

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARNOLD & RICHTER CINE TECHNIK GmbH & CO. BETRIEBS KG,

Petitioner,

v.

ROTOLIGHT LIMITED,

Patent Owner.

IPR2021-01498

Patent 10,203,101 B2

Before GRACE KARAFFA OBERMANN, MICHELLE N. ANKENBRAND,
and AVELYN M. ROSS, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

DECISION

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

I. INTRODUCTION

Arnold & Richter Cine Technik GmbH & Co. Betriebs KG (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–21 of U.S. Patent No. 10,203,101 B2 (Ex. 1001, “the ’101 Patent”). Rotolight Limited (“Patent Owner”) waived filing a preliminary response. Paper 6. This Decision is based solely on information presented in the Petition. Any final decision shall be based on the full trial record, including information presented in a timely response to the Petition.

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2020); 37 C.F.R. § 42.4(a). The standard for instituting review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines” that “there is a reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition.”

For the following reasons, we determine Petitioner shows a reasonable likelihood of prevailing with respect to at least one challenged claim. Accordingly, we grant the Petition, and institute an *inter partes* review.

A. Real Parties-in-Interest

Petitioner states that “[t]he real party-in-interest in this proceeding is Arnold & Richter Cine Technik GmbH & Co. Betriebs KG.” Pet. 2. Patent Owner identifies Rotolight Limited and Rotolight Group Ltd. as a real parties-in-interest. Paper 4, 1 (Patent Owner’s Mandatory Notices).

B. Related Matters

The Parties identify the petitions for *inter partes* review challenging U.S. Patent Nos. 10,197,257 (IPR2021-01496) and 10,197,258 (IPR2021-01497) as related matters. Pet. 2; Paper 4, 1–2.

II. BACKGROUND

A. The '101 Patent (Ex. 1001)

The '101 patent is titled “Lighting System and Control Thereof.” Ex. 1001, code (54). The patent discusses “a method for controlling a lighting device to produce user customizable lighting effect” by “calculating a time varying lighting value based on at least one simulation parameter” and, further, “outputting said time varying lighting value thereby to simulate a lighting effect.” *Id.* at 1:51–56. The invention is directed to “controlling a lighting device to produce user customizable realistic lighting effects while compensating for rolling shutter.” *Id.* at code (57).

According to the written description, the invention provides an “improved solution” over known “flicker box” devices conventionally used in videography, broadcasting, and cinematography industries “to produce flickering light effects to mimic,” for example, “a fire place, candle, electrical spark or lightening” effects on set or filming location. *Id.* at 1:18–27, 1:47, 5:49–54. Flicker boxes, however, are “complex, costly and time consuming” to set up and the “connection and control of multiple pieces of hardware . . . require[e] a physical wired connection to the ‘hot’ light source desired to be controlled.” *Id.* at 1:30–35.

The '101 patent informs that a “user has very limited ability to alter many of the parameters to adapt the lighting effect as desired” when using a flicker box. *Id.* at 5:66–67. The invention, by contrast, may allow calculating “a time varying lighting value based on at least one simulation parameter,” which includes “a user selectable camera frequency” and provides for a determination of “the minimum pulse width of” that time varying lighting value “so as to avoid rolling shutter artefacts.” *Id.* at code (57).

The '101 patent further informs that “‘flicker boxes’ are incompatible with LED light sources” and “require the use of ‘hot’ incandescent light sources which are energy inefficient and,” further, “impose health and safety risks to those working on a set.” *Id.* at 1:41–44. The solution the '101 patent offers includes a “light source” that “is in the form of an LED lighting fixture” and includes “in built special effects.” *Id.* at 4:11–12.

The description of the invention includes methods, controllers, and computer programs “for controlling a lighting device to produce user customizable lighting effect” by, among other things, “calculating a time varying lighting value based on at least one simulation parameter” and “outputting said time varying lighting value thereby to simulate a lighting effect.” *Id.* at 1:51–56, 2:64–3:3; 3:41–46. Figure 2 is illustrative and reproduced below.

