

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

INTELLECTUAL VENTURES II LLC.,
Patent Owner

IPR2025-00222
U.S. Patent No. 9,232,158

**PETITIONER'S REPLY TO
PATENT OWNER'S RESPONSE**

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Ex.1002	Prosecution History of U.S. Application No. 14/063,236 (issued as the '158 patent)
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Ex.1004	<i>Curriculum Vitae</i> of R. Michael Guidash
Ex.1005	U.S. Pat. No. 6,611,289 to Yu et. al
Ex.1006	U.S. Pat. No. 7,365,780 to Miyazaki
Ex.1007	JP Application Publication No. JP2003-319231 to Matsushima (Certified English Translation + Declaration + Japanese)
Ex.1008	Eastman Kodak Company, Shutter Operations for CCD and CMOS Image Sensors, Application Note, MTD/PS-0259, Revision 1 (October 23, 2001) (retrieved from https://web.archive.org/web/20030419002619/http://www.kodak.com/global/plugins/acrobat/en/digital/ccd/applicationNotes/ShutterOperations.pdf)
Ex.1009	Eastman Kodak Company, Kodak CMOS Image Sensors White Paper (November 10, 2000) (retrieved from https://web.archive.org/web/20010611235410/http://www.kodak.com/US/plugins/acrobat/en/digital/ccd/cmos.pdf)
Ex.1010	Eastman Kodak Company, Kodak Digital Science KAC-0311 Image Sensor (August 5, 2002) (retrieved from https://web.archive.org/web/20030411152500/http://www.kodak.com/global/plugins/acrobat/en/digital/ccd/products/cmos/KAC-0311LongSpec.pdf)
Ex.1011	U.S. Pat. No. 7,733,414 to Kobayashi
Ex.1012	Dave Litwiler, "CCD vs. CMOS: Facts and Fiction, Photonics Spectra" (January 2001)

Ex.1013	U.S. Application Pub. No. 2004/0239771 to Habe
Ex.1014	EP Application Pub. No. EP0858208 to Weldy et al.
Ex.1015	Memorandum in Support of Claim Construction Order, <i>Intellectual Ventures I LLC et al. v. General Motors Company et al.</i> , 6:21-CV-1088 (WDTX), December 1 st , 2022
Ex.1016	Texas Instruments, TC255P 336- × 244-PIXEL CCD IMAGE SENSOR (March 2003)
Ex.1017	IV’s Complaint, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , No. 6:24-cv-188-ADA (WDTX)
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Ex.1019	Statistics on District Court Timing
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Ex.1021	Eastman Kodak Company, Solid State Image Sensors Terminology, Application Note, DS 00-001, Revision 0 (December 8, 1994) (retrieved from https://web.archive.org/web/20030413064955/http://www.kodak.com/global/plugins/acrobat/en/digital/ccd/applicationNotes/terminology.pdf)
Ex.1022	U.S. Pat. No. 7,830,435 to Guidash
Ex.1023	Eastman Kodak Company, Charge Coupled Device (CCD) Image Sensors, CCD Primer, MTD/PS-0218, Revision No. 1 (May 29, 2001) (retrieved from https://web.archive.org/web/20030422183725/http://www.kodak.com/global/plugins/acrobat/en/digital/ccd/applicationNotes/chargeCoupledDevice.pdf)
Ex.1024	Szeliski, “Image Mosaicing for Tele-Reality Applications,” (May 1994)
Ex.1025	Mann et al., “On Being ‘Undigital’ with Digital Cameras: Extending Dynamic Range By Combining Differently Exposed Pictures,” (May 1995)

Ex.1026	Debevec et al., "Recovering High Dynamic Range Radiance Maps from Photographs," SIGGRAPH '97: Proceedings of the 24th annual conference on Computer graphics and interactive techniques, 369-378 (August 1997)
Ex.1027	PCT Pub. No. WO2001/010110 to Stark
Ex.1028	Yang et al., "A 640 512 CMOS Image Sensor with Ultrawide Dynamic Range Floating-Point Pixel-Level ADC," IEEE Journal of Solid-State Circuits, VOL. 34, NO. 12 (December 1999)
Ex.1029	CCD Electronic Shutters, Interactive Java Tutorial, October 22, 2002 (retrieved from https://web.archive.org/web/20021028042044/https://micro.magnet.fsu.edu/primer/java/digitalimaging/ccd/shutter/index.html)
Ex.1030	Prosecution History of U.S. Application No. 11/212,803 (abandoned)
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Ex.1032	Prosecution History of U.S. Application No. 12/496,854 (issued as U.S. Pat. No. 8,198,574)
Ex.1033	Prosecution History of U.S. Application No. 13/465,229 (issued as U.S. Pat. No. 8,334,494)
Ex.1034	Prosecution History of U.S. Application No. 13/681,603 (issued as U.S. Pat. No. 8,598,504)
Ex.1035	Holst, CCD arrays, Cameras, and Displays, 2nd edition (1998)
Ex.1036	U.S. Pat. No. 4,831,403 to Ishida et al.
Ex.1037	U.S. Pat. No. 7443,427 to Takayanagi
Ex.1038	U.S. Pat. No. 4,642,679 to Nagano
Ex.1039	e2v Technologies, CCD Sensors Technical Note: Glossary of Terms (2003)
Ex.1040	Ralph E. Jacobson et al., The Manual of Photography: photographic and digital imaging, 9th Edition (2000)
Ex.1041	U.S. Pat. No. 6,215,597 to Duncan et al.
Ex.1042	O'Donnell, The Practical Use of the Exposure Triangle (retrieved

