

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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HESAI TECHNOLOGY CO., LTD.  
Petitioner

v.

OUSTER, INC.  
Patent Owner

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Case No. IPR2023-01457  
U.S. Patent No. 11,190,750

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**PATENT OWNER SUR-REPLY**

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## **EXHIBIT LIST**

| <b>EXH. NO.</b> | <b>DESCRIPTION</b>                                                                                                         |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>2001</b>     | Respondent's Proposed List of Terms to be Construed dated June 21, 2023, in ITC Inv. No. 337-TA-1363                       |
| <b>2002</b>     | Respondent's Proposed Claim Constructions dated June 28, 2023, in ITC Inv. No. 337-TA-1363                                 |
| <b>2003</b>     | Respondent's Proposed List of <i>Markman</i> Exhibits dated July 13, 2023, in ITC Inv. No. 337-TA-1363                     |
| <b>2004</b>     | Excerpts from Rudolf F. Graf, <i>Modern Dictionary of Electronics</i> (7th ed. 1999)                                       |
| <b>2005</b>     | Excerpts from Frank Pedrotti, <i>Introduction to Optics</i> (3d ed. 2006)                                                  |
| <b>2006</b>     | Excerpts from Ulrich Kubitscheck, <i>Fluorescence Microscopy, From Principles to Biological Applications</i> (2d ed. 2017) |
| <b>2007</b>     | Biography of Patrick W. Lauppe                                                                                             |
| <b>2008</b>     | Declaration of Patrick W. Lauppe ISO Motion for <i>Pro Hac Vice</i> Admission                                              |
| <b>2009</b>     | Declaration of Jason A. Janét, Ph.D.                                                                                       |
| <b>2010</b>     | Transcript of James F. Shanley, Ph.D., deposition dated June 28, 2024                                                      |
| <b>2011</b>     | The Oxford English Dictionary (2d Ed., Vol. III), Cham-Creeky (1989) (excerpts)                                            |
| <b>2012</b>     | Sergey L. Vinogradov, "Evaluation of performance of silicon photomultipliers in LIDAR applications" (2017)                 |
| <b>2013</b>     | Edoardo Charbon et al, "SPAD-Based Sensors" (2013)                                                                         |

| <b>EXH. NO.</b> | <b>DESCRIPTION</b>                                                                                                    |
|-----------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>2014</b>     | Cristiano Niclass, et al, “A Single Photon Avalanche Diode Array Fabricated in Deep-Submicron CMOS Technology” (2006) |
| <b>2015</b>     | Transcript of James F. Shanley, Ph.D., deposition dated June 6, 2024                                                  |
| <b>2016</b>     | Transcript of Michael Stephen Lebby, Ph.D., deposition in IPR2023-01422 dated May 23, 2024 (excerpts)                 |
| <b>2017</b>     | Hesai Technology Co., Ltd.’s Petition in IPR2023-01422, dated September 14, 2023                                      |
| <b>2018</b>     | Declaration of James F. Shanley, Ph.D., in IPR2023-01456, dated September 25, 2023 (excerpts)                         |
| <b>2019</b>     | Deposition Transcript of Jason Janét, Ph.D., dated Aug. 30, 2024, in IPR2023-01421                                    |
| <b>2020</b>     | Deposition Transcript of James F. Shanley, Ph.D. dated Nov. 6, 2024                                                   |

## **I. INTRODUCTION**

Instead of using its reply to respond to the Patent Owner Response, Petitioner has improperly sought to use its reply as a do-over of its deficient Petition. Petitioner's reply improperly raises new rationales for its unpatentability grounds—including new obviousness combinations, new “claim construction” arguments, and more. Further, not content with its expert Dr. Shanley's original declaration and deposition testimony, Petitioner has filed a new **51-page** reply declaration of Dr. Shanley replete with improper new reply opinions and evidence. Petitioner's improper new reply arguments, expert opinions, and evidence should be disregarded.

Additionally, Patent Owner was denied the opportunity to legitimately cross-examine Dr. Shanley regarding his reply declaration. Dr. Shanley consistently refused to answer Patent Owner's questions, including by refusing to examine the prior art as “too ponderous.” EX2020, 37:2-10. As a result, none of Dr. Shanley's opinions in this proceeding should be given any weight.

Petitioner's procedural violations belie the fundamental deficiencies in its Petition. For example, none of the asserted grounds meet the “non-overlapping beyond a threshold distance,” “electromagnetic radiation output from...,” or “adjacent to” limitations.

Accordingly, the Board should find claims 44-48 and 50 (the “challenged claims”) of U.S. Patent No. 11,190,750 (the “750 patent”) patentable over the

instituted grounds.

## **II. THE REPLY AND REPLY DECLARATION OF DR. SHANLEY SHOULD BE DISREGARDED AS UNTIMELY**

Instead of fairly and properly engaging with the Patent Owner Response within the Petition’s grounds of unpatentability, Petitioner introduces improper new arguments, opinions, and evidence on reply, including in a 51-page reply declaration of its expert Dr. Shanley. *See, e.g., infra* Sections V.A.1, V.A.3, V.A.6, V.B.1, V.B.3, V.C.2. Since Petitioner has not even attempted to justify its new reply arguments and evidence, the Reply and the accompanying reply declaration of Dr. Shanley should be disregarded. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (the Board is not required to “parse the reply brief” for new arguments); *see* Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019)<sup>1</sup>, 73 (“Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability.”); *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1331 (Fed. Cir. 2019) (“We conclude that the Board did not abuse its discretion in holding [petitioner] to its word and disregarding its new theory first raised in reply.”); *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 775 (Fed. Cir. 2018); *Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1367 (Fed. Cir. 2023); *Dish*

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<sup>1</sup> Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

*Network LLC v. Sound View Innovations, LLC*, IPR2020-01041, Paper 41 at 27 (P.T.A.B. Jan. 18, 2022) (declining to consider “new reply argument [that] attempts to fill in a gap in Petitioner’s unpatentability contentions”); 37 C.F.R. § 42.23(b).

