

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOSHIBA CORPORATION,
Petitioner,

v.

OPTICAL DEVICES, LLC,
Patent Owner.

Case IPR2014-01443
Patent RE40,927 E

Before ERICA A. FRANKLIN, GLENN J. PERRY, and JAMES B. ARPIN,
Administrative Patent Judges.

FRANKLIN, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. *Background*

Toshiba Corporation (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 37, 38, 48, 49, 51–53, 55–58, 60, 61, 63, 64, 67–69, and 71 of Patent No. US RE40,927 E (Ex. 1001, “the ’927 patent”). Optical Devices, LLC (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).

On March 10, 2015, we instituted an *inter partes* review of claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 of the ’927 patent. Paper 8 (“Dec. Inst.”). Patent Owner filed a Patent Owner Response to the Petition. Paper 15 (“PO Resp.”). Petitioner filed a Reply to the Patent Owner Response. Paper 21 (“Pet. Reply”).

Additionally, Patent Owner filed a Contingent Motion to Amend seeking to replace any of original claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 found to be unpatentable with substitute claims 72–89, respectively. Paper 16 (“Mot.”). Petitioner filed an Opposition to the Contingent Motion to Amend. Paper 22 (“Opp.”). Patent Owner filed a Reply to Petitioner’s Opposition. Paper 31 (“Reply”). On January 12, 2016, the parties presented arguments at an oral hearing. Paper 37 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S. C. § 318(a) and 37 C.F.R. § 42.73, we determine that Petitioner has shown by a preponderance of the evidence that claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 are unpatentable. We also *deny* the Motion to Amend.

B. The Cited Reference and Declaration

Petitioner relies upon Patent No. US 3,506,839 to Ando, filed February 20, 1967 (“Ando”) (Ex. 1007) in support of its ground challenging the identified claims of the ’927 patent. Petitioner relies also upon the Declaration of Lambertus Hesselink, Ph.D. (Ex. 1008).

Patent Owner relies upon the Declaration of James R. Leger, Ph.D. (Ex. 2104).

C. The Instituted Ground of Unpatentability

Petitioner challenges the patentability of claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 under 35 U.S.C 102(e) (pre-AIA) as anticipated by Ando. Pet. 12.

D. Related Proceedings

The parties indicate that the ’927 patent is the subject of *Optical Devices, LLC v. Toshiba Corp.*, Case No. 1:13-cv-10530 (D. Del. 2013). Pet. 1; Paper 6, 2 (also identifying other related cases). In addition, the patent currently is the subject of an investigation before the U.S. International Trade Commission: *In the Matter of Certain Optical Disc Drives, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-897. Pet. 1; Paper 6, 1. Further, we instituted *inter partes* reviews for claims of the following patents covering related subject matter: Patent Nos. US RE42,913 E (IPR2014-01439, Paper 7) and US RE43,681 E (IPR2014-01441, Paper 8, and IPR2014-01442, Paper 7). IPR2014-01442 was consolidated with IPR2014-01441 (IPR2014-01441, Paper 9; IPR2014-01442, Paper 8).

E. The '927 Patent

The '927 patent describes an optical system having a focusing lens and a reflective surface positioned near the focal plane of the lens, whereby radiant energy from a radiant energy source directed at the system is reflected back towards the source by the optical system due its retroreflection characteristics. Ex. 1001, 2:48–53. The retroreflected rays are recovered by a radiant energy receiver to allow detection of the presence and relative position of the optical system. *Id.* at 2:52–55. The claims at issue are directed to an apparatus for measuring the retroreflective characteristics of such an optical system, as well as a method and apparatus for detecting characteristics or properties of such a system. *See, e.g., id.* at Claims 38, 48, and 61.

The Specification defines a “retroreflector” as “a reflector wherein incident rays or radiant energy and reflected rays are parallel for any angle of incidence within the field-of-view.” *Id.* at 1:10–13. The Specification explains that “[a] characteristic of a retroreflector is that the energy impinging thereon is reflected in a very narrow beam, herein referred to as the retroreflected beam.” *Id.* at 1:13–15. According to the Specification, “[t]his phenomenon is termed retroreflection.” *Id.* at 1:15–16.

Figure 1 of the '927 patent is reproduced below:

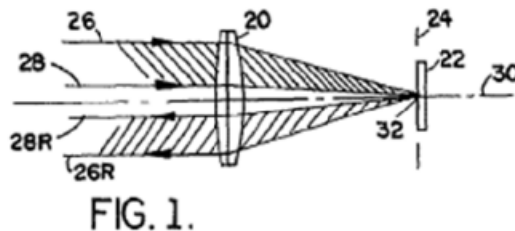


Figure 1 of the '927 patent depicts an optical system including lens 20 and reflective surface 22 (e.g., a mirror) positioned in focal plane 24 of lens 20. Ex. 1001, 2:59–62. Radiation rays 26 and 28 are directed towards lens 20 of the optical system from a radiation (e.g., light) source (not shown). *Id.* at 2:62–65. For purposes of clarity, the '927 patent shows the *incident* rays at the top of lens 20 and the *reflected* rays at the bottom of lens 20. *Id.* at 2:66–3:2. Incident rays 26 and 28 are refracted by lens 20 and focused at focal point 32 on mirror 22. *Id.* at 3:2–4. The rays are reflected, such that the angle of reflection equals the angle of incidence, and the reflected rays are refracted again by lens 20 and emerge therefrom as retroreflected rays 26R and 28R. *Id.* at 3:4–8.

Figure 3 of the '927 patent is reproduced below:

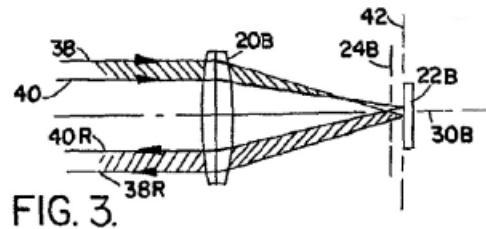


Figure 3 of the '927 patent shows that the radiant flux density at surface 22B may vary based on characteristics of the components of the optical system, such as placement of or imperfections in lens 20B. *Id.* at 3:28–44; 3:66–4:59; see Prelim. Resp. 3. For example, in Figure 3, reflective surface 22B is positioned substantially, but not entirely, in focal plane 24B. *Id.* at 3:28–44. According to the '927 patent,

[i]n the system depicted in FIG. 3 . . . the lens 20B is assumed to be imperfect; i.e., it has aberrations. In this case the rays 38 and 40 are parallel to the optical axis 30B but are not focused at a single point on the focal plane 24B, and instead form an image on the mirror 22B, which image is referred to as the circle of confusion. In most practical optical systems there are circles of

confusion and the mirror is normally positioned at the plane of least circle of confusion, herein depicted by the reference numeral 42. Thus, the image formed on the mirror by means of the rays 38 and 40 can be considered to be a radiant source, and the retroreflected rays 38R and 40R exit from the lens 20B substantially parallel to each other.