	from https://creativeraw.com/practical-use-exposure-triangle-explained/)
Ex.1043	U.S. Pat. No. 2,953,983 to Larson
Ex.1044 (New)	Supplemental Declaration of R. Michael Guidash under 37 C.F.R. § 1.68
Ex.1045 (New)	U.S. Pat. No. 7,564,019 to Olsen et al.
Ex.1046 (New)	U.S. Pat. No. 7,916,180 to Olsen et al. (“180 Patent”)
Ex.1047 (New)	Prosecution History of U.S. Application No. 11/788,279 (issued as U.S. Pat. No. 7,916,180)
Ex.1048 (New)	Deposition of Eli Saber Transcript, IPR2025-00222 (December 1, 2025)
Ex.1049 (New)	Deposition of Eli Saber Transcript, IPR2025-00339 (December 8, 2025)
Ex.1050 (New)	Plaintiffs’ Responsive Claim Construction Brief, <i>Intellectual Ventures I LLC et al. v. General Motors Company et al.</i> , 6:21-CV-1088 (WDTX) (“GM Litigation”), August 1 st , 2022
Ex.1051 (New)	Patent Owner’s Response, IPR2025-00339 (October 17, 2025)
Ex.1052	RESERVED
Ex.1053	Statistics on District Court Timing (Dec. 31, 2024)
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Ex.1055	Amended Order Assigning the Business of the Court (Judge Moses, Jan. 31, 2025)
Ex.1056	LexMachina docket report
Ex.1057	LexMachina docket report
Ex.1058	“Albright Worried Multipatent Trials Ask Too Much Of Jurors,” Law360 (Dec. 18, 2020), at https://www.law360.com/articles/1337976/albright-worriedmultipatent-trials-ask-too-much-of-jurors

Ex.1059	Bifurcation Order – Videolabs, Inc. v. Asustek Computer, Inc. 6:22-cv-00720-ADA (WDTX)
Ex.1060	Joint Claim Construction Statement, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA, ECF No. 37 (WDTX) (March 28, 2025)
Ex.1061	“The economic contributions of Tesla to the California economy, 2018–2021,” IHS Markit (Oct. 2022), available at https://digitalassets.tesla.com/tesla-contents/image/upload/Tesla-California-Economic-Impact-Final-Report-October-2022
Ex.1062	“Tesla’s ‘American-made’ cars won’t get hit as hard by the auto tariffs,” CNN.com, https://www.cnn.com/2025/03/29/cars/american-made-cars-tesla-auto-tariffs/index.html , retrieved Apr. 14, 2025
Ex.1063	“An Assessment of the Impact of the Inter Partes Review Process under the Patent Trial and Appeal Board on the US Economy,” The Perryman Group, available at https://www.perrymangroup.com/publications/report/2021/9/23/an-assessment-of-the-potential-impact-of-expanding-inter-partes-review-ipr-under-the-america-invents-act-on-the-us-economy/
Ex.1064	’158 Patent Assignment Recordation
Ex.1065	“Tesla’s California Footprint,” https://www.tesla.com/blog/teslas-california-footprint (retrieved Apr. 25, 2025)
Ex.1066	“FAQs for Interim Processes for PTAB Workload Management,” available at https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management (retrieved May 13, 2025).
Ex.1067	Notice of <i>Sotera</i> Plus Stipulation for Defendant Tesla, Inc., <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA, ECF No. 59 (WDTX) (May 27, 2025)
Ex.1068	Defendant’s Final Invalidity Contentions, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA (WDTX) (May 22, 2025)

I. INTRODUCTION

Intellectual Ventures (“IV”), in its Patent Owner’s Response (“POR”), attempts to rewrite the claims by improperly importing extraneous limitations. IV’s arguments depend entirely on their improper claim constructions. The Board should reject IV’s rewriting of the claims and find the challenged claims unpatentable.

Moreover, the Petition’s grounds render the claims obvious even under IV’s improper constructions. The challenged claims are thus unpatentable under both the proper constructions and IV’s improper constructions.

II. CLAIM CONSTRUCTION

Petitioner adopted the prior constructions of the Board and the district court in the GM litigation. Pet., 7-8. To avoid prior art, IV seeks to import additional limitations into the claims. The Board should reject IV’s constructions. Ex.1044, ¶¶2-37.

A. “*integration time*” (claims 1-3, 8-9, 11, 13-16)

Petitioner’s Position / Court’s Construction in GM Litigation	IV’s Proposed Construction
“the time the image sensor collects and integrates signal from the scene” Ex.1015, 49.	“the time <u>interval during which</u> the image sensor collects and integrates signal from the scene” POR, 12.

IV seeks to alter the district court’s construction by replacing “time” with “time interval during which.” POR, 12. This conflicts with the express definition in the ’158 patent for “*integration time*,” which IV itself acknowledges. POR, 12;

Ex.1001, 4:3-7 (integration time means “the time the image sensor collects and integrates signal from the scene.”); Ex.1044, ¶3. IV provides no justification for deviating from the patent’s lexicography. The Board should reject IV’s addition and apply the express definition, as the court did in the GM litigation. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315-16 (Fed. Cir. 2005) (en banc) (claims should be construed according to an express definition in the specification).

B. “control an integration time of each sensor” (claim 1), “determine an integration time of each channel” (claim 9), and “identifying an integration time for each of a plurality of channels” (claim 15)

The Board should construe these terms according to their plain and ordinary meaning. IV proposes construing each of these terms as requiring “independent control of the integration time of each sensor.” POR, 14. The Board should reject IV’s improper constructions. Ex.1044, ¶¶4-24. To the extent the Board determines that construction is required, Petitioner has proposed constructions consistent with the specification. II.B.2.

1. IV’s construction should be rejected.

a. IV’s construction contradicts the specification and file history.

IV’s attempt to import “independent control” into the term “*control*” contradicts both the specification and file history. Ex.1044, ¶5. Applicant used varied expressions (e.g., “automatically controlled,” “separately control,” “separately and simultaneously control,” “independent control” and merely

“control”) to denote variations on “*control*.” In contrast, claim 1 recites only “*control*,” without the particularized limiting variation IV seeks to import. *Compare* Ex.1001, Abstract (“**separately control** an integration time”); 3:50-52 (“integration time...**automatically controlled and/or controlled** in response to a user input.”); 4:42-45 (“use integration time control to **control**...”); 4:56-59 (“**independent control**”); 5:4-6 (“**separately and simultaneously control** an integration time”); claims 1-2, 7-8, 14 (“**control**”); claim 13 (“**automatically control**”); claim 19 (“**separately controlling**”).

Construing “*control an integration time of each sensor*” as IV proposes would exclude embodiments that “automatically control,” “separately and simultaneously control,” “separately control,” or just “control” integration time. *Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1320 (Fed. Cir. 2005) (claims should not be construed to exclude embodiments). IV has not pointed to any definition or disclaimer for its exclusion. Ex.1044, ¶6.

