent Owner's reliance on the prosecution history of the '109 patent to argue that an MPEG frame is different from the claimed "frame." *See* PO Resp. 37. First, we are not persuaded that applicants, without even mentioning MPEG, disclaimed the MPEG I-frame by arguing over a brief disclosure in Yamada that does not even mention a frame (*see* Ex. 2004, 273; Ex. 2005, 19:33–49). Second, as discussed below, we are persuaded that Wiltshire, through its disclosure of full screen displays and full screen refreshes, combined with Saha's disclosure of I-Frames and MPEG compression, teaches a "frame" under Patent Owner's construction.

Patent Owner agrees that Saha's frames could "include something that takes up the entire display," but argues that "that is not inherent in MPEG." *Id.* at 68:16–69:5. Patent Owner's argument is not persuasive because Saha states that I-frames provide entry points for random access, which, when combined with Wiltshire's teaching of updated images (from Doom) transmitted as an MPEG stream, teaches that a single instance of the *entire* display from which a video sequence may be played is provided in order for the video sequence to be displayed. *See* Ex. 1005, 2:47–49 ("When an MPEG encoder receives a video file or bitstream, the MPEG encoder generally first creates the I-frames."); *see also* Ex. 1002 ¶ 89.

Moreover, we agree with Petitioner that Wiltshire "provides multiple examples of 'images' that are '*displayed on a screen* of a client/terminal computer.'" Pet. Reply 19 (citing Ex. 1004, 3:23–57, 8:38–41, Figs. 4–9). Each of the images shown in Wiltshire's Figures 4–9 are in fact full displays, not partial ones. For example, Figures 5A and 5B of Wiltshire are reproduced below.



Figures 5A and 5B are images displayed on the screen of a client computer showing a front view of a slot machine. Ex. 1004, 3:26–30.

Based on these figures and Wiltshire's description of these figures, we are persuaded each of these is a single instance of the display, transmitted to the client, and "*displayed on a screen* of a client/terminal computer." Ex. 1004, 3:26–27 (emphasis added).

Further, Wiltshire makes clear that its system can support both "full screen refreshes" or partial screen updates on the client. *Id.* at 8:1–7 ("In some embodiments, to further reduce the amount of network bandwidth required for the operation of computer gaming system 100, image updates (once an image has been displayed) are limited to areas of the screen that are actually modified rather than *full screen refreshes*."). A full screen refresh means displaying the entire screen again, and would thus entail a single instance of the display.

Relying on Dr. Hart's testimony, Patent Owner contends that "Wiltshire [is] silent about other embodiments (including any embodiments with full screen refreshes), and silence cannot establish the presence of a limitation." PO Sur-reply 16 (citing Ex. 1025, 55:15–57:9). We are not persuaded that more is needed. Dr. Fuchs testifies that Wiltshire's disclosure teaches full screen disclosures. He testifies that "by disclosing alternative embodiments that use[] 'partial screen' updates, Wiltshire discloses that its *default* embodiment of transmitting images from the server to the client results in 'full screen refreshes' on the client," and that "[t]his means the compressed frame transmitted from the server to the client is for the full client screen, further confirming that a [person of ordinary skill in the art] would understand Wiltshire's images to be full screen images." Ex. 1033 ¶ 89. Between the two experts, we find Dr. Fuchs's testimony persuasive given that Wiltshire's images are clearly depicted and described as full screen images or single instances of a display. Wiltshire further

discloses that an image is sent from the server to the client and the client "causes the *image* to be displayed on a screen of the client/terminal computer." Ex. 1004, 7:12–18, 7:26–27 (emphasis added). This further supports Dr. Fuchs's testimony that Wiltshire teaches that the server transmits a full screen image.

Patent Owner's argument that Wiltshire's disclosure, discussed above, is not enough to teach full screen refreshes, is not unlike the argument that the Federal Circuit rejected on appeal—that Wiltshire's disclosure needs to provide more detail or that it be detailed enough to enable a person of ordinary skill in the art to practice Wiltshire with a specific game. *See Sony*, 2023 WL 6773879, at *4 (explaining that we erred when we required more detailed disclosure of Wiltshire) (citing *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021)). As the Federal Circuit explained in *Raytheon*, "a prior art reference asserted under § 103 does not necessarily have to enable its own disclosure, i.e., be 'self-enabling,' to be relevant to the obviousness inquiry." *Raytheon*, 993 F.3d at 1380. We find Wiltshire's disclosure, including that of full screen refreshes, teaches the claimed frame under Patent Owner's construction.

Petitioner additionally relies on Saha for teachings of MPEG, including the teaching of Intra-frames (or I-frames), which as discussed above, are entire frames. Pet. 27–30. Petitioner points out that "Saha explains that these MPEG standards describe an encoder to generate compressed 'frames' (also called 'pictures')," and specifically quotes Saha's disclosure of I-frames. Wiltshire's disclosure of using an MPEG stream and providing full screen refreshes, in combination with Saha's disclosure of MPEG, teaches transmitting a compressed frame.

On remand, Petitioner argues that "the Federal Circuit's ruling that Doom applies to Wiltshire's Figure 2 means that Wiltshire and Saha disclose a 'frame' even under PO's flawed claim construction." Pet. Remand Br. 6. According to Petitioner, "Doom generates 'frames' under [Patent Owner's] construction, and those 'frames,' when input into Saha's MPEG encoder, result in '[compressed] frames' just as [Patent Owner] conceded." *Id.* at 6–7 (citing Ex. 1025, 52:2–8, 53:22–25). Petitioner cites to Dr. Fuchs's testimony that Doom generates frames, including by providing example screen displays from Doom in his Reply declaration—each one a full instance of the display as opposed to just part of the display. *Id.* at 7 (citing Ex. 1033 ¶ 42).

We agree that Petitioner persuasively shows that Wiltshire's Figure 2 and the accompanying description as applied to Doom in combination with Saha teaches this claim limitation. The Federal Circuit determined that "Wiltshire explicitly discloses that Figure 2 is to be applied to games like Doom." *Sony*, 2023 WL 6773879, at *4. In his Reply declaration, Dr. Fuchs testifies in detail regarding how the application of Doom to Figure 2 of Wiltshire teaches the claim limitation. Ex. 1033 ¶¶ 42–59. As shown below, Dr. Fuchs reproduces a sequence of screenshots from a YouTube video example of gameplay from the game Doom. *Id.* ¶ 42.

Dr. Fuchs testifies that "[i]n Doom, the player's perspective changes dynamically based on what the user is doing in real time (using inputs from the user), as illustrated in the above screen shots, where the player is running up the stairs," and "the game running on the server generates the image based on the game state, compresses the image (using MPEG), and transmits the image to the [client]." *Id.* ¶ 43. Specifically, as to the claimed "frame," Dr. Fuchs testifies that "it would make no sense to a [person of ordinary skill in the art] to run games such as Doom on the server . . . and output something other than the image generated by the Doom application," but instead a person of ordinary skill in the art would have understood "the Doom application running on the server would output its full image at any given instance in time for transmission to the client for display." *Id.* ¶ 59 (citing Ex. 1004, 1:26–43). We credit Dr. Fuchs's testimony and find that it supports our determination that Wiltshire discloses transmitting a compressed "frame," under Patent Owner's construction of "frame."

Patent Owner argues that applying Doom to Figure 2 of Wiltshire to find that Wiltshire teaches the claimed "compressed frame," is a "new argument on remand . . . running afoul of Board rules, the APA, and Section 312(a)(3)." PO Remand Resp. Br. 3–5. We disagree. As discussed above, Dr. Fuchs testifies in detail about how Doom teaches the claim limitation, and Petitioner cited to specific portions of that testimony in its Reply (i.e., before the remand). *See, e.g.*, Pet. Reply 20 (citing Ex. 1033 ¶¶ 56–59); *see also* Pet. 20 (referencing Wiltshire's disclosure of games such as Doom).

To the extent Patent Owner argues that these contentions were not detailed in the Petition, Petitioner's Reply arguments were in response to Patent Owner's contentions, which in turn were based on a construction of the term "frame" that we did not agree with in our Institution Decision. We

therefore find Petitioner's arguments do not present a new theory of unpatentability and are indeed timely. Similarly, Petitioner's post-remand arguments seek to highlight these contentions in light of the Federal Circuit's reading of Wiltshire, which the Court found we improperly ignored. *See* Paper 43 at 1 (granting briefing as "to the impact of the Federal Circuit's decision on the parties' arguments made during the *inter partes* review"). Moreover, Patent Owner has had an opportunity to respond to these arguments. For example, Patent Owner had an opportunity, and did, respond to Petitioner's arguments in its Sur-reply as well as at oral argument, and more recently, its post-remand briefing. *See* PO Sur-reply 12–13; PO Remand Resp. Br. 1–5. We are therefore not persuaded that Petitioner's arguments are untimely or improper.

Turning now to the compressing aspect of this limitation, we are persuaded that Petitioner has shown that Wiltshire teaches compressing the updated image and transmitting the updated image as a compressed frame. Pet. 27–30. Stage 230 of Wiltshire's Figure 2 shows that an updated image is sent from server to the client device and Wiltshire teaches that to reduce bandwidth requirements, the server may compress the updated images in the form of "a compressed video MPEG stream." Ex. 1004, 7:13–18; 7:62–64. Saha details MPEG standards and describes how MPEG compression "encode[s] or compress[es] frames in the sequence." Ex. 1005, 2:19–35. Dr. Fuchs testifies that a person of ordinary skill in the art "would have understood that MPEG was well known and widely used to compress and decompress image or video data years before the '109 patent." Ex. 1002 ¶ 91. Dr. Fuchs further testifies that real-time image compression (including by using MPEG) was also well known at the time of the invention, as evidenced by the Levoy article. Ex. 1033 ¶ 53 (citing Ex. 1002 ¶ 27,

Ex. 1016, 21). We find this testimony credible given the disclosure of Saha and the Levoy article. *See, e.g.*, Ex. 1016, 21 (discussing "advances in realtime image compression and decompression hardware," and the ease of "compressing and transmitting an image stream to the client").

As discussed above, we determine that the combination of Wiltshire and Saha teaches the claimed "frame," when a frame is compressed using MPEG, that would result in a "compressed frame" within the meaning of the claims. Tr. 58:24–59:3; Pet. Remand Br. 6 (arguing that Doom generates "frames," and those frames when input into Saha's MPEG encoder result in compressed frames). Thus, the combination of Wiltshire with Saha teaches compressing the updated image.

Patent Owner argues "Wiltshire does not disclose on-the-fly creation and compression of an MPEG stream, but instead could have used a pre-existing MPEG stream." PO Remand Br. 5; *see also* PO Resp. 27–29. Patent Owner points us to Dr. Hart's testimony that "a [person of ordinary skill in the art] would have understood Wiltshire to disclose that the 'image [] generated by the game computer program' could include the contents of a preexisting compressed image file." PO Remand Br. 5 (citing Ex. 2009 ¶ 62). Patent Owner therefore argues that "Wiltshire does not disclose an 'MPEG stream' resulting from newly-generated images (in response to user input) that are compressed before being sent to the client." *Id.* Patent Owner also points us to our Final Written Decision finding that Wiltshire is silent as to the content of that compressed MPEG stream, and argues that that finding was not rejected by the Federal Circuit. *See id.* 5–8; *see also* PO Remand Resp. Br. 1–2.