Ex. 1001, 3:28–41. The difference in radiant flux density between the smaller circle of confusion of Figure 1, i.e., where surface 22 lies in the focal plane, and that of Figure 3, i.e., where surface 22B lies substantially, but not entirely, in focal plane 24B, is referred to as the optical gain. *See id.* at col. 3:28–65. In Figures 1 and 3, the rays retroreflected by the optical system are in the form of a narrow, substantially collimated beam having a high radiant flux density. *Id.* at 3:59–61. “[T]here is an actual increase in the radiant flux density of the retroreflected beam due to the narrowing thereof. This increase in radiant flux density is herein termed optical gain.” *Id.* at 3:62–65.

F. Illustrative Claims

Independent claim 37 is illustrative and is reproduced below:

37. Apparatus for measuring the retroreflective characteristics of an optical system consisting of at least a focusing means and a *surface exhibiting some degree of reflectivity disposed substantially in the focal plane of said focusing means*, said apparatus comprising

a radiant energy source,

detection means,

measuring means connected to said detection means, and

means for directing said radiant energy produced by said

source at said optical system,

whereby said radiant energy is retroreflected *with an optical*

gain by said optical system and detected by said

detecting means and the output thereof is coupled to said

measuring means.

Ex. 1001, 12:55–13:2 (disputed limitation emphasized). Claims 37, 48, and 61 are independent. The remaining challenged claims depend, directly or indirectly, from one of these independent claims.

G. Claim Construction

In an *inter partes* review, the Board construes claim terms in an unexpired patent according to the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278–79 (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 84 U.S.L.W. 3218 (U.S. Jan. 15, 2016) (No. 15-446). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

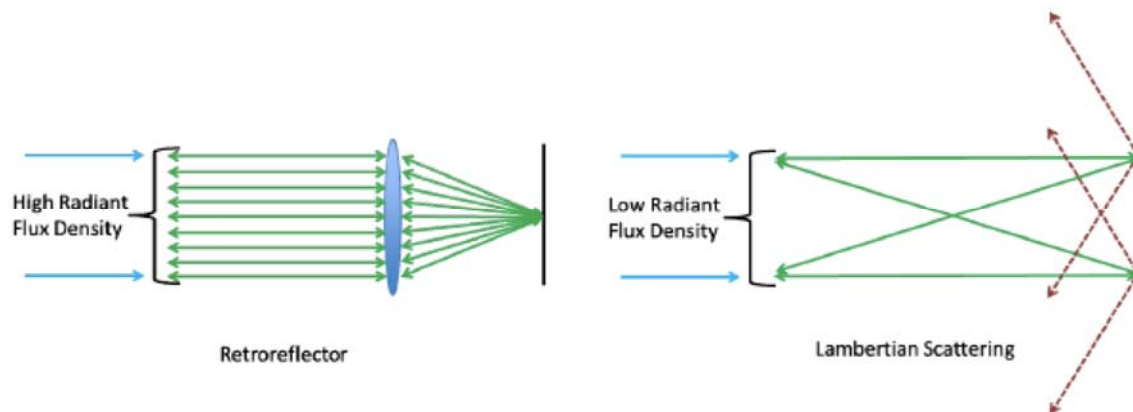
Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). “In such cases, the inventor’s lexicography governs.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (*en banc*). In the absence of such definitions, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Only terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). For this reason, we provide express constructions for only the following terms.

1. “Optical Gain”

In the context of a retroreflecting optical system, Petitioner proposes that we construe “optical gain” as “an actual increase in the radiant flux density of the retroreflected beam due to the narrowing thereof.” Pet. 16. Petitioner argues that retroreflected light inherently has the attribute of optical gain because the lens concentrates rays into a smaller solid angle that otherwise would be reflected into a larger one. *Id* at 20.

In support of its position, Petitioner provides the following image comparing retroreflected light with Lambertian scattered light at Petition page 21 and at Exhibit 1008 ¶ 47:



According to Petitioner, the comparison depicted in this image demonstrates that light that would otherwise be scattered into a wide angle (right side) is gathered into a smaller angle and collimated (left side) thereby increasing flux density of the reflected light. Pet. 21.

Patent Owner argues for a broader construction of “optical gain” that it asserts would be consistent with various “embodiments” described in the Specification of the ’927 patent. PO Resp. 6–19. Patent Owner proposes that the broadest reasonable construction of the term “optical gain” in the context of the ’927 patent is “a change in radiant flux density of reflected

radiant energy.” PO Resp. 6 (citing Ex. 2104 ¶¶ 20–21).

Patent Owner’s declarant, Dr. Leger, explains that one of ordinary skill would have understood that in certain of the embodiments, “the radiant flux density of the reflected radiation at one scanned location can be compared with the reflected [radiant] flux density at another scanned location.” Ex. 2104 ¶ 21. Dr. Leger explains further that “a change in the detected reflected [radiant] flux density from one location to another can signal the presence or absence of a retroreflective instrument.” *Id.*

According to Dr. Leger, one of ordinary skill would appreciate that a photodetector signal increase would represent “an increase in the radiation flux density when the scanning radiation is moved from an object that is not a retroreflector onto an adjacent object that exhibits a retroreflective characteristic (e.g., a binocular).” *Id.* On the other hand, a signal decrease would represent “a decrease in the radiation flux density when the scanning radiation is moved from an object that has a retroreflective characteristic to an adjacent object that does not have such a characteristic.” *Id.* According to Dr. Leger, the fact that an object has a retroreflective characteristic is determined when the scanning radiation moves to an adjacent object that does not exhibit such a characteristic or does so to a lesser degree, thereby resulting in a relative decrease in the reflected radiant flux density. *Id.* In another example, in order to track an object associated with some level of retroreflectivity, a relative decrease in the retroreflectivity is detected when the object moves away from the initially detected location. *Id.* Therefore, Dr. Leger reasons that one of ordinary skill would have understood that the concept of “optical gain” as used in the ’927 patent “covers both an increase and a decrease in the reflected radiant flux density.” *Id.*

Petitioner, relying upon the testimony of its declarant, Dr. Hesselink, disagrees with Patent Owner. Pet. 16–22; Pet. Reply 4–8. According to Dr. Hesselink, the inventor of the '927 patent acted as a lexicographer by providing a special meaning for the term “optical gain” as “an actual increase in the radiant flux density of the retroreflected beam due to the narrowing thereof.” Ex. 1008 ¶ 39 (emphasis omitted). Dr. Hesselink refers to the following passage from the '927 patent to support his view:

The rays retroreflected by the optical systems depicted in FIGS. 1 to 4 are in the form of a narrow, substantially collimated beam having a high radiant flux density. It is to be noted that there is an actual increase in the radiant flux density of the retroreflected beam due to the narrowing thereof. *This increase in radiant flux density is herein termed optical gain.*

Ex. 1001, 3:59–63 (emphasis added).