The patent family confirms this differentiation. In Application 11/788,122 (the '158 patent's parent), Applicant amended claim 1:

1. (Currently amended) A digital camera comprising:

a plurality of sensors integrated in a semiconductor substrate, each sensor comprising an array of photo-detectors, wherein each sensor is configured to image the same field of view;

a plurality of optics component, each optics component configured to pass light to a sensor of the plurality of sensors, wherein each optics component and an associated sensor form one of a plurality of channels; and

a processing component coupled to the plurality of channels and configured to ~~separately and simultaneously~~ control an integration time of each sensor during a frame, wherein the integration time of at least one sensor is relatively shorter than the integration time of at least one other sensor, the processing component configured to combine data from the plurality of sensors received ~~simultaneously~~ during the frame to provide an image ~~having a large dynamic range.~~

Ex.1031, 66, annotated.

Here, Applicant amended “separately and simultaneously control” by removing “simultaneously,” demonstrating its differentiation between such formulations and mere “*control*.” Ex.1031, 66; Ex.1045, claims 1, 24, 40; Ex.2017, ¶¶56-58 (IV’s expert acknowledging this amendment); Ex.1044, ¶¶7-8.

Likewise, claims in US 7,916,180 in the family recite narrower variations of “control.” Ex.1046, claims 1, 19, 22, 36-37 (“**independently control** simultaneous data acquisition”); claim 32 (“**separately and simultaneously controlling**...the first and the second optics components”). The claims of the ’158 patent do not. Ex.1044, ¶9.

IV’s expert, Dr. Saber, attempts to override this record by asserting that claims 1, 9, and 15 each require “independent control” and “separately and simultaneously

controlling an integration time.”¹ Ex.1048, 48:17-49:3, 50:15-51:3; 51:9-12. This is the type of “misread[ing] the claim” Dr. Saber acknowledged. Ex.1048, 85:13-19 (Dr. Saber testified that reading “simultaneously” into “*separately controlling*” is “misread[ing] the claim”). Ex.1044, ¶¶10-13.

The Board should reject IV's attempt to import “independent” control into the claims.

b. IV's reliance on the Board's prior institution decision is misplaced.

IV misapplies the Board's analysis in the Toyota IPR. POR, 13-14; Ex.1044, ¶¶14-17.

As explained in the Petition, the Board interpreted claim 1 in the Toyota IPR to require that “each of the plurality of optics components is configured to pass light separately to **a distinct sensor** of the plurality of sensors,” and interpreted claims 9 and 15 to require “multiple independent structures that separately pass light to a **different respective sensor**.” Pet. 7-8; Ex.1002, 19-20 (IPR2022-00710, Paper 13).

Contrary to IV's assertion (POR, 13-14), the Board did *not* rewrite the term “*control*” to mean “independent control.” Rather, the Board found that the claims require a one-to-one configuration between an optics component and a sensor that form a channel. Ex.1002, 19-20; Pet.7-8. In supporting that conclusion, the panel

¹ Claims 9 and 15 do not recite “control,” much less “independent control.”

stated that this one-to-one configuration is consistent with [1.3] providing a configuration to “control the integration time of **an individual sensor distinct from the other sensor(s)** in the group.” Ex.1002, 16-17 (emphasis added). In doing so, the Board emphasized that each channel has a sensor “distinct from the other sensor(s) and the channels do not share a common sensor. The Board’s determination here concerned the distinctness of the sensors, not a requirement (or *dicta*) for a requirement of “independent control” as asserted by IV. Ex.1044, ¶¶15-16.

IV contends that its proposed constructions are required based on the Board’s previous one-to-one configuration requirement. POR, 13-14. But there is no dispute that: (i) the claims require such a one-to-one relationship; and (ii) the Petition’s grounds demonstrate precisely that relationship. Ex.1044, ¶17. Because there is no dispute on the very issue IV claimed its construction is meant to resolve, there is no need to construe this term. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (only terms in controversy need be construed, and only to the extent necessary to resolve the controversy).

c. IV improperly imports the same requirement into three distinct claim terms.

IV imports the same “independent control” requirement into each of claims 1, 9, and 15. POR, 12. For claim 1, IV asserts that “*control*” should be redefined as

“independent control.” POR, 14. Rewriting “*control*” as “independent control” is improper, and should be rejected. II.B.1.a.

IV extends this assertion to independent claims 9 and 15, even though neither recites “*control*.” POR, 12. IV’s assertion of requirements based on a term entirely absent from the claim language should be rejected. Ex.1044, ¶¶18-19.

Moreover, IV ignores the differences among the terms “*control*,” “*determine*,” and “*identifying*” in claims 1, 9, and 15. *Phillips*, 415 F. 3d at 1314 (“Differences among claims can also be a useful guide in understanding the meaning of particular claim terms”). The Board should reject IV’s attempt to rewrite the claims. Ex.1044, ¶20.

2. Petitioner’s alternative constructions should be adopted if the Board determines that construction is required.

To the extent the Board determines that explicit constructions are needed, Petitioner’s alternative constructions below should be adopted. Ex.1044, ¶¶21-24.

Term	Petitioner’s Alternative Construction
“ <i>control an integration time of each sensor</i> ” (claim 1)	“control an integration time of each <u>distinct</u> sensor”
“ <i>determine an integration time of each channel</i> ” (claim 9)	“determine an integration time of each <u>independent</u> channel”
“ <i>identifying an integration time for each of a plurality of channels</i> ” (claim 15)	“identifying an integration time for each of a plurality of <u>independent</u> channels”

Although IV underlined the term “*each*” in the heading (POR, 12, §III.B), it offered no explicit construction of the term relative to the different claims. If IV’s

emphasis on “*each*” is meant to indicate that the claims exclude channels sharing a common optical component and/or common sensor, Petitioner’s alternative construction makes that clarification.

Petitioner’s alternative constructions are consistent with the Board’s constructions from the Toyota IPR, which provides (i) a one-to-one configuration between an optics component and a sensor that form a channel; and (ii) that one-to-one configuration is consistent with limitation [1.3], which “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.**” Ex.1002, 16-17. Petitioner’s alternative constructions likewise require a one-to-one configuration and exclude devices with channels that share a common optics component or image sensor. Ex.1044, ¶23.

