

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TESLA, INC.

Petitioner,

v.

INTELLECTUAL VENTURES II LLC

Patent Owner.

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Case No. IPR2025-00222

U.S. Patent No 9,232,158

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**PATENT OWNER'S SUR-REPLY**

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## PATENT OWNER’S EXHIBIT LIST

|        |                                                                                                                                                                                                                                                                      |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EX2001 | Petitioner’s Answer to Complaint and Counterclaim, dated June 20, 2024, in <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)                                                                                                   |
| EX2002 | Docket from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)                                                                                                                                       |
| EX2003 | Scheduling Order from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)                                                                                                                             |
| EX2004 | Defendant’s Second Supplemental Preliminary Invalidity Contentions, dated January 9, 2025, in District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)                                                     |
| EX2005 | Declaration of Dr. Eli Saber                                                                                                                                                                                                                                         |
| EX2006 | Resume of Dr. Eli Saber                                                                                                                                                                                                                                              |
| EX2007 | U.S. Patent Publ. 2005/0128509 (Tokkonen)                                                                                                                                                                                                                            |
| EX2008 | U.S. Patent No. 7,123,298 (Schroeder)                                                                                                                                                                                                                                |
| EX2009 | U.S. Patent Publ. 2004/0155175 (McNulty)                                                                                                                                                                                                                             |
| EX2010 | Patent Owner Preliminary Response in IPR2022-01338, Paper #7.                                                                                                                                                                                                        |
| EX2011 | Mrinal Kr. Mandal, <i>Multimedia Signal And Systems</i> , Springer, 2003, 3rd Edition (December 31, 2002), ISBN10-1402072703.                                                                                                                                        |
| EX2012 | Yong Rui, Thomas S. Huang, and Sharad Mehrotra. “Constructing table-of-content for videos.” <i>Multimedia systems</i> 7 (1999): 359-368.                                                                                                                             |
| EX2013 | Boreczky, John S., and Lawrence A. Rowe. “Comparison of video shot boundary detection techniques.” <i>Journal of Electronic Imaging</i> 5.2 (1996): 122-128.                                                                                                         |
| EX2014 | Yong Rui, Thomas S. Huang, and Sharad Mehrotra. “Exploring video structure beyond the shots.” <i>Proceedings. IEEE International Conference on Multimedia Computing and Systems</i> (Cat. No. 98TB100241). IEEE, 1998.                                               |
| EX2015 | U.S. Patent No. 8,108,890, assigned to Apple.                                                                                                                                                                                                                        |
| EX2016 | Uyttendaele, Matthew, Ashley Eden, and Richard Skeliski. “Eliminating ghosting and exposure artifacts in image mosaics.” <i>Proceedings of the 2001 IEEE Computer Society Conference on Computer Vision and Pattern Recognition. CVPR 2001</i> . Vol. 2. IEEE, 2001. |

# **I. THE CLAIMS REQUIRE CONTROLLING THE INTEGRATION TIME OF AN INDIVIDUAL SENSOR DISTINCT FROM THE OTHER SENSOR(S)**

In the context of Claim 1 of the ‘158 Patent, the Board has already decided that controlling “an integration time of each sensor” means controlling “the integration time of an individual sensor distinct from the other sensor(s).” As the Board found:

[T]he plain meaning of the phrase “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors” requires each optics component to pass light separately to a distinct sensor of the plurality of sensors. Ex. 1001, 25:34–36. ... Consistent with this interpretation, claim 1 also recites “a processing component configured to control an integration time of each sensor,” which similarly distinguishes the processing component’s configuration as being able to control the integration time of an individual sensor distinct from the other sensor(s) in the group. *Id.* at 25:38–39 (emphasis added).

The Specification is in accordance with this interpretation. For example, the Specification states, ...

... Each sensor is controlled under or with an independent signal integration time . . . [and] [t]he images obtained in each channel under the different integration times are obtained simultaneously or nearly simultaneously, so undesirable temporal aliasing from moving scenes or camera motion is minimized. *Id.* at 3:43–57 (emphasis added).

Decision Denying Institution, IPR2022-00710, Paper #13, 11-13 (PTAB 2022) (emphasis added).

