

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

**DECLARATION OF R. MICHAEL GUIDASH,
UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITIONER'S REPLY**

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I. Introduction

1. I, R. Michael Guidash, previously submitted a declaration as Ex.1003 in this proceeding. The terms of my engagement, my background, qualifications and prior testimony, and the legal standards and claim constructions I am applying are set forth in my previous CV and declaration. *See* Ex.1003; Ex.1004. I offer this declaration in reply to the Response the Patent Owner filed in this proceeding (“Patent Owner Response” or “POR”). In forming my opinion, I have considered the materials noted in my previous declaration, as well as the following additional materials:

Ex.2006	CV of Dr. Dr. Eli Saber
Ex.2016	Uyttendaele, Matthew, Ashley Eden, and Richard Szeliski, “Eliminating ghosting and exposure artifacts in image mosaics.” Proceedings of the 2001 IEEE Computer Society Conference on Computer Vision and Pattern Recognition. CVPR 2001. Vol. 2. IEEE, 2001.
Ex.2017	Declaration of Dr. Eli Saber
Ex.1045	U.S. Pat. No. 7,564,019 to Olsen et al. (“’019 Patent”)
Ex.1046	U.S. Pat. No. 7,916,180 to Olsen et al. (“’180 Patent”)
Ex.1047	Prosecution History of U.S. Application No. 11/788,279 (issued as U.S. Pat. No. 7,916,180)
Ex.1048	Deposition of Eli Saber Transcript, IPR2025-00222 (December 1, 2025)
Ex.1049	Deposition of Eli Saber Transcript, IPR2025-00339 (December 8, 2025)
Ex.1050	Plaintiffs’ Responsive Claim Construction Brief, <i>Intellectual Ventures I LLC et al. v. General Motors</i>

	<i>Company et al.</i> , 6:21-CV-1088 (WDTX) (“GM Litigation”), August 1 st , 2022
Ex.1051	Patent Owner's Response, IPR2025-00339 (October 17, 2025)

II. Claim Construction

2. I understand that Petitioner adopted the prior constructions of the Board and the district court in the GM litigation. Ex.1003, ¶¶62-68. To avoid prior art, Intellectual Ventures (“IV”) seeks to import additional limitations into the claims. IV's constructions are improper and should be rejected.

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.

3. IV seeks to alter the district court's construction by replacing “time” with “time interval during which.” POR, 12. This change 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.”). It is my opinion that IV's addition is unsupported and should be rejected. The express definition should be applied, as the court did in the GM litigation.

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)

4. It is my opinion that each of these terms should be construed 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. It is my opinion that IV’s constructions are unsupported and should be rejected. To the extent the Board determines that construction is required, Petitioner’s alternative constructions below that are consistent with the specification should be adopted. *See* Section II.B.2.

1. IV’s construction is incorrect.

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

5. IV’s attempt to import “independent control” into the term “*control*” contradicts both the specification and file history. 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**").

6. 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. IV has not pointed to any definition or disclaimer for its exclusion.

7. 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.

8. Here, Applicant amended "separately and simultaneously control" by removing "simultaneously," demonstrating its differentiation between such

formulations and mere “*control*.” Ex.1031, 66; Ex.2017, ¶¶56-58 (Dr. Saber acknowledging this amendment).

9. Likewise, claims in US 7,916,180 (another patent 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”). In contrast, the claims of the ’158 patent do not.

10. 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.” Ex.1048, 48:17-49:3, 50:15-51:3; 51:9-12 (arguing that claims 1, 9, and 15 each require “separately and simultaneously controlling an integration time”).¹ This is exactly the type of “misread[ing] the claim” Dr. Saber acknowledged in his deposition. Ex.1048, 85:13-19 (Dr. Saber testified that reading “simultaneously” into the claim term “separately controlling” is “misread[ing] the claim”).

11. Dr. Saber asserts, claims 1, 9, 15 show that “a POSITA would conclude that the invention requires: (i) separate values to be determined/identified for the respective channels and (ii) separate focal-plane actuation of those values

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

for capture in the same frame window,” and that dependent claim 3 strengthens that construction. Ex.2017, ¶¶72-73. I disagree. Dr. Saber is improperly construing independent claims 1, 9, and 15 as one single claim for his conclusion. He also imports the asserted requirement of claim 3 as the requirement for claims 1, 9, and 15. This is contrary to a POSITA's understanding that claims 1, 9, and 15 have different scopes, and dependent claim 3 further narrows the scope of claim 1.

