

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 6:21-cv-1088	DATE FILED 10/19/2021	U.S. DISTRICT COURT Western District of Texas
PLAINTIFF INTELLECTUAL VENTURES I LLC and INTELLECTUAL VENTURES II LLC		DEFENDANT GENERAL MOTORS COMPANY and GENERAL MOTORS LLC
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,832,283	12/14/2004	INTELLECTUAL VENTURES II LLC
2 7,891,004	2/15/2011	INTELLECTUAL VENTURES I LLC
3 9,934,628	4/3/2018	INTELLECTUAL VENTURES II LLC
4 9,291,475	3/22/2016	INTELLECTUAL VENTURES II LLC
5 SEE ATTACHED		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT 6/19/23-Order granting joint motion to dismiss. Document 116.

CLERK PHILIP J. DEVLIN	(BY) DEPUTY CLERK <i>NDavis</i>	DATE 06/20/2023
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

INTELLECTUAL VENTURES I LLC and	)	
INTELLECTUAL VENTURES II LLC,	)	
	)	
Plaintiffs,	)	C.A. No. 6:21-cv-1088
	)	
v.	)	
	)	
GENERAL MOTORS COMPANY and	)	
GENERAL MOTORS LLC,	)	ADDENDUM TO
	)	REPORT ON THE FILING OR
Defendants.	)	DETERMINATION OF AN ACTION
	)	REGARDING A PATENT OR
	)	TRADEMARK
	)	
	)	
	)	
	)	
	)	

Patent or Trademark No.	Date of Patent Or Trademark	Holder of Patent or Trademark
7,382,771	6/3/2008	INTELLECTUAL VENTURES II LLC
9,232,158	1/5/2016	INTELLECTUAL VENTURES II LLC
9,602,608	3/21/2017	INTELLECTUAL VENTURES II LLC
10,292,138	5/14/2019	INTELLECTUAL VENTURES II LLC
7,684,318	3/23/2010	INTELLECTUAL VENTURES I LLC
8,953,641	2/10/2015	INTELLECTUAL VENTURES II LLC
9,681,466	6/13/2017	INTELLECTUAL VENTURES II LLC
8,811,356	8/19/2014	INTELLECTUAL VENTURES II LLC

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED 6/8/2023	U.S. DISTRICT COURT Western District of Texas, Waco Division
PLAINTIFF INTELLECTUAL VENTURES I LLC and INTELLECTUAL VENTURES II LLC		DEFENDANT VOLVO CAR CORPORATION, VOLVO CARS OF NORTH AMERICA, LLC, and VOLVO CAR USA LLC
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,832,283	12/14/2004	INTELLECTUAL VENTURES II LLC
2 7,484,008	1/27/2009	INTELLECTUAL VENTURES I LLC
3 7,684,318	2/23/2010	INTELLECTUAL VENTURES I LLC
4 7,891,004	2/15/2011	INTELLECTUAL VENTURES I LLC
5 SEE ATTACHED		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
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3		
4		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

INTELLECTUAL VENTURES I LLC and
INTELLECTUAL VENTURES II LLC,

Plaintiffs,

v.

VOLVO CAR CORPORATION,
VOLVO CARS OF NORTH AMERICA,
LLC, and VOLVO CAR USA LLC,

Defendants.

C.A. No. 6:23-cv-00429

**ADDENDUM TO
REPORT ON THE FILING OR
DETERMINATION OF AN ACTION
REGARDING A PATENT OR
TRADEMARK**

Patent or Trademark No.	Date of Patent Or Trademark	Holder of Patent or Trademark
8,953,641	2/10/2015	INTELLECTUAL VENTURES II LLC
9,232,158	1/5/2016	INTELLECTUAL VENTURES II LLC
9,602,608	3/21/2017	INTELLECTUAL VENTURES II LLC
10,292,138	5/14/2019	INTELLECTUAL VENTURES II LLC

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORP.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2022-00710
Patent 9,232,158 B2

Before SCOTT A. DANIELS, FREDERICK C. LANEY, and
MATTHEW S. MEYERS, *Administrative Patent Judges*.

LANEY, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Toyota Motor Corporation (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–20 (the “challenged claims”) of U.S. Patent No. 9,232,158 B2 (Ex. 1001, “the ’158 patent”). Intellectual Ventures II LLC (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”). With our authorization, Petitioner also filed a Preliminary Reply and Patent Owner filed a Preliminary Sur-reply. Paper 10 (“Prelim. Reply”); Paper 12 (“Prelim. Sur-reply”).

We have jurisdiction under 35 U.S.C. § 314. Under § 314, an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). The Board determines whether to institute a trial on behalf of the Director. 37 C.F.R. § 42.4(a). A decision to institute is “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition.” *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018).

For the reasons set forth below, we determine that Petitioner has not demonstrated that there is a reasonable likelihood that at least one of the challenged claims is unpatentable. Accordingly, we do not institute an *inter partes* review of the challenged claims in the Petition.

B. *Real Parties-in-Interest*

Petitioner identifies itself and Toyota Motor North America, Inc., Toyota Motor Engineering & Manufacturing North America, Inc., and Toyota Motor Sales, U.S.A., Inc. as the real parties-in-interest. Pet. 75. Patent Owner identifies itself as the real party-in-interest. Paper 4, 2.

C. *Related Matters*

Petitioner and Patent Owner both identify the '158 patent as currently being involved in the following district court litigations: *Intellectual Ventures I LLC et al. v. Toyota Motor Corp. et al.*, 2:21-cv-00389 (E.D. Tex. October 19, 2021); *Intellectual Ventures I LLC et al. v. General Motors Company*, 6:21-cv-01088 (W.D. Tex. October 19, 2021); and *Intellectual Ventures I LLC et al. v. Honda Motor Company, Ltd. et al.*, 3:22-cv-00761 (N.D. Tex. April 4, 2022). Pet. 75; Paper 4, 2.

D. *The '158 Patent*

The '158 patent, titled “Large Dynamic Range Cameras,” relates to “[a] digital camera [that] includes a plurality of channels and a processing component operatively coupled to the plurality of channels.” Ex. 1001, codes (54), (57). “Each channel of the plurality of channels includes an optics component and a sensor that includes an array of photo-detectors” and “[t]he processing component is configured to separately control an integration time of each channel,” as well as, “combine data from the plurality of channels to generate an image.” *Id.* at code (57). The '158 patent suggests that this configuration with two or more camera channels enable a camera to have a wide dynamic range that is greater than the dynamic range obtained by a conventional digital camera with a single image sensor channel and one integration time. *Id.* at 4:41–64.

As shown below in annotated Figure 3 provided by Petitioner (Pet. 9), the '158 patent describes a digital camera subsystem 210 (gray) that includes multiple camera channels 260A-260D (blue), each channel including a respective sensor portion 292A-292D (red) and an optics portion 290A-

290D (purple) that receives and transmits light (yellow) to the sensor portions. *Id.* at 7:17–33.

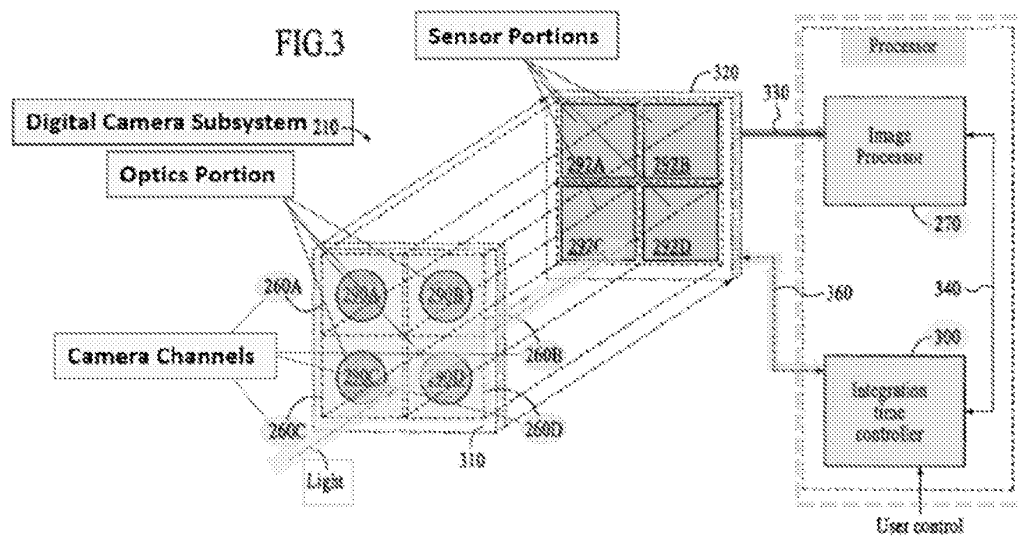


Figure 3 is a block diagram of a digital camera subsystem 210 in accordance with the invention disclosed by the '158 patent. The '158 patent describes subsystem 210 as also including “an image processor portion 270 [green] (referred to as image processor 270) and an integration time controller portion 300,” which are coupled to the sensor portions via communication couplings or links, e.g., signal lines 330 (red arrow) and 360 (green arrow). *Id.* at 8:32–35. The controller “provides integration time control for each of the camera channels” and the image processor “generates a combined image based at least in part on the images from two or more of the camera channels.” *Id.* at 8:32–38, 8:63–66.

E. Illustrative Claim

Petitioner challenges claims 1–20 of the '158 patent. Pet. 1. Claims 1, 9, and 15 are the independent claims. Ex. 1001, 25:31–39, 26:5–14, 25:30–39. Independent claim 1 is directed to an image capture device with a

plurality of sensors and optics components, as well as, a processing component. *Id.* at 25:31–39. Claims 2–8 depend from claim 1. *Id.* at 25:40–26:4. Independent claim 9 is directed to a system similar to the image capture device described in claim 1. *Id.* at 26:5–14. Claims 10–14 depend from claim 9. *Id.* at 26:15–29. Claim 15 is directed to a method of operation for a system similar to the system described in claim 15. *Id.* at 26:30–39. Claims 16–20 depend from claim 15. *Id.* at 26:40–54.

Independent claims 1 and 9 are illustrative and are reproduced below with bracketed labels employed by Petitioner to facilitate analysis and discussion.

1. [preamble] An image capture device comprising:

[a] a plurality of sensors;

[b] a plurality of optics components, wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors; and

[c] a processing component configured to control an integration time of each sensor.

* * * *

9. [preamble] A system comprising:

[a] a plurality of channels, wherein each channel of the plurality of channels includes a sensor; and

[b] a processing component coupled to the plurality of channels, wherein the processing component is configured to determine an integration time of each channel of the plurality of channels, wherein the processing component is configured to combine data from the plurality of channels received to provide an image.

Ex. 1001, 25:31–39, 26:5–14.

F. Prior Art and Asserted Grounds

Petitioner asserts that one or more of the challenged claims would have been either anticipated or obvious on the following six grounds:

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)
1–5, 8–11, 13–16, 19, 20	102(b)	Ikeda ²
3, 7, 13	103(a)	Ikeda, Booth ³
6, 12, 17, 18	103(a)	Ikeda, Fraenkel ⁴
1–5, 7–11, 13–16, 19, 20	102(b)	Nakajima ⁵
3, 7	103(a)	Nakajima, Booth
6, 12, 17, 18	103(a)	Nakajima, Fraenkel

Pet. 3. Petitioner supports its challenge with the Declaration of Alan Bovik (Ex. 1004).

II. ANALYSIS

Petitioner contends that we should institute an *inter partes* review of the '158 patent because several claims are anticipated by either Ikeda (Ground 1, claims 1–5, 8–11, 13–16, 19, 20) or Nakajima (Ground 4, claims 1–5, 7–11, 13–16, 19, 20); additionally, because several claims would have

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the challenged claims of the '158 patent have an effective filing date before the effective date of the applicable AIA amendment, we refer to the pre-AIA version of 35 U.S.C. § 103.

² US 5,801,773, iss. Sept. 1, 1998 (Ex. 1005, “Ikeda”).

³ JP Laid-Open Patent Application No. H11-317905, pub. Nov. 16, 1999 (Ex. 1006, “Nakajima”).

⁴ US 6,943,837 B1, iss. Dec. 31, 1999 (Ex. 1007, “Booth”).

⁵ WO 02/0198112 A2, pub. Dec. 5, 2002 (Ex. 1008, “Fraenkel”).

been obvious in view of the combination Ikeda and Booth (Ground 2, claims 3, 7, 13), the combination of Ikeda and Fraenkel (Ground 3, claims 6, 12, 17, 18), the combination of Nakajima and Booth (Ground 5, claims 3, 7), and the combination of Nakajima and Fraenkel (Ground 6, claims 6, 12, 17, 18). Patent Owner contends that discretionary denial of *inter partes* review under 35 U.S.C. § 314(a) is appropriate because of the alleged inefficiencies created by this proceeding in view of the parallel litigation. *See* Prelim. Resp. 21–41. And even if discretionary denial is not appropriate, Patent Owner asserts that we should deny *inter partes* review because Petitioner’s grounds of unpatentability are deficient. *See id.* at 41–54.

After considering the contentions and evidence submitted by both parties, for the reasons explained below, Patent Owner’s discretionary arguments are moot because we determine that the Petition fails to demonstrate sufficiently that there is a reasonable likelihood Petitioner would prevail in proving at least one of the challenged claims is unpatentable. Specifically, as Patent Owner argues, neither Ikeda nor Nakajima disclose “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” as recited in independent claim 1, or “a plurality of channels,” as recited in independent claims 9 and 15. Prelim. Resp. 41–54. Because Petitioner’s failure to establish Ikeda or Nakajima disclose those claim limitations is dispositive of the Petition, we focus our discussion below accordingly.

A. Principles of Law

Petitioner has the burden of proof. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“In an IPR, the petitioner has the

burden from the onset to show with particularity why the patent it challenges is unpatentable.”). Except in limited circumstances not present here, this burden of persuasion does not shift to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A prior art reference can only anticipate a claim if it discloses all the claimed limitations “arranged or combined in the same way as in the claim.” *Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1361 (Fed. Cir. 2012) (quoting *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008)). “However, a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or combination.” *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (quoting *In re Petering*, 301 F.2d 676, 681 (CCPA 1962)); *see also Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1343 (Fed. Cir. 2016) (distinguishing *Net MoneyIN* when the reference in question explicitly contemplated the combination of the disclosed functionalities).

Applying these general principles, we consider the evidence and arguments of the parties.

B. Level of Ordinary Skill in the Art

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). “This reference point prevents . . . factfinders from using their own insight or, worse yet, hindsight, to gauge obviousness.” *Id.*

Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima*, 261 F.3d at 1355.

Petitioner asserts that a person of ordinary skill in the art at the relevant time would have had a “at least a four-year undergraduate degree in electrical engineering or computer science or a closely related field and at least two years of experience in the field of digital imaging. Additional education could substitute for professional experience and vice versa.” Pet. 9–10 (citing Ex. 1004 ¶ 54). In the Preliminary Response, Patent Owner contends that a skilled artisan would have had “a bachelor’s degree in electrical engineering, computer science, computer engineering, physics, or a related subject, and two to three years of work experience in digital imaging.” Prelim. Resp. 21.

For purposes of this Decision, and based on the current record, we adopt Petitioner’s characterization of the level of skill for one of ordinary

skill in the art, except we decline to adopt “at least,” as that language is vague and open-ended. However, we note Patent Owner’s proposed characterization of a skilled artisan is not meaningfully different than the one proposed by Petitioner without the “at least” language. Because we find the parties’ characterizations to be consistent with the ’158 patent and the asserted prior art, we apply in our analysis below Petitioner’s characterization, as modified by the Board, for the level of ordinary skill in the art.

C. Claim Construction

We construe each claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b).” 37 C.F.R. § 42.100(b) (2019). Under this standard, claim terms are generally given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc) (“We have frequently stated that the words of a claim ‘are generally given their ordinary and customary meaning.’”).

Petitioner contends that “no terms need construction because the claims read on the prior art identified below under any construction consistent with *Phillips*.” Pet. 10. In the Petition, however, Petitioner notably does not provide anything further regarding how any claim term or phrase would be construed by a skilled artisan at the time of the invention in view of the ’158 patent, despite such a requirement being imposed by 37 C.F.R. § 42.204(b)(3). *Id.*

Patent Owner contends that, applying the canons of claim construction set forth in *Phillips*, (1) “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” as recited in independent claim 1, and (2) “a plurality of channels,” as recited in independent claims 9 and 15, are properly interpreted as “excluding devices with optics that are common to multiple channels.” Prelim. Resp. 13, 15. Petitioner disagrees. Prelim. Reply 1–3. Petitioner argues that neither the claims’ plain language or the Specification require independent optics for each channel or sensor. *Id.* Because our analysis of whether the evidence presented in the Petition establishes sufficiently that either Ikeda or Nakajima anticipates independent claims 1, 9, and 15 turns on the proper interpretation of these two phrases, we address each disputed phrase in order below.

1. *“wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors” (Claim 1)*

Turning first to the claim language itself, the plain meaning of the phrase “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors” requires each optics component to pass light separately to a distinct sensor of the plurality of sensors.⁶ Ex. 1001, 25:34–36. This is so because the phrase expressly singles out “*each* optics component” from “the plurality of optics components” and associates it with passing light to “*a* sensor” that is

⁶ In the context of the ’158 patent, a sensor may be an array of photo-detectors and multiple sensors may be formed on a single semiconductor substrate or chip. Ex. 1001, code (57), 4:18–21, 4:67–5:3, 7:17–39, 11:62–676, 14:45–47, 15:46–65, 16:8–15, Figs. 2, 3, 9, 14, 15.

distinguished from “the plurality of sensors.” *Id.* (emphasis added). As a result, claim 1 requires each optics component to have a configuration that allows it to pass light separately to an individual sensor distinct from the other sensor(s) in the plurality of sensors.

Petitioner argues,

the plain language of claim 1 only requires that “each optics component” “is configured to pass light to a sensor of [a] plurality of sensors.” Thus, the plain language of claim 1 does not preclude, e.g., an optical component passing light to one or more sensors.

Prelim. Reply 1. Although, “[a]s a general rule,” the word “a” in a patent claim carries the meaning of “one or more,” “the question whether ‘a’ or ‘an’ is treated as singular or plural depends heavily on the context of its use” and “[t]he general rule does not apply when the context clearly evidences that the usage is limited to the singular.” *TiVo, Inc. EchoStar Communications Corp.*, 516 F.3d 1290, 1303 (Fed. Cir. 2008).

Here, the context clearly evidences that the usage of “a” in “a sensor” is limited to a singular one of the “plurality of sensors.” In the context of the disputed phrase “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” the article “a” before “sensor” is used to distinguish the configuration of “*each* optics component” as being able “to pass light to” to an individual sensor distinct from the other sensor(s) in the group. Ex. 1001, 25:34–36. Consistent with this interpretation, claim 1 also recites “a processing component configured to control an integration time of *each* sensor,” which similarly distinguishes the processing component’s configuration as being able to control the integration time of an individual

sensor distinct from the other sensor(s) in the group. *Id.* at 25:38–39 (emphasis added).

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

The digital cameras described herein overcome this dynamic range limitation through the use of multiple camera channels, including multiple optics and image sensors on a single integrated circuit (IC) or semiconductor Substrate. The multiple camera channels are configured to image the same field of view simultaneously, and *each operates independently* under a different integration time.

Ex. 1001, 4:18–24 (emphasis added). And the Specification states,

Each channel includes an optics component and an image sensor having an active area including multiple picture elements (pixels). Each sensor is controlled under or with an independent signal integration time . . . [and] [t]he images obtained in each channel under the different integration times are obtained simultaneously or nearly simultaneously, so undesirable temporal aliasing from moving scenes or camera motion is minimized.

Id. at 3:43–57 (emphasis added). The Specification further explains that “a digital camera subsystem can have *multiple separate arrays* on a single image sensor, *each with its own lens*,” and by this “simple geometry of smaller, multiple arrays allows for a smaller lenses (e.g., smaller diameter, thickness and focal length), which allows for reduced stack height in the digital camera.” *Id.* at 14:45–50 (emphasis added). And “[e]ach of the optics portions . . . [as illustrated in Figure 15,] may include a lens, and may be associated with a respective one of the sensors arrays.” *Id.* at 15:50–53.

The individual nature of the optics component is evidenced by its description as “each be[ing] the same or different relative to the other optics.” *Id.* at 7:58–59. The Specification states, “*each sensor array and the*

*respective optics portion may define an optical component.” Id. at 15:55–56 (emphasis added). Finally, as Patent Owner correctly notes, “every figure shown in the ‘158 Patent (except the conventional prior art system distinguished by Fig. 1) includes optics specific to a channel, and none include optics that are common to more than one channel.” Prelim. Sur-reply 1; *see also* Ex. 1001, 6:43–7:3, 7:17–39, 11:44–13:10, 15:46–16:27; 17:3–24, 20:4–57.*

Petitioner argues, rather than supporting independent camera channels, that the Specification “describe[es] channels including ‘a shutter assembly’ and ‘a cover glass at the camera entrance (common aperture) to all optics (common to all optical channels),’ demonstrating that the embodiment has neither independent channels nor exclusively independent optical components.” Prelim. Reply 2–3. Petitioner argues that “[t]he ‘158 patent not only fails to clearly and deliberately disclaim shared optical components, but, as noted above, describes ‘a shutter assembly’ and a ‘common aperture’ that is ‘common to all optical channels’ for controlling the passage of light into the digital camera, contrary to the alleged disclaimer.” *Id.* at 3.

Petitioner’s argument is unavailing. In the context of the ‘158 patent, the “shutter assembly” and the “common aperture” of a digital camera are described as controlling the passage of light *into* the digital camera, and the invention addresses the channeling of the light *after* it enters the digital camera. In fact, although the Specification describes the “shutter assembly” and the “common aperture” as conventional parts of a digital camera, the Specification makes clear that the invention is directed to improving over a different conventional part in the camera; specifically, the conventional use

of a lens, color filter, and image sensor(s) assembly that forms a *single* camera channel to capture the light allowed into the camera. *See* Ex. 1001, 6:54–59. In fact, the Specification states that the invention itself may be used with a conventional “shutter assembly” and “common aperture” to control the passage of light *into* the digital camera. Ex. 1001, 5:59–6:12, 6:43–59, 7:10–16, 11:44–56, 12:18–61. But in every embodiment of the invention that the Specification discusses, rather than using the conventional lens, color filter, and image sensor(s) assembly, the embodiment captures the light conventionally allowed into the camera by using multiple camera channels formed with several optical components that each separately pass light to a different sensor. *Id.* at 6:43–7:3, 7:17–39, 11:44–13:10, 15:46–16:27; 17:3–24, 20:4–57. Thus, we agree with Patent Owner that “Petitioner’s arguments . . . wrongly assume that a shutter (a device that opens and closes), a cover or an aperture (a hole) are optics components within the meaning of the patent.” Prelim. Sur-reply 1.

When viewed in context of the intrinsic record from the perspective of a skilled artisan, the plain meaning of the phrase “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors” is properly interpreted to mean that each of the plurality of optics components is configured to pass light separately to a distinct sensor of the plurality of sensors. Therefore, we also agree with Patent Owner that the plain meaning of this claim element excludes from the scope of claim 1 devices that rely on a common optics component to pass light to multiple camera channels.

2. “a plurality of channels” (Claims 9 and 15)

Again, first looking within the context of the claim language itself, the plain meaning of “a plurality of channels” requires two or more distinct structures that each direct light to a specific sensor. Ex. 1001, 26:5–13, 26:31–39. Claims 9 and 15 further limit the respective channel structures to ones that also *include* a sensor. *Id.* at 26:6–7 (“wherein each channel of the plurality of channels includes a sensor”), 26:33–34 (“wherein the plurality of channels includes a plurality of sensors”). Because each claimed channel actually *includes* a sensor, it is clear that each channel structure is intended to have its own respective sensor that it passes light to. Thus, to a skilled artisan and within the context of claims 9 and 15 of the ’158 patent, the recited “plurality of channels” limitation refers to multiple independent structures that separately pass light to a different respective sensor.

The Specification supports this construction. In various ways throughout the Specification, it states clearly that “[e]ach channel of the plurality of channels includes an optics component and a sensor that includes an array of photo-detectors.” Ex. 1001, Code (57), 3:43–45 (“Each channel includes an optics component and an image sensor having an active area including picture elements (pixels)”), 4:66–5:2 (“The digital camera systems include multiple channels. Each channel includes an optics component and a sensor comprising an array of photo-detectors”), 5:15–18 (“Each sensor camera channel has its own optics, photo-detection and readout mechanism that includes a plurality of picture elements (pixels) with independent signal integration time control”), 7:23–25 (“Each of the camera channels 260A–260D includes an optics component or portion and a sensor component or portion”), 14:45–47 (“a digital camera subsystem can have multiple separate

arrays on a single image sensor, each with its own lens”), 15:1–3 (“The above-described devices can include any suitable number of combinations, including as few as two arrays/lenses, and many more than two arrays/lenses”), 15:50–56 (“Each of the optics portions 1504A-1504D may include a lens, and may be associated with a respective one of the sensor arrays 1504A-1504D . . . Each sensor array and the respective optics portion may define an optical channel”).

In each example the Specification discloses to explain the invention, there are multiple independent structures (e.g., lens) that separately pass light to a different respective sensor. Ex. 1001, 6:43–7:3, 7:17–39, 11:44–13:10, 15:46–16:27; 17:3–24, 20:4–57. Figure 15, and its description is representative and reproduced below.

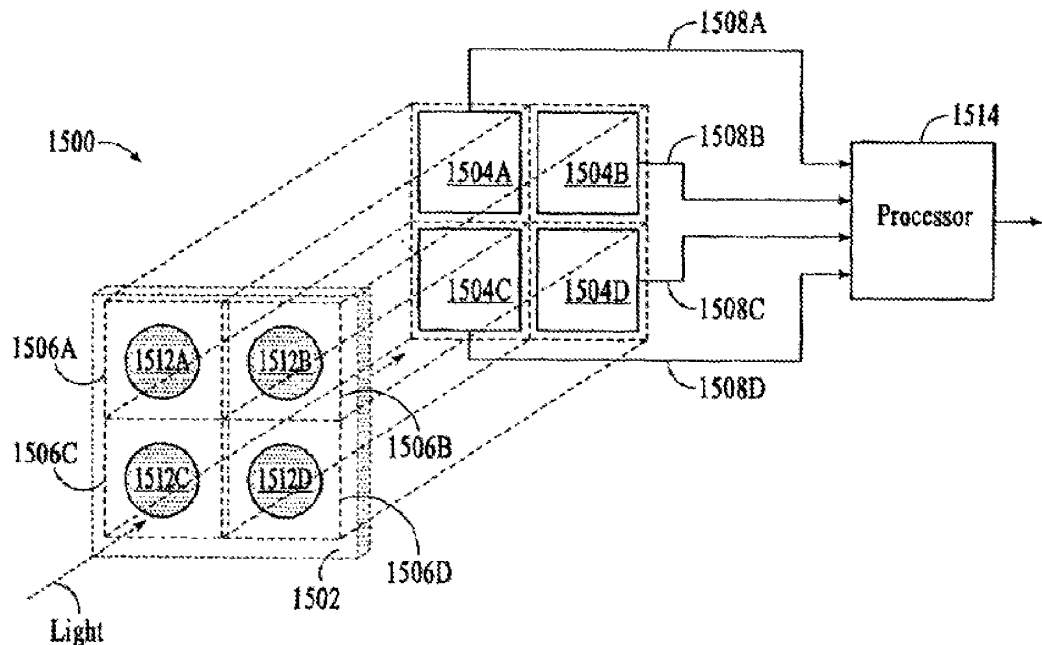


FIG.15

Figure 15 “is an exploded perspective view of a digital camera 1500.” *Id.* at 15:46–47. The Specification explains that Figure 15 illustrates

an optical channel 1506A may be defined by the optics portion 1512A and the sensor array 1504A. An optical channel 1506B may be defined by the optics portion 1512B and the sensor array 1504B. An optical channel 1506C may be defined by optics portion 1512C and the sensor array 1504C. An optical channel 1506D may be defined by optics portion 1512D and a sensor array 1504D.

Id. at 15:57–65. Moreover, the Specification attributes several benefits to having multiple independent structures that separately pass light to a different respective sensor, such as (1) overcoming dynamic range limitations (*id.* at 4:18–21); and (2) allowing for smaller lenses, which allows for reduced stack height in the digital camera (*id.* at 14:45–50).

When viewed in context of the intrinsic record from the perspective of a skilled artisan, the plain meaning of the phrase “plurality of channels” is properly interpreted as multiple independent structures that separately pass light to a different respective sensor. Therefore, we also agree with Patent Owner that the plain meaning of this claim element excludes from the scope of claims 9 and 15 devices that rely on a common optics component to pass light to multiple camera channels.

D. The Challenged Claims In View of Asserted Grounds 1–6

Grounds 1–6 in the Petition, directly or indirectly, depend on Petitioner showing that either Ikeda (Ground 1) or Nakajima (Ground 4) anticipate independent claims 1, 9, and 15. *See generally* Pet. 15–74. Patent Owner contends that Grounds 1–6 are deficient because Petitioner has failed to make such a showing. Prelim. Resp. 1–3. In particular, Patent Owner contends that the evidence in the Petition fails to demonstrate sufficiently that either Ikeda or Nakajima discloses “wherein each optics component of the plurality of optics components is configured to pass light to a sensor,” as

recited claim 1, or “a plurality of channel,” as recited in independent claims 9 and 15. *Id.* Patent Owner correctly notes that the Petition does not reference any of the additional prior art as disclosing either of these two limitations in any of the grounds. *See id.* at 46–48, 53–54; *see also* Pet. 38–50, 69–74. Because we agree that these two limitations are dispositive of the Petition, we address each in turn below in the context of the independent in which the limitation is recited (i.e., claim 1, 9, or 15). But before do, however, we first provide an overview of the Ikeda and Nakajima references.

1. *Ikeda*

Ikeda, titled “Image Data Processing Apparatus for Processing Combined Image Signals in Order to Extend Dynamic Range,” is directed to an “image data processing apparatus” that includes a controller for “match[ing] a dynamic range of image data to be outputted to an output unit to a dynamic range of data and/or to an output characteristic of the output unit so that the data may be processed in the output unit.” Ex. 1005, codes (54), (57).

2. *Nakajima*

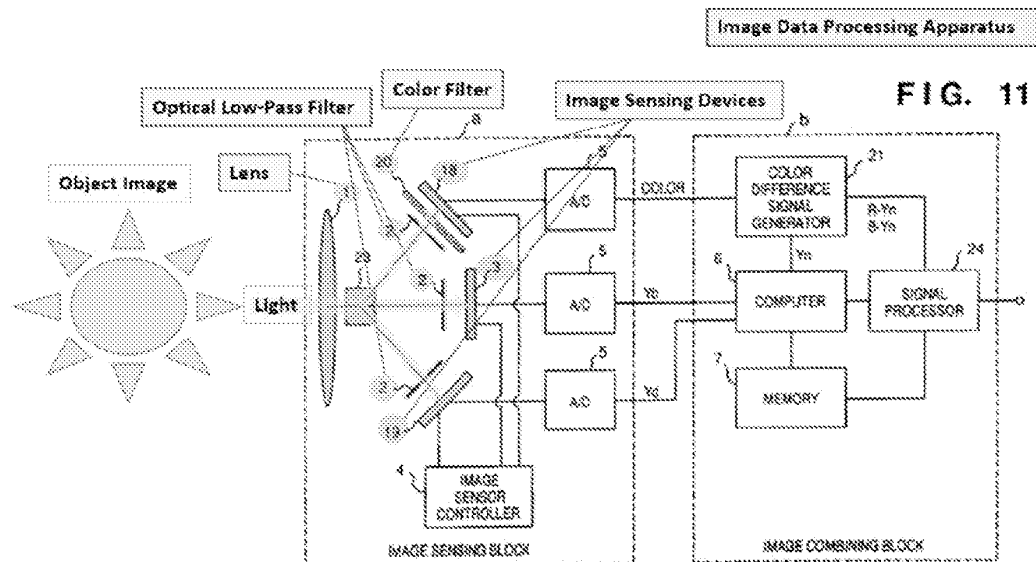
Nakajima, titled “Digital Camera,” is directed to “digital camera that can photograph pictures with a wider dynamic range.” Ex. 1006, codes (54), (57). In Nakajima, “[a]n image with an appropriate exposure, an overexposed image and an underexposed image are recorded by a single photography” and the image data for the three images “is weighted so as to increase a weight of the overexposed image in [the] dark portions” to “increase a weight of the underexposed image in bright portions in accordance with the luminance recorded with the appropriate exposure.” *Id.*

code (57). “With this process, because a weight of the overexposed image is greatly used for the portions [that] are blackened in the image with the appropriate exposure, the image will become brighter than that with the appropriate exposure and the gradation of the dark portions is reproduced.”

Id. “[B]ecause a weight of the underexposed image is greatly used for the portions [that] are whiter in the image with the appropriate exposure, the image will become darker than that with the appropriate exposure and the gradation of the bright portions is reproduced.” *Id.*

3. *Independent Claim 1*

Claim 1 recites an image capture device with a plurality of sensors and a plurality of optics components, “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors.” Ex. 1001, 25:32–36. To show Ikeda discloses this limitation, Petitioner relies on an annotated version of Ikeda’s Figure 11, reproduced below.



Petitioner contends Ikeda's annotated Figure 11 shows

Ikeda's apparatus also includes a plurality of optics components, including a lens 1, a prism 23, optical low-pass filters 2, and a color filter 20 (all purple), which provide a 'light path' to pass light (yellow) from an object image to be "projected upon the first, second, and third image sensing devices 18, 3, and 19 [red].

Pet. 16. Neither the Petition, nor Petitioner's expert Dr. Bovik, provides any further explanation or reasoning for how Ikeda discloses an apparatus "wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors." *Id.* at 16–17; *see also* Ex. 1004 ¶¶ 66–67.