Cognizant that it was not writing on a clean slate, given the Board’s earlier construction of the claims, the Petitioner here framed the present challenge as one that applied the prior art in accordance with those prior constructions. From the Petition:

Terms in the Challenged Claims were construed by the Board in the Toyota IPR and by the Court in *Intellectual Ventures I LLC et al. v. General Motors Company et al.*, WDTX 6:21-CV-1088 (“GM Litigation”). Ex.1002, 14-18; Ex.1015, 46-54. Petitioner has summarized these constructions for completeness and applies the prior art in this Petition in accordance with those constructions. Petition, 7 (emphasis added).

Now that it is apparent that the mappings in the Petition fail to meet the Board’s earlier interpretation of the claims, the Petitioner attempts to change course in the Reply by arguing controlling “an integration time of each sensor” does not require controlling “the integration time of an individual sensor distinct from the other sensor(s)” (or independently), as the Board previously found. Petitioner forfeited its right to quarrel with the Board’s earlier interpretation of the ‘158 Patent by failing to do so in the Petition itself. Even if the Petitioner had timely raised the issue, the Board in these proceedings should proceed in accordance with the Office’s commitment to defer to the Office’s previous finding<sup>1</sup> that the claims require

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<sup>1</sup> See, e.g., *Advanced Bionics, LLC v. Med-El Elektromedizineische Gerate GMBH*, IPR2019-01469, Paper #6, 8-9 (PTAB 2019) (Precedential) (identifying “a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown”).

controlling “the integration time of an individual sensor distinct from the other sensor(s)” because, among other reasons, that is the correct interpretation of the claim language.

Petitioner tries to re-label Patent Owner’s position as a demand that claim 1 include a particular adverb such as “independent,” “separately,” or “simultaneously,” and then argues that because claim 1 uses only “control,” Patent Owner is impermissibly importing extra words into the claim. (Reply, 11–14.) That argument ignores the Board’s finding in the Toyota IPR that the claims require controlling “the integration time of an individual sensor distinct from the other sensor(s),” which is the same thing as independently controlling the integration time of each sensor. IPR2022-00710, Paper #13, 11-13. As the Board found in the Toyota IPR, the disclosure in the specification that “[e]ach sensor is controlled under or with an independent signal integration time” is “in accord with” the Board’s finding that the claims require controlling “the integration time of an individual sensor distinct from the other sensor(s).” *Id.*

A construction that treats “control ... of each sensor” as satisfied by “one value applied to both” effectively eviscerates that Board’s finding that the claims require controlling “the integration time of an individual sensor distinct from the other sensor(s).” Moreover, as Dr. Saber explains, in ordinary engineering usage and consistent with the specification, “control an integration time of each sensor”

denotes per-sensor control integration time, not a global value broadcast identically to all channels. (EX2017, ¶70).

Petitioner argues the Board’s Toyota IPR analysis did not “rewrite” the word “control” into “independent control.” That is a strawman because it focuses on the word “control” in isolation, rather than the phrase “a processing component configured to control an integration time of each sensor” as a whole. With respect to that phrase (as a whole), the Board found that it required controlling “the integration time of an individual sensor distinct from the other sensor(s) in the group,” and characterized its interpretation as being in accord with the disclosure in the specification that “[e]ach sensor is controlled under or with an independent signal integration time.”

Petitioner points out that the specification uses several formulations involving “control” (e.g., “automatically control,” “separately control,” “separately and simultaneously control,” “independent control”) and asserts that because claim 1 uses only “control,” there is no requirement to control “the integration time of an individual sensor distinct from the other sensor(s),” as the Board previously found. (Reply, 12). Again, that reasoning fails because it focuses on the word “control” in isolation. The claims recite that phrase: “a processing component configured to control an integration time of each sensor.” As the Board found in the Toyota IPR, in the context of the specification, the recitation of the “each sensor” within that

claim phrase means controlling “the integration time of an individual sensor distinct from the other sensor(s).” As Dr. Saber explains, the specification of the ‘158 Patent is in accord with this interpretation because it discloses a pipeline in which the processor selects an integration time for each camera channel, image captures under those respective settings, and then combines that data. (EX2017, ¶71). Petitioner’s attempt to treat “control ... of each sensor” as satisfied by a common-value regime is not a neutral “plain meaning” application; it is a construction that is at odds with both the Board’s decision in the Toyota IPR and the patent specification as a whole. (EX2017, ¶71). Moreover, it is an improper, late attempt to rewrite the argument in the Petition.

