

y: Optical Devices, LLC
Thomas Engellenner
Pepper Hamilton LLP
125 High Street
19th Floor, High Street Tower
Boston, MA 02110
(617) 204-5100 (telephone)
(617) 204-5150 (facsimile)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOSHIBA CORPORATION and
TOSHIBA AMERICA INFORMATION SYSTEMS, INC.
Petitioner

v.

OPTICAL DEVICES, LLC
Patent Owner

Case IPR2014-01442
Patent RE043681

**PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR
INTER PARTES REVIEW OF U.S. PATENT RE43,681**

TABLE OF CONTENTS

	<u>Page</u>
Table of Contents	i
Table of Authorities	iv
Table of Exhibits	vi
I. INTRODUCTION	1
II. BACKGROUND OF THE ‘681 PATENT	2
III. A PERSON OF ORDINARY SKILL IN THE ART	12
IV. CLAIM CONSTRUCTION	13
A. “Focal Plane”	15
B. “Retroreflection”	16
C. “Optical Gain”	16
D. “Optical System”	18
E. “An Optical System Having Retroreflective Characteristics”	18
F. “Utilization System”	19
G. “Laser”	20
H. “Automatically”	22
I. “Track/Tracking”	22
V. THE PETITION FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD THAT ANY OF THE CHALLENGED CLAIMS ARE RENDERED OBVIOUS	23
A. Summary Of The Cited References	24
1. “Precision Laser Automatic Tracking System” by Lucy <i>et</i> <i>al.</i> (Ex. 1007)	24
2. U.S. Patent No. 3,385,971 of Fertig <i>et al.</i> (Ex. 1010)	26
3. U.S. Patent No. 3,144,926 of Edelman (Ex. 1011)	27
4. U.S. Patent No. 3,427,611 of Enenstein (Ex. 1009)	27
B. Challenge #1 – Non-Obviousness Of Claims 48, 50-53, 54, And 56-59 Over Lucy In View Of Fertig Or Edelman	28

	<u>Page</u>
1. The References Do Not Disclose A Method Or System That Includes A Laser And A Radiant Energy Source.....	28
2. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy	30
3. The References Do Not Disclose Automatically Directing a Laser	33
4. Petitioner Fails To Demonstrate That Dependent Claims 50 and 56 Are Obvious Over The References	34
5. Petitioner Fails To Demonstrate That Claims 51 and 57 Are Obvious Over The References	36
6. Claims 53 and 59 Are Not Obvious Because The References Do Not Characterize Any Surface Included In The Object.....	38
C. Challenge #2 – Non-Obviousness Of Claims 48, 50-54, and 56-59 Over Lucy And Enenstein In View Of Fertig Or Edelman	38
1. One Skilled In The Art Would Not Have Been Motivated To Combine Enenstein with Lucy As Proposed By Petitioner	39
2. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy	43
3. The References Do Not Disclose A Method Or System That Automatically Directs a Laser	44
4. Petition Fails To Demonstrate A Reasonable Likelihood That Dependent Claims 50, 51, 53, 56, 57, And 59 Are Obvious Over The Cited References	44
D. Challenge #3 – Non-Obviousness Of Claims 60-69 Over Lucy In View Of Fertig Or Edelman.....	45
1. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy	45

	<u>Page</u>
2. Lucy Does Not Disclose Automatically Tracking An Object	46
3. Petitioner Fails To Demonstrate That Dependent Claims 61 And 66 Are Obvious Over The References	47
4. Petitioner Fails To Demonstrate That Dependent Claims 62 And 67 Are Obvious Over The References	47
5. Petitioner Fails To Demonstrate That Dependent Claims 64 And 69 Are Obvious Over The References	48
E. Challenge #4 – Non-Obviousness Of Claims 49 and 55 Over Lucy And Enenstein In View Of Fertig Or Edelman.....	48
VI. PETITIONER PRESENTS REDUNDANT GROUNDS IN THE INSTANT PETITION AND THE CONCURRENTLY-FILED PETITION IN IPR2014-01441	49
VII. CONCLUSION.....	52

TABLE OF AUTHORITIES

	Page(s)
<u>CASES</u>	
<i>Becton, Dickinson & Co. v. Tyco Healthcare Group, LP</i> , 616 F.3d 1249 (Fed. Cir. 2010)	21, 29
<i>Bicon Inc. v. Straumann Co.</i> , 441 F.3d 945 (Fed. Cir. 2006)	14
<i>Canon Inc. v. Intellectual Ventures I LLC</i> , IPR2014-00535, Paper 9 (PTAB, September 24, 2014)	51
<i>Canon Inc. v. Intellectual Ventures I LLC</i> , IPR2014-00536, Paper 11 (PTAB, November 5, 2014)	51
<i>CCS Fitness, Inc. v. Brunswick Corp.</i> , 288 F.3d 1359 (Fed. Cir. 2002)	14, 19
<i>Endo Pharmaceutical, Inc. v. Depomed, Inc.</i> , IPR2014-00656, Paper 12 (PTAB, September 29, 2014)	14
<i>Engel Indus., Inc. v. Lockformer Co.</i> , 96 F.3d 1398 (Fed. Cir. 1996)	24
<i>Ex Parte Konstant</i> , Appeal No. 2009-001901, Decision on Appeal at 7 (BPAI Aug. 20, 2009)	29
<i>Grain Processing Corp. v. American-Maize Prods. Co.</i> , 840 F.2d 902 (Fed. Cir. 1988)	41
<i>In re NTP, Inc.</i> , 654 F.3d 1279 (Fed. Cir. 2011)	41
<i>In re Paulsen</i> , 30 F.3d 1475 (Fed. Cir. 1994)	14
<i>InTouch Tech., Inc. v. VGO Comm's, Inc.</i> , 2014 U.S. App. LEXIS 8745 (Fed. Cir., May 9, 2014)	41
<i>Inventio AG v. ThyssenKrupp Elevator Ams. Corp.</i> , 649 F.3d 1350 (Fed. Cir. 2011)	19
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	40, 41, 42
<i>Lantech Inc. v. Keip Machine Co.</i> , 32 F.3d 542 (Fed. Cir. 1994)	29

<i>Liberty Mutual Insurance Co. v. Progressive Casualty Insurance Co.</i> , CBM2012-00003, Paper 7 (PTAB, Oct. 25, 2012)	49, 50
<i>Lighting World, Inc. v. Birchwood Lighting, Inc.</i> , 382 F.3d 1354 (Fed. Cir. 2004).....	20
<i>Macronix Int’l v. Spansion LLC</i> , IPR2014-00106, Paper 13 (PTAB, Apr. 24, 2014)	14
<i>Merck & Co. v. Teva Pharms. USA, Inc.</i> , 395 F.3d 1364 (Fed. Cir. 2005).....	14
<i>Microsoft Corporation v. Depomed, Inc.</i> , IPR2014-00292, Paper 33 (PTAB, October 14, 2014).....	15
<i>MIT v. Abacus Software</i> , 462 F.3d 1344 (Fed. Cir. 2006).....	19
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	17
<i>Stumbo v. Eastman Outdoors, Inc.</i> , 508 F.3d 1358 (Fed. Cir. 2007)	14
<i>Unigene Labs, Inc. v. Apotex, Inc.</i> , 655 F.3d 1352 (Fed. Cir. 2011).....	40
<i>Universal Remote Control, Inc. v. Universal Electronics, Inc.</i> , IPR2013- 00152, Paper 8 (PTAB, Aug. 19, 2013)	13, 14

STATUTES

35 U.S.C. § 313	1, 20
35 U.S.C. § 314.....	23

OTHER AUTHORITIES

37 C.F.R. § 42.1(b)	49
37 C.F.R. § 42.100(b)	13
37 C.F.R. § 42.107	1
37 C.F.R. § 42.108(c).....	1
77 Fed. Reg. 48,756 (Aug. 14, 2012)	13

TABLE OF EXHIBITS

Exhibit #	Exhibit Description
2401	Petition for <i>Inter Partes</i> Review of U.S. Patent No. RE43,681, Case IPR2014-01441, Paper 1 (September 3, 2014)
2402	McGraw-Hill Dictionary of Scientific and Technical Terms, McGraw Hill, Inc., 5 th , 1994 (p. 785).
2403	The American Heritage Dictionary of The English Language, Houghton Mifflin Company, 1976 (pp. 89-90)
2404	Ninth New Collegiate Dictionary, Meriam-Webster, Inc. 1990 (p.1249)

**PATENT OWNER PRELIMINARY RESPONSE
PURSUANT TO 37 C.F.R. § 42.107**

Optical Devices, LLC (“Patent Owner”) respectfully submits this Preliminary Response in accordance with 35 U.S.C. § 313 and 37 C.F.R. § 42.107, in response to the Petition for *Inter Partes* Review of U.S. Patent No. RE43,681 (“the ‘681 Patent”) filed by Toshiba Corporation and Toshiba American Information Systems, Inc. (“Petitioner”). This Preliminary Response is timely, as it is being filed within three months of the mailing date of the Notice of Filing Date Accorded to Petition (Paper 4), mailed September 11, 2014.

I. INTRODUCTION

The Petition asserts four challenges to claims of the ‘681 Patent based upon various combination of references, each of which fails to establish that the claimed invention would have been obvious to one skilled in the art at the time of the invention. In each case, the Petition has failed to demonstrate a reasonable likelihood that the asserted combination(s) disclose each and every feature of the challenged claims or that one of ordinary skill in the art would have combined the references as suggested by the Petitioner to arrive at the claimed invention. As such, trial should not be instituted in this proceeding as the Petition has failed to demonstrate a reasonable likelihood that any of the challenged claims of the ‘681 Patent are invalid. *See* 37 C.F.R. § 42.108(c).