Patent Owner argues that

Ikeda teaches a digital camera where incident light from an image passes through a lens (Reference Numeral 1) and then through a beam splitting prism (Reference Numeral 23). Ikeda explains that *the prism is used "for distributing an image from the lens 1 to the plurality of image sensing devices 3, 18 and 19."* After passing through the prism, the separated light then passes through "the optical low-pass filter 2 and the color filter 20, to be projected upon the image sensing devices 18, 3 and 19." Then the image sensor controller (Reference Numeral 4) causes the image sensing devices to acquire an image and transfer the respective acquired images to the Analog to Digital Converters (Ikeda, Reference Numeral 5) which is subsequently transferred to a computer (Ikeda, Reference Numeral 6) for processing. Ikeda's digital camera that utilizes a lens and a prism to distribute light from an incident light to a group of image sensors is depicted in Figure 11.

Prelim. Resp. 41–42 (citing Ex. 1005, 11:62–12:1, Fig. 11). Because Figure 11, and its description, in Ikeda disclose a plurality of sensors that *all* receive light from a single-common source (in other words, a single-common source is configured to pass light to *all* of the sensors), Patent Owner argues that

Petitioner has failed to show sufficiently that Ikeda discloses a plurality of optics components that are *each* configured to pass light separately to a distinct sensor of the plurality of sensors. *Id.* at 43.

We agree. For the reasons discussed above (*supra* §II.C.1), “each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” as recited in claim 1, requires each of the plurality of optics components to be configured to pass light separately to a distinct sensor of the plurality of sensors and cannot rely on a common optics component to pass light to all of the sensors. Although Petitioner provides little guidance, the only two structures in Figure 11 of Ikeda that can even arguably be optics components “configured to pass light” are lens 1 and prism 23. And Ikeda discloses those structures as functioning as a single unit that is common to the three disclosed sensors. *See* Ex. 1005, 11:62–12:1. As such, Ikeda only discloses a single optical component/unit configured to pass light to a plurality of sensors, rather than a plurality of optical components/units that are *each* able to pass light to their respective sensor(s) out of the plurality of sensors.

In fact, the only structure included in Figure 11 that Petitioner’s expert, Dr. Bovik, suggests is configurable *to pass light* to a sensor is the lens. *See* Ex. 1004 ¶¶ 39–41, 49, 66. For example, Dr. Bovik describes that, during operation of the device Ikeda discloses, the light from an object enters lens 1, which then passes the light through filters to projects the light upon an image sensing device. *Id.* ¶ 39. Although the Petition and Dr. Bovik lump “a lens 1, a prism 23, optical low-pass filters 2, and a color filter 20 (all purple)” together and refer to them collectively as “provid[ing] a ‘light path’ to pass light (yellow) from an object image to be ‘projected upon

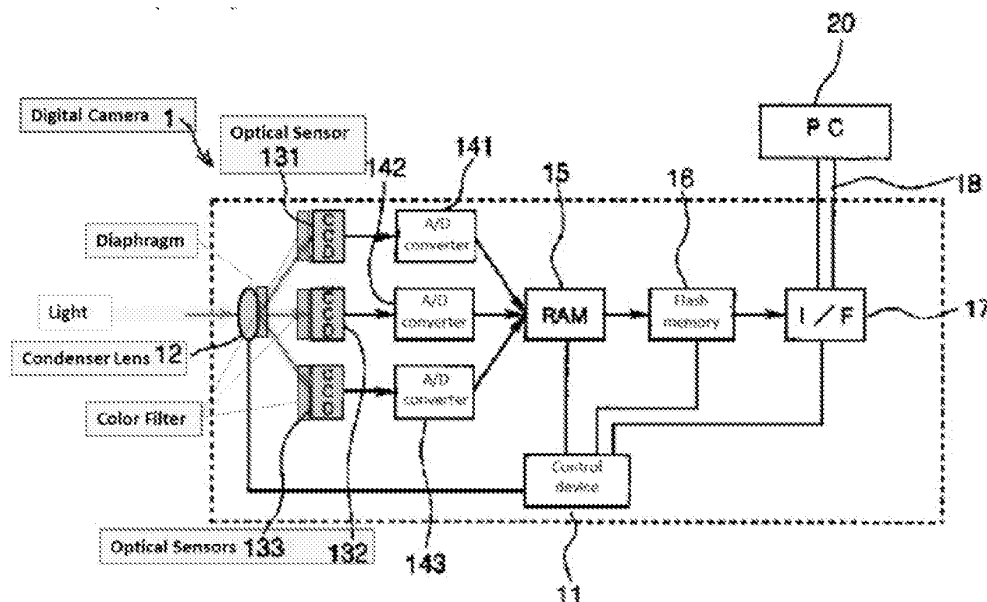
the first, second, and third image sensing devices 18, 3, and 19” (Pet. 16, Ex. 1004 ¶ 66), Ikeda suggests that lens 1 is the only structure configured to pass light (i.e., establish the light path) to a sensor.

This is evidenced by the fact that Ikeda describes the prism, optical low-pass filters, and a color filter as all being “provided *at the intermediate position of the light path*” that begins at lens 1. Ex. 1005, 13:34–38, 13:59–63 (emphasis added). In order for the prism, optical low-pass filters, and a color filter to be *at an intermediate position* of the light path, the light path must necessarily have been established before reaching them. Consistent with this understanding, Dr. Bovik only describes lenses as being configurable to pass light to a sensor (i.e., to zoom and focus incident light); the diaphragms, irises, and neutral density (ND) filters are described as “varying the amount of incident light” that has been passed; the optical low pass filters are described as “combat[ing] high-frequency moiré patterns” in the light that has been passed; and the color filters and filter arrays are described as “filtering specific wavelengths, or colors” of light that has been passed. Ex. 1004 ¶ 40.

Therefore, because Ikeda only discloses a single optical component (either lens 1 alone or in combination with prism 23⁷) configured to pass light to a sensor, we are not persuaded Petitioner has shown a reasonable likelihood of being able to establish that Ikeda discloses “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” as independent claim 1 recites.

⁷ Consistent with the teachings of the ’158 patent, a single optical component may be comprised of several parts. Ex. 1001, 17:41–48.

Turning now to Nakajima, Petitioner relies on an annotated version of Nakajima's Figure 5 reproduced below.



Petitioner contends Nakajima's annotated Figure 5 shows

Nakajima's digital camera includes a plurality of optics components, including a condenser lens 12 (purple) and primary and/or complementary color filters (also purple) that pass light (yellow) to each of the optical sensors 131, 132, 133 (red) where it "is converted into an electric signal."

Pet. 51 (citing Ex. 1006, ¶¶ 9, 14, 16, 18, 28, 30). But here again, as Patent Owner argues (Prelim. Resp. 49–50), Petitioner has only identified a single structure (i.e., lens 12) that is configurable to pass light to a plurality of sensor. Nakajima only suggests that condenser lens 12 is used to pass light to the image sensors 131–133. Ex. 1006 ¶ 27 ("In the present embodiment [illustrated in Figure 5], as the optical sensors, three CCDs 131, 132 and 133 are mounted, and a light that has passed the condenser lens 11 is collected, respectively"); *see also id.* ¶ 15 ("a light collected by the condenser lens 12 is entered into the CCD 13 and is converted into an electric signal").

Petitioner and Dr. Bovik note that Nakajima discloses that a diaphragm may be incorporated into the disclosed camera, but they describe the diaphragm “as designed to control the amount of peripheral light going through the lens aperture, i.e., *the opening of the lens*.” *Id.* at 52 (citing Ex. 1004 ¶ 151) (emphasis added). Thus, even by their own admission, the diaphragm does not pass light to a sensor; instead, it controls the amount of peripheral light that a lens can pass to a sensor. Similarly, Petitioner and Dr. Bovik describe the color built over or into the image sensor as “modify[ing] the characteristics of light (e.g., the color) exposed to groups of pixels on each sensor.” *Id.* at 52–53. Again, even by their own admission, the color filters do not evidence a structure that is configured to pass light to a particular sensor; instead, it alters to characteristics of the light that a lens passes to a sensor.

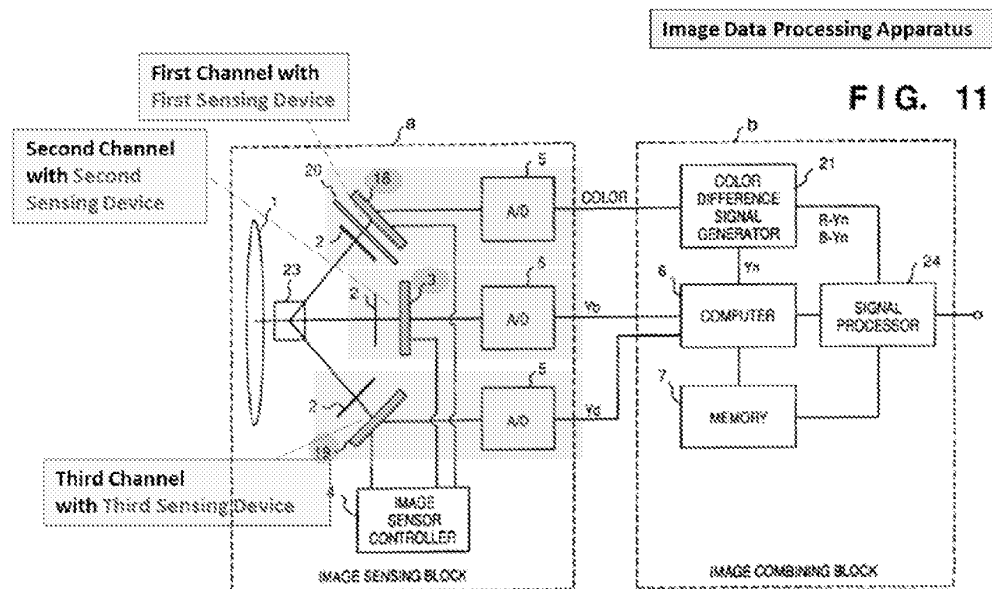
Therefore, because Nakajima only discloses a single optical component (lens 12) configured to pass light to a sensor, we are not persuaded Petitioner has shown a reasonable likelihood of being able to establish that Nakajima discloses “wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors,” as independent claim 1 recites.

4. *Independent Claims 9 and 15*

As an initial matter, we note that Petitioner treats as equals the limitations “a plurality of channels, wherein each channel of the plurality of channels includes a sensor,” as recited in independent claim 9, and “identifying an integration time for each of a plurality of channels of an image capture device, wherein the plurality of channels includes a plurality of sensors,” as recited in independent claim 15, by relying on the same

evidence and reasoning for both. *See* Pet. 27–28, 33. Accordingly, like Petitioner, we address whether Nakajima discloses “a plurality of channels” in the context of claim 9.

To show Ikeda discloses “a plurality of channels” that each include a sensor, Petitioner relies on another annotated version of Ikeda’s Figure 11, reproduced below.



Petitioner contends Ikeda’s annotated Figure 11 shows “Ikeda’s system includes a plurality of channels (blue), with each channel including respective first, second, and third ‘image sensing devices’ 18, 3, and 19 (red) (sensors) ‘for receiving light and photoelectric-converting the received light.’” Pet. 27 (citing Ex. 1005, 3:60–61, 4:15–16, 11:56–58, 11:65–12:1; Ex. 1004 ¶ 92). Neither the Petition, nor Petitioner’s expert Dr. Bovik, provides any further explanation or reasoning for how Ikeda discloses an apparatus with “a plurality of channels.” *Id.* at 27–28; *see also* Ex. 1004 ¶¶ 92–93.

Patent Owner states,

As shown in the annotated Figure above, Petitioner omitted the lens (Ikeda, Reference Numeral 1) and the Prism (Ikeda, Reference Numeral 23), which the Petitioner previously had defined as the plurality of optical components (see Petition at 16). Instead, the Petitioner defines the “channels” to include only the low pass filters (Ikeda, Reference Numeral 2), a single-color filter (Ikeda, Reference Numeral 20), and the sensors (Ikeda, Reference Numeral 5). Accordingly, Petitioner alleged that “channels” do not include the lens and the prism that receives the incident light and provides the light to all of the sensors. Instead, the Petitioner proposed that the “channels” are formed without any shared components or any lens. As a result, the Petitioner proffers that Ikeda’s low pass filters, single color filter, and sensors are the alleged “channels” recited in the claims.

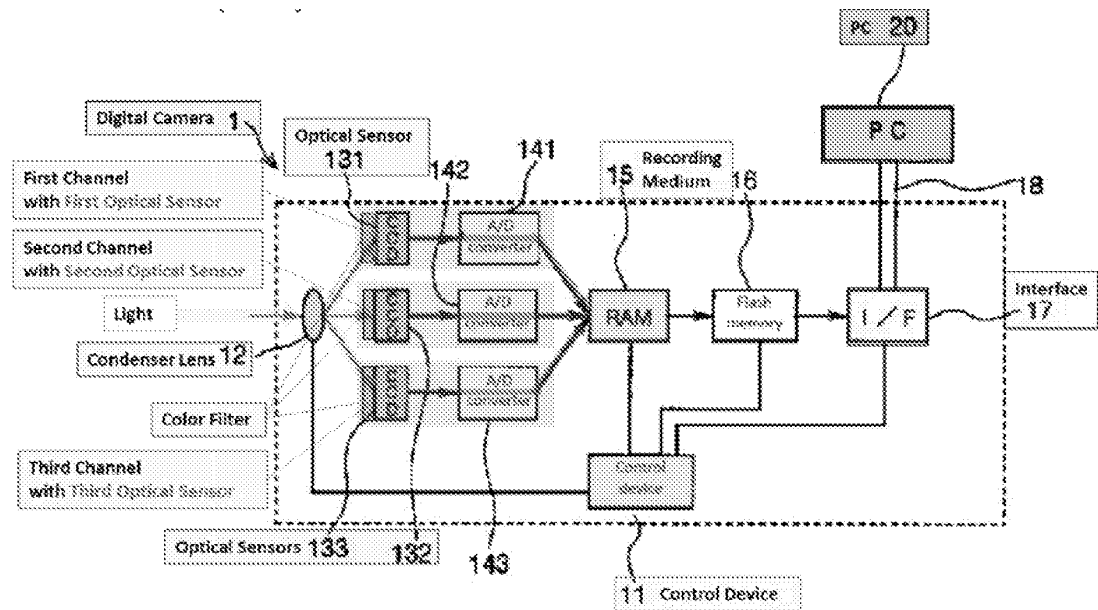
Prelim. Resp. 18–19. Patent Owner argues that Petitioner’s reliance on Ikeda’s annotated Figure 11 is misplaced and cannot show a plurality of channels because “each ‘channel’ requires a respective lens and sensor that allow the incident light to be independently processed and controlled.” *Id.* at 16.

We agree that Petitioner has failed to demonstrate sufficiently how Ikeda discloses a plurality of channels. For the reasons discussed above (*supra* §II.C.2), to a skilled artisan and within the context of claims 9 and 15 of the ’158 patent, the recited “plurality of channels” limitation refers to multiple independent structures that separately pass light to a different respective sensor. Although Petitioner provides little guidance, we do not find Petitioner to have shown in annotated Figure 11 that Ikeda discloses multiple independent structures that separately pass light to a different respective sensor. First, as Patent Owner notes, Petitioner does not rely on

lens 1, alone or in combination with prism 23, to show a channel. Second, Petitioner's suggestion that the combination of a low pass filter 2 and image sensors 3, 18, and 19 in Ikeda discloses a plurality of channels is unavailing because there is not sufficient support to find a low pass filter 2 is a structure that passes light to a sensor. Instead, Petitioner and Dr. Bovik describe the optical low pass filters as "combat[ing] high-frequency moiré patterns" in the light that has been passed. Pet. 4; Ex. 1004 ¶ 40. Furthermore, even considering lens 1, alone and in combination with prism 23, that Ikeda discloses, it is evident that Ikeda only discloses a single component for passing light to multiple sensors, rather than multiple independent structures that separately pass light to a different respective sensor.

Therefore, because Ikeda only discloses a single component (either lens 1 alone or in combination with prism 23) that is configured to pass light to a sensor and because Petitioner has only established that a low pass filter is configurable to modify the characteristics of the light passed by a lens to a sensor, we are not persuaded Petitioner has shown a reasonable likelihood of being able to establish that Ikeda discloses "a plurality of channels," as independent claims 9 and 15 recite.

Turning now to Nakajima, Petitioner relies on another annotated version of Nakajima's Figure 5 reproduced below.



Petitioner contends Nakajima’s annotated Figure 5 shows “Nakajima’s system includes a plurality of channels (blue), with each channel including a color filter (purple) and respective first, second, and third CCD sensors 131, 132, and 133 (red) for collecting light.” Pet. 61. Neither the Petition, nor Petitioner’s expert Dr. Bovik, provide any further any further explanation or reasoning for how Nakajima discloses an apparatus with “a plurality of channels.” *Id.* at 61–62; *see also* Ex. 1004 ¶¶ 175–176.

Petitioner again provides little guidance, nonetheless, we do not find Petitioner to have shown in annotated Figure 5 that Nakajima discloses multiple independent structures that separately pass light to a different respective sensor. First, Nakajima only discloses a single component (i.e., condenser lens 12) for passing light to multiple sensors, rather than multiple independent structures that separately pass light to a different respective sensor. Second, to the extent Petitioner is relying on the color filter/sensor combination in Nakajima to disclose a plurality of channels, it is likewise

unavailing because there is not sufficient support to find a color filter is a structure that passes light to a sensor. Instead, Petitioner and Dr. Bovik describe color filters as “for filtering specific wavelengths, or colors, of incident light” that has been passed by a lens. Pet. 4–5; Ex. 1004 ¶ 40. Thus, similar to Ikeda, because Nakajima only discloses a single component (condenser lens 12) that is configured to pass light to a sensor and because Petitioner has only established that a color filter is configurable to modify the characteristics of the light passed by a lens to a sensor, we are not persuaded Petitioner has shown a reasonable likelihood of being able to establish that Nakajima discloses “a plurality of channels,” as independent claims 9 and 15 recite.

Therefore, for all of the foregoing reasons, Petitioner has not shown sufficiently that either Ikeda or Nakajima anticipates independent claims 1, 9, and 15.

5. *Dependent Claims 2–8, 10–14, and 16–20*

Each of Petitioner’s contentions regarding the patentability of dependent claims 2–8, 10–14, and 16–20 in Grounds 1–6 depends on either Ikeda or Nakajima anticipating independent claims 1, 9, and 15. *See* Pet. 22–27, 30–33, 35–50, 56–61, 64–65, 67–74. Therefore, because Petitioner has not shown sufficiently that either reference anticipates any of the independent claims challenged, we likewise are not persuaded Petitioner has shown a reasonable likelihood of being able to establish any of dependent claims 2–8, 10–14, and 16–20 are unpatentable.

III. CONCLUSION

Our review of the Petition under 35 U.S.C. § 314 is not to determine whether an individual asserted fact is indisputable or whether a preponderance of the evidence supports Petitioner. Our review is to determine whether the totality of the information presented in the Petition and Preliminary Response shows that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition.

For the above reasons, we determine Petitioner has not established a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim of the '158 patent. Therefore, we deny *inter partes* review of the '158 patent on all challenged claims and all grounds asserted in the Petition. *See* 35 U.S.C. § 314(a).

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the '158 patent is denied.

IPR2022-00710
Patent 9,232,158 B2

FOR PETITIONER:

David Reese
James Barney
Luke McCammon
Nicholas Eitsert
david.reese@finnegan.com
james.barney@finnegan.com
luke.mccammon@finnegan.com
nicholas.eitsert@finnegan.com

FOR PATENT OWNER:

Ryan W. O'Donnell
Jeffrey G. Glabicki
Robert D. Leonard
Dawn C. Kerner
Michael F. Snyder
Daniel H. Golub
Russell J. Rigby
RODonnell@vklaw.com
JGlabicki@vklaw.com
DKerner@vklaw.com
Msnyder@vklaw.com
DGolub@vklaw.com
RRigby@intven.com



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840

23524
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

CONFIRMATION NO. 1847
POWER OF ATTORNEY NOTICE



Date Mailed: 04/26/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/19/2022.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/snguyen/



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/063,236	10/25/2013	Richard Ian Olsen	NEWT-USCN203090

CONFIRMATION NO. 1847

POA ACCEPTANCE LETTER

3624
VOLPE KOENIG
30 SOUTH 17TH STREET, 18TH FLOOR
PHILADELPHIA, PA 19103



Date Mailed: 04/26/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/19/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/snguyen/

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/063,236
Filing Date	October 25, 2013
First Named Inventor	Richard Ian Olsen
Title	LARGE DYNAMIC RANGE CAMERAS
Art Unit	2878
Examiner Name	Seung C. Sohn
Attorney Docket Number	NEWT-USCN203090

SIGNATURE of Applicant or Patent Practitioner

Signature	/John D. Wilt/	Date (Optional)	2022-04-19
Name	John D. Wilt	Registration Number	76,110
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)	Intellectual Ventures II LLC		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐

*Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with the Customer Number:**3624**

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number:**3624**

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☐ Firm or Individual Name

Address

City

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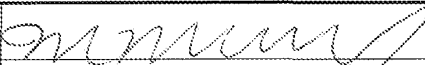
Assignee Name and Address:

Intellectual Ventures II LLC
251 Little Falls Drive
Wilmington, DE 19808

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1/9/2020
Name	Michelle Macartney	Telephone	
Title	Assistant Company Secretary for Intellectual Ventures II LLC		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	45508924
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	John D. Wilt/Caren Burgoon
Filer Authorized By:	John D. Wilt
Attorney Docket Number:	088245-9840
Receipt Date:	19-APR-2022
Filing Date:	25-OCT-2013
Time Stamp:	16:56:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	NEWT_USCN203090_373C_2020419.pdf	137622 0914e825c4a32fa5281073dfe9497603b3745550	no	3

Warnings:

Information:					
2	Power of Attorney	NEWT_USCN203090_POA_202 20419.pdf	820528 35742c34ea952cb82d95cb99bc0f495b2d0 bb0b3	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			958150		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: INTELLECTUAL VENTURES II LLC

Application No./Patent No.: 14/063,236 Filed/Issue Date: October 25, 2013

Titled: LARGE DYNAMIC RANGE CAMERAS

INTELLECTUAL VENTURES II LLC, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: RICHARD IAN OLSEN ET AL. To: NEWPORT IMAGING CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 019576, Frame 0976, or for which a copy thereof is attached.

2. From: NEWPORT IMAGING CORPORATION To: PROTARIUS FILO AG, L.L.C

The document was recorded in the United States Patent and Trademark Office at
Reel 053479, Frame 0248, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: PROTARIUS FILO AG, L.L.C. To: CALLAHAN CELLULAR L.L.C.

The document was recorded in the United States Patent and Trademark Office at
Reel 036743, Frame 0514, or for which a copy thereof is attached.

4. From: CALLAHAN CELLULAR L.L.C. To: INTELLECTUAL VENTURES II LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 057795, Frame 0618, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/John D. Wilt/

Signature

John D. Wilt

Printed or Typed Name

2022-04-19

Date

76,110

Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
 filed in the U.S. District Court Eastern District of Texas on the following

☒ Trademarks or ☐ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF INTELLECTUAL VENTURES I LLC and INTELLECTUAL VENTURES II LLC		DEFENDANT HONDA MOTOR COMPANY, LTD.; AMERICAN HONDA MOTOR COMPANY, INC.; AMERICAN HONDA FINANCE CORP.; HONDA OF AMERICA MANUFACTURING, INC., et al.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,832,283	12/14/2004	INTELLECTUAL VENTURES II LLC
2 9,602,608	3/21/2017	INTELLECTUAL VENTURES II LLC
3 7,891,004	2/15/2011	INTELLECTUAL VENTURES I LLC
4 9,291,475	3/22/2016	INTELLECTUAL VENTURES II LLC
5 SEE ATTACHED		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

INTELLECTUAL VENTURES I LLC and	)	
INTELLECTUAL VENTURES II LLC,	)	
	)	
Plaintiffs,	)	C.A. No. 2:21-cv-390
	)	
v.	)	
	)	
HONDA MOTOR COMPANY, LTD.;	)	ADDENDUM TO REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
AMERICAN HONDA MOTOR COMPANY,	)	
INC.; AMERICAN HONDA FINANCE	)	
CORP.; HONDA OF AMERICA	)	
MANUFACTURING, INC.; HONDA	)	
MANUFACTURING OF ALABAMA, LLC;	)	
and HONDA MANUFACTURING OF	)	
INDIANA, LLC,	)	
	)	
Defendants.	)	
	)	
	)	

Patent or Trademark No.	Date of Patent Or Trademark	Holder of Patent or Trademark
7,382,771	6/3/2008	INTELLECTUAL VENTURES II LLC
9,232,158	1/5/2016	INTELLECTUAL VENTURES II LLC
9,681,466	6/13/2017	INTELLECTUAL VENTURES II LLC
10,292,138	5/14/2019	INTELLECTUAL VENTURES II LLC
7,684,318	3/23/2010	INTELLECTUAL VENTURES I LLC
8,953,641	2/10/2015	INTELLECTUAL VENTURES II LLC
8,811,356	8/19/2014	INTELLECTUAL VENTURES II LLC

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

☒ Trademarks or ☐ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF INTELLECTUAL VENTURES I LLC and INTELLECTUAL VENTURES II LLC		DEFENDANT TOYOTA MOTOR CORP.; TOYOTA MOTOR NORTH AMERICA, INC.; TOYOTA MOTOR ENGINEERING & MANUFACTURING NORTH AMERICA, INC.; and TOYOTA MOTOR SALES, U.S.A., INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,832,283	12/14/2004	INTELLECTUAL VENTURES II LLC
2 7,484,008	1/27/2009	INTELLECTUAL VENTURES I LLC
3 9,291,475	3/22/2016	INTELLECTUAL VENTURES II LLC
4 7,382,771	6/3/2008	INTELLECTUAL VENTURES II LLC
5 SEE ATTACHED		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

INTELLECTUAL VENTURES I LLC and	)	
INTELLECTUAL VENTURES II LLC,	)	
	)	
Plaintiffs,	)	C.A. No. 2:21-cv-389
	)	
v.	)	
	)	
TOYOTA MOTOR CORP.; TOYOTA	)	
MOTOR NORTH AMERICA, INC.;	)	JURY TRIAL DEMANDED
TOYOTA MOTOR ENGINEERING &	)	
MANUFACTURING NORTH AMERICA,	)	
INC.; and TOYOTA MOTOR SALES, U.S.A.,	)	
INC.,	)	
	)	
Defendants.	)	
	)	
	)	
	)	
	)	

Patent or Trademark No.	Date of Patent Or Trademark	Holder of Patent or Trademark
9,232,158	1/5/2016	INTELLECTUAL VENTURES II LLC
9,602,608	3/21/2017	INTELLECTUAL VENTURES II LLC
10,292,138	5/14/2019	INTELLECTUAL VENTURES II LLC
7,684,318	3/23/2010	INTELLECTUAL VENTURES I LLC
8,953,641	2/10/2015	INTELLECTUAL VENTURES II LLC
9,681,466	6/13/2017	INTELLECTUAL VENTURES II LLC
8,811,356	8/19/2014	INTELLECTUAL VENTURES II LLC



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	01/05/2016	9232158	088245-9840	1847

23524 7590 12/16/2015
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 176 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

PROTARIUS FILO AG, L.L.C., Dover, DE;
Richard Ian Olsen, Truckee, CA;
Darryl L. Sato, Irvine, CA;
Feng-Qing Sun, Austin, TX;
James Gates, Carlsbad, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Receipt date: 01/22/2014

14063236 - GAU: 2878

PTO/SB/08 (09-06)

Approved for use through 03/31/2007. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 (use as many sheets as necessary)		Application Number	14/063236
		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet 1	of 8	Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		2002/0020845-A1	02-21-2002	OGURA ET AL.	
		2002/0024606-A1	02-28-2002	YUKI ET AL.	
		2002/0051071-A1	05-02-2002	ITANO ET AL.	
		2002/0067416-A1	06-06-2002	YONEDA ET AL.	
		2002/0075481-A1	06-20-2002	ROUSTAEI, ALEXANDER R.	
		2002/0089596-A1	07-11-2002	SUDA, YASUO	
		2002/0113888-A1	08-22-2002	SONODA ET AL.	
		2002/0122124-A1	09-05-2002	SUDA	
		2002/0142798-A1	10-03-2002	HIROYUKI MIYAKE	
		2003/0020814-A1	01-30-2003	ONO, SHUJI	
		2003/0086013-A1	05-08-2003	ARATANI, MICHIHARU	
		2003/0095711-A1	05-22-2003	MCGUINNESS ET AL.	
		2003/0151685-A1	08-14-2003	LA GRONE, MARCUS J.	
		2003/0160886-A1	08-28-2003	MISAWA ET AL.	
		2003/0209651-A1	11-13-2003	IWASAKI, TATSUYA	
		2003/0234907-A1	12-25-2003	KAWAI	
		2004/0012688-A1	01-22-2004	TINNERINO ET AL.	
		2004/0012689-A1	01-22-2004	TINNERINO ET AL.	
		2004/0017620-A1	01-29-2004	KANEKO ET AL.	
	F	2004/0027687-A1	02-12-2004	BITTNER ET AL.	
		2004/0080638-A1	04-29-2004	LEE, WON-HO	
		2004/0095495-A1	05-20-2004	~~KAZUYUKI ET AL.~~ Inokuma, Kazuyuki, et al.	
		2004/0183918-A1	09-23-2004	SQUILLA ET AL.	
		2005/0024731-A1	02-03-2005	MITCHELL ET AL.	
		2005/0128335-A1	06-16-2005	KOLEHMAINEN ET AL.	
		2005/0128509-A1	06-16-2005	TOKKONEN ET AL.	
		2005/0134712-A1	06-23-2005	GRUHLKE ET AL.	
		2005/0160112-A1	07-21-2005	MAKELA ET AL.	
		2005/0248667-A1	11-10-2005	SCHWENG ET AL.	
		2005/0285955-A1	12-29-2005	UTZ ET AL.	
		2006/0087572-A1	04-27-2006	SCHROEDER	
		2006/0108505-A1	05-25-2006	GRUHLKE ET AL.	
		2006/0125936-A1	06-15-2006	GRUHLKE ET AL.	
		2006/0187322-A1	08-24-2006	JANSON, JR., ET AL.	
		2006/0187338-A1	08-24-2006	MAY ET AL.	
		2006/0222220-A1	10-05-2006	YAMANO ET AL.	
		2007/0002159-A1	01-04-2007	OLSEN ET AL.	
		3,609,367-	09-28-1971	BARRON, DONALD ROBERT	
		3,971,065	07-20-1976	BAYER, BRYCE E.	

Changes applied
to document,
/J.E.B./
11/17/2015

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP . if possible. and . The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by . This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /SCS/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor Name: Richard Ian Olsen
Title: LARGE DYNAMIC RANGE
CAMERAS
Appl. No.: 14/063236
Filing Date: 10/25/2013
Examiner: Seung C. Sohn
Art Unit: 2878
Confirmation Number: 1847

ISSUE FEE TRANSMITTAL

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Enclosed herewith please find Issue Fee Transmittal Form PTOL-85(B).

Fees in the amount of \$960.00 for payment of the Issue Fee are being paid by credit card via EFS-Web.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

Respectfully submitted,

Date November 30, 2015

By /Paul S. Hunter/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (858) 847-6733
Facsimile: (858) 792-6773

Paul S. Hunter
Attorney for Applicant
Registration No. 44,787

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or **Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23524 7596 09/02/2015
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840	1847

TITLE OF INVENTION: LARGE DYNAMIC RANGE CAMERAS

APPL. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/02/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
SOHN, SEUNG C	2878	250-208100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. _____

2. _____

3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Callahan Cellular L.L.C.

Wilmington, DE

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☒ Payment by credit card. Form PTO 2038 is attached. **EFS Web**
- ☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number **19-0741** (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Paul S. Hunter/

Typed or printed name Paul S. Hunter

Date November 30, 2015

Registration No. 44,787

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor Name: Richard Ian Olsen
Title: LARGE DYNAMIC RANGE CAMERAS
Appl. No.: 14/063236
Filing Date: 10/25/2013
Examiner: Seung C. Sohn
Art Unit: 2878
Confirmation Number: 1847

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

Mail Stop ISSUE FEE
Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

These Comments on Statement of Reasons for Allowance under 37 C.F.R. § 1.104 are intended to be responsive to the Notice of Allowance dated September 2, 2015. On pages 2-3 of the Notice of Allowability under “Examiner’s Statement of Reasons for Allowance,” the Examiner provided a statement of reasons for allowance.

While Applicant agrees that the allowed claims recite a combination of subject matter that is patentable over the cited references, Applicant does not necessarily agree with or acquiesce in the statement of reasons for allowance given by the Examiner. Moreover, the Applicant notes that the recited subject matter as well as various other subject matter and/or combinations of subject matter may be patentable for other reasons than those given by the Examiner. Applicant expressly reserves the right to set forth additional and/or alternative reasons for patentability and/or allowance with the present Application or in any other future proceeding.