Patent Owner argues that one of ordinary skill would not have understood this passage to be a definition, but rather would have understood it to be describing “optical gain” in the context of a particular illustrative embodiment. PO Resp. 10 (citing Ex. 2104 ¶ 23). Restricting the construction of “optical gain” in the context of the '927 patent to an increase in radiant flux density would be inconsistent with the use of the term “optical gain” in a number of embodiments of the '927 patent. *Id.*

Patent Owner asserts that Dr. Hesselink’s view requires that “optical gain” be measured relative to a Lambertian radiator. *Id.* (citing Ex. 1008 ¶ 40). Dr. Hesselink refers to the following passage from the '927 patent: “In order to obtain a measure of the optical gain we **must** compare the retroreflector to a standard or a reference. This reference has been taken to be a diffuse surface known in the art as a Lambertian radiator.” *Id.* ¶ 40 (citing Ex. 1001, 4:27–30). However, Dr. Leger interprets this passage

differently, namely — it provides a general statement that one must compare the retroreflector to a standard or reference to obtain a measure of optical gain. Ex. 2104 ¶ 24. Following this general statement and in the context of a particular illustrative example, the '927 patent indicates that the reference has been chosen to be a Lambertian radiator. *Id.* As such, one of ordinary skill would have understood from this language that the '927 patent has chosen the Lambertian radiator as an illustrative reference only in the context of the particular example, and not as a way of determining optical gain in all cases. *Id.*

Patent Owner further asserts that Dr. Hesselink relies upon the plain meaning “gain” in construing “optical gain” to indicate a positive change. PO Resp. 11 (citing Ex. 1008 ¶ 44). Patent Owner argues, however, that, in the field of microwave antennas, for example, the “gain” of an antenna can be positive or negative. *Id.* For example, in the field of microwave antennas, the “gain” of an antenna can be positive or negative. *Id.* (citing Ex. 2104 ¶ 25). The Specification of the '927 patent explains that its teachings are applicable to the detection of microwave apparatus, such as antennas. *Id.* (citing Ex. 1001, 9:5–8). Thus, according to Patent Owner, one of ordinary skill would understand that the concept of “optical gain” as used in the '927 patent covers both an increase and a decrease in the reflected radiant flux density as compared to a standard or reference. *Id.* at 11–12 (citing Ex. 2104 ¶ 24).

Dr. Hesselink acknowledged Patent Owner’s argument that in various fields of science and engineering, the term “gain” may be employed to denote both positive and negative change, but testified that such an interpretation is not appropriate here. *See* Ex. 2119, 60:10–61:8.

Specifically, Dr. Hesselink testified that

“Gain” in general, unrelated to what is here, *my understanding of that from physics and optics is that “gain” and “loss” are two words that are opposite of each other*. “Gain” would mean that I would increase the value of something. “Loss” would mean I would have lost the value of something.

Ex. 2119, 60:22–61:3 (emphasis added); *see id.* at 61:13–16; *see also* WEBSTER’S SEVENTH NEW COLLEGIATE DICTIONARY 341 (1967) (Ex. 3002)¹ (the noun “gain” defined as “an increase in amount, magnitude, or degree; *specif*: the ratio of *increase* in output over input in an amplifier” (emphasis added)).

Patent Owner’s arguments notwithstanding, we conclude that the strongest evidence for construing the term “optical gain” comes from the Specification itself which defines the term. As the Federal Circuit has explained,

[The claims] are part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims. For that reason, claims must be read in view of the specification . . . [T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.

See Phillips v. AWH Corp., 415 F.3d 1303, 1320–21 (Fed. Cir. 2005) (the specification is “the single best guide to the meaning of a disputed term” and “acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication”); *In re Abbott Diabetes Care Inc.*, 696 F.3d 1142, 1149 (Fed. Cir. 2012) (any broadest reasonable construction must be consistent with the specification, and claim language should be read in

¹ This Final Written Decision does not reference Exhibit 3001.

light of the specification). Given the plain language of the claims, in particular the emphasis on “optical”; the testimony of the parties’ declarants, and the clear definition of the Specification, we are not persuaded here by Patent Owner’s argument that all disclosed embodiments should be embraced by our construction. “It is not necessary that each claim read on every embodiment.” *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010); *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 689 (Fed. Cir. 2008) (“[E]ach claim does not necessarily cover every feature disclosed in the specification. When the claim addresses only some of the features disclosed in the specification, it is improper to limit the claim to other, unclaimed features.”) (quoting *Ventana Med. Sys., Inc. v. Biogenex Labs., Inc.*, 473 F.3d 1173, 1181 (Fed. Cir. 2006)).

The ’927 patent includes a description of a radar system embodiment with respect to Figures 13 and 14. Ex. 1001, 9:25–57. The radar system is detected by means of the “retroreflection principles” of the invention. *Id.* at 9:25–27. However, the term “optical gain” is not used in connection with this embodiment. The term appears in the Specification only in connection with embodiments relying on what has traditionally been referred to as “optical.” WEBSTER’S SEVENTH NEW COLLEGIATE DICTIONARY 592 (1967) (Ex. 3002) (the adjective “optic” defined as “of or relating to vision or the eye” and the adjective “optical” defined as “relating to the science of optics” and “relating to vision”).

Finally, the claim terms must be construed in the context of the entire claim. The challenged claims are directed to either a method of or an apparatus for measuring or detecting characteristics of an “optical system.” As noted above, we construe “optical system” to mean “a collection of

optical elements including at least a lens and a reflective surface.” In this context, we conclude that “optical gain” is limited to the optical spectrum and does not apply to other portions of the electromagnetic spectrum, such as other electromagnetic waves used in radar systems. We, therefore, construe “optical gain” to mean “an increase in radiant flux density of reflected optical radiant energy.”

2. *Unchallenged Constructions*

We provided the following constructions in the Institution Decision:

(a) “‘focal plane’” as “‘a plane through the focus perpendicular to the axis of an optical element.’” Dec. Inst. 8.

(b) “‘retroreflected’” as “‘having undergone reflection of an incident ray in a manner such that the reflected ray is parallel to the incident ray of any angle of incidence,’ . . . wherein any angle of incidence is ‘within the field-of-view’ of the retroreflector.’” *Id.*

(c) “‘retroreflection’” as “‘reflection of an incident ray in a manner such that the reflected ray is parallel to the incident ray for any angle of incidence, . . . wherein any angle of incidence is ‘within the field-of-view’ of the retroreflector.’” *Id.*

(d) “‘optical system’” as “‘a collection of optical elements including at least a lens and a reflective surface.’” *Id.*

(e) “‘substantially concentric’” as “‘having an axis, or axes, aligned coaxially or nearly coaxially therewith.’” *Id.* at 9.

The parties do not challenge those constructions in the Patent Owner’s Response or in the Petitioner’s Reply. Nor do we find any reason to depart from those constructions in this Final Written Decision. Accordingly, we maintain each of those unchallenged constructions as the broadest

reasonable interpretation, consistent with the Specification, in this Decision.

Based on our analysis, we determine that no express claim construction is necessary for any remaining claim term.

H. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999)(citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966) and *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner asserts that one of ordinary skill in the art at the time of the filing of the '729 patent as having either:

(1) a Bachelor's of Science Degree in Physics, Optics, Electrical Engineering, or a related field with coursework in Optics technology, Photonics technology, or related technologies, either in industry, academia, or research, or (2) a Master's degree in Physics, Optics, Electrical Engineering, or a related field with coursework in Optics or Photonics.

Pet. 26–27 (citing Ex. 1008 ¶ 32) (emphasis added).