The Reply also argues that because claims in a continuation patent filed years after the ‘158 Patent issued recite “independently control simultaneous data acquisition” or “separately and simultaneously controlling,” the claims of the ‘158 Patent must mean something other than what the Board said in the Toyota IPR. (Reply, 12–14). The claims in the continuation patent do not alter the meaning of the claims of the ‘158 Patent. Nor does the Reply cite any authority for the proposition that claims in a later continuation patent can be used to nullify or undercut the Board’s earlier construction of the parent patent.

## II. IN THE ‘158 PATENT, CONTROLLING THE INTEGRATION TIME OF A SENSOR REQUIRES CONTROLLING A CHARGE ACCUMULATION SWITCH

The ‘158 Patent expressly defines “integration time” as “the time the image sensor collects and integrates signal from the scene.” EX1001, 4:4-6 (emphasis added). The ‘158 Patent also expressly defines “[i]ntegration time control,” also referred to as “focal plane shutter control” as controlling “the time the electrical signal is integrated or accumulated by controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor.” *Id.*, 4:46-50 (emphasis added). Given those definitions, the claim language that recites a “processing component configured to control an integration time of each sensor” requires a processing component configured to control “a switch (e.g., charge integration switch)” that controls “the time the image sensor collects and integrates signal from the scene.” (EX2017, ¶44).

Petitioner makes the specious argument that “integration time control” as defined in the specification is untethered to the phrase “control an integration time” in the claim, and therefore the definition of “integration time control” set forth in the specification fails to inform the meaning of “control an integration time” in the claim. (Reply, 9–11). However, the only grammatical difference between “integration time control” and “control an integration time” relates to the part of speech of “control”: in the former phrase “control” is used in its noun form, while in

the latter phrase “control” is used in its verb form. However, the explicit definition of “integration time control” set forth in the specification makes clear that this is a distinction without a difference because the specification defines the “integration time control” (where “control” is used in its noun form) by using “control” in its verb form. EX1001, 4:46-50 (“Integration time control [noun] ... controls [verb] the time the electrical signal is integrated or accumulated by controlling [verb] a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor”). Tellingly, the Reply points to no evidence in the intrinsic record that even remotely suggests that the meaning of “control an integration time” in the claims fails to completely align with the meaning of “integration time control” as defined in the specification.

Petitioner implicitly treats “control[ling] an integration time” as defined and claimed in the ‘158 Patent as interchangeable with any system-level exposure setting or with downstream clocking/readout decisions. Dr. Saber explains why that is technically wrong in the context of the CCD/CMOS imaging techniques disclosed in the relied-on references. In CCD/CMOS imagers, there are two distinct layers of timing: a pixel-domain, focal-plane layer that opens and closes the charge-collection path (the integration gate), and a separate sequencer/readout layer that controls transfer, sampling, and conversion after charge has been collected. (EX2017, ¶90). A system can manipulate the sequencer/readout layer (for example, initiating

transfer earlier or advancing row cadence) and thereby affect when the charge is moved or read, without ever performing focal-plane shutter control that defines the start/stop of charge accumulation at the pixel. (EX2017, ¶¶91–93).

That distinction is not an “extra limitation.” It is the engineering content of what the ‘158 Patent defines as “integration time control” (which the patent itself equates with focal-plane shutter control) accomplished by controlling the time the electrical signal is integrated or accumulated by controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor controlling a switch coupled to the sensor. EX2017, ¶44; EX2017, ¶92. Dr. Saber’s testimony makes the point concrete: absent an active command that gates the sensor-local integration switch (reset/clear/transfer gating at the focal plane), changing frame-transfer timing or readout cadence is “schedule control,” not control of the integration time at the focal-plane. (EX2017, ¶¶91–93). That is exactly why, as defined in the ‘158 Patent, “integration time control” is distinct from upstream exposure heuristics or downstream sequencing. (EX2017, ¶96). Petitioner’s “plain meaning” approach effectively collapses these distinct layers by alleging that a reference satisfies “control an integration time” without disclosing any mechanism that controls the time the electrical signal is integrated or accumulated by controlling a switch (e.g., charge integration switch) coupled or

connected to the sensor or a photo-detection mechanism of a sensor, as required by the claims of the ‘158 Patent. (Reply, 11).