Atty. Dkt. No. 088245-9840

Respectfully submitted,

Date: November 30, 2015

By: /Paul S. Hunter/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4292
Facsimile: (608) 258-4258

Paul S. Hunter
Attorney for Applicant
Registration No. 44,787

Electronic Patent Application Fee Transmittal				
Application Number:		14063236		
Filing Date:		25-Oct-2013		
Title of Invention:		LARGE DYNAMIC RANGE CAMERAS		
First Named Inventor/Applicant Name:		Richard Ian Olsen		
Filer:		Paul S. Hunter/Linda Anderson		
Attorney Docket Number:		088245-9840		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	24208433
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Paul S. Hunter/Linda Anderson
Filer Authorized By:	Paul S. Hunter
Attorney Docket Number:	088245-9840
Receipt Date:	30-NOV-2015
Filing Date:	25-OCT-2013
Time Stamp:	13:59:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 960
RAM confirmation Number	229
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	088245-9840Issuefee.pdf	453990 97a3429651b1d844e0e63fb74e20bc0811ff40c9	no	3
Warnings:					
Information:					
2	Post Allowance Communication - Incoming	088245-9840CommentsOnAllowance.pdf	112455 34a2fa8489f699661bf4ab1fcff434be70aabb1d	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30410 ab7e89c80bf1b5fe3ff0e43d895aa03d4d5eb89c	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			596855		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Richard Ian Olsen

Title: LARGE DYNAMIC RANGE CAMERAS

Appl. No.: 14/063236

Filing Date: 10/25/2013

Examiner: Seung C. Sohn

Art Unit: 2878

Confirmation Number: 1847

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith in response to the Notice to File Corrected Application Papers mailed September 23, 2015, and October 30, 2105 is a properly signed corrected Application Data Sheet correcting the typographical errors in the Application Data Sheet filed on October 25, 2013.

Applicant believes that no fee is due. If for any reason a fee is deemed to be due, authorization is hereby given to charge any deficiency (or credit any balance) to Deposit Account No. 19-0741.

Respectfully submitted,

Date: November 11, 2015

By: /Christopher L. Kalafut/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4286
Facsimile: (608) 258-4258

Christopher L. Kalafut
Attorney for Applicant
Registration No. 57,946

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2. (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	--

Inventor Information:

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Richard	Ian	Olsen			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Truckee	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1		556 Stewart McKay				
Address 2						
City	Truckee	State/Province	CA			
Postal Code	96161	Country	US			
Inventor 2					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Darryl	L.	Sato			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Irvine	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1		21 Pintail Apt. 12D				
Address 2						
City	Irvine	State/Province	CA			
Postal Code	92604	Country	US			
Inventor 3					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Feng-Qing		Sun			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

City	Austin	State/Province	TX	Country of Residence	US
------	--------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	224 Mediterra Pl.				
Address 2					
City	Austin	State/Province	TX		
Postal Code	78732	Country	US		

Inventor 4	Remove
------------	------------------------

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James		Gates	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Carlsbad	State/Province	CA	Country of Residence	US
------	----------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	2399 Jefferson St. Apt. 11				
Address 2					
City	Carlsbad	State/Province	CA		
Postal Code	92008	Country	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

[Add](#)**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	23524		
Email Address	IPDocketing@foley.com	Add Email	Remove Email

Application Information:

Title of the Invention	LARGE DYNAMIC RANGE CAMERAS		
Attorney Docket Number	088245-9840	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	24	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:			
☒	Customer Number	☐	US Patent Practitioner
☐	Limited Recognition (37 CFR 11.9)		
Customer Number	23524		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.					
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
This Application	Continuation of	13/681603	2012-11-20		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/681603	Continuation of	13/465229	2012-05-07	8334494	2012-12-18
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/465229	Continuation of	~~12/469854~~ 12/496854	2009-07-02	8198574	2012-06-12
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
~~12/469854~~ 12/496854	Continuation of	11/788122	2007-04-19	7564019	2009-07-21
Prior Application Status	Expired		Remove		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	An application claiming the benefit of	~~60/075882~~ 60/795882	2006-04-28
Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	Continuation in part of	11/212803	2005-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/604854	2004-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/695946	2005-07-01
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) ^h the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

[Remove](#)

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.
--

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.
--

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Applicant 1				Remove	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.					
Clear					
☒ Assignee		☐ Legal Representative under 35 U.S.C. 117		☐ Joint Inventor	
☐ Person to whom the inventor is obligated to assign.			☐ Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:					
Name of the Deceased or Legally Incapacitated Inventor:					
If the Applicant is an Organization check here. ☒					
Organization Name		PROTARIUS FILO AG, L.L.C.			
Mailing Address Information:					
Address 1		160 Greentree Drive, Suite 101			
Address 2					
City		Dover	State/Province		DE
Country ⁱ		US	Postal Code		19904
Phone Number			Fax Number		
Email Address					
Additional Applicant Data may be generated within this form by selecting the Add button. Add					

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.	
Assignee 1	
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.	
Remove	
If the Assignee is an Organization check here. ☐	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button.

Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/Christopher L. Kalafut/		Date (YYYY-MM-DD)	2015-11-11
First Name	Christopher L.	Last Name	Kalafut	Registration Number
				57,946

Additional Signature may be generated within this form by selecting the Add button.

Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	24047257
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Christopher L. Kalafut/Linda Anderson
Filer Authorized By:	Christopher L. Kalafut
Attorney Docket Number:	088245-9840
Receipt Date:	11-NOV-2015
Filing Date:	25-OCT-2013
Time Stamp:	10:44:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Post Allowance Communication - Incoming	088245-9840SeconResponseNotice_to_CorrAppPapers.pdf	93878 a852ab04ceefc7e487328a4c7af3b33a4e9a9079	no	1

Warnings:

Information:

2	Application Data Sheet	088245-9840SuppADS.pdf	4993141 88538b6eeeb9752e526%cad8029169e93 b68511	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
Total Files Size (in bytes):				5087019	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840	1847
23524 7590 10/30/2015 FOLEY & LARDNER LLP 3000 K STREET N.W. SUITE 600 WASHINGTON, DC 20007-5109			EXAMINER SOHN, SEUNG C	
			ART UNIT 2878	PAPER NUMBER
			NOTIFICATION DATE 10/30/2015	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocketing@foley.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 14063236
Applicant : Olsen
Filing Date : 10/25/2013
Date Mailed : 10/30/2015

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

*A copy of this notice **MUST** be returned with the reply. Please address response to
"Mail Stop Issue Fee, Commissioner for Patents,
P.O. Box 1450, Alexandria, VA 22313-1450".*

/Joseph Boris/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 14063236

**IDENTIFICATION OF APPLICATION DEFICIENCIES
IN APPLICATION FILED ON OR AFTER SEPTEMBER 16, 2012**

- ☐ Applicant must provide legible text for the following item(s).
- ☐ Specification filed , page(s) .
- ☐ Claims filed , claim(s) .
- ☐ Other: .
- ☐ Applicant must provide missing information on the following page(s) of the specification by amending the specification to add the missing text. No new matter may be added.
Page/line no(s).
- ☐ The specification refers to one or more applications by attorney docket number and does not show the U.S. application number(s). Applicant must supply the U.S. application number in place of each attorney docket number.
Page/line no(s).
- ☐ Applicant must provide an Abstract of the Disclosure.
- ☐ The Application Data Sheet (ADS dated) does not supply the inventor's city and/or does not supply the inventor's U.S. state and/or does not supply the inventor's country. Applicant must submit a signed application data sheet that corrects this deficiency. To be in compliance with 37 CFR 1.76, the corrected application data sheet must identify the information being changed by using underlining for additions and strikethroughs or brackets for deletions..
- ☒ The Application Data Sheet (ADS dated 10/23/2015) was not properly signed. Applicant must submit an application data sheet that is properly signed in accordance with 37 CFR 1.76(e) and 1.33(b). If the unsigned application data sheet shows foreign priority information or domestic benefit information, and if the Office does not show foreign priority information or domestic benefit information on the filing receipt, applicant may need to file a petition under 37 CFR 1.55 or 1.78 for delayed claim for priority or benefit if the claim for priority or benefit has not been filed in accordance with the time periods set forth in 37 CFR 1.55 or 1.78.
- ☐ Other:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Richard Ian Olsen

Title: LARGE DYNAMIC RANGE CAMERAS

Appl. No.: 14/063236

Filing Date: 10/25/2013

Examiner: Seung C. Sohn

Art Unit: 2878

Confirmation Number: 1847

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith in response to the Notice to File Corrected Application Papers mailed September 23, 2015, is a corrected Application Data Sheet correcting the typographical errors in the Application Data Sheet filed on October 25, 2015.

Applicant believes that no fee is due. If for any reason a fee is deemed to be due, authorization is hereby given to charge any deficiency (or credit any balance) to Deposit Account No. 19-0741.

Respectfully submitted,

Date October 23, 2015

By: /Christopher L. Kalafut/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4286
Facsimile: (608) 258-4258

Christopher L. Kalafut
Attorney for Applicant
Registration No. 57,946

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Richard	Ian	Olsen		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Truckee	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	556 Stewart McKay				
Address 2					
City	Truckee	State/Province	CA		
Postal Code	96161	Country	US		
Inventor 2					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Darryl	L.	Sato		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Irvine	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	21 Pintail Apt. 12D				
Address 2					
City	Irvine	State/Province	CA		
Postal Code	92604	Country	US		
Inventor 3					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Feng-Qing		Sun		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

City	Austin	State/Province	TX	Country of Residence i	US
------	--------	----------------	----	------------------------	----

Mailing Address of Inventor:

Address 1	224 Mediterra Pl.				
Address 2					
City	Austin	State/Province	TX		
Postal Code	78732	Country i	US		

Inventor 4

Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James		Gates	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Carlsbad	State/Province	CA	Country of Residence i	US
------	----------	----------------	----	------------------------	----

Mailing Address of Inventor:

Address 1	2399 Jefferson St. Apt. 11				
Address 2					
City	Carlsbad	State/Province	CA		
Postal Code	92008	Country i	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.

Add

Correspondence Information:Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).☐ An Address is being provided for the correspondence information of this application.

Customer Number	23524		
Email Address	IPDocketing@foley.com	Add Email	Remove Email

Application Information:

Title of the Invention	LARGE DYNAMIC RANGE CAMERAS		
Attorney Docket Number	088245-9840	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	24	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	23524		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.					
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
This Application	Continuation of	13/681603	2012-11-20		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/681603	Continuation of	13/465229	2012-05-07	8334494	2012-12-18
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/465229	Continuation of	~~12/469854~~ 12/496854	2009-07-02	8198574	2012-06-12
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
~~12/469854~~ 12/496854	Continuation of	11/788122	2007-04-19	7564019	2009-07-21
Prior Application Status	Expired		Remove		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	An application claiming the benefit of	~~60/075882~~ 60/795882	2006-04-28
Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	Continuation in part of	11/212803	2005-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/604854	2004-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/695946	2005-07-01
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) ^h the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

[Remove](#)

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Applicant 1				Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
Clear				
☒ Assignee		☐ Legal Representative under 35 U.S.C. 117		☐ Joint Inventor
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor:				
If the Applicant is an Organization check here. ☒				
Organization Name		PROTARIUS FILO AG, L.L.C.		
Mailing Address Information:				
Address 1		160 Greentree Drive, Suite 101		
Address 2				
City		Dover	State/Province	DE
Country ⁱ		US	Postal Code	19904
Phone Number			Fax Number	
Email Address				
Additional Applicant Data may be generated within this form by selecting the Add button. Add				

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.	
Assignee 1	
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.	
Remove	
If the Assignee is an Organization check here. ☐	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	14/063236
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button.

Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/Christopher L. Kalafut		Date (YYYY-MM-DD)	Oct. 23, 2015
First Name	Christopher L.	Last Name	Kalafut	Registration Number
				57,946

Additional Signature may be generated within this form by selecting the Add button.

Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	23874637
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Christopher L. Kalafut/Linda anderson
Filer Authorized By:	Christopher L. Kalafut
Attorney Docket Number:	088245-9840
Receipt Date:	23-OCT-2015
Filing Date:	25-OCT-2013
Time Stamp:	13:55:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Post Allowance Communication - Incoming	088245-9840Response_to_Notice_to_FileCorAPP_Papers.pdf	94180 1b67511d4996b9ded0d3d26565c3b3ea2e1ca8e	no	1

Warnings:

Information:

2	Application Data Sheet	088245-9840UpdatedADS.pdf	4995499 50ffe01ba4bd07a19524dbaaa0b9998b6143b9f	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
Total Files Size (in bytes):			5089679		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840	1847
23524 7590 09/23/2015 FOLEY & LARDNER LLP 3000 K STREET N.W. SUITE 600 WASHINGTON, DC 20007-5109			EXAMINER SOHN, SEUNG C	
			ART UNIT 2878	PAPER NUMBER
			NOTIFICATION DATE 09/23/2015	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocketing@foley.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 14063236
Applicant : Olsen
Filing Date : 10/25/2013
Date Mailed : 09/23/2015

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The application is not in compliance with 37 CFR 1.78, as indicated in the attachment. The consequences of failure to respond within the above-identified time period are set forth in the attachment.

Even if the Office has recognized a benefit claim and has entered it into the Office's database and included it on applicant's filing receipt, the benefit claim is not a proper benefit claim unless the reference in compliance with 37 CFR 1.78 is included, depending upon the application's filing date and as indicated in the attachment, in an application data sheet or in the first sentence(s) of the specification and all other requirements are met.

See attachment.

*A copy of this notice **MUST** be returned with the reply. Please address response to
"Mail Stop Issue Fee, Commissioner for Patents,
P.O. Box 1450, Alexandria, VA 22313-1450".*

/Joseph Boris/
Publication Branch
Office of Data Management
(571) 272-4200

**APPLICATION FILED ON OR AFTER MARCH 16, 2013,
NOT IN COMPLIANCE WITH 37 CFR 1.78**

- ☐ The 37 CFR 1.78(c)(2) reference on the application data sheet does not indicate the relationship (continuation, division, continuation-in-part) to the prior U.S. nonprovisional application or international application designating the U.S. See document coded dated , listing application number(s) .
- ☐ The 37 CFR 1.78(c)(2) reference on the application data sheet does not provide the U.S. nonprovisional application number (series code and serial number) or, with respect to an international PCT application designating the U.S., it provides the international application number or international filing date but not both. See document coded dated , in which the following is missing: .
- ☒ The 37 CFR 1.78(c)(2) reference on the application data sheet shows an incorrect, incomplete, or illegible U.S. nonprovisional application number, international PCT application number, or international PCT filing date. See document coded ADS dated 10/25/2013, in which the following error was made: 12496854 is listed as 12469854.
- ☐ The 37 CFR 1.78(c)(2) reference to the prior U.S. nonprovisional application or international application designating the U.S. is not present on an application data sheet, thus removing the validating link under 35 U.S.C. 119(a)-(d) to a prior foreign application or under 35 U.S.C. 119(e) to a prior U.S. provisional application.
- ☐ The 37 CFR 1.78(c)(2) reference to the prior U.S. nonprovisional application or international application designating the U.S. is not present on an application data sheet.
- ☐ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application is not present on an application data sheet.
- ☐ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application on an application data sheet does not provide the provisional application number (series code and serial number). See document coded dated , in which the following is missing: .
- ☒ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application on an application data sheet shows an incorrect, incomplete, or illegible U.S. provisional application number. See document coded ADS dated 10/25/2013, in which the following error was made: 60795882 is listed as 60975882.
- ☐ Other: .

HOW TO RESPOND

A proper response to this notice would include: (1) a corrected Application Data Sheet (ADS) pursuant to 37 CFR 1.76(c) which provides the benefit information from the attached filing receipt which would make the benefit information comply with 37 CFR 1.78(c)(2) or 37 CFR 1.78(a)(3) or (2) a petition filed pursuant to the provisions of 37 CFR 1.78(b) or 37 CFR 1.78(d) if the benefit information from the attached filing receipt does not accurately reflect the benefits under 35 U.S.C. 119(e), 120, 121 or 365(c) as claimed by applicant (a grantable petition would include a corrected ADS as required by 37 CFR 1.78(b)(1) or 37 CFR 1.78(d)(1)).

WARNING: If Applicant fails to timely submit a proper response, the benefit information will be deleted and the patent will be printed without the benefit information present.



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NOTICE OF ALLOWANCE AND FEE(S) DUE

23524 7590 09/02/2015
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

EXAMINER

SOHN, SEUNG C

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 09/02/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/063,236

10/25/2013

Richard Ian Olsen

088245-9840

1847

TITLE OF INVENTION: LARGE DYNAMIC RANGE CAMERAS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/02/2015

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23524 7590 09/02/2015
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840	1847

TITLE OF INVENTION: LARGE DYNAMIC RANGE CAMERAS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/02/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
SOHN, SEUNG C	2878	250-208100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840	1847

23524	7590	09/02/2015
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FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

EXAMINER	
SOHN, SEUNG C	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 09/02/2015

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/063,236	Applicant(s) OLSEN ET AL.	
	Examiner SEUNG C. SOHN	Art Unit 2878	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 7/27/2015.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892) 2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>See Continuation Sheet</u> 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	--

Continuation of Attachment(s) 2. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 1/22/2014 and 7/27/2015.

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Reasons for Allowance

2. Claims 1-20 are allowed.
3. The following is an examiner's statement of reasons for allowance:

Claims 1-20 are not disclosed or made obvious by the prior art of record, specifically in combination with the limitation of "a plurality of sensors; a plurality of optics components, wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors; and a processing component configured to control an integration time of each sensor."

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEUNG C. SOHN whose telephone number is (571)272-4123. The examiner can normally be reached on Mon-Thur, 7:30 AM -6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, GEORGIA Y. EPPS can be reached on 571-272-2328. The fax phone

Art Unit: 2878

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SEUNG C SOHN/

Primary Examiner, Art Unit 2878

Notice of References Cited	Application/Control No. 14/063,236		Applicant(s)/Patent Under Reexamination OLSEN ET AL.	
	Examiner SEUNG C. SOHN		Art Unit 2878	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5,604,534 A	02-1997	Hedges; Thomas M.	G01C11/025	348/106
*	B	US-7,436,038 B2	10-2008	Engelmann; Michael G.	G01J5/02	257/233
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 14063236	Applicant(s)/Patent Under Reexamination OLSEN ET AL.
	Examiner SEUNG C SOHN	Art Unit 2878

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	08/24/2015								
	1	=								
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CONFIRMATION NO. 1847

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/063,236	10/25/2013	250	2878	088245-9840		
RULE						
APPLICANTS PROTARIUS FILO AG, L.L.C., Dover, DE; INVENTORS Richard Ian Olsen, Truckee, CA; Darryl L. Sato, Irvine, CA; Feng-Qing Sun, Austin, TX; James Gates, Carlsbad, CA; ** CONTINUING DATA ***** This application is a CON of 13/681,603 11/20/2012 PAT 8598504 which is a CON of 13/465,229 05/07/2012 PAT 8334494 which is a CON of 12/496,854 07/02/2009 PAT 8198574 which is a CON of 11/788,122 04/19/2007 PAT 7564019 which claims benefit of 60/795,882 04/28/2006 and is a CIP of 11/212,803 08/25/2005 ABN which claims benefit of 60/604,854 08/25/2004 and claims benefit of 60/695,946 07/01/2005 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 11/06/2013						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/SEUNG C SOHN/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 24	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 3
ADDRESS FOLEY & LARDNER LLP 3000 K STREET N.W. SUITE 600 WASHINGTON, DC 20007-5109 UNITED STATES						
TITLE LARGE DYNAMIC RANGE CAMERAS						
FILING FEE RECEIVED 1600	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Search Notes 	Application/Control No. 14063236	Applicant(s)/Patent Under Reexamination OLSEN ET AL.
	Examiner SEUNG C SOHN	Art Unit 2878

CPC- SEARCHED		
Symbol	Date	Examiner
H01L27/14618, H01L27/14621, H01L27/14625, H01L27/14634, H01L27/14645, H04N5/2253, H04N5/2254, H04N5/2353, H04N5/332, H04N5/335	8/24/2015	SCS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
250	208.1	8/24/2015	SCS
348	273, 302, 308	8/24/2015	SCS

SEARCH NOTES		
Search Notes	Date	Examiner
EAST (US-PGPUB, USPAT, EPO, JPO, DERWENT)	8/24/2015	SCS
INVENTOR SEARCH	8/24/2015	SCS
ASSIGNEE SEARCH	8/24/2015	SCS
BIB DATA VERIFIED	8/24/2015	SCS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	TEXT SEARCH (EAST US-PGPUB, USPAT, UPAD)	8/24/2015	SCS

	/SEUNG C SOHN/ Primary Examiner.Art Unit 2878
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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	"13681603"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 12:58
L2	10141	H01L27/14618.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:01
L3	9059	H01L27/14621.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:01
L4	7690	H01L27/14625.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:02
L5	3375	H01L27/14634.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:02
L6	3449	H01L27/14645.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:02
L7	7495	H04N5/2253.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:03
L8	16540	H04N5/2254.CPC.	US-PGPUB;	OR	ON	2015/08/24

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L9	4889	H04N5/2353.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:04
L10	2541	H04N5/332.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:04
L11	9368	H04N5/335.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:04
L12	32283	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:05
L13	144	10 AND 12	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:05
L14	384078	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:06
L16	49	13 and 14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/24 13:06
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S2	98	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:33
S3	16	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:33
S4	134277	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:34
S5	4029	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:35
S6	16014	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:35
S7	985	S4 and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:35
S8	67	S5 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:36
S9	1027	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2008/06/23 08:36

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S10	31	S5 and S9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/23 08:36
S11	4326	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/03/02 11:07
S12	3	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/03/02 11:08
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S14	139	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S15	31	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S16	244192	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S17	5770	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S18	22948	integration adj time	US-PGPUB; USPAT;	OR	ON	2012/02/11 13:00

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S19	1852	S16 and S18	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S20	111	S17 and S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S21	1526	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S22	45	S17 and S21	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S23	5770	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
S24	4	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:00
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S28	3145	348/302,308.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/02/11 13:32
S30	0	"13465229"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:54
S31	2	"12496854"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S32	5	"11788122"	US-PGPUB; USPAT;	OR	ON	2012/08/13 11:55

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S33	142	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S34	34	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S35	260035	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S36	6085	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S37	24036	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S38	2020	S35 and S37	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S39	124	S36 and S38	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S40	1624	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55

S41	50	S36 and S40	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
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S46	34	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S47	260035	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S48	6085	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S49	24036	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2012/08/13 11:55

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S50	2020	S47 and S49	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S51	124	S48 and S50	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
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S53	50	S48 and S52	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
S54	6085	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/13 11:55
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S63	155	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S64	41	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S65	287598	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S66	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S67	25926	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S68	2267	S65 and S67	US-PGPUB; USPAT;	OR	ON	2013/07/01 12:03

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S69	153	S66 and S68	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S70	1788	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S71	64	S66 and S70	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S72	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S73	4	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S74	8	"11788122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S75	155	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S76	41	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03

S77	287598	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S78	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S79	25926	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S80	2267	S77 and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S81	153	S78 and S80	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S82	1788	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S83	64	S78 and S82	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S84	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S85	4	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2013/07/01 12:03

			DERWENT; IBM_TDB			
S86	2	"7564019".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S87	199	("20030086013" "20040017620" "20050160112" "20060087572" "4323925" "6429898" "6570613" "6611289" "6841816" "6859299" "6882368" "6946647" "7223954" "7417674" "20020024606" "20020067416" "20030151685" "20040095495" "20040183918" "20060187338" "5051830" "5760832" "6833873" "6885404" "6885508" "7095159" "7206136" "20020075481" "20020020845" "20020051071" "20020142798" "20040012689" "20050128509" "20050285955" "5742659" "6437335" "6617565" "7214926" "7239345" "20020122124" "3971065" "5436660" "5766980" "6381072" "6765617" "6834161" "7280290" "20060222220" "20020113888" "20030209651" "20040027687" "20040080638" "20060125936" "6885398" "7170665" "7305180" "7362357" "20040012688" "20050248667" "20060187322" "20070002159" "4385373" "4894672" "5005083" "5691765" "5694165" "6137535" "6714239" "6903770" "6952228" "7115853" "7199348" "7236306" "7256944" "7460160" "20030095711" "20020089596" "20030160886" "6375075" "6727521" "7123298" "20030020814" "20030234907" "20050024731" "20050128335" "20050134712" "20060108505" "3609367" "5654752" "5850479" "7358483" "7379104").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S88	925	348/273.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S89	3734	348/302,308.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03

S90	3	"13465229"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S91	5	"12496854"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S92	8	"11788122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S93	155	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S94	41	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S95	287598	digital adj camera	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S96	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S97	25926	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S98	2267	S95 and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2013/07/01 12:03

			DERWENT; IBM_TDB			
S99	153	S96 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S100	1788	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S101	64	S96 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S102	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S103	4	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S104	8	"11788122"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S105	155	olsen near2 richard	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S106	41	olsen near2 richard near2 ian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S107	287598	digital adj camera	US-PGPUB; USPAT; USOCR;	OR	ON	2013/07/01 12:03

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S108	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S109	25926	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S110	2267	S107 and S109	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S111	153	S108 and S110	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S112	1788	shorter same (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S113	64	S108 and S112	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S114	6686	250/208.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S115	4	((integration adj time) with frame with shorter with image).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S116	2	"7564019".pn.	US-PGPUB;	OR	ON	2013/07/01

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S118	925	348/273.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
S119	3734	348/302,308.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:03
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S121	1	(13/681603).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/07/01 12:05
S125	4324	control\$4 with (integration adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:15
S126	0	S125 with (each adj (sensor or detector))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:15
S127	19	S125 with (during near frame)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:16

S128	199	("20020020845" "20020051071" "20020075481" "20020113888" "20020142798" "20030086013" "20030151685" "20030209651" "20040012688" "20040017620" "20040080638" "20040183918" "20050128335" "20050134712" "20050248667" "20060087572" "20060125936" "20060187338" "20070002159" "3971065" "4894672" "5436660" "5694165" "5766980" "6375075" "6437335" "6617565" "6765617" "6841816" "6885398" "6903770" "7095159" "7170665" "7214926" "7239345" "7305180" "7379104" "7460160").PN. "20020024506" "20020067416" "20020089596" "20020122124" "20030020814" "20030095711" "20030160886" "20030234907" "20040012689" "20040027687" "20040095495" "20050024731" "20050128509" "20050160112" "20050285955" "20060108505" "20060187322" "20060222220" "3609367" "4323925" "5005083" "5654752" "5742659" "5850479" "6381072" "6570613" "6714239" "6833873" "6859299" "6885404" "6946647" "7115853" "7199348" "7223954" "7256944" "7358483" "7417674" "4385373" "5051830" "5691765" "5760832" "6137535" "6429898" "6611289" "6727521" "6834161" "6882368" "6885508" "6952228" "7123298" "7206136" "7236306" "7280290" "7362357")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:20
S129	19	S127 not S128	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:21
S130	74058	plurality near sensor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:28
S131	9	S127 and S130	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:28
S132	307	S125 and S130	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2013/07/01 12:28

			EPO; JPO; DERWENT; IBM_TDB			
S133	185	S125 and S130 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 12:29
S134	3	"13465229"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/01 13:39
S137	2	"7564019".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 15:19
S138	2	"8198574".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 15:21
S139	2	"8334494".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 15:23
S140	5078	focal adj plane adj shutter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:06
S141	228	S140 with frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:08
S142	134250	dynamic adj range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:09
S143	12	S141 and S142	US-PGPUB; USPAT;	OR	ON	2013/07/03 16:09

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S144	25942	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:12
S145	228	S141 with frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:12
S146	30885	multiple adj sensor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:13
S147	0	S145 and S146	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:13
S148	12	S145 and S142	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:13
S149	2	"6903770".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:28
S150	2	"7199348".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:35
S151	2	"20050128509"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:37

S152	2	"8334494".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/11 17:09
S153	1	"14063236"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:03
S154	32283	integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:26
S155	254	("20020020845" "20020024606" "20020051071" "20020067416" "20020075481" "20020089596" "20020113888" "20020122124" "20020142798" "20030086013" "20030151685" "20030160886" "20030209651" "20030234907" "20040012688" "20040012689" "20040017620" "20040027687" "20040080638" "20040095495" "20050024731" "20050128335" "20050128509" "20050160112" "20050248667" "20050285955" "20060087572" "20060108505" "20060125936" "20060187322" "20060187338" "20060222220" "20070002159" "3609367" "3971065" "4323925" "4385373" "4688080" "4894672" "5005083" "5051830" "5436660" "5654752" "5691765" "5694165" "5742659" "5760832" "5766980" "5850479" "6137535" "6375075" "6381072" "6429898" "6437335" "6570613" "6617565" "6714239" "6727521" "6765617" "6834161" "6841816" "6859299" "6866873" "6882368" "6885398" "6885404" "6885508" "6903770" "6946647" "6952228" "6999130" "7095159" "7115853" "7123298" "7170665" "7199348" "7206136" "7214926" "7223954" "7236306" "7239345" "7256944" "7280290" "7305180" "7358483" "7362357" "7379104" "7417674" "7460160").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:27
S156	1087	second adj integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/08/21 09:29

			IBM_TDB			
S157	655	S156 and image	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:29
S158	965	control\$4 adj integration adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:30
S159	721	S158 and image	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/08/21 09:31

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S29	2	((integration adj time) with frame with shorter with image).clm.	US-PGPUB	OR	ON	2012/02/11 13:38
S61	2	((integration adj time) with frame with shorter with image).clm.	US-PGPUB	OR	ON	2012/08/13 11:55
S135	2	((integration adj time) with frame with shorter with image).clm.	US-PGPUB	OR	ON	2013/07/01 12:03
S136	2	((integration adj time) with frame with shorter with image).clm.	US-PGPUB	OR	ON	2013/07/01 12:03

8/ 24/ 2015 1:13:56 PM**C:\ Users\ ssohn\ Documents\ EAST\ Workspaces\ 14063236.wsp**

Issue Classification 	Application/Control No. 14063236	Applicant(s)/Patent Under Reexamination OLSEN ET AL.	
	Examiner SEUNG C SOHN	Art Unit 2878	

CPC					
Symbol				Type	Version
H04N	5	/	3355	F	2013-01-01
G02B	3	/	0031	A	2013-01-01
G02B	3	/	0043	A	2013-01-01
G02B	3	/	0062	I	2013-01-01
G02B	3	/	0075	I	2013-01-01
G02B	9	/	12	I	2013-01-01
H01L	27	/	14618	I	2013-01-01
H01L	27	/	14621	I	2013-01-01
H01L	27	/	14625	I	2013-01-01
H01L	27	/	14634	A	2013-01-01
H01L	27	/	14645	I	2013-01-01
H01L	31	/	0232	I	2013-01-01
H04N	5	/	2253	I	2013-01-01
H04N	5	/	2254	I	2013-01-01
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H04N	2209	/	049	A	2013-01-01
H01L	2924	/	0002	A	2013-01-01

CPC Combination Sets								
Symbol				Type	Set	Ranking	Version	
H01L		2924		0002	A	1	1	2013-01-01
H01L		2924		00	A	1	2	2013-01-01

NONE		Total Claims Allowed:	
		20	
(Assistant Examiner)	(Date)		
/SEUNG C SOHN/ Primary Examiner. Art Unit 2878	08/24/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	6

Issue Classification 	Application/Control No. 14063236	Applicant(s)/Patent Under Reexamination OLSEN ET AL.
	Examiner SEUNG C SOHN	Art Unit 2878

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
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CROSS REFERENCE(S)																			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		

NONE		Total Claims Allowed:	
		20	
(Assistant Examiner)	(Date)		
/SEUNG C SOHN/ Primary Examiner. Art Unit 2878	08/24/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	6

Issue Classification 	Application/Control No. 14063236	Applicant(s)/Patent Under Reexamination OLSEN ET AL.
	Examiner SEUNG C SOHN	Art Unit 2878

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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NONE		Total Claims Allowed:	
		20	
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(Primary Examiner)	(Date)	1	6

Receipt date: 07/27/2015

14063236 - GAU: 2878
PTO/SB/08 (modified)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: July 27, 2015 <i>(use as many sheets as necessary)</i>				Application Number	14/063236
				Filing Date	10/25/2013
				First Named Inventor	Richard Ian Olsen
				Art Unit	2878
				Examiner Name	Seung C. Sohn
Sheet	1	of	1	Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			

FOREIGN PATENT DOCUMENTS						
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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Communication on EP Application 05793927.4, mailed July 8, 2015	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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4814-8848-9254
ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /SCS/

Receipt date: 01/22/2014

14063236 - GAU: 2878

PTO/SB/08 (09-06)

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		Art Unit	2878
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U.S. PATENT DOCUMENTS					
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		Number-Kind Code ² (if known)			
		2002/0020845-A1	02-21-2002	OGURA ET AL.	
		2002/0024606-A1	02-28-2002	YUKI ET AL.	
		2002/0051071-A1	05-02-2002	ITANO ET AL.	
		2002/0067416-A1	06-06-2002	YONEDA ET AL.	
		2002/0075481-A1	06-20-2002	ROUSTAEI, ALEXANDER R.	
		2002/0089596-A1	07-11-2002	SUDA, YASUO	
		2002/0113888-A1	08-22-2002	SONODA ET AL.	
		2002/0122124-A1	09-05-2002	SUDA	
		2002/0142798-A1	10-03-2002	HIROYUKI MIYAKE	
		2003/0020814-A1	01-30-2003	ONO, SHUJI	
		2003/0086013-A1	05-08-2003	ARATANI, MICHIHARU	
		2003/0095711-A1	05-22-2003	MCGUINNESS ET AL.	
		2003/0151685-A1	08-14-2003	LA GRONE, MARCUS J.	
		2003/0160886-A1	08-28-2003	MISAWA ET AL>	
		2003/0209651-A1	11-13-2003	IWASAKI, TATSUYA	
		2003/0234907-A1	12-25-2003	KAWAI	
		2004/0012688-A1	01-22-2004	TINNERINO ET AL.	
		2004/0012689-A1	01-22-2004	TINNERINO ET AL.	
		2004/0017620-A1	01-29-2004	KANEKO ET AL.	
	7	2004/0027687-A1	02-12-2004	BITTNER ET AL.	
		2004/0080638-A1	04-29-2004	LEE, WON-HO	
		2004/0095495-A1	05-20-2004	KAZUYUKI ET AL.	
		2004/0183918-A1	09-23-2004	SQUILLA ET AL.	
		2005/0024731-A1	02-03-2005	MITCHELL ET AL.	
		2005/0128335-A1	06-16-2005	KOLEHMAINEN ET AL.	
		2005/0128509-A1	06-16-2005	TOKKONEN ET AL.	
		2005/0134712-A1	06-23-2005	GRUHLKE ET AL.	
		2005/0160112-A1	07-21-2005	MAKELA ET AL.	
		2005/0248667-A1	11-10-2005	SCHWENG ET AL.	
		2005/0285955-A1	12-29-2005	UTZ ET AL.	
		2006/0087572-A1	04-27-2006	SCHROEDER	
		2006/0108505-A1	05-25-2006	GRUHLKE ET AL.	
		2006/0125936-A1	06-15-2006	GRUHLKE ET AL.	
		2006/0187322-A1	08-24-2006	JANSON, JR., ET AL.	
		2006/0187338-A1	08-24-2006	MAY ET AL.	
		2006/0222220-A1	10-05-2006	YAMANO ET AL.	
		2007/0002159-A1	01-04-2007	OLSEN ET AL.	
		3,609,367-	09-28-1971	BARRON, DONALD ROBERT	
		3,971,065	07-20-1976	BAYER, BRYCE E.	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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14063236 - GAU: 2878

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 <i>(use as many sheets as necessary)</i>		Application Number	14/063236
		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet	2	of	8
		Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examiner	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
		4,323,925-	04-06-1982	ABELL ET AL.	
		4,385,373-	05-24-1983	HOWE, DONALD J.	
		4,688,080	08-18-1987	WAGNER, STEVEN D.	
		4,894,672-	01-16-1990	TANAKA	
		5,005,083-	04-02-1991	GRAGE ET AL.	
		5,051,830-	09-24-1991	VON HOESSLE, WOLFGANG	
		5,436,660-	07-25-1995	SAKAMOTO, YUKIO	
		5,654,752-	08-05-1997	YAMAZAKI, YASUYUKI	
		5,691,765-	11-25-1997	SCHIETZ ET AL.	
		5,694,165-	12-02-1997	YAMAZAKI ET AL.	
		5,742,659-	04-21-1998	ATAC ET AL.	
		5,760,832-	06-02-1998	YAMANAKA ET AL.	
		5,766,980-	06-16-1998	OHTAGAKI ET AL.	
		5,850,479-	12-15-1998	TERRY ET AL.	
		6,137,535-	10-24-2000	MEYERS, MARK MARSHALL	
		6,375,075-B1	04-23-2002	ACKLEY ET AL.	
		6,381,072-B1	04-30-2002	BURGER, ROBERT J.	
		6,429,898-B1	08-06-2002	SHODA ET AL.	
		6,437,335-B1	08-20-2002	BOHN, DAVID D	
		6,570,613-B1	05-27-2003	HOWELL, PAUL	
		6,611,289-B1	08-26-2003	YU ET AL.	
		6,617,565-B2	09-09-2003	WU, RAYMOND	
		6,714,239-B2	03-30-2004	GUIDASH, ROBERT M.	
		6,727,521-B2	04-27-2004	MERRILL, RICHARD B.	
		6,765,617-B1	07-20-2004	TANGEN ET AL.	
		6,833,873-B1	12-21-2004	SUDA, YASUO	
		6,834,161-B1	12-21-2004	STIEHLER	
		6,841,816-B2	01-11-2005	MERRILL ET AL.	
		6,859,299-B1	02-22-2005	CHIAO, JUNG-CHIH	
		6,882,368-B1	04-19-2005	SUDA, YASUO	
		6,885,398-B1	04-26-2005	SLADEN, PETER	
		6,885,404-B1	04-26-2005	SUDA, YASUO	
		6,885,508-B2	04-26-2005	YAMAGUCHI ET AL.	
		6,903,770-B1	06-07-2005	KOBAYASHI ET AL.	
		6,946,647-B1	09-20-2005	O'NEILL ET AL.	
		6,952,228-B2	10-04-2005	YONEDA ET AL.	
		6,999,130	02-14-2006	TANIGAWA, SATORU	
		7,095,159-B2	08-22-2006	MACHIDA, AKIHIRO	
		7,115,853-B2	10-03-2006	JIANG ET AL.	
		7,123,298-B2	10-17-2006	SCHROEDER ET AL.	
		7,170,665-B2	01-30-2007	KANEKO ET AL.	