Patent Owner asserts that one of ordinary skill in the art in 1967 would have “held a Bachelor of Science and Master of Science Degrees in either Physics or Electrical Engineering with a focus on optics, *and* additionally, at least two to three (2-3) years of experience in Physics or Electrical Engineering optics research.” PO Resp. 4 (citing Ex. 2104 ¶ 10) (emphasis added).

Based on our consideration of the record, we find that the evidence as a whole supports Petitioner's broader description of the level of ordinary skill in the art. Accordingly, we adopt Petitioner's statement of the ordinary skill in the art.

II. ANALYSIS

Petitioner contends that claims 37, 38, 48, 49, 51–53, 55–58, 60, 61, 63, 64, 67–69, and 71 of the '927 patent are anticipated by Ando. Pet. 27; Pet. Reply 9–15. In the Patent Owner's Response, Patent Owner challenges Petitioner's contentions only with respect to claims 37, 38, 58, and 69, i.e., only the challenged claims requiring that "the reflected radiant energy has an optical gain." PO Resp. 33–37. As explained in the Scheduling Order, "any arguments for patentability not raised in the response will be deemed waived." Paper 9, 3 (discussing due date for Patent Owner's Response). Accordingly, Patent Owner has waived arguments relating to Petitioner's challenge of claims 48, 49, 51–53, 55–57, 60, 61, 63, 64, 67, 68, and 71.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A. Ando

Ando is directed to "[a] contactless probe system for determining the configuration of an object comprising a laser scanner scanning the surface of the object with a beam of light focused at a point which is a fixed distance from the scanner." Ex. 1007, 1:15–19.

Ando's Figure 1 is reproduced below.

FIG. 1

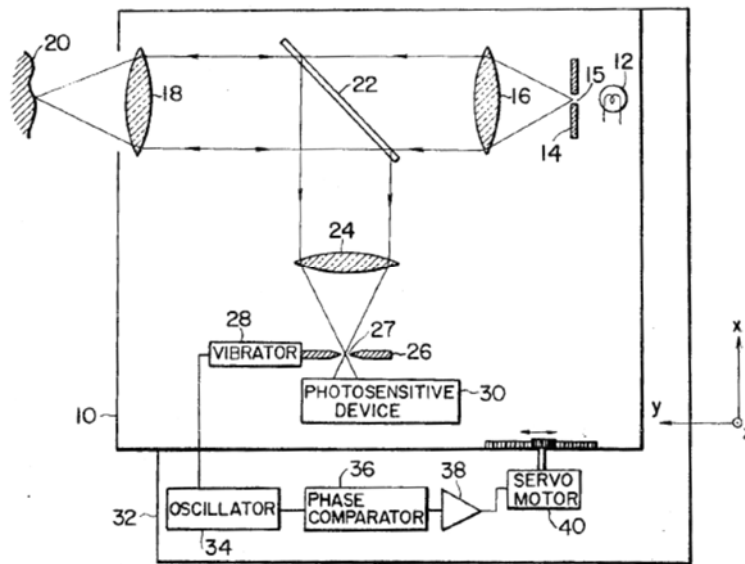


Figure 1 is a block diagram of a “contactless probe system” constructed in accordance with the teachings of Ando’s specification. Ex. 1007, 2:30–32. Ando explains that its “contactless probe system” determines the contour of the surface of object 20 by using servo control to adjust the probe system so as to keep light focused on the surface of the object as it is scanned. Ex. 1007, 2:18–26. Light source 12 may be an electric lamp or a laser. *Id.* at 1:15–19, 2:43–44. Servo control of the probe system is affected by superimposing a frequency on the radiation reflected from the object and passing through lens 24 by vibrating 28 pinhole 27 through which the received radiation passes. The probe system is moved so as to minimize the frequency imposed by vibrator 28. Ando states,

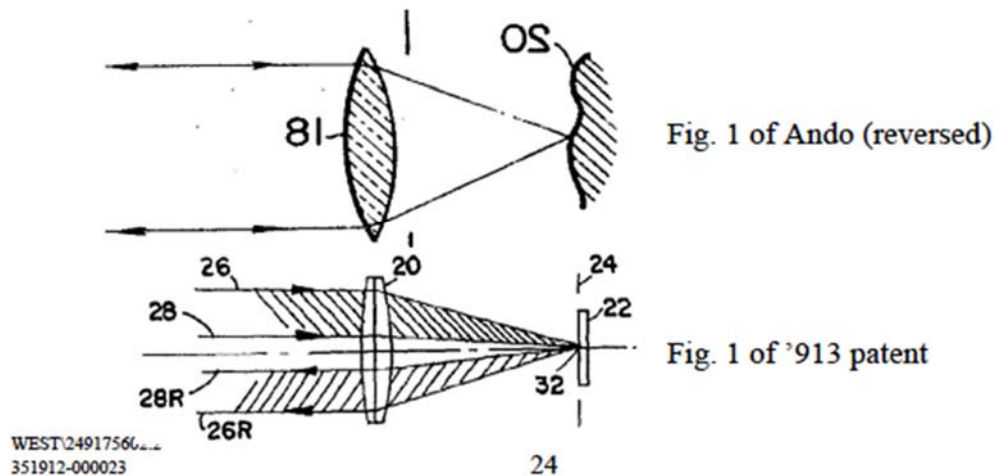
More specifically, when an illuminated point on the surface of the object **20** is at a distance from the lens **18** substantially equal to the focal length f_1 thereof, the corresponding beam of light passing through the lens **24** has a minimum diameter at the center of vibration about which the pinhole **27** is vibrating. *This causes*

the output from the photocell 30 to have no component of the fundamental frequency at which the pinhole 27 is vibrating whereby the phase comparator 34 provides a null output.

Id. at 3:49–57 (emphasis added). The movement of table 10 of the probe system, while object 20 is kept in focus, maps the contour, i.e., three-dimensional configuration, of object 20. *Id.* at 4:19–25. Thus, a characteristic, i.e., the surface contour, of object 20 is determined from the reflected light and manipulation of the probe system so as to maintain focus.

B. Independent Claim 37 and Dependent Claim 38

Claims 37 and 38 of the '927 patent are directed to apparatus for measuring the retroreflective characteristics of an optical system. Petitioner asserts that Ando discloses each limitation of claims 37 and 38, as set forth in its claim charts. Pet. 30–35. In particular, referring to Ando's Figure 1, Petitioner asserts that the claim limitation, "radiant energy is retroreflected with an optical gain by said optical system" is met by Ando's disclosure of a retroreflector having a reflective surface 20 in the focal plane of lens 18, wherein the incoming light to the lens 18 is collimated, "which shows radiant energy retroreflected with optical gain." *Id.* at 34. To illustrate this point, Petitioner reverses a portion of Ando's Figure 1 and juxtaposes it with Figure 1 of the '927 patent (Pet. 29), as follows:



According to Petitioner, both figures show incoming collimated light focused onto a surface of an object substantially in the focal plane of a lens, whereby reflected light is collimated by the lens, so that retroreflected light rays are parallel to the incoming light rays. Pet. 29–30 (citing Ex. 1008 ¶ 60).