The Board should therefore adopt Petitioner’s alternative construction should it deem construction necessary.

C. “a processing component configured to control an integration time of each sensor” (claim 1)

Construction in GM Litigation (Petitioner's Proposed Construction)	IV's Implicit Construction
plain and ordinary meaning. Ex.1015, 108-109.	No explicit construction in Section III.C of POR, but IV implicitly, requires both: (i) “applied at the focal plane of the image” and (ii) “performed by controlling a switch (e.g., charge integration switch). . . .” POR, 14-15, 44-45, 50-55.

1. IV's construction should be rejected.

IV's construction should be rejected because it improperly imports limitations, is unnecessary, and contradicts constructions in prior proceedings. Ex.1044, ¶¶25-28.

IV does not propose an express construction but implicitly construes this term by incorporating specific components from the specification that are not required by the claims. POR, 14-15. This is improper. *Phillips*, 415 F.3d at 1323 (“[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.”).

The district court already construed “*integration time*” (Ex.1015, 49; Pet., 8) (Section II.A) and construed “*a processing component configured to control an integration time of each sensor*” according to its plain and ordinary meaning. Ex.1015, 108-109. No further construction is needed.

IV now seeks an additional construction of “*control an integration time*,” adding unrecited implementation mechanisms including “applied at the focal plane” and “controlling a switch” on top of its constructions of “*integration time*” and “*control*.” POR, 14-15. The claim simply requires controlling an integration time, not any particular method or mechanism. IV’s arguments should therefore be rejected.

2. The ’158 patent does not define “*control an integration time*.”

IV’s arguments rely on an alleged express definition of “integration time control,” but this is wrong. “Integration time control” and “*control an integration time*” are different terms. Conflating them distorts the claim language. Ex.1044, ¶¶29-33.

The ’158 patent does not define the term “*control an integration time*.” “To act as its own lexicographer, a patentee must **clearly set forth a definition of the disputed claim term** other than its plain and ordinary meaning and must **clearly express an intent to redefine the term**.” *Kyocera Senco Indus. Tools Inc. v. Int’l Trade Comm’n*, 22 F.4th 1369, 1378 (Fed. Cir. 2022). Instead, IV substitutes a different phrase, “integration time control,” and treats that as if it were the claim term. That sleight of hand should be rejected. To the extent the term “*control an integration time*” requires construction, the Board should construe it as

“control[ling]” an “*integration time*,” where “*integration time*” is expressly defined by the specification and construed by the district court in GM litigation. *See* Section II.A. The disclosure cited by IV is not an express definition of “integration time control,” much less the claim term “*control an integration time*.” The statement “[i]ntegration time control, also referred to as ‘focal plane shutter’ control, controls the time the electrical signal is integrated or accumulated...” (Ex.1001, 4:46-50) is merely a description of a feature of an embodiment, not a definition.

The Board should reject IV’s attempt to rewrite the claims.

D. “*during a frame*” (claim 2)

Petitioner’s Proposed Construction	IV’s Implicit Construction
“during a period of time in which data for a single frame of an image is captured” Pet. 9	None in Section III (Claim Construction) of POR; “within the frame-capture window itself—i.e., actuating the focal-plane (charge-integration) switch that opens/closes each sensor’s integration window while that frame’s data are being collected, not merely choosing a value beforehand.” POR, 40.

IV does not expressly construe the term “*during a frame*.” POR, Section III; Ex.2017, Section VII; Ex.1048, 25:4-7 (Dr. Saber confirmed that no terms other than those listed in Section VII of his declaration were construed). Ex.1044, ¶¶34-37. However, in its analysis of claim 1, IV asserts that it requires “within the frame-capture window itself—i.e., actuating the focal-plane (charge-integration) switch

that opens/closes each sensor's integration window while that frame's data are being collected, not merely choosing a value beforehand." POR, 40.

IV's requirement should be rejected, because the term "*during a frame*" defines a **period** of time, and does not define specific technical implementations including "actuating the focal-plane (charge-integration) switch" as asserted by IV.

Petitioner's proposed construction should be adopted because it is supported by the specification and the surrounding language. Pet., 9-10; Ex.1003, ¶¶69-71. It is also supported by IV's expert's statements. Ex.1049, 71:5-6 (Dr. Saber stating that "during a frame" is "while the frame is **acquired and put together**" when testifying about the related '180 patent); *see also*, Ex.1049, 67:1-4; 79; Ex.2017, ¶181 (Dr. Saber stating that "**readout/CDS/A-D** must be sequenced so both sensors' data are **available for the same output frame**"); Ex.1051, 17 (IV admitting that "a '*frame*' is **digital data corresponding to a single image**").

Therefore, the Board should adopt Petitioner's proposed construction.

III. GROUND 1: MATSUSHIMA RENDERS THE CHALLENGED CLAIMS OBVIOUS.

A. Matsushima renders obvious independent claims 1, 9, and 15.

IV's arguments focus on limitation [1.3] of claim 1. As explained below at Section III.A.1, those arguments rely on IV's attempt to improperly import unrequired limitations into claim 1 and should be rejected. If the Board rejects IV's

improper constructions (it should), then IV has not contested the obviousness of the claims under their proper construction. Moreover, as shown in Section III.A.2, Matsushima renders obvious limitation [1.3] even under IV's improper claim construction. IV does not directly raise these arguments for claims 9 and 15; if it does, Petitioner's responses similarly apply. Ex.1044, ¶¶38-69.

1. IV's arguments fail because they rest on improperly imported requirements.

a. IV's improper requirement of "independent per-sensor control—more than one value applied to both" should be rejected.

IV argues, "[t]he claim language and intrinsic record require independent per-sensor control—more than one value applied to both." POR, 18. As discussed at II.B, IV's attempt to rewrite the claim should be rejected.

Further, IV's requirement of "more than one value applied to both" is inconsistent with the dependent claims. Dependent claim 11 recites, "the integration time of at least one channel is relatively shorter than the integration time of at least one other channel." *See also* Ex.1001, claim 16. Thus, the independent claims are **not limited** to different integration times, contrary to IV's assertion. *Phillips*, 415 F.3d at 1315 (dependent claim adding a limitation creates a presumption that the independent claim lacks that limitation).