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14063236 - GAU: 2878

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		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet	3	of	8
		Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examin er	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
		7,199,348-B2	04-03-2007	OLSEN ET AL.	
		7,206,136-B2	04-17-2007	LABAZIEWICZ ET AL.	
		7,214,926-B2	05-08-2007	GRUHLKE ET AL.	
		7,223,954-B2	05-29-2007	MCNULTY, PETER C.	
		7,236,306-B2	06-26-2007	JANSON JR. ET AL.	
		7,239,345-B1	07-03-2007	ROGINA, PETER	
		7,256,944-B2	08-14-2007	LABAZIEWICZ ET AL.	
		7,280,290-B2	10-09-2007	ARAKI ET AL.	
		7,305,180-B2	12-04-2007	LABAZIEWICZ ET AL.	
		7,358,483-B2	04-15-2008	MITSUGI ET AL.	
		7,362,357-B2	04-22-2008	BROWN ET AL.	
		7,379,104-B2	05-27-2008	HATTORI ET AL.	
		7,417,674-B2	08-26-2008	GRUHLKE ET AL.	
		7,460,160-B2	12-02-2008	HERSHEY ET AL.	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ² Number ³ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		EP-1 032 045	08-30-2000	SANYO ELECTRIC CO.	
		EP-0 599 470	06-01-1994	PICKER INTERNATIONAL, INC.	
		JP-62-011264	01-20-1987	FUJI PHOTO FILM CO LTD.	

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		Communication from the European Patent Office on European Patent Application 05793927.4, mailed 2/10/2012.	
		Duparre et al., "Artificial apposition compound eye fabricated by micro-optics technology," Applied Optics, Vol. 43, No. 22, August 2004, pp. 4303-4310.	
		Duparre et al., "Artificial compound eyes - different concepts and their application to ultra flat image acquisition sensors," Proceedings of SPIE, Vol. 5346 (SPIE, Bellingham, WA, 2004), pp. 89-100.	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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14063236 - GAU: 2878

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Sheet	4	of	8	Attorney Docket Number	088245-9840

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		Duparre et al., "Microoptical telescope compound eyet," Optics Express, Vol. 13, No. 3, February 2005, pp. 889-903.	
		Duparre et al., "Theoretical analysis of an artificial superposition compound eye for application in ultra flat digital image acquisition devices," Proceedings of SPIE, Vol. 5249, 2004, pp. 408-418.	
		Duparre et al., "Ultra-Thin Camera Based on Artificial Apposition Compound Eyes," Proc. 10th Microoptics Conference MOC '04, Jena, 2004, Paper E-2 (2 pages).	
		Final Office Action on U.S. Application 11/212,803, mailed 9/20/2007.	
		First Office Action for Chinese Application 200580032374.0, notification date 2/5/10.	
		International Preliminary Report on Patentability for PCT/US2005/030256 issued March 17, 2009.	
		International Preliminary Report on Patentability for PCT/US2006/025781 issued March 10, 2009.	
		International Search Report and Written Opinion for PCT/US05/30256 mailed July 7, 2008.	
		International Search Report and Written Opinion for PCT/US06/25781 mailed July 22, 2008.	
		Kitamura et al., "Reconstruction of a high-resolution image on a compound-eye image-capturing system," Applied Optics, Vol. 43, No. 8, March 2004, pp. 1719 - 1727.	
		Miki et al., "A Study of Multi-Stack Silicon-Direct Wafer Bonding for MEMS Manufacturing," 2002, IEEE, pp. 407-410.	
		Miyatake et al., "Thin observation module by bound optics (TOMBOO with color filters," SPEI and IS&T, Vol. 5301, 2004, pp. 7-12.	
		Non-final Office Action on U.S. Application 11/212,803, mailed 2/7/2007.	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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Sheet 5 of 8	Attorney Docket Number	088245-9840	

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		Non-Final Office Action on U.S. Application 11/265,669, mailed 2/28/2006.	
		Non-Final Office Action on U.S. Application 11/322,959, mailed 8/8/2007.	
		Non-Final Office Action on U.S. Application 11/788,122, mailed 6/27/2008.	
		Non-Final Office Action on U.S. Application 11/888,546, mailed 5/1/2008.	
		Non-Final Office Action on U.S. Application 11/888,570, mailed 5/28/2008.	
		Norvell, Robin, " Shellcase Debuts Ultra-Thin Miniaturization for Optics," July 8, 2005, 1 page.	
		Notice of Allowance for U.S. Application 11/478,242, mailed December 30, 2009.	
		Notice of Allowance for U.S. Application 11/888,546, mailed December 14, 2009.	
		Notice of Allowance of U.S. Application 11/825,382, mailed May 5, 2010.	
		Notice of Allowance on U.S. Appl. 11/729,132, mailed 10/11/2011.	
		Notice of Allowance on U.S. Application 11/265,669, mailed 10/27/2006.	
		Notice of Allowance on U.S. Application 11/788,122, mailed 3/9/2009.	
		Notice of Allowance on U.S. Application 11/788,279, mailed October 28, 2010.	

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Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 <i>(use as many sheets as necessary)</i>		Application Number	14/063236
		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet	6	of	8
		Attorney Docket Number	088245-9840

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Notice of Allowance on U.S. Application 11/810,623, mailed 2/2/2011.	
		Notice of Allowance on u.S. Application 11/888,546, mailed 12/2/2008.	
		Notice of Allowance on U.S. Application 11/888,546, mailed 6/3/2009.	
		Notice of Allowance on U.S. Application 11/888,570, mailed 3/23/2009.	
		Notice of Allowance on U.S. Application 11/888,582, mailed August 6, 2010.	
		Notice of Allowance on U.S. Application 11/888546, mailed 6/3/2009	
		Notice of Allowance on U.S. Application 12/496,854, mailed 2/16/2012.	
		Notice of Allowance on U.S. Application 13/006,351, mailed 5/17/2011.	
		Notice of Allowance on U.S. Application 13/006351, mailed 12/21/12	
		Notice of Allowance on U.S. Application 13/100,725, mailed 7/23/2012.	
		Notice of Allowance on U.S. Application 13/345007, mailed 1/14/2013	
		Notice of Allowance on U.S. Application 13/465229, mailed 8/20/2012.	
		Notice of Allowance on U.S. Application 13/647708, mailed 9/13/2013	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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4846-6205-1176
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Receipt date: 01/22/2014

14063236 - GAU: 2878

PTO/SB/08 (09-06)

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		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet	7	of	8
		Attorney Docket Number	088245-9840

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Notice of Allowance on U.S. Application 13/681603, mailed 7/22/2013.	
		Notice of Allowance on U.S. Application 13/786803, mailed 10/10/2013	
		Office Action for USSN 11/825,382, mailed 10/29/2009.	
		Office Action on 11/788,279, mailed January 21, 2010.	
		Office Action on U.S. Appl. 11/810,623, mailed 8/18/2010	
		Office Action on U.S. Application 11/478,242, mailed 9/16/2009	
		Office Action on U.S. Application 11/729,132, mailed 2/3/11.	
		Office Action on U.S. Application 11/788,120, mailed 4/16/2010	
		Office Action on U.S. Application 11/788,120, mailed 5/19/2009	
		Office Action on U.S. Application 11/788,120, mailed 7/30/2010	
		Office Action on U.S. Application 11/788,120, mailed 9/18/2009	
		Office Action on U.S. Application 11/788,279, mailed 8/4/2010	
		Office Action on U.S. Application 11/810,623 mailed February 4, 2010.	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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1406-6226-7170
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Receipt date: 01/22/2014

14063236 - GAU: 2878

PTO/SB/08 (09-06)

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 (use as many sheets as necessary)		Complete if Known <table border="1"> <tr> <td>Application Number</td> <td>14/063236</td> </tr> <tr> <td>Filing Date</td> <td>10/25/2013</td> </tr> <tr> <td>First Named Inventor</td> <td>Richard Ian Olsen</td> </tr> <tr> <td>Art Unit</td> <td>2878</td> </tr> <tr> <td>Examiner Name</td> <td>Unassigned</td> </tr> <tr> <td>Attorney Docket Number</td> <td>088245-9840</td> </tr> </table>		Application Number	14/063236	Filing Date	10/25/2013	First Named Inventor	Richard Ian Olsen	Art Unit	2878	Examiner Name	Unassigned	Attorney Docket Number	088245-9840
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		Search Report for EP Application 05793927.4, dated February 26, 2010	
		Second Office Action on Chinese Application 200580032374.0, issued September 9, 2010.	
		Shogenji et al., "Bimodal fingerprint capturing system based on compound-eye imaging module," Applied Optics, Vol. 43, No. 6, February 2004, pp. 1355-1359.	
		Shogenji et al., "Multispectral imaging using compact compound optics," Optics Express, Vol. 12, No. 8, April 2004, pp. 1643-1655.	
		Stager et al., "Replicated Micro-Optics for Automotive Applications," SPIE European Workshop on Photonics in the Automobile, Geneva, 2004, (8 pages).	
		Tanida et al., "Compact image capturing system based on compound imaging and digital reconstruction," Proceedings of SPIE, Vol. 4455, 2001, pp. 34-41.	
		Tanida, "Color imaging with an integrated compound imaging system," Optics Express, Vol. 11, No. 18, September 2003, pp. 2109-2117.	
		Third Office Action issued on Chinese Application 200580032374.0, mailed 5/24/2011 (with English translation)	
		Volkel et al., "Miniaturization of Imaging Systems," mstnews, February 2003, pp. 36-38.	
		Volkel et al., "Miniaturized imaging systems," Elsevier Science B.V., Microelectronic Engineering 67-68 (2003), pp. 461-472.	
		Wood et al., "Resolution Improvement for Compound Eye Images Through Lens Diversity," IEEE, Signal Processing Society, DSP/SPE Workshop, August 2, 2004 (5 pages).	

Examiner Signature	/Seung C Sohn/	Date Considered	08/24/2015
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: July 27, 2015 <i>(use as many sheets as necessary)</i>				Application Number	14/063236
				Filing Date	10/25/2013
				First Named Inventor	Richard Ian Olsen
				Art Unit	2878
				Examiner Name	Seung C. Sohn
Sheet	1	of	1	Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² <i>(if known)</i>			

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ <i>(if known)</i>				

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Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Communication on EP Application 05793927.4, mailed July 8, 2015	

Examiner Signature		Date Considered	
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Electronic Acknowledgement Receipt	
EFS ID:	23026201
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Christopher L. Kalafut/Linda Anderson
Filer Authorized By:	Christopher L. Kalafut
Attorney Docket Number:	088245-9840
Receipt Date:	27-JUL-2015
Filing Date:	25-OCT-2013
Time Stamp:	11:08:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	088245-9840SupplDS.pdf	103646 03072235c2d2b5a21ae09a69fe868a5bf6c900cc	no	3

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	088245-9840SB08.pdf	91668 2faa0a5ef60b8eba53e87924407aee847c39d278	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Other Reference-Patent/App/Search documents	088245-9846EPComm.pdf	427177 5f4d45cdfba7bcc53bd7d44e56eb80d82924af23	no	4
Warnings:					
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Total Files Size (in bytes):			622491		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor Name: Richard Ian Olsen
Title: LARGE DYNAMIC RANGE
CAMERAS
Appl. No.: 14/063236
Filing Date: 10/25/2013
Examiner: Seung C. Sohn
Art Unit: 2878
Confirmation Number: 1847

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §1.56

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Applicant submits herewith documents for the Examiner's consideration in accordance with 37 CFR §§1.56, 1.97 and 1.98.

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

Applicant requests that, in accordance with 37 CFR §1.98(d), the Examiner review all applications relied on for an earlier effective filing date under 35 U.S.C. 120, including application no. 11/212803, filed 8/25/2005; application no. 11/788122, filed 4/19/2007; application no. 12/496854, filed 7/2/2009; application no. 13/465229, filed 5/7/2012; application no. 13/681603, filed 11/20/2012, for copies of references of record therein that are not being

provided here; although Applicant would be pleased to provide copies of any such documents at the Examiner's request.

The submission of any document herewith is not an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document submitted herewith.

CONCISE EXPLANATION OF RELEVANCE

General

The listed document was cited during the prosecution of a co-pending European Application 05793927.4.

TIMING OF THE DISCLOSURE

The listed document is being submitted in compliance with 37 CFR §1.97(b), before the mailing date of the first Office Action on the merits.

STATEMENT UNDER 37 CFR §1.704(d)

The undersigned hereby states in accordance with 37 CFR §1.704(d) that each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and that this communication was not received by any individual designated in 37 CFR §1.56(c) more than thirty days prior to the filing of the information disclosure statement.

Although Applicant believes that no fee is required, the Commissioner is hereby authorized to charge any additional fees which may be due to Deposit Account No. 19-0741.

Atty. Dkt. No. 088245-9840

Respectfully submitted,

Date July 27, 2015

By: /Christopher L. Kalafut/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4286
Facsimile: (608) 258-4258

Christopher L. Kalafut
Attorney for Applicant
Registration No. 57,946



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840

CONFIRMATION NO. 1847

PUBLICATION NOTICE



OC000000066708244

23524
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

Title:LARGE DYNAMIC RANGE CAMERAS

Publication No.US-2014-0049660-A1

Publication Date:02/20/2014

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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		2002/0020845-A1	02-21-2002	OGURA ET AL.	
		2002/0024606-A1	02-28-2002	YUKI ET AL.	
		2002/0051071-A1	05-02-2002	ITANO ET AL.	
		2002/0067416-A1	06-06-2002	YONEDA ET AL.	
		2002/0075481-A1	06-20-2002	ROUSTAEI, ALEXANDER R.	
		2002/0089596-A1	07-11-2002	SUDA, YASUO	
		2002/0113888-A1	08-22-2002	SONODA ET AL.	
		2002/0122124-A1	09-05-2002	SUDA	
		2002/0142798-A1	10-03-2002	HIROYUKI MIYAKE	
		2003/0020814-A1	01-30-2003	ONO, SHUJI	
		2003/0086013-A1	05-08-2003	ARATANI, MICHIHARU	
		2003/0095711-A1	05-22-2003	MCGUINNESS ET AL.	
		2003/0151685-A1	08-14-2003	LA GRONE, MARCUS J.	
		2003/0160886-A1	08-28-2003	MISAWA ET AL.	
		2003/0209651-A1	11-13-2003	IWASAKI, TATSUYA	
		2003/0234907-A1	12-25-2003	KAWAI	
		2004/0012688-A1	01-22-2004	TINNERINO ET AL.	
		2004/0012689-A1	01-22-2004	TINNERINO ET AL.	
		2004/0017620-A1	01-29-2004	KANEKO ET AL.	
	7	2004/0027687-A1	02-12-2004	BITTNER ET AL.	
		2004/0080638-A1	04-29-2004	LEE, WON-HO	
		2004/0095495-A1	05-20-2004	KAZUYUKI ET AL.	
		2004/0183918-A1	09-23-2004	SQUILLA ET AL.	
		2005/0024731-A1	02-03-2005	MITCHELL ET AL.	
		2005/0128335-A1	06-16-2005	KOLEHMAINEN ET AL.	
		2005/0128509-A1	06-16-2005	TOKKONEN ET AL.	
		2005/0134712-A1	06-23-2005	GRUHLKE ET AL.	
		2005/0160112-A1	07-21-2005	MAKELA ET AL.	
		2005/0248667-A1	11-10-2005	SCHWENG ET AL.	
		2005/0285955-A1	12-29-2005	UTZ ET AL.	
		2006/0087572-A1	04-27-2006	SCHROEDER	
		2006/0108505-A1	05-25-2006	GRUHLKE ET AL.	
		2006/0125936-A1	06-15-2006	GRUHLKE ET AL.	
		2006/0187322-A1	08-24-2006	JANSON, JR., ET AL.	
		2006/0187338-A1	08-24-2006	MAY ET AL.	
		2006/0222220-A1	10-05-2006	YAMANO ET AL.	
		2007/0002159-A1	01-04-2007	OLSEN ET AL.	
		3,609,367-	09-28-1971	BARRON, DONALD ROBERT	
		3,971,065	07-20-1976	BAYER, BRYCE E.	

Examiner Signature	Date Considered
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		4,323,925-	04-06-1982	ABELL ET AL.	
		4,385,373-	05-24-1983	HOWE, DONALD J.	
		4,688,080	08-18-1987	WAGNER, STEVEN D.	
		4,894,672-	01-16-1990	TANAKA	
		5,005,083-	04-02-1991	GRAGE ET AL.	
		5,051,830-	09-24-1991	VON HOESSLE, WOLFGANG	
		5,436,660-	07-25-1995	SAKAMOTO, YUKIO	
		5,654,752-	08-05-1997	YAMAZAKI, YASUYUKI	
		5,691,765-	11-25-1997	SCHIETZ ET AL.	
		5,694,165-	12-02-1997	YAMAZAKI ET AL.	
		5,742,659-	04-21-1998	ATAC ET AL.	
		5,760,832-	06-02-1998	YAMANAKA ET AL.	
		5,766,980-	06-16-1998	OHTAGAKI ET AL.	
		5,850,479-	12-15-1998	TERRY ET AL.	
		6,137,535-	10-24-2000	MEYERS, MARK MARSHALL	
		6,375,075-B1	04-23-2002	ACKLEY ET AL.	
		6,381,072-B1	04-30-2002	BURGER, ROBERT J.	
		6,429,898-B1	08-06-2002	SHODA ET AL.	
		6,437,335-B1	08-20-2002	BOHN, DAVID D	
		6,570,613-B1	05-27-2003	HOWELL, PAUL	
		6,611,289-B1	08-26-2003	YU ET AL.	
		6,617,565-B2	09-09-2003	WU, RAYMOND	
		6,714,239-B2	03-30-2004	GUIDASH, ROBERT M.	
		6,727,521-B2	04-27-2004	MERRILL, RICHARD B.	
		6,765,617-B1	07-20-2004	TANGEN ET AL.	
		6,833,873-B1	12-21-2004	SUDA, YASUO	
		6,834,161-B1	12-21-2004	STIEHLER	
		6,841,816-B2	01-11-2005	MERRILL ET AL.	
		6,859,299-B1	02-22-2005	CHIAO, JUNG-CHIH	
		6,882,368-B1	04-19-2005	SUDA, YASUO	
		6,885,398-B1	04-26-2005	SLADEN, PETER	
		6,885,404-B1	04-26-2005	SUDA, YASUO	
		6,885,508-B2	04-26-2005	YAMAGUCHI ET AL.	
		6,903,770-B1	06-07-2005	KOBAYASHI ET AL.	
		6,946,647-B1	09-20-2005	O'NEILL ET AL.	
		6,952,228-B2	10-04-2005	YONEDA ET AL.	
		6,999,130	02-14-2006	TANIGAWA, SATORU	
		7,095,159-B2	08-22-2006	MACHIDA, AKIHIRO	
		7,115,853-B2	10-03-2006	JIANG ET AL.	
		7,123,298-B2	10-17-2006	SCHROEDER ET AL.	
		7,170,665-B2	01-30-2007	KANEKO ET AL.	

Examiner Signature	Date Considered
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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 <i>(use as many sheets as necessary)</i>				Application Number	14/063236
				Filing Date	10/25/2013
				First Named Inventor	Richard Ian Olsen
				Art Unit	2878
				Examiner Name	Unassigned
Sheet	3	of	8	Attorney Docket Number	088245-9840

U.S. PATENT DOCUMENTS					
Examiner	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
		7,199,348-B2	04-03-2007	OLSEN ET AL.	
		7,206,136-B2	04-17-2007	LABAZIEWICZ ET AL.	
		7,214,926-B2	05-08-2007	GRUHLKE ET AL.	
		7,223,954-B2	05-29-2007	MCNULTY, PETER C.	
		7,236,306-B2	06-26-2007	JANSON JR. ET AL.	
		7,239,345-B1	07-03-2007	ROGINA, PETER	
		7,256,944-B2	08-14-2007	LABAZIEWICZ ET AL.	
		7,280,290-B2	10-09-2007	ARAKI ET AL.	
		7,305,180-B2	12-04-2007	LABAZIEWICZ ET AL.	
		7,358,483-B2	04-15-2008	MITSUGI ET AL.	
		7,362,357-B2	04-22-2008	BROWN ET AL.	
		7,379,104-B2	05-27-2008	HATTORI ET AL.	
		7,417,674-B2	08-26-2008	GRUHLKE ET AL.	
		7,460,160-B2	12-02-2008	HERSHEY ET AL.	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ² Number ³ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		EP-1 032 045	08-30-2000	SANYO ELECTRIC CO.	
		EP-0 599 470	06-01-1994	PICKER INTERNATIONAL, INC.	
		JP-62-011264	01-20-1987	FUJI PHOTO FILM CO LTD.	

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.		
		Communication from the European Patent Office on European Patent Application 05793927.4, mailed 2/10/2012.		
		Duparre et al., "Artificial apposition compound eye fabricated by micro-optics technology," Applied Optics, Vol. 43, No. 22, August 2004, pp. 4303-4310.		
		Duparre et al., "Artificial compound eyes - different concepts and their application to ultra flat image acquisition sensors," Proceedings of SPIE, Vol. 5346 (SPIE, Bellingham, WA, 2004), pp. 89-100.		

Examiner Signature	Date Considered
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		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
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Sheet	4	of	8
		Attorney Docket Number	088245-9840

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Duparre et al., "Microoptical telescope compound eyet," Optics Express, Vol. 13, No. 3, February 2005, pp. 889-903.	
		Duparre et al., "Theoretical analysis of an artificial superposition compound eye for application in ultra flat digital image acquisition devices," Proceedings of SPIE, Vol. 5249, 2004, pp. 408-418.	
		Duparre et al., "Ultra-Thin Camera Based on Artificial Apposition Compound Eyes," Proc. 10th Microoptics Conference MOC '04, Jena, 2004, Paper E-2 (2 pages).	
		Final Office Action on U.S. Application 11/212,803, mailed 9/20/2007.	
		First Office Action for Chinese Application 200580032374.0, notification date 2/5/10.	
		International Preliminary Report on Patentability for PCT/US2005/030256 issued March 17, 2009.	
		International Preliminary Report on Patentability for PCT/US2006/025781 issued March 10, 2009.	
		International Search Report and Written Opinion for PCT/US05/30256 mailed July 7, 2008.	
		International Search Report and Written Opinion for PCT/US06/25781 mailed July 22, 2008.	
		Kitamura et al., "Reconstruction of a high-resolution image on a compound-eye image-capturing system," Applied Optics, Vol. 43, No. 8, March 2004, pp. 1719 - 1727.	
		Miki et al., "A Study of Multi-Stack Silicon-Direct Wafer Bonding for MEMS Manufacturing," 2002, IEEE, pp. 407-410.	
		Miyatake et al., "Thin observation module by bound optics (TOMBOO with color filters," SPEI and IS&T, Vol. 5301, 2004, pp. 7-12.	
		Non-final Office Action on U.S. Application 11/212,803, mailed 2/7/2007.	

Examiner Signature		Date Considered	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 22, 2014 <i>(use as many sheets as necessary)</i>		Application Number	14/063236
		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet 5 of 8	Attorney Docket Number	088245-9840	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Non-Final Office Action on U.S. Application 11/265,669, mailed 2/28/2006.	
		Non-Final Office Action on U.S. Application 11/322,959, mailed 8/8/2007.	
		Non-Final Office Action on U.S. Application 11/788,122, mailed 6/27/2008.	
		Non-Final Office Action on U.S. Application 11/888,546, mailed 5/1/2008.	
		Non-Final Office Action on U.S. Application 11/888,570, mailed 5/28/2008.	
		Norvell, Robin, " Shellcase Debuts Ultra-Thin Miniaturization for Optics," July 8, 2005, 1 page.	
		Notice of Allowance for U.S. Application 11/478,242, mailed December 30, 2009.	
		Notice of Allowance for U.S. Application 11/888,546, mailed December 14, 2009.	
		Notice of Allowance of U.S. Application 11/825,382, mailed May 5, 2010.	
		Notice of Allowance on U.S. Appl. 11/729,132, mailed 10/11/2011.	
		Notice of Allowance on U.S. Application 11/265,669, mailed 10/27/2006.	
		Notice of Allowance on U.S. Application 11/788,122, mailed 3/9/2009.	
		Notice of Allowance on U.S. Application 11/788,279, mailed October 28, 2010.	

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		Filing Date	10/25/2013
		First Named Inventor	Richard Ian Olsen
		Art Unit	2878
		Examiner Name	Unassigned
Sheet	6	of	8
		Attorney Docket Number	088245-9840

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		Notice of Allowance on U.S. Application 11/810,623, mailed 2/2/2011.	
		Notice of Allowance on u.S. Application 11/888,546, mailed 12/2/2008.	
		Notice of Allowance on U.S. Application 11/888,546, mailed 6/3/2009.	
		Notice of Allowance on U.S. Application 11/888,570, mailed 3/23/2009.	
		Notice of Allowance on U.S. Application 11/888,582, mailed August 6, 2010.	
		Notice of Allowance on U.S. Application 11/888546, mailed 6/3/2009	
		Notice of Allowance on U.S. Application 12/496,854, mailed 2/16/2012.	
		Notice of Allowance on U.S. Application 13/006,351, mailed 5/17/2011.	
		Notice of Allowance on U.S. Application 13/006351, mailed 12/21/12	
		Notice of Allowance on U.S. Application 13/100,725, mailed 7/23/2012.	
		Notice of Allowance on U.S. Application 13/345007, mailed 1/14/2013	
		Notice of Allowance on U.S. Application 13/465229, mailed 8/20/2012.	
		Notice of Allowance on U.S. Application 13/647708, mailed 9/13/2013	

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		Notice of Allowance on U.S. Application 13/681603, mailed 7/22/2013.	
		Notice of Allowance on U.S. Application 13/786803, mailed 10/10/2013	
		Office Action for USSN 11/825,382, mailed 10/29/2009.	
		Office Action on 11/788,279, mailed January 21, 2010.	
		Office Action on U.S. Appl. 11/810,623, mailed 8/18/2010	
		Office Action on U.S. Application 11/478,242, mailed 9/16/2009	
		Office Action on U.S. Application 11/729,132, mailed 2/3/11.	
		Office Action on U.S. Application 11/788,120, mailed 4/16/2010	
		Office Action on U.S. Application 11/788,120, mailed 5/19/2009	
		Office Action on U.S. Application 11/788,120, mailed 7/30/2010	
		Office Action on U.S. Application 11/788,120, mailed 9/18/2009	
		Office Action on U.S. Application 11/788,279, mailed 8/4/2010	
		Office Action on U.S. Application 11/810,623 mailed February 4, 2010.	

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		Search Report for EP Application 05793927.4, dated February 26, 2010	
		Second Office Action on Chinese Application 200580032374.0, issued September 9, 2010.	
		Shogenji et al., "Bimodal fingerprint capturing system based on compound-eye imaging module," Applied Optics, Vol. 43, No. 6, February 2004, pp. 1355-1359.	
		Shogenji et al., "Multispectral imaging using compact compound optics," Optics Express, Vol. 12, No. 8, April 2004, pp. 1643-1655.	
		Stager et al., "Replicated Micro-Optics for Automotive Applications," SPIE European Workshop on Photonics in the Automobile, Geneva, 2004, (8 pages).	
		Tanida et al., "Compact image capturing system based on compound imaging and digital reconstruction," Proceedings of SPIE, Vol. 4455, 2001, pp. 34-41.	
		Tanida, "Color imaging with an integrated compound imaging system," Optics Express, Vol. 11, No. 18, September 2003, pp. 2109-2117.	
		Third Office Action issued on Chinese Application 200580032374.0, mailed 5/24/2011 (with English translation)	
		Volkel et al., "Miniaturization of Imaging Systems," mstnews, February 2003, pp. 36-38.	
		Volkel et al., "Miniaturized imaging systems," Elsevier Science B.V., Microelectronic Engineering 67-68 (2003), pp. 461-472.	
		Wood et al., "Resolution Improvement for Compound Eye Images Through Lens Diversity," IEEE, Signal Processing Society, DSP/SPE Workshop, August 2, 2004 (5 pages).	

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Electronic Acknowledgement Receipt	
EFS ID:	17981637
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Christopher L. Kalafut/Linda Anderson
Filer Authorized By:	Christopher L. Kalafut
Attorney Docket Number:	088245-9840
Receipt Date:	22-JAN-2014
Filing Date:	25-OCT-2013
Time Stamp:	12:15:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		InitialIDS.pdf	643061	yes	10
			8b82f674562b6c29204b42ebc228cc7253e0b769		

	Multipart Description/PDF files in .zip description								
	Document Description		Start	End					
	Transmittal Letter		1	2					
	Information Disclosure Statement (IDS) Form (SB08)		3	10					
Warnings:									
Information:									
2	Non Patent Literature	9823NOA07222013.pdf	787398	no	8				
			1f893f029c744aa71e6ee1c8974b47dec269088c						
Warnings:									
Information:									
Total Files Size (in bytes):			1430459						
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.									

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor Name: Richard Ian Olsen
Title: LARGE DYNAMIC RANGE
CAMERAS
Appl. No.: 14/063236
Filing Date: 10/25/2013
Examiner: Unassigned
Art Unit: 2878
Confirmation Number: 1847

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §1.56

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Applicant submits herewith documents for the Examiner's consideration in accordance with 37 CFR §§1.56, 1.97 and 1.98.

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

Applicant requests that, in accordance with 37 CFR §1.98(d), the Examiner review all applications relied on for an earlier effective filing date under 35 U.S.C. 120, including application no. 11/212803, filed 8/25/2005; application no. 11/788122, filed 4/19/2007; application no. 12/496854, filed 7/2/2009; application no. 13/465229, filed 5/7/2012; application

no. 13/681603, filed 11/20/2012, for copies of references of record therein that are not being provided here; although Applicant would be pleased to provide copies of any such documents at the Examiner's request.

The submission of any document herewith is not an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document submitted herewith.

TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(b), within three (3) months of the filing date of the application.