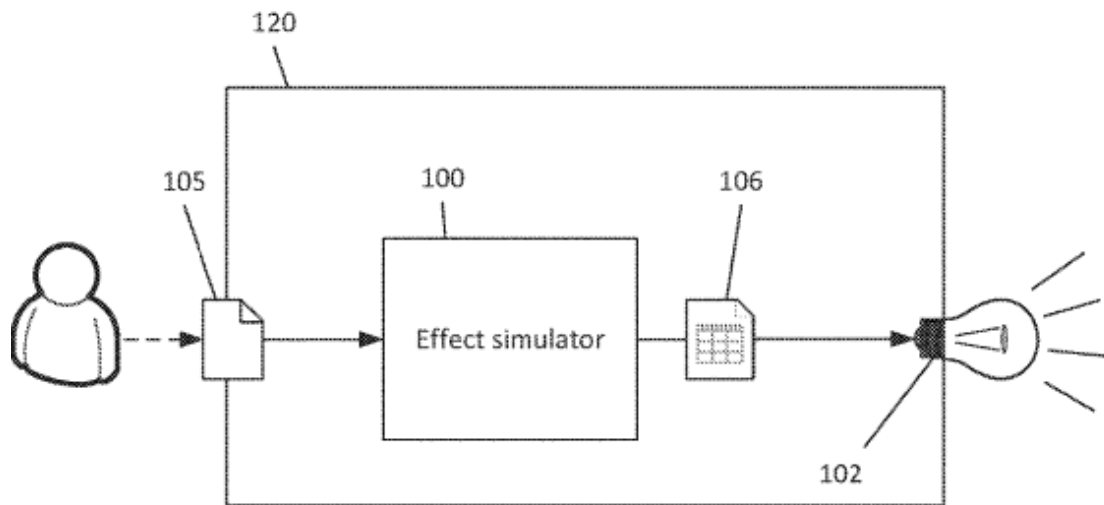


Figure 2

Figure 2 “is a schematic diagram of a further lighting system.” *Id.* at 5:35.

Figure 2 shows studio lamp device 120 that includes input interface 105 and

lighting effect simulator 100, which produces data 106 used to modulate light 102. *Id.* at 6:1–6:17. “In one example, the light 102 is an array of LEDs, preferably of differing colours” and a “microcontroller or other computing unit is integrated in the lamp device 120 for performing calculations.” *Id.* at 6:3–11. The ’101 patent explains, “This arrangement does not require the DMX distribution hub 302, power elements 304, 306” required in a flicker box lighting system and “is more flexible in producing” desired lighting effects. *Id.* at 6:5–9. Figure 6, reproduced below, illustrates a simulated lighting effect employing an exemplary graphic user interface.

800

Light control system	
Fire effect	
Parameter	Setting
More info Fire activity	 Low High
More info Fire colour	2000K
More info Peak brightness	80%
More info Baseline brightness	40%
More info Camera frequency	60Hz
	
Colour Swing Blue	Monochrome

Figure 6

Figure 6 “is a graphic user interface [800] for user input of simulation parameters.” *Id.* at 5:42–43. According to Figure 6, the simulated effect is a fire effect. *Id.* at 8:23–24. Interface 800 allows the user to select a “fire activity” by sliding the slider between low to high and set values for “fire colour,” “peak brightness,” “baseline brightness,” and “camera frequency.” *Id.* at 8:25–29.

The ’101 patent also describes and claims compensating for “rolling shutter artefacts.” Ex. 1001, code (57) (Abstract), Fig. 3b (label assigned in flow diagram); *id.* at 12:8–11, 12:61–64, 14:4–8 (relevant limitations in each independent challenged claim). We reproduce below Figure 3b.