We disagree. In our Final Written Decision, we "focus[ed] on embodiments in Wiltshire where images are pre-loaded." *Sony*, 2023 WL

6773879, at *4. The Federal Circuit concluded that was improper. As the Court explained, "the existence of those examples does not exclude other examples where new images are created," and "[a]lthough both parties agree[d] the game Doom requires creating new images, [we incorrectly] determined that listing Doom in the specification was not a sufficient disclosure." *Id.* Contrary to Patent Owner's assertion, the logical conclusion from the Federal Circuit's reasoning is that our finding that Wiltshire is silent as to the content of that compressed MPEG stream has now been rejected. We must "credit[] Wiltshire's disclosure of applying its system to video games like Doom, which require 'generating' new images." *Id.* Based on that reading of Wiltshire, Petitioner persuasively shows that the combination of Wiltshire and Saha teaches compressing those new images using MPEG and transmitting those as compressed frames. Dr. Fuchs testifies that a person of ordinary skill in the art would have understood from Wiltshire's disclosure that "if the image is displayed or updated, it is then sent to the client in the form of a 'video stream," and that "[t]ransmitting the updated images as a video stream allows Wiltshire's system to be used with the wide variety of games it contemplates, including arcade games (like Doom) that continually update images on the screen." Ex. 1033 ¶ 46; *see also id.* ¶ 49 ("The video stream must be dynamically generated because Wiltshire system must be capable of playing real-time interactive games like Doom."); Pet. Reply 13–16. We find Dr. Fuchs's testimony persuasive and consistent with the Court's guidance as to Wiltshire's disclosure.

Patent Owner also argues that an ordinarily skilled artisan would not have understood *how* to use MPEG for live, real-time interactive games disclosed in Wiltshire in view of Saha's MPEG disclosure. PO Resp. 30–31;

PO Remand Br. 6–7; PO Remand Resp. Br. 3. Dr. Fuchs's testimony discussed above, and the fact that both Wiltshire and the '109 patent refer to the MPEG standard without providing further detail as to the *how*, establish that compressing frames generated in Wiltshire using MPEG was within an ordinarily skilled artisan's knowledge.[10] *See, e.g.*, Ex. 1001, 8:26–28 ("When the drawing is complete the resulting image is compressed and transmitted to the client using a protocol such as MPEG4. . . . The use of an industry standard image compression protocol such as MPEG allows us to make use of facilities that are already present in most clients."); Ex. 1033 ¶ 53 (citing Ex. 1002 ¶ 27; Ex. 1016, 21); Pet. Reply 18; Pet. Remand Opp. Br. 4–5.

Patent Owner also asserts that "Petitioner never argued that Doom, or any other video game for that matter, required MPEG streams, much less MPEG streams that were compressed in realtime." PO Remand Br. 7–8; *see also* PO Remand Resp. Br. 2. First, the Petition's discussion of claim 1 begins by referencing Wiltshire's disclosure of various games, including Doom. *See* Pet. 20. As to the compressing limitation, the Petition states that MPEG would be used for its intended purpose of providing compression for various applications, including *video games*. *Id.* at 32.

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[10] Patent Owner and Dr. Hart seek to distinguish the barebones disclosure of MPEG in the '109 patent by arguing that "the '109 [patent] has a specific component . . . that compresses the image data, that's component number 66" and "[t]hat component is missing from the design . . . of Wiltshire." PO Remand Br. 7 (citing Ex. 1025 at 144:12–15; Ex. 2009 ¶ 82). But that specific component is simply a box in a flowchart that says "Compress the image data" (Ex. 1001, Fig. 2D), which we find is no different than Wiltshire's teaching to "us[e] data compression techniques." Ex. 1004, 7:62–64.

Next, in response to Patent Owner's arguments regarding Wiltshire's disclosure of transmitting a "compressed video MPEG stream," Petitioner's Reply specifically argues how Wiltshire's disclosure would apply to Doom. Pet. Reply 16 (citing Ex. 1033 ¶¶ 49–50). As discussed above, Dr. Fuchs's Reply declaration provides details about how a person of ordinary skill in the art would have understood Wiltshire's disclosure, as applied to Doom. *See* Ex. 1033 ¶ 49–50 (testifying that the "compressed video MPEG stream" disclosed in Wiltshire "must be dynamically generated because [the] Wiltshire system must be capable of playing real-time interactive games like Doom"). We therefore fail to see how Petitioner's arguments are new or improper.

Aside from the arguments discussed above, Patent Owner does not otherwise respond to Petitioner's remaining contentions as to the asserted combination's teaching of this limitation. *See generally* PO Resp. We find Petitioner's contentions persuasive and supported on the complete record before us, and, therefore, we adopt them as our own findings. Pet. Pet. 27–34; Reply 12–20; Pet Remand Br. 1–7. Accordingly, for the reasons explained by Petitioner, we find that the combination of Wiltshire and Saha teaches this limitation.

f) Reason to Combine and Reasonable Expectation of Success

Petitioner persuasively argues that "Wiltshire teaches that the system may use the MPEG standard for compressing the updated images that are sent to the client, and thus provides an express motivation to combine with Saha, which describes the predominant MPEG standards known at the time of Wiltshire, including additional details that MPEG includes decompressing compressed frames." Pet. 30–31 (citing Ex. 1004, 7:15–19; Ex. 1005, 2:21–35; 4:9–13). We agree with Petitioner that "Wiltshire's teaching that a

client displays frames that had been compressed by a server using MPEG would thus have motivated a [person of ordinary skill in the art] to incorporate Saha's teaching to decompress the compressed frames of an MPEG video stream sent by a server to display those images at the client." *Id.* at 31 (citing Ex. 1002 ¶ 94). Petitioner also persuasively argues that there would have been a reasonable expectation of success in applying Saha's MPEG related teachings to the teachings of Wiltshire because [t]he "combination thus uses MPEG in the intended manner that both Saha and Wiltshire instruct." *Id.* at 32 (citing Ex. 1004, 7:62–65; Ex. 1005, 2:10–13; 4:9–13 5:46–56).

Patent Owner does not respond to Petitioner's contentions as to the reason to combine Wiltshire with Saha or the reasonable expectation of success in combining those references. *See generally* PO Resp.; PO Sur-reply; PO Remand Br. On the complete record, we determine Petitioner persuasively shows why one of ordinary skill in the art would have combined the teachings of Wiltshire and Saha, with a reasonable expectation of success.

g) Objective Indicia of Nonobviousness

Patent Owner does not present evidence of objective indicia of nonobviousness. *See generally* PO Resp.

h) Conclusion as to Obviousness of Claim 1

"Once all relevant facts are found, the ultimate legal determination [of obviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan." *Arctic Cat Inc. v. Bombardier Recreational Products Inc.*, 876 F.3d 1350, 1361 (Fed. Cir. 2017). Considering the complete record before us, Petitioner has established, by a preponderance of the evidence, that the combination of

Wiltshire and Saha would have rendered the subject matter of claim 1 obvious to one of ordinary skill in the art at the time of the invention.

2. Independent Claim 8

Claim 8 recites "an image display system" and "a server having a processor and memory configured to execute an interactive software application," and also recites other limitations that are similar to those in claim 1. Ex. 1001, 10:27–45.

Petitioner asserts that Wiltshire teaches an image display system because it discloses that each client device is connected to a display device. Pet. 42 (citing Ex. 1004, 3:66–67, 7:25–27, Figs. 1A, 1D, 2; Ex. 1002 ¶ 127).

Petitioner contends that Wiltshire teaches the claimed server because it discloses a server/host computer that runs Wiltshire's game program. Pet. 43 (citing Ex. 1004, 4:49–65; Ex. 1002 ¶¶ 130, 131).

Claim 8 also recites "the client device is configured for decompressing of the compressed updated image and displaying the updated image on a display coupled to the client device." Ex. 1001, 10:42–45. Petitioner contends that the combination of Wiltshire and Saha discloses that the client device receiving and displaying the compressed MPEG stream is configured "for decompressing of the compressed updated image and displaying the updated image on a display coupled to the client device." Pet. 45 (citing *id.* § XI(A)(1)(e); Ex. 1002 ¶¶ 135–138).

For the remaining limitations of claim 8, Petitioner relies on its arguments directed to claim 1. Pet. 43–45 (citing Pet. §§ XI(A)(1)(a)–(d); Ex. 1002 ¶¶ 133–138). Petitioner therefore contends that claim 8 is unpatentable over Wiltshire in combination with Saha. *Id.* at 45 (citing Ex. 1002 ¶ 139).

Patent Owner's arguments for claim 8 are the same as those directed to claim 1. *See, e.g.*, PO Resp. 24–39 (arguing both claims together); PO Sur-reply 2, 12–15.

We agree with Petitioner that the combination of Wiltshire and Saha teaches each of the limitations of claim 8 that are slightly different from those in claim 1 for the reasons argued by Petitioner. For the reasons discussed above with regard to claim 1, and because Petitioner persuasively shows that the combination of Wiltshire and Saha discloses limitations of claim 8 that are slightly different than those of claim 1, we determine that Petitioner has established, by a preponderance of the evidence, that the combination of Wiltshire and Saha would have rendered the subject matter of claim 8 obvious to one of ordinary skill in the art at the time of the invention.

3. Dependent Claims 3–5, 7, 9, and 10

Petitioner argues that claim 3 would have been obvious in view of Wiltshire and Saha. Pet. 34–36. Claim 3 depends on claim 1 and additionally recites "wherein the server is configured for bidirectional communications with a plurality of client devices, the bidirectional communication including receiving at the server user input signals and transmitting the compressed updated image." Ex. 1001, 10:8–12. Petitioner persuasively shows that Wiltshire teaches this additional limitation because Wiltshire's system connects its server to a plurality of client devices, and data is transmitted from the server to the client device in one direction and from the client device to the server in the other direction. Pet. 34–36 (citing Ex. 1004, 3:62–66, 4:52–59, 7:13–15, 7:34–39, Figs. 1D, 2; Ex. 1002 ¶¶ 101–103). As Petitioner notes, at stage 230 of Wiltshire's method, an image is sent from the server to the client, and at stage 250, user input

commands detected at the client program are transmitted back to the server. *Id.* at 36 (citing Ex. 1004, 7:13–15, 7:34–39; Ex. 1002 ¶ 104). We therefore agree with Petitioner that claim 3 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 105).

Claim 4 depends on claim 1 and additionally recites "wherein the server is configured to receive user input data and transmit compressed updated images with a plurality of client devices." Ex. 1001, 10:13–15. Petitioner persuasively shows, based on its arguments directed at claim 3, that Wiltshire also teaches the additional limitation of claim 4. Pet. 37 (citing Pet. § XI(A)(2); Ex. 1004, 7:13–15; 7:34–39; Fig. 1D; Ex. 1002 ¶ 107). We therefore agree with Petitioner that claim 4 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 108).