Although Applicant believes that no fee is required, the Commissioner is hereby authorized to charge any additional fees which may be due to Deposit Account No. 19-0741.

Respectfully submitted,

Date January 22, 2014

By: /Christopher L. Kalafut/

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4286
Facsimile: (608) 258-4258

Christopher L. Kalafut
Attorney for Applicant
Registration No. 57,946



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/063,236	10/25/2013	2661	1600	088245-9840	20	3

CONFIRMATION NO. 1847

23524
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

FILING RECEIPT



OC000000064859080

Date Mailed: 11/08/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Richard Ian Olsen, Truckee, CA;
Darryl L. Sato, Irvine, CA;
Feng-Qing Sun, Austin, TX;
James Gates, Carlsbad, CA;

Applicant(s)

PROTARIUS FILO AG, L.L.C., Dover, DE

Assignment For Published Patent Application

PROTARIUS FILO AG, L.L.C., Dover, DE

Power of Attorney: The patent practitioners associated with Customer Number 23524

Domestic Priority data as claimed by applicant

This application is a CON of 13/681,603 11/20/2012
which is a CON of 13/465,229 05/07/2012 PAT 8334494
which is a CON of 12/496,854 07/02/2009 PAT 8198574
which is a CON of 11/788,122 04/19/2007 PAT 7564019
which claims benefit of 60/795,882 04/28/2006
and is a CIP of 11/212,803 08/25/2005 ABN
which claims benefit of 60/604,854 08/25/2004
and claims benefit of 60/695,946 07/01/2005

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 11/06/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/063,236**

Projected Publication Date: 02/20/2014

Non-Publication Request: No

Early Publication Request: No
Title

LARGE DYNAMIC RANGE CAMERAS

Preliminary Class

348

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/063,236			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720		
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *				x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 420 =	0.00		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1600		
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =		
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
TOTAL ADD'L FEE						TOTAL ADD'L FEE			
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =		
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
TOTAL ADD'L FEE						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/063,236	10/25/2013	Richard Ian Olsen	088245-9840

23524
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

CONFIRMATION NO. 1847
POA ACCEPTANCE LETTER



Date Mailed: 11/08/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/25/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/mpaulos/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor Name: Richard Ian Olsen

Title: LARGE DYNAMIC RANGE
CAMERAS

Prior Appl. No.: 13/681603

Prior Appl. Filing
Date: 11/20/2012

CONTINUING PATENT APPLICATION
TRANSMITTAL LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Transmitted herewith for filing under 37 C.F.R. § 1.53(b) is a:

☒ Continuation ☐ Division ☐ Continuation-In-Part (CIP)

of the above-identified copending prior application in which no patenting, abandonment, or termination of proceedings has occurred. Priority to the above-identified prior application is hereby claimed under 35 U.S.C. § 120 for this continuing application. The entire disclosure of the above-identified prior application is considered as being part of the disclosure of the accompanying continuing application and is hereby incorporated by reference therein.

☐ Applicant claims small entity status under 37 CFR 1.27.

Enclosed are:

☒ Description, Claim(s), and Abstract (44 pages).

☒ Formal drawings (24 sheets, Figures 1-21).

- ☒ Executed Declaration (4 pages).
- ☒ Power of Attorney (1 page).
- ☒ 3.73(b) statement (directed to parent application no. 11/788122)
- ☐ Request for application not to be published with certification under 35 USC
- ☒ Application Data Sheet (37 CFR 1.76).

The adjustment to the number of sheets for EFS-Web filing follows:

Number of Sheets		EFS-Web Adjustment	Number of Sheets for EFS-Web
68	x	75%	51

The filing fee is calculated below at the large entity rate:

	Number Filed		Included in Basic Fee	Extra		Rate	Fee Totals
Basic Filing Fee						\$280.00 =	\$280.00
Search Fee						\$600.00	\$600.00
Examination Fee						\$720.00	\$720.00
Size Fee	51	-	100	= 0	x	\$400.00	\$0.00
Total	20	-	20	= 0	x	\$80.00 =	\$0.00
Claims:							
Independents	3	-	3	= 0	x	\$420.00 =	\$0.00
:							
If any Multiple Dependent Claim(s) present:					+	\$780.00 =	\$0.00
Surcharge under 37 CFR 1.16(e) for late filing of Executed Declaration or late payment of filing fee					+	\$140.00 =	\$0.00
Prioritized Examination fee (Track I) under 37 C.F.R. § 1.17 (c)							\$0.00
Processing Fee (Track I) under 37 C.F.R. § 1.17 (i)							\$0.00
TOTAL FILING FEE:						=	\$1600.00
Assignment Recordation Fee:					+	\$40.00 =	\$0.00
Processing Fee under 37 CFR 1.17(i) for Late Filing of English Translation of Application:					+	\$140.00 =	\$0.00
Publication Fee							\$0.00
TOTAL FEE						=	\$1600.00

The above-identified fees of \$1600.00 are being paid by credit card via EFS-Web.

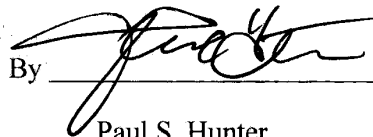
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

Date October 25, 2013

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4292
Facsimile: (608) 258-4258

By 

Paul S. Hunter
Attorney for Applicant
Registration No. 44,787

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Richard	Ian	Olsen		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Truckee	State/Province	CA	Country of Residence i	US
Mailing Address of Inventor:					
Address 1		556 Stewart McKay			
Address 2					
City	Truckee	State/Province	CA		
Postal Code	96161	Country i	US		
Inventor 2					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Darryl	L.	Sato		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Irvine	State/Province	CA	Country of Residence i	US
Mailing Address of Inventor:					
Address 1		21 Pintail Apt. 12D			
Address 2					
City	Irvine	State/Province	CA		
Postal Code	92604	Country i	US		
Inventor 3					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Feng-Qing		Sun		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840	
		Application Number		
Title of Invention	LARGE DYNAMIC RANGE CAMERAS			

City	Austin	State/Province	TX	Country of Residence i	US
------	--------	----------------	----	------------------------	----

Mailing Address of Inventor:

Address 1	224 Mediterra Pt.				
Address 2					
City	Austin	State/Province	TX		
Postal Code	78732	Country i	US		

Inventor 4

Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James		Gates	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Carlsbad	State/Province	CA	Country of Residence i	US
------	----------	----------------	----	------------------------	----

Mailing Address of Inventor:

Address 1	2399 Jefferson St. Apt. 11				
Address 2					
City	Carlsbad	State/Province	CA		
Postal Code	92008	Country i	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

Add

Correspondence Information:Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).☐ An Address is being provided for the correspondence Information of this application.

Customer Number	23524		
Email Address	IPDocketing@foley.com	Add Email	Remove Email

Application Information:

Title of the Invention	LARGE DYNAMIC RANGE CAMERAS		
Attorney Docket Number	088245-9840	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	24	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	23524		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.					
Prior Application Status		Pending		Remove	
Application Number	Continuity Type		Prior Application Number	Filing Date (YYYY-MM-DD)	
This Application	Continuation of		13/681603	2012-11-20	
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/681603	Continuation of	13/465229	2012-05-07	8334494	2012-12-18
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/465229	Continuation of	12/469854	2009-07-02	8198574	2012-06-12
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/469854	Continuation of	11/788122	2007-04-19	7564019	2009-07-21
Prior Application Status		Expired		Remove	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	An application claiming the benefit of	60/975882	2006-04-28
Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/788122	Continuation in part of	11/212803	2005-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/604854	2004-08-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
11/212803	An application claiming the benefit of	60/695946	2005-07-01

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices
If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

Applicant 1				Remove
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	088245-9840
		Application Number	
Title of Invention	LARGE DYNAMIC RANGE CAMERAS		

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION
USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

088245-9823

Title of Invention	LARGE DYNAMIC RANGE CAMERAS
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As the below named inventor, I hereby declare that:

This declaration is directed to: ☐ The attached application, or

☒ United States application or PCT international application number 13/681803 filed on 11/20/2012.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

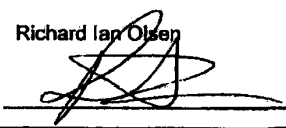
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LEGAL NAME OF INVENTOR

Inventor: Richard Ian Olsen Date (Optional): _____

Signature: 

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Title of Invention

Ex.1002 / Page 175 of 252
TESLA, INC.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN
APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

088245-9823

**Title of
Invention**

LARGE DYNAMIC RANGE CAMERAS

As the below named inventor, I hereby declare that:

This declaration
is directed to:



The attached application, or



United States application or PCT international application number 13/681603
filed on 11/20/2012.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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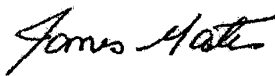
LEGAL NAME OF INVENTOR

Inventor: James Gates

Date (Optional):

8/8/2013

Signature: _____



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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN
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088245-9823

**Title of
Invention**

LARGE DYNAMIC RANGE CAMERAS

As the below named inventor, I hereby declare that:

This declaration
is directed to:



The attached application, or



United States application or PCT international application number 13/681603
filed on 11/20/2012.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: Feng-Qing Sun

Date (Optional): _____

Signature: _____



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LARGE DYNAMIC RANGE CAMERAS

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This application is a Continuation of U.S. Patent Application 13/681,603, filed 11/20/2012, which is a Continuation of U.S. Patent Application 13/465,229, filed 5/7/2012, (now U.S. Patent 8334494), which is a Continuation of U.S. Patent Application No. 12/496,854, filed 7/02/2009 (now U.S. Patent 8198574), which is a Continuation of U.S. Patent Application No. 11/788,122, filed 4/19/2007 (now U.S. Patent 7,564,019), which is a Continuation-In-Part of U.S. Patent Application No. 11/212,803, filed 8/25/2005, which claims priority to U.S. Provisional Patent Application No. 60/695,946 filed on 07/01/05 and to U.S. Provisional Patent Application No. 60/604,854 filed on 08/25/04; U.S. Patent Application No. 11/788,122 also claims priority to U.S. Provisional Patent App. No. 60/795,882 filed 04/28/06. Each of the above-referenced patent applications is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The following disclosure relates generally to optical devices and more particularly to expanding the dynamic exposure range in digital cameras.

BACKGROUND

[0003] Image sensors can be realized with semiconductors based on their capability to convert locally impinging light energy into a proportional amount of electronic charge. This electronic charge "Q" is often referred to as photo-charge, and can be integrated within the pixel on a storage device such as a reverse biased diode or as a pre-charged metal-oxide-semiconductor capacitance. The finite charge storage capacitance within each pixel limits the amount of integrated photo-charge. Dynamic range is measured as the ratio of the maximum photo-charge that can be meaningfully integrated in a pixel of the imager to the pixel noise level.

[0004] Intrascene dynamic range refers to the range of incident light that can be accommodated by an image sensor in a single frame of pixel data. Examples of high dynamic scenes range scenes include an indoor room with a window view of the outdoors, an outdoor scene with mixed shadows and bright sunshine, and evening or night scenes combining artificial lighting and shadows. In a typical charge coupled device (CCD) or CMOS active pixel sensor (APS), the available dynamic range is in a range of 1,000:1 to about 4,000:1. Unfortunately, many outdoor and indoor scenes with highly varying illumination have a dynamic range significantly greater than 4,000:1. Image sensors with intrascene dynamic range significantly greater than 4,000:1 are required to meet many imaging requirements.

[0005] The dynamic range of an image sensor can be increased by using multiple exposure times and/or integration times. For example, U.S. Pat. No. 4,647,975 describes a method based on the acquisition of two or more images, each having an exposure time. Once numerous images have been taken at different exposure times, the images have to be fused or merged to form one single piece of pixel information having a wide dynamic range. U.S. Pat. Nos. 4,647,975, 5,168,532, and 5,671,013 disclose the use of a selection rule to combine information from the most suitable of the multiple images. The merged pixel information or value is then multiplied by a suitable factor that corrects for the respective exposure times. This method however exhibits undesirable temporal aliasing if the scene or camera is moving because the two or more images having different exposure times are captured using the same image sensor and thus are not captured concurrently.

[0006] Despite improvements in solid-state image sensor and digital camera technology, the light signal or brightness range of scenes often exceeds the dynamic range of the sensor. For this reason, numerous methods have been described in the art of image sensors to extend the dynamic or signal range. A summary of some methods is presented in: "Wide dynamic range sensors", Optical Engineering, Vol. 38, No. 10, pp. 1650-1660, October 1999. Methods to provide wide dynamic range imaging capability with a single image sensor include: (a) logarithmic or compressed response photo-detection; (b) multiple integration and charge storage capability within each pixel; (c) frequency based sensors, where the sensor output is converted to pulse frequency; (d) local integration time control, where different areas within the sensor can have different exposure times; (e) signal charge versus integration time rate

(signal slope) measurement; (f) analog to digital conversion per pixel; and (g) autonomous pixel control. These methods require complex pixel circuitry and are difficult to implement in small pixel areas without taking up area required for the photo-detection mechanism (such as a photodiode).

[0007] Typical scenes imaged by digital cameras have light levels that span a range including low light (1-100 lux), moderate light (100-1000 lux), and bright light (1000-1,000,000 lux) under outdoor conditions. To 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. To cover a single scene that might involve indoor lighting (100 lux) and outdoor lighting (100,000 lux), the required intrascene dynamic range is approximately 10,000:1, corresponding to 80 dB (14-bits). This exceeds the dynamic range of a single image sensor using a single integration time (typically 3,100:1 corresponding to 70 dB (12-bits)). Therefore, there is a need for a digital camera in which the effective single-frame dynamic exposure range is expanded.

INCORPORATION BY REFERENCE

[0008] Each patent, patent application, and/or publication mentioned in this specification is herein incorporated by reference in its entirety to the same extent as if each individual patent, patent application, and/or publication was specifically and individually indicated to be incorporated by reference. diagram of a digital camera that includes multiple channels, under an embodiment.

[0009] FIG. 1 is a block diagram of a conventional digital camera.

[0010] FIG. 2 is a block diagram of a digital camera that includes multiple channels, under an embodiment.

[0011] FIG. 3 is a block diagram of a digital camera subsystem, under an embodiment.

[0012] FIG. 4 is a digital camera subsystem, under an alternative embodiment.

[0013] FIG. 5 is a digital camera subsystem, under another alternative embodiment.

[0014] FIG. 6 is a digital camera subsystem, under still another alternative embodiment.

[0015] FIG. 7 is a block diagram of a method for forming images having a large dynamic range, under an embodiment.

[0016] FIG. 8 is a block diagram of a digital camera, under an embodiment.

[0017] FIG. 9 is an exploded view of a digital camera subsystem, under an embodiment.

[0018] FIG. 10 is a block diagram of a digital camera having a three array/lens configuration, under an embodiment.

[0019] FIG. 11 is a block diagram of a digital camera subsystem that employs separate arrays on one image sensor, under an embodiment.

[0020] FIG. 12 is a block diagram of arrays, each of which receives a respective color as passed by a respective lens, under an embodiment.

[0021] FIG. 13 is a block diagram of processing circuitry of a digital camera subsystem, under an embodiment.

[0022] FIG. 14 is a block diagram of signal processing circuitry, under an embodiment.

[0023] FIG. 15 is an exploded perspective view of a digital camera, under an embodiment.

[0024] FIGS. 16A-16D are schematic exploded representations of one embodiment of an optics portion, under an embodiment.

[0025] FIGS. 17A-17C are schematic representations of a sensor array, under an embodiment.

[0026] FIG. 18 is a schematic cross-sectional view of a digital camera apparatus, under an embodiment.

[0027] FIG. 19 is a schematic perspective view of a digital camera apparatus having one or more optics portions with the capability to provide color separation, under an embodiment.

[0028] FIG. 20A is a block diagram of a processor of a digital camera subsystem, under an embodiment.

[0029] FIG. 20B is a block diagram of a channel processor of a digital camera subsystem, under an embodiment.

[0030] FIG. 20C is a block diagram of an image pipeline of a digital camera subsystem, under an embodiment.

[0031] FIG. 20D is a block diagram of an image post processor of a digital camera subsystem, under an embodiment.

[0032] FIG. 21 is a block diagram of digital camera system, including system control components, under an embodiment.

DETAILED DESCRIPTION

[0033] Digital camera systems and methods are described below that provide an expanded effective single-frame dynamic exposure range. The digital camera systems and methods, collectively referred to herein as digital camera systems, generally include two or more camera channels. Each channel includes an optics component and an image sensor having an active area including multiple picture elements (pixels). Each sensor is controlled under or with an independent signal integration time as described in detail below. Image capture by the camera is performed using the multiple camera channels, and each camera channel is controlled during a frame under an independent integration time. The integration time for each channel can be automatically controlled and/or controlled in response to a user input. A wide range of integration times are available for use in an embodiment. The images obtained in each channel under the different integration times are obtained simultaneously or nearly simultaneously, so undesirable temporal aliasing from moving scenes or camera motion is minimized.

[0034] The digital camera systems, through the use of multiple integration times, enable formation of an image having a wide dynamic range by combining the data from all camera channels to form a composite single frame. The wide dynamic range of an embodiment is

generally greater than the dynamic range obtained by a conventional digital camera with a single image sensor channel and one integration time.

[0035] Conventional digital cameras may have a maximum photo-signal storage capacity that limits the dynamic range of the particular system. The photo-signal charge is stored on a capacitor within the pixel area. The charge handling capacity is limited by the maximum voltage swing in the integrated circuitry and the storage capacitance within the pixel. The amount of integrated photo-charge is directly related to the time the image sensor collects and integrates signal from the scene. This is known as integration time. A long integration time is desired for weak signals since more photo-charge is integrated within the pixel and the signal-to-noise of the digital camera is improved. Once a maximum charge capacity is reached, the sensor no longer senses image brightness resulting in data loss. Therefore, the use of a single integration time for the entire field of view creates an imaging dilemma in conventional cameras. The digital camera integration time can be set to image low light levels and saturate bright signals or image high light levels and not detect low light levels (since the integrated photo-charge from low light levels is below the signal-to-noise of the sensor).

[0036] The digital cameras described herein overcome this dynamic range limitation through the use of multiple camera channels, including multiple optics and image sensors on a single integrated circuit (IC) or semiconductor substrate. The multiple camera channels are configured to image the same field of view simultaneously, and each operates independently under a different integration time. The digital camera can include, for example, a 3 by 3 assembly of image sensors, perhaps three sensors of each color (e.g., red (R), green (G), and blue (B)) and the integration time of the sensors associated with each color can be varied, for example, each color can have three distinct values (e.g., 0.1 msec, 1 msec, and 10 msec integration time, respectively). The data from all sensors can be digitally combined to provide a much greater dynamic range within one frame of digital camera data. The raw digital camera data could be used by digital signal processing of the scene. The digital data can also be stored and displayed to exhibit low light or bright light characteristics as desired.

[0037] Exposure is the total amount of light allowed to fall on a sensor during the process of taking a photograph. Exposure control is control of the total amount of light incident on a sensor during the process of taking a photograph.

[0038] In contrast to exposure control, which is used by conventional digital cameras to manage dynamic range, the digital camera systems of an embodiment use integration time control to control the time the electrical signal is integrated on a charge storage device (capacitance) within a sensor (pixel), as described herein. 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. Digital camera components or circuitry are configured to allow independent control of the charge integration switch associated with each sensor, thereby making possible dynamic range control for each sensor. The integration time control can be executed (depending on readout configuration) according to a number of techniques, for example, rolling mode and/or snap-shot mode to name a few.

[0039] Generally, the digital camera systems of an embodiment provide digital cameras with large effective single-frame dynamic exposure ranges. The digital camera systems include multiple channels. Each channel includes an optics component and sensor comprising an array of photo-detectors. The sensors of the camera channels are integrated on a semiconductor substrate. The camera systems include a processing component coupled to the channels. The processing component is configured to separately and simultaneously control an integration time of each channel. The integration time of at least one channel is controlled relative to the integration time of at least one other channel so that an image formed by combining data of a frame received simultaneously from the channels has a relatively large dynamic range.

[0040] A digital camera according to an embodiment includes multiple (e.g., two or more) closely spaced image sensor camera channels integrated on or in a common semiconductor substrate. Each sensor camera channel has its own optics, photo-detection and readout mechanism that includes a plurality of picture elements (pixels) with independent signal integration time control. The pixel area, including photo-detector and circuitry, can be as small as $2\text{ }\mu\text{m}$ by $2\text{ }\mu\text{m}$ but is not so limited. The individual camera channels of an embodiment look at the same field of view.

[0041] Each image sensor camera channel for example includes a plurality of pixels, wherein at least two channels may be individually interrogated, for example, the channels can independently be reset, integrate charge for a predetermined and unique time period, and read out. The digital camera further comprises circuitry and/or algorithms for individually interrogating the camera image sensor camera channels, for combining output values of said subsets into combined output values to form a high dynamic range composite image within a single frame of data, and for electrically outputting said composite image.

[0042] The digital camera systems and methods of an embodiment use a range of integration times, T_{long} to T_{short} , for each channel to increase significantly the dynamic range of the digital camera, while insuring a signal overlap between the images. For example, the dynamic range of a digital camera using the methods described herein can be increased from approximately 70 dB to 90 dB using a ratio of $T_{\text{long}}/T_{\text{short}}$ equal to 25. The use of a long integration time in one camera channel allows dark objects to be detected, whereas very bright objects are not, due to saturation of the corresponding pixels storage capacity. In contrast, the use of a short integration time in another channel enables detection of bright objects, whereas very dark objects are not detected due to a weak signal below the noise floor of the pixel. The digital camera systems and methods described below suitably combine the output signals of both exposures to increase the dynamic range of the digital camera.

[0043] The sensor camera channel output values P_{short} to P_{long} , measured with different exposure times, of the camera system described below may not be related ideally through the ratio ($t=T_{\text{long}}/T_{\text{short}}$), for example, P_{long} may be close to but not identical with $t \cdot P_{\text{short}}$ due to non-linear photo-response. For this reason the methods of an embodiment include algorithms

that combine the two values to form a large dynamic range composite image in a manner that does not lead to image artifacts and pattern noise.

[0044] FIG. 1 is a block diagram of a conventional digital camera 100. The digital camera 100 includes a lens assembly 110, a color filter array layer 112, an image sensor 116, and an electronic image storage media 120. The camera 100 also includes a power supply 124, a peripheral user interface (represented as a shutter button) 132, a circuit board 136 (which supports and electrically interconnects the aforementioned components), a housing 140 (including housing portions 141, 142, 143, 144, 145 and 146) and a shutter assembly (not shown), which controls an aperture 150 and passage of light into the digital camera 100. A mechanical frame 164 is used to hold the various parts of the lens assembly 110 together. The lens assembly 110 includes lenses 161 and 162 and one or more electro-mechanical devices 163 to move the lenses 161 and 162 along a center axis 165. The lenses 161 and 162 can be made up of multiple elements arranged together to in any combination to form an integral optical component. Additional lenses can be used if necessary. The electromechanical device 163 portion of the lens assembly 110 and the mechanical frame 164 portion of the lens assembly 110 can include numerous components and/or complex assemblies.

[0045] The color filter array layer 112 has an array of color filters arranged in a Bayer pattern (e.g., a 2 by 2 matrix of colors with alternating red and green in one row and alternating green and blue in the other row, although other colors may be used). The Bayer pattern is repeated throughout the color filter array. In some imaging applications, such as broadband visible imaging color filter layers 112 are not required. In other color imaging applications different color filters are used or color separation capability is built into the image sensor detection mechanism.

[0046] The image sensor 116 contains a plurality of identical photo detectors (alternatively referred to as "picture elements" or "pixels") arranged in a matrix. The number of photo detectors is usually in a range of hundreds of thousands to millions. The lens assembly 110 spans the diagonal of the array.

[0047] Each of the color filters in the color filter array 112 is disposed above a respective one of the photo detectors in the image sensor 116, such that each photo detector in the image

sensor receives a specific band of visible light (e.g., red, green or blue) and provides a signal indicative of the color intensity of the respective band. Signal processing circuitry (not shown) receives signals from the photo detectors, processes the signals, and ultimately outputs a color image.

[0048] The peripheral user interface 132, which includes the shutter button, can further include one or more additional input devices (e.g., for settings, controls and/or input of other information), one or more output devices, (e.g., a display for output of images or other information) and associated electronics.

[0049] FIG. 2 is a block diagram of a digital camera 200 that includes multiple channels, under an embodiment. The digital camera 200 includes a digital camera subsystem 210 and an electronic image storage media 220. The digital camera 200 also includes a power supply 224, a peripheral user interface (represented as a shutter button) 232, a circuit board 236 (which electrically interconnects and/or supports one or more components), a housing 240 (including housing portions 241, 242, 243, 244, 245 and 246) and a shutter assembly (not shown), which controls an aperture 250 and passage of light into the digital camera 200.

[0050] The digital camera subsystem 210, also referred to herein as the "DCS" 210, includes one or more camera channels (e.g., four camera channels 260A-260D) and replaces (and/or fulfills one, some or all of the roles fulfilled by) the lens assembly 110, the color filter 112 and the image sensor 116 of the digital camera 100 described above. The four camera channels 260A-260D have a configurable or selectable signal integration time control that can be made optimal for a range of incident optical signal levels. The combination of signals from the four camera channels representing the varying integration times allow a greater range of incident photo-signal levels to be detected. Each camera channel, working in conjunction with a selected or programmed integration time, can be optimized to collect an incident light range; for example the optical f-number, photo-detector design, in-pixel circuitry and readout circuitry can be selected for low, medium or high light levels.

[0051] The peripheral user interface 232, which includes the shutter button, may further include one or more additional input devices (e.g., for settings, controls and/or input of other

information), one or more output devices, (e.g., a display for output of images or other information) and associated electronics.

[0052] The electronic image storage media 220, power supply 224, peripheral user interface 232, circuit board 236, housing 240, shutter assembly (not shown), and aperture 250, may be, for example, similar to the electronic image storage media 120, power supply 124, peripheral user interface 132, circuit board 136, housing 140, shutter assembly (not shown), and aperture 150 of the digital camera 100 described above.

[0053] FIG. 3 is a block diagram of a digital camera subsystem 210, under an embodiment. As described above, the subsystem 210 includes one or more camera channels. The digital camera subsystem 210 for example is a four channel signal integration time control system (e.g., four camera channels 260A-260D), but the embodiment is not limited to four channels and can include any number of camera channels. Each of the camera channels 260A-260D includes an optics component or portion and a sensor component or portion. The optics component can have different optical f-number among the included camera channels but is not so limited. For example, camera channel 260A includes an optics portion 290A and a sensor portion 292A. Camera channel B includes an optics portion 290B and a sensor portion 292B. Camera channel C includes an optics portion 290C and a sensor portion 292C. Camera channel D includes an optics portion 290D and a sensor portion 292D. The optics portions of the one or more camera channels are collectively referred to herein as an optics subsystem. The sensor portions of the one or more camera channels are collectively referred to herein as a sensor subsystem. Each camera channel has a selectable integration, and the integration time setting between channels is selected to cover a range of incident light level onto the digital camera.

[0054] In the digital camera subsystem 210, each channel can have the same configuration or a different configuration relative to at least one other channel of the subsystem 210. For example, in some embodiments, the camera channels are all identical to one another. In some other embodiments, one or more of the camera channels are different, in one or more respects, from one or more of the other camera channels. In some of the latter embodiments, each camera channel may be used to detect a different color (or band of colors) and/or band

of light than that detected by the other camera channels. For example, in some embodiments, one of the camera channels (e.g., camera channel 260A) detects red light, one of the camera channels (e.g., camera channel 260B) detects green light, and one of the camera channels (e.g., camera channel 260C) detects blue light; any other color combinations can also be used. The color detection capability can be provided by optical materials, color filter layers over the detector, and/or color separation mechanisms built into the photo-detector structure.

[0055] Thus, the optics portions can each be the same or different relative to other optics portions. In some embodiments, all optics portions are identical. In some other embodiments, one or more of the optics portions are different, in one or more respects, from one or more of the other optics portions. For example, in some embodiments, one or more of the characteristics (for example, but not limited to, its type of element(s), size, and/or performance) of one or more of the optics portions is tailored to the respective sensor portion and/or to help achieve a desired result. For example, if a particular camera channel is dedicated to a particular color (or band of colors) or wavelength (or band of wavelengths) then the optics portion for that camera channel may be adapted to transmit only that particular color (or band of colors) or wavelength (or band of wavelengths) to the sensor portion of the particular camera channel and/or to filter out one or more other colors or wavelengths.

[0056] Similar to the optics portion, if the digital camera subsystem 210 includes more than one sensor portion, configurations of the sensor portions can be the same or different relative to one or more other sensor portions. In some embodiments, the sensor portions are similar or identical to the other sensor portions. In some other embodiments, one or more of the sensor portions are different, in one or more respects, from one or more of the other sensor portions. In some embodiments, for example, one or more of the characteristics (for example, but not limited to, its type of element(s), size, and/or performance) of one or more of the sensor portions is tailored to the respective optics portion and/or to help achieve a desired result. For example, if a particular camera channel is dedicated to a particular color (or band of colors) or wavelength (or band of wavelengths) then the sensor portion for that camera channel may be adapted to have a sensitivity that is higher to that particular color (or band of colors) or wavelength (or band of wavelengths) than other colors or wavelengths and/or to sense only that particular color (or band of colors) or wavelength (or band of wavelengths). The sensor

portion for that camera may be adapted for optimized operation by features such as array size, pixel size, pixel design, image sensor design, image sensor integrated circuit process and electrical circuit operation.

[0057] The digital camera subsystem 210 further includes a processor. The processor includes an image processor portion 270 (referred to as image processor 270) and an integration time controller portion 300 (referred to as controller 300). The controller is a component of the variable integration time that provides integration time control for each of the camera channels. The processor 270 is coupled or connected to the one or more sensor portions (e.g., sensor portions 292A-292D) via one or more communication couplings or links, represented by a signal line 330. A communication link may be any kind of communication link including but not limited to, for example, wired (e.g., conductors, fiber optic cables) links, wireless links (e.g., acoustic links, electromagnetic links, and/or any combination of links including but not limited to microwave links, satellite links, infrared links), and/or combinations of wired and/or wireless links.

[0058] The operation of the digital camera subsystem 210 is described below. For example, the user selects a desired incident light range and the camera automatically adjusts the integration time setting between the camera channels to give an optimal dynamic range result. Alternatively the user can select an integration time for each camera channel. An optics portion of a camera channel receives light from within a field of view and transmits one or more portions of such light. The sensor portion receives one or more portions of the light transmitted by the optics portion and, in response, generates an output signal representative or indicative of information of the received light. The output signal from the sensor portion is coupled to the image processor 270 which, as is further described below, can generate an image based at least in part on the output signal from the sensor.

[0059] When the digital camera subsystem 210 includes more than one camera channel, the image processor 270 generates a combined image based at least in part on the images from two or more of the camera channels. For example, in an embodiment, each of the camera channels is dedicated to a different color (or band of colors) or wavelength (or band of wavelengths) relative to the other camera channels, and the image processor 270 combines

the images from the two or more camera channels to provide a full-color large dynamic range image. In other embodiments, all camera channels provide the same color capability (such as RGB Bayer patterns on each color channel) and the image processor 270 combines the camera channels to create a large dynamic range image.

[0060] The image processor 270 can also combine sensor channels and analyze the resultant image on a frame by frame basis. The image processor 270 can send a signal to the integration time controller 300 for real-time, or near real-time, dynamic range management by adjustment of each channel's integration time control. This same method can be used to optimize a subsequent single field exposure for optimal picture taking.

[0061] In the digital camera subsystem 210 of an embodiment, the four camera channels 260A-260D are configured to detect RGB light. Each of the camera channels can be identical in configuration or optimized for a specified light level as described above; for example if camera channel 260A is intended to detect dim light the optics f-number in that channel could be reduced. The pixel photo-detector can be configured for low dark current and the pixel circuitry configured for low noise. The integration time control on camera channel 260A is increased to allow increased signal collection. Some pixels in channel 260A would saturate due to incident light levels; this would be determined electrically and data from those pixels would not be used in creating a composite image. Channels 260B-260D would be configured and operated in a similar fashion to sense larger incident light levels.

[0062] In the digital camera subsystem 210 of another alternative embodiment, the four camera channels 260A-260D are configured to provide different imaging capability; for example channel 260A is configured to detect red and blue light, while channel 260B is configured to detect green light. The combined response from channels 260A and 260B of this embodiment thus comprises a RGB color camera. The integration time settings for channels 260A and 260B are configured or set for low incident light levels. Camera channel 260C is configured to collect red and blue light and channel 260D is configured to collect green light. The combined images of channels 260C and 260D generate a second RGB imaging capability and the integration time of channels 260C and 260D is configured for high incident light levels.

[0063] In the digital camera subsystem 210 of yet another alternative embodiment, camera channel 260A is configured for red light, camera channel 260B is configured for green light, and camera channel 260C is configured for blue light. Camera channels of a single color can provide superior low light response since the color transmission with each channel is high (high transmission color filters within the optical path) and the photo-detection mechanism in each camera channel is configured or set for a specific color for high responsivity. The combined response from channels 260A, 260B and 260C thus comprises a RGB color camera. The integration time settings for channels 260A, 260B and 260C are configured for low incident light levels. Camera channel 260D is configured for RGB light detection and the integration time of that channel configured or set for high incident light levels. Various other combinations of integration times among the channels are possible under the description herein.

[0064] FIG. 4 is a digital camera subsystem 410, under an alternative embodiment. The digital camera subsystem 410 for example is a three channel signal integration time control system (e.g., three camera channels 260A-260C), but the embodiment is not limited to three channels and can include any number of camera channels. The digital camera subsystem 410 includes camera channel 260A configured for RGB light, camera channel 260B configured for RGB light, and camera channel 260C configured for RGB light. The integration time of camera channel 260A is configured for low light, the integration time of camera channel 260B is configured for medium high, and the integration time of camera channel 260C is configured for high incident light levels. The combined response from camera channels 260A, 260B and 260C provides a large dynamic range imaging capability.