Light from electric lamp 12 passes through pinhole 15, enters lens 16, and is collimated and directed through lens 18. Ex. 1007, 2:8–13, 37–52. Lens 18 then focuses this collimated light onto the surface of object 20. *Id.* at 2:52–63. Petitioner asserts that light reflected from the object 20 back through lens 18 is split by half-silvered reflector plate 22 and ultimately is received by photosensitive device 30. Pet. 28–30. A servo system comprising oscillator 34, vibrator 28, slit 27 of aperture plate 26, photosensitive device 30, phase comparator 36, amplifier 38, and servo motor 40 moves table 10 of the probe system so as to re-focus light continuously on object 20, thereby mapping its contour.

Petitioner argues that light reflected from object 20 is received with an optical gain because retroreflection is occurring and optical gain is “an

inherent necessary result from a retroreflector having a lens and a surface disposed in the focal plane of that lens for collimated incoming light.” Pet. 20, 34 (citing Ex. 1008 ¶¶ 45–48). According to Petitioner, when optical gain is present in the retroreflected light, then the retroreflected light ultimately received by photosensitive device 30 necessarily must have an optical gain also. *Id.* We agree.

Patent Owner asserts that Ando fails to disclose at least one limitation of claim 37. PO Resp. 35. In particular, Patent Owner asserts that one of ordinary skill would understand the recitation in claim 37 that “radiant energy is retroreflected with an optical gain by said optical system and detected by said detecting means” requires the “detecting means” to detect an optical gain of the retroreflected energy, i.e., detecting a change in the radiant flux density of the retroreflected energy. *Id.* at 33. According to Patent Owner, because Ando does not disclose detecting optical gain, it would not anticipate this limitation. *Id.* at 34. In particular, Patent Owner notes that Ando relies upon analyzing the frequency content of an oscillatory output of the photosensitive device 30 rather than comparing flux density of two illuminated spots. *Id.* Further, Patent Owner relies on Dr. Leger’s explanation that

the operation of Ando’s comparator 36 does not even depend on the amplitude of the output of the photosensitive device 30 so long as the output of the photosensitive device 30 exhibits sufficient signal-to-noise ratio (SNR) to allow the phase comparator 36 to operate properly in analyzing the frequency and phase content of the oscillatory output of the photosensitive device.

Id. at 35 (citing Ex. 2104 ¶ 65).

Although we agree with Patent Owner's description of Ando's operation, we disagree with Patent Owner's conclusion that Ando does not disclose the disputed claim limitation. Specifically, we do not find sufficient evidence to read into claim 37 a requirement of detecting optical gain. The invention of the '927 patent involves discerning a retroreflector from its background. The retroreflector provides a brighter spot than does its background because of the concentration of flux caused by the retroreflector that makes it appear brighter. However, that key feature is missing from claim 37.

Claim 37 recites "whereby said radiant energy is retroreflected with an optical gain by said optical system." However, the detection that follows simply requires detection of said retroreflected radiant energy. Because Ando detects such retroreflected radiant energy, we find that Ando discloses the single limitation of claim 37 disputed by Patent Owner.

Patent Owner asserts that claim 38 is not anticipated by Ando for at least the reasons provided in connection with claim 37. PO Resp. 35. Thus, we remain unpersuaded by Patent Owner's contention regarding claim 38 for the same reasons discussed regarding claim 37.

Based on our review of the record, as a whole, and our claim interpretations, we find that Petitioner has established by a preponderance of the evidence that Ando discloses each limitation of claims 37 and 38. Accordingly, we conclude that the preponderance of the evidence establishes that Ando anticipates claims 37 and 38.

C. Independent Claim 48 and Dependent Claims 49, 51–53, 55, 57, and 60

Claims 48, 49, 51–53, 55, 57, and 60 of the '927 patent are directed to methods of detecting characteristics or properties of an optical system based on a retroreflected beam. Petitioner asserts that Ando discloses each limitation of those claims, as set forth in its claim charts. Pet. 35–44. In particular, Petitioner asserts that Ando's photosensitive device 30 detects radiant energy retroreflected from the optical system, and Ando's phase comparator 36 compares the output of the photosensitive device with the output of an oscillator to determine the displacement of the object from the focal plane of the lens. *Id.* at 39. In the Patent Owner Response, Patent Owner does not address claims 48, 49, 51–53, 55, 57, and 60.

Having considered the record as a whole, we agree with Petitioner that Ando discloses the elements of the challenged claims. In particular, we find that Ando determines a characteristic of an object based on light reflected from its surface. Specifically, Ando determines the contour of the object, i.e., “a three dimensional configuration of an object.” See Ex. 1007, 1:69. Without the benefit of the reflected radiant energy, the Ando system could not servo focus on the surface of object 20, thereby mapping the contours of that surface. As noted above, when the portion of the surface of object 20, from which radiant energy is retroreflected, is in the focal plane, the retroreflected radiant energy is focused by lens 24 through the center of slit 27. Ando uses the reflected radiant energy as a carrier on which to impose a modulation by vibrating the slit 27 through which the reflected light passes. Thus, as Petitioner has explained (Pet. 39 (citing Ex. 1007, 2:18–26)), the reflected radiant energy detected by photosensitive device 30 is used by the phase comparator to determine at least the displacement of the object from

the focal plane of the lens, which is a characteristic or property of the optical system. Pet. 40 (citing Ex. 1007, 3:49–57).

Therefore, we find that Petitioner has demonstrated by a preponderance of the evidence that Ando’s disclosure meets the claim limitation requiring “detecting the reflected radiant energy after retroreflection to determine at least one characteristic or property of the optical system.”

Further, based on our review of the record, as a whole, and our claim interpretations, we find that Petitioner has demonstrated by a preponderance of the evidence that Ando discloses the remaining elements of claims 48, 49, 51–53, 55, 57, and 60. Accordingly, we conclude that the preponderance of the evidence establishes that those claims are anticipated by Ando.

D. Dependent Claim 58

Claim 58 of the ’927 patent recites that “[t]he method of claim 48, wherein the reflected radiant energy has an optical gain.” Because claim 48 recites, in part, “detecting the reflected radiant energy after retroreflection,” Patent Owner asserts that one of ordinary skill in the art would have understood that claim 58 requires detecting optical gain of the retroreflected radiant energy. PO Resp. 36. Patent Owner relies on the same rational asserted regarding the detection limitation of claim 37. *Id.* As discussed, Petitioner has established by a preponderance of the evidence (a) that Ando discloses detecting the reflected radiant energy after retroreflection, and (b) that the reflected radiant energy has an optical gain. Further, for the same reasons discussed with respect to claim 37, we do not find sufficient evidence to read into claim 58 a requirement of detecting optical gain.

Therefore, based on our review of the record, as a whole, and our claim interpretations, we find that Petitioner has demonstrated by a preponderance of the evidence that Ando discloses each and every element of claim 58. Accordingly, we conclude that the preponderance of the evidence establishes that claim 58 is anticipated by Ando.

E. Independent Claim 61 and Dependent Claims 63, 67, 68, and 71

Claims 61, 63, 64, 67, 68, and 71 of the '927 patent are directed to apparatus for detecting characteristics or properties of an optical system based on a retroreflected beam. Petitioner asserts that Ando's disclosure of each limitation of the claims is demonstrated in its claim charts. Pet. 30, 44–50. Patent Owner does not raise any contentions regarding these claims in the Patent Owner Response.