Petitioner cannot carry its burden of demonstrating that the references disclose the requirements of integration time control as defined in the ‘158 Patent by pointing to generalized statements that a controller produces “exposure control signals” or that a timing block drives sensor circuitry, because those statements do not identify focal-plane gating that controls the time the electrical signal is integrated or accumulated by controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor, as required by the ‘158 Patent. (EX2017, ¶94). Dr. Saber explains this in the specific context of Yu: Yu describes system-level exposure-time control signals and “necessary control signals” driven by histogram feedback, but does not identify the focal-plane actuator (reset/clear/transfer gating) or specify per-sensor gate/clear waveforms that define the time the electrical signal is integrated or accumulated by controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor, as required by the ‘158 Patent. (EX2017, ¶94). In contrast to the ‘158 Patent’s definition of “integration time control,” Yu controls the system’s exposure layer rather than a switch (e.g., a charge integration switch) that controls integration time at the focal plane.

### III. THE ADDITIONAL REQUIREMENT IN CLAIM 2 THAT INTEGRATION TIME IS CONTROLLED “DURING A FRAME” IS NOT SATISFIED BY INTEGRATION TIME CONTROL APPLIED DURING “A PERIOD OF TIME”

The Reply treats claim 2 as a nullity by arguing that “during a frame” “defines a period of time” and “does not define specific technical implementations,” and then insisting that Matsushima’s shutter-gate “on/off” signal meets the claim language. Reply, 11–12; Reply, 24–25. However, in claim 2, the phrase “during a frame” imposes a temporal constraint requiring control of the integration time for each during the frame-capture window (i.e., between the start and end of the window), rather than, e.g., simply defining the start and end of that window.

Dr. Saber explains why Petitioner’s “spans the entire integration period” theory is a non sequitur. Even if “during a frame” is understood as the exposure interval for that frame, the question remains what control action occurs within that interval and whether it is per-sensor. Claim 2 is not satisfied by pointing to the mere existence of an electronic shutter structure and then narrating, at a high level, that “charges accumulate” until accumulation ends. Dr. Saber explains that, read in light of the ‘158 Patent’s treatment of integration-time control as focal-plane shutter gating, “during a frame” requires in-frame actuation of the focal-plane (charge-integration) gate that opens and closes each sensor’s integration window *while that frame’s data are being collected*. (EX2017, ¶¶146–147). That is the entire reason

claim 2 is separately claimed as a “further configured” limitation: it is directed to in-frame application of integration-time control, not merely the selection of an exposure setting.

The Reply characterizes Patent Owner’s position as an “improper” attempt to rewrite “during a frame” to require “actuating the focal-plane switch,” then tries to win by asserting that any shutter-gate control necessarily “happens during the frame for completing the integration period.” (Reply, 23–25). That collapses claim 2 into a tautology: whenever a shutter exists, its state necessarily “spans” the exposure. If that were enough, claim 2 would add nothing to claim 1. But claim 2’s added language must have meaning. Arguing that the language of claim 2 means that “the exposure lasts some amount of time” is tantamount to ascribing no meaning to the additional requirements of claim 2. Dr. Saber’s testimony supplies the claim-faithful boundary: claim 2 requires an identified in-frame control event attributable to the processing component. EX2017, ¶¶146–147.

#### **IV. GROUND 1:**

##### **A. Petitioner’s “illogical” critique does not supply the missing disclosure of per-sensor integration-time control in Matsushima**

The Reply argues that Patent Owner’s “single common integration time” reading is “illogical” because Matsushima allegedly includes “separate EV” measurement circuits and therefore must be using different integration times for the

two imaging systems. Reply, 27. But Petitioner’s attorneys’ argument is not evidence of what Matsushima *discloses*, and it does not cure the core defect in Petitioner’s Ground 1 mapping: Petitioner still cannot point to any passage in Matsushima that sets, actuates, or applies distinct integration-time values for CCD 18A versus CCD 18B.