Should the Board decide to institute a trial, Patent Owner reserves the right to present additional arguments. In addition, Patent Owner reserves the right to provide evidence for antedating one or more of the cited references.

Further, the grounds raised by the Petitioner against the challenged claims are redundant relative to the grounds raised by the same Petitioner in a separate petition filed concurrently with the instant Petition. *See* IPR2014-01441, the Petition of which is submitted herewith as Exhibit 2401. Petitioner, however, has failed to articulate in either of its Petitions any meaningful distinction between the references relied upon with respect to their application to one or more claim limitations of the challenged claims. Should a trial be instituted based on the reference cited in one of the instant Petition and that of IPR2014-01441, the other Petition should therefore be denied as redundant.

II. BACKGROUND OF THE ‘681 PATENT

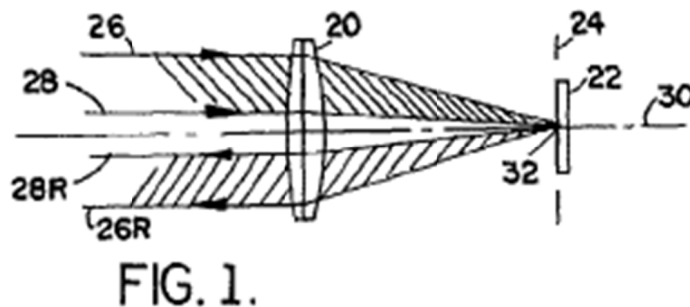
In one aspect, the ‘681 Patent is generally directed to methods and apparatus for *automatically directing a laser at an object*. (Ex. 1001 at 8:51-9:16.) The methods involve *transmitting radiant energy at an object* included in an optical system having retroreflective characteristics, wherein the optical system includes a lens and the object exhibiting some degree of reflectivity disposed substantially in a focal plane of the lens. (Ex. 1001 at Abstract and 1:34-67.) The methods further include *receiving reflected radiant energy after retroreflection* of the radiant

energy; and *directing automatically a laser at the object based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.* (Ex. 1001 at 9:8-13.) Apparatuses in accordance with this aspect include *a radiant energy source*, a *detector* configured to detect a received reflected radiant energy after retroreflection of the radiant energy; and *a utilization system configured to direct automatically a laser at the object based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.*

In another aspect, the '681 Patent is directed to methods and apparatus for *automatically tracking at least a portion of an object* within an optical system. (Ex. 1001 at 9:4-8.) The methods include *transmitting radiant energy* at an object included in an optical system having retroreflective characteristics, and *receiving reflected radiant energy after retroreflection* of the radiant energy. The methods further include *automatically tracking the at least a portion of the object based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.* Apparatuses according to this second aspect of the invention includes a *radiant energy source* configured to transmit radiant energy at an object included in an optical system having retroreflective characteristics, *a detector configured to detect received reflected radiant energy after retroreflection of the radiant energy*, and a *utilization system configured to automatically track the at*

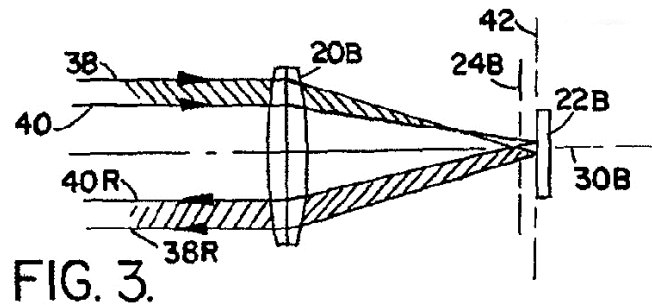
least a portion of the object based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.

With reference to FIG. 1 of the '681 Patent, which is reproduced below, an exemplary optical system is shown consisting of a lens 20 and a reflective surface 22 (e.g., a mirror) positioned in the focal plane 24 of the lens. (Ex. 1001 at 2:59-62).



Rays of radiation 26 and 28, respectively, are directed towards the system, and more particularly towards the lens 20, from a radiation source (not shown). It is noted with respect to FIG. 1 that for the purpose of clarity the incident rays are shown as being confined to the top half of the lens 20. The incident rays 26 and 28 are refracted by the lens 20 and focused at the focal point 32 of the lens, which focal point lies on the mirror 22. The rays are then reflected by the mirror so that the angle of reflection equals the angle of incidence, and are returned to the lower half of the lens where they are again refracted and emerge therefrom as retroreflected rays 26R and 28R. (Ex. 1001 at 3:9-19.)

With reference to FIG. 3 of the '681 Patent, which is reproduced below, the radiant flux density at the reflector surface can vary based on characteristics of components of the optical system, such as the position of the reflector and/or an imperfection of the lens.



In FIG. 3, the mirror 22B is positioned substantially in the focal plane 24B, but not exactly in the focal plane 24B. As shown in FIG. 3, “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. 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 at 3:64-4:19.) As can be appreciated from FIG. 3, the closer the mirror 22B is to being exactly in the focal plane, the smaller the circle of confusion and the narrower the retroreflected beam bounded by 38R and

40R. Since the circle of confusion and therefore shape of the returning beam will vary based on the position of the mirror 22B, the flux density of the returning light varies according to the positioning of the mirror 22B. This change in flux density is an example of optical gain referenced in the '681 Patent, as discussed in detail below.

The '681 Patent notes that “[i]n order to obtain a measure of the optical gain we must compare the retroreflector to a standard or reference.” (Ex. 1001 at 4:61-62.) With reference again to FIG. 3, the '681 Patent explains that if the irradiance produced by the radiating source at the collecting lens is 100 watts/cm^2 and the area of the lens is 100 cm^2 , then the radiant flux at focal plane is 10^4 watts. (Ex. 1001 at 4:32-35.) If one assumes the resolution of the optical system shown in FIG. 3 is 10^{-4} radians, the solid angle into which the retroreflected beam will be returned is about 10^{-8} steradians, which leads to a radiant intensity of 10^{12} watts/steradian. (Ex. 1001 at 4:45-48.) In contrast, a diffuse surface, known in the art as a Lambertian radiator, that would re-radiate 10^4 watts of incident radiant flux into a solid angle of $3.14 (\pi)$ steradians, provides a radiant intensity of about 3.1×10^3 watts/steradian. (Ex. 1001 at 4:64-5:5.)

The comparison of the radiant intensity of the retroreflector of FIG. 3 with that of a diffuse surface in the above example, shows that the retroreflector has an overall optical gain of 3.14×10^8 . (Ex. 1001 at 6-10.) The comparison with a

Lambertian radiator, of course, is only one example of the degree of optical gain that can be achieved through the use of a retroreflector.

The '681 Patent further discloses embodiments for directing a laser and/or tracking an object based upon retroreflected radiant energy. (Ex. 1001 at 8:46-9:16.) As shown in Figure 12 (reproduced below), the '681 Patent describes an embodiment in which radiant energy is transmitted at an optical instrument 196 (e.g., an optical system including a lens and the object exhibiting some degree of reflectivity when disposed substantially in a focal plane of the lens). As also shown in Figure 12, retroreflected radiant energy is detected by a detector 184.

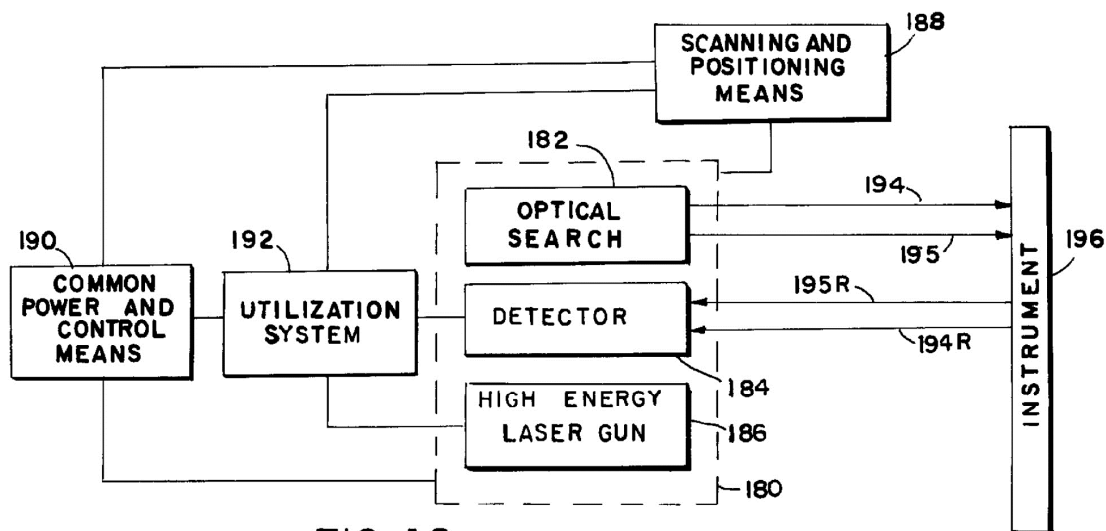


FIG. 12.

The output of the detector is provided to utilization system 192, which controls a scanning and positioning means 188 to track the location of the object.