12. Dr. Saber asserts that the specification supports his assertions. Ex.2017, ¶¶74-75 (e.g., stating “The intrinsic record also signals the hardware consequences of the claimed control.”). I disagree. Contrary to Dr. Saber's assertion, the specification does not even suggest, much less define, the claim term to require specific technical implementations.

13. Therefore, IV's importation of “independent” control into the claims is unsupported.

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

14. IV misapplies the Board's prior analysis of “*control an integration time of each sensor*” in the Toyota IPR. POR, 13-14.

15. As explained in my previous declaration, 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.**" Ex.1003, ¶¶64-65; Ex.1002, 19-20 (IPR2022-00710, Paper 13).

16. Contrary to IV's assertion (POR, 13-14), the Board did *not* rewrite the term "*control*" in limitation [1.3] 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; Ex.1003, ¶¶63-65. The Board stated that this one-to-one configuration is consistent with limitation [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 of "independent control."

17. IV contends that its proposed constructions are required based on the Board's previous one-to-one configuration requirement. POR, 13-14. I disagree. There is no dispute that: (i) the claims require such a one-to-one relationship; and (ii) Petitioner's grounds demonstrate precisely that relationship.

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

18. 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 inconsistent with a POSITA’s understanding of “*control*” of the ’158 patent. II.B.1.a.

19. IV then extends this assertion to claims 9 and 15, even though neither claim recites “*control*.” POR, 12. This is incorrect. IV’s assertion of requirements is based on a term entirely absent from the claim language, and is inconsistent with a POSITA’s understanding of claims 9 and 15.

20. Moreover, IV ignores the differences among the terms “*control*,” “*determine*,” and “*identifying*” in claims 1, 9, and 15. This is inconsistent with a POSITA’s understanding of claims 9 and 15.

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

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

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”

22. 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.

23. 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.

24. Therefore, Petitioner's alternative construction should be adopted if construction is 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.

25. I disagree with IV's construction. It imports unrequired limitations, is unnecessary, and contradicts constructions in prior proceedings.

26. 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. It is my opinion that these specific components are not required by the claims.

27. The district court already construed “*integration time*” (Ex.1015, 49; Ex.1003, ¶¶66-68) (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. It is my opinion that no further construction is needed.

28. 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*.” I disagree with IV’s importation of these limitations. The claim simply requires controlling an integration time, not any particular method or implementation mechanism.

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

29. IV’s arguments rely on an alleged express definition of “integration time control,” but this is wrong. The ’158 patent does not define the term “*control an integration time*.” “Integration time control” and “*control an integration time*” are different terms, the former is a noun-phrase referring to a feature of an embodiment, and the latter refers to a method/action performed by a processing component. Conflating them as proposed by IV is inconsistent with a POSITA’s understanding of these different usages.

30. 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 nothing more than a description of a feature of an embodiment, and is not a definition. It does not purport to define the term, does not

use any definitional language, and does not indicate any intent to depart from the term's ordinary meaning.

31. Dr. Saber asserts various technical implementation requirements of the claims. Ex.2017, ¶¶90-96 (asserting that the claims exclude “[o]ff-sensor frame/line/transfer clocks” and requires “per-sensor focal-plane gating.”). I disagree. Dr. Saber's assertion is contrary to the description of the '158 patent, which does not even mention such asserted distinctions and exclusions.

32. In fact, the '158 patent explicitly describes the use of CCD sensors. Ex.1001, 19:31-35 (“The sensor array may employ any type of technology, for example, but not limited to MOS pixel technologies (e.g., one or more portions of the sensor are implemented in “Metal Oxide Semiconductor” technology), **charge coupled device (CCD) pixel technologies**, or combination of both.” It was well known to a POSITA that CCD sensors require off-sensor frame/line/transfer clocks for controlling integration times. As such, the claims do not exclude off-sensor frame/line/transfer clocks.

33. Therefore, IV's attempt to rewrite the claims should be rejected.

D. “*during a frame*” (claim 2)

Petitioner's Proposed Construction	IV's Implicit Construction
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“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.
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34. 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). 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.