Claim 5 depends on claim 1 and additionally recites "wherein at least two of the plurality of client devices include different device platforms." Ex. 1001, 10:16–18. Petitioner persuasively shows that Wiltshire teaches the additional limitation of claim 5 because it discloses various client devices such as Intel x86 or Pentium based computers, Mac PowerPC computers, and Sun SPARC computers, which a person of ordinary skill in the art would have understood as examples of different device platforms. Pet. 38 (citing Ex. 1004, 5:14–23; Ex. 1002 ¶ 111). Petitioner further contends, and we agree, that a person of ordinary skill in the art would have been motivated to use different device platforms with Wiltshire's server because it would allow more players using different client platforms to play the same game, and that there would have been a reasonable expectation of success that different device platforms would have operated successfully in Wiltshire. *Id.* at 38–39 (citing Ex. 1004, 4:43–48, 6:44–48, 8:24–33, Figs. 1C, 3; Ex. 1002 ¶¶ 113–115). We therefore agree with Petitioner that

claim 5 is unpatentable over Wiltshire in combination with Saha. *Id.* at 39 (citing Ex. 1002 ¶ 117).

Claim 7 depends on claim 1 and additionally recites "wherein the interactive software application is an interactive game that is configured to run at the server, which is in bidirectional communication with a plurality of client devices, and wherein said updating the state of the software application includes updating the game state of the interactive game." Ex. 1001, 10:21–26. Petitioner persuasively shows, based on its arguments directed at claims 1 and 3, that Wiltshire teaches the additional limitation of claim 7. Pet. 41 (citing Pet. §§ XI(A)(1)(b), XI(A)(1)(d), XI(A)(2); Ex. 1002 ¶¶ 122–125). We therefore agree with Petitioner that claim 7 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 126).

Claim 9 depends on claim 8 and additionally recites "wherein the user input signals are generated at the client device to update the state of the interactive software application from the state that initiated the current image displayed on the display coupled to the client device." Ex. 1001, 10:46–50. Petitioner persuasively shows, based on its arguments directed at claim 1, that Wiltshire teaches (1) user input signals are generated at the client device, (2) those user input signals update the state of the game at the server, (3) an updated image is generated at the server and transmitted to the client, and (4) the updated image is displayed on the client device. Pet. 45–46 (citing Pet. §§ XI(A)(1)(c)–(d); Ex. 1002 ¶ 141). Petitioner further contends, and we agree, that Wiltshire also provides examples showing how a user input signal generated at the client updates the current image displayed at the client display with a new state of the game. *Id.* at 46 (citing Ex. 1004, 7:7–8, 8:39–11:54, Fig. 2; Ex. 1002 ¶ 142). As Petitioner points

out, in the blackjack game example in Wiltshire, the initial image of a blackjack table on a client display is modified when the user presses the "double down button." *Id.* at 46–48 (citing Ex. 1004, 7:25–27, 8:39–41, 9:13–14, 9:63–65, Figs. 6A, 6B; Ex. 1002 ¶¶ 143–144). We therefore agree with Petitioner that claim 9 is unpatentable over Wiltshire in combination with Saha. *Id.* at 49 (citing Ex. 1002 ¶ 145).

Claim 10 depends on claim 8 and additionally recites "wherein the server is configured to exchange user input data and compressed updated images with a plurality of client devices." Ex. 1001, 10:51–53. Petitioner persuasively shows, based on its arguments directed at claims 1 and 3, that Wiltshire teaches the additional limitations of claim 10. Pet. 49–50 (citing Pet. §§ XI(A)(1)(c), XI(A)(1)(e), XI(A)(2); Ex. 1004, 7:65–8:2; Ex. 1002 ¶¶ 147–149). We therefore agree with Petitioner that claim 10 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 150).

Patent Owner does not raise any arguments directed specifically to claims 3–5, 7, 9, and 10. *See generally* PO Resp.; PO Sur-reply. Considering the complete record before us, we determine that Petitioner has established, by a preponderance of the evidence, the combination of Wiltshire and Saha would have rendered the subject matter of claims 3–5, 7, 9, and 10 obvious to one of ordinary skill in the art at the time of the invention for the reasons provided by Petitioner.

4. Dependent Claims 6, 11, and 12

a) Petitioner's Contentions

Petitioner argues that claim 6 would have been obvious in view of Wiltshire and Saha. Pet. 39–40. Claim 6 depends on claim 1 and additionally recites "wherein the client device is a mobile device."

Ex. 1001, 10:19–20. Petitioner contends that Wiltshire discloses this additional limitation because Wiltshire's clients can include "wireless communication pathways" to "allow[] a patron to participate in a mobile gaming environment." Pet. 40 (citing Ex. 1004, code (57), 13:20–25). According to Petitioner, a person of ordinary skill in the art would have understood that Wiltshire's client devices with wireless communication capabilities must be mobile devices in order to be used in the described "mobile gaming environment." *Id.* Petitioner contends that, based on Wiltshire's disclosure that a client computer "can also be any type of cost effective special purpose or general purpose computer such as an Intel® x86 or Pentium® based computer [or] a Mac® PowerPC computer," a person of ordinary skill in the art would have understood that such computers could be, for example, laptops, and that those laptops could be used in Wiltshire's "mobile gaming environment." *Id.* (citing Ex. 1007, 9; Ex. 1020, 7–12; Ex. 1002 ¶¶ 119–120). Petitioner therefore contends that claim 6 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 121).

Claim 11 depends on claim 8 and additionally recites "wherein the interactive software application is a game and wherein the client device is a mobile device." Ex. 1001, 10:54–56. Petitioner relies on its arguments directed at claim 1 to argue that Wiltshire teaches a game program that is an interactive software application. Pet. 50 (citing Pet. § XI(A)(1)(a)–(b); Ex. 1002 ¶ 152). Petitioner relies on its arguments directed at claim 6 to argue that Wiltshire teaches a mobile device. *Id.* at 51 (citing Pet. § XI(A)(5); Ex. 1002 ¶ 153). Petitioner therefore contends that claim 11 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 154).

Claim 12 depends on claim 10 and additionally recites "wherein the interactive software application is a game and wherein at least one of the plurality of client devices is a mobile device." Ex. 1001, 10:57–59. Petitioner relies on its arguments directed at claim 1 to argue that Wiltshire teaches a game program that is an interactive software application. Pet. 50 (citing Pet. §§ XI(A)(1)(a)–(b); Ex. 1002 ¶ 156). Petitioner relies on its arguments directed at claim 6 to argue that Wiltshire teaches a mobile device. *Id.* at 51 (citing Pet. § XI(A)(5); Ex. 1002 ¶ 157). Petitioner therefore contends that claim 12 is unpatentable over Wiltshire in combination with Saha. *Id.* (citing Ex. 1002 ¶ 158).

b) Patent Owner's Arguments

Patent Owner responds that "even if Petitioner were correct that Wiltshire disclose[s] a laptop, and it is not, a laptop is not a mobile device within the meaning of claims 6, 11, and 12." PO Resp. 39.

According to Patent Owner, Wiltshire discloses that "(stereo) head mounted displays with separate input controls such as a six degrees of freedom joystick/mouse can be used *in place of touch screen display devices*." *Id.* at 41 (citing Ex. 1004, code (57); 4:19–22). Patent Owner contends that "the touch screen display devices in Wiltshire [are] *not* the client devices. Rather, the display devices [are] connected to the client devices." *Id.* (citing Ex. 1004, 3:66–67, 4:4–7). Patent Owner annotates Figure 1D as shown below.

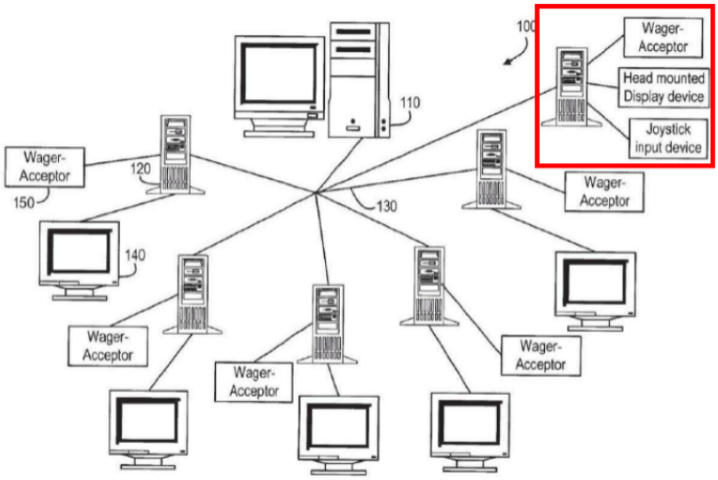


Fig. 1D

Patent Owner contends that the "mobile gaming" client, annotated in red, is the same client/terminal computer as the others, including with a Wager-Acceptor, but without the separate display 140 shown on the other client/terminal computers, and therefore, that Wiltshire does not provide a reason to use a "mobile" client as required by claims 6, 11, and 12. *Id.* at 42 (citing Ex. 2009 ¶¶ 90–91).

Patent Owner argues that Petitioner's reliance on Wiltshire's disclosure of "[a] cost effective special purpose or general purpose computer" as teaching a mobile device is also misplaced because Wiltshire does not mention or suggest use of a laptop computer, which, according to Patent Owner, is not surprising given the nature of the clients in Wiltshire's commercial gambling system. *Id.* at 42–43 (citing Ex. 1004, Fig. 1D). Lastly, Patent Owner argues, based on its proposed claim construction, that even if Wiltshire suggests use of a laptop, a laptop is a portable device, not a mobile device, as claimed. *Id.* at 29 (citing Ex. 1007, 10; Ex. 2009 ¶ 56.).

c) Petitioner's Reply

Petitioner responds that Wiltshire's Figure 1D shows that the communication pathways are lines labeled 130 connecting each client to the

server—*not* lines connecting the head mounted display and joystick to the client. Pet. Reply 20. Petitioner contends that "Wiltshire defines 'communication pathway' 130 as the 'pathways suitable for connecting *server/host* computer 100 to the *client/terminal* computers 120,'" and further discloses that "communication pathway[s] between clients and [the] server can include 'RF links,' which are wireless connections." *Id.* at 20–21 (citing Ex. 1004, 3:67–4:3, 5:38–51; Ex. 1025, 155:4–18). Thus, Petitioner contends, Wiltshire's "wireless communication pathways" that allow "a mobile gaming environment" are wireless connections between the clients and the servers. *Id.* at 21 (citing Ex. 1004, code (57); Ex. 1033 ¶ 61).