(Ex. 1001 at 9:4-8.) The '681 Patent further discloses that a laser may be directed at the object. (Ex. 1001 at 9:8-13.)

The invention was a breakthrough in the art of optical measurements and detection. In fact, it was then considered so novel and important by the U.S. government that a secrecy order precluded issuance of the patent on this invention for over thirty years.

Petitioner challenges claims 48-69 of the '681 Patent, of which claims 48, 54, 60, and 65 are independent.

Independent claim 48 recites a method of directing a laser at an object within an optical system, comprising: *transmitting radiant energy at an object* included in an optical system having retroreflective characteristics, wherein the optical system includes a lens and the object includes at least a portion exhibiting some degree of reflectivity disposed substantially in a focal plane of the lens; *receiving reflected radiant energy after retroreflection of the radiant energy*; and directing automatically a laser at the object based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.

Claim 49, which depends from method claim 48, further recites causing the laser to alter the object.

Claim 50, which depends from method claim 48, further recites that the characteristic is determined from a *characteristic of the reflected radiant energy*,

while claim 51, which depends from claim 50, recites that the characteristic includes at least one of *an optical gain, an intensity level, a temporal characteristic, a temporal property, a spectral characteristic, and a spectral property*.

Claim 52, which depends from claim 48, recites that the characteristic is at least one of a relative position, a mechanical characteristic, and an electrical characteristic, while claim 53, which also depends from claim 48, recites that the characteristic is included in at least a portion of *a surface included in the object*.

Independent claim 54 recites an apparatus for directing a laser at an object within an optical system, comprising: *a radiant energy source* configured to transmit radiant energy at an object included in an optical system having retroreflective characteristics, wherein the optical system includes a lens and the object includes at least a portion exhibiting some degree of reflectivity disposed substantially in a focal plane of the lens; *a detector configured to detect received reflected radiant energy after retroreflection* of the radiant energy; and *a utilization system configured to direct automatically a laser at the object based on a characteristic of the at least a portion of the object* determined from the reflected radiant energy.

Claim 55, which depends from claim 54, further recites that the apparatus includes a power source configured to cause the laser to alter the object.

Claim 56, which depends from apparatus claim 54, further recites that the utilization means operates based on a *characteristic of the reflected radiant energy*, while claim 57, which depends from claim 56, recites that the characteristic includes at least one of *an optical gain*, *an intensity level*, *a temporal characteristic*, *a temporal property*, *a spectral characteristic*, and *a spectral property*.

Claim 58, which depends from claim 54, recites that the characteristic is at least one of a relative position, a mechanical characteristic, and an electrical characteristic, while claim 59, which also depends from claim 54, recites that the characteristic is included in at least a portion of *a surface included in the object*.

Independent claim 60 recites a method of automatically tracking at least a portion of an object within an optical system, comprising: *transmitting radiant energy at an object* included in an optical system having retroreflective characteristics, wherein the optical system includes a lens and the object includes at least a portion exhibiting some degree of reflectivity disposed substantially in a focal plane of the lens; *receiving reflected radiant energy after retroreflection of the radiant energy*; and *automatically tracking the at least a portion of the object based on a characteristic of the at least a portion of the object* determined from the reflected radiant energy.

Claim 61, which depends from method claim 60, further recites that the characteristic is determined from a *characteristic of the reflected radiant energy*, while claim 62, which depends from claim 61, recites that the characteristic includes at least one of *an optical gain, an intensity level, a temporal characteristic, a temporal property, a spectral characteristic, and a spectral property*.

Claim 63, which depends from claim 60, recites that the characteristic is at least one of a relative position, a mechanical characteristic, and an electrical characteristic, while claim 64, which also depends from tracking method claim 60, recites that the characteristic is included in at least a portion of *a surface included in the object*.

Independent claim 65 recites an apparatus for tracking at least a portion of an object within an optical system, comprising: *a radiant energy source* configured to transmit radiant energy at an object included in an optical system having retroreflective characteristics, wherein the optical system includes a lens and the object includes at least a portion exhibiting some degree of reflectivity disposed substantially in a focal plane of the lens; *a detector configured to detect received reflected radiant energy after retroreflection* of the radiant energy; and *a utilization system configured to automatically track the at least a portion the object*

based on a characteristic of the at least a portion of the object determined from the reflected radiant energy.

Claim 66, which depends from apparatus claim 65, further recites that the utilization means operates based on a *characteristic of the reflected radiant energy*, while claim 67, which depends from claim 66, recites that the characteristic includes at least one of *an optical gain, an intensity level, a temporal characteristic, a temporal property, a spectral characteristic, and a spectral property.*

Claim 68, which depends from claim 65, recites that the characteristic is at least one of a relative position, a mechanical characteristic, and an electrical characteristic, while claim 69, which also depends from claim 65, recites that the characteristic is included in at least a portion of *a surface included in the object.*

III. A PERSON OF ORDINARY SKILL IN THE ART

Petitioner alleges that a person having ordinary skill in the art would have had either a (1) a Bachelor of Science degree in Physics, Optics, Electrical Engineering, or a related field with coursework in Optics or Photonics and at least one year of additional experience 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. (Paper 1 at 20; *see also* Ex. 1008 at ¶30.)

In Patent Owner's Preliminary Response in in IPR2014-00302 ("the '302 Proceeding") concerning related U.S. Patent No. RE042,913 ("the '913 Patent")¹, which shares the same specification as the '681 Patent, Patent Owner submitted that a person having ordinary skill in the art of the invention would have held a Bachelor of Science and Master of Science Degrees in either Physics or Electrical Engineering with a focus in Photonics, and additionally, at least two-three (2-3) years of experience in Physics or Electrical Engineering Photonics research. (Ex. 1005 at 12.)

For purposes of this paper, Patent Owner applies Petitioner's proposed standard without prejudice, and reserves its rights to present evidence and arguments in this proceeding or any other proceeding as to Petitioner's above definition or an alternative definition as to the level of ordinary skill in the field.

IV. CLAIM CONSTRUCTION

In an *inter partes* review, a claim of an unexpired patent is construed using the "broadest reasonable construction in light of the specification." 37 C.F.R. §42.100(b); *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Under the BRI standard, "[t]here is a 'heavy presumption' that a claim term carries its ordinary and customary meaning." *Universal Remote Control, Inc.*

¹ Petitioner filed Patent Owner's Preliminary Response (Paper 9) in IPR2014-00302 as Exhibit 1005 in the instant proceeding.

v. Universal Electronics, Inc., IPR2013-00152, Paper 8 at 6 (PTAB, Aug. 19, 2013) (quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). A “claim term will not receive its ordinary meaning, however, if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.” *Macronix Int’l v. Spansion LLC*, IPR2014-00106, Paper 13 at 6 (PTAB, Apr. 24, 2014) (quoting *CCS Fitness, Inc.*, 288 F.3d at 1366). However, “[a]ny special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision.” *Endo Pharmaceutical, Inc. v. Depomed, Inc.*, IPR2014-00656, Paper 12 at 6 (PTAB, September 29, 2014) (citing *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)).

Moreover, claims are to be construed “with an eye toward giving effect to all terms in the claim.” *Endo Pharmaceutical*, IPR2014-00656, Paper 12 at 8 (quoting *Bicon Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006)); *see also Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.”)). Claims should therefore be construed so as not to render limitations redundant or superfluous. *See Endo Pharmaceutical*, IPR2014-00656, Paper 12 at 8 (citing *Stumbo v. Eastman Outdoors, Inc.*, 508 F.3d 1358, 1362 (Fed.

Cir. 2007)); *see also Microsoft Corporation v. Depomed, Inc.*, IPR2014-00292, Paper 33 at 11-12 (PTAB, October 14, 2014).

Patent Owner proposes that the Board adopt the following constructions for the terms “focal plane,” “retroreflection,” “optical gain,” “optical system,” “an optical system having retroreflective characteristics,” “utilization system,” “laser,” “automatically,” and “tracking” in accordance with the claim construction standard applicable to *inter partes* review proceedings.

A. “Focal Plane”

Each of independent claims 48, 51, 60, and 65 recites the term “focal plane.” Patent Owner submits that the term “focal plane” should be construed as “a plane through the focus perpendicular to the axis of an optical element.” Support for this construction is based on the plain and ordinary meaning of this term. *See, e.g., McGraw-Hill Dictionary of Scientific and Technical Terms*, McGraw Hill, Inc., (5th ed., 1994), “focal plane” (Exhibit 2402).

This construction is also consistent with the Board’s construction of this term in the Decision Denying Institution of the ‘302 Proceeding, which was submitted as Exhibit 1006 in the instant proceeding by Petitioner. (Ex. 1006 at 8.)

Petitioner does not object to this construction being adopted in this proceeding. (Paper 1 at 13.)

B. “Retroreflection”

The term “retroreflection” should be construed 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.” Support for this construction can be found, e.g., at col. 1, lines 37-40, col. 3, line 9 to col. 4, line 4; col. 6, lines 55-68, and col. 7, lines 11-21 of the specification of the ‘681 Patent.

This construction is also consistent with the Board’s construction of this term in the ‘302 Proceeding. (Ex. 1006 at 8.)

Petitioner does not object to this construction being adopted in the instant proceeding, “with the caveat that, as expressly stated in the ’681 patent, this is true for any angle of incidence within the ‘field-of-view’ of the retroreflector.” (Paper 1 at 13-14.)