The only evidence of what Matsushima teaches is Matsushima’s own AE description, which repeatedly uses singular exposure-control variables applied across both channels. Dr. Saber explains that Matsushima describes a single AE solution in which the CPU determines “the final aperture value and shutter speed” (singular), and then the “CCD 18A and CCD 18B charge accumulation time” is controlled using an electronic shutter “to reach the determined shutter speed,” again in the singular. EX2017, ¶109. That disclosure aligns with Matsushima’s system architecture: a single CPU drives a single timing generator (TG) that provides timing to both CCD drive circuits, and “each circuit is driven synchronously” by the TG. EX2017, ¶108. In a synchronous TG architecture, the natural—and disclosed—operation is common-mode shutter gating, not two distinct in-frame integration windows. (EX2017, ¶110). Dr. Saber further explains that independent per-sensor integration-time control would require de-synchronized per-channel timing (e.g., distinct shutter-gate pulse trains or distinct timing domains) so CCD 18A and CCD

18B integrate for distinct intervals, and Matsushima does not disclose that; it discloses the opposite: one CPU, one TG, synchronous drive. EX2017, ¶111.

Petitioner’s “illogical” label is therefore a rhetorical substitute for disclosure. Even if Matsushima contains two “integration circuits,” Petitioner must still show that Matsushima teaches those circuits being used to implement distinct per-sensor integration times. (Reply, 27). Dr. Saber explains why that inference does not follow. In Matsushima’s disclosed control domain, the TG can coordinate readout and downstream timing across two channels without establishing distinct focal-plane integration windows; the presence of circuitry that could, in theory, support a divergence does not establish that Matsushima actually does so. EX2017, ¶121. Under the Board’s trial standard (see *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15–17 (PTAB Aug. 24, 2022) (precedential)), Petitioner cannot replace a missing teaching with “it would be illogical otherwise,” particularly where the reference’s own AE narrative points the other way through repeated singular control variables and synchronous timing. EX2017, ¶109; EX2017, ¶111.

**B. Petitioner’s “different FOV → different luminance → different integration times” theory is an inference that Matsushima itself does not teach**

The Reply also doubles down on the proposition that because the two imaging systems have different fields of view, they “receive different subject luminance,” which supposedly “leads to different integration times.” (Reply, 25–26). But that

“leads to” step is exactly what is missing from Matsushima. Dr. Saber addresses this head-on: The assertion of Petitioner’s expert that Matsushima provides a broad dynamic range “by combining images ... having different integration times” is not supported “either expressly or inherently” by Matsushima. EX2017, ¶125. When the underlying citations are examined, Matsushima’s synthesis paragraphs describe wide-angle/telephoto capture and compositing, not distinct integration times. EX2017, ¶126. And the key AE paragraph relied on by Petitioner refers to “the charge accumulation time” in the singular for “the CCD 18A and CCD 18B,” which “indicates that the same charge accumulation time is used to drive both devices.” EX2017, ¶127.

That matters because Matsushima never discloses the distinct per-sensor integration-time control required by the claims of the ‘158 Patent. As Dr. Saber explains, recognizing that Matsushima fails to disclose distinct integration times, Petitioner’s expert “pivots” to the assertion that a POSITA “would have understood” different values for different luminance across different FOVs. EX2017, ¶129. But “a POSITA would have understood” cannot rewrite a reference that repeatedly uses singular AE variables and a synchronous TG architecture, and it cannot stand in for the missing disclosure of distinct per-sensor integration-time control. EX2017, ¶¶109, 111 and 129. This is especially true where Petitioner’s characterization of Matsushima has required adding words not found in the reference: Dr. Saber

documents that Petitioner inserted “respectively” into its parenthetical summary of Matsushima’s AE paragraph, even though the word “does not appear in Matsushima,” and that this edit “substantially changes the meaning” of what Matsushima actually says. EX2017, ¶123. The need for Petitioner’s improper addition underscores that the “different integration times” concept is being imported, not disclosed. EX2017, ¶123; Reply, 25–26.

**C. An “electronic shutter at each CCD” is not the same thing as distinct per-sensor integration-time control.**

Finally, Petitioner argues that Matsushima satisfies the requirement for distinct per-sensor integration-time control limitation because each CCD has an electronic shutter and thus “each sensor” has accumulation time control, including focal-plane shutter control and control of a switch. (Reply, 27, 31–32). Patent Owner does not dispute that Matsushima describes electronic shutter hardware elements at each CCD. But that does not equate to the claimed processing component configured to “control an integration time of each sensor,” which requires distinct per-sensor control of integration time. Petitioner must show that Matsushima teaches the processing component actually controlling integration time on a per-sensor basis, not merely that electronic shutter structures exist on the sensors. EX2017, ¶121. As Dr. Saber explains, in Matsushima’s disclosed configuration, the electronic shutter capability is operated under common timing from the single TG, yielding a common

integration window—the very opposite of the distinct per-sensor control required to meet the claim language. EX2017, ¶¶110, 111.