35. I disagree with IV's requirement, 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.

36. Petitioner's proposed construction of “*during a frame*” should be adopted because it is supported by the specification and the surrounding language. Ex.1003, ¶¶69-71. It is also supported by Dr. Saber'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,), 79; *see also*, Ex.1049,

67:1-4 (“when you collect the data on those CCD arrays, **you have to read it out**”); 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 (in the IPR proceeding for the related ’180 patent, IV admitting that “a ‘*frame*’ is **digital data corresponding to a single image**”).

37. Therefore, Petitioner’s proposed construction should be adopted.

III. Ground 1: Matsushima renders the challenged Claims obvious.

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

38. IV’s arguments focus on limitation [1.3] of claim 1. As explained below at Section III.A.1, it is my opinion that those arguments fail because they rely on IV’s attempt to import unrequired limitations into claim 1. Moreover, as shown in Section III.A.2, Matsushima renders obvious limitation [1.3] even under IV’s claim construction.

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

a. IV’s requirement of “independent per-sensor control—more than one value applied to both” should be rejected.

39. 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, it is my opinion that IV’s attempt to rewrite the claim is improper.

40. 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.

41. 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.

42. Accordingly, IV's requirement is improper.

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

43. 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. In my opinion, these arguments fail for a straightforward reason: the independent claims do not include a "same field of view" requirement.

44. 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; Ex.1003, ¶66. Indeed, 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.

45. 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 CC Reply Brief), 22.

46. Thus, IV's arguments fail because they rely on features that are not required by the claims.

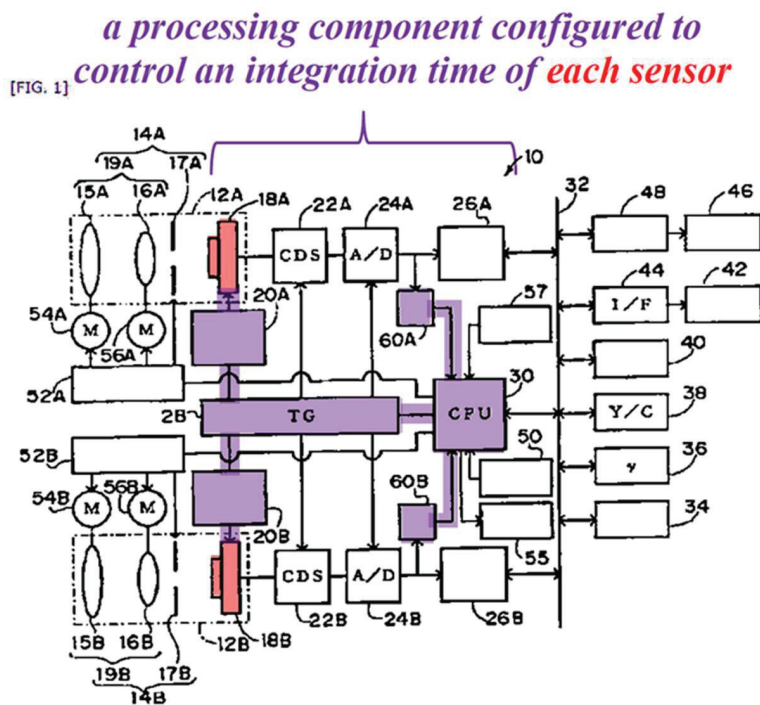
2. Matsushima renders obvious the independent claims even under IV's flawed claim construction.

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 explained in my previous declaration.

47. As explained in my previous declaration, Matsushima teaches independent control of integration time of each sensor. Ex.1003, ¶¶90-100 (citing Ex.1007, FIG. 1, [0024], [0027], [0034]-[0035]).