Having considered the record, as a whole, and our claim interpretations, we agree with Petitioner that Ando discloses each and every element of the challenged claims. Accordingly, we conclude that the preponderance of the evidence establishes that claims 61, 63, 64, 67, 68, and 71 are anticipated by Ando.

F. Dependent claim 69

Claim 69 of the '927 patent recites, “[t]he apparatus of claim 61, wherein the reflected radiant energy has an optical gain.” Because claim 61 recites, in part, “an optical system that directs radiant energy from the source toward a retroreflective surface that returns reflected radiant energy to the detector; wherein the detector determines at least one characteristic or property of [a retroreflective] optical system,” Patent Owner asserts that one of ordinary skill in the art would have understood that claim 69 requires the

detector to detect the optical gain associated with the reflected radiant energy received from the retroreflective surface. PO Resp. 37. Patent Owner relies on the same rationale asserted regarding the detection limitation of claim 37. *Id.* As discussed, Petitioner has established by a preponderance of the evidence that Ando discloses (a) an optical system that directs radiant energy from a source toward a retroreflective surface that returns reflected radiant energy to the detector, (b) a detector that determines at least one characteristic or property of a retroreflective optical system, i.e., contour, and (c) that the reflected radiant energy has an optical gain. Further, for the same reasons discussed with respect to claim 37, we do not find sufficient evidence to read into claim 69 a requirement of detecting optical gain.

Therefore, based on our review of the record, as a whole, and our claim interpretations, we find that Petitioner has demonstrated by a preponderance of the evidence that Ando discloses each and every element of claim 69. Thus, we conclude that the preponderance of the evidence establishes that claim 69 is anticipated by Ando.

For the foregoing reasons, we conclude that Petitioner has established by a preponderance of the evidence that claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 are unpatentable under 35 U.S.C. § 102(e) (pre-AIA) as anticipated by Ando.

III. MOTION TO AMEND

Having concluded that claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 are anticipated by Ando, we consider Patent Owner's Contingent Motion to Amend the claims of the '927 patent. Proposed amended claims are set forth in Appendix A to the Motion, filed as Paper 17 ("App."). Patent Owner supports its motion with the declaration of

Dr. Leger (Ex. 2104). Mot. 1.

As the moving party, Patent Owner bears the burden of proof to establish that it is entitled to the relief requested. *See* 37 C.F.R. § 42.20(c). Entry of proposed amendments is not automatic, but occurs only upon the patent owner having met the requirements of 37 C.F.R. § 42.121 and demonstrating, by a preponderance of the evidence, the patentability of the proposed substitute claims. *Nike, Inc. v. Adidas AG*, No. 2015-1719, 2016 WL 537609, at *3–*5 (Fed. Cir. Feb. 11, 2016) (“[T]he Board did not err by placing the burden on [Patent Owner] to establish patentability over the prior art of [Patent Owner]’s proposed substitute claims.”); *see Idle Free Systems, Inc. v. Bergstrom, Inc.*, IPR2012-00027, slip op. at 7–8 (PTAB June 11, 2013) (Paper 26, “*Idle Free*”) (Informative). For the reasons explained below, we conclude that Patent Owner has not met its burden with respect to proposed substitute new claims.

1. One-For-One Substitutions

Patent Owner’s proposed claims 72–89 represent a one-for-one substitution for original claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71, respectively. Mot. 1; App. 1–10; *see Idle Free*, Case IPR2012-00027, slip op. at 3–6 (Paper 26). Thus, the proposed substitutions satisfy 37 C.F.R. § 42.121(a)(3).

2. No Broadening of Scope

Proposed substitute claims in an *inter partes* review “may not enlarge the scope of the claims of the patent.” 35 U.S.C. § 316(d)(3); *see* 37 C.F.R. § 42.121(a)(2)(ii). In the Motion to Amend, each of the proposed substitute claims only add to the limitations of each corresponding original claim. No

limitations are removed. Thus, each proposed substitute claim properly narrows the scope of each respective original claim that it replaces.

3. Written Description Support

Pursuant to 37 C.F.R. § 42.121(b), a motion to amend in an *inter partes* review must set forth “[t]he support in the original disclosure of the patent for each claim that is added or amended,” and “[t]he support in an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” In particular, the limitations added to the challenged claims must be supported *individually* by the application, from which Patent Owner claims priority, and the substitute claims also must be supported *as a whole* by that application. *Nichia Corp. v. Emcore Corp.*, Case IPR2012-00005, slip op. at 4 (PTAB June 3, 2013) (Paper 27) (Representative)(emphasis in original).

Moreover, the Board recognized that the proposed substitute claims need not be described “*in haec verba*” in the original disclosure in order to satisfy the written description requirement. However, should the claim language does not appear *in ipsius verbis* in the original disclosure, a mere citation to the original disclosure without any explanation as to why a person of ordinary skill in the art would have recognized that the inventor possessed the claimed subject matter as a whole may be similarly inadequate. *Id.* (emphasis in original). Whether a patent claim is supported by an adequate written description is a question of fact. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1355 (Fed. Cir. 2010) (en banc).

Patent Owner asserts that each substitute claim finds written description support in the disclosure of U.S. Reissue Application No. 11/197,731 (Ex. 1002)(“the reissue application”) and in its priority

document, U.S. Patent Application No. 04/623,186 (Ex. 2118)(“the ’186 application”) which share the same disclosure.² Mot. 2. According to Patent Owner, based on the disclosure of the ’186 application, one of ordinary skill in the art would understand that the inventors had possession of the methods and apparatus of claims 72–89. *Id.* Petitioner disagrees. Opp. 2–10.

On this record and for the reasons set forth below, Patent Owner fails to demonstrate that there is adequate written description for the substitute claims in either the reissue application or the ’186 application.³

a. Proposed Amended Independent Claim 72

Patent Owner proposed the following amended claim 72 as a substitute for independent claim 37, wherein the added limitations are underlined, and the removed portions are bracketed:

72. Apparatus for measuring the retroreflective characteristics of an optical system consisting of at least a focusing means and a surface exhibiting some degree of reflectivity disposed substantially in the focal plane of said focusing means, said apparatus comprising a radiant energy source, detection means, [a] measuring means connected to said detection means, and [a] means for scanning an area to direct[[ing]] said radiant energy

² Patent Owner states, “[t]he ’927 Patent is a reissue from the ’731 Application, which was filed as a copy of U.S. Patent No. 6,603,134, which issued based on the ’186 Application, filed March 10, 1967.” Mot. 2 n.1. References are made to the page and line numbers of the ’186 Application, as filed. *Id.*

³ Because of the lack of adequate written description, we *deny* Patent Owner’s Motion to Amend with respect to the requested entry of the substitute claims, without reaching Petitioner’s challenges to those claims based on the references applied in the grounds asserted in the Petition or on the alleged prior art identified by Patent Owner in the Motion to Amend. Opp. 11–24; *see* Mot. 14–25.

produced by said source at said optical system, whereby said radiant energy is retroreflected with an optical gain by said optical system, and wherein a radiant flux density of the retroreflected radiant energy is detected by said detecting means and the output thereof is coupled to said measuring means, wherein a characteristic of the optical system is determined based on the optical gain by comparing the radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area.