Petitioner also argues that to the extent clients in Wiltshire require Wager-Acceptors, those can include a "smart-card reader" or "credit card reader," which could be used with laptops without preventing mobility since they do not hold cash or coins. *Id.* (citing Ex. 1004, 4:33; Ex. 1033 ¶ 62). According to Petitioner, Wiltshire discloses that the clients can run "Windows CE," which is an operating system suitable for use in handheld devices. *Id.* (citing Ex. 1004, 6:55–59; Ex. 1033 ¶ 63).

d) Patent Owner's Sur-reply

Patent Owner responds that Wiltshire's mention of "wireless communication pathways" in its Abstract and claim 11 "is not referring to the same communication pathways 130 shown in Wiltshire's Figure 1D." PO Sur-reply 17–18 (citing Ex. 1004, code (57), 13:20–24). And even if it were, Patent Owner argues, Wiltshire still does not disclose any "mobile device." *Id.* at 18. Patent Owner also disputes Petitioner's contention that Wager-Acceptors could be smart-card or credit card readers used with laptops, because Patent Owner contends Wiltshire does not disclose laptops. *Id.* As to Petitioner's reliance on Wiltshire's reference to Windows CE,

which is suitable for handheld devices, Patent Owner contends that even if that were true, "Windows CE cannot substitute for Wiltshire's failure to disclose the claimed mobile device." *Id.*

e) Our Analysis

Based on the complete record, we agree that Petitioner has shown that Wiltshire discloses a mobile device as a client device. Wiltshire discloses that its "invention allows a patron to participate in a *mobile* gaming environment." Ex. 1004, code (57) (emphasis added). Wiltshire's client/terminal computers are "cost effective special purpose or general purpose computer[s] such as an Intel® x86 or Pentium® based computer, a Mac® PowerPC computer, a Sun® SPARC®," or "WinTerm™ 3315SE terminals." *Id.* at 5:14–30. Dr. Fuchs persuasively testifies that a person of ordinary skill in the art "was well aware and understood that such computers could be, for example, laptops, and that those laptops could be used in a 'mobile gaming environment' as Wiltshire describes," and thus, would have understood that "Wiltshire discloses that the client device is a 'mobile device.'" Ex. 1002 ¶ 120 (citing Ex. 1007, 9; Ex. 1020, 7–12). Dr. Fuchs further testifies that Wiltshire discloses that its clients can run Windows CE, which a person of ordinary skill in the art would have understood as "a scaled down version of the Windows operating system designed for devices with less memory, storage, and slower processing speed, such as smaller handheld devices," and thus would have understood that Wiltshire contemplates using such devices for its mobile gaming platform. Ex. 1033 ¶ 63 (citing Ex. 1004, 6:55–60; Ex. 1026, 6; Ex. 1037).

First, we agree with Petitioner that in light of the Federal Circuit's decision, Wiltshire is not limited to casino games, and that applying the system of Wiltshire to a game like Doom means that a person of ordinary

skill in the art would have envisioned using a laptop in Wiltshire's system. *Sony*, 2023 WL 6773879, at *5. As discussed above, we determine that the claimed "mobile device" does include computers such as laptops (*supra* § II.C.1). We also are persuaded, in light of Dr. Fuchs's testimony, that Wiltshire's disclosed client devices include laptops, and that Wiltshire teaches a "mobile device." *See* Ex. 1002 ¶ 120; Ex. 1033 ¶ 62.

Second, we find Dr. Fuchs's uncontroverted testimony persuasive that in light of Wiltshire's disclosure of Windows CE devices as client devices, Wiltshire teaches a "mobile device." Patent Owner argues "Windows CE cannot substitute for Wiltshire's failure to disclose the claimed mobile device." PO Sur-reply 18. But Dr. Fuchs's testimony (Ex. 1033 ¶ 63) relies on evidence showing that Windows CE devices include smartphones and handheld devices similar to those listed in the '109 patent specification, which meet even Patent Owner's proposed construction of a "mobile device" (i.e., handheld computing device). *See, e.g.*, Ex. 1037, 1–2 (listing smartphones and tablets as Windows CE devices).

Patent Owner further argues that the mention of "wireless communication pathways" in Wiltshire relates to the use of "a stereo head-mounted display together with a joystick input device," and not to the pathways between the server and clients. PO Resp. 40–41 (citing Ex. 1004, code (57); Ex. 2009 ¶ 90); PO Sur-reply 17–18. Even if we agree with Patent Owner that Wiltshire does not expressly disclose wireless communication pathways between its server and clients, considering Wiltshire's disclosure in its entirety, including the various examples disclosed for its client devices, along with Dr. Fuchs's testimony, and in light of the guidance provided by the Federal Circuit, we are persuaded that Wiltshire teaches a mobile gaming system which supports laptops and

handheld computing devices as client devices, even under Patent Owner's proposed construction of a "mobile device." Patent Owner's remaining arguments (such as its argument that laptops cannot be used with betting devices) are based on a narrow reading of Wiltshire as limited to casino games, and that reading has been rejected by the Federal Circuit.

Accordingly, on the complete record, we are persuaded that Petitioner has shown that Wiltshire teaches a client device that is a "mobile device." We are also persuaded that, for claims 11 and 12, Petitioner has shown that Wiltshire teaches a game program that is an interactive software application. *See* Pet. 50. We are therefore persuaded that Petitioner has shown that the combination of Wiltshire and Saha renders claims 6, 11, and 12 obvious.

5. Determination as to Petitioner's Ground 1

Petitioner has established by a preponderance of the evidence that the combination of Wiltshire and Saha would have rendered the subject matter of claims 1 and 3–12 obvious to one of ordinary skill in the art at the time of the invention.

F. Obviousness of Claims 6, 11, and 12 over Wiltshire, Saha, and PC Magazine

1. Petitioner's Contentions

Petitioner contends that claims 6, 11, and 12 would have been obvious in view of the combination of PC Magazine with Wiltshire and Saha. Pet. 66–73. Petitioner contends that PC Magazine describes the Apple iBook as a "portable" laptop computer for mobile use, and it includes "wireless technology" that allows users to "roam up to 150 feet" from a base station. *Id.* at 67 (citing Ex. 1007, 9). Petitioner further contends that given the iBook's six-hour battery life, a person of ordinary skill in the art would

have understood that the iBook is a mobile device capable of operating when not connected to a power outlet. *Id.*

Petitioner contends that a person of ordinary skill in the art would have been motivated to use laptops, such as the iBook disclosed in PC Magazine, as the client computers in Wiltshire because the iBook uses a G3 processor, which is a "PowerPC processor," and falls within Wiltshire's teaching of "client/terminal computers." *Id.* at 68 (citing Ex. 1004, 5:14–17; Ex. 1007, 9; Ex. 1021, 3:23–25; Ex. 1019, Abstract; Ex. 1002 ¶¶ 217–218). Petitioner asserts that the iBook is equipped with wireless communication technology and sufficient hardware to play interactive games in Wiltshire's system, which would have further motivated an ordinarily skilled artisan to use the iBook as the client device to support "mobile gaming" in Wiltshire. *Id.* at 68–69 (citing Ex. 1004, code (57), 13:20–25; Ex. 1007, 9; Ex. 1002 ¶ 219).

Petitioner contends that using a mobile device for a client device would have been just one of a finite number of known options contemplated by a person of ordinary skill in the art for use in Wiltshire, i.e., either the client devices can be non-mobile or the client devices can be mobile. *Id.* at 69. Petitioner asserts that because mobile devices were well known at the time of the '109 patent invention, using mobile devices would have been a predictable and identified option that was obvious to try. *Id.* (citing Ex. 1007, 9; Ex. 1002 ¶ 220). Petitioner argues that its proposed substitution of a laptop would have been a simple one of one known element for another to obtain predictable results. *Id.* (citing Ex. 1002 ¶ 221).

Petitioner contends that a person of ordinary skill in the art would have had a reasonable expectation of success in using the laptops described in PC Magazine as the client computers in Wiltshire's computing system.

Id. According to Petitioner, a person of ordinary skill in the art would have understood that the iBook's "300-MHz G3 processor" would have been more than sufficient to decode MPEG-1 and MPEG-2 encoded video streams, and that iBook's wireless speeds fall within Wiltshire's stated bandwidth requirement. *Id.* at 70 (citing Ex. 1004, code (57), 5:14–17; Ex. 1007, 9; Ex. 1002 ¶¶ 50, 222–224). Petitioner also asserts that Wiltshire, Saha, and PC Magazine are analogous art to the '109 patent and are thus properly used for the obviousness combination. *Id.* at 70–71 (citing Ex. 1001, code (57), 1:29–33, 3:34–37; Ex. 1007, 9; Ex. 1002 ¶ 226).

Petitioner relies on the same arguments for the "mobile device" limitation of claims 11 and 12. *Id.* at 71–73.

2. Patent Owner's Arguments

Patent Owner presents two arguments as to this ground: (1) the iBook disclosed in PC Magazine is not a "mobile device," as claimed, and (2) a person of ordinary skill in the art would not have been motivated to use laptops, such as the iBook disclosed in PC Magazine, as the client computers in Wiltshire. PO Resp. 45–52.

Patent Owner argues that the iBook disclosed in PC Magazine is a "portable" computer, not the claimed "mobile device," which according to Patent Owner is a handheld computing device. *Id.* at 45 (citing Ex. 1007, 10; Ex. 2009 ¶ 56).

Patent Owner also contends that Petitioner ignores that Wiltshire's system is a commercial gambling system in which the client computers are equipped to facilitate that purpose, and that Petitioner has not explained how an iBook, even if it could be client computer 120 in Wiltshire's system, would function with a Wager-Acceptor (i.e., a commercial betting device) attached, much less be mobile. *Id.* at 46–47 (citing Ex. 1004, code (57),

2:45–51, 4:30–33; Ex. 2009 ¶¶ 111–112). Moreover, Patent Owner contends, a person of skill in the art would not have thought a mobile coin or bill collector, or even a mobile device containing credit card information, was a good idea because mobility makes theft much easier. *Id.* at 47–48 (citing Ex. 2006, 1:14–30; Ex. 2009 ¶ 112). Patent Owner further contends that because Wiltshire does not teach the use of mobile devices in its system, Wiltshire does not provide a reason to use a laptop computer as a client. *Id.* at 33–34 (citing PO Resp. § V.C.2; Ex. 1004, code (57), Fig. 1D; Ex. 2009 ¶¶ 108–109).