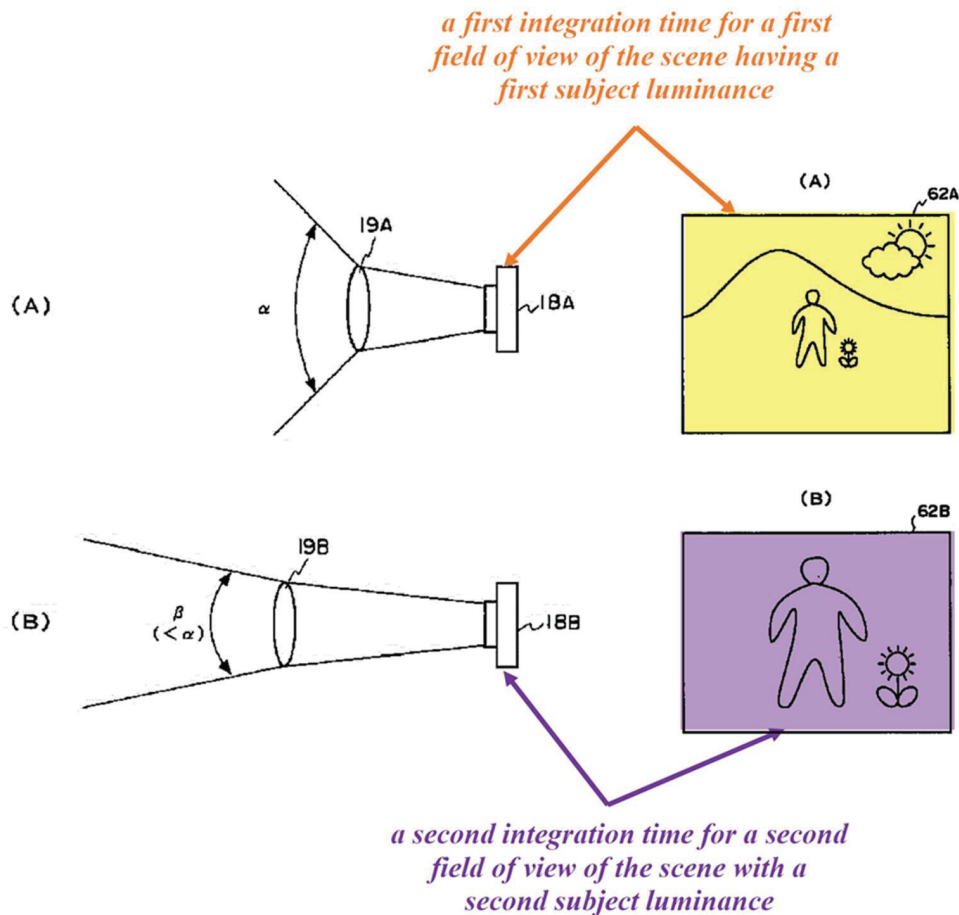
48. It appears that IV does not dispute that (i) Matsushima teaches **an electronic shutter on each sensor**; and (ii) FIG. 1 of Matsushima (reproduced below) illustrates **independent** imaging systems 12A and 12B and **distinct** paths for controlling the integration time of an individual sensor **distinct** from other sensor, as explained in my previous declaration. Ex.1003, ¶¶93-99.



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

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

49. It appears that IV does not directly contest my analysis that Matsushima teaches different integration times for the independent imaging systems. Ex.1003, ¶¶132-135 (citing Ex.1007, [0017], [0020], [0034], Ex.1009, 9; Ex.1024, 3; Ex.1025, 7, FIG. 8; Ex.1026, 1). 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. Ex.1003, ¶133.



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

50. Also, it appears that IV likewise does not dispute the well-known principle, confirmed by multiple references, that different integration times are used for different subject luminance for optimal performance. Ex.1003, ¶¶132-135 (citing Ex.1009, 9; Ex.1024, 3; Ex.1025, 7, FIG. 8; Ex.1026, 1).

51. Unable to directly rebut the analysis provided in my previous declaration, IV instead mischaracterizes Matsushima's disclosure and a POSITA's knowledge of the art. These mischaracterizations are addressed next.

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

52. IV argues that Matsushima lacks “independent per-sensor control,” because “Matsushima’s AE sets and applies a single common value.”² POR, 26. I disagree.

53. Matsushima expressly 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 (shutter speed) of the charge accumulated 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.

54. Matsushima further explains that each independent imaging system has its own exposure, controlled by its aperture and shutter speed. Ex.1003, ¶¶42, 94-97; Ex.1007, [0032], [0034]. Each system’s “**aperture value and shutter speed** are determined” based on that system’s imaging EV value. Ex.1007, [0034], [0032] (apertures 17A and 17B have “appropriate aperture **values**”).

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

III.A.1.a.

55. IV's "single common integration time" theory is illogical in the context of Matsushima's design. Matsushima includes separate EV 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.

56. 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. Nowhere in Matsushima requires that that CCD sensors 18A and 18B have a single common charge accumulation time.

57. 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.

58. 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.

59. First, Matsushima's correction data method prevents an unnatural boundary when combining images of different exposures. Ex.1003, ¶¶110-111; Ex.1007, [0050]-[0069], Figs. 4A, 5-7. 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.1007, [0057].