For purposes of this paper, Patent Owner applies Petitioner’s proposed construction without prejudice, but reserves its rights to present evidence and arguments in this or any other proceeding as to the proper construction of the term “retroreflection” within the meaning of the ‘681 Patent.

C. “Optical Gain”

Dependent claims 51, 57, 62, and 67 recite the term “optical gain.” Patent Owner submits that the term “optical gain” should be construed as “a change in radiant flux density of reflected radiant energy.” Support for this construction can

be found throughout the specification, e.g., at 3:9-5:45 of the ‘681 Patent. The Patent Owner notes that retroreflected radiant energy does not *necessarily* or *inherently* exhibit an optical gain. Rather, in order to exhibit optical gain, retroreflected radiant energy must show a change in its radiant flux density relative to the radiant flux density of other reflected radiant energy, e.g., reflection from a reference or a standard. (*See, e.g.*, Ex. 1001 at 4:61-62.)² In other words, the term “optical gain” should be given weight in construing the claims that recite this term independent of the term “retroreflection.”

² This interpretation of optical gain is consistent with the way this term is employed in the specification and the claims of U.S. Patent RE40,927 (“the ‘927 Patent”), to which the ‘681 Patent claims priority. *See, e.g., Phillips v. AWH Corp.* at 1314 (“Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claim terms”). For example, claim 48 of the ‘927 Patent recites “receiving reflected radiant energy after retroreflection of the radiant energy; and detecting the reflected radiant energy after retroreflection to determine at least one characteristic or property of the optical system,” while claim 58, which depends on claim 48, recites that “the reflected radiant energy has an optical gain.” Hence, the term “retroreflection” as recited in claim 48 should not be interpreted as necessarily or inherently exhibiting optical gain.

This construction is also consistent with the Board's construction of this term in the '302 Proceeding. (Ex. 1006 at 8-9.)

Petitioner has not proposed any construction for this term in the Petition.

D. "Optical System"

Patent Owner submits that this term should be given its plain and ordinary meaning in light of the specification. The term "optical system" should be construed as "a collection of optical elements including at least a lens and a reflective surface." Support for this construction can be found, e.g., at col. 2, lines 45-65; col. 3, lines 20-23; col. 5, lines 47-48 and 64-67; col. 8, lines 42-45; and FIGS. 1-4 and 6-12 of the specification of the '681 Patent.

This construction is also consistent with the Board's construction of this term in the '302 Proceeding. (Ex. 1006 at 9.)

Petitioner does not object to this construction being adopted in the instant proceeding. (Paper 1 at 14.)

E. "An Optical System Having Retroreflective Characteristics"

Each of independent claims 48, 54, 60, and 62 further recites the phrase "an optical system having retroreflective characteristics."

Patent Owner submits that this phrase should be construed in light of the specification to mean an optical system (as defined above) having a focusing element and reflective surface that is located substantially in the focal plane of the

focusing element, wherein the system is configured so that a ray incident on the focusing element and focused on the reflective surface is reflected along a path parallel to the incident ray for any angle of incidence. (*See, e.g.*, Ex. 1001 at 3:4-25, 5:45-63, 8:62-9:13, and FIGS. 1-4 and 6-12.)

Petitioner has not proposed any construction for this term in the Petition.

F. “Utilization System”

Independent apparatus claims 54 and 65 respectively recite a “utilization system configured to direct automatically...” and a “utilization system configured to automatically track.” Patent Owner disagrees with Petitioner’s assertion that these terms are means-plus-function claim elements under 35 U.S.C. § 112, ¶6.

First, use of the term “utilization system” rather than “means for” creates a presumption that § 112, ¶ 6 does not apply. *See CCS Fitness, Inc.*, 288 F.3d at 1369. Second, the term “utilization system” is not a “nonce word or verbal construct that is not recognized,” as was the case in *MIT v. Abacus Software*, 462 F.3d 1344, 1353 (Fed. Cir. 2006). *See Inventio AG v. ThyssenKrupp Elevator Ams. Corp.*, 649 F.3d 1350, 1357 (Fed. Cir. 2011), where the court concluded that it was error to treat “distributed control module” as a means-plus-function claim term. The failure to use the word ‘means’ in a claim limitation creates a strong presumption that 35 U.S.C. § 112, ¶6 does not apply. Rebutting this presumption requires meeting a very high standard: it must be demonstrated that “skilled

artisans, after reading the patent, would conclude that [the] claim limitation *is so devoid of structure* that the drafter constructively engaged in means-plus-function claiming.” *Inventio*, 649 F.3d 1350 at 1357 (emphasis added).

A claimed expression cannot be said to be devoid of structure if it is used “in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function.” *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1359-60 (Fed. Cir. 2004).

One skilled in art would understand, in view of the specification of the ‘681 Patent as a whole, that the term “utilization system” is used to describe a control system that processes detector signals and generates output control signals. Patent Owner submits that this phrase should be construed in light of the specification to mean *a control system configured to receive the output of a radiant energy receiver and generate control signals, e.g., for tracking an object or directing a laser*. Support for this construction can be found throughout the specification of the ‘681 Patent, *e.g.*, at 8:46-9:13.

G. “Laser”

The term “laser” as used in independent claims 48 and 54 (as well as dependent claims 49 and 55) has an ordinary and customary meaning in the art. A person having ordinary skill in the art would also understand the term as an

acronym for “Light Amplification by Stimulated Emission of Radiation.”

Petitioner offers no construction for this term.

Importantly, as used in the ‘681 Patent specification, the term “laser” refers to an element that is distinct from the “radiant energy source” that illuminates the object and causes reflection of radiant energy after retroreflection. For example, as shown in Figure 12 of the ‘681 Patent, the radiant energy source is depicted as element 182 (labelled “optical search”) and the laser is depicted as element 186 (labelled “high energy laser gun”). The radiant energy source can itself also be a laser, but it serves a distinctly different purpose than the laser referred to in claims 48, 49, 54, and 55.

Patent Owner disputes Petitioner’s assertion that it took the position, in an underlying ITC investigation, that a single source can serve as the radiant energy source and the laser. Thus, Patent Owner and Petitioner appear to be in agreement that the “laser” recited in claims 48, 49, 54, and 55 describes a distinct, separate element from the “radiant energy source” that is also recited in these claims. *See Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention.”) (internal citations and quotations omitted)); *see also Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404-05 (Fed. Cir. 1996) (concluding that where

a claim provides for two separate elements, a “second portion” and a “return portion,” these two elements “logically cannot be one and the same”).

H. “Automatically”

The term “automatically” is used in each of the challenged independent claims (*e.g.*, “to direct automatically a laser...” or “to automatically track...”). The term “automatically” has an ordinary and customary meaning in the art, namely, “*an action that occurs on its own without human intervention.*” This is consistent with dictionary definitions. See, for example, the definition of “automatic” from *The American Heritage Dictionary of the English Language*, Houghton Mifflin (1976): “*acting or operating in a manner essentially independent of external influence or control; self-moving.*” (Exhibit 2403.) Petitioner has offered no definition for this term.

I. “Track/Tracking”

The term “track” or “tracking” is used in independent claims 60 and 65 (*e.g.*, “to automatically track...”). The terms “track” and “tracking” has an ordinary and customary meaning in the art, namely, *to adjust for movement of an observed object*. This is consistent with dictionary definitions. See, for example, the definition of “track” from the *Ninth New Collegiate Dictionary*, Merriam-Webster (1990): “*to observe or plot the moving path of (spacecraft or missile) instrumentally.*” (Ex. 2404.) Petitioner has offered no definition for this term.

**V. THE PETITION FAILS TO DEMONSTRATE A REASONABLE
LIKELIHOOD THAT ANY OF THE CHALLENGED CLAIMS ARE
RENDERED OBVIOUS**

“The Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that 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).

In the Petitioner’s four asserted challenges, the Petitioner alleges that each of claims 48-69 of the ‘681 Patent is obvious over at least one of (1) the combination of Lucy and Fertig or Edelman, and (2) the combination of Lucy, Enenstein, and Fertig or Edelman. The Petitioner, however, has failed to prove that any of the challenged claims are obvious over either of the asserted combinations of alleged prior art references. In each case, the Petition has failed to demonstrate a reasonable likelihood that the asserted combination(s) disclose each and every feature of the challenged claims, and/or that one of ordinary skill in the art would have combined the references as suggested by the Petitioner to arrive at the claimed invention.

A. Summary Of The Cited References

1. “Precision Laser Automatic Tracking System” by Lucy *et al.* (Ex. 1007)

Lucy is a journal article entitled “Precision Laser Automatic Tracking System,” purportedly published in the journal of *Applied Optics* in 1966. (Ex. 1007). Lucy discloses an optical tracking device for tracking low accelerating targets such as satellites and airplanes. (Ex. 1007 at Abstract and at p. 517, col 1, 1st para.) Figure 1 of Lucy, which is reproduced below, depicts a block diagram of Lucy’s tracking system.