### **III. DR. SHANLEY’S OPINIONS SHOULD BE GIVEN NO WEIGHT GIVEN HIS REFUSAL TO BE CROSS-EXAMINED**

Additionally, all of Dr. Shanley’s opinions—both in his initial and reply declarations—should be given no weight, because Patent Owner did not have the opportunity to cross-examine him on his opinions due to his obstructive and nonresponsive conduct at his November 6 deposition.

For example, when asked in deposition whether the Retterath reference used the language “slightly different” to describe emission and detection regions, Dr. Shanley said he “would have to go back and look through the patent,” which he refused to do. EX2020, 37:2-8. When Patent Owner’s counsel indicated that Dr. Shanley should “[f]eel free to take any time that [he] need[s],” Dr. Shanley said that “[i]t’s too ponderous at this point,” and continued to refuse to consult the Retterath reference. *Id.*, 37:9-10. In other words, Dr. Shanley explicitly refused to answer Patent Owner’s counsel’s questions about Retterath to the best of his ability (*e.g.*, by consulting Retterath). As another example, when Dr. Shanley was asked what “detail” regarding the “threshold distance” limitation the ’750 patent provided per his declaration, he refused to “go back and do a detailed analysis, going through the patents, to further give you an explanation of that.” *Id.*, 58:17-59:13. Instead, he

deferred to his declaration—which provides no such explanation. *See infra* Sections IV.A.1, IV.B.1.

Throughout his deposition, Dr. Shanley refused to answer Patent Owner’s counsel’s questions and merely pointed to his declaration—even when his declaration did not provide any answers. For example, Dr. Shanley refused to answer:

- Whether, for the “fields of view coincident with...” limitation in the related ’381 patent (which involves disputed issues similar to the ’750 patent “electromagnetic radiation output from...” limitation), Dr. Shanley considered there to be a minimum amount of necessary overlap between emission and detection regions. EX2020, 32:3-36:1;
- Whether certain embodiments in the related ’381 patent specification Dr. Shanley discussed in his reply declaration (and which Petitioner and Dr. Shanley also cite in a similar context for the ’750 patent) were preferred embodiments (EX2020, 42:3-43:11); and
- Whether certain “non-sensitive areas between pixels” Dr. Shanley opined would have been present in the system disclosed in the Weimer reference are shown in Figure 2A of Weimer (EX2020, 38:3-41:21).

Dr. Shanley’s refusal to answer the questions of Patent Owner’s counsel and his parroting of his declaration is particularly concerning, given that Dr. Shanley

previously testified that Petitioner’s counsel had been coaching him about his answers, including not to be “verbose” and to “cite [his] declaration.” EX2010, 140:21-147:6.

Accordingly, Dr. Shanley’s reply declaration should be disregarded or given little to no weight in this proceeding. Furthermore, Dr. Shanley’s refusal to be cross-examined on his positions casts doubt on any of the opinions he has provided in this case, including in his initial declaration.

#### IV. CLAIM CONSTRUCTION

**A. “[E]lectromagnetic radiation output from each emitter in the illumination pattern is coincident with a field of view of a corresponding pixel” (claim 44)**

As shown in the Patent Owner Response, the “electromagnetic radiation output from...” limitation should be construed to require that the field of view of each pixel and the emission region of a corresponding optical emitter cover substantially the same area in the field. POR at 25-30. Petitioner’s grounds depend on an overbroad view of this claim language satisfied by *any* overlap between emission and detection regions. On reply, Petitioner continues to fail to show that its overbroad understanding of the claim is appropriate.

Petitioner argues that Patent Owner’s construction of the “each pixel...” claim language is an attempt to amend and narrow the claims. Reply at 3. Not so. Rather, Patent Owner’s claim construction reflects the plain and ordinary meaning of the “coincident” term based on the intrinsic and extrinsic evidence. POR at 25-30;

EX2009, ¶¶ 105-119. The '750 patent makes clear that the fields of view of optical emitters and corresponding detector pixels are to be substantially *matched*. EX1001, 2:44-3:11 (discussing “project[ing] discrete illuminating beams at an operating wavelength into (and substantially only into) the fields of view defined by the apertures”); *id.*, 3:16-20 (disclosing diffuser that spreads “incident photons across [a pixel’s] **full width and height** thereby increasing the dynamic range of the system” (emphasis added).)