60. 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.

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

61. 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 charge accumulated by each sensor via shutter gate pulses."

62. Indeed, the two phrasings are nearly identical. The acts (*control/controls*), the objects (*integration time/accumulation time*³), and the numerosity (*each sensor*) align almost perfectly. A POSITA would have understood these two phrases to have the same meaning.

63. Dr. Saber 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

³ As explained in my previous declaration (Ex.1003, ¶93), Matsushima's "accumulation time" is synonymous of "*integration time*," which IV does not appear to dispute.

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.

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

65. 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.

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

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

67. 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. II.C. Regardless, Matsushima teaches them.

68. Regarding “focal-plane (on-sensor) control,” Matsushima discloses an electronic shutter at each sensor for integration time control. Ex.1003, ¶¶94-97; 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.”). Matsushima’s electronic shutter (shutter gate and drain) is located on the sensor at the focal plane, thereby teaching IV’s “focal-plane (on-sensor) control” requirement.

69. Regarding “control of a switch,” Matsushima’s shutter gate teaches a charge-integration switch because control of the on/off state of the shutter gate controls the accumulation time. Ex.1003, ¶¶94-97; Ex.1007, [0024], [0034]. The control process includes switching/keeping the shutter gate off to allow the charges to accumulate and be transferred from the collection region for readout, and switching/keeping the shutter gate on to end the charge accumulation by sweeping charges to the shutter drain. This was well known to a POSITA. Ex.1003, ¶¶25-34, 48-50 (citing Ex.1023, 6, FIGS 7-8; EX 1021, FIG. 17).

B. Matsushima renders obvious claim 2.

1. IV’s requirements imported into “*during a frame*” are not supported.

70. 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.

71. 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 thus fail.

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

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

73. As explained in my previous declaration, Matsushima discloses controlling an electronic shutter of each sensor for capturing the corresponding single frame of an image. Ex.1003, ¶¶103-104 (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 from the collection region for readout, and switching/keeping the shutter gate on to end the charge accumulation by sweeping charges to the shutter drain. This was well known to a POSITA. Ex.1003, ¶¶25-34, 48-50 (citing Ex.1023, 6, FIGS 7-8; EX 1021, FIG. 17).

74. 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
<p>Ex.1001, 4:46-56:</p> <p>“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 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.”</p>	<p>Ex.1007, [0024]:</p> <p>“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 shutter gate pulses.”</p>

75. 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.1003, ¶103.

C. Matsushima renders obvious dependent claims 11 and 16.

76. As explained in my previous declaration, Matsushima teaches different integration times for the independent imaging systems. Ex.1003, ¶¶132-135. IV does not directly rebut that analysis.

77. 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.”

78. 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 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 or still images is incorrect.

79. IV's assertion that “scene” excludes still photographs (POR, 39) is incorrect because it contradicts the '158 patent's disclosure.

80. The '158 patent expressly states, “[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. This language equates a "scene" with a "frame," which is a single still image. Nothing in the '158 patent requires a "scene" to include multiple frames as IV asserted. *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").

81. Dr. Saber states, "The specification of the '158 Patent thus differentiates between controlling light captured during the process of taking a photograph - and "integration time control" which the '158 defines as the time the image sensor collects and integrates signal from a scene." Ex.2017, ¶45. I disagree. Exposure control applies to both photograph and videos. Exposure control controls the **total amount** of light incident on a sensor, which is controlled using both aperture control (controlling how much light incident on a sensor at a particular time) and integration time control (controlling the length of time that the sensor is responding to incident light).

82. Dr. Saber asserts, "it is clear that integration time in the '158 Patent is fundamentally tied to a scene, which in the context of the '158 Patent is entirely different from a static photograph or still image." Ex.2017, ¶¶79-89. I disagree.

83. Dr. Saber asserts, "[t]he "single scene" described in the '158 Patent as including both indoor lighting and outdoor lighting (id., 2:34-37) would, by way of example, include a person walking from inside of a house to outside of the house

or vice versa.” Ex.2017, ¶84. This is contrary to a POSITA’s understanding of the description of the ’158 patent. The ’158 patent states, “Examples of high dynamic scenes range scenes include an indoor room **with a window view of the outdoors.**” Ex.1001, 1:45-47. As such, the single scene refers to a single frame with indoor lighting and outdoor lighting in that frame, because it has “**a window view of the outdoors.**” It does not require a person walking from inside of a house to outside of the house or vice versa as asserted by Dr. Saber.