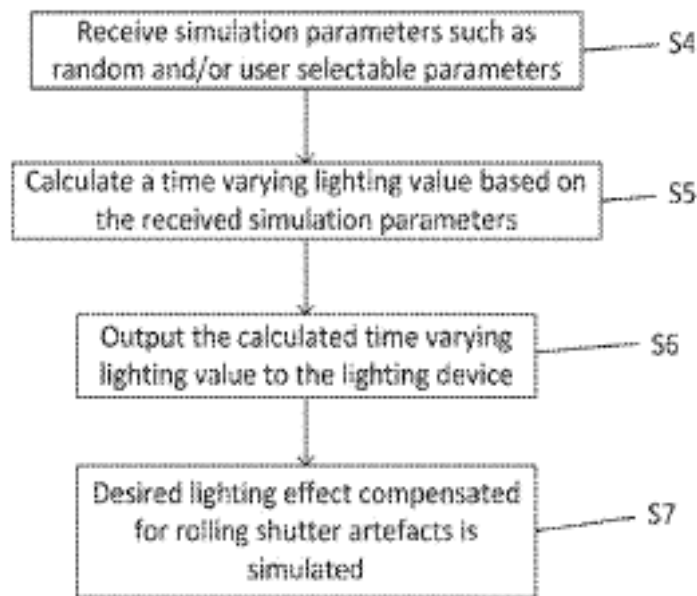


Figure 3b

Ex. 1001, Fig. 3b. Figure 3b is a flow diagram of a method for adjusting a lighting device. *Id.* at 5:36–38. Figure 3b illustrates a “method for simulating a lighting effect.” *Id.* at 7:35–36. In a step identified as S7, a “[d]esired lighting effect compensated for rolling shutter artefacts is simulated.” *Id.* at Fig. 3b; *see id.* at 7:34–53 (further describing Figure 3b).

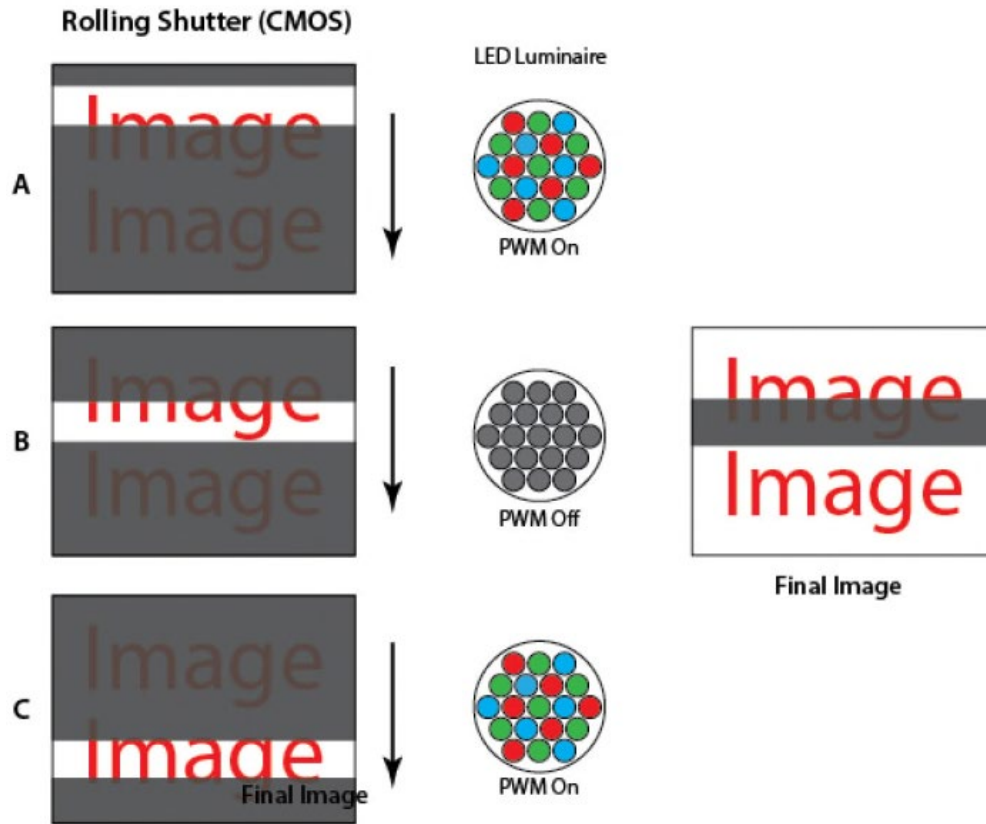
The '101 patent provides “[e]xamples of user defined parameters,” including “Rolling Shutter Compensation.” *Id.* at 6:52, 7:6. In that regard, the written description explains, “Film and TV cameras typically operate at frequencies between 24 Hz and 60 Hz. In order to provide consistent illumination during each camera frame, short time-period (e.g., stroboscopic) lighting effects should have a minimum pulse width which lasts at least one camera frame period.” *Id.* at 7:6–11.

The '101 patent instructs that the parameter of rolling shutter compensation “can be adjusted to suit the camera and frame rate.” *Id.* at 7:12–13. “Preferably, the system” of the invention “includes rolling shutter compensation enabling the minimum light pulse width to be adjusted to suit the shutter speed or frame rate of the user’s camera in order to prevent ‘strobing’ due to the light effect being out of” phase or sync “with the frame rate of the camera,” thereby “ensuring that each frame captured by the camera is fully illuminated.” *Id.* at 4:25–31.