Indeed, the '750 patent discloses that this matching of emission and detection regions is key to accomplishing the goal of conserving light energy and maintaining a high signal-to-noise ratio within particular emitter-detector channels. Dr. Janét testified regarding the importance the '381 patent (which shares a specification with the '750 patent) places on ensuring that emission and detection regions match, stating “the '381 is concerned with minimizing waste, wasted energy, while at the same time improving or maximizing the signal-to-noise ratio.” EX1041, 41:7-24. For example, the '750 patent discloses that “an illumination pattern that substantially matches—in size and geometry across a range of distances from the system—the fields of view of the apertures[.]” means that “minimal power output by the system (via the illumination sources) is wasted by illuminating surfaces in the field for which the pixels are blind.” EX1001, 2:58-3:3. The system “can therefore achieve a relatively high ratio of output signal (i.e., illuminating beam power) to input signal

(i.e., photons passed to an incident on the pixel array).” *Id.* Further, the ’750 patent discloses that “due to the geometry of a particular aperture and its corresponding illumination source, a particular aperture may pass a signal exhibiting a relatively high SNR to its corresponding lens and thus not its corresponding pixel.” *Id.*, 6:25-28.

The ’750 patent’s Figure 1 shows an optical system in which emission and detection regions match. Petitioner and its expert argue that “nothing in FIG. 1 indicates that [an emission region] has substantially the same area, and certainly not ‘the same’ area, as the emission region.” Reply at 4 (citing EX1040, ¶¶ 14-15). But contrary to Petitioner and its expert’s *ipse dixit*, the emission regions of the emitters perfectly match the fields of view of corresponding emitters. And the light that enters an aperture from an external field is spread out over the entire pixel area by diffusers. EX1001, 3:16-20.

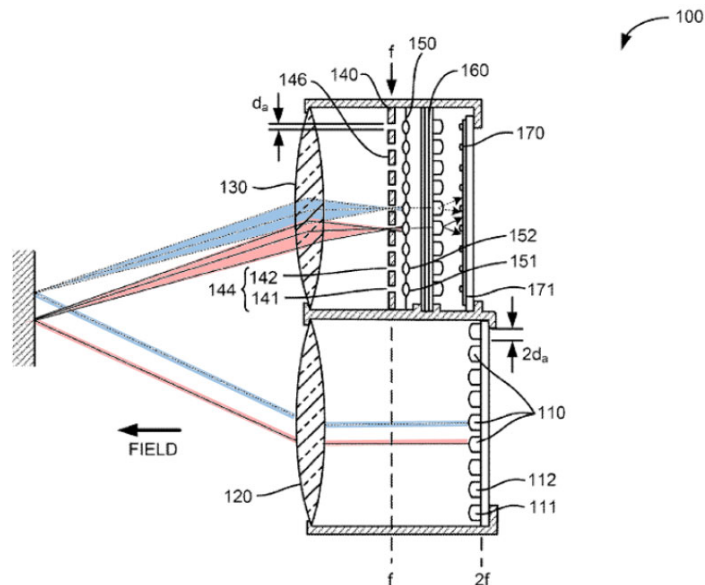


FIG. 1

EX2009, ¶ 109 (demonstrative diagram based on '750 patent, Fig. 1).

Petitioner and its expert focus on Figure 2 of the '750 patent, which shows the impact curvature in an object in the external field can have on the path of certain light emitted by an optical system. Reply at 4-7. But an aberration caused by the curvature of the external field does not invalidate the '750 patent's clear and extensive disclosures regarding *matching* emission and detection regions and thereby minimizing wasted light and wasted detector area "across a range of distances from the system[.]"<sup>2</sup> EX1001, 2:58-3:3, 2:44-3:11, 3:16-20; EX1041,

<sup>2</sup> Petitioner's contention that Dr. Janét did not consider Figure 2 of the '750 patent in forming his opinions is directly contradicted by his testimony. EX1041, 30:7-

41:7-24.<sup>3</sup>

Petitioner repeatedly mischaracterizes the intrinsic evidence in support of its overbroad understanding of the claim language. Petitioner argues that Patent Owner’s construction is incorrect under claim construction canon that “a claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct.” Reply at 5 (quoting *Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013)). But none of the specification excerpts Petitioner points to relate to a preferred embodiment.<sup>4</sup> In fact, there is no indication that these specification excerpts relate to an embodiment having pixels

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31:12 (discussing his “consideration of Figure 2”); EX2009, ¶ 118 (referring to ’750 patent, Figure 2).

<sup>3</sup> Petitioner and its expert complain about the “substantially” language in Patent Owner’s construction. Reply at 6-7; EX1040, ¶ 22. But this language comes directly from the specification of the ’750 patent. EX1001, 2:58-3:3; 2:44-3:11. Petitioner can also point to no facts or law to support its baseless position that the term “substantially” in Patent Owner’s construction is improper because it “injects unpredictable ambiguity” into the claims. Reply at 6-7.

<sup>4</sup> Dr. Shanley refused to be cross-examined regarding this issue. EX2020, 42:3-43:11; *see supra* Section III.

with fields of view “coincident with” corresponding optical emitters at all. EX1001, 10:65-11:19 (discussing “one implementation”), 6:3-11 (discussing unclaimed “substantially coincident” fields of view).

Petitioner also points to intrinsic and extrinsic evidence related to “substantially coincident” language that does not appear in the claims. EX1001, 6:3-11; Reply at 4-5 (citing EX1043, EX1044). But “substantially coincident” is not the claim language at issue, and Petitioner fails to show that these excerpts should bear on the disputed “fields of view coincident with...” claim language.

Accordingly, the Board should adopt Patent Owner’s construction for the “electromagnetic radiation output from...” claim language.