84. Further, even if the claims require a video including multiple frames, which they don’t, it was well known to a POSITA that the techniques for controlling the integration time for a frame similarly applies to videos.

2. Yu teaches “*control an integration time of each sensor.*”

85. 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 this is not a requirement of any claim. *See* §III.C. IV’s arguments rest on its improper construction and thus fail.

86. Second, IV’s contention that Petitioner relies on inherency mischaracterizes Petitioner’s ground. POR, 45 (“Petitioner concludes that ‘controlling exposure time’ **inherently means** ‘*controlling an integration time.*’”). Petitioner’s ground was not based on inherency. Instead, as explained in my

previous declaration, Yu's express disclosure of on-sensor exposure time control discloses "*controlling an integration time*". Ex.1003, ¶¶176-183.

87. A POSITA would have understood Yu's on-sensor exposure time control discloses "*controlling an integration time*," much like how a POSITA would have understood "a car" disclosing "an automobile" despite different wording. Ex.1003, ¶¶52-53, 177 ("exposure time" and "integration time" are often used interchangeably in the context of an image sensor with an on-sensor exposure time control, citing Ex.1028, 1821n.1; Ex.1022, 1:22-24; Ex.1027, 3:10-12; Ex.1029, 1; Ex.1012, 2, 4; Ex.1008, 2; Ex.1001, 5:33-54. 2:31-34).

88. Further, to the extent IV incorrectly argues that Yu does not expressly disclose "*controlling an integration time*"—despite the undisputed fact that "integration time" and "exposure time" are used interchangeably in the art for on-sensor exposure time control—the limitation would still have been obvious under Yu, because controlling integration time is a fundamental and well-known implementation of exposure time control. Ex.1003, ¶¶41-53. Recognizing that a disclosed feature (on-sensor exposure time control) in Yu is understood by a POSITA to expressly teach the claimed limitation is not inherency.

3. IV mischaracterizes Petitioner's Yu-Miyazaki combination.

89. 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.

90. As explained in my previous declaration, a POSITA would have used, for each sensor in Yu’s multi-sensor multi-lens digital camera system, an on-sensor electronic shutter to control the exposure time by controlling the integration time of that sensor as taught by Miyazaki. Ex.1003, ¶193; Ex.1006, 9:11-14. Electronic shutters were a standard feature in image sensors and provide the disclosed function of Yu’s on-sensor exposure time control. Ex.1003, ¶193 (citing Ex.1010, 8; Ex.1008, 2). Petitioner’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.

91. IV’s assertion that the Petition “misses enablement like specifics” for a multi-sensor, on-sensor shutter system (POR, 51) is misplaced. However, multi-sensor, on-sensor shutter systems were well established at the time. *See, e.g.*, Ex.1007, FIG. 1. Thus, Yu need not describe every well-known technical detail, contrary to IV’s “enablement-like specifics” arguments.

B. Yu and Miyazaki render obvious claim 2.

92. IV argues that the combination does not teach claim 2, because (i) “Yu never identifies per-sensor, on-sensor actuation during the frame;” (ii) Yu does not teach “how ‘exposure time’ is realized;” (iii) Yu does not “disclose an electronic

shutter;" and (iv) Yu does not have "a disclosure of focal-plane gating at each sensor while the frame is being captured." POR, 56.

93. However, none of these limitations are required by claim 2. *See* Section III.B.4. IV's arguments should be rejected, because they rest entirely on its unsupported requirements for "*during a frame.*"

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

94. IV argues that Yu is "agnostic as to whether the commanded 'exposure time' values are equal or different." This is incorrect, and directly contradicts Yu's disclosure.

95. 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.1003, ¶236; Ex.1005, 9:40-46. This description applies to Yu's FIG. 3 embodiment including four sensors, which is not disputed by IV. *Id.*

96. Further, as explained in the analysis of claim 8 in my previous declaration (undisputed by IV), in the Yu-Miyazaki combination, integration time is independently controlled based on the incident light level received at each sensor. Ex.1005, 6:44-52; 53-58; Ex.1003, ¶235. Accordingly, in the combination, different integration times are provided at the sensors.

V. DECLARATION

97. I declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with knowledge that willful false statements so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Dated: December 30, 2025



R. Michael Guidash