In response to Petitioner's "obvious to try" argument, Patent Owner argues that the options for Wiltshire's clients are not so limited because Petitioner ignores that portable devices were also available as an option. *Id.* at 49. Patent Owner also argues that the fact that mobile devices were known is not, by itself, a reason to use them in Wiltshire's system. *Id.* (citing *L.A. Biomed. Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049, 1064 (Fed. Cir. 2017)). Patent Owner asserts that "Petitioner does not even suggest, for example, that a person of skill in the art would have had a reason to use a mobile phone or PDA in Wiltshire's commercial gambling system." *Id.*

Patent Owner argues that even present-day commercial gambling establishments still use large, bulky gaming stations, and "Petitioner cannot point to any apparent reason to use a laptop as a gambling station when every incentive is to make gambling stations, like ATM machines, hard to raid or steal." *Id.* at 51 (citing Ex. 2006, 1:14–30; Ex. 2010, 58:2–60:9, 59:6–19; Ex. 2009 ¶¶ 111–112). According to Patent Owner, Wiltshire itself acknowledges that its invention was designed to substantially increase the tamper resistance of individual gaming stations, and Petitioner cannot show

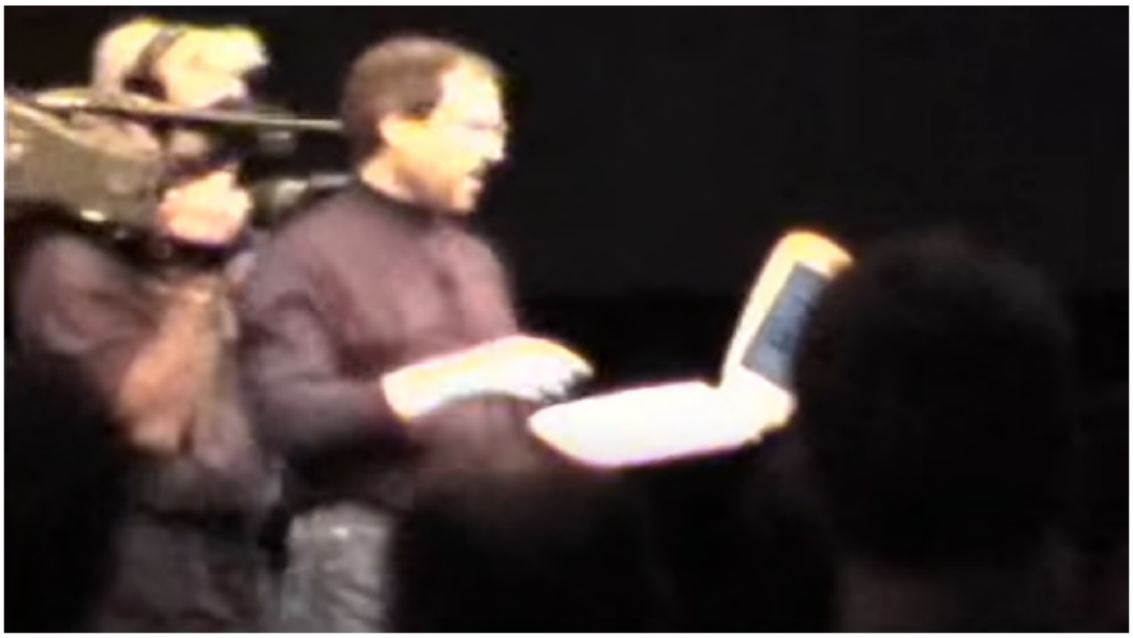
that use of laptops could possibly benefit Wiltshire's commercial gambling system. *Id.* (citing Ex. 1004, 2:22–25).

Patent Owner contends that the results of Petitioner's proposed combination would not have been predictable given the constraints on Wiltshire's commercial gambling system and that a person of ordinary skill in the art would not have had a reasonable expectation of success in using the laptops in Wiltshire's system where mobility is a detriment. *Id.* at 51–52 (citing Ex. 2006, 1:24–30).

3. Petitioner's Reply

Petitioner responds that under the correct meaning of the term, which includes laptops, the Apple iBook laptop, with its wireless capability, is a "mobile device." Pet. Reply 22 (citing Ex. 1033 ¶ 66). Petitioner contends that the iBook is not just portable, but uses "wireless technology" to allow it to be used in a mobile fashion. *Id.* (citing Ex. 1033 ¶ 67).

In support of its argument, Petitioner asserts that "[w]hen the Apple iBook was first unveiled during MacWorld in 1999, Steve Jobs demonstrated its mobile and wireless capability by browsing multiple websites while holding the iBook in his left hand." *Id.* (citing Ex. 1007, 9; https://youtu.be/3iTNWZF2m3o?t=876; https://youtu.be/HFngngjy4fk?t=57). Petitioner reproduces a screen capture from one of the cited videos:



On motivation to combine, Petitioner contends that Wiltshire is not limited to a casino environment in which mobile devices would not be used because Wiltshire broadly defines "game" and "gaming," to which its disclosure applies and expressly contemplates "non-casino games," including video games such as "Doom" and "Myst," neither of which are casino games. *Id.* at 24–25 (citing Ex. 1004, 1:26–43, 12:11; Ex. 1025, 36:1–25). Petitioner also asserts that Wiltshire discloses input commands "such as mouse movements, mouse clicks or keystrokes," which a person of ordinary skill in the art would have understood as applying to non-casino gaming like playing Doom or Myst. *Id.* at 25 (citing Ex. 1004, 5:59–65; Ex. 1033 ¶ 74). Petitioner contends that PC Magazine discloses the iBook and other laptops being advertised to both businesses and consumers, and Dr. Hart admitted to using laptops extensively before 2001. *Id.* (citing Ex. 1025, 169:8–170:25; Ex. 1002 ¶ 220; Ex. 1033 ¶ 75).

4. Patent Owner's Sur-reply

In its Sur-reply, Patent Owner argues that PC Magazine's Apple iBook laptop is not a "mobile device" under the proper construction of the term (handheld computing device), and the mere availability of wireless capability in a device does not make a device mobile. PO Sur-reply 19. According to Patent Owner, PC Magazine refers to the iBook as a portable device and mobile devices are a subcategory of portable devices. *Id.* As to screenshots from the 2009 YouTube video featuring Steve Jobs holding the iBook in his left hand, Patent Owner points out that a desktop computer or a VHS player can similarly rest on one's hand, but no one would consider either a "mobile device," and doing so would eviscerate the claim requirement that the client device be a "mobile device." *Id.* at 19–20.

Patent Owner also reiterates that a person of ordinary skill in the art would not have been motivated to use the iBook in Wiltshire's commercial gambling system. *Id.* at 20. Patent Owner contends Petitioner's argument that laptops with connected card readers would not present any security risk ignores that even present-day commercial gambling establishments still use large, bulky gaming stations and Wiltshire's teaching that its invention was designed to "substantially increase[] the tamper resistance of individual gaming stations." *Id.* (citing Ex. 1004, 2:22–25; Ex. 2010, 58:2–60:9). Patent Owner further contends that Wiltshire's disclosure is focused on gambling and in particular commercial gambling operations provided by a "house" or a "casino," which is why Wiltshire's Figure 1D shows "Wager-Acceptor" devices on each client computer. *Id.* at 21 (citing Ex. 1004, 12:10–13; Ex. 1025, 38:6–40:14, 33:23–35:16; Ex. 2009 ¶ 111). Patent Owner also argues that the prevalence of laptop products at the time of the invention only shows that a person of ordinary skill in the art could

have made, not would have been motivated to make, the combinations or modifications of prior art to arrive at the claimed invention. *Id.* at 22.

5. Our Analysis

a) Reasons to Combine

"Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (citations omitted). "[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan 'would have had a reasonable expectation of success from doing so.'" *Arctic Cat*, 876 F.3d at 1360–61 (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

Based on our review of the complete record, we determine that Petitioner provides persuasive reasons why one of ordinary skill in the art would have had reason to combine the iBook disclosed in PC Magazine in Wiltshire's system, with a reasonable expectation of success.[11] Pet. 68–71. We are specifically persuaded by Petitioner's argument that using a laptop for a client device would have been just one of a finite number of known options contemplated by an ordinarily skilled artisan for use in Wiltshire's system and would have been a predictable and identified option that was obvious to try. Pet. 69 (citing Ex. 1002 ¶ 220). Dr. Fuchs testifies in support of Petitioner's rationale to combine that "[a]s can be seen in commercial magazines such as PC Magazine, the personal computer

[11] As discussed above, we are persuaded that Wiltshire alone teaches the claimed "mobile device." *See supra* § III.E.4. Even if Wiltshire does not teach a "mobile device," we are persuaded that Petitioner's combination of Wiltshire with PC Magazine does so.

industry had already begun shifting towards offering viable mobile laptop products to the general public" and "many businesses competed to offer their own laptop models to potential customers." Ex. 1002 ¶ 220 (citing Ex. 1007). We are persuaded by this testimony. *See also* Ex. 1025, 169:8–170:25 (Dr. Hart discussing his extensive use of his laptop in 2000).

We agree with Petitioner that a laptop described in PC Magazine would have been a simple substitution of one known element for another to obtain predictable results. Pet. 69. Wiltshire describes using "any type of cost-effective special purpose or general purpose computer such as an Intel® x86 or Pentium® based computer, a Mac® PowerPC computer, a Sun® SPARC®, etc." Ex. 1004, 5:14–17. Dr. Fuchs testifies that the Apple iBook described in PC Magazine uses a 300-MHz PowerPC "G3 processor," and that a person of ordinary skill in the art would have understood the Apple iBook, which was noteworthy when it was released in 1999, as a suitable client device in Wiltshire's system. Ex. 1002 ¶ 218 (citing Ex. 1007, 9; Ex. 1019, Abstract; Ex. 1021, 3:23–25). *See KSR*, 550 U.S. at 420 ("[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed").

We are persuaded by Petitioner's argument and Dr. Fuchs's testimony that a person of ordinary skill in the art would have understood that "Wiltshire's disclosure that 'any' general purpose computer can be used for the client includes the Apple iBook," as disclosed in the PC Magazine. Pet. 68 (citing Ex. 1002 ¶ 218). In light of the Federal Circuit's decision, we determine that Wiltshire is not limited to a casino environment but instead broadly defines "game" and "gaming," expressly contemplating "non-casino games" such as Doom and Myst. *See Sony*, 2023 WL 6773879, at *2–4

(explaining that we erred when we improperly "narrowed the disclosure of Wiltshire to exclude Doom and only focused on the more detailed examples"); Ex. 1004, 1:26–43, 12:11; *see also* Pet. Remand Br. 7–8 (arguing that the Federal Circuit's finding that Wiltshire is not limited to casino games confirms that a person of ordinary skill in the art would have been motivated to combine Wiltshire with PC Magazine's iBook). Wiltshire discloses input commands "such as mouse movements, mouse clicks or keystrokes." Ex. 1004, 5:59–65. Relying on Dr. Fuchs's testimony, Petitioner persuasively argues that a person of ordinary skill in the art would have understood this disclosure as applying to non-casino gaming like playing Doom or Myst. Pet. Reply 25; Ex. 1033 ¶ 74. Dr. Fuchs testifies that a person of ordinary skill in the art would have understood based on all the non-casino teachings set forth in Wiltshire that its system applies to these other contexts, including using a *laptop as the client device in a user's home* or other building while the game is running on a remote server. Ex. 1033 ¶ 74. In view of the Federal Circuit's decision that Wiltshire is not limited to a casino environment, we credit Dr. Fuchs's testimony and determine that a person of ordinary skill in the art would have had reason to combine the iBook taught by PC magazine with Wiltshire's system, to be able to use a laptop as the client device in a user's home to play a game such as Doom.