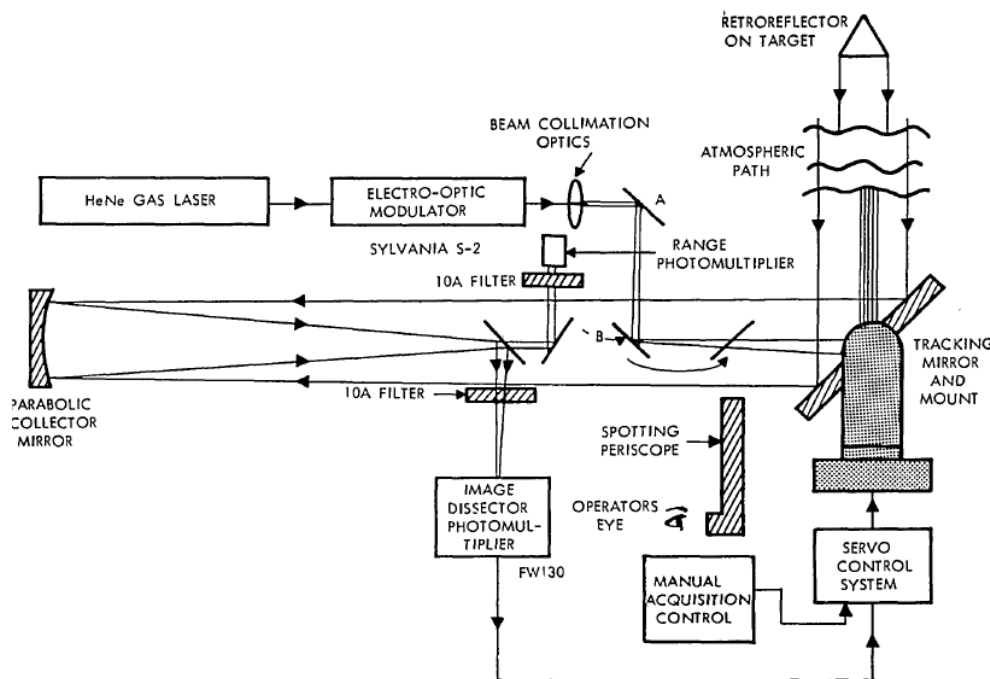


Fig. 1. Precision cw laser tracking system.

Lucy’s tracking system includes as its main components “a servo-controlled flat mirror, a large-aperture parabolic mirror, an image dissector, and manual control facilities.” (Ex. 1007 at p. 517, col. 2, 2nd para.) The manual control

facilities include a periscope and manual-control console for acquisition and manual tracking. (Ex. 1007 at p. 517, col. 2, 2nd para..) A 10-mW He-Ne gas laser is provided, the output of which “passes through an optical modulator to the collimator and a series of mirrors, and is incident finally on the servo-controlled flat mirror.” (Ex. 1007 at p. 517, col. 2, last paragraph.) A Sylvania S-2 electro-optic modulator can superimpose sinusoidal amplitude modulation on the laser. (Ex. 1007 at p. 518, col. 1, 1st full para.)

Lucy’s laser tracking system requires a human operator to look through a periscope and manually position the servo-controlled mirror to direct the laser at an object to be tracked. (Ex. 1007 at p. 518, col. 2, 1st full para.) After manual positioning such that reflected light from an object is captured by the flat “tracking mirror,” the reflected light is directed (via the parabolic “collecting mirror”) to a beam splitter, where a portion of the reflected light is sent to an image dissector photomultiplier and another portion is sent to a range photomultiplier. (Ex. 1007 at p. 518, col 1, .)

Importantly, the portion of the captured light that is sent to a range photomultiplier is used to calculate range, but the range photomultiplier is not connected to the servo-control system (Ex. 1007 at Figure 1.) The output of the range photomultiplier, i.e. the distance of the object, is calculated but there is no disclosure in Lucy that this property is used in the tracking procedure.

The portion of the captured light that is sent to the image dissector photomultiplier is used to create an electronic signal reflecting movement of the manually-acquired object, with such signal being delivered to the servo-control system. (Ex. 1007 at p. 518, col. 2, last full para. through para. bridging pp. 518-519.)

Lucy discloses that “[t]he precision laser tracker has been used to track a retroreflector carried by a light airplane, a small rocket covered with **Scotchlight retroreflective material**, the Echo I satellite, and a +7.5 visual magnitude star.” (Ex. 1007 at p. 523, col. 1, under the heading “Tracking Tests” (emphasis added).)

2. U.S. Patent No. 3,385,971 of Fertig *et al.* (Ex. 1010)

Petitioner cites to Fertig (Ex. 1010) merely as evidence that the Scotchlite material referenced by Lucy represents an optical system having retroreflective characteristics. (Paper 1 at 25.)

Fertig is directed to a fabric flaw detection system in which the fabric is disposed between a “retro-reflective material” and a light source. According to Fertig, a “[r]etro-reflective material is a material which effects reflection or return of light to the source along the same path as the incident light rays regardless of the angle of incidence.” (Ex. 1010 at 3:43-45.) Fertig indicates that retro-reflection “is most commonly accomplished through the use of small, spherical lenses or lenticulae that are placed over a specular reflecting surface.” (Ex. 1010 at 3:53-

54.) “Examples of such retro-reflective material are ‘Scotchlite’ brand reflective sheeting or tape manufactured by Minnesota Mining and Manufacturing Co.” (Ex. 1010 at 3:69-72.)

3. U.S. Patent No. 3,144,926 of Edelman (Ex. 1011)

Petitioner also cites to Edelman (Ex. 1011) as evidence that the Scotchlite material referenced by Lucy represents an optical system having retroreflective characteristics. (Paper 1 at 25.)

Edelman discloses a system for selectively diverting items that are on a conveyor belt based on a pattern of “retrodirective reflectors” associated with each item. (*See* Ex. 1011 at 1:8-12 and 1:34-41.) Edelman discloses that the retrodirective reflectors can be Scotchlite, which is described as glass balls operating as lenses to concentrate the incident light to a focal area which is highly reflective. (Ex. 1011 at 3:12-14.)

4. U.S. Patent No. 3,427,611 of Enenstein (Ex. 1009)

Enenstein is directed to a laser weapon system for disabling a space vehicle, such as an intercontinental missile. (Ex. 1009 at 1:9-11 and 2:5-7). Enenstein provides that “an array of spaced lasers are controlled to point at a single object. The individual lasers are of such intensity that they will not separately ionize the atmosphere so as to produce high loss in the transmitted energy. On the other hand, at the surface of the object upon which the lasers are all directed, the heating

effect is cumulative so that destruction or severe damage to the object may be accomplished.” (Ex. 1009 at 1:35-44.)

B. Challenge #1 – Non-Obviousness Of Claims 48, 50-53, 54, And 56-59 Over Lucy In View Of Fertig Or Edelman

The Petition alleges that claims 48, 50-54, and 56-59 are obvious over the combination of Lucy and either Fertig or Edelman, the two latter of which are cited by the Petitioner to merely demonstrate that the Scotchlite material disclosed by Lucy has retroreflective characteristics. The Petitioner, however, has failed to demonstrate a reasonable likelihood that the cited references render obvious any of these challenged claims.

1. The References Do Not Disclose A Method Or System That Includes A Laser And A Radiant Energy Source

Petitioner asserts that independent claims 48 and 54 are rendered obvious by Lucy in view of Fertig or Edelman “[t]o the extent the Board construes the ‘direct automatically a laser’ limitation in claims 48 and 54 to allow a single light source to satisfy both the radiant energy (source) and the laser claim limitations.” (Paper 1 at 20.)

As discussed above in Section IV(G), however, Patent Owner submits that such a construction would be improper in light of the recitation of both a “laser” and a “radiant energy source,” a position that Petitioner apparently agrees with. Because the “laser” element recited in independent claims 48 and 54 should be

construed to be a distinct element from the “radiant energy source” that is separately recited in claims 48 and 54 (*see e.g., Becton, Dickinson*, 616 F.3d at 1254), and neither Lucy nor the secondary references relied upon in this challenge disclose such an arrangement, this challenge must be denied. *Lantech Inc. v. Keip Machine Co.*, 32 F.3d 542, 547 (Fed. Cir. 1994) (“When a claim requires two separate elements, one element construed as having two separate functions will not suffice to meet the terms of the claim.”); *Ex Parte Konstant*, Appeal No. 2009-001901, Decision on Appeal at 7 (BPAI Aug. 20, 2009) (“Consistent with the principle that all limitations in a claim must be considered to be meaningful, it is improper to rely on the same structure in the Mulholland reference as being responsive to two different elements (the upper flange/upper support width and the outer face) in claims 1, 10, and 18.”).

As such, no combination of Lucy and the secondary references cited in Petitioner’s “Challenge #1” can render independent claim 48 (or its dependent claims 50-54) and independent claim 56 (and its dependent claims 57-59) obvious at least because none of the cited references discloses any “laser” element separate from a “radiant energy source.”

2. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy

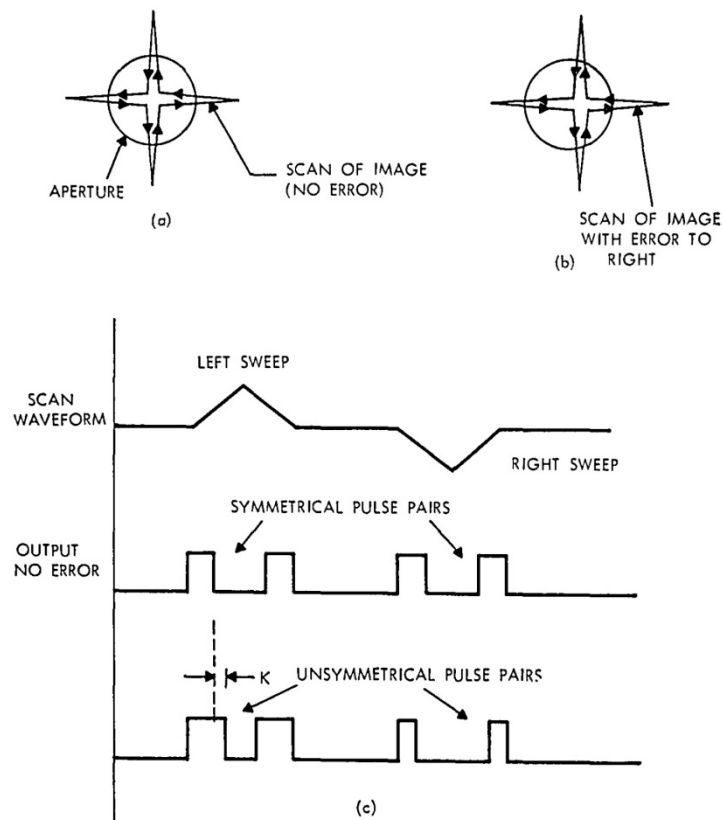
Even if the Board determines that Lucy's single light source (*i.e.*, the He-Ne gas laser) meets the separate recitations in claims 48 and 54 of a "laser" and a "radiant energy source," the Petition should nonetheless be denied with respect to these claims as the combination of Lucy and either Fertig or Edelman would still fail to meet the limitations in independent claims 48 and 54.

As noted above, independent claim 48 recites "directing automatically a laser at the object *based on a characteristic of the at least a portion of the object determined from the reflected radiant energy*." Similarly, independent claim 54 includes "a utilization system configured to direct automatically a laser at the object *based on a characteristic of the at least a portion of the object determined from the reflected radiant energy*."

Petitioner alleges that this limitation is met by Lucy's image dissector photomultiplier. (*See* Paper 1 at 29-30 and 34). Petitioner alleges that "[l]ight retroreflected from the target is received by an image dissector photomultiplier, which generates signals to control the servo control system, which in turn aims the laser at the target based upon characteristics (e.g. the relative position and distance from the tracking system) of the object." (Paper 1 at 29.)

Lucy, however, does not measure the energy of the reflected light to make this determination. In fact, the magnitude of the reflected energy is irrelevant to Lucy's tracking mechanism.

That is, Lucy's system simply collects light from a manually acquired reflective source and directs the collected light to the image dissector photomultiplier so as to determine the angular displacement of the source based on the movement of an aperture in a rosette pattern (as shown below in Fig. 4 of Lucy):



According to Lucy, if the received light is centered on the image dissector photomultiplier, the excursion of the aperture in the rosette pattern will yield symmetric pulse pairs. If, however, the beam is not centered, the pulses will be asymmetric. (See Ex. 1007, para. bridging 518-19 (“Each time the scan of the aperture passes through the image, a pulse is formed in the output. When the image is centered within the scan, this pulse train is symmetrical. When the image is displaced from the center of the scan, as in Fig. 4(b), an unsymmetrical pulse pair is generated...”).) That is, Lucy is essentially wiggling an aperture back and forth in two orthogonal directions to determine whether the reflected light remains centered on the image dissector photomultiplier.

There is no indication in Lucy, however, that the output of the image dissector photomultiplier indicates the *energy* of the reflected light. Thus, because the output of the image dissector photomultiplier merely provides information regarding the *symmetry of pulses* imposed on the reflected light by the rosette movement of its image dissector, Lucy does not characterize the object based on any *determination* of the reflected radiant *energy*.

Accordingly, the Petitioner’s challenge that claims 48 and 56 (and claims which depend therefrom) are obvious over Lucy in view of Fertig or Edelman must be denied for at least this reason.

3. The References Do Not Disclose Automatically Directing a Laser

Lucy does not disclose an *automatic* system as set forth in the claims. The apparatus and methods disclosed in Lucy without exception require a human operator to employ the disclosed apparatus in a method of directing a laser at an object. It is not possible to perform the disclosed method in Lucy without a human operator acquiring the target. Independent claim 48 provides the step of “directing *automatically* a laser at the object...” Each of dependent claims 50-53 directly or indirectly depends from claim 48 and contains this step. Likewise, independent claim 54 provides “a utilization system configured to direct *automatically* a laser at the object...” and each of dependent claims 56-59 directly or indirectly depends from claim 54 and includes this element.

Figure 1 clearly shows that a *spotting periscope* and the eye of a *human operator* are used to manually acquire and track the object with the manual acquisition control. The apparatus cannot function absent the manual acquisition of the target by the operator and therefore the operation of the apparatus in Figure 1 and the apparatus itself cannot direct “*automatically* a laser at the object” as set forth in each of claims 48 and 50-53 and claims 54 and 56-59, respectively.

Neither Fertig nor Edelman cures this fundamental deficiency in the teachings of Lucy to arrive at the claimed invention.

Accordingly, the Petitioner's challenge that claims 48 and 56 (and claims which depend therefrom) are obvious over Lucy in view of Fertig or Edelman must be denied for at least this reason.

4. Petitioner Fails To Demonstrate That Dependent Claims 50 and 56 Are Obvious Over The References

In addition to the reasons discussed above with respect to the independent claims from which claims 50 and 56 depend, *supra* Section V(B)(1)-(3), the Petition must also be denied with respect to claims 50 and 56 at least because the Petition has failed to demonstrate that the combination results in a method or system arranged as in the claims.

Claims 50 and 56 further limit their respective base claims (claims 48 and 54, respectively) by reciting that “*the characteristic of the at least a portion of the object* is determined from a characteristic of the reflected radiant energy,” with antecedent basis for this claim term being provided in the respective independent claim.

As discussed above, Petitioner alleges with respect to claims 48 and 54 that Lucy's image dissector photomultiplier represents the “receiving” element (as recited in claim 48) or the detector (as recited in claim 54). Indeed, in the claim charts on page 28 and 34 of the Petition, Figure 1 of Lucy is reproduced with markings added around the image dissector photomultiplier to depict the alleged

element of Lucy's system that performs the recited function or represents the claimed detector.

However, with reference to claims 50 and 56, the only characteristic of the object purportedly identified in the Petition (i.e., the distance of the target from the tracking system) is alleged to be determined from the characteristics of "signal power (*i.e.*, intensity level) and wavelength." (Paper 1 at 30 and 36).

However, Lucy does not disclose or suggest that the *distance* of the object from the tracking system is determined with the image dissector photomultiplier, which as noted above is identified by Petitioner as the "receiving" element or detector element of claims 48 and 54. To the contrary, the range photomultiplier of Lucy, which is a separate element and receives a different portion of the reflected light relative to the image dissector photomultiplier, is responsible for determining the range. Indeed, there is no indication in Lucy (and the Petitioner does not demonstrate) that the range photomultiplier is even connected to the servo-controlled tracking mirror, let alone how a determined signal power or wavelength could be utilized to adjust the tracking mirror to "direct automatically the laser," as alleged by the Petitioner with respect to independent claims 48 and 54. To the contrary, the range photomultiplier is not used to direct the laser of Lucy.

The other alleged characteristic of the radiant energy used to determine a characteristic of the object as recited in claims 50 and 56 is identified by the Petitioner as “*signal power* (i.e., intensity level).” The Petition, however, fails to demonstrate how “signal power” is utilized to determine a characteristic of the at least part of the object. To the contrary, Lucy explains that the *signal power* is used to determine the limitations of the system with respect to sensitivity. Formula 1 in Lucy, for example, includes factor $F(t)$, which corresponds to signal fading due to atmospheric turbulence. There is no indication in Lucy or the Petition how the signal power can be used to determine distance, let alone that the element of Lucy’s system that represents the “receiving” element (as recited in claim 48) or the detector (as recited in claim 54) determines the signal power.

The Petition must therefore be denied with respect to dependent claims 50 and 56 for at least these additional reasons.

5. Petitioner Fails To Demonstrate That Claims 51 and 57 Are Obvious Over The References

In addition to the reasons discussed above with respect to the independent claims from which claims 51 and 57 depend (Section V(C)(1)-(3)), and the reasons discussed above with respect to claims 50 and 56 (Section V(C)(4)), the Petition must also be denied with respect to claims 51 and 57 at least because the Petition has failed to demonstrate that the combination results in a method or system arranged as in the claims.

Claims 51 and 57 further limit their respective base claims (claims 50 and 56, respectively) by reciting that “the characteristic of the at least a portion of the object is determined from a characteristic of the reflected radiant energy is *at least one of an optical gain, an intensity level, a temporal characteristic, a temporal property, a spectral characteristic, and a spectral property.*” In its claim chart on page 31, however, Petition merely identifies “intensity level and spectral properties, such as wavelength” as representing the properties of the reflected radiant energy used to determine a characteristic of the object.

As with claim 50 and 56 above, the Petition has failed to demonstrate how the vaguely-referenced disclosures of Lucy teach the method and apparatus, as arranged in the claims. In fact, there is no indication in Lucy that the intensity level or spectral properties are determined by the image dissector photomultiplier (which is alleged by the Petitioner to represent the “receiving” element (as recited in claim 48) or the detector (as recited in claim 54)), let alone how a determined signal power or wavelength could be utilized to adjust the tracking mirror to “direct automatically the laser,” as recited in the claims.

The Petition must therefore be denied with respect to dependent claims 51 and 57 for at least these additional reasons.