App. 1–2.

Patent Owner asserts that “[s]upport for the proposed amendments to substitute claim 72, as well as [] the claim as a whole, can be found throughout the ’186 Application as filed.” Mot. 4. Patent Owner refers only to the following disclosure as an example of that support: “page 4, lines 5-8 and FIG. 12 of Exhibit 2118.” *Id.* Further, Patent Owner asserts that the declaration of Dr. Leger confirms that a person of ordinary skill in the art would have understood that the Specification of ’927 patent taught the invention recited in claim 72. *Id.* at 6. Specifically, Patent Owner quotes the following portion from Dr. Leger’s declaration:

In my opinion, substitute claims 72, 74, and 83 find support at page 2, lines 4-10, page 4, lines 5-8; page 5, lines 14-22, page 7, lines 5-24, page 8, lines 10-12, page 14, line 11 through page 15, line 5 of the priority document of the ’927 Patent. In particular, one of ordinary skill would have understood that the priority document discloses embodiments in which a retroreflective optical system, e.g., binoculars, is identified based on detecting optical gain by comparing a radiant flux density of the retroreflected radiant energy to the radiant flux density of the reflected radiant energy as an area is scanned (e.g., by comparing radiant flux density of retroreflected radiant energy to that of another scanned area (e.g., with little or no retroreflectivity)) and that a characteristic of the retroreflective optical system can be determined based on the optical gain.

Id. at 6–7 (quoting Ex. 2104 ¶ 134).

Petitioner asserts that none of the references to detectors in the '927 patent are shown or described as detecting radiant flux density. Opp. 4. According to Petitioner, one skilled in the art would understand all of the disclosed detectors “detect radiant flux, not radiant flux density.” *Id.* (citing Ex. 1010 ¶ 35). Petitioner asserts that Dr. Leger admitted this fact by acknowledging that the figures in the '927 patent depicting detectors do not measure radiant flux density. *Id.* (citing Ex. 1009, 82:6–10, 85:18–86:6, 148:22–25).

Petitioner asserts further that Dr. Leger’s declaration testimony that the '927 patent discloses embodiments in which retroreflective optical systems are detected based on a comparison of radiant flux densities of the reflective radiant energy and reflected radiant energy from the scanned area is undermined by a number of admissions made by Dr. Leger during his cross-examination. *Id.* at 6–7. For example, Petitioner asserts that Dr. Leger admitted that it is not possible to practice “*comparing the radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area*” using only a detector that measures radiant flux. *Id.* at 7 (citing Ex. 1009, 158:7–159:5).

In addition, Petitioner asserts that the portions of the priority document cited by Patent Owner in support of the proposed amendments only describes the lens configurations of Figures 3 and 4, and that the cited Figure 12 is simply a block diagram showing detector 184 receiving reflected light. *Id.* at 5 (citing Mot. 4). According to Petitioner, none of the cited portions of the priority document “disclose a detector for detecting radiant flux density, nor comparing radiant flux densities to determine optical gain or a characteristic of the optical system.” *Id.* at 5–6.

In the Reply to Petitioner's Opposition, Patent Owner continues to assert that the priority document discloses radiant flux density detectors, and further asserts that a skilled artisan "would easily be able to determine radiant flux density from a measure of radiant flux through the known physical relationships and laws relating [to] the quantities," and that replacing a detector that detects radiant flux with one that detects radiant flux density "would have yielded very predictable and successful results." Reply 6 (citing Ex. 2125 ¶ 65; quoting Ex. 1010 ¶ 45).

Having considered the arguments and evidence, we agree with Petitioner that Patent Owner has not demonstrated adequate written description support for proposed amended claim 72. In particular, Patent Owner fails to establish that the '186 application supports the proposed added limitations reciting "wherein a radiant flux density of the retroreflected radiant energy is detected by said detecting means" and "wherein a characteristic of the optical system is determined based on the optical gain by comparing the radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area." As Petitioner asserted, the portions of the '186 application cited by Patent Owner do not describe those limitations. Opp. 5–6. Nor has Patent Owner explained how one of skill in the art would have understood from those cited portions of the '186 application that the inventor possessed the claimed subject matter.

Contrary to Patent Owner's assertion, Dr. Leger's declaration does not confirm that each of the proposed amendments find support in the '186 application. To begin, the portion of Dr. Leger's declaration cited by Patent Owner contains a conclusory opinion that is allegedly supported by disclosures in the '186 application. Ex. 2104 ¶ 134. Dr. Leger, however,

does not explain or otherwise justify why one of skill in the art would have understood from those cited portions of the '186 application that the inventor possessed the claimed subject matter. Further, we agree with Petitioner that Dr. Leger's testimony on cross-examination undermined his credibility with respect to written description support for the amended claim.

In particular, we consider Dr. Leger's cross-examination testimony regarding detecting radiant flux density and comparing radiant flux density that Petitioner listed:

- Making a determination "*by comparing the radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area*" as recited in claims 72, 74 and 83 requires measuring radiant flux density twice and comparing the measured values. ([Ex.]-1009 at 155:20-160:4.)
- Measuring radiant flux density requires measuring radiant flux through a known area, and dividing the radiant flux by the known area. (*Id.* at 50:9-51:4.)
- Without knowing the area (e.g. spot size hitting detector), radiant flux density cannot be measured or determined. (*Id.* at 53:21-54:1.)
- Even if the beam completely fills the detector, a utilization means (connected to the detector) which is not provided with the surface area of the detector is NOT capable of detecting or measuring radiant flux density. (*Id.* at 84:5-85:4.)
- It is not possible to practice "*by comparing the radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area*" using only a detector that measures radiant flux. (*Id.* at 158:7-159:5.)
- Detector 82 in Fig. 6, and detectors 92, 92A and 92B in Figs. 7, 7a and 7b, respectively, of the '927 patent only measure radiant flux. (*Id.* at 82:6-10; 85:18-86:6.)
- There is no disclosure in the '927 patent that detector 184 in Fig. 12 measures radiant flux density. (*Id.* at 148:22-25.)
- The '927 patent does not disclose a detector that itself compares radiant flux density values. (*Id.* at 163:20-25.)

- The '927 patent does not disclose a utilization means that compares radiant flux density values. (*Id.* at 164:20-24.)

Opp. 6–7. We find that testimony fails to provide a reasonable basis for Dr. Leger’s conclusory opinion that the priority document adequately supports the additional limitations of the amended claim.

We remain unpersuaded by Patent Owner’s assertion that one of skill in the art “would easily be able to determine radiant flux density from a measure of radiant flux through the known physical relationships and laws relating [to] the quantities,” and that replacing a detector that detects radiant flux with one that detects radiant flux density “would have yielded very predictable and successful results.” Reply 6. Even if true, those assertions do not establish that written description exists. *See Ariad*, 598 F.3d at 1352 (“a description that merely renders the invention obvious does not satisfy the [written description] requirement”).