For the same reason, we reject Patent Owner's arguments that there would have been no motivation to use a laptop as a client device because Wiltshire's preferred embodiments are directed to commercial casino establishments, which use "large, bulky gaming stations." PO Resp. 46–52. Patent Owner argues that even present-day commercial gambling establishments still use large, bulky gaming stations, and there would have been no reason to use a laptop as a gambling station, which need to be

difficult to raid or steal. *Id.* at 50–51. The size of gambling stations is not as important because we do not read Wiltshire as limited to gambling or casino environments. Wiltshire's disclosure contemplates playing games such as Doom away from the casino, without concerns of theft.

Patent Owner's argument as to the lack of reasonable expectation of success in using the laptops described in PC Magazine as the "client/terminal computers" in Wiltshire's systems is also not persuasive. Dr. Fuchs testifies in support of Petitioner's rationale to combine that "the personal computer industry had already begun shifting towards offering viable mobile laptop products to the general public" and the iBook was targeted at students and consumers. Ex. 1002 ¶ 220 (citing Ex. 1007, 9); *see also* Ex. 1033 ¶ 75. He further testifies that the iBook's "300-MHz G3 processor" would have been more than sufficient to decode MPEG-1 and MPEG-2 encoded video streams, and a person of ordinary skill in the art would have fully expected the iBook to be able to decode MPEG streams as taught by Wiltshire combined with Saha. Ex. 1002 ¶ 223 (citing Ex. 1007, 9; Ex. 1019, 324). He also testifies that the iBook's network connectivity would have met Wiltshire's stated bandwidth requirements. *Id.* ¶ 224. We credit this testimony because it is consistent with PC Magazine's disclosure.

Patent Owner's remaining arguments and Dr. Hart's testimony are premised on reading Wiltshire as limited to a casino environment (which has already been rejected by the Federal Circuit), and therefore, do not undermine Petitioner's showing of a reason to combine. *See, e.g.*, PO Resp. 47 (arguing that Petitioner fails to explain how an iBook, even if it could be client/terminal computer 120, would function with a Wager-Acceptor attached); PO Remand Resp. Br. 5 ("That Wiltshire's casino gaming system can play non-casino games is no reason to replace the casino-standard

"immobile" "large, bulky gaming stations" with PC Magazine's "iBook" laptop which would be inappropriate in a casino environment.").

On the complete record, we determine Petitioner persuasively shows that one of ordinary skill in the art would have had reason to combine the teachings of Wiltshire with PC Magazine in the manner claimed, with a reasonable expectation of success, as asserted by Petitioner.

b) Mobile Device

As discussed above (*supra* § III.C.2), we are not persuaded to construe the claimed "mobile device" as "handheld computing device," excluding portable devices such as laptops, in the manner argued by Patent Owner. We therefore determine that PC Magazine's disclosure of an Apple iBook is sufficient to teach the claimed "mobile device." Ex. 1007, 9. Dr. Fuchs testifies that a person of ordinary skill in the art "would have understood that the Apple iBook laptop was both portable *and* mobile" because "the iBook design included features to allow it to be used in a mobile fashion, including its 'wireless technology' and small form factor." Ex. 1033 ¶ 67; Pet. Reply 22. We find Dr. Fuchs's testimony persuasive because it is consistent with the disclosure of PC Magazine, which explains that "iBook users can roam up to 150 feet" from a base station. Ex. 1007, 9.

In our view, screenshots from the YouTube video clips reproduced by Petitioner further indicate that the iBook is a mobile device. For example, the screenshot reproduced above from an iBook launch video shows Mr. Jobs browsing the web while holding the iBook with one hand. Pet. Reply 23; Ex. 1033 ¶ 69. The iBook demonstration shows the wireless capabilities of the iBook as well as the ability to use the device in a mobile fashion, and further supports that the iBook is a *mobile* device. Patent Owner's arguments that PC Magazine does not teach a "mobile device" are

based on its claim construction position, which we reject. PO Resp. 45; PO Sur-reply 19–20.

As to claims 11 and 12, Petitioner has persuasively shown that Wiltshire teaches a game program that is an interactive software application. *See* Pet. 71–72.

Accordingly, we find that Petitioner persuasively shows that the combination of Wiltshire, Saha, and PC Magazine would have rendered the subject matter of claims 6, 11, and 12 of the ’109 patent obvious to one of ordinary skill in the art at the time of the invention.

G. Obviousness of Claim 2 over Wiltshire, Saha, and Chen

1. Petitioner’s Contentions

Petitioner argues that claim 2 would have been obvious in view of Wiltshire, Saha and Chen. Pet. 39–40. Claim 2 depends on claim 1 and additionally recites “wherein a first bandwidth for transmitting the user input data between the client device and the server and a second bandwidth for transmitting the compressed updated image from the server to the client device are asymmetric.” Ex. 1001, 10:3–7. Petitioner contends that Chen discloses the additional limitation of claim 2, and that the combination of Chen with Wiltshire and Saha renders this claim obvious. Pet. 59 (citing Ex. 1002 ¶ 193). Petitioner asserts that Chen describes the ADSL standard, which discloses a first bandwidth of 16–64 kb/s for upstream transmissions and second bandwidth of 1.544 Mb/s for downstream transmissions. *Id.* at 59–60 (citing Ex. 1006, 69; Ex. 1001, 6:14–16; Ex. 1002 ¶ 195).

Petitioner further contends that a person of ordinary skill in the art would have been motivated to apply Chen’s teaching of two asymmetric bandwidths to the combination of Wiltshire and Saha because Wiltshire

describes using the Internet as a communication pathway between its server and clients, and Chen teaches that ADSL is an "ideal vehicle for Internet access" and other "telecommuting applications." *Id.* at 61 (citing Ex. 1004, 5:30–32; Ex. 1006, 69). Petitioner further contends that Chen describes ADSL as "well suited to the concept of video-on-demand service" and Wiltshire's system provides a form of "video-on-demand." *Id.* at 61–63 (citing Ex. 1006, 69; Ex. 1002 ¶ 198). Petitioner also contends that using ADSL would have been just one of a finite number of known options for providing Internet connectivity described in Wiltshire because at that time, broadband Internet access was typically provided by either ADSL or cable networks. *Id.* at 63 (citing Ex. 1006, 69; Ex. 1007, 76; Ex. 1002 ¶ 201). According to Petitioner, a person of ordinary skill in the art would have had a reasonable expectation of success in the combination because Wiltshire describes using a communication pathway such as the Internet, Wiltshire discloses a video-on-demand system that uses MPEG for transmitting video streams, and the proposed combination would have used ADSL, which supports MPEG, in the intended manner. *Id.* at 63–64 (citing Ex. 1002 ¶¶ 202–204).

2. Patent Owner's Arguments

Patent Owner responds that "Petitioner's proposed use of Chen's ADSL *for home installation* relies on hindsight and ignores Wiltshire's description of its system as a gambling system *for commercial establishments* that is not disclosed or suggested to be installed in homes." PO Resp. 53 (emphases added).

Patent Owner argues that "Chen only disclose[s] using ADSL in the residential context and describe[s] a proposal for ADSL 'having the traditional duplex [plain old telephone service] channels, occupying the

frequency band between 300 Hz to 4 kHz, an upstream control channel of 16–64 kb/s, occupying the frequency band between 10 kHz to 50 kHz, and a downstream channel of 1.544 Mb/s, occupying the frequency band between 100 and 500 kHz.'" *Id.* at 53–54 (citing Ex. 1006, 69). According to Patent Owner, "Chen justified the use of ADSL for residential applications: 'Researchers realized that for residential applications, a POTS service, where the traditional telephone service can be provided whether the ADSL is on or off, was more practical than ISDN service.'" *Id.* at 54 (citing Ex. 1006, 69). Patent Owner argues that Chen includes a "simulation study of the effect of the in-house wiring," and teaches only "the use of ADSL in residential homes." *Id.* (citing Ex. 1006, 71–72).

Patent Owner contends that a person of ordinary skill in the art would have understood Wiltshire's system was designed for a commercial gambling establishment, not in residential homes. *Id.* at 56–57 (citing Ex. 1004, code (57), 1:16–18, 2:22–25, 2:45–65; Ex. 2009 ¶ 111). Patent Owner argues that Petitioner fails to address why a person of ordinary skill in the art would want to use a technology meant to optimize bandwidth on residential telephone systems in a commercial establishment. *Id.* at 58 (citing Ex. 2009 ¶¶ 95–100).

Patent Owner argues Wiltshire's disclosure that the communication pathway between server and clients may be the Internet does not in any way suggest that the clients are located in residences. *Id.* at 58–59 (citing Ex. 2009 ¶ 96). Patent Owner further argues that Wiltshire's system is not a video-on-demand system and Petitioner's reliance on Chen's suitability for video-on-demand to combine it with Wiltshire is misplaced. *Id.* at 59–60 (citing Ex. 1004, 12:10–13; Ex. 1002 ¶ 198; Ex. 2009 ¶ 97). Patent Owner contends that "[e]ven if Chen's ADSL were well-suited to video on demand

in residences, that does not suggest that a person of skill in the art would have thought it was a good solution for a video-on-demand system in a commercial establishment." *Id.*

Patent Owner further argues that "with a bandwidth requirement of 1.3 Mb/s for an MPEG video stream, Chen disclose[s] that ADSL's downstream bandwidth can provide only *one* MPEG video stream on a single pair of copper wires." *Id.* at 61 (citing Ex. 2009 ¶¶ 103–104). According to Patent Owner, Petitioner's motivation assumes that a commercial gambling operation, like that in Wiltshire, could operate successfully even though it would only be receiving a single video stream, whereas a commercial gaming operation would likely have tens of gaming stations in a *single* location and a remote server. *Id.* at 61–62. Citing to Dr. Fuchs's testimony, Patent Owner argues that even if Wiltshire's "bandwidth requirement can be further reduced using data compression techniques to about 100 KB/sec, that is still a bandwidth requirement of 0.8 Mb/s, meaning ADSL's downstream bandwidth disclosed in Chen can provide still *just one video stream*." *Id.* at 62 (citing Ex. 1004, 7:62–64; Ex. 2010, 15:2–4, 19:20–20:1, 74:11–21, 75:21–76:7; Ex. 1002 ¶ 224).

Patent Owner also disagrees that ADSL was just one of a finite number of known options for providing Internet connectivity described in Wiltshire given the existence of other services such as DSL lines and SOHO networks. *Id.* at 62 (citing Ex. 1007, 76 (discussing home and Small Office Home Office ("SOHO") networks)). Patent Owner thus contends that Petitioner has failed to prove, by a preponderance of the evidence, its assertion that the combination of Chen with Wiltshire and Saha would have rendered claim 2 obvious. *Id.* at 63 (citing Ex. 2009 ¶¶ 100–105).