**B. The Deficiencies in the Petition Regarding the “Stop Region” Language of Claim 44 Do Not Constitute a Claim Construction Issue**

Claim 44 requires an aperture layer “comprising a plurality of apertures separated from each other by a stop region.” For the Retterath grounds, Petitioner points to an aperture layer that is described as only “partially” or “substantially” preventing light from passing. EX1005, 9:59-65, 10:14-17. This deficiency is simply a matter of Petitioner not accounting for the claim language—“*stop region*”—rather than a claim construction issue. Accordingly, Petitioner’s new claim construction arguments on reply are improper and should be disregarded.

**V. THE BOARD SHOULD REJECT PETITIONER’S PROPOSED COMBINATIONS.**

**A. The Board Should Reject the Retterath-Based Grounds**

**1. Petitioner Continues to Fail to Show that Retterath Discloses Fields of View that are “Non-Overlapping Beyond a Threshold Distance”—Notwithstanding its Improper New Theories**

In the Petition, Petitioner failed to point to any disclosures in Retterath indicating fields of view that were “non-overlapping beyond a threshold distance,” as claim 44 requires. As discussed in the Patent Owner Response, Petitioner could only point to disclosures generally related to emitter and detector channels, but nothing indicating any threshold distance related to non-overlapping fields of view. POR at 40-41. This was confirmed by deposition testimony from Dr. Shanley, who could not identify a threshold distance disclosed by Retterath. EX2010, 56:6-11 (“I can’t be certain.”)

Seemingly recognizing the gap in its Petition, Petitioner and its expert now focus on an untimely new demonstrative figure and improper new opinions from Dr. Shanley related to alleged similarities between Retterath and the ’750 patent’s disclosures. Reply at 17-19; EX1040, ¶¶ 47-49. Petitioner’s new arguments and evidence on reply should be disregarded. *See supra* Section II.

Even if Petitioner’s new arguments and evidence were considered, they fail to show that Retterath satisfies the “threshold distance” limitation. Petitioner and its expert argue that Retterath discloses the same amount of the detail as the ’750 patent

related to the “non-overlapping beyond a threshold distance” limitation. Reply at 17-19; EX1040, ¶¶ 47-49. But that conclusory position is never explained.<sup>5</sup> Furthermore, contrary to Petitioner’s *ipse dixit*, Dr. Janét testified that “[u]nlike Retterath, the ’750 patent describes how a person of ordinary skill would arrive at a number” for a threshold distance beyond which fields of view are non-overlapping. EX1041, 91:12-17; *see also id.*, 93:8-14; EX1001, FIG. 1, 2:44-48.

Petitioner cites to the *In re Epstein* case. Reply at 19 (citing 32 F.3d 1559, 1568 (Fed. Cir. 1994)). But *In re Epstein* was an appeal of the Board’s affirmance of an examiner’s rejection of claims. In that context, the Federal Circuit’s finding was based in part on the fact that the claims at issue “were not rejected under 35 U.S.C. § 112, para. 1, as lacking an enabling disclosure.” *In re Epstein*, 32 F.3d at 1568. This is inapposite to the present IPR proceeding, where 35 U.S.C. § 112 invalidity is outside the scope. 35 U.S.C. § 311(b).

## **2. Petitioner Fails to Show that Retterath Satisfies the “Stop Region” Limitation**

As shown in the Patent Owner Response, Retterath does not disclose that its waveguides consist of a “stop region” for claim 44, because the waveguides only “partially” or “substantially” block light. POR at 19-22. Petitioner attempts to

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<sup>5</sup> Dr. Shanley refused to be cross-examined regarding this issue. EX2020, 58:17-59:13; *see supra* Section III.

explain these disclosures away by arguing that the non-blocked light is light that enters the aperture itself—not light that is let through the waveguide material. Reply at 8-10. But Petitioner relies exclusively on conclusory opinions of Dr. Shanley that fail to cite to Retterath *once*. Reply at 9-10 (citing EX1040, ¶¶ 29-30.) Furthermore, Retterath provides no basis for Petitioner’s argument, instead indicating that “[i]nbound optical energy that is more than slightly-non-parallel to the receive detector vector”—in other words, light that should be blocked by the waveguide material—is only “**substantially** blocked by the detector waveguide.” EX1005, 9:62-65 (emphasis added).

### **3. Petitioner’s New Theory Related to the Retterath-Borowski-Hipp Combination Should Be Disregarded**

In the Petition, Petitioner asserted that the Retterath-Borowski-Hipp combination would have involved using Hipp’s shadow mask along with SPAD detectors based on Borowski’s teachings. Pet. at 40-43. The Patent Owner Response showed that a POSITA would not have been motivated to combine Hipp’s noisy shadow mask with SPADs, which are highly sensitive and therefore vulnerable to noise. POR at 22-24. In response, Petitioner now asserts an untimely reply argument that the Retterath-Borowski-Hipp combination would include a “layer of material absorbing signal light” on the “rear side of the carrier glass.” Reply at 11 (quoting EX1007, 22:7-10); EX1040, ¶ 32; EX2020, 44:6-45:3.

Petitioner made no mention of this “layer of material absorbing signal light”

in the Retterath-Borowski-Hipp combination in the Petition. Pet. at 40-43. Petitioner cannot fill in gaps in the Retterath-Borowski-Hipp combination asserted in its Petition by raising a new theory on reply that incorporates a new, previously undisclosed feature from the art into the combination. *See supra* Section II.

Accordingly, Petitioner's new arguments and evidence related to the "layer of material absorbing signal light" should be disregarded. Since Petitioner's new theory is the sole basis for its argument that a POSITA would have been motivated to combine Borowski's noise-prone SPADs with Hipp's noisy shadow mask, the Retterath-Borowski-Hipp combination must fail.