Thus, considering and weighing the priority application, the testimonial evidence, and the parties’ arguments, we conclude that a preponderance of evidence compels a determination that there is insufficient written description in the priority application for the '927 patent to support claim 72 with regard to the additional limitations *individually* or the substitute claim *as a whole*. Because claim 73 depends from independent claim 72, claim 73 also is not supported for at least the same reasons discussed regarding claim 72.

b. Proposed Amended Independent Claim 74

Patent Owner proposed the following amended claim 74 as a substitute for independent claim 48, wherein the added limitations are underlined:

74. A method of detecting characteristics or properties of an optical system based on a retroreflected beam, comprising: transmitting radiant energy at an optical system having retroreflective characteristics by scanning an area; receiving reflected radiant energy after retroreflection of the radiant energy; detecting an optical gain of the reflected radiant energy after retroreflection by comparing a radiant flux density of the radiant energy after retroreflection to that of a reference in the scanned area to determine at least one characteristic or property of the optical system.

App. 3–4.

Patent Owner asserts that “[s]upport for the proposed amendments, as well as to claim 74 as a whole, can be found throughout the ’186 Application as filed.” Mot. 5. Patent Owner refers only to the following disclosure as an example of that support: “page 7, lines 5-24 and FIG. 12 of Exhibit 2118.” *Id.* Further, Patent Owner asserts that the same paragraph of Dr. Leger’s declaration cited in support of claim 72 also confirms that a person of ordinary skill in the art would have understood that the Specification of ’927 patent taught the invention recited in claim 74. *Id.* at 6.

Petitioner asserts that the Specification of the ’927 patent does not describe detecting an optical gain by comparing radiant flux densities. Opp. 4. Rather, the Specification describes “calculating optical gain based on radiant flux of a retroreflected light *per steradian* (i.e. power per unit *solid angle*).” *Id.* (citing Ex. 1001, 3:66–4:44; Ex. 1009, 16:19–21; Ex. 1010 ¶ 34). Further, Petitioner asserts that the portions of the priority document

cited by Patent Owner in support of claim 74 only describe the lens configuration of Figures 3 and 4, and that retroreflectors direct more light back to the source than background objects. *Id.* at 3–4. In addition, as discussed regarding claim 72, Petitioner asserts that Dr. Leger’s declaration testimony is undermined by his admissions on cross-examination, which Petitioner asserts make clear that the ’927 patent does not disclose comparing radiant flux density values, or making any determinations based upon such comparisons. *Id.* at 7.

Having considered the arguments and evidence, and for similar reasons discussed with respect to claim 72, we agree with Petitioner that Patent Owner has not demonstrated adequate written description support for proposed amended claim 74. In particular, Patent Owner has not provided adequate support for the additional limitation of detecting an optical gain by comparing radiant flux densities.

Thus, considering and weighing the priority application, the testimonial evidence, and the parties’ arguments, we conclude that preponderance of evidence compels a determination that there is insufficient written description in the priority application for the ’927 patent to support claim 74 with regard to the additional limitations *individually* or the substitute claim *as a whole*. Because claims 75–82 depend from independent claim 74, those claims also are not supported for at least the same reasons discussed regarding claim 74.

c. Proposed Amended Independent Claim 83

Patent Owner proposed the following amended claim 83 as a substitute for independent claim 61, wherein the added limitations are underlined, and the removed portions are bracketed:

83. An apparatus for detecting characteristics or properties of a[[n]] retroreflective optical system based on a retroreflected beam, comprising: a source of radiant energy; a detector; and an optical system that scans an area to direct[[s]] radiant energy from the source toward a retroreflective [[surface]] optical system and returns reflected radiant energy to the detector; wherein the detector detects an optical gain of the reflected radiant energy to determine[[s]] at least one characteristic or property of the retroreflective optical system by comparing a radiant flux density of the retroreflected radiant energy to that of a reference in the scanned area.

App. 7–8.

Patent Owner asserts that “[s]upport for the proposed amendments, as well as to claim 83 as a whole, can be found throughout the ’186 Application as filed.” Mot. 6. Patent Owner refers only to the following disclosure as an example of that support: “page 7, lines 5-24 and FIG. 12 of Exhibit 2118.”

Id. Further, Patent Owner asserts that the same paragraph of Dr. Leger’s declaration cited in support of claims 72 and 74 also confirms that a person of ordinary skill in the art would have understood that the Specification of ’927 patent taught the invention recited in claim 83. *Id.* at 6–7.

As previously discussed, Petitioner asserts that one skilled in the art would have understood all of the disclosed detectors detect radiant flux, do not detect radiant flux density, and do not compare radiant flux densities to detect optical gain. Opp. 4–5, 7 (citing Ex. 1010 ¶ 35; Ex. 1009, 163:20–25). Rather, the Specification describes calculating optical gain based on radiant flux. *Id.* at 4 (citing Ex. 1001, 3:66–4:44; Ex. 1009, 16:19–21; Ex. 1010 ¶ 34).

Further, Petitioner asserts that the portions of the priority document cited by Patent Owner in support of claim 83 only describe the lens configuration of Figures 3 and 4, and that retroreflectors direct more light

back to the source than background objects. *Id.* at 5. Additionally, as discussed regarding claims 72 and 74, Petitioner asserts that Dr. Leger's declaration testimony is undermined by his admissions on cross-examination, which Petitioner asserts make clear that the '927 patent does not disclose comparing radiant flux density values, or making any determinations based upon such comparisons. *Id.* at 7.

Having considered the arguments and evidence, and for similar reasons discussed with respect to claims 72 and 74, we agree with Petitioner that Patent Owner has not demonstrated adequate written description support for proposed amended claim 74. In particular, Patent Owner has not provided adequate support for the additional limitation of a detector that detects an optical gain by comparing radiant flux densities.

Thus, considering and weighing the priority application, the testimonial evidence, and the parties' arguments, we conclude that preponderance of evidence compels a determination that there is insufficient written description in the priority application for the '927 patent to support claim 83 with regard to the additional limitations *individually* or the substitute claim *as a whole*. Because claims 84–88 depend from independent claim 83, those claims also are not supported for at least the same reasons discussed regarding claim 83.

IV. CONCLUSIONS

For the foregoing reasons, we conclude that Petitioner has established by a preponderance of the evidence that 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 are unpatentable under 35 U.S.C. § 102(e) (pre-AIA) as anticipated by Ando. We conclude further that Patent Owner has not demonstrated sufficient written description support for any of the proposed substitute claims.

V. ORDER

For the reasons given, it is:

ORDERED that claims 37, 38, 48, 49, 51–53, 55, 57, 58, 60, 61, 63, 64, 67–69, and 71 of the '927 patent are unpatentable under 35 U.S.C. § 102(e) (pre-AIA) as anticipated by Ando;

FURTHER ORDERED that Patent Owner's Contingent Motion to Amend is *denied*; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2014-01443
Patent RE40,927 E

PETITIONER:

Alan A. Limbach
Brent K. Yamashita
DLA PIPER LLP (US)
alan.limbach@dlapiper.com
brent.yamashita@dlapiper.com
OD-Toshiba-DLA-IPR@dlapiper.com

PATENT OWNER:

Theodosios Thomas
Stephen Tytran
OPTICAL DEVICES, LLC
tedt@optical-devices.com
slt@optical-devices.com