6. Claims 53 and 59 Are Not Obvious Because The References Do Not Characterize Any Surface Included In The Object

Claims 53 and 59 further limit their respective base claims (claims 48 and 54, respectively) by reciting that the portion of the object that is characterized is “at least a portion of a surface included *in* the object.” (*emphasis added.*)

Petitioner erroneously equates “in” and “on” in its attempt to apply Lucy to these claims. The Petition merely relies upon a passage from Lucy that refers to light reflected from the surface of the object:

53. The method of claim 48, wherein the at least a portion of the object is included in at least a portion of a surface included in the object.	Lucy discloses this limitation. (TOSH-1008, ¶ 60.) Lucy discloses determining a characteristic of the object such as the relative position of the object (e.g. the distance of the target from the tracking system), including the surface of the object, based upon received radiant energy. (TOSH-1007, pp. 518, 519; TOSH-1008, ¶ 60.)
---	---

In contrast, the ‘681 Patent describes surfaces both “on” and “in” objects, *e.g.*, film within a camera. *See, e.g.*, Figure 11 and column 8, lines 35-45 of the ‘681 Patent.

The Petition, however, makes no distinction between “in” and “on” in its analysis of claims 53 and 59. Therefore, the Petitioner has failed to meet its burden as to these claims.

C. Challenge #2 – Non-Obviousness Of Claims 48, 50-54, and 56-59 Over Lucy And Enenstein In View Of Fertig Or Edelman

The Petition asserts that in the event that the Board construes the “directing automatically a laser” limitation in claims 48 and 54 to require a separate laser

from the source of radiant energy, claims 48, 50-54, and 56-59 should be found obvious over the combination of Lucy in view of Enenstein and further in view of Fertig or Edelman.

Enenstein is relied on by Petitioner for its disclosure of two, separate sources of radiant energy (i.e., a laser search radar for tracking an object and a laser array for damaging or destroying the tracked object). Notwithstanding the addition of Enenstein, the claimed invention would not be obvious to one having ordinary skill in the art viewing Lucy and Enenstein together with Fertig or Edelman. Indeed, the Petitioner has failed to demonstrate any rational reason that one of ordinary skill in the art would have combined the references as suggested, let alone that one of ordinary skill in the art would have arrived at the claimed inventions.

1. One Skilled In The Art Would Not Have Been Motivated To Combine Enenstein with Lucy As Proposed By Petitioner

A person of ordinary skill in the art would not have combined the teachings of Lucy regarding tracking an object *by applying Scotchlite reflective material thereto* and capturing the light reflected therefrom and Enenstein's teachings regarding a laser array weapons systems to arrive at the claimed inventions.

With regard to purported motivation to combine the references, Petitioner asserts that "Enenstein extends the capability disclosed by Lucy to include damage or destruction of the tracked target. (TOSH-1008, ¶ 72.) Thus, one of ordinary skill in the art seeking to locate, track and destroy an enemy vehicle would be

motivated to combine these references.” (Paper 1 at 40.) The portion of Petitioner’s expert declaration that is cited in the preceding passage does not, however, provide any additional analysis. Rather, Petitioner’s expert repeats the argument verbatim. (Ex. 1008 at ¶72.)

The Petition must be denied at least because the Petitioner’s proffered rationale for adding Enenstein’s destruction system to Lucy’s tracking system is illogical, and instead appears to be based solely on an ex post reconstruction of the claimed inventions. “Obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination.” *Unigene Labs, Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011) (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).)

“Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.* (citing *KSR*, 550 U.S. at 421). The Supreme Court in *KSR* explained that “because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known,” it is important to identify a reason that would have prompted a person of ordinary skill to combine the prior art elements in the way claimed in the challenged patent. *KSR*, 550 U.S. at 418-19.

Importantly, the Federal Circuit warns that “[c]are must be taken to avoid hindsight reconstruction by using ‘the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.’” *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (quoting *Grain Processing Corp. v. American-Maize Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988)); *see also KSR*, 550 U.S. at 421 (“A factfinder should be aware...of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning.”). To that end, “[a] reason for combining disparate prior art references is a critical component of an obviousness analysis; ‘this analysis should be made explicit.’” *InTouch Tech., Inc. v. VGO Comm’s, Inc.*, 2014 U.S. App. LEXIS 8745, *58 (Fed. Cir. May 9, 2014) (citing *KSR*, 550 U.S. at 418).

The Petition must be denied as the Petitioner proffered motivations fail to provide any rational reason why a person of ordinary skill in the art would have added Enenstein’s destruction system to Lucy’s tracking system as proposed by the Petitioner.

The Petitioner’s assertion that Lucy and Enenstein are similar because both use laser beams to track a “target” (e.g., an aircraft or rocket) disingenuously overlooks the clear distinction between the two systems and their uses. Not only is there no suggestion in Lucy that it would be desirable to destroy the object under

observation,³ Lucy instead is directed to tracking systems for tracking an object *by applying Scotchlite reflective material thereto* and capturing the light reflected therefrom. Enenstein, on the other hand, is directed to weapons systems employing a laser array to *destroy* “space vehicles,” such as intercontinental missiles.

That is, the Petitioner’s ultimate conclusion that “one of ordinary skill in the art seeking to locate, track, and destroy an enemy vehicle would be motivated to combine these references” ignores the fact that one of ordinary skill in the art would not have used Lucy’s system to “locate, track, or destroy” because Lucy requires affixation of a retroreflective material to the tracked object. That is, unless the skilled artisan also had a plan for how to attach Scotchlite material to incoming missiles, one skilled in the art would not have been motivated to combine Lucy and Enenstein as suggested by the Petitioner.

This challenge by the Petitioner should therefore be denied at least because the Petition has failed to provide any “articulated reasoning with some *rational* underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (emphasis added).

³ Likewise, neither Fertig nor Edelman disclose destroying objects that have retroreflective material affixed on their surface.

2. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy

Even if one would have been motivated to combine Lucy, Enenstein, and Fertig/Edelman, one would have failed to arrive at the invention recited in independent claims 48 and 54 and the combination would not produce a method or apparatus that directs “automatically a laser at the object based upon a characteristic of the at least a portion of the object *determined from the reflected radiant energy*.”

The reasons set forth above in Section V(B)(2) regarding the combination of Lucy in view of Fertig or Edelman apply with equal force to the Petitioner’s challenge to the same claims as being obvious over Lucy, Enenstein, and Fertig/Edelman. That is, Enenstein does not cure the deficiencies of Lucy and Fertig/Edelman with respect to independent claims 48 and 54, and moreover, the Petitioner relies on Enenstein for such teachings. That is, the Petition merely offers Enenstein should the Board construe the claims as reciting a second radiant energy source in addition to the laser. (Paper 1 at 39-40.)

Accordingly, the Petitioner’s challenge that claims 48 and 56 (and claims which depend therefrom) are obvious over Lucy and Enenstein in view of Fertig or Edelman must be denied for at least this additional reason.

3. The References Do Not Disclose A Method Or System That Automatically Directs a Laser

As noted above in Section V(B)(3), Lucy does not disclose an *automatic* system as set forth in the claims, and it is not possible to perform the disclosed method in Lucy without a human operator acquiring the target. The Petition also fails to articulate any reason why the addition of Enenstein's laser weapon array would thus allow for tracking in Lucy's system without a human operator acquiring the target.

Accordingly, the Petitioner's challenge that claims 48 and 56 (and claims which depend therefrom) are obvious over Lucy and Enenstein in view of Fertig or Edelman must be denied for at least this additional reason.

4. Petition Fails To Demonstrate A Reasonable Likelihood That Dependent Claims 50, 51, 53, 56, 57, And 59 Are Obvious Over The Cited References

In addition to the reasons discussed above with respect to the independent claims from which dependent claims 50, 51, 53, 56, 57, and 59 depend (*supra* Section V(C)(1)-(3)), the Petition must also be denied with respect to these dependent claims at least because the Petition has failed to demonstrate that the combination results in a method or system arranged as in the claims.

The arguments presented above with respect to the same dependent claims and the Petitioner's proposed ground of obviousness over Lucy in view of Fertig or

Edelman apply with equal force to the proposed challenge based on Lucy and Enenstein and further in view of Fertig or Edelman.

Accordingly, the Petition fails to demonstrate a reasonable likelihood that claims 50, 51, 53, 56, 57, and 59 are obvious for these additional reasons.

D. Challenge #3 – Non-Obviousness Of Claims 60-69 Over Lucy In View Of Fertig Or Edelman

The Petition alleges that claims 60-69 are obvious over the combination of Lucy and either Fertig or Edelman, the two latter of which are cited by the Petitioner to merely demonstrate that the Scotchlite material disclosed by Lucy has retroreflective characteristics. The Petitioner, however, has failed to demonstrate a reasonable likelihood that the cited references render obvious any of these challenged claims.

1. The References Do Not Disclose A Method Or System That Performs An Action Based On An Object Characteristic Determined From Reflected Radiant Energy

As noted above, independent claim 60 recites “automatically tracking at least a portion of the object *based on a characteristic of the at least a portion of the object determined from the reflected radiant energy*.” Similarly, independent claim 65 includes “a utilization system configured to automatically track at least a portion of the object *based on a characteristic of the at least a portion of the object determined from the reflected radiant energy*.”

The arguments presented above with reference to independent claims 48 and 54 (*see supra* Section V(B)(2)), apply with equal force to independent claims 60 and 65. Indeed, there is no indication that Lucy's system performs any action based on an object characteristic determined from reflected radiant *energy*. To the contrary, Lucy's image dissector photomultiplier device merely provides information regarding the *asymmetry of pulses* imposed on the reflected light by the rosette movement of its image dissector, and does not characterize the object based on any *determination* of the reflected radiant *energy*.