#### **4. Retterath Does Not Satisfy the "[E]lectromagnetic Radiation Output from..." Limitation as Properly Construed**

As shown in the Patent Owner Response, Retterath does not disclose emission regions that cover substantially the same area in the field as corresponding detection regions. POR at 30-35.

On reply, Petitioner again juxtaposes Figures 4 and 8 of Retterath. Reply at 11-12. But there is *no* evidence in Retterath that the separately numbered light beams 100 shown in Figure 4 and light beams 200 shown in Figure 8 have *any* relationship to one another—let alone that they cover substantially the same area in the field. Accordingly, Petitioner's demonstrative based on Figures 4 and 8 is misleading and underscores Petitioner's failure of proof as to Retterath.

Petitioner also argues that Retterath's disclosures regarding emission and

detection regions are similar to the '750 patent's. Reply at 12. But in doing so, Petitioner ignores (1) evidence from Retterath indicating significant *mismatch* between emitter and detector regions and (2) evidence from the '750 patent indicating the importance of *matching* emission and detection regions. See EX1005, Figs. 7, 19-20, 5:55-6:7, 9:36-44, 17:43-46, 17:58-60, 18:29-32; EX1001, 2:58-3:3, 2:44-3:11, 3:16-20; *see also* EX1041, 41:7-24.<sup>6</sup>

#### **5. Weimer Does Not Satisfy the “[E]lectromagnetic Radiation Output from...” Limitation as Properly Construed**

As shown in the Patent Owner Response, the combination of Retterath with Weimer does not satisfy the claimed “electromagnetic radiation output from...” requirement, because Weimer does not disclose emission regions substantially the same as corresponding detection regions. POR at 33-35.

On reply, Petitioner points to Weimer's disclosure that emitted light can “correspond[] to a single pixel.” Reply at 13 (emphasis omitted) (citing EX1008, 4:56-58.) But this excerpt in Weimer relates to Figure 2A, which (as discussed in the Patent Owner Response) shows that this “correspond[ence]” entails emission regions that are *significantly smaller* and *differently shaped* than the detection regions of corresponding pixels:

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<sup>6</sup> Dr. Shanley refused to be cross-examined regarding this issue. EX2020, 37:2-10; *see supra* Section III.

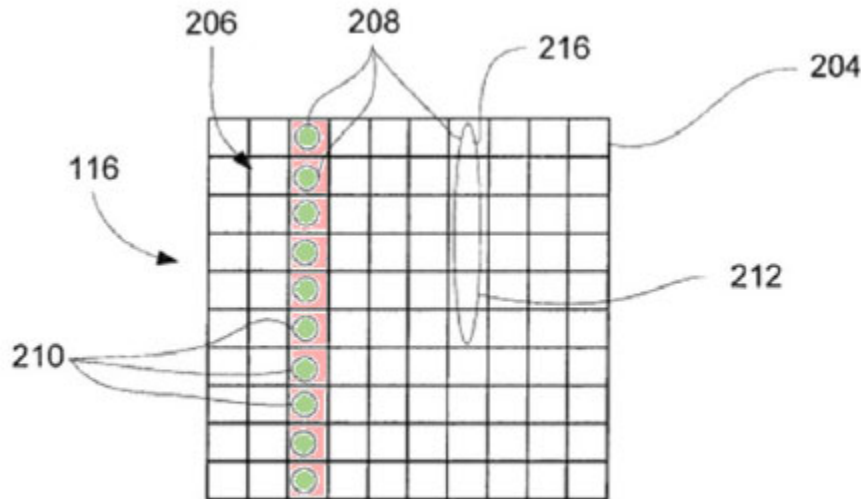


Fig. 2A

EX2009, ¶ 217 (colored highlighting added). Petitioner also points to “only slightly smaller” language in the background section of the Weimer reference, but there is no indication this describes Weimer’s system or any embodiments of Weimer Petitioner relies on. Reply at 13 (emphasis omitted) (citing EX1008, 1:56-60.)

Petitioner also relies on improper new reply opinions of Dr. Shanley indicating that a POSITA would have understood that Figure 2A of Weimer would include nonsensitive areas between pixels. Reply at 13-14 (citing EX1040, ¶¶ 39-41); *see supra* Section II. But neither Petitioner nor its expert indicate how—if at all—these alleged nonsensitive regions would impact the relationship between emission and detection regions in Weimer’s system. Furthermore, Dr. Shanley’s opinions cite to no evidence in Weimer or otherwise for the alleged nonsensitive regions, and Dr. Shanley refused to be cross-examined regarding Figure 2A of

Weimer. EX2020, 38:3-41:21. Accordingly, Dr. Shanley's opinions and Petitioner's related arguments regarding alleged nonsensitive regions should be disregarded.

The Retterath grounds fail notwithstanding the combination with Weimer.

**6. Retterath Does Not Disclose a Bulk Transmitting Optic “Adjacent” to a Bulk Imaging Optic**

As discussed in the Patent Owner Response, Petitioner's theory for what allegedly constitutes “adjacent” bulk transmitting and bulk imaging optics in Retterath requires combining different embodiments of Retterath shown in Figures 6, 10, and 11b. POR at 35-40. However, Petitioner failed to provide any analysis for why those embodiments should be combined. Nothing in Figure 11b or the corresponding excerpt of the Retterath specification discusses multiple optics or how they are arranged. EX1005, 10:62-11:25. Indeed, the only discussion of optics relates to use of a *single* global optic. *Id.*, 10:50-51, 11:10-15.