Although not provided in the '101 patent, the Petition includes an overview of rolling shutter artefacts and causes thereof. Pet. 4–6. We next discuss Petitioner’s information in that regard, because it provides background that may be helpful to understanding the asserted prior art, as well as the claim limitations that specify compensating for rolling shutter artefacts. Patent Owner is free to dispute the following background information in a timely response to the Petition.

Petitioner avers, “In ‘rolling shutter’ cameras, the image sensor is typically made up of rows or bands of sensors that each capture a pixel,” but not “all are exposed to light at the same time.” Pet. 4 (citing Ex. 1006 ¶¶ 26–36). “Instead, each row is exposed to light sequentially, one at a time,

corresponding with an open shutter for that row.” *Id.* Petitioner provides the following illustration.



Pet. 5. Petitioner asserts that the above figure “shows an active sensor band scanning down an image as the image is captured, with pulse width modulation (“**PWM**”) LEDs providing the illumination. *Id.* at 4 (citing Ex. 1006 ¶¶ 26–36).

Petitioner argues, “This means that the bottom portion of the image (C) is exposed to light later in time that the top portion (A).” *Id.* Further, according to Petitioner, “This time shift in acquisition of the image can cause unwanted artefacts, if the lighting changes during the times the shutter is open for each row of sensors to capture the camera frame of the full image.” *Id.* at 5 (citing Ex. 1006 ¶¶ 26–36). Petitioner further avers, “If the light changes during acquisition of the frame, such as shown” in the above

figure “with the PWM for the LEDs being ‘off’ in B, then some bands may not have the same illumination as others, resulting in unwanted dark bands or other distortions in the image.” *Id.*

B. Challenged Claims

Petitioner challenges claims 1–21 of the ’101 patent. Pet. 6. Claims 1, 11, and 17 are written in independent form. We reproduce below claim 1, which is illustrative of the claimed subject matter.

1. A method for controlling a lighting device to produce user customizable lighting effects while compensating for rolling shutter artefacts produced by a camera, the method comprising:

calculating, using an effect simulator, a time varying lighting value;

compensating for the rolling shutter artefacts produced by the camera, the time varying lighting value being calculated based on at least one user input simulation parameter input by a user, said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of:

a camera recording frequency of the camera;

a camera shutter speed of the camera, and

a camera frame rate of the camera; and

outputting, from said effect simulator, said calculated time varying lighting value to said lighting device thereby to simulate a lighting effect compensated for the rolling shutter artefact.

Ex. 1001, 11:59–12:11.

Claim 11 is directed to a controller, whereas claim 17 is directed to a computer program. *Id.* at 12:47, 13:16. Claims 2–10 and 18–21 depend directly or indirectly from claim 1. Claims 12–16 depend directly or indirectly from claim 11. No claims depend from claim 17.

C. Asserted Grounds of Unpatentability

The Petition raises five grounds of invalidity, as follows:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–21	102 ¹ /103	Edwards ²
1, 2, 5–10, 11–16, 17, 21	102/103	Astera ³
3–4, 18–20	103	Astera, Edwards

Pet. 4 (grounds chart).

Petitioner’s grounds are supported by the Declaration of Mr. Michael Wood. Ex. 1006. Based on his statement of qualifications and *curriculum vitae*, for purposes of this Decision, we find Mr. Wood is qualified to provide technical opinions from the perspective of a person of ordinary skill in the art at the time of the invention. Ex. 1006 ¶¶ 3–16 (Mr. Wood’s statement of qualifications); Ex. 1007 (Mr. Wood’s *curriculum vitae*).

III. ANALYSIS

A. Level of Ordinary Skill in the Art

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a primary guarantee of objectivity in an

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 102, effective March 16, 2013. Given that the application from which the ’257 patent issued was filed after this date, the current versions of §§ 102 and 103 apply.

² U.S. Patent No. 9,743,010 B1, issued Aug. 22, 2017 (Ex. 1004).