3. Petitioner's Reply

Petitioner responds that Wiltshire is not limited to commercial casino establishments and nor is Chen limited to residential applications. Pet. Reply 26. Petitioner reiterates that Wiltshire "teaches use of its system in a variety of gaming contexts, including playing games like Doom at home." *Id.* Conversely, Petitioner contends, "Chen discloses more than just ADSL in residential contexts, but also for business applications like accessing database records and tele-education." *Id.* (citing Ex. 1006, 69). Petitioner further contends that "it was well known that ADSL could be used for the 'last mile' to both 'businesses and residences.'" *Id.* (citing Ex. 1029, Abstract; Ex. 1030, Abstract; Ex. 1033 ¶¶ 77–78). Petitioner argues that it is immaterial whether ADSL could support more than one concurrent MPEG video stream because a person of ordinary skill in the art would have understood that "any given application in Wiltshire need not consume the entire 1.3 Mbps bandwidth," and "Wiltshire contemplates games like Pong or simpler games that could stream multiple concurrent MPEG videos that total less than 1.3 Mbps." *Id.* at 27 (citing Ex. 1033 ¶ 79).

Petitioner also argues a person of ordinary skill in the art would have understood DSL, discussed in the PC Magazine article, to refer to ADSL because the article discloses that ADSL was the "ideal vehicle for providing Internet Access" and the '109 patent uses the term DSL in the same manner. *Id.* (citing Ex. 1006, 69; Ex. 1001, 6:14–16. Ex. 1033 ¶ 80).

4. Patent Owner's Sur-reply

Patent Owner responds that Petitioner's argument seeking to read both Wiltshire and Chen broadly and Petitioner's reliance on its newly-submitted evidence are an attempt to bolster its deficient *prima facie* case that exceeds the proper scope of reply under 37 C.F.R. § 42.23(b). PO Sur-reply 22–23.

Patent Owner argues that Wiltshire's system is directed at commercial gaming involving "stake games," and Chen's reference to tele-education and database records does not show the use of ADSL outside the home. *Id.* at 23 (citing Ex. 1025, 162:1–164:12). Patent Owner also argues that Petitioner's additional references do not show that a person of ordinary skill in the art would have "thought ADSL could successfully be employed in a commercial gaming operation involving tens of gaming stations in a single location," or that it "was an adequate choice for a commercial gaming establishment." *Id.* (citing Ex. 1029; Ex. 1030, 2). Patent Owner contends that because the Petition referred to Wiltshire's disclosure of a plurality of clients, Petitioner's reply argument that "Wiltshire discloses a system . . . with only one client computer" proffers "an entirely new theory of invalidity." *Id.* at 23–24. According to Patent Owner, Petitioner's assertion that Wiltshire contemplates games "that could stream multiple concurrent MPEG videos that total less than 1.3 Mbps" is unsupported by any citation to Wiltshire and should be rejected. *Id.* at 24–25.

Patent Owner also argues that the various versions of DSL themselves present numerous options for Internet connectivity, therefore rejecting Petitioner's contention that ADSL was one of a finite number of options for providing Internet connectivity. *Id.* at 25 (citing Ex. 1029, 9; Ex. 1030, 2).

5. Analysis

Based on our review of the complete record, we determine that Petitioner persuasively shows that one of ordinary skill in the art would have had reason to combine Chen's teaching of a first bandwidth and a second bandwidth that are asymmetric with the combination of Wiltshire and Saha. Pet. 60–65.

Petitioner persuasively shows that a person of ordinary skill in the art would have been motivated to apply Chen's ADSL teachings to implement the Internet access described in Wiltshire. *Id.* at 61 (citing Ex. 1002 ¶ 197). Wiltshire discloses that "communication pathways 130 is any type of local area, wide area or global communication pathways, including the Internet," and Chen states that "ADSL has been considered as an ideal vehicle for Internet access." *See* Ex. 1004, 5:31–44; Ex. 1006, 69. As Dr. Fuchs testifies, Wiltshire's teaching would have motivated an ordinarily skilled artisan to apply Chen's ADSL teachings in implementing the Internet access described in Wiltshire. Ex. 1002 ¶ 197 (citing Ex. 1006, 69).

Petitioner persuasively shows that ADSL would have been "well-suited to exchange the same type of information (i.e., user input controls on one hand and image/video data on the other) as disclosed in Wiltshire." Pet. 62 (citing Ex. 1002 ¶¶ 199–200). As Dr. Fuchs testifies, a person of ordinary skill in the art would have understood that keyboard data (such as the data from a key press) is typically encoded as 8-bit ASCII data and Wiltshire's upstream input commands would have required less bandwidth than the downstream video transmissions. Ex. 1002 ¶¶ 199–200 (citing Ex. 1018, code (57)). Further, as mentioned in Chen, a person of ordinary skill in the art would have understood that an MPEG stream may have required rates of at least 1.3 megabits per second, which is many times greater than the typical 8 or 16 bits per second required for transmitting a user input command. *Id.* (citing Ex. 1006, 69). As Dr. Fuchs testifies, a person of ordinary skill in the art would have been motivated to use the smaller bandwidth of ADSL for exchanging user input commands and the larger bandwidth of ADSL for transmitting the compressed image using MPEG to provide a better user experience, particularly for real-time

interactive games. *Id.* ¶ 200. We are persuaded by Dr. Fuchs's testimony because it is consistent with the disclosures of Wiltshire and Chen, and determine that a person of ordinary skill in the art would have had reason to combine Chen's teaching of ADSL with the teachings of Wiltshire and Saha, as proposed by Petitioner.

We are not persuaded by Patent Owner's arguments that "Petitioner's failure to consider Chen's narrow focus on residential applications dooms its proposed obviousness combination." PO Resp. 53–55. Chen does not expressly limit the use of ADSL to residential service. *See generally* Ex. 1006. Although we agree with Patent Owner that Chen does discuss a simulation study of the effect of in-house wiring on the performance of ADSL (*id.* at 71–72), that is simply one portion—i.e., Chen's Appendix—and not the focus of Chen's disclosure. Patent Owner also points us to Chen's statement that "[r]esearchers realized that for residential applications, a POTS service, where the traditional telephone service can be provided whether the ADSL is on or off, was more practical than ISDN service." Ex. 1006, 69. But this statement does not indicate that ADSL was proposed as *solely* for use in residential homes; instead, it explains why the proposed ADSL architecture was more practical than ISDN service for residential applications. In fact, Chen mentions other applications of ADSL that may not have necessarily been residential. *See id.* (explaining that "[t]he capabilities of ADSL are also well suited to applications such as network computing where software and database records could be stored on network servers and retrieved at a speed equivalent to CD-ROM access, and tele-education, where a specialist can be shared with a large student population through downstream channels, and individual feedback can be provided through upstream channels").

Even if were to agree with Patent Owner that ADSL is in fact limited to residential applications, given the Federal Circuit's guidance, we read Wiltshire's system as applying to games such as Doom and Myst, i.e., games that are typically played at a user's residence, and thus ADSL would have been a suitable communication pathway between Wiltshire's server and client devices when applying Wiltshire's system to such games. *See Sony*, 2023 WL 6773879, at *2–4; Ex. 1004, 1:26–43, 12:11; *see also* Pet. Remand Br. 9–10 (arguing that the Federal Circuit's finding that Wiltshire is not limited to casino games confirms that a person of ordinary skill in the art would have been motivated to combine Wiltshire with Chen).

Dr. Fuchs testifies that a person of ordinary skill in the art would have understood that Wiltshire "discloses a gaming system that could be used in a variety of contexts, including *in homes and including for video games*." Ex. 1033 ¶ 78 (citing *id.* § IV.F). Dr. Fuchs further testifies that a person of ordinary skill in the art "would have understood based on all the non-casino teachings set forth in Wiltshire that its system applies to these other contexts, including using a laptop as the client device in a user's home or other building while the game is running on a remote server." *Id.* ¶ 74. Reading Wiltshire's disclosure as not limited to casino games, we find Dr. Fuchs's testimony credible because it is consistent with how video games such as Doom and Myst had traditionally been played. Dr. Hart, for example, testified that he has "played [Doom] on a desktop and laptop computer in the '90s." Ex. 1025, 36:4–12; Pet. Remand Br. 10.

Patent Owner argues that Chen's tele-education application is really directed to students accessing educational materials from their residences. Under Patent Owner's argument, the video game application that Dr. Fuchs describes—with client devices placed in users' homes while the game is

running a remote server—would have used the same network setup as Chen's tele-education application. *See* Ex. 1033 ¶ 79 (explaining that "games like Pong or simpler games . . . could stream multiple concurrent MPEG videos that total much less than 1.3 Mbps"); Ex. 1002 ¶¶ 199–200; PO Sur-reply 23 (citing Ex. 1025, 162:1–164:12).

We are also persuaded by Petitioner's argument that ADSL was just one of a finite number of known options for providing Internet connectivity described in Wiltshire. First, we do not agree with Patent Owner that DSL mentioned in PC Magazine is a different Internet connectivity option than ADSL. PO Resp. 62 (citing Ex. 1007, 17). Chen itself discusses the different standardized systems of DSL and explains that it is the third standardized system, ADSL, that "[m]ost recently . . . has been considered as an ideal vehicle for Internet access." Ex. 1006, 68–69. Dr. Fuchs persuasively testifies that PC Magazine was published the same year as Chen, and when read in conjunction, a person of ordinary skill in the art "would have understood the reference to 'DSL' in PC Magazine to mean 'ADSL.'" Ex. 1033 ¶ 80. In view of these references, Dr. Fuchs testifies that a person of ordinary skill in the art "would have known that ADSL was a widespread and common choice for broadband Internet access in the 1998–2000 time frame," and that it "would have been—at a minimum—obvious to try when implementing Wiltshire's system with an Internet connection." Ex. 1002 ¶ 201. We credit Dr. Fuchs's testimony because it is consistent with our reading of PC Magazine and Chen. We are therefore persuaded that Petitioner has shown that a person of ordinary skill in the art would have had reason to use Chen's ADSL Internet connectivity in Wiltshire's system. *See KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of

identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp.”).

Petitioner also persuasively shows that a person of ordinary skill in the art would have had a reasonable expectation of success in Petitioner’s proposed combination given Wiltshire’s teaching of the use of MPEG for transmitting video streams, suggesting that the system would be compatible with ADSL. Pet. 63–64. Patent Owner argues that given the bandwidth requirement of 1.3 Mbps for an MPEG video stream, ADSL’s downstream bandwidth can provide just one video stream and a person of ordinary skill in the art would not have considered that ADSL could have been successfully employed in Wiltshire’s commercial gaming operation, which would likely have tens of gaming stations in a single location. PO Resp. 61–62. First, because we reject Patent Owner’s view of Wiltshire as limited to commercial gaming, we are also not persuaded that Wiltshire’s system has to support tens of gaming stations in a single location. We agree with Petitioner that an ordinarily skilled artisan would have understood that Wiltshire’s system could have been implemented with a single client. Pet. Reply 27 (citing Ex. 1004, claim 1; Ex. 1025, 31:22–32:21). Second, we disagree that every game in Wiltshire’s list requires the same amount of bandwidth. Dr. Fuchs persuasively testifies that a person of ordinary skill in the art

> would understand that any given application in Wiltshire need not consume the entire 1.3 Mbps bandwidth used for MPEG’s full motion video (over ADSL’s 1.544 Mb/s downstream link). The fact that an MPEG stream may require rates of 1.3 Mb/s for “full motion video” using MPEG . . . does not mean that this full 1.3 Mb/s will be required for all uses or all applications. To the contrary, it was common, especially in 2001 and earlier, to use much lower transmission rates. For example, Wiltshire

> contemplates games like Pong or simpler games that could stream multiple concurrent MPEG videos that total much less than 1.3 Mbps. Pong's graphics were rudimentary and would have required a small fraction of the full 1.3Mbps bandwidth.