Additionally, IV took the opposite position in the GM Litigation:

GM argues...that a POSITA would understand that the '158 Patent intends that multiple sensors with “different” integration times.... **This is incorrect.** The '158 Patent specification **does not limit** the term image capture device to one using “different” integration times.... **There is simply nothing in the specification that would limit integration time to a “different time.”**

Ex.1050, 21-22.

IV's improper requirement should be rejected.

b. IV's improper “same field of view” requirement should be rejected.

IV asserts that Matsushima's wide/tele compositor “is not the same-scene, single-frame fusion” claimed by the '158 Patent, and that its two paths “do not view the same field of view.” POR, 38. These arguments fail because the independent claims do not include a “same field of view” requirement.

IV's requirement contradicts the district court's construction of “*an image capture device*” as “a device including a plurality of sensors, where two or more of the plurality of sensors each capture **an overlapping portion of the same scene.**” Ex.1015, 52; Pet., 8. IV provides no justification for deviating from the district court's construction. *Cf. Revvo Techs., Inc. v Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20, 4 (Nov. 3, 2025) (precedential) (claims should be construed consistently across forums). Dependent claims 4 and 10 expressly add the

limitation of “the same field of view,” confirming that the independent claims do not have such a requirement. *Phillips*, 415 F.3d at 1315.

IV's requirement also contradicts its own statements in GM Litigation: “Dependent claim 4 limits claim 1 to require each sensor to image the same field of view....**Claim 1 is thus, not limited to sensors that must capture a portion of the same image or the same field of view.**”). Ex.1050 (IV's Reply Brief), 22.

Thus, the Board should reject IV's arguments, because they rely on features that are not required by the claims.

2. Matsushima renders obvious the independent claims even under IV's flawed claim construction.

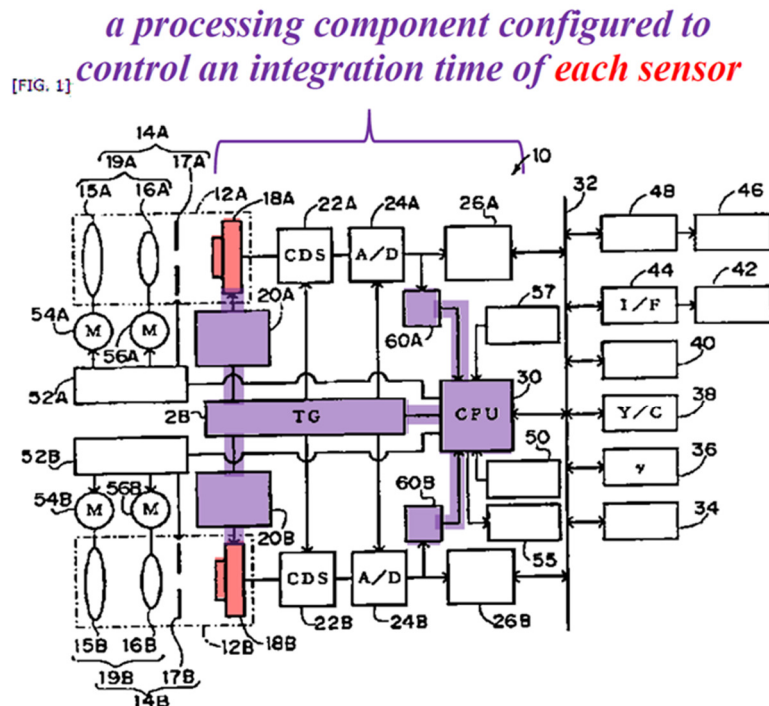
a. Matsushima teaches independent control of integration time of each sensor using different integration times.

i. IV does not contest that Matsushima teaches using an electronic shutter per sensor for independent imaging systems, as shown in the Petition.

The Petition explains that Matsushima teaches independent control of integration time of each sensor. Pet., 18-20 (citing Ex.1007, FIG. 1, [0024], [0027], [0034]-[0035]; Ex.1003, ¶¶90-100; *see also* Paper 8, 33-34; Ex.1044, ¶¶47-48.

IV does not dispute that (i) Matsushima teaches **an electronic shutter on each sensor**; and (ii) FIG. 1 of Matsushima (reproduced below) illustrates **independent** imaging systems 12A and 12B and **distinct** paths for controlling the integration time

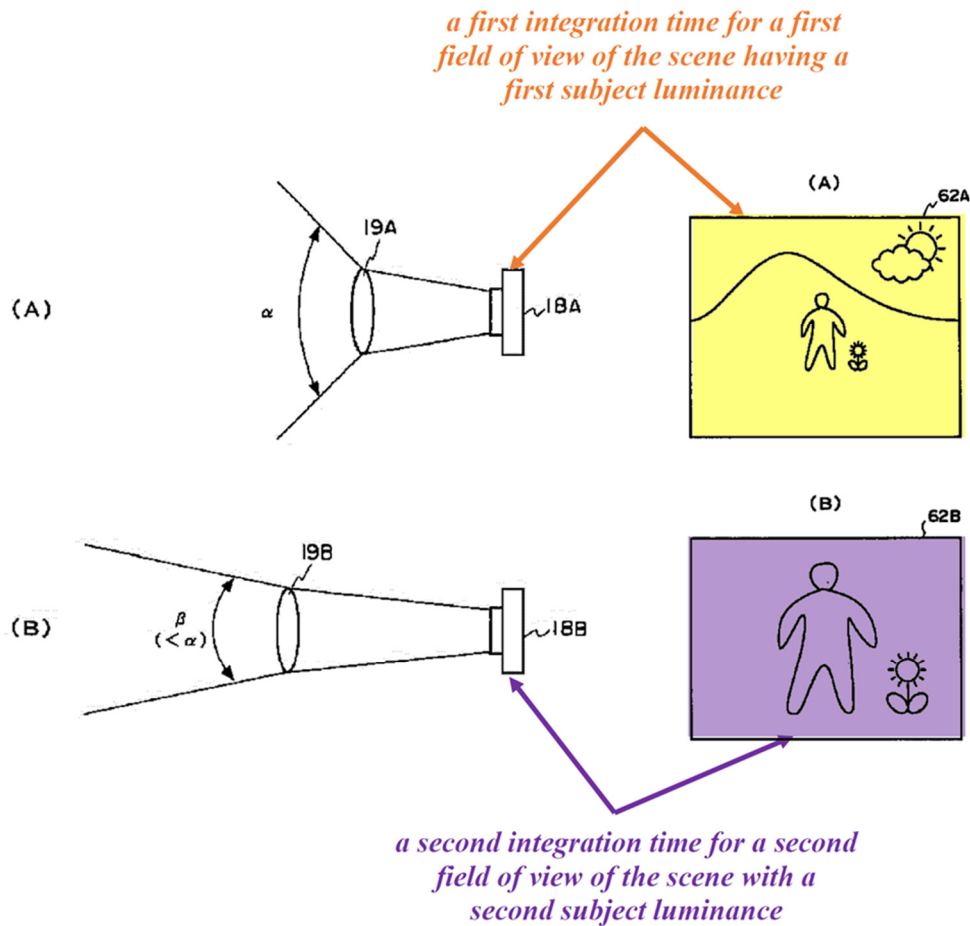
of an individual sensor **distinct** from other sensor, as shown in the Petition. Pet. 18-20.