[0065] The digital camera subsystem 410 of one alternative configuration is a three channel system in which camera channel 260A is configured for RGB light, camera channel 260B is configured for RGB light, and camera channel 260C is configured for RGB light. The integration time of camera channel 260A is configured for medium light, the integration time of camera channel 260B is configured for medium high, and the integration time of camera channel 260C is configured for high incident light levels. The combined response from camera channels 260A, 260B and 260C provides a large dynamic range imaging capability.

Various other combinations of integration times among the channels are possible under the description herein.

[0066] While the triangular layout configuration of the three camera channels 260A-260C can provide area reduction advantages in imager layout and processing on semiconductor wafers, and can provide optical symmetry between the channels, alternative layout configurations are possible using the three camera channels. For example, one alternative layout includes a 1 by 3 vertical configuration. Another alternative layout includes a 1 by 3 horizontal configuration.

[0067] FIG. 5 is a digital camera subsystem 510, under another alternative embodiment. The digital camera subsystem 510 for example is a two channel signal integration time control system (e.g., two camera channels 260A-260B), but the embodiment is not limited to two channels and can include any number of camera channels. The digital camera subsystem 510 includes camera channel 260A configured for RGB light and camera channel 260B configured for RGB light. The integration time of camera channel 260A is configured or set for low light and camera channel 260B is configured for high incident light levels. The combined response from camera channels 260A and 260B provides a large dynamic range imaging capability. Alternative configurations of the two camera channels include a 1 by 2 vertical layout and a 1 by 2 diagonal layout of camera channels.

[0068] The digital camera subsystem 510 of one alternative configuration is a two channel system in which camera channel 260A is configured for RGB light and camera channel 260B is configured for RGB light. The integration time of camera channel 260A is configured or set for low light and camera channel 260B is configured for medium incident light levels. The combined response from camera channels 260A and 260B provides a large dynamic range imaging capability.

[0069] The digital camera subsystem 510 of another alternative configuration is a two channel system in which camera channel 260A is configured for RGB light and camera channel 260B is configured for RGB light. The integration time of camera channel 260A is configured or set for medium light and camera channel 260B is configured for high incident light levels. The combined response from camera channels 260A and 260B provides a large

dynamic range imaging capability. Various other combinations of integration times among the channels are possible under the description herein.

[0070] FIG. 6 is a digital camera subsystem 610, under still another alternative embodiment. The digital camera subsystem 610 is a six channel signal integration time control system (e.g., six camera channels 260A-260F), but the embodiment is not limited to six channels and can include any number of camera channels. The digital camera subsystem 610 includes camera channel 260A configured for incident red light, camera channel 260B configured for green light, and camera channel 260C configured for blue light. The combined response from camera channels 260A, 260B and 260C provides a first RGB color camera. The integration time settings for camera channels 260A, 260B and 260C are configured for low incident light levels.

[0071] The digital camera subsystem 610 also includes camera channel 260D configured for incident red light, camera channel 260E configured for green light, and camera channel 260F configured for blue light. The combined response from camera channels 260D, 260E and 260F provides a second RGB color camera. The integration time settings for camera channels 260D, 260E and 260F are configured for high incident light levels.

[0072] The digital camera system described above includes a method for forming images having a large dynamic range. FIG. 7 is a block diagram for forming images 700 having a large dynamic range, under an embodiment. The method for forming images 700 can be implemented using the image processor 270 and/or the 300 integration time controller as described above with reference to FIGS. 3-6. The method of an embodiment includes selecting 702 an integration time for each image sensor camera channel from a range of integration times. The photo-signal from each camera channel is integrated 704 within a single frame of data, and the resultant photo-charge for each pixel is stored within that pixel. The photo-signal is read from each pixel and each pixel response is corrected 706 for one or more of non-linearity, gain and offset as appropriate and/or required. The method combines 708 data of the multiple camera channels, and thus provides a continuous monotonic representation of the combined pixel response from low to high incident light levels. The method of an embodiment includes processing (e.g. post-processing), storing, displaying

and/or outputting the resultant large dynamic range image from the combined camera channels. Information of the resultant image and/or any post-processing operations is used to determine integration time control settings 710 that provide optimum dynamic range on subsequent frames of data but is not so limited.

[0073] FIGS. 8-21 illustrate further examples of apparatus and systems in which the imaging module and focusing method embodiments disclosed above can be implemented. FIG. 8 is a block diagram of a digital camera 800, under an embodiment. The digital camera includes a digital camera subsystem 802, a circuit board 812, a peripheral user interface electronics 810 (here represented as a shutter button, but could also include display and/or one or more other output devices, setting controls and/or one or more additional input devices etc), a power supply 806, and electronic image storage media 804. The digital camera 800 may further include a housing and a shutter assembly (not shown), which controls an aperture 814 and passage of light into the digital camera 800.

[0074] FIG. 9 is an exploded view of the digital camera subsystem 802, under an embodiment. In this embodiment, the digital camera subsystem includes an image sensor 904, an optics frame (also referred to as a frame) 902, and lenses 912A-912D. The frame 902 is used to mount the lenses 912A-912D to the image sensor 904. The image sensor, or imager die 904 generally includes a semiconductor integrated circuit or "chip" having several higher order features including multiple arrays 904A-904D and signal processing circuits 908 and 910. Each of the arrays 904A-904D captures photons and outputs electronic signals. The signal processing circuit 908, in certain embodiments, processes signals for each of the individual arrays 904. The signal processing circuit 910 may combine the output from signal processing 908 into output data (usually in the form of a recombined full color image). Each array and the related signal processing circuitry may be tailored to address a specific band of visible spectrum.

[0075] Each of lenses 912A-912D may be tailored for the respective wavelength of the respective array. Lenses are approximately the same size as the underlying array 904, and will differ from one another in size and shape depending upon the dimensions of the underlying array. In alternative embodiments a lens could cover only a portion of an array,

and could extend beyond the array. Lenses can comprise any suitable material or materials, including for example, glass and plastic. Lenses can be doped in any suitable manner, such as to impart a color filtering, polarization, or other property. Lenses can be rigid or flexible.

[0076] In the example of FIG. 9, each lens, array, and signal processing circuit constitutes an image generating subsystem for a band of visible spectrum (e.g., red, blue, green, etc). These individual images are then combined with additional signal processing circuitry within the semiconductor chip to form a full image for output.

[0077] Although the digital camera subsystem 904 is depicted in a four array/lens configuration, the digital camera subsystem can be employed in a configuration having any number of arrays/lenses and any combination of shapes of arrays/lenses. FIG. 10 is a block diagram of a digital camera 1000 having a three array/lens configuration, under an embodiment. The digital camera 1000 includes a digital camera subsystem 1002 that includes three lenses. The digital camera 1000 further includes a circuit board 1012, a peripheral user interface electronics 1010 (here represented as a shutter button, but could also include display and/or one or more other output devices, setting controls and/or one or more additional input devices etc), a power supply 1006, and electronic image storage media 1004. The digital camera 1000 may further include a housing and a shutter assembly (not shown), which controls an aperture 1014 and passage of light into the digital camera 1000.

[0078] FIG. 11 is a block diagram of a digital camera subsystem that employs separate arrays, e.g., arrays 1104A-1104D, on one image sensor, in contrast to the prior art. For example, typical prior art approaches employ a Bayer pattern (or variations thereof), perform operations across the array (a pixel at a time), and integrate each set of four pixels (for example, red/green/blue/green or variation thereof) from the array into a single full color pixel.

[0079] Each of the arrays 1104 focuses on a specific band of visible spectrum. Each lens only needs to pass a respective color (1106A-1106D) on to the image sensor. The traditional color filter sheet is eliminated. Each array 1104 outputs signals to signal processing circuitry. Signal processing circuitry for each of these arrays is also tailored for each of the bands of visible spectrum. In effect, individual images are created for each of these arrays. Following

this process, the individual images are combined or to form one full color or black/white image. By tailoring each array and the associated signal processing circuitry, a higher quality image can be generated than the image resulting from traditional image sensors of like pixel count.

[0080] As such, each array may be tuned to be more efficient in capturing and processing the image in that particular color. Individual lenses (1112A-D) can be tailored for the array's band of spectrum.

[0081] FIG. 12 is a block diagram of arrays 1204A-1204D. Each array 1204 receives a respective color as passed by a respective lens. The traditional color filter sheet is eliminated. Each array 1204 outputs signals to signal processing circuitry. Signal processing circuitry for each of these arrays is also tailored for each of the bands of visible spectrum. In effect, individual images are created for each of these arrays. Following this process, the individual images are combined or to form one full color or black/white image. By tailoring each array and the associated signal processing circuitry, a higher quality image can be generated than the image resulting from traditional image sensors of like pixel count.

[0082] FIG. 13 is a block diagram of processing circuitry of a digital camera subsystem, under an embodiment. FIG. 13 includes an array 1304, including arrays 1304A-1304D, and signal processing circuitry (also referred to as image processing circuitry) 1414 and 1416. Each array outputs signals to signal processing circuitry.

[0083] FIG. 14 is a block diagram of image processing circuitry 1414 and 1416. Within the image processing circuitry 1414, each array can be processed separately to tailor the processing to the respective bands of spectrum.

[0084] Column logic 1414.1A-1414.1D is the portion of the signal processing circuitry that reads the signals from the pixels. For example, the column logic 1414.1A reads signals from the pixels in array 1404A. Column logic 1414.1B reads signals from the pixels in array 1404B. Column logic 1414.1C reads signals from the pixels in array 1404C. Column logic 1414.1D reads signals from the pixels in array 1404D.

[0085] Since an array is targeting a specific wavelength, wavelengths, band of wavelength, or band of wavelengths, the column logic may have different integration times for each array enhancing dynamic range and/or color specificity. Signal processing circuitry complexity for each array can be substantially reduced since logic may not have to switch between extreme color shifts.

[0086] Analog Signal Logic (ASL) 1414.2A-1414.2D for each array may be color specific. As such, the ASL processes a single color and therefore can be optimized for gain, noise, dynamic range, linearity, etc. Due to color signal separation, dramatic shifts in the logic and settling time are not required as the amplifiers and logic do not change on a pixel by pixel (color to color) basis as in traditional Bayer patterned designs.

[0087] Black level control 1414.3A-1414.3D assesses the level of noise within the signal, and filters it out. With each array focused upon a narrower band of visible spectrum than traditional image sensors, the black level control can be more finely tuned to eliminate noise.

[0088] Exposure control 1414.4A-1414.4D measures the overall volume of light being captured by the array and adjusts the capture time for image quality. Traditional cameras must make this determination on a global basis (for all colors). The embodiments describe herein allow for exposure control to occur differently for each array and targeted band of wavelengths.

[0089] These processed images are then passed to a second group of signal processing circuitry 1416. First, image processing logic 1416.1 integrates the multiple color planes into a single color image. The image is adjusted for saturation, sharpness, intensity, hue, artifact removal, and defective pixel correction.

[0090] In an embodiment, the final two operations include encoding the signal into standard protocols such as MPEG, JPEG, etc. in an encoder 1416.2 before passing the result to a standard output interface 1416.3, such as USB.

[0091] Although the signal processing circuitries 1414 and 1416 are shown at specific areas of the image sensor, the signal processing circuitries 1414 and 1416 can be placed anywhere

on the chip and subdivided in any fashion. The signal processing circuitries are often placed in multiple locations.

[0092] As previously stated, the image sensor 1404 generally includes a semiconductor chip having several higher order features including multiple arrays (1404A-1404D), and signal processing circuitry 1414, in which each array and the related signal processing circuitry is preferably tailored to address a specific band of visible spectrum. As noted above, the image sensor array can be configured using any multiple numbers and shapes of arrays.

[0093] The image sensor 1404 can be constructed using any suitable technology, including silicon and germanium technologies. The pixels can be formed in any suitable manner, can be sized and dimensioned as desired, and can be distributed in any desired pattern. Pixels that are distributed without any regular pattern may also be used.

[0094] Any range of visible spectrum can be applied to each array depending on the specific interest of the customer. Further, an infrared array could also be employed as one of the array/lens combinations giving low light capabilities to the sensor.

[0095] As previously described, arrays 1404A-1404D may be of any size or shape. While some figures referenced herein show the arrays as individual, discrete sections of the image sensor, these arrays may also be touching. There may also be one large array configured such that the array is subdivided into sections, and each section is focused upon one band of spectrum, creating the same effect as separate arrays on the same chip.

[0096] Although the well depth of the photo detectors across each individual array 1404 may be the same, the well depth of any given array may be different from that of other arrays of the sensor subsystem. A photo detector includes an area or portion of the photo detector that captures, collects, is responsive to, detects and/or senses the intensity illumination of incident light. In some embodiments, the well depth is the distance from the surface of the photo detector to a doped region.

[0097] Selection of an appropriate well depth depends on many factors, including the targeted band of visible spectrum. Since each entire array is likely to be targeted at one band of visible spectrum (e.g., red) the well depth can be configured to capture that wavelength

and ignore others (e.g., blue, green). Doping of the semiconductor material in the color specific arrays can further be used to enhance the selectivity of the photon absorption for color-specific wavelengths.

[0098] In various embodiments, a digital camera subsystem can have multiple separate arrays on a single image sensor, each with its own lens. The simple geometry of smaller, multiple arrays allows for a smaller lenses (e.g., smaller diameter, thickness and focal length), which allows for reduced stack height in the digital camera.

[0099] The lens and frame concept is applicable to traditional image sensors (without the traditional color filter sheet) to gain physical size, cost and performance advantages.

[0100] Each array can advantageously be focused on one band of visible and/or detectable spectrum. Among other things, each lens may be tuned for passage of one specific band of wavelength. Since each lens would therefore not need to pass the entire light spectrum, the number of elements may be reduced, for example, to one or two.

[0101] Further, due to the focused bandwidth for each lens, each of the lenses may be dyed during the manufacturing process for its respective bandwidth (e.g., red for the array targeting the red band of visible spectrum). Alternatively, a single color filter may be applied across each lens. This process eliminates the traditional color filters (such as the sheet of individual pixel filters) thereby reducing cost, improving signal strength and eliminating the pixel reduction barrier.

[0102] The above-described devices can include any suitable number of combinations, including as few as two arrays/lenses, and many more than two arrays/lenses. Examples include: two arrays/lenses configured as red/green and blue; two arrays/lenses configured as red and blue/green; two arrays/lenses configured as red, green, blue; four arrays/lenses configured as red, blue, green, emerald (for color enhancement); four arrays/lenses configured as red, blue, green, infrared (for low light conditions); and eight arrays/lenses configured as double the above configurations for additional pixel count and image quality.

[0103] The cameras or camera subsystems described herein are intended to be emblematic of a generic appliance containing the digital camera subsystem. Thus, the description herein

should be interpreted as being emblematic of still and video cameras, cell phones, other personal communications devices, surveillance equipment, automotive applications, computers, manufacturing and inspection devices, toys, plus a wide range of other and continuously expanding applications. Of course these alternative interpretations may or may not include the specific components as depicted herein. For example, the circuit board may not be unique to the camera function but rather the digital camera subsystem may be an add-on to an existing circuit board, such as in a cell phone.

[0104] Any or all of the methods and/or apparatus disclosed herein may be employed in any type of apparatus or process including, but not limited to still and video cameras, cell phones, other personal communications devices, surveillance equipment, automotive applications, computers, manufacturing and inspection devices, toys, plus a wide range of other and continuously expanding applications.

[0105] Although each array and the related signal processing circuitry is can be tailored to address a specific band of visible spectrum, and each lens may be tuned for passage of that one specific band of wavelength, there is no requirement that each such array and the related signal processing circuitry be tailored to address a specific band of the visible spectrum. Nor is there any requirement that each lens be tuned for passage of a specific band of wavelength or that each of the arrays be located on the same semiconductor device. Indeed, the embodiments described and illustrated herein, including the specific components thereof, need not employ wavelength-specific features. For example, the arrays and/or signal processing circuitry need not be tailored to address a specific wavelength or band of wavelengths.

[0106] FIG. 15 is an exploded perspective view of a digital camera 1500, under an embodiment. The digital camera apparatus 1500 includes one or more sensor arrays, e.g., four sensor arrays 1504A-1504D, and one or more optics portions, e.g., four optics portions 1512A-1512D. Each of the optics portions 1504A-1504D may include a lens, and may be associated with a respective one of the sensor arrays sensor arrays 1504A-1504D. In some embodiments a support 1502, for example a frame, is provided to support the one or more optics portions 1512A-1512D, at least in part. Each sensor array and the respective optics

portion may define an optical channel. For example, an optical channel 1506A may be defined by the optics portion 1512A and the sensor array 1504A. An optical channel 1506B may be defined by the optics portion 1512B and the sensor array 1504B. An optical channel 1506C may be defined by optics portion 1512C and the sensor array 1504C. An optical channel 1506D may be defined by optics portion 1512D and a sensor array 1504D. The optics portions of the one or more optical channels are also collectively referred to as an optics subsystem.

[0107] The sensor arrays of the one or more optical channels are collectively referred as a sensor subsystem. The two or more sensor arrays may be integrated in or disposed on a common substrate, referred to as an image device, on separate substrates, or any combination thereof. For example, where the system includes three or more sensor arrays, two or more sensor arrays may be integrated in a first substrate, and one or more other sensor arrays may be integrated in or disposed on a second substrate.

[0108] In that regard, the one or more sensor arrays 1504A-1504D, may or may not be disposed on a common substrate. For example, in some embodiments two or more of the sensor arrays are disposed on a common substrate. In some embodiments, however, one or more of the sensor arrays is not disposed on the same substrate as one or more of the other sensor arrays. The one or more optical channels may or may not be identical to one another.

[0109] In some embodiments, one of the optical channels 1506 detects red light, one of the optical channels 1506 detects green light, and one of the optical channels 1506 detects blue light. In some of such embodiments, one of the optical channels 1506 detects infrared light, cyan light, or emerald light. In some other embodiments, one of the optical channels 1506 detects cyan light, one of the optical channels 1506 detects yellow light, one of the optical channels 1506 detects magenta light and one of the optical channels 1506 detects clear light (black and white). Any other wavelength or band of wavelengths (whether visible or invisible) combinations can also be used.

[0110] A processor 1514 is coupled to the one or more sensor arrays 1504A-1504D, via one or more communication links, e.g., communication links 1508A-1508D, respectively. A communication link may be any kind of communication link including but not limited to, for

example, wired (e.g., conductors, fiber optic cables) or wireless (e.g., acoustic links, electromagnetic links or any combination thereof including but not limited to microwave links, satellite links, infrared links), and combinations thereof, each of which may be public or private, dedicated and/or shared (e.g., a network). A communication link may include for example circuit switching or packet switching or combinations thereof. Other examples of communication links include dedicated point-to-point systems, wired networks, and cellular telephone systems. A communication link may employ any protocol or combination of protocols including but not limited to the Internet Protocol.

[0111] The communication link may transmit any type of information. The information may have any form, including, for example, but not limited to, analog and/or digital) e.g., a sequence of binary values, or a bit string). The information may or may not be divided into blocks. If divided into blocks, the amount of information in a block may be predetermined or determined dynamically, and/or may be fixed (e.g., uniform) or variable.

[0112] As will be further described hereinafter, the processor may include one or more channel processors, each of which is coupled to a respective one (or more) of the optical channels and generates an image based at least in part on the signal(s) received from the respective optical channel, although this is not required. In some embodiments, one or more of the channel processors is tailored to its respective optical channel, for example, as described herein. For example, when one of the optical channels is dedicated to a specific wavelength or color (or band of wavelengths or colors) the respective channel processor may be adapted or tailored to such wavelength or color (or band of wavelengths or colors). Further, the gain, noise reduction, dynamic range, linearity and/or any other characteristic of the processor, or combinations of such characteristics, may be adapted to improve and/or optimize the processor to such wavelength or color (or band of wavelengths or colors). Tailoring the channel processing to the respective optical channel may facilitate generating an image of a quality that is higher than the quality of images resulting from traditional image sensors of like pixel count. In addition, providing each optical channel with a dedicated channel processor may help to reduce or simplify the amount of logic in the channel processors as the channel processor may not need to accommodate extreme shifts in color or wavelength, e.g., from a color (or band of colors) or wavelength (or band of wavelengths) at

one extreme to a color (or band of colors) or wavelength (or band of wavelengths) at another extreme.

[0113] In operation, an optics portion of a optical channel receives light from within a field of view and transmits one or more portions of such light, e.g., in the form of an image at an image plane. The sensor array receives one or more portions of the light transmitted by the optics portion and provides one or more output signals indicative thereof. The one or more output signals from the sensor array are supplied to the processor. In some embodiments, the processor generates one or more output signals based, at least in part, on the one or more signals from the sensor array. In some other embodiments, the processor may generate a combined image based, at least in part, on the images from two or more of such optical channels.

[0114] Although the processor 1514 is shown separate from the one or more sensor arrays 1504A-1504D, the processor 1514, or portions thereof, may have any configuration and may be disposed in one or more locations. For example, certain operations of the processor may be distributed to or performed by circuitry that is integrated in or disposed on the same substrate or substrates as one or more of the one or more of the sensor arrays and certain operations of the processor are distributed to or performed by circuitry that is integrated in or disposed on one or more substrates that are different from (whether such one or more different substrates are physically located within the camera or not) the substrates the one or more of the sensor arrays are integrated in or disposed on.

[0115] The digital camera apparatus 1500 may or may not include a shutter, a flash and/or a frame to hold the components together.

[0116] FIGS. 16A-16D are schematic exploded representations of one embodiment of an optics portion, such as optic portion 1512A, under an embodiment. In FIG. 16A, the optics portion 1512A includes one or more lenses, e.g., a complex aspherical lens module 1680, one or more color coatings, e.g., a color coating 1682, one or more masks, e.g., an auto focus mask 1684, and one or more IR coatings, e.g., an IR coating 1686.

[0117] Lenses can comprise any suitable material or materials, including for example, glass and plastic. Lenses can be doped in any suitable manner, such as to impart a color filtering, polarization, or other property. Lenses can be rigid or flexible. In this regard, some embodiments employ a lens (or lenses) having a dye coating, a dye diffused in an optical medium (e.g., a lens or lenses), a substantially uniform color filter and/or any other filtering technique through which light passes to the underlying array.

[0118] The color coating 1682 helps the optics portion filter (or substantially attenuate) one or more wavelengths or bands of wavelengths. The auto focus mask 1684 may define one or more interference patterns that help the digital camera apparatus perform one or more auto focus functions. The IR coating 1686 helps the optics portion 1512A filter a wavelength or band of wavelength in the IR portion of the spectrum.

[0119] The one or more color coatings, e.g., color coating 1682, one or more masks, e.g., mask 1684, and one or more IR coatings, e.g., IR coating 1686 may have any size, shape and/or configuration.

[0120] In some embodiments, as shown in FIG. 16B, one or more of the one or more color coatings, e.g., the color coating 1682, are disposed at the top of the optics portion. Some embodiments of the optics portion (and/or components thereof) may or may not include the one or more color coatings, one or more masks and one or more IR coatings and may or may not include features in addition thereto or in place thereof.

[0121] In some embodiments, as shown in FIG. 16C, one or more of the one or more color coatings, e.g., the color coating 1682, are replaced by one or more filters 1688 disposed in the optics portion, e.g., disposed below the lens. In other embodiments, as shown in FIG. 16D, one or more of the color coatings are replaced by one or more dyes diffused in the lens.

[0122] The one or more optics portions, e.g., optics portions 1512A-1512D of FIG. 15, may or may not be identical to one another. In some embodiments, for example, the optics portions are identical to one another. In some other embodiments, one or more of the optics portions are different, in one or more respects, from one or more of the other optics portions. For example, in some embodiments, one or more of the characteristics (for example, but not

limited to, its type of element(s), size, response, and/or performance) of one or more of the optics portions is tailored to the respective sensor array and/or to help achieve a desired result. For example, if a particular optical channel is dedicated to a particular color (or band of colors) or wavelength (or band of wavelengths) then the optics portion for that optical channel may be adapted to transmit only that particular color (or band of colors) or wavelength (or band of wavelengths) to the sensor array of the particular optical channel and/or to filter out one or more other colors or wavelengths. In some of such embodiments, the design of an optical portion is optimized for the respective wavelength or bands of wavelengths to which the respective optical channel is dedicated. It should be understood, however, that any other configurations may also be employed. Each of the one or more optics portions may have any configuration.

[0123] In some embodiments, each of the optics portions, e.g., optics portions 1512A-1512D of FIG. 15, comprises a single lens element or a stack of lens elements (or lenslets), although, as stated above. For example, in some embodiments, a single lens element, multiple lens elements and/or compound lenses, with or without one or more filters, prisms and/or masks are employed.

[0124] An optical portion can also contain other optical features that are desired for digital camera functionality and/or performance. For example, these features can include electronically tunable filters, polarizers, wavefront coding, spatial filters (masks), and other features not yet anticipated. Some of the features (in addition to the lenses) are electrically operated (such as a tunable filter), or are mechanically movable with MEMs mechanisms.

[0125] In some embodiments, one or more photochromic (or photochromatic) materials are employed in one or more of the optical portions. The one or more materials may be incorporated into an optical lens element or as another feature in the optical path, for example, above one or more of the sensor arrays. In some embodiments, photochromatic materials may be incorporated into a cover glass at the camera entrance (common aperture) to all optics (common to all optical channels), or put into the lenses of one or more optical channels, or into one or more of the other optical features included into the optical path of an optics portion over any sensor array.

[0126] FIGS. 17A-17C are schematic representations of one embodiment of a sensor array 1704. The sensor array is similar to one of the sensor arrays 1504A-1504D of FIG. 15, for example. As shown in FIG. 17A, the sensor array 1704 is coupled to circuits 1770, 1772, and 1774. The sensor array 1704 captures light and converts it into one or more signals, such as electrical signals, which are supplied to one or more of the circuits 1770, 1772, and 1774. The sensor array 1704 includes a plurality of sensor elements such as for example, a plurality of identical photo detectors (sometimes referred to as "picture elements" or "pixels"), e.g., pixels 1780_{1,1}-1780_{n,m}. The photo detectors 1780_{1,1}-1780_{n,m} are arranged in an array, for example a matrix-type array. The number of pixels in the array may be, for example, in a range from hundreds of thousands to millions. The pixels may be arranged for example, in a two-dimensional array configuration, for example, having a plurality of rows and a plurality of columns, e.g., 640 by 480, 1280 by 1024, etc. However, the pixels can be sized and dimensioned as desired, and can be distributed in any desired pattern. Pixels that are distributed without any regular pattern can also be used. Referring to FIG. 17B, a pixel, for example 1780_{1,1}, may be viewed as having x and y dimensions, although the photon capturing portion of a pixel may or may not occupy the entire area of the pixel and may or may not have a regular shape. In some embodiments, the sensor elements are disposed in a plane, referred to herein as a sensor plane. The sensor may have orthogonal sensor reference axes, including for example, an x-axis, a y-axis, and a z-axis, and may be configured so as to have the sensor plane parallel to the x-y plane XY and directed toward the optics portion of the optical channel. Each optical channel has a field of view corresponding to an expanse viewable by the sensor array. Each of the sensor elements may be associated with a respective portion of the field of view.

[0127] 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. The sensor array may comprise any suitable material or materials, including, but not limited to, silicon, germanium and/or combinations thereof. The sensor elements or pixels may be formed in any suitable manner.

[0128] In operation, the sensor array 1704A, is exposed to light on a sequential line per line basis (similar to a scanner, for example) or globally (similar to conventional film camera exposure, for example). After being exposed to light for certain period of time (exposure time), the pixels $1780_{1,1}$ - $1780_{n,m}$, are read out, e.g., on a sequential line per line basis.

[0129] In some embodiments, circuitry 1770, also referred to as column logic 1770, is used to read the signals from the pixels $1780_{1,1}$ - $1780_{n,m}$. FIG. 17C is a schematic representation of a pixel circuit. The pixels $1780_{1,1}$ - $1780_{n,m}$, also referred to as sensor elements, may be accessed one row at a time by asserting one of the word lines 1782, which run horizontally through the sensor array 1704A. A single pixel $1780_{1,1}$ is shown. Data is passed into and/or out of the pixel $1780_{1,1}$ via bit lines (such as bit line 1784) which run vertically through the sensor array 1704A.

[0130] The pixels are not limited to the configurations shown in FIGS. 17A-17C. As stated above, each of the one or more sensor arrays may have any configuration (e.g., size, shape, pixel design).

[0131] The sensor arrays 1502A-1502D of FIG. 15 may or may not be identical to one another. In some embodiments, for example, the sensor arrays are identical to one another. In some other embodiments, one or more of the sensor arrays are different, in one or more respects, from one or more of the other sensor arrays. For example, in some embodiments, one or more of the characteristics (for example, but not limited to, its type of element(s), size (for example, surface area), and/or performance) of one or more of the sensor arrays is tailored to the respective optics portion and/or to help achieve a desired result.

[0132] FIG. 18 is a schematic cross-sectional view of a digital camera apparatus 1800 including a printed circuit board 1820 of a digital camera on which the digital camera elements are mounted, under an embodiment. In this embodiment, the one or more optics portions, e.g., optics portions 1812A and 1812B are seated in and/or affixed to a support 1814. The support 1814 (for example a frame) is disposed superjacent a first bond layer 1822, which is disposed superjacent an image device 1820, in or on which sensor portions 1812A-1812D (sensor portions 1812C and 1812D are not shown), are disposed and/or integrated.

The image device 1820 is disposed superjacent a second bond layer 1824 which is disposed superjacent the printed circuit board 1821.

[0133] The printed circuit board 1821 includes a major outer surface 1830 that defines a mounting region on which the image device 1820 is mounted. The major outer surface 1830 may further define one or more additional mounting regions (not shown) on which one or more additional devices used in the digital camera may be mounted. One or more pads 1832 are provided on the major outer surface 1830 of the printed circuit board to connect to one or more of the devices mounted thereon.

[0134] The image device 1820 includes the one or more sensor arrays (not shown), and one or more electrically conductive layers. In some embodiments, the image device 1820 further includes one, some or all portions of a processor for the digital camera apparatus 1800. The image device 1820 further includes a major outer surface 1840 that defines a mounting region on which the support 1814 is mounted.

[0135] The one or more electrically conductive layers may be patterned to define one or more pads 1842 and one or more traces (not shown) that connect the one or more pads to one or more of the one or more sensor arrays. The pads 1842 are disposed, for example, in the vicinity of the perimeter of the image device 1820, for example along one, two, three or four sides of the image device 1820. The one or more conductive layers may comprise, for example, copper, copper foil, and/or any other suitably conductive material(s).

[0136] A plurality of electrical conductors 1850 may connect one or more of the pads 1842 on the image device 1820 to one or more of the pads 1832 on the circuit board 1821. The conductors 1850 may be used, for example, to connect one or more circuits on the image device 1820 to one or more circuits on the printed circuit board 1821.

[0137] The first and second bond layers 1822 and 1824 may comprise any suitable material(s), including but not limited to adhesive, and may comprise any suitable configuration. The first and second bond layers 1822, 1824 may comprise the same material(s) although this is not required. As used herein, a bond layer may be continuous or discontinuous. For example, a conductive layer may be an etched printed circuit layer.

Moreover, a bond layer may or may not be planar or even substantially planar. For example, a conformal bond layer on a non-planar surface will be non-planar.

[0138] FIG. 19 is a schematic perspective view of a digital camera apparatus having one or more optics portions with the capability to provide color separation in accordance with one embodiment of the present invention. In some of such embodiments, one or more of the optics portions, e.g., optics portion 1912C includes an array of color filters, for example, but not limited to a Bayer patter. In some of such embodiments, one or more of the optics portions, e.g., optics portion 1912C has the capability to provide color separation similar to that which is provided by a color filter array.

[0139] In some embodiments, the lens and/or filter of the optical channel may transmit both of such colors or bands of colors, and the optical channel may include one or more mechanisms elsewhere in the optical channel to separate the two colors or two bands of colors. For example, a color filter array may be disposed between the lens and the sensor array, and/or the optical channel may employ a sensor capable of separating the colors or bands of colors. In some of the latter embodiments, the sensor array may be provided with pixels that have multiband capability, e.g., two or three colors. For example, each pixel may comprise two or three photodiodes, wherein a first photodiode is adapted to detect a first color or first band of colors, a second photodiode is adapted to detect a second color or band of colors and a third photodiode is adapted to detect a third color or band of colors. One way to accomplish this is to provide the photodiodes with different structures and/or characteristics that make them selective, such that the first photodiode has a higher sensitivity to the first color or first band of colors than to the second color or band of colors, and the second photodiode has a higher sensitivity to the second color or second band of colors than to the first color or first band of colors. Alternatively, the photodiodes are disposed at different depths in the pixel, taking advantage of the different penetration and absorption characteristics of the different colors or bands of colors. For example, blue and blue bands of colors penetrate less (and are thus absorbed at a lesser depth) than green and green bands of colors, which in turn penetrate less (and are thus absorbed at a lesser depth) than red and red bands of colors. In some embodiments, such a sensor array is employed, even though the

pixels may see only one particular color or band of colors, for example, to in order to adapt such sensor array to the particular color or band of colors.

[0140] FIG. 20A is a block diagram of a processor 2002 of a digital camera subsystem 2000, under an embodiment. In this embodiment, the processor 2002 includes one or more channel processors, one or more image pipelines, and/or one or more image post processors. Each of the channel processors is coupled to a respective one of the optical channels (not shown) and generates an image based at least in part on the signal(s) received from the respective optical channel. In some embodiments the processor 2002 generates a combined image based at least in part on the images from two or more of the optical channels. In some embodiments, one or more of the channel processors are tailored to its respective optical channel, as previously described.