Nothing in Petitioner's reply remedies any of the deficiencies with the Petition. Petitioner merely provides new demonstrative diagrams to suggest spatial relationships between embodiments that are not discussed at all in Retterath. Reply at 15-17. Petitioner also provides new expert opinions from Dr. Shanley, which are improper on reply and should be disregarded. *See supra* Section II.

Accordingly, the Retterath grounds must fail based on Petitioner's failure to show “adjacent” bulk transmitting and imaging optics.

## **B. The Board Should Reject the Imai-Based Ground 2**

### **1. Petitioner Continues to Fail to Show that Imai Discloses Fields of View that are “Non-Overlapping Beyond a Threshold Distance”—Notwithstanding its Improper New Theories**

In the Petition, Petitioner failed to point to any disclosures in Imai satisfying claim 44’s “non-overlapping beyond a threshold distance” requirement, as confirmed by Petitioner’s expert in deposition testimony. EX2010, 99:15-22 (threshold distance in Imai is “not a quantifiable number”); POR at 50. On reply, Petitioner points back to its Petition argument and evidence without even attempting an explanation of why the Petition did not have the gap Patent Owner identifies. Reply at 22-23. Further, Petitioner defers to improper new arguments about alleged similarities between Imai and the ’750 patent just like it did for Retterath. *Id.* at 23. As discussed above for Retterath, Petitioner’s new reply arguments and evidence should be disregarded, and Petitioner’s arguments related to detail and enablement of the ’750 patent’s disclosures are meritless. *See supra* Section II.

Without a showing that Imai satisfies the “threshold distance” limitation of claim 44, the Board should reject Petitioner’s Ground 2.

### **2. Petitioner’s Reply Arguments Fail to Show that Imai Satisfies the “[E]lectromagnetic Radiation Output from...” Limitation as Properly Construed**

As shown in the Patent Owner Response, Imai does not satisfy the “fields of view coincident with...” limitation because it does not disclose pixels with detection

regions substantially the same as the emission regions of corresponding emitters. POR at 41-44.

On reply, Petitioner argues that Imai's "slightly larger" language is similar to language in the '750 patent specification. Reply at 20. But as discussed above, the '750 patent disclosure in question relates to irrelevant "substantially coincident" language that Petitioner fails to tie to the claims. *See supra* Section IV.A.

Petitioner also raises a conclusory single-reference obviousness argument based on Imai, suggesting that it would have been obvious based on Imai alone to have detection regions be the same as emission regions. Reply at 20. This is an improper new reply argument that should be disregarded, since the only motivation to combine asserted in the Petition relates to "achiev[ing] a one-to-one correspondence (such that each of pixels 1-16 was **coincident** with a corresponding one of the LDs)[.]" Pet. at 58 (emphasis added). Given Petitioner's overbroad apparent understanding of the claim language requiring emission and detection regions that are "coincident with" each other, Petitioner cannot turn around now and argue that this motivation to combine pertained to Patent Owner's narrower claim construction position. In any case, the Patent Owner Response addresses such an argument by showing that there is no suggestion in Imai's disclosures that detection regions and emission regions match. POR at 41-44.

**3. Petitioner’s Improper New Reply Arguments for Ground 2 Related to the “Adjacent to” Limitation Should Be Disregarded**

In the Petition, Petitioner made a one-sentence argument that Figure 2C of Imai showed coupling lens 22 and imaging lens in system 30 “are adjacent to each other along the ‘Z-axis’ direction[.]” Pet. at 60. On reply, Petitioner raises untimely new arguments related to omitted elements and an “X-Z plane” it never previously discussed. Reply at 21-22. Petitioner’s untimely reply arguments and evidence should be disregarded. *See supra* Section II. Even if considered, neither Petitioner nor Dr. Shanley even attempt to show that Imai meets Dr. Shanley’s understanding that the “adjacent to” claim language means “immediately next to”—or how such an understanding could be satisfied by a “schematic” or “sketch” like Imai’s Figure 2C. EX2010, 81:3-19, 90:9-21. Accordingly, Petitioner and its expert’s new reply arguments should be given no weight.

**C. The Board Should Reject the Weimer-Based Ground 3**

**1. Petitioner Failed to Meet its Burden as to the “Adjacent to” Limitation (claim 44(e)) for Weimer**

As shown in the Patent Owner Response, Petitioner failed to identify “a bulk transmitting optic disposed adjacent to the bulk imaging optic” for claim 44(e). POR at 50-51. Petitioner identified an alleged “bulk transmitting optic” (transmit optic 318 in Weimer), but Petitioner failed to identify a “bulk imaging optic”—instead pointing to a “bulk transmit optic 31” not in Weimer. Pet. at 76-77; EX1003,

¶¶ 276-277 (also referencing “bulk transmit optic 31”). On reply, Petitioner acts like this did not happen and points to arguments it raised for limitations other than claim 44(e). Reply at 23. But Petitioner fails to point to any place in the Petition where it identified a bulk transmitting optic disposed adjacent to a bulk imaging optic. Accordingly, Petitioner’s ground 3 must fail.