The Reply tries to “fix” Ground 1 by arguing that distinct per-sensor control exists in Matsushima because it would be “illogical” otherwise and different luminance would “lead to” different integration times. Reply, 25–27. However, Matsushima’s disclosure is limited to what the reference actually says, not to what Petitioner’s expert now conveniently (and entirely conclusory) speculates is “logical” or “illogical.” That disclosure is limited to singular AE variables applied via a single CPU and a single TG driving both channels synchronously. EX2017, ¶¶108–111. Inferences cannot supply the missing teaching of distinct per-sensor integration-time control—particularly where the inferences run directly into Matsushima’s own words and architecture. EX2017, ¶¶109, 127 and 129.

**D. Claim differentiation does not rescue Petitioner’s “broadcast one value” theory**

Petitioner invokes dependent claim differentiation, pointing to dependent claims that recite a “relatively shorter” or “less than” relationship, to argue that the independent claims cannot require different integration time values. (Reply, 22). That argument overlooks how the claim set is drafted. The independent claims use different verbs to capture different stages of the exposure control pipeline. Claim 1 requires a processing component configured to “control an integration time of each

sensor,” while claim 9 separately requires “determin[ing] an integration time of each channel of the plurality of channels.” Claim 11 then depends from claim 9 and adds a relative constraint: “wherein the integration time of at least one channel is relatively shorter than the integration time of at least one other channel.” The claim set therefore distinguishes between selecting or computing per channel integration time values (“determine”) and effectuating those values at the sensors during capture (“control”).

Under that structure, Petitioner’s claim differentiation point does not justify collapsing claim 1’s “control of each sensor” into a common mode broadcast. Claim 11 does not supply, for the first time, the existence of per-channel integration time variables. Claim 9 already requires that an integration time be determined for each channel, and claim 11 merely specifies a relationship among the already determined per-channel values. Claim 11 refines what is determined under claim 9. It does not define what “control” means under claim 1, and it does not authorize Petitioner to treat claim 1 as satisfied by a system that produces only a single global integration time value applied identically to all channels.

This is also why Petitioner’s “broadcast one value” theory is inconsistent with the claim set’s structure. A broadcast one value regime is not a determination of “an integration time of each channel,” as claim 9 requires, because it is the determination of one integration time for the system. Even if Petitioner relabels a single broadcast

value as “an integration time” for each channel by asserting that each channel “has” that same value, that approach renders claim 11’s relative shorter limitation largely meaningless. A single common value cannot satisfy a relative shorter relationship without additional per channel degrees of freedom that Petitioner’s theory denies. Dr. Saber confirms the Prior PTAB interpretation that the claim set is coherent when “control an integration time of each sensor” is given operative effect as per sensor control authority over the sensor local integration interval, rather than reduced to a global exposure label applied across channels. (EX2017, ¶70).

Properly read, the claim set uses “determine” in claim 9 to require per-channel integration time values, uses claim 11 to constrain those values, and uses “control” in claim 1 to require that the processing component be configured to effectuate integration time control at the sensors. Petitioner’s “broadcast one value” theory collapses those distinctions and renders multiple claim phrases superfluous.

## **V. GROUND 2:**

### **A. Petitioner’s “Yu teaches control ... integration time” theory is a relabeling argument, not an evidence-based mapping**

The Reply argues that, because Yu discloses per-sensor “exposure time” control signals, a POSITA would treat that as teaching “control an integration time of each sensor,” and any insistence on focal-plane gating or switch control is said to be an impermissible “implementation mechanism.” Reply, 26–27. That argument is

not a mapping of claim language to Yu; it is a substitution of labels for missing disclosure.