Ex.1007, FIG. 1, annotated; Ex.1003, ¶94.

ii. Matsushima teaches different integration times for independent imaging systems having different FOV.

IV does not directly contest the Petition's analysis that Matsushima teaches different integration times for the independent imaging systems. Pet. 33-35 (citing Ex.1007, [0017], [0020], [0034], Ex.1009, 9; Ex.1024, 3; Ex.1025, 7, FIG. 8; Ex.1026, 1); Ex.1003, ¶¶132-135. As shown in annotated FIGS. 2-3 of Matsushima below, Matsushima teaches that sensors imaging different fields of view (FOVs) receive different subject luminance, leading to different integration times. Pet. 34.



Ex.1007, FIGS. 2-3, annotated; Ex.1003, ¶133.

IV likewise does not dispute the well-known principle, confirmed by multiple references and Mr. Guidash, that different integration times are used for different subject luminance for optimal performance. Pet. 33-35 citing Ex.1009, 9; Ex.1024, 3; Ex.1025, 7, FIG. 8; Ex.1026, 1; Ex.1003, ¶¶132-135.

IV instead mischaracterizes Matsushima's disclosure and a POSITA's knowledge, which are addressed next.

iii. IV's mischaracterization of Matsushima as providing a common integration time is wrong.

IV argues that Matsushima lacks “independent per-sensor control,” because its AE applies “a single common value.”² POR, 26. This is incorrect.

Matsushima states that “each sensor” has its own accumulation-time control: “CCD 18A and CCD 18B **each** have a shutter drain via a shutter gate.... the CCDs 18 have a so-called electronic shutter function that controls the accumulation time ...by each sensor”). Ex.1007, [0024]. Further, there is no dispute that CCDs 18A and 18B belong to “two independent imaging systems” with distinct control paths. Ex.1007, [0017], Fig. 1; Ex.1044, ¶53.

Matsushima further explains that each independent system has its own exposure, controlled by its aperture and shutter speed. Pet. 19-20, Ex.1007 [0032], [0034]; Ex.1003, ¶42; Ex.1044, ¶54. Each independent system's “aperture value and shutter speed are determined” based on the system's EV value. Pet. 19-20, Ex.1007 [0032], [0034].

As explained by Mr. Guidash, IV's “single common integration time” theory is illogical in the context of Matsushima's design. Matsushima includes separate EV

² The claims do not exclude “a single common value” applied to individual sensors. III.A.1.a.

measurements and separate integration circuits 60A and 60B, which only serve a purpose if each system uses its own integration time. Using a single shutter speed would render these circuits pointless and merely increase cost, size, power, and complexity with no benefits. Ex.1044, ¶55.

IV's theory also conflicts with its own "same exposure" argument. POR, 37 ("Matsushima's description of **a single, common charge accumulation...**would have resulted in images having **the same exposure.**"). Because exposure depends on both aperture and integration time, Ex.1003 ¶42, a single integration time combined with different apertures in Matsushima (Ex.1007, [0032]) would produce different, not the same, exposures. Ex.1044, ¶56.

IV's interpretation is incompatible with Matsushima's explicit disclosure, inconsistent with a POSITA's understanding, and internally contradictory. It should be rejected.

iv. IV's mischaracterization of Matsushima's image synthesis as requiring a common integration time is wrong.

IV argues that Matsushima does not teach different integration times, reasoning that (i) Matsushima does not describe specific techniques for synthesizing images with different exposures, and (ii) the prior art recognizes the challenge of achieving a natural boundary. POR, 33-34. But these arguments conflict with both Matsushima and a POSITA's general knowledge, and should be rejected.

First, Matsushima’s correction data method prevents an unnatural boundary when combining images of different exposures. Pet. 26; Ex.1007, [0050]-[0069], Figs. 4A, 5–7. As explained by Mr. Guidash, Matsushima’s method does not require images of the same exposure; applying it when combining images of different exposures provides the same result: “the image data between A and B [the boundary] is almost continuous,” thereby producing a natural boundary. Ex.1044, ¶59.

Second, IV asserts that “Petitioner’s reading of Matsushima is inconsistent with the state of the art” recognizing unnatural boundary concerns. POR, 37. However, a POSITA would have possessed the skill to address the unnatural boundary concerns, particularly in light of Matsushima’s discussion of correction data. Ex.1007, [0060] (“Any method may be used [to generate correction data] as long as the image data between A and B is nearly continuous.”). Indeed, IV’s own supporting reference (Ex.2016, 1) confirms established techniques for eliminating exposure artifacts when combining images of different exposures. Ex.1044, ¶60.

b. Matsushima’s disclosure tracks limitation [1.3], and IV’s contrary interpretation should be rejected.

The terminology of limitation [1.3] and Matsushima’s description in [0024] are strikingly parallel:

claim limitation [1.3]	Matsushima, Ex.1007, [0024]
“a processing component configured to control an integration time of each sensor. ”	“the CCDs 18 have a so-called electronic shutter function that controls the accumulation time (shutter speed) of the

claim limitation [1.3]	Matsushima, Ex.1007, [0024]
	charge accumulated by <u>each</u> sensor via shutter gate pulses.”