[0141] In various embodiments, the gain, noise reduction, dynamic range, linearity and/or any other characteristic of the processor, or combinations of such characteristics, may be adapted to improve and/or optimize the processor to a wavelength or color (or band of wavelengths or colors). Tailoring the channel processing to the respective optical channel makes it possible to generate an image of a quality that is higher than the quality of images resulting from traditional image sensors of like pixel count. In such embodiments, providing each optical channel with a dedicated channel processor helps to reduce or simplify the amount of logic in the channel processors, as the channel processor may not need to accommodate extreme shifts in color or wavelength, e.g., from a color (or band of colors) or wavelength (or band of wavelengths) at one extreme to a color (or band of colors) or wavelength (or band of wavelengths) at another extreme

[0142] The images (and/or data which is representative thereof) generated by the channel processors are supplied to the image pipeline, which may combine the images to form a full color or black/white image. The output of the image pipeline is supplied to the post processor, which generates output data in accordance with one or more output formats.

[0143] FIG. 20B shows one embodiment of a channel processor. In this embodiment, the channel processor includes column logic, analog signal logic, and black level control and exposure control. The column logic is coupled to the sensor and reads the signals from the

pixels. Each of the column logic, analog signal logic, black level control and exposure control can be configured for processing as appropriate to the corresponding optical channel configuration (e.g., specific wavelength or color, etc.). For example, the analog signal logic is optimized, if desired, for processing. Therefore, gain, noise, dynamic range and/or linearity, etc., are optimized as appropriate to the corresponding optical channel configuration (e.g., a specific wavelength or color, etc.). As another example, the column logic may employ an integration time or integration times adapted to provide a particular dynamic range as appropriate to the corresponding optical channel.

[0144] The output of the analog signal logic is supplied to the black level control, which determines the level of noise within the signal, and filters out some or all of such noise. If the sensor coupled to the channel processor is focused upon a narrower band of visible spectrum than traditional image sensors, the black level control can be more finely tuned to eliminate noise.

[0145] The output of the black level control is supplied to the exposure control, which measures the overall volume of light being captured by the array and adjusts the capture time for image quality. Traditional cameras must make this determination on a global basis (for all colors). In the camera of an embodiment, however, the exposure control can be specifically adapted to the wavelength (or band of wavelengths) to which the sensor is configured. Each channel processor is thus able to provide a capture time that is specifically adapted to the sensor and/or specific color (or band of colors) targeted, and which may be different than the capture time provided by another channel processor for another optical channel.

[0146] FIG. 20C is a block diagram of the image pipeline, under an embodiment. In this embodiment, the image pipeline includes two portions. The first portion includes a color plane integrator and an image adjustor. The color plane integrator receives an output from each of the channel processors and integrates the multiple color planes into a single color image. The output of the color plane integrator, which is indicative of the single color image, is supplied to the image adjustor, which adjusts the single color image for saturation, sharpness, intensity and hue. The adjustor also adjusts the image to remove artifacts and any undesired effects related to bad pixels in the one or more color channels. The output of the

image adjustor is supplied to the second portion of the pipeline, which provides auto focus, zoom, windowing, pixel binning and camera functions.

[0147] FIG. 20D is a block diagram of the image post processor, under an embodiment. In this embodiment, the image post processor includes an encoder and an output interface. The encoder receives the output signal from the image pipeline and provides encoding to supply an output signal in accordance with one or more standard protocols (e.g., MPEG and/or JPEG). The output of the encoder is supplied to the output interface, which provides encoding to supply an output signal in accordance with a standard output interface, e.g., universal serial bus (USB) interface.

[0148] FIG. 21 is a block diagram of digital camera system, including system control components, under an embodiment. The system control portion includes a serial interface, configuration registers, power management, voltage regulation and control, timing and control, a camera control interface and a serial interface, but is not so limited. In some embodiments, the camera interface comprises an interface that processes signals that are in the form of high level language (HLL) instructions. In some embodiments the camera interface comprises an interface that processes control signals that are in the form of low level language (LLL) instructions and/or of any other form now known or later developed. Some embodiments may process both HLL instructions and LLL instructions.

[0149] As used herein, the following terms are interpreted as described below, unless the context requires a different interpretation.

[0150] "Array" means a group of photodetectors, also know as pixels, which operate in concert to create one image. The array captures photons and converts the data to an electronic signal. The array outputs this raw data to signal processing circuitry that generates the image sensor image output.

[0151] "Digital Camera" means a single assembly that receives photons, converts them to electrical signals on a semiconductor device ("image sensor"), and processes those signals into an output that yields a photographic image. The digital camera would included any necessary lenses, image sensor, shutter, flash, signal processing circuitry, memory device,

user interface features, power supply and any mechanical structure (e.g. circuit board, housing, etc) to house these components. A digital camera may be a stand-alone product or may be imbedded in other appliances, such as cell phones, computers or the myriad of other imaging platforms now available or to be created in the future, such as those that become feasible as a result of this invention.

[0152] "Digital Camera Subsystem" (DCS) means a single assembly that receives photons, converts them to electrical signals on a semiconductor device ("image sensor") and processes those signals into an output that yields a photographic image. The Digital Camera Subsystem includes any necessary lenses, image sensor, signal processing circuitry, shutter, flash and any frame to hold the components as may be required. The power supply, memory devices and any mechanical structure are not necessarily included.

[0153] "Electronic media" means that images are captured, processed and stored electronically as opposed to the use of film.

[0154] "Frame" or "thin plate" means the component of the DCS that is used to hold the lenses and mount to the image sensor.

[0155] "Image sensor" means the semiconductor device that includes the photon detectors ("pixels"), processing circuitry and output channels. The inputs are the photons and the output is the image data.

[0156] "Lens" means a single lens or series of stacked lenses (a column one above the other) that shape light rays above an individual array. When multiple stacks of lenses are employed over different arrays, they are called "lenses."

[0157] "Package" means a case or frame that an image sensor (or any semiconductor chip) is mounted in or on, which protects the imager and provides a hermetic seal.

[0158] "Packageless" refers to those semiconductor chips that can be mounted directly to a circuit board without need of a package.

[0159] The terms "Photo-detector" and "pixels" mean an electronic device that senses and captures photons and converts them to electronic signals. These extremely small devices are used in large quantities (hundreds of thousands to millions) in a matrix to capture an image.

[0160] "Semiconductor Chip" means a discrete electronic device fabricated on a silicon or similar substrate, which is commonly used in virtually all electronic equipment.

[0161] "Signal Processing Circuitry" means the hardware and software within the image sensor that translates the photon input information into electronic signals and ultimately into an image output signal.

[0162] Aspects of the digital camera systems and methods described herein may be implemented as functionality programmed into any of a variety of circuitry, including programmable logic devices (PLDs), such as field programmable gate arrays (FPGAs), programmable array logic (PAL) devices, electrically programmable logic and memory devices and standard cell-based devices, as well as application specific integrated circuits (ASICs). Some other possibilities for implementing aspects of the digital camera systems and methods include: microcontrollers with memory (such as electronically erasable programmable read only memory (EEPROM)), embedded microprocessors, firmware, software, etc. Furthermore, aspects of the digital camera systems and methods may be embodied in microprocessors having software-based circuit emulation, discrete logic (sequential and combinatorial), custom devices, fuzzy (neural) logic, quantum devices, and hybrids of any of the above device types. Of course the underlying device technologies may be provided in a variety of component types, e.g., metal-oxide semiconductor field-effect transistor (MOSFET) technologies like complementary metal-oxide semiconductor (CMOS), bipolar technologies like emitter-coupled logic (ECL), polymer technologies (e.g., silicon-conjugated polymer and metal-conjugated polymer-metal structures), mixed analog and digital, etc.

[0163] It should be noted that components of the various systems and methods disclosed herein may be described using computer aided design tools and expressed (or represented), as data and/or instructions embodied in various computer-readable media, in terms of their behavioral, register transfer, logic component, transistor, layout geometries, and/or other

characteristics. Computer-readable media in which such formatted data and/or instructions may be embodied include, but are not limited to, non-volatile storage media in various forms (e.g., optical, magnetic or semiconductor storage media).

[0164] Examples of transfers of such formatted data and/or instructions by carrier waves include, but are not limited to, transfers (uploads, downloads, e-mail, etc.) over the Internet and/or other computer networks via one or more data transfer protocols (e.g., HTTP, FTP, SMTP, etc.). When received within a computer system via one or more computer-readable media, such data and/or instruction-based expressions of the above described systems and methods may be processed by a processing entity (e.g., one or more processors) within the computer system in conjunction with execution of one or more other computer programs.

[0165] Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in a sense of "including, but not limited to." Words using the singular or plural number also include the plural or singular number respectively. Additionally, the words "herein," "hereunder," "above," "below," and words of similar import refer to this application as a whole and not to any particular portions of this application. When the word "or" is used in reference to a list of two or more items, that word covers all of the following interpretations of the word: any of the items in the list, all of the items in the list and any combination of the items in the list.

[0166] The above description of illustrated embodiments of the digital camera systems and methods is not intended to be exhaustive or to limit the digital camera systems and methods to the precise form disclosed. While specific embodiments of, and examples for, the digital camera systems and methods are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the digital camera systems and methods, as those skilled in the relevant art will recognize. The teachings of the digital camera systems and methods provided herein can be applied to other processing systems and methods, not only for the systems and methods described above.

[0167] The elements and acts of the various embodiments described above can be combined to provide further embodiments. These and other changes can be made to the digital camera systems and methods in light of the above detailed description.

[0168] In general, in the following claims, the terms used should not be construed to limit the digital camera systems and methods to the specific embodiments disclosed in the specification and the claims, but should be construed to include all systems that operate under the claims. Accordingly, the digital camera systems and methods are not limited by the disclosure, but instead the scope of the digital camera systems and methods is to be determined entirely by the claims.

[0169] While certain aspects of the digital camera systems and methods are presented below in certain claim forms, the inventors contemplate the various aspects of the digital camera systems and methods in any number of claim forms. Accordingly, the inventors reserve the right to add additional claims after filing the application to pursue such additional claim forms for other aspects of the digital camera systems and methods

WHAT IS CLAIMED IS:

1. An image capture device comprising:

a plurality of sensors;

a plurality of optics components, wherein each optics component of the plurality of optics components is configured to pass light to a sensor of the plurality of sensors; and

a processing component configured to control an integration time of each sensor.
2. The device of claim 1, wherein the processing component is further configured to control the integration time of each sensor during a frame.
3. The device of claim 1, further comprising an interface operatively coupled to the processing component, wherein the interface is configured to receive the integration time of the each sensor as an input to an image capture device.
4. The device of claim 1, wherein each sensor is configured to image the same field of view.
5. The device of claim 1, wherein the processing component is further configured to combine data from the plurality of sensors received to provide an image.
6. The device of claim 5, wherein the image corresponds to a first frame, and wherein the processing component is further configured to determine one or more integration times for a second frame based at least in part on the image.
7. The device of claim 1, wherein the integration time is controlled based on an external input.
8. The device of claim 1, wherein the integration time is controlled based on incident light level.
9. A system comprising:

a plurality of channels, wherein each channel of the plurality of channels includes a sensor; and

a processing component coupled to the plurality of channels, wherein the processing component is configured to determine an integration time of each channel of the plurality of channels, wherein the processing component is configured to combine data from the plurality of channels received to provide an image.

10. The system of claim 9, wherein each sensor in the plurality of channels is configured to image the same field of view.

11. The system of claim 9, wherein the integration time of at least one channel is relatively shorter than the integration time of at least one other channel.

12. The system of claim 9, wherein the processing component is configured to use the image to determine the integration time for each channel for use during a subsequent frame.

13. The system of claim 9, wherein the processing component is configured to automatically control the integration time of each sensor.

14. The system of claim 9, wherein the integration time is used to control an amount of electrical charge placed on one or more storage devices associated with a sensor.

15. A method comprising:

identifying an integration time for each of a plurality of channels of an image capture device, wherein the plurality of channels includes a plurality of sensors;

capturing data with each of the plurality of sensors, wherein the data captured by each sensor is based at least in part on the integration time of the sensor; and

generating an image by combining the data captured by each of the plurality of sensors.

16. The method of claim 15, wherein a first integration time of a first sensor is less than a second integration time of a second sensor.

17. The method of claim 15, further comprising determining a subsequent integration time for each of the plurality of sensors based at least in part on the image.

18. The method of claim 15, further comprising analyzing a previous image generated by the image capture device.

19. The method of claim 15, further comprising separately controlling a parameter of an optics component associated with each channel of a plurality of channels.

20. The method of claim 15, further comprising providing an electrical charge to each sensor for a period of time, wherein the period of time comprises an integration time corresponding to the sensor.

ABSTRACT

A digital camera includes a plurality of channels and a processing component operatively coupled to the plurality of channels. Each channel of the plurality of channels includes an optics component and a sensor that includes an array of photo-detectors. The processing component is configured to separately control an integration time of each channel, where a first integration time of a first channel is less than a second integration time of a second channel. The processing component is also configured to combine data from the plurality of channels to generate an image.

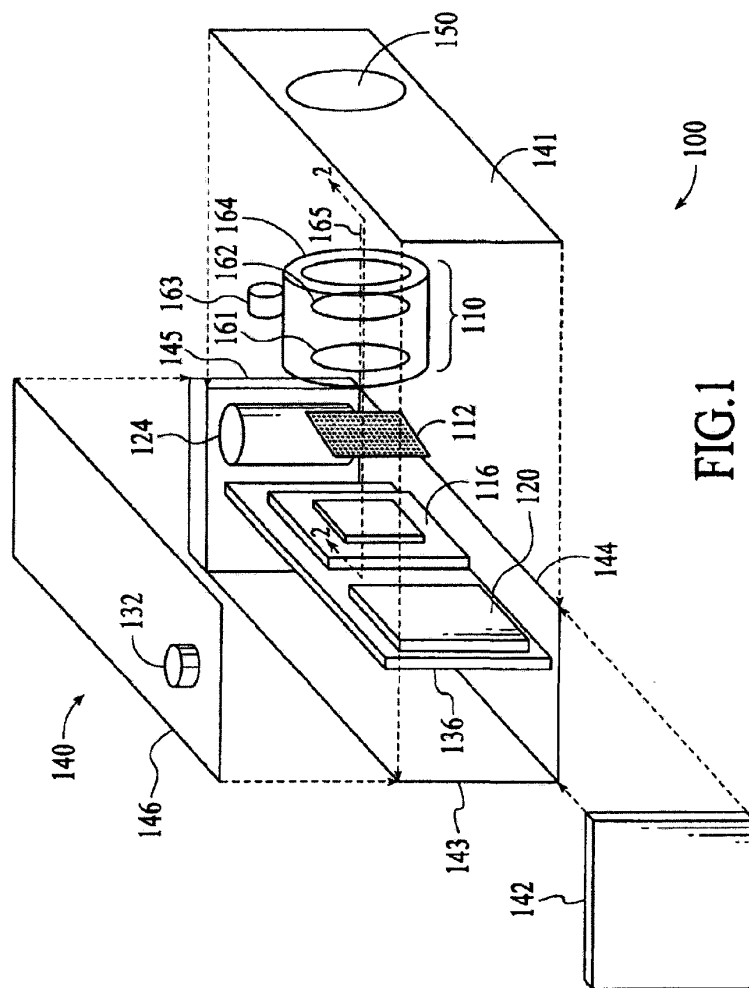
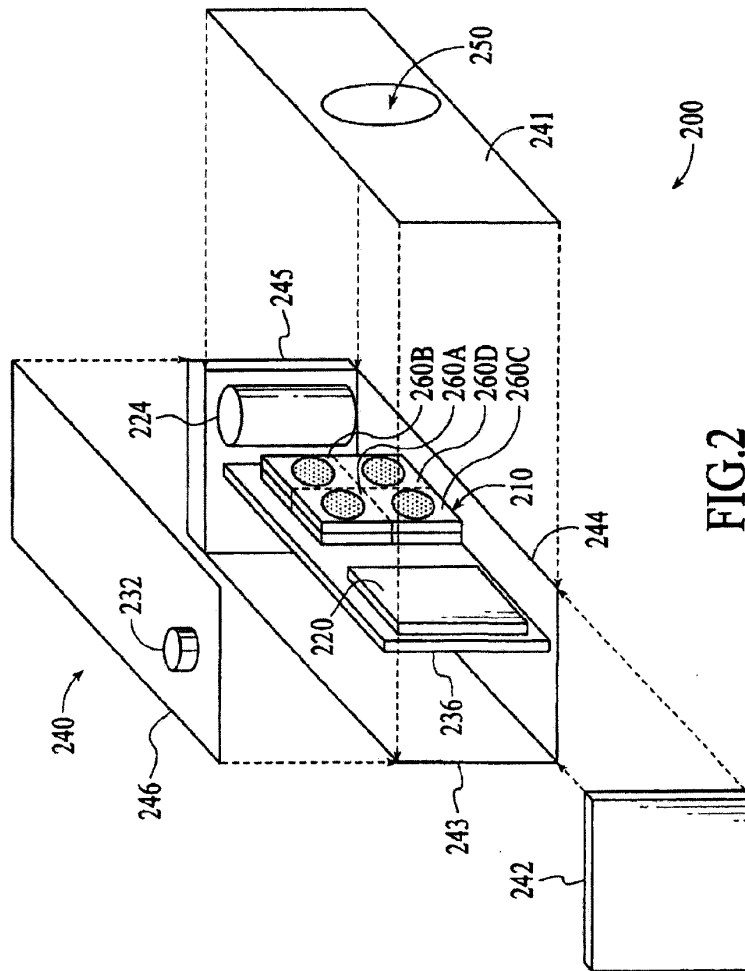
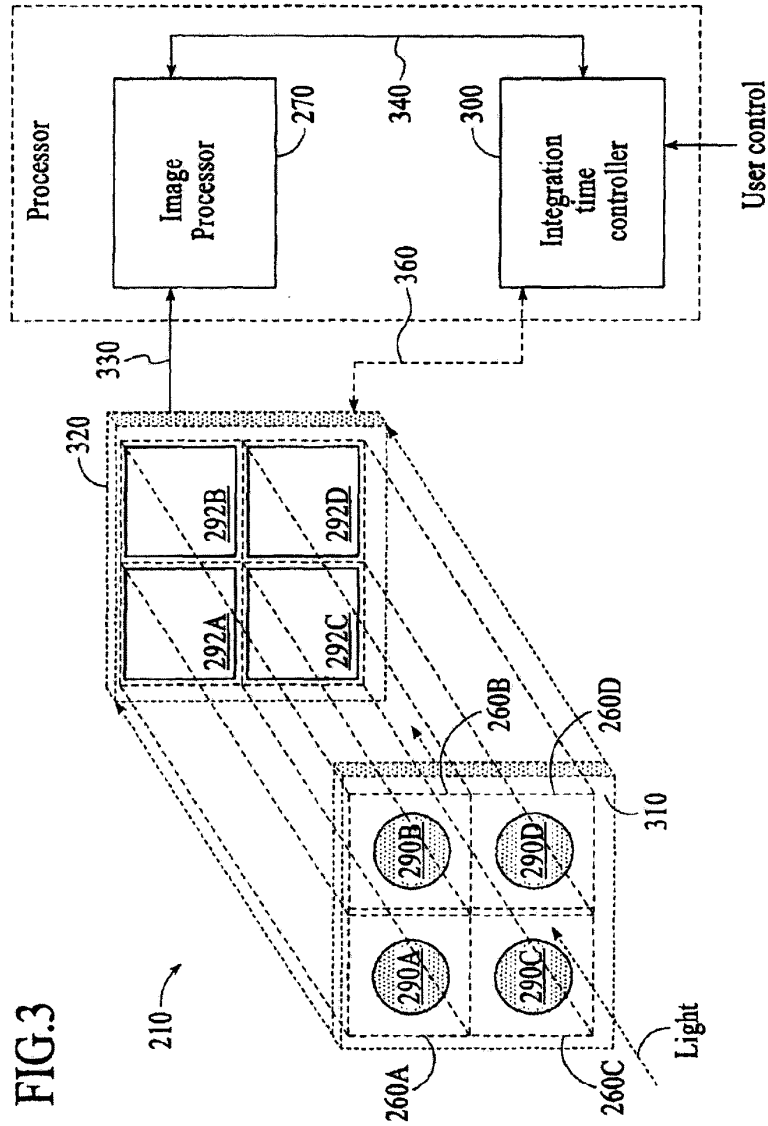
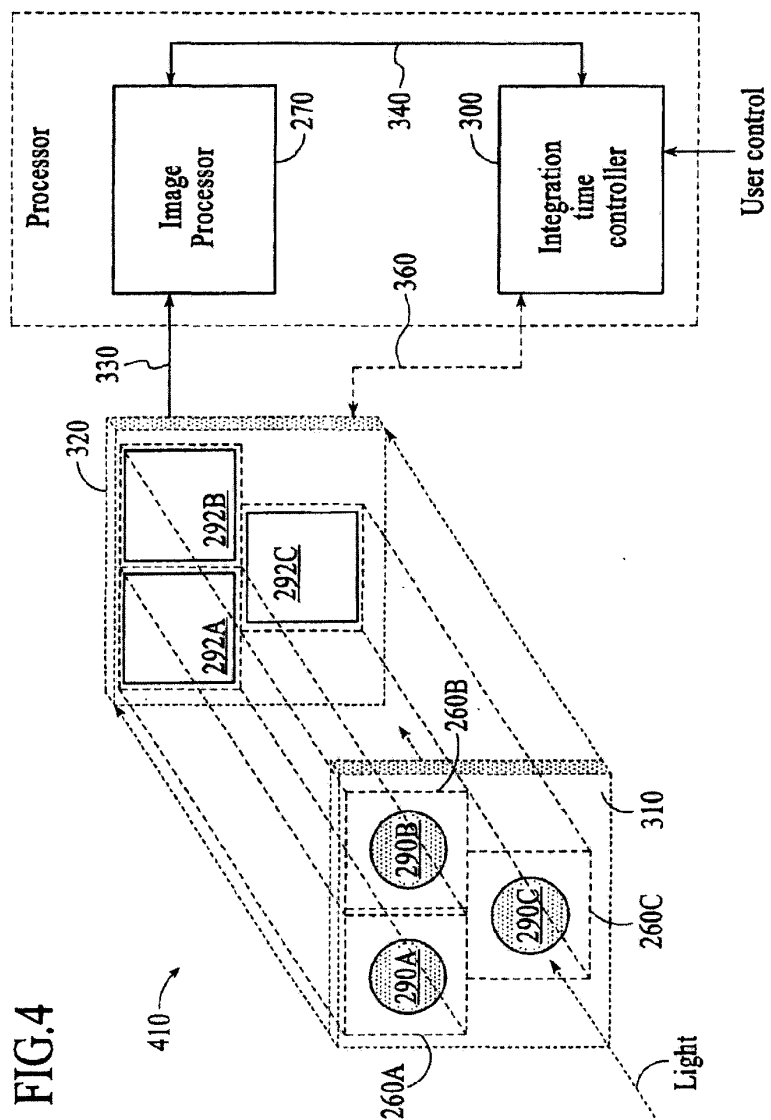
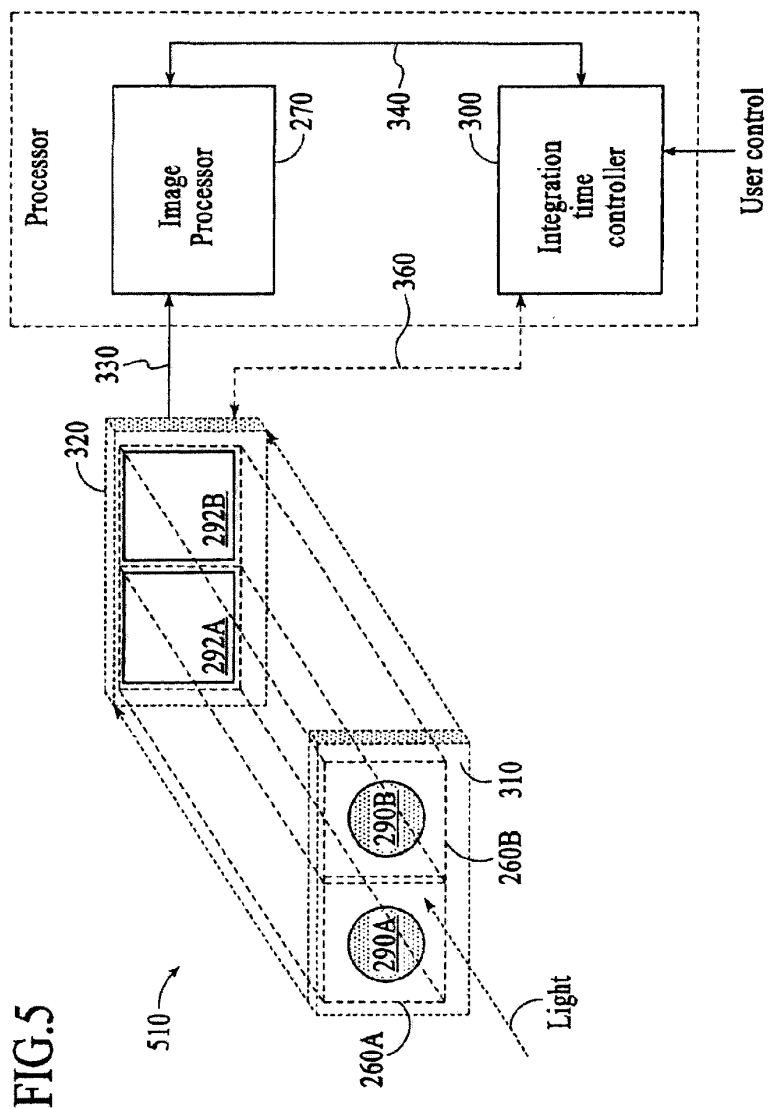


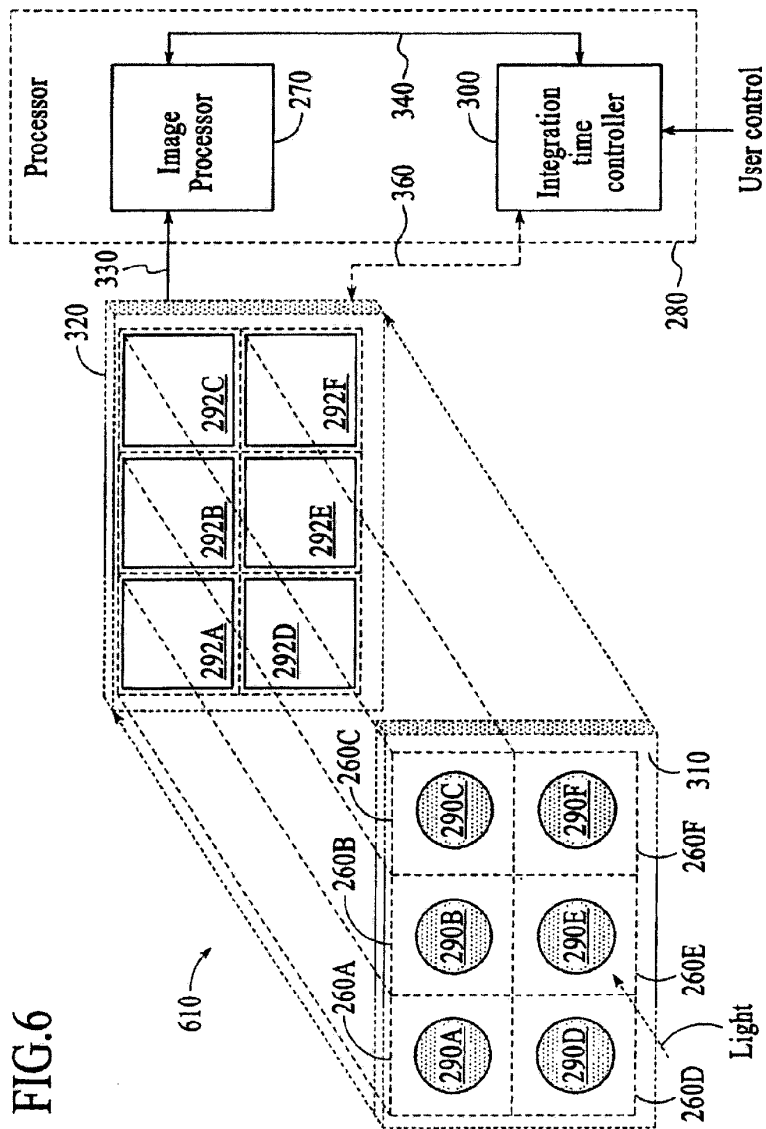
FIG.1

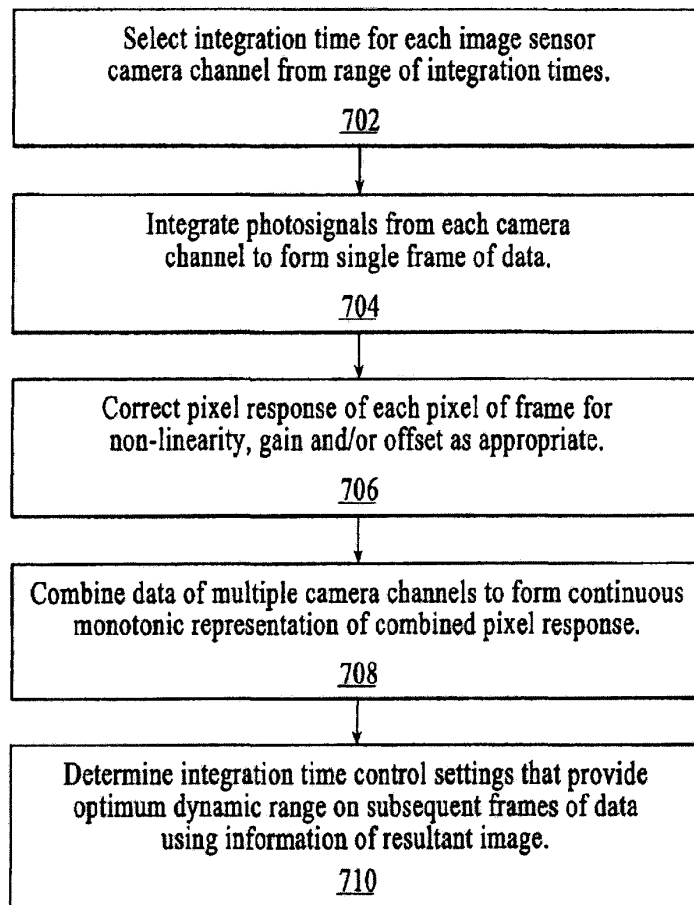






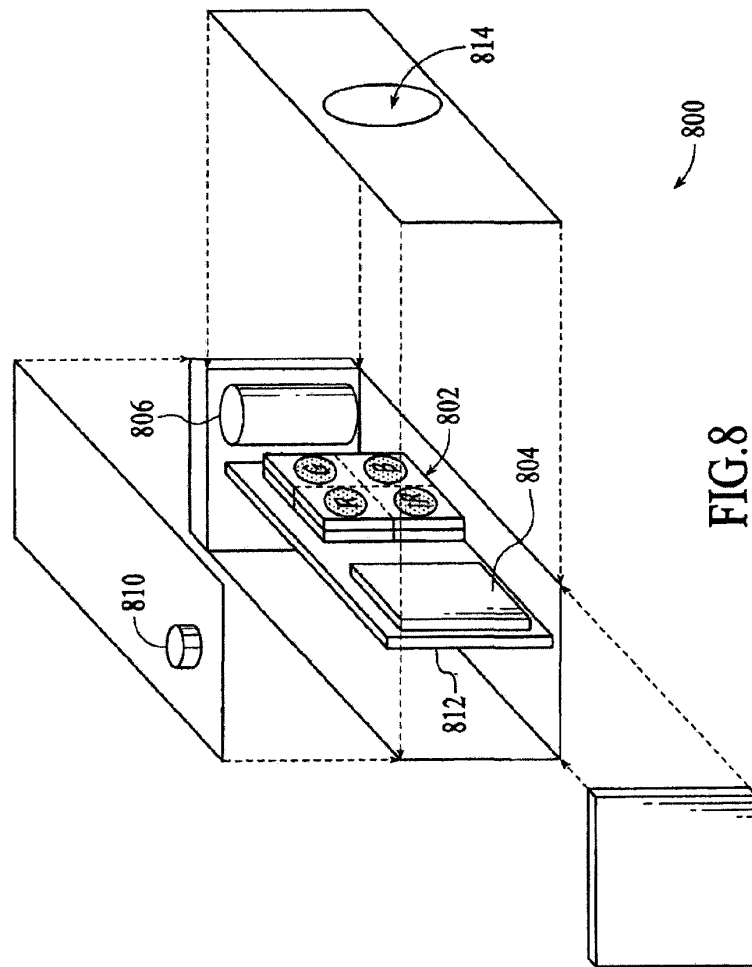






700

FIG.7



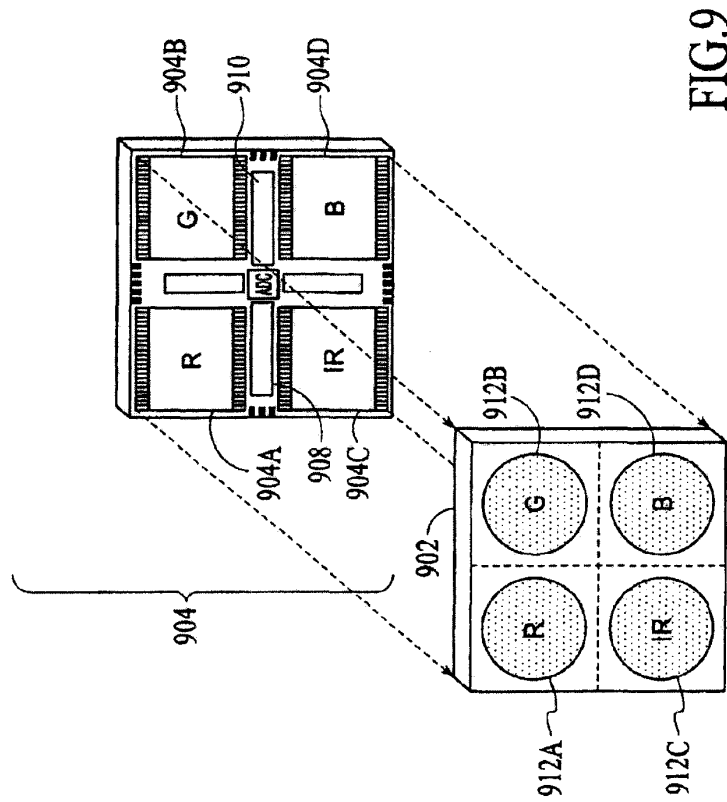
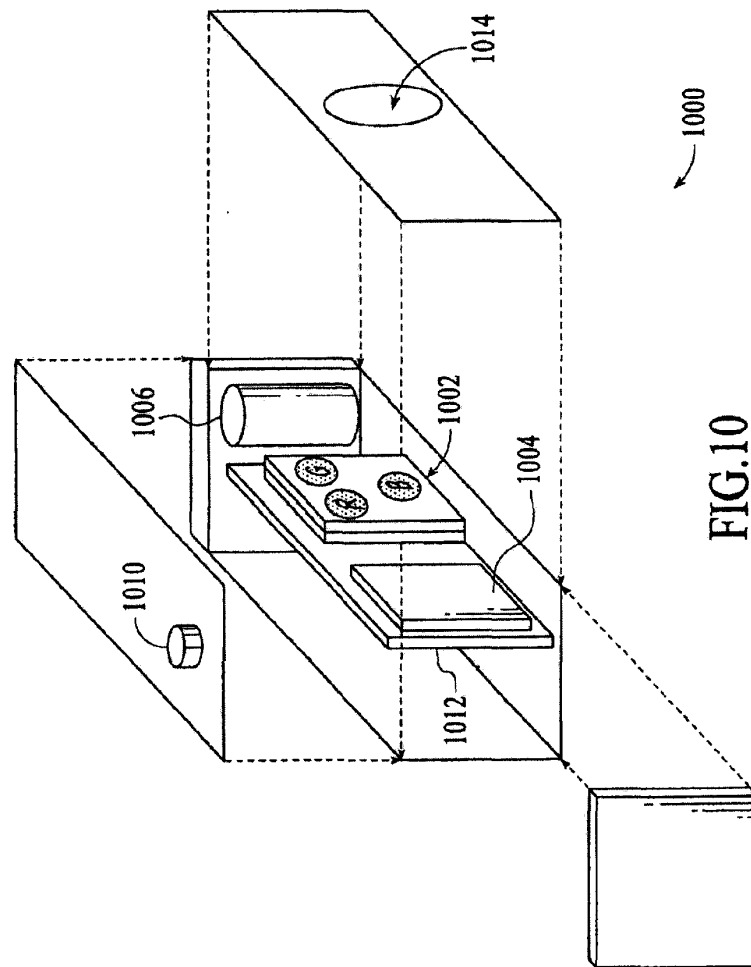
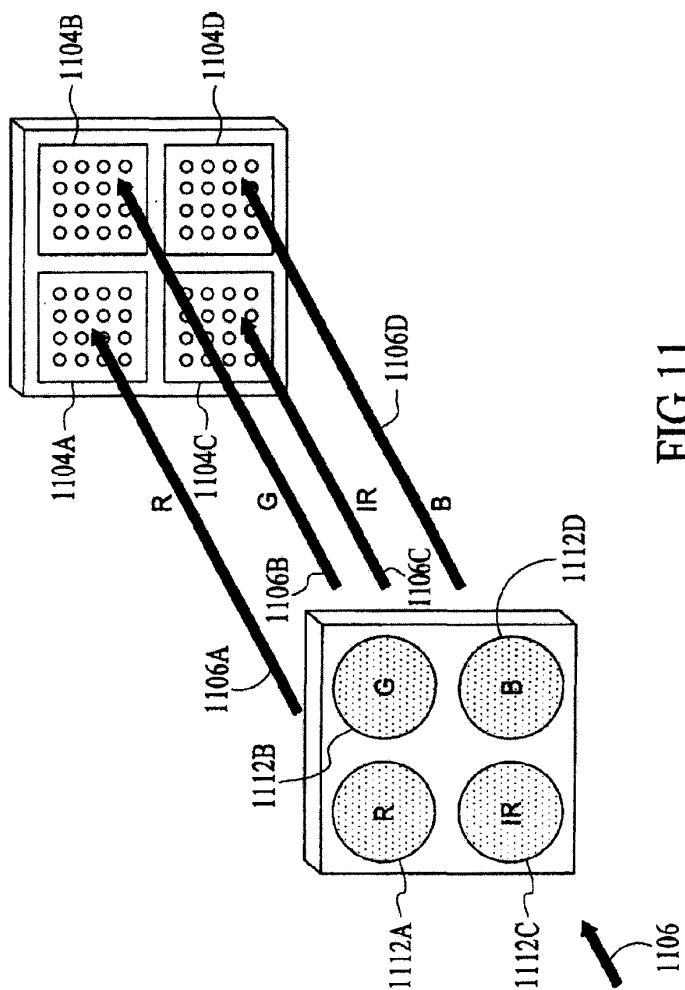