The claim term at issue is not “exposure control.” The challenged claims require “control[ling] an integration time of each sensor” by “controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor controlling a switch coupled to the sensor.” EX1001, 4:46-50. The ‘158 Patent equates the required integration time control with “focal plane shutter control,” which is not merely an exposure “setting.” EX2017, ¶¶90–96. For example, as Dr. Saber explains, there is a critical divide between (i) focal-plane, pixel-domain gating that opens and closes the charge-collection path (the integration gate), and (ii) off-sensor driver and sequencer timing (frame/line/transfer clocks) that schedules transfer, sampling, and readout. EX2017, ¶¶90–96. A system can adjust the latter and even reduce effective exposure opportunity, but unless it actuates the sensor-local gate that defines when charge accumulation starts and stops, it has not performed integration-time control as defined in the ‘158 Patent. *Id.*

Yu falls short because it discloses only that image-processing circuitry produces control signals “each controlling the exposure time” of a respective sensor and routes those signals to per-sensor control circuits, derived from histogram feedback. EX2017, ¶¶164–165. Yu does not disclose whether its “exposure time” is

implemented optically (aperture/ND), mechanically, or electronically at the focal-plane, nor does it disclose any on-sensor charge-integration switch, or reset/clear gating that would define a focal-plane integration window. *Id.*, ¶¶164–166. In other words, Yu discloses the existence of a feedback loop and control signals; it does not disclose the actuator that actually opens and closes each sensor’s integration interval. *Id.*, ¶¶164–168. Given that the ‘158 Patent draws a technical line between focal-plane integration gating and other techniques such as generic exposure control or sequencer/readout scheduling, Petitioner fails to demonstrate that the claim language is met by pointing to a generic “exposure time” label that is silent on implementation. EX2017, ¶¶90–96 and 164–168.

**B. The Reply’s “car vs automobile” analogy underscores that Petitioner is litigating semantics rather than disclosure.**

The Reply purports to reframe Petitioner’s position as merely “recognizing” that Yu’s disclosed “on-sensor exposure time control” is understood by a POSITA to be the same as “controlling an integration time,” likening it to “a car” disclosing “an automobile.” Reply, 27. The analogy fails because the dispute is not about synonymous nouns; it is about whether the prior art discloses the explicitly defined control modality needed to meet the claim limitation as used in the ‘158 Patent.

The terms “car” and “automobile” refer to the same object, and therefore are not an apt analogy. A better analogy would involve the terms “vehicle” and

“bicycle.” Just as the term “vehicle” is generic and can cover everything from automobiles to trains, ships, airplanes, helicopters and bicycles, the term “exposure time” is a functional objective that can be realized in multiple non-equivalent ways such as control of the optical aperture, mechanical shuttering, on-sensor charge-integration switch, among others. Just as the generic disclosure of a vehicle does not equate to a disclosure of a bicycle, Yu’s generic disclosure of “exposure control” does not equate to “control[ling] an integration time of each sensor” by “controlling a switch (e.g., charge integration switch) coupled or connected to the sensor or a photo-detection mechanism of a sensor controlling a switch coupled to the sensor,” as required by the claims of the ‘158 Patent. EX1001, 4:46-50; EX2017, ¶¶164–165. Where, as here, the reference is silent on implementation, calling the function by another name is not “recognition”; it is impermissible gap-filling. EX2017, ¶166.

**C. The Reply’s “not inherency” framing demonstrates that Petitioner lacks proof that Yu necessarily includes the claimed integration-time control**

The Reply also argues Petitioner “does not rely on inherency,” asserting instead that Yu expressly discloses “on-sensor exposure time control,” and that it is “well-known” that controlling integration time is a fundamental implementation of exposure time control. Reply, 27. But this is simply inherency/common-knowledge gap-filling under a different label. If Yu does not disclose the actuator and implementation modality, then the proposition “Yu therefore controls integration

time” is either (i) a claim of necessary presence in Yu’s system, or (ii) an obviousness theory that purports to supply the missing element from general knowledge without identifying where the element appears in the reference. Either way, the Petitioner lacks evidentiary support that the limitation is taught or would necessarily have been implemented in the proposed system, not merely that it could have been. EX2017, ¶¶164–166.

Dr. Saber’s testimony explains why “could have” is not enough here. Off-sensor sequencer timing can change when charge is transferred or read without ever opening and closing the integration gate at the sensor, and Yu’s disclosure fits that off-sensor side of the divide because it identifies processing and control signals but not focal-plane gating. EX2017, ¶¶90–96. If Petitioner’s theory is that a POSITA would necessarily implement Yu’s exposure-time control using sensor-local electronic shutter gating, the Petitioner failed to meet its burden of proof because Yu is silent with respect to such implementation details and Petitioner has failed to demonstrate that such implementation details are inherent in Yu. EX2017, ¶¶164–166.