³ Astera LED Technology GmbH, *AX10 SPOTMAX User Manual*, dated May 7, 2015, but alleged by Petitioner to have a publication date of June, 2015 (Ex. 1003). *See* Pet. 36 (Petitioner’s information pertaining to earliest publication date).

obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)). Based on the information presented, we find that the asserted prior art itself is sufficient to demonstrate the level of skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art itself can reflect the appropriate level of ordinary skill in the art). To the extent a more precise definition is required, we adopt Petitioner's definition because it is uncontested at this stage and appears consistent with the disclosures of the asserted prior art and the '101 patent. Pet. 8 (Petitioner's asserted definition of the ordinarily skilled artisan).

B. Claim Construction

Petitioner does not ask us to provide a construction for any claim term, and none is required for purposes of this Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

C. Alleged Invalidity Based on Edwards

Petitioner argues that Edwards anticipates or renders obvious the subject matter of claims 1–21. Pet. 4 (grounds chart). Petitioner supports its arguments with Mr. Wood's declaration testimony. Ex. 1006 ¶¶ 41–100.

1. Overview of Edwards (Ex. 1004)

Edwards discloses a system and method for synchronizing LED light fixtures to digital camera shutters. Ex. 1004, code (57) (Abstract). The

system controls the LEDs so that “changing of lighting can be synchronized with the times when the shutter is closed so that all frames are complete and are without the visual artifact of the light changing mid frame.”⁴ *Id.* The lighting system may be configured to produce lighting effects such a lightening, strobing, a camera flash, street light flicker, fire, or candlelight, while compensating for rolling shutter artefacts. *Id.* at 3:18–28, 11:38–12.1.

The system includes “LED light fixtures” and a “lighting controller.” *Id.* at 5:18–51, 6:49–62. A user may input a camera synchronization signal to the lighting controller, along with “commands that control the lights” and produce the special lighting effects. *Id.* at 5:18–24, 6:57–62, 7:20–8:1.

The lighting controller compensates for rolling shutter artefacts by holding commands to control the lights “until the next vertical frame synch pulse,” then times any lighting transitions for each frame to “occur during the closed shutter period prior to the frame being captured by the camera.” *Id.* at 5:24–29. Edwards, thereby, allows for “synchronization of changes in lighting to the camera shutter for videos and motion pictures. This enables all lighting transitions to be done between frames,” which makes “the resulting frame image capture clean and free from artifacts that occur when lighting changes” transpire “in the middle of a frame.” *Id.* at 1:25–30.

2. Analysis of Claim 1

Petitioner shows sufficiently that Edwards discloses each limitation of claim 1. Pet. 8–36. For example, the preamble of claim 1 recites, “A method

⁴ Except when quoting Edwards, which refers to rolling shutter “artifacts,” we follow Petitioner’s convention and refer instead to rolling shutter “artefacts,” because Petitioner’s spelling is consistent with the challenged claims. *See* Ex. 1001, 12:11 (claim 1), 12:64 (claim 11), 14:8 (claim 17).

for controlling a lighting device to produce user customizable lighting effects while compensating for rolling shutter artefacts produced by a camera.” Ex. 1001, 11:59–61. Petitioner explains adequately how Edwards teaches or suggests the subject matter of this preamble. Pet. 10–11.

In particular, as Petitioner points out, Edwards teaches “synchronizing one or more light emitting diode” lights to “shutters of one or more digital cameras, and changing an intensity of the one or more lights while the shutter on each of the one or more cameras is closed.” *Id.* at 10 (quoting Ex. 1004, 144–49). As a result, “all frames are complete and are without the visual artifact of the light changing mid frame,” when producing, for example, “a simulated camera flash, lighting pattern or gun flash.” *Id.* at 10–11 (quoting Ex. 1004, 3:18–28).

Claim 1 also specifies “calculating, using an effect simulator, a time varying lighting value.” Ex. 1001, 11:63–64. Petitioner shows sufficiently that Edwards anticipates or makes obvious this feature of the invention as specified in claim 1. Pet. 11–13. For example, Petitioner shows sufficiently that “Edwards discloses a ‘lighting controller’ that receives (a) ‘commands that control the lights’ (*e.g.*, to produce an effect on the light) and (b) a ‘sync signal’ for compensating for rolling shutter artefacts.” *Id.* at 12 (quoting Ex. 1004, 5:15–23). On this preliminary record, there is no dispute that the lighting controller of Edwards calculates control signals sent to the light emitting diodes based on input commands and sync signals. *Id.* Further, in the system of Edwards, a “command is used to setup the schemes.” *Id.* at 13 (quoting 7:20–36). “Using either the control panel on each light or using” other command signals, a “cinematographer adjusts each light until”

reaching “the desired settings on all lights for the ‘lighting scheme.’” *Id.* (quoting Ex. 1004, 7:20–36).