FIG. 9





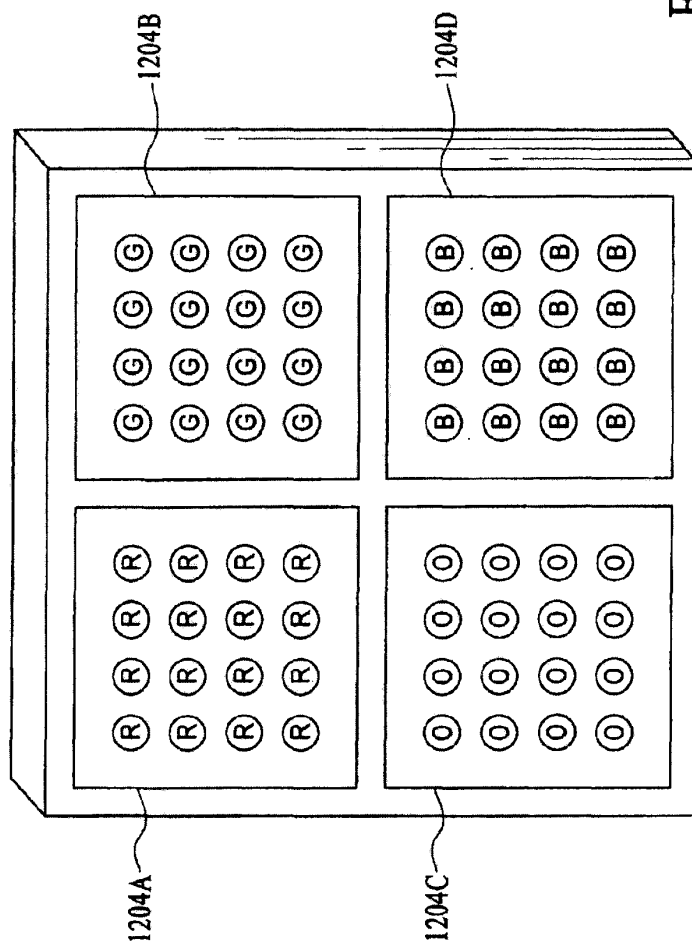


FIG.12

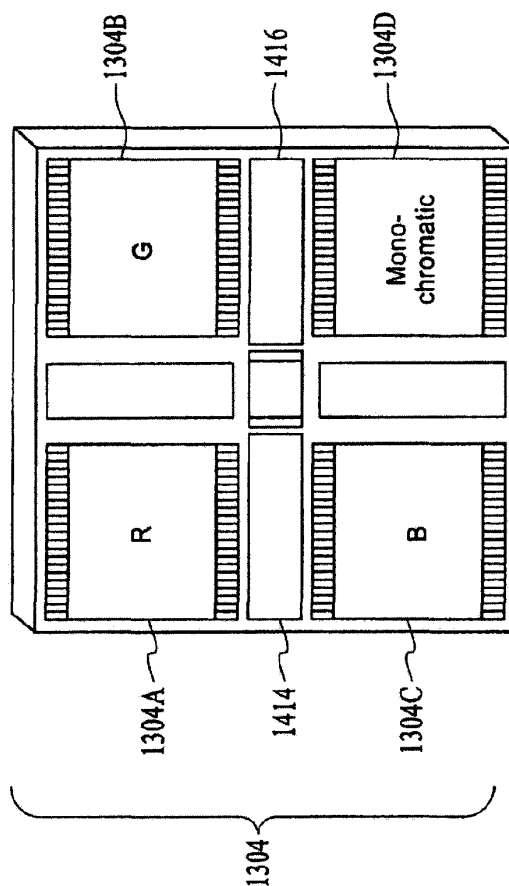
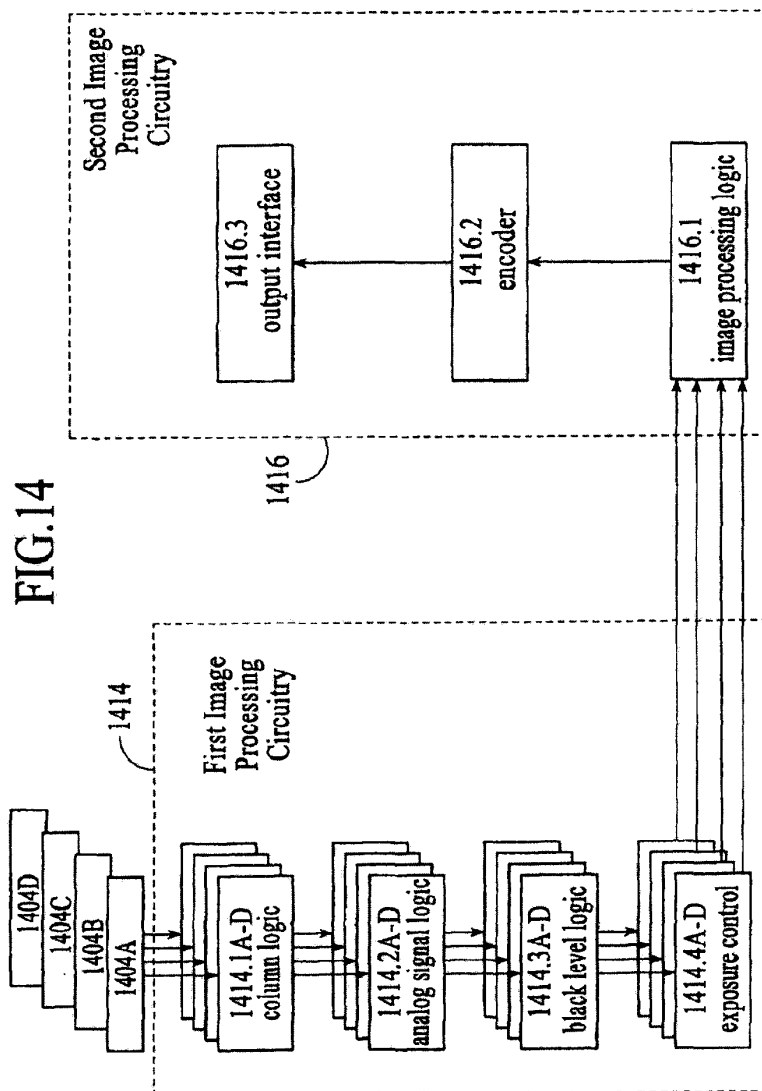


FIG.13



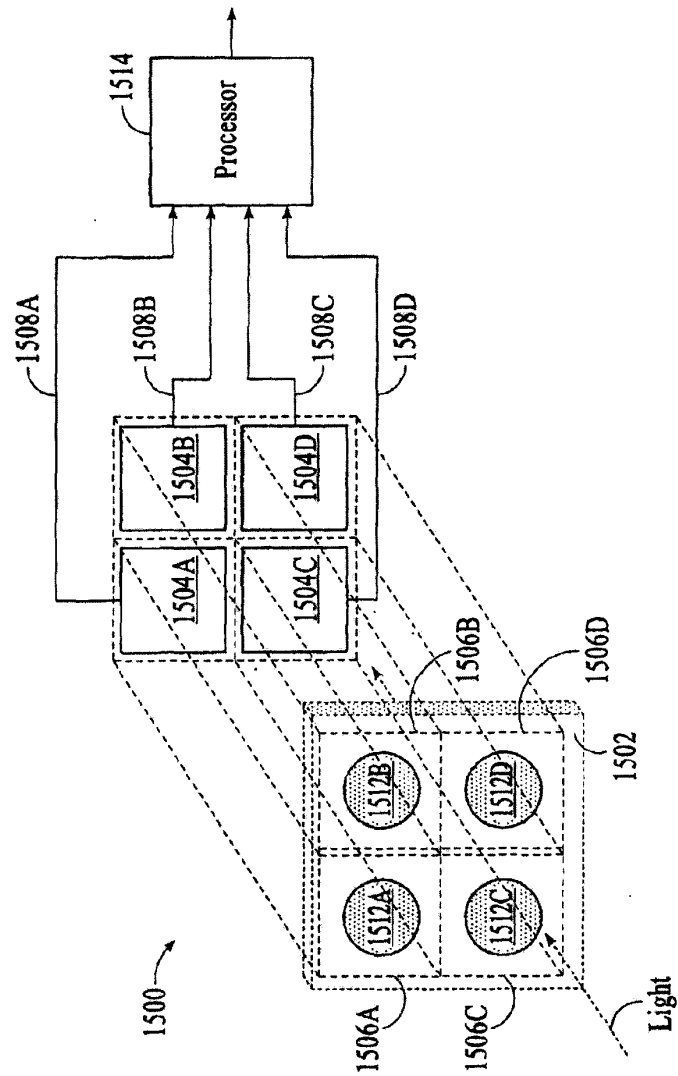
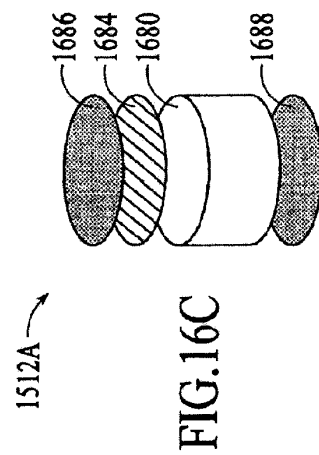
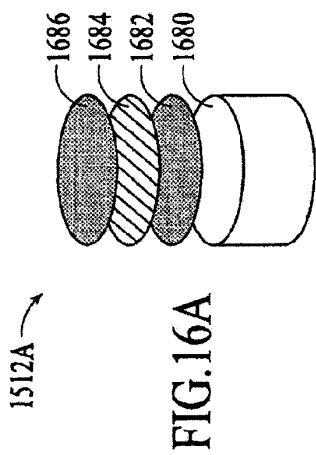
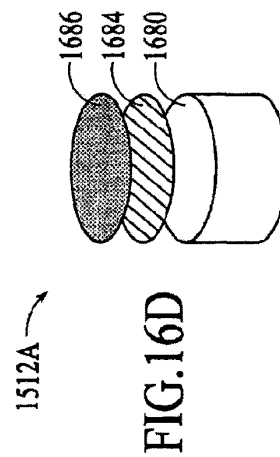
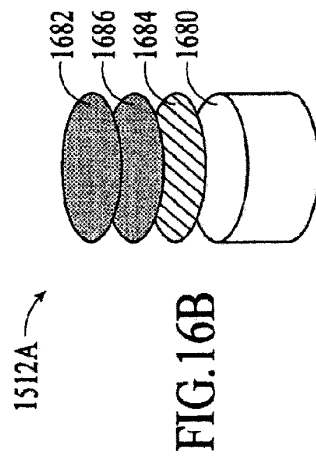
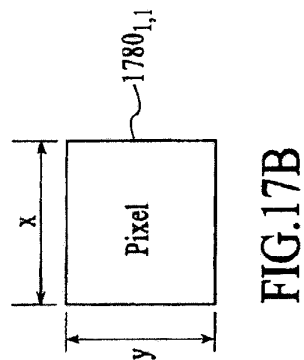
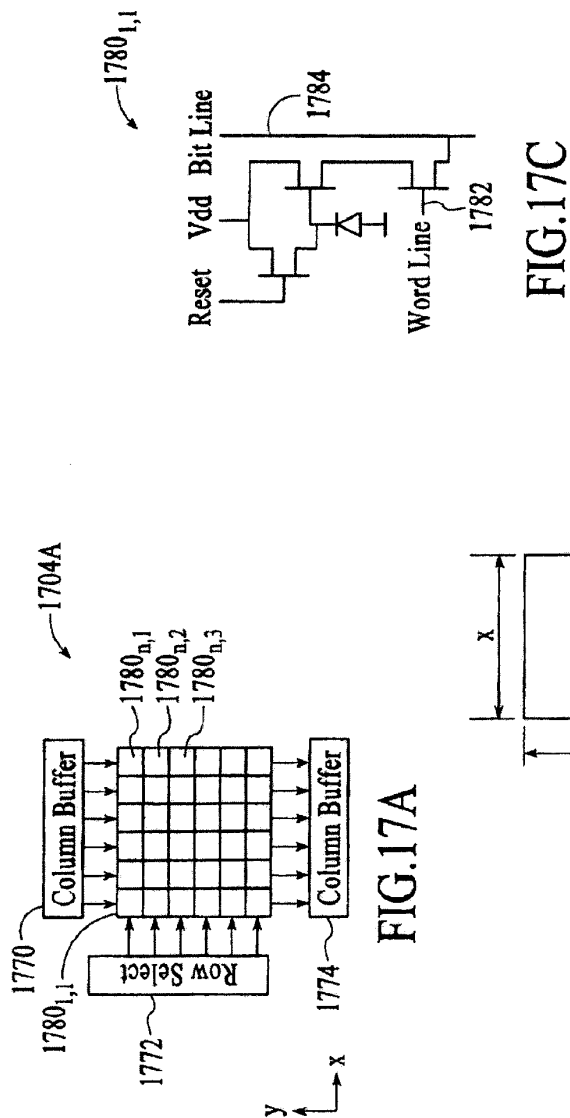


FIG.15





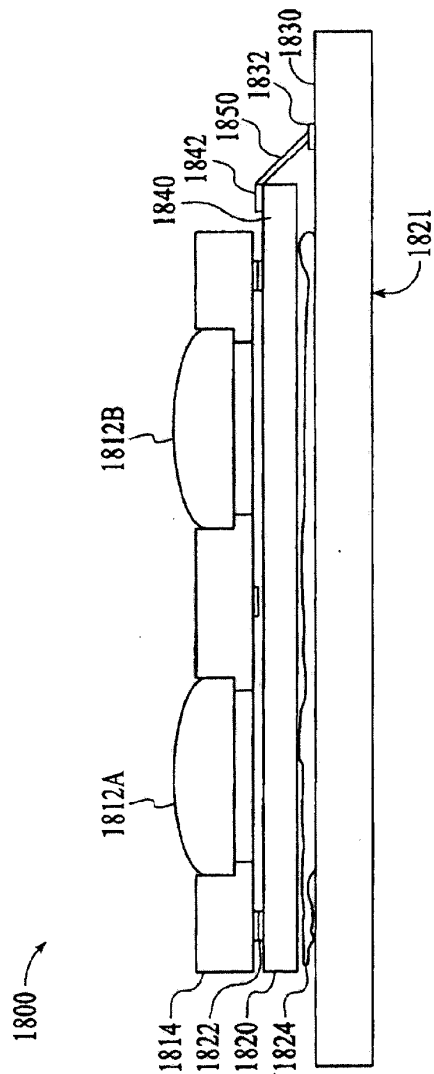


FIG. 18

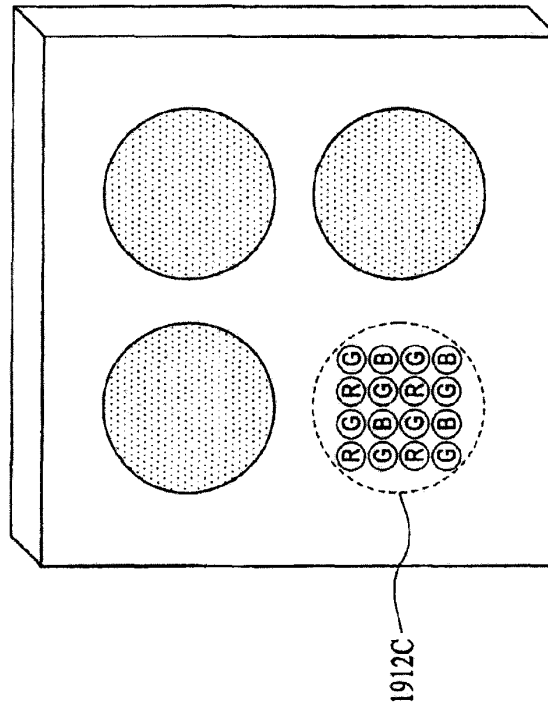


FIG.19

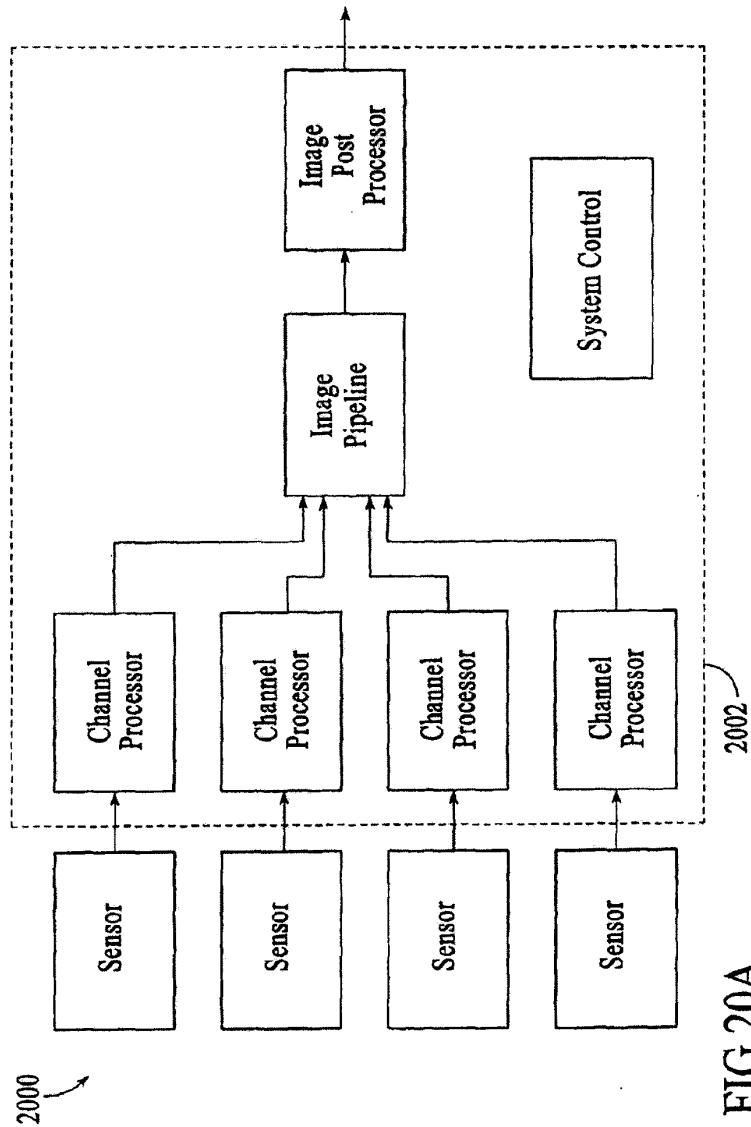


FIG. 20A

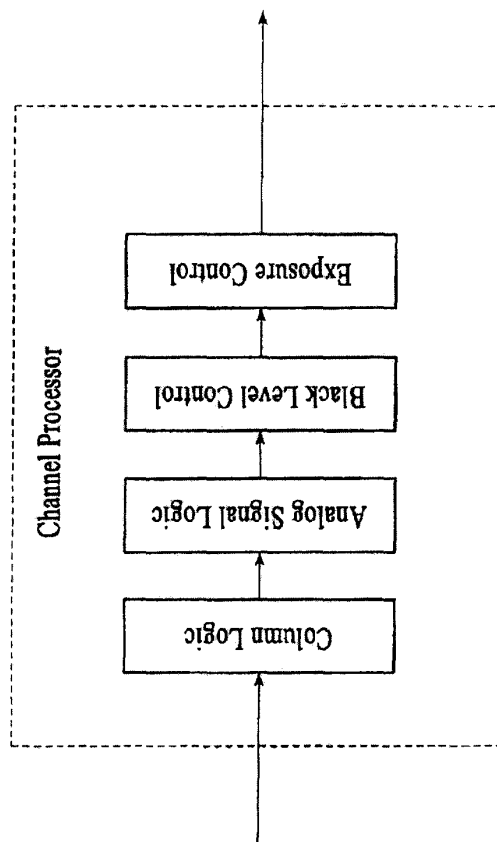


FIG.20B

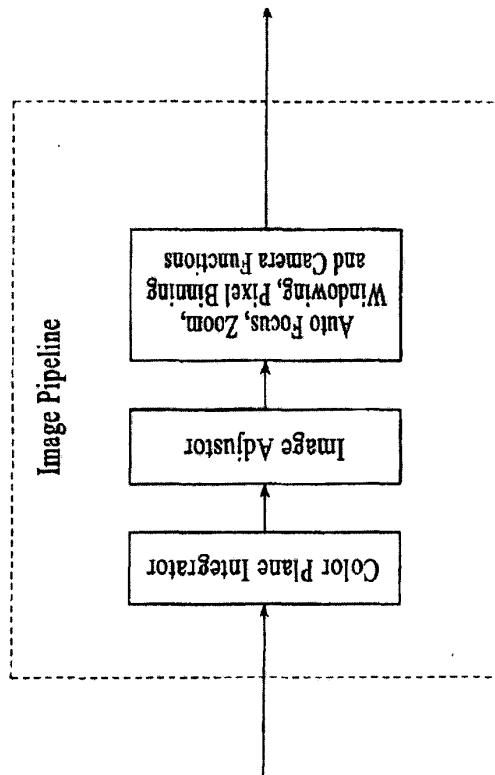


FIG.20C

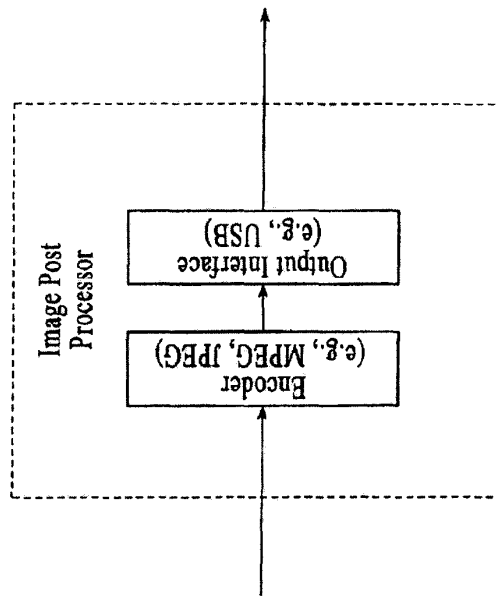
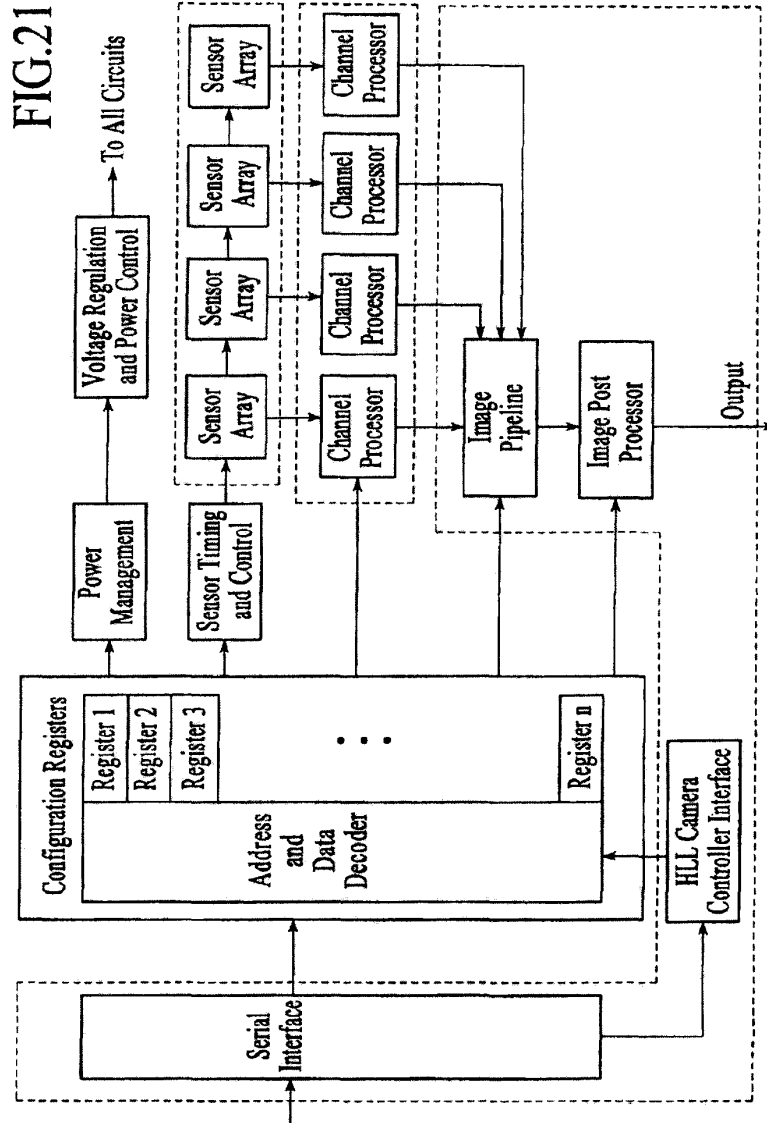


FIG.20D



POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

- ☒ Practitioner(s) associated with the Customer Number: **23524**
- OR
- ☐ Practitioner(s) named below (If more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

- ☒ The address associated with Customer Number: **23524**

☐ Firm or Individual Name

Address

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Email

Assignee Name and Address:

PROTARIUS FILO AG, L.L.C.
160 Greentree Drive, Suite 101
Dover, DE 19904
USA

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/88 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	<i>Jeremiah Miller</i>	Date	12/26/08
Name	Jeremiah Miller	Telephone	
Title	Authorized Person for Protarius Filo AG, L.L.C.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (or by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1408, Alexandria, VA 22313-1408. DO NOT SEND FEES OR COMPLETED FORM TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1468, Alexandria, VA 22313-1468.

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MADI_1784079.1

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: OLSEN, Richard Ian et al. Confirmation No. 5081
Application No.: 11/788,122 Filed: 4/18/2007
Patent No.: _____ Issue Date: _____
Docket Number: 088245-6122
Entitled: LARGE DYNAMIC RANGE CAMERAS

PROTARIUS FILO AG, L.L.C.
(Name of Assignee)

LLC
(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title, and interest.
The extent (by percentage) of its ownership interest is: %

In the patent application/patent identified above by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel/Frame _____ or for which a copy thereof is attached.

OR

B. ☒ A chain of title from the inventor(s) of the patent application/patent identified above, to the current assignee as shown below:

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The document was recorded in the United States Patent and Trademark Office at
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NOTE: A separate copy (i.e., a true copy of the original document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08.

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Christopher L. Kalsut
Signature

01/05/09
Date

Christopher L. Kalsut (Reg. No. 57,946)

(806) 258-4286

Printed or Typed Name

Telephone Number

Attorney for Applicant

Title

This collection of information is required by 37 CFR 3.730(d). The information is required to obtain or retain a benefit by the public which is to be (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the extent of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1480, Alexandria, VA 22313-1480. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Correspondence for Patents, P.O. Box 1480, Alexandria, VA 22313-1480.

If you need assistance in completing the form, call 1-800-PTO-9799 and select option 2.

MADI_1770282.1

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		LARGE DYNAMIC RANGE CAMERAS		
First Named Inventor/Applicant Name:		Richard Ian Olsen		
Filer:		Paul S. Hunter/Linda Anderson		
Attorney Docket Number:		088245-9840		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1600

Electronic Acknowledgement Receipt	
EFS ID:	17227679
Application Number:	14063236
International Application Number:	
Confirmation Number:	1847
Title of Invention:	LARGE DYNAMIC RANGE CAMERAS
First Named Inventor/Applicant Name:	Richard Ian Olsen
Customer Number:	23524
Filer:	Paul S. Hunter/Linda anderson
Filer Authorized By:	Paul S. Hunter
Attorney Docket Number:	088245-9840
Receipt Date:	25-OCT-2013
Filing Date:	
Time Stamp:	13:43:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1600
RAM confirmation Number	12225
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Transmittal of New Application	transmittal.pdf	97622 a6ad9aec54350f461cfbab8b5342b8dda7618407	no	4
Warnings:					
Information:					
2	Application Data Sheet	ADS.pdf	1107893 1638bbe2f55d2a2de5513d8e75378352940f4c4	no	8
Warnings:					
Information:					
3	Oath or Declaration filed	declarations.pdf	225112 48d4e2fe481ed57781c05e25b79656aad82481d	no	4
Warnings:					
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4		spec.pdf	218070 6f48d40a69937f6ad36a639b8a66a19a8c12b6f0	yes	44
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	40	
	Claims		41	43	
	Abstract		44	44	
Warnings:					
Information:					
5	Drawings-only black and white line drawings	drawings.pdf	500952 c1b6de990ea810a877eb46059b6b84853a466132	no	24
Warnings:					
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6		POA.pdf	107512 6a8382008d2eaae31df74c2324c9aa22ff882ded	yes	2
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Power of Attorney		1	1	
	Assignee showing of ownership per 37 CFR 3.73.		2	2	
Warnings:					

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7	Fee Worksheet (SB06)	fee-info.pdf	33037	no	2
			2d79cd42e2f5acd8e50d41a0594ac898e4d57a35		
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