Even if Petitioner’s improper backfilling of its Petition were allowed, Petitioner fails to meet its burden of identifying “adjacent” optics in Weimer. Petitioner relies exclusively on how certain optics *appear* in Figure 3A of Weimer—even though its expert Dr. Shanley testified in deposition that he has “no idea” whether Weimer’s Figure 3A is to scale. EX2010, 108:18-20. Petitioner now argues with nothing but the *ipse dixit* of its expert that being “to scale” does not matter for the “adjacent to” limitation of claim 44(e). Reply at 23-24. Dr. Janét provides a contrary opinion, that if Figure 3A is not necessarily to scale, then it cannot “be relied on to understand the spatial relationship between various elements in Weimer’s system.” EX2009, ¶ 210. Dr. Shanley’s opinions have little credibility and should not be accorded any weight, because he previously testified that in his understanding, the term “adjacent to” in the ’750 patent requires two elements to be “immediately next to one another.” EX2010, 81:3-19. Since it is unclear, and Dr. Shanley fails to provide any explanation for how a “not to scale” figure could provide the level of spatial detail necessary to show two elements allegedly

“immediately next to one another,” Dr. Janét’s opinion should outweigh Dr. Shanley’s on this issue.

Accordingly, Petitioner has failed to meet its burden for showing that Weimer satisfies claim 44(e).

**2. Petitioner Continues to Fail to Show that Imai Discloses Fields of View that are “Non-Overlapping Beyond a Threshold Distance”—Notwithstanding its Improper New Theories**

In the Petition, Petitioner failed to point to any disclosures in Imai satisfying the claim 44 requirement of fields of view that are “non-overlapping beyond a threshold distance,” which Petitioner’s expert confirmed in his deposition. EX2010, 115:8-11 (testifying he “can’t quantify” the threshold distance disclosed by Weimer). On reply, Petitioner points back to its Petition argument and evidence without even attempting an explanation of why the Petition did not have the gap Patent Owner identifies. Reply at 24-25. Further, Petitioner defers to the same improper new arguments about alleged similarities between Weimer and the ’750 patent just like it did for Retterath. *Id.* As discussed above for Retterath and Imai, Petitioner’s new reply arguments and evidence should be disregarded, and Petitioner’s arguments related to enablement of the ’750 patent’s disclosures are meritless. *See supra* Section II.

**3. Weimer Does Not Satisfy the “[E]lectromagnetic Radiation Output from...” Limitation as Properly Construed**

Patent Owner hereby incorporates by reference its arguments regarding Weimer provided above. *See supra* Section V.A.5.

**4. Petitioner’s New Theory Related to the Weimer-Borowski-Hipp Combination Should Be Disregarded**

Patent Owner hereby incorporates by reference its arguments for the Borowski-Hipp combination provided above. *See supra* Section V.A.3.

**VI. SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS**

The Patent Owner Response presents evidence of secondary considerations related to the use of SPADs in LIDAR systems, which there is no dispute all challenged claims require. POR at 54-58. Petitioner challenges nexus for this evidence by arguing that Patent Owner’s secondary considerations evidence relates to “one claim element never alleged to be ‘novel.’” Reply at 25 (citation omitted). Petitioner does not elaborate on which claim element—and furthermore Patent Owner is challenging that any claims are unpatentable over the Petitioner’s asserted combinations. *See WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1330-31 (Fed. Cir. 2016) (“[T]he fact that an isolated feature may be present in the prior art may not render irrelevant objective evidence of non-obviousness of that feature in the claimed combination.”) Accordingly, there is no support for Petitioner’s nexus challenge.

Petitioner argues that SPADs in LIDAR systems were “ubiquitous” or well-

known prior to the '750 patent. Reply at 26-27. But Patent Owner's secondary considerations evidence indicates otherwise. POR at 54-58. Dr. Shanley testified that he was unaware of any commercial or *noncommercial* LIDAR devices that used SPADs prior to the '750 patent. EX2015, 79:2-5 (testifying that he was unaware of "any commercial LiDAR devices that use SPADs" before the 2017-filed '405 patent); *id.*, 79:11-14 (testifying that he was only able to "assume" that there were noncommercial LIDAR devices using SPADs before the 2017-filed '405 patent). Furthermore, Dr. Shanley indicated that factors like unavailability of off-the-shelf SPADs that motivated his decision not to use SPADs in LIDAR systems in 2008 persisted until well after the 2017 priority date at issue here. EX2015, 17:2-20 (testifying that he used a component that was "off-the-shelf" in a LIDAR system rather than SPADs, because an off-the-shelf component was cheaper and more reliable); *id.*, 79:15-80:13 (testifying that SPADs have only been "cheap and off-the-shelf" since around 2020); *see also id.*, 23:20-22 (testifying that the LIDAR field has not changed very much since 2008). Accordingly, the evidence indicates that SPADs in LIDAR systems were not obvious to a POSITA in 2017. *See WBIP*, 829 F.3d at 1330-31.