Ex. 1033 ¶ 79 (citing Ex. 1006, 69); Ex. 1004, 1:26–44 (listing games).

Patent Owner's remaining arguments and Dr. Hart's testimony are premised on reading Wiltshire as limited to a casino environment, and therefore, do not undermine Petitioner's showing of a motivation to combine. *See, e.g.*, PO Resp. 47 (arguing that Petitioner fails to address why a person of ordinary skill in the art would want to use a technology meant to optimize bandwidth on residential telephone systems in a commercial establishment); PO Remand Resp. Br. 5 ("But Wiltshire's teaching of 'non-casino' games remained in a casino environment.").

As discussed above, we are persuaded by Dr. Fuchs's testimony that non-casino games in Wiltshire could have been played on laptops in a user's home. *See, e.g.*, Ex. 1033 ¶ 74. Patent Owner points us to Wiltshire's disclosure of "the house taking a percentage of the stake for providing the game" as support for its argument that Wiltshire's teaching of non-casino games remained in a casino environment. PO Remand Resp. Br. 5 (citing Ex. 1004 at 12:10–13). First, the quoted sentence in Wiltshire appears to be incomplete. *See* Tr. 77:2–17. Moreover, we read that statement as applying to "any casino game or other non-casino games where players play against each other *for money*." Ex. 1004, 12:10–12 (emphasis added). We are not persuaded that it applies to every single game, including Doom, listed in Wiltshire's long list of games. *Id.* at 1:26–44 (specifically listing "non-house stake games between two or more players"). Indeed, in the same paragraph as the quoted sentence, Wiltshire states that the invention therein "is not limited to any particular game." *Id.* at 12:9–10.

Lastly, we address Patent Owner's argument that Petitioner's Reply arguments related to disclosure of Wiltshire and Chen exceed the proper scope of reply under 37 C.F.R. § 42.23(b). We disagree because we find Petitioner's arguments and reliance on additional evidence to be squarely in response to arguments raised in the Patent Owner Response, and not in support of contentions different from those in the Petition. *See Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 707 (Fed. Cir. 2020) (finding that the Board abused its discretion in ignoring petitioner's responsive arguments to issues raised by patent owner during trial). As discussed above, the Petition identified Wiltshire as disclosing various games, including Doom and Myst. *See* Pet. 20. The Petition also states that Chen's ADSL was well-suited to exchange the same type of information (i.e., user input controls on one hand and image/video data on the other) as disclosed in Wiltshire. *Id.* at 61; *see also id.* at 64 (arguing that "ADSL in particular were well-understood technologies by the middle of the dot-com boom, 1998, when Wiltshire was filed"). In response, Patent Owner argued that ADSL, as disclosed in Chen, was designed for residential use and Wiltshire teaches a gambling system for commercial use. PO Resp. 53–57. Petitioner's arguments, supported by Dr. Fuchs's testimony and other references, that Wiltshire is not limited to commercial casino establishments, and that Chen is not limited to residential applications, are responsive to Patent Owner's arguments.

Accordingly, on the complete record, we determine Petitioner persuasively shows that one of ordinary skill in the art would have had reason to combine Chen's ADSL teaching with the teachings of Wiltshire and Saha in the manner asserted by Petitioner.

Aside from the arguments discussed above, Patent Owner does not otherwise respond to Petitioner's remaining contentions as to claim 2. *See*

generally PO Resp. We find Petitioner's contentions persuasive and supported on the complete record before us. We agree with Petitioner that Chen discloses a first bandwidth for upstream transmissions and second bandwidth for downstream transmissions, and that the bandwidths are asymmetric. Pet. 60 (citing Ex. 1006, 69; Ex. 1002 ¶ 195). We are also persuaded that "Wiltshire and Chen . . . teach toward one another, and a [person of ordinary skill in the art] would have had reason to apply Chen's ADSL teachings to implement the Internet communication access described in Wiltshire." *Id.* at 60–63 (citing Ex. 1004, 5:30–32; Ex. 1006, 69; Ex. 1002 ¶¶ 197–200). And we agree with Petitioner that a person of ordinary skill in the art would have had a reasonable expectation of success with the combination of Wiltshire and Chen. *Id.* at 63–64 (citing Ex. 1006, 69; Ex. 1002 ¶¶ 202–204)

Accordingly, for the reasons explained by Petitioner and those discussed above, we find that Petitioner persuasively shows that the combination of Wiltshire, Saha, and Chen would have rendered the subject matter of claim 2 obvious to one of ordinary skill in the art at the time of the invention.

IV. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner filed a motion to exclude Exhibits 1024, 1029, and 1030, and a portion of Dr. Fuchs's declaration (Exhibit 1033 ¶ 79). Paper 31, 1–6; Paper 33, 1–5.

Patent Owner, as the "moving party," "has the burden of proof to establish that it is entitled to the requested relief." 37 C.F.R. § 42.20.

Exhibit 1024 is an exhibit to the deposition of Dr. Hart, and Petitioner does not refer to that exhibit in its briefing. Paper 32, 10. Petitioner has no

objection to excluding Exhibit 1024 from the record. *Id.* Accordingly, Patent Owner's motion to exclude as to Exhibit 1024 is *granted*.

Petitioner relies on Exhibits 1029 and 1030 as well as paragraph 79 of Dr. Fuchs's declaration in Petitioner's Reply for demonstrating that a person of ordinary skill in the art would have been motivated to combine Chen with Wiltshire and Saha. *See* Pet. Reply 25–27. Patent Owner contends this evidence should be excluded because it is improper new argument and evidence that were not made of record at the institution stage, were filed for the first time with Petitioner's Reply, and are relied upon by Petitioner to fill a gap in its *prima facie* case. Mot. 2–3.

Patent Owner argues that Petitioner relies on Exhibits 1029 and 1030 in an attempt to close the gap in its Reply, by asserting that Wiltshire is not "limited to commercial casino establishments" and that Chen is not "limited to residential applications." *Id.* at 3; *see also* Mot. Reply 2–3.

As for Dr. Fuchs's declaration, Patent Owner argues that Dr. Fuchs's opinions that Wiltshire's system can work with only one client and that a given client in Wiltshire need not consume the entire 1.3 Mbps bandwidth are newly presented opinions in support of Petitioner's reply that change both the Petition's theories and Dr. Fuchs's original testimony. Mot. 4–5. On the contrary, Patent Owner argues, we instituted this *inter partes* review based on Dr. Fuchs's original testimony that "an MPEG stream may require rates of *at least* 1.3 megabits per second." *Id.* at 5 (citing Ex. 1002 ¶ 200; Inst. Dec. 44–45); *see also* Mot. Reply 3–5.

Petitioner responds that Exhibits 1029 and 1030 are proper Reply exhibits because Petitioner cites these exhibits for one simple point—to rebut the suggestion in Patent Owner's Response that ADSL was for residential use only, but not for business use. Opp. 2–3. Petitioner contends

there was no way of knowing that Patent Owner would argue that ADSL is for residential use only, and, given Chen's disclosure of the use of ADSL, Exhibits 1029 and 1030 are not necessary for a *prima facie* case of obviousness. *Id.* at 4. As to Dr. Fuchs's testimony, Petitioner contends that the Petition itself refers to a single client of Wiltshire and also reproduces Wiltshire's Figure 2, which describes steps performed by a single client. *Id.* at 5. Petitioner argues that Dr. Fuchs's opinions in paragraph 79 of Exhibit 1033 are not inconsistent with his opinion in Exhibit 1002 because "Dr. Fuchs did *not* opine or contend that MPEG requires or must always use at least 1.3 Mb/s." *Id.* at 8–9 (citing Ex. 1002 ¶ 88; Ex. 2010, 72:21–73:4, 73:11–17).

We agree with Petitioner. As a threshold matter, Patent Owner's motion is improper as it does not argue admissibility of the challenged evidence. *See* Consolidated Trial Practice Guide 79 (Nov. 2019), https://www.uspto.gov/TrialPracticeGuideConsolidated ("A motion to exclude must explain why the evidence is not admissible (e.g., relevance or hearsay) but may not be used to challenge the sufficiency of the evidence to prove a particular fact. A motion to exclude is not a vehicle . . . [to] address arguments or evidence that a party believes exceeds the proper scope of reply or sur-reply."); Opp. 1–2.

Further, we are not persuaded that Exhibits 1029 and 1030 are improper reply evidence or that the cited portions of Dr. Fuchs's declaration present improper new opinions. As discussed above, we deem Petitioner's reply arguments relating to the disclosures of Wiltshire and Chen in context of the reason to combine the two references to be properly responsive to Patent Owner's arguments. *See supra* § III.G.5. We therefore agree with

Petitioner that responding to Patent Owner's argument with additional evidence and opinions from Dr. Fuchs was indeed proper.

We also do not find Dr. Fuchs's Reply declaration testimony to be inconsistent with his original testimony. Dr. Fuchs did not testify that MPEG always requires the use of *at least* 1.3 Mb/s. *See* Ex. 1002 ¶ 200 ("an MPEG stream *may* require rates of at least 1.3 megabits per second" (emphasis added)). We understand Dr. Fuchs's testimony to show that the bandwidth required for the MPEG stream in one direction is different from that required for transmitting a user input command in the other direction, not to opine on the exact data rates that were being used. *Id.* That is what we cited Dr. Fuchs's testimony for in our Institution Decision. Inst. Dec. 44–45. Dr. Fuchs's testimony in paragraph 79 of his second declaration, that a given client in Wiltshire need not consume the *entire* 1.3 Mbps bandwidth, is therefore not improper Reply evidence under 37 C.F.R. § 42.23(b). Accordingly, Patent Owner's Motion to Exclude Exhibits 1029 and 1030 as well as paragraph 79 of Exhibit 1033 is *denied*.

V. CONCLUSION

For the reasons discussed above, Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–12 of the '109 patent are unpatentable.[12] Our conclusions regarding the Challenged Claims are summarized below:

Claims Challenged	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 3–12	103(a)	Wiltshire, Saha	1, 3–12	
2	103(a)	Wiltshire, Saha, Chen	2	
6, 11, 12	103(a)	Wiltshire, Saha, PC Magazine	6, 11, 12	
Overall Outcome			1–12	

VI. ORDER

It is, therefore,

ORDERED that claims 1–12 of U.S. Patent No. 10,681,109 B2 are determined to be unpatentable;

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

FURTHER ORDERED that Patent Owner's motion to exclude (Paper 31) is *granted in part* and *denied in part*; and

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

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