Claim 1 further requires “compensating for the rolling shutter artefacts produced by the camera, the time varying lighting value being calculated based on at least one user input simulation parameter input by a user.” Ex. 1001, 11:65–12:3. In particular, “said at least one use input simulation parameter” includes “a user selectable parameter indicative of a member of a group consisting of: a camera recording frequency of the camera, a camera shutter speed of the camera, and a camera frame rate of the camera.” *Id.* at 12:3–7.

Petitioner shows sufficiently that Edwards teaches or suggests these features of the invention as specified in claim 1. Pet. 13–16. In Edwards, when the cinematographer or other user chooses “to feed the camera sync signal to the controller,” that user “‘preferably holds the commands until the next vertical *frame sync pulse*,’ so that the ‘lighting transitions for each frame are preferably timed to occur during the *closed shutter period* prior to the frame being captured by the *camera*.”” *Id.* at 14 (quoting Ex. 1004, 5:18–31) (Petitioner’s emphasis, highlighting features in Edwards that correspond to the features specified in the claim 1 limitation at hand). Petitioner directs us to additional disclosures in Edwards, which show sufficiently that the reference teaches or suggests these features of the invention. *Id.* at 14–15 (and citations therein to Edwards).

Finally, claim 1 includes a limitation directed to “outputting, from said effect simulator, said calculated time varying to said lighting device thereby to simulate a lighting effect” that is “compensated for the rolling shutter artefacts.” Ex. 1001, 12:8–11. Petitioner shows sufficiently that

Edwards anticipates or makes obvious this specified feature of the invention. Pet. 16–18. “For example, Edwards discloses that ‘[a]ll lights would wait for the rising edge of the sync signal to trigger turning on each scheme frame.’” *Id.* at 17 (quoting Ex. 1004, 7:56–8:1). “At the falling edge the lights would all turn off.” *Id.* “At the next rising edge all lights would turn on the next sequential scheme.” *Id.* Further, “[e]ach active light in” the system of Edwards is configured to “recall the stored values for each of these schemes and replay them in order, sequentially in sync with the sync signal.” *Id.*

Petitioner’s information is uncontested at this preliminary stage of the proceeding. *See* Paper 6 (Patent Owner’s waiver of preliminary response). Based on the information presented in the Petition, we are persuaded that Petitioner demonstrates a reasonable likelihood of prevailing at trial in showing that the subject matter of claim 1 is unpatentable as anticipated by, or obvious over, the disclosure of Edwards. Pet. 10–18.

3. Remaining Claims

Taking account of the uncontested information presented in the Petition, we determine that Petitioner also demonstrates a reasonable likelihood of prevailing at trial in showing that claims 2–21 are unpatentable as anticipated by, or obvious over, the disclosure of Edwards. Pet. 18–36 (mapping each limitation of claims 2–21 sufficiently to disclosures in Edwards); *see* Ex. 1006 ¶¶ 41–100 (Mr. Wood’s declaration testimony pertaining to the ground based on anticipation by Edwards).

D. Remaining Invalidity Challenges

Petitioner advances additional grounds of invalidity based on Astera, alone or in combination with Edwards. Pet. 4 (grounds chart). In view of our finding that the information presented in the Petition establishes a reasonable

likelihood that Petitioner would prevail on its assertion that at least one claim of the '101 patent is unpatentable over Edwards, we institute an *inter partes* review of all challenged claims and all grounds presented in the Petition. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (indicating that a decision whether to institute an *inter partes* review “require[s] a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

IV. CONCLUSION

For the above reasons, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we institute an *inter partes* review of the '101 patent.

The factual findings set forth in this Decision are preliminary and provided for the sole purpose of deciding whether to institute a review. Any final findings will be based on the full trial record, including any information presented in a timely filed response to the Petition. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner’s burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”) (quoting 35 U.S.C. § 314(a) and comparing *id.* with § 316(e)).

V. ORDER

It is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–21 of the '101 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), notice is hereby given of the institution of a trial, which will commence on the entry date of this Decision.

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