Indeed, the two phrasings are nearly identical. The acts (*control*/controls), the objects (*integration time*/accumulation time³), and the numerosity (*each sensor*) align almost perfectly. As confirmed by Mr. Guidash, a POSITA would have understood these two phrases to have the same meaning. Ex.1044, ¶62.

Dr. Saber, IV's expert, states that the language “control an integration time of each sensor” means per-sensor control authority:

In ordinary engineering usage, “control an integration time of each sensor” denotes per-sensor control authority over the sensor-local charge-integration interval, not a global exposure value broadcast identically to all channels.

Ex.2017, ¶70. Dr. Saber confirmed that “in ordinary engineering usage” means plain and ordinary meaning understood by a POSITA. Ex.1048, 31:20-32:1.

Yet IV and Dr. Saber assign entirely different meaning to Matsushima's nearly identical language. Dr. Saber asserts: “The fact that Matsushima refers to ‘**the charge accumulation time**’ (in the singular) of both ‘the CCD 18A and CCD 18B’

³ As explained in the Petition (Pet. 17-18), Matsushima's “accumulation time” is synonymous of “*integration time*,” which IV does not dispute.

indicates that the same charge accumulation time is used to drive both devices.”
Ex.2017, ¶104.

IV cannot have it both ways. Two practically identical phrasings cannot simultaneously require per-sensor control in the '158 patent but foreclose it in Matsushima. This contradictory treatment is untenable.

Accordingly, whatever meaning IV assigns to “*control an integration time of each sensor,*” Matsushima discloses it.

***c. Matsushima teaches the additional requirements
that IV seeks to import.***

IV seeks to import additional requirements into the claims. *See, e.g.*, POR, 15 (requiring “focal plane shutter control” and “controlling a switch”); POR, 30 (“the '158 Patent defines integration time control as focal-plane (on-sensor) control of the charge-integration switch”); POR, 38. These limitations are unsupported and should be rejected. II.C. Regardless, Matsushima teaches them.

Regarding “focal-plane (on-sensor) control,” Matsushima discloses an electronic shutter at each sensor for integration time control. Ex.1007, [0024] (“CCD 18A and CCD 18B **each** have a shutter drain via a shutter gate”); [0034] (“the CCD 18A and CCD 18B charge accumulation time is controlled **using an electronic shutter** to reach the determined shutter speed.”). As explained by Mr. Guidash, Matsushima’s electronic shutter is located on the sensor at the focal plane, thereby

teaching IV's "focal-plane (on-sensor) control" requirement. Ex.1044, ¶68.

Regarding "control of a switch," Mr. Guidash explains that Matsushima's shutter gate (Pet., 19; Ex.1007, [0024]) teaches a charge-integration switch because the on/off of the shutter gate controls the accumulation time. Ex.1044, ¶69 (the control process includes switching/keeping the shutter gate off to allow the charges to accumulate and be transferred for readout, switching/keeping the shutter gate on to end the charge accumulation by sweeping charges to the shutter drain); Pet. 2, 37.

B. Matsushima renders obvious claim 2.

1. IV's improper requirements imported into "*during a frame*" should be rejected.

IV asserts that "*during a frame*" requires "control within the frame-capture window—i.e., actuating the focal-plane (charge-integration) switch that opens/closes the integration window for each sensor while that frame's data are being collected, not merely choosing a value beforehand." POR, 40. IV then asserts that Matsushima's does not teach these additional requirements. POR, 40-42.

As discussed at II.D, IV attempts to rewrite "*during a frame*" to require a specific technical implementation. IV's arguments rely on this improper construction and should be rejected. Ex.1044, ¶¶70-71.

2. Matsushima renders obvious claim 2, even under IV's flawed construction of "*during a frame*."

Matsushima renders obvious claim 2 even under IV's improper construction.

Ex.1044, ¶¶72-75.

As explained in the Petition, Matsushima discloses controlling an electronic shutter of each sensor for capturing the corresponding single frame of an image. Pet. 23-24 (citing Ex.1007, [0034]). Matsushima's shutter-gate control teaches controlling a charge-integration switch during a frame, because the controlling of the on/off state of the shutter gate spans the entire integration period: switching/keeping the shutter gate off to allow the charges to accumulate and be transferred for readout, and switching/keeping the shutter gate on to end the charge accumulation by sweeping charges to the shutter drain. Ex.1044, ¶73; Pet. 2, 37.

Moreover, Matsushima teaches exactly the "integration time control" described in the '158 patent, which IV relied upon to import the extraneous requirements. POR, 40. The correspondence (annotated in the same color) is shown below:

'158 patent	Matsushima
Ex.1001, 4:46-56: "Integration time control, also referred to as 'focal plane shutter' control, 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. For example, the charge integration switch is placed in a state to allow charge to accumulate within the sensor for a period of time approximately equal to the	Ex.1007, [0024]: "CCD 18A and CCD 18B each have a shutter drain via a shutter gate, and the accumulated signal charges can be swept to the shutter drain by driving the shutter gates with shutter gate pulses. In other words, the CCDs 18 have a so-called electronic shutter function that controls the accumulation time (shutter speed) of the charge accumulated by each sensor via

'158 patent	Matsushima
integration time corresponding to that sensor; upon completion of the integration period, the switch is placed in a state to transfer the accumulated charge as a photo-signal to a processing component.	shutter gate pulses.”

Matsushima's disclosure of driving a shutter gate is the same "integration time control" described in the '158 patent. Both describe controlling a switch to govern per-sensor charge accumulation time **during the capture of a single frame**. As such, Matsushima's shutter gate control, like the integration time control of the '158 patent, happens **during the frame** for completing the integration period. Ex.1044, ¶74; Ex.1003, ¶103.

C. Matsushima renders obvious dependent claims 11 and 16.

The Petition explains that Matsushima teaches different integration times for the independent imaging systems. Pet. 33-35; Ex.1003, ¶¶132-135. IV does not directly rebut that analysis. Ex.1044, ¶¶76-78.