**D. Miyazaki does not cure Yu’s silence; it highlights why Petitioner’s combination requires missing multi-sensor mechanics.**

The Reply accuses Patent Owner of misrepresenting the Yu–Miyazaki combination by characterizing it as importing Miyazaki’s mechanical shutter into

Yu, and the Reply asserts that the combination uses only Miyazaki's electronic shutter "for each sensor" in Yu. Reply, 28. That still does not cure Yu's defect because Miyazaki is a single-sensor camera reference. Dr. Saber explains that Miyazaki teaches electronic-shutter timing only for one CCD and does not disclose any mechanism to synchronize distinct per-sensor gating events across multiple sensors, which is precisely what would be required to implement multi-sensor, in-frame integration-time control. EX2017, ¶¶182–184. Nor does Miyazaki disclose the "feedback-to-gate wiring per sensor" that would be necessary to morph Yu's histogram-based exposure-time loop into distinct gating inputs at each sensor. EX2017, ¶182. Scaling a single-sensor electronic shutter scheme to multiple sensors is not a "copy-paste" exercise. In the context of the proposed combination, it would require multi-channel shutter timing generation with independently programmable widths/phases, inter-sensor phase relationships within the frame budget, and downstream alignment so differently exposed streams can be fused without conflicts or artifacts -- none of which is disclosed in Miyazaki or Yu. *Id.*, ¶¶183–184.

This is where the Reply's "no bodily incorporation of a mechanical shutter" rebuttal misses the point. Patent Owner's feasibility critique is not a literal requirement that Petitioner must import a mechanical shutter; it is a demonstration that Petitioner's proposed combination is internally inconsistent and under-specified. The Petition alternates between (i) importing Miyazaki's mechanical-

plus-electronic shutter scheme (which becomes infeasible at Yu’s scale) and (ii) cherry-picking only the electronic portion (which Miyazaki itself does not teach as a standalone multi-sensor solution), while still never supplying the multi-sensor focal-plane gating architecture that the claim limitation requires. EX2017, ¶¶182–184 and 202–205). The absence of that architecture is not “enablement-like detail”; it is the absence of the features required by the claims of the ‘158 Patent.

**E. The Reply’s “enablement-like specifics” response confuses the enablement doctrine with Petitioner’s burden to prove the missing element is taught or would have been implemented.**

Finally, the Reply argues there is “no absolute requirement” that a relied-upon reference be self-enabling and that “multi-sensor, on-sensor shutter systems were well established,” so Yu “need not detail every well-known technique.” Reply, 28–29. Even accepting the legal premise, it does not fill the void in the present record. Petitioner is not missing “every technique”; Petitioner is missing any disclosure tying Yu’s exposure-time control signals to focal-plane integration gating at each sensor and any disclosure of the multi-sensor in-frame coordination that would make Miyazaki’s single-sensor electronic shutter relevant to Yu’s architecture. (EX2017, ¶¶164–166, 182–184 and 202–205). The issue is not whether a POSITA could imagine an electronic shutter exists somewhere in the universe; the issue is whether the asserted art, alone or as combined, provides a reasoned, evidence-supported teaching of per-sensor integration-time control as claimed, rather than a post hoc

reconstruction that relabels “exposure time” as “integration time” and declares the missing mechanics “well-known.” EX2017, ¶¶164–166; Reply, 27–29.

On this record, the Board should treat Petitioner’s Ground 2 “Yu teaches control integration time” argument as what it is: a semantic substitution that leaves the key implementation modality undisclosed, and a combination theory that relies on a single-sensor shutter reference without supplying the multi-sensor focal-plane timing, synchronization, and wiring that would be necessary to implement the asserted control across Yu’s plurality of sensors.

## **VI. CONCLUSION**

For at least the foregoing reasons, Petitioner has not met its burden to prove unpatentability by a preponderance of the evidence, and the Board should enter a Final Written Decision confirming the patentability of the challenged claims.

Respectfully submitted,

Dated: February 3, 2026

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

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 5,599 words, excluding the parts of this Patent Owner's Sur-Reply that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Sur-Reply.

Respectfully submitted,

Dated: February 3, 2026

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## **CERTIFICATE OF SERVICE**

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S SUR-REPLY** was served via email (as consented to by counsel) on February 3, 2026 to lead and backup counsel of record for Petitioner as follows:

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