## **VII. LEVEL OF A PERSON OF ORDINARY SKILL IN THE ART**

Petitioner attacks Dr. Janét because "[t]he record lacks any indication" that Dr. Janét has sufficient experience with LIDAR systems per the parties' POSITA

definitions. Reply at 27. But Petitioner’s attack mischaracterizes the record. Patent Owner’s POSITA definition requires one year of work experience with LIDAR designs—while Petitioner’s requires two to three years of experience in LIDAR design. POR at 4; Pet. at 3. Dr. Janét’s CV—filed as Exhibit A to his declaration in support of the Patent Owner Response (EX2009)—lists two years of experience (2011-2012) working with LIDAR for an “ONR/USMC Cargo UGV” project for Teledyne Technologies; two years of experience (2012-2013) working with LIDAR for an “Army LTL” project for Teledyne Technologies; and experience working with LIDAR related to Duke University’s DARPA Grand Challenge Team. EX2009, Ex. A at 2, 4; EX2020, 13:4-14 (Dr. Shanley testifying that Dr. Janét’s resume says that he worked on projects involving LIDAR from 2011 to 2013). This record evidence indicates that Dr. Janét has several years of experience in LIDAR design, clearly meeting both Petitioner and Patent Owner’s requirements for the amount of LIDAR experience possessed by a POSITA.<sup>7</sup> POR at 4; Pet. at 3.

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<sup>7</sup> In the parallel proceeding *Hesai Tech. Co., Ltd. v. Ouster, Inc.*, IPR2023-01421 (the “1421 IPR”), Petitioner asked Dr. Janét in deposition about his LIDAR experience and he explained in detail how his level of experience meets the parties’ POSITA definitions (which are the same in this proceeding and the 1421 IPR). In the 1421 IPR, Petitioner does not challenge the sufficiency of Dr. Janét’s experience

Accordingly, Petitioner's challenge to Dr. Janét's experience level is baseless.<sup>8</sup>

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level under either party's POSITA definition. Accordingly, it appears that Petitioner has attempted to hide its head in the sand in this proceeding regarding Dr. Janét's LIDAR experience in an attempt to discredit his testimony, which is improper. Patent Owner attaches the transcript of Dr. Janét's deposition in the 1421 IPR (EX2019), which was introduced as an exhibit to the deposition of Dr. Shanley in this proceeding. EX2020, 21:15-17 (testifying to having reviewed Dr. Janét's 1421 IPR deposition testimony); *see also* EX2019, 23:11-24:22 (discussing at least a year of designing LIDAR systems), 26:21-40:15 (discussing several additional years of designing LIDAR systems), 21:3-22.

<sup>8</sup> Petitioner's expert Dr. Shanley provides his conclusory opinion that "[t]he record lacks any indication that Dr. Janét's declarant [sic] has sufficient LIDAR experience, much less 2-3 years of experience." EX1040, ¶ 77. But Dr. Shanley's deposition testimony indicates that his assessment of Dr. Janét is based on assumptions about Dr. Janét's background and qualifications that are not included in Dr. Shanley's POSITA definition and that Dr. Shanley himself has not shown. *See, e.g.*, EX2020, 14:22-15:22 (testifying that Dr. Janét's LIDAR experience is insufficient because he was working on other things at the same time as his years of experience in the field of LIDAR design), 17:9-18 (assuming that the three years of LIDAR experience

Petitioner also raises arguments comparing and contrasting patents in different proceedings in an effort to support its POSITA definition. Reply at 27-28. But these assessments of different patents are mere attorney argument supported by no expert evidence—and should be disregarded.

## **VIII. CONCLUSION**

Based on the arguments and evidence provided above, the Board should find claims 44-48 and 50 of the '750 patent patentable over the instituted grounds.

Dated: November 15, 2024

Respectfully submitted,

COOLEY LLP  
ATTN: Patent Group  
1299 Pennsylvania Avenue NW  
Suite 700  
Washington, DC 20004  
Tel: (202) 728-7055  
Fax: (202) 842-7899

/ Phillip Morton /  
Phillip Morton  
Reg. No. 57,835  
*Counsel for Patent Owner*

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listed on Dr. Janét's CV does not meet Dr. Shanley's 2-year requirement), 16:16-18 (testifying that his POSITA definition requires "in-depth knowledge of LiDAR").

## **CERTIFICATE OF COMPLIANCE WITH WORD COUNT**

Pursuant to 37 C.F.R. § 42.24(d), I certify that this sur-reply complies with the type-volume limits of 37 C.F.R. § 42.24(c)(4) because it contains 5,593 words, according to the word-processing system used to prepare this sur-reply, excluding the parts of this sur-reply that are exempted by 37 C.F.R. § 42.24(c) (including the table of contents; a table of authorities; a listing of facts that are admitted, denied, or cannot be admitted or denied; a certificate of service or this certificate word count; and appendix of exhibits).

DATED: November 15, 2024

COOLEY LLP  
ATTN: Patent Docketing  
1299 Pennsylvania Avenue NW  
Suite 700  
Washington, D.C. 20004  
Tel: (202) 728-7055  
Fax: (202) 842-7899

/ Phillip Morton /  
Phillip Morton

## **CERTIFICATE OF SERVICE**

I hereby certify, pursuant to 37 C.F.R. Section 42.6, that a complete copy of the attached **PATENT OWNER SUR-REPLY**, including all exhibits (**Nos. EX2019 – EX2020**) and related documents, are being served via electronic mail on the 15<sup>th</sup> day of November 2024, upon Petitioner by serving Petitioner's counsel of record as follows:

Michael T. Hawkins  
Craig A. Deutsch  
Yao Wang  
FISH & RICHARDSON PC  
IPR56432-0092IP2@fr.com  
PTABInbound@fr.com

Nicoletta Kennedy  
Megan Bussey  
KILPATRICK TOWNSEND & STOCKTON LLP  
nkennedy@kilpatricktownsend.com  
mbussey@kilpatricktownsend.com

Dated: November 15, 2024

/ Phillip Morton /  
Phillip Morton  
Reg. No. 57,835