Instead, IV repeats the same unsupported limitations it tried to read into claims 1 and 2, namely: "independent, per-sensor focal-plane control" and "sets different integration-time windows across sensors within the frame." POR, 42. IV's attempt fails for at least the reasons discussed at Sections II.B and II.D. Additionally, claims 11 and 16 provide no support for IV's construction: they do not even recite "control" or "within the frame."

Regardless, as shown in Section III.A.2 and III.B.2, Matsushima teaches both alleged requirements. Thus, Matsushima renders claims 11 and 16 obvious under IV's improper requirements.

IV. GROUND 2: YU AND MIYAZAKI RENDER OBVIOUS THE CHALLENGED CLAIMS.

A. Yu and Miyazaki render obvious the independent claims.

1. IV's assertion that "scene" excludes photograph should be rejected.

IV argues that "scene" excludes photographs (POR, 39), which contradicts the '158 patent's disclosure, and should be rejected. Ex.1044, ¶¶79-84.

The '158 patent equates a "scene" with a "frame," a single still image: "[t]o accommodate lighting changes **from scene to scene** (the interscene dynamic range) an electronic shutter is used to change the integration time of all pixels in an array **from frame to frame.**" Ex.1001, 2:31-34. Nothing requires a "scene" to include multiple frames. *See, e.g.*, Ex.1001, 1:46-49 (examples of scenes not requiring video, e.g., "**an outdoor scene** with mixed shadows and bright sunshine"); Ex.1044, ¶¶80-84.

2. Yu teaches "control an integration time of each sensor."

IV's arguments against Yu fail for two independent reasons. **First**, IV asserts that Yu does not disclose "independent control of integration time applied at the focal plane by controlling a switch." POR, 44. But no claim requires this. *See* §III.C.

IV's arguments rest on improper constructions and should be rejected. Ex.1044, ¶¶85-88.

Second, IV mischaracterizes the Petition's position as relying on inherency. POR, 45. The Petition does not argue inherency; it explains that Yu's on-sensor exposure time control discloses "*controlling an integration time*." Pet. 50-54; Ex.1003, ¶¶176-183; Ex.1044, ¶¶86-87 (Mr. Guidash explains a POSITA would have understood Yu's on-sensor exposure time control discloses "*controlling an integration time*," similar to how a POSITA would have understood "a car" disclosing "an automobile" despite different wording). Even if IV disputes Yu's express disclosure, the limitation would have been obvious under Yu, because controlling integration time is a well-known implementation of exposure time control. Ex.1044, ¶88.

IV's reliance on *Par Pharm.*, *Southwire*, and *Millennium* is misplaced. Those cases caution against using inherency to fill gaps. Petitioner does not rely on inherency. Recognizing that a disclosed feature (on-sensor exposure time control) in Yu is understood by a POSITA to teach the claimed limitation is not inherency. IV's attempt to reframe Petitioner's express disclosure and obviousness argument as inherency should be rejected.

3. IV mischaracterizes the Petition's Yu-Miyazaki combination.

IV argues, “Miyazaki’s exposure is a mechanical plus electronic scheme. **Importing it into Yu would bring both**, and would therefore not be feasible.” POR, 47. This misrepresents the combination and improperly reframes it as a bodily incorporation of Miyazaki’s mechanical shutter into Yu. Ex.1044, ¶¶89-90.

As explained in the Petition, a POSITA would have used, for each sensor in Yu’s multi-sensor multi-lens digital camera system, an electronic shutter to control the exposure time by controlling the integration time of that sensor as taught by Miyazaki. Ex.1006, 9:11-14. Electronic shutters were standard in image sensors and provided Yu’s on-sensor exposure time control. Pet. 59, Ex.1003, ¶193 (citing Ex.1010, 8; Ex.1008, 2). The Petition’s combination does **not** suggest or require bodily incorporation of Miyazaki’s mechanical shutter. IV’s argument should be rejected.

4. IV’s contention for “enablement-like specifics” is misplaced.

IV’s assertion that the Petition “misses enablement like specifics” is misplaced. POR, 49. Multi-sensor, on-sensor shutter systems were well established at the time. Ex.1044, ¶91; Ex.1007, FIG. 1. Under §103, “there is no absolute requirement for a relied-upon reference to be self-enabling...so long as *the overall evidence*...establishes that a skilled artisan could have made and used the claimed

invention.” *Raytheon Techs. v. Gen. Elec. Co.*, 993 F. 3d 1374, 1376-77 (Fed. Cir. 2021). Accordingly, Yu need not detail every well-known technique. IV’s “enablement-like specifics” arguments should be rejected.

B. Yu and Miyazaki render obvious claim 2.

IV argues that the combination does not teach claim 2, because Yu allegedly does not disclose (i) “per-sensor, on-sensor actuation during the frame;” (ii) “how ‘exposure time’ is realized;” (iii) “an electronic shutter;” and (iv) “focal-plane gating.” POR, 56.

None of these are required by claim 2. *See* III.B.4. IV’s arguments rest entirely on its unsupported requirements for “*during a frame*,” and should be rejected. Ex.1044, ¶¶92-93.

C. Yu and Miyazaki render obvious claims 11 and 16.

IV argues that Yu is “agnostic as to whether the commanded ‘exposure time’ values are equal or different.” This directly contradicts Yu’s disclosure, and should be rejected. Yu expressly states, “three color sensors can compliment each other...as a result of **three images from three independent sensors, each being separately controlled with different exposure time**.” Ex.1005, 9:40-46; Pet. 73-75. This description applies to Yu’s FIG. 3 embodiment including four sensors, which is not disputed by IV. *Id.*; Ex.1003, ¶236; Ex.1044, ¶¶94-95.

Further, as explained in Petition’s analysis of claim 8 (undisputed by IV), in

Yu-Miyazaki, integration time is independently controlled based on the incident light level received at each sensor. Pet. 67-69; Ex.1005, 6:44-52; 53-58; Ex.1003, ¶235. Accordingly, in the combination, different integration times are provided at the sensors. Ex.1044, ¶96.

V. CONCLUSION

The Challenged Claims are unpatentable.

Respectfully submitted,

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VI. CERTIFICATE OF WORD COUNT

Under 37 C.F.R. § 42.24, the undersigned attorney for the Petitioner, declares that the argument section of this Reply (§§I-V) has 5,591 words, according to the word count tool in Microsoft Word™.

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Petitioner

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