Accordingly, the Petitioner's challenge that claims 60 and 65 (and claims 61-64 and 66-69 which depend therefrom) are obvious over Lucy in view of Fertig or Edelman must be denied for at least this reason.

2. Lucy Does Not Disclose Automatically Tracking An Object

As noted above, Lucy does not disclose an automatic tracking system as set forth in the claims. Rather, as discussed above (Section V(B)(3)), Lucy's apparatus and methods, without exception, require a human operator to employ the disclosed apparatus in a method of tracking an object. It is not possible to perform the disclosed method in Lucy without a human operator acquiring the target.

The arguments presented above with reference to independent claims 48 and 54 (*see supra* Section V(B)(3)), apply with equal force to independent claims 60 and 65.

Accordingly, the Petitioner's challenge that claims 60 and 65 (and claims 61-64 and 66-69 which depend therefrom) are obvious over Lucy in view of Fertig or Edelman must be denied for at least this additional reason.

3. Petitioner Fails To Demonstrate That Dependent Claims 61 And 66 Are Obvious Over The References

Claims 61 and 66, like claims 50 and 56 discussed above (*supra* Section V(B)(4)), further limit their respective base claims by reciting that “*the characteristic of the at least a portion of the object is determined from a characteristic of the reflected radiant energy.*” Petitioner's claim chart regarding claims 61 and 66 merely refers to the analysis provided with respect to claim 50 (Paper 1 at 45 and 50). As such, the Petition is deficient with respect to claims 61 and 66 for at least the reasons discussed above in Section V(B)(4)).

4. Petitioner Fails To Demonstrate That Dependent Claims 62 And 67 Are Obvious Over The References

Claims 62 and 67, like claims 50 and 56 discussed above (*supra* Section V(B)(5)), further limit their respective base claims by reciting that “the characteristic of the at least a portion of the object is determined from a characteristic of the reflected radiant energy is *at least one of an optical gain, an intensity level, a temporal characteristic, a temporal property, a spectral characteristic, and a spectral property.*” Petitioner's claim chart regarding claims 62 and 67 merely refers to the analysis provided with respect to claim 50 (Paper 1

at 45 and 50). As such, the Petition is deficient with respect to claims 62 and 67 for at least the reasons discussed above in Section V(B)(5)).

5. Petitioner Fails To Demonstrate That Dependent Claims 64 And 69 Are Obvious Over The References

Claims 64 and 69, similar to claims 53 and 59 discussed above (*supra* Section V(B)(6)), further limit their respective base claims by reciting that “the at least a portion of the object is included in at least a portion of a surface included *in* the object.” Petitioner’s claim chart regarding claims 64 and 69 merely refers to the analysis provided with respect to claim 50 (Paper 1 at 46 and 69). As such, the Petition is deficient with respect to claims 64 and 69 for at least the reasons discussed above in Section V(B)(6)).

E. Challenge #4 – Non-Obviousness Of Claims 49 and 55 Over Lucy And Enenstein In View Of Fertig Or Edelman

As noted above, claim 49 is dependent on claim 48 and adds the further limitation of “causing the laser to alter the object.” Similarly, claim 55 is dependent on claim 54 and adds the further limitation of “comprising a power source configured to cause the laser to alter the object.”

Patent Owner’s reasoning as to why the combination of Enenstein and Lucy does not render base claims 48 and 54 obvious has been set forth above, and applies with equal force to this challenge. (*See supra* Section V(C)(1)). Thus, in addition to the same reasons for which the independent claims from which they

depend distinguish over the cited art, dependent claims 49 and 55 therefore distinguish over the cited references for at least this additional reason.

VI. PETITIONER PRESENTS REDUNDANT GROUNDS IN THE INSTANT PETITION AND THE CONCURRENTLY-FILED PETITION IN IPR2014-01441

Petitioner alleges in the instant Petition that claims 48-69 of the ‘681 Patent are obvious over a combination of references as discussed in detail above, while in IPR2014-01441 (“the ‘1441 Proceeding”), the Petitioner challenges claims 48, 50-54, and 56-69 of the ‘681 Patent as being anticipated U.S. Patent No. 3,506,839 of Ando *et al.* (Ex. 1007 in the ‘1443 Proceeding, “Ando”).

The grounds presented across the two petitions are redundant, and the Petitioner has failed to articulate a meaningful distinction with respect to the application of the references to any limitations of the challenged claims.

Part 42 of Title 37, Code of Federal Regulations, governs proceedings before the Board and 37 C.F.R. § 42.1(b) provides that “[t]his part shall be construed to secure the just, speedy, and inexpensive resolution of every proceeding.” In the case of *Liberty Mutual Insurance Co. v. Progressive Casualty Insurance Co.*, CBM2012-00003, Paper 7 (PTAB, Oct. 25, 2012), the Board addressed the issue of redundancy:

When promulgating the regulations, the Board considered “the effect of the regulations on the economy, the integrity of the patent system, the efficient administration of the Office, and the ability of the Office

to timely complete proceedings” as mandated by 35 U.S.C. § 326(b). Conducting a proceeding contrary to those statutory considerations would frustrate Congressional intent. We take this opportunity to note that multiple grounds, which are presented in a redundant manner by a petitioner who makes no meaningful distinction between them, are contrary to the regulatory and statutory mandates, and therefore are not all entitled to consideration. . . . A petitioner has the burden of proof to establish that it is entitled to the requested relief. 37 C.F.R. § 42.20(c).

CBM2012-00003, Paper 7 at 2.

In the *Liberty Mutual* case, the Board dismissed duplicative grounds as being horizontally redundant:

[Horizontal Redundancy] involves a plurality of prior art references applied not in combination to complement each other but as distinct and separate alternatives. All of the myriad references relied on provide essentially the same teaching to meet the same claim limitation, and the associated arguments do not explain why one reference more closely satisfies the claim limitation at issue in some respects than another reference, **and** vice versa. Because the references are not identical, each reference has to be better in some respect or else the references are collectively horizontally redundant.

CBM2012-00003, Paper 7 at 2 (emphasis in the original). Similarly, in a series of IPRs in which the petitioner concurrently filed three separate petitions to allege that various combinations of references rendered identical claims in the challenged

patent invalid, the Board indicated that “Petitioner has not shown, and we are not convinced, that any of the additional grounds based on [prior art references asserted in two of the proceedings] add substantively to the grounds on which we institute *inter partes* review [in one of the proceedings].” *Canon Inc. v. Intellectual Ventures I LLC*, IPR2014-00535, Paper 9 at 20 (PTAB, September 24, 2014). *See also Canon Inc. v. Intellectual Ventures I LLC*, IPR2014-00536, Paper 11 at 4 (PTAB, November 5, 2014) (“Patent Owner elected to organize its challenges to the ’406 patent across three Petitions, thus gaining the benefit of 180 pages to make its arguments, instead of the 60 pages provided for a single petition. In doing so, Petitioner chose to incur additional fees. Petitioner’s separate fee payments, however, did not assure them that three separate trials would be instituted.”)

In the related proceedings of the present case and the ‘1441 Proceeding, despite the 60 pages of additional briefing that Petitioner afforded itself by filing separate petitions, Petitioner failed to utilize any of this additional space to articulate any meaningful distinction between the cited references with respect to their application to the challenged claims. Indeed, the Petitions fail to even mention the reference(s) relied upon in the other proceeding, let alone “explain why one reference more closely satisfies the claim limitation at issue in some respects than another reference,” as required under *Liberty Mutual*.

Accordingly, should a trial be instituted based on the reference(s) cited in one of the instant Petition and that of IPR2014-01441, the redundant grounds based on the other reference(s) should be dismissed in the interest of timely and efficient administration of justice.

VII. CONCLUSION

For the foregoing reasons, the Petition fails to meet the threshold required for institution of an *inter partes* review. The Board should deny the Petition in its entirety and not institute proceedings in this matter. In the event that a trial is instituted in the instant proceeding or the '1441 Proceeding with respect to anticipation based on Lucy, the other petition should be dismissed with respect to the other as redundant.

Dated: December 11, 2014

Respectfully submitted,
By: /Thomas Engellenner/
Thomas Engellenner, Reg. No. 28,711
Pepper Hamilton LLP
125 High Street, 19th Floor
Boston, MA 02110
(617) 204-5100 (telephone)
(617) 204-5150 (facsimile)
Attorney for Patent Owner

CERTIFICATE OF SERVICE

I hereby certify that on December 11, 2014, a true and accurate copy of this paper, PATENT OWNER'S PRELIMINARY RESPONSE, and its exhibits, were served on the following counsel for Petitioner via email:

Alan A. Limbach
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303
(650) 833-2433 (telephone)
(650) 687-1182 (facsimile)
alan.limbach@dlapiper.com

Brent K. Yamashita
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303
(650) 833-2348 (telephone)
(650) 687-1206 (facsimile)
brent.yamashita@dlapiper.com

OD-Toshiba-DLA-IPR@dlapiper.com

Dated: December 11, 2014

Respectfully submitted,
By: /Thomas Engellenner/
Thomas Engellenner, Reg. No. 28,711
Pepper Hamilton LLP
125 High Street, 19th Floor
Boston, MA 02110
(617) 204-5100 (telephone)
(617) 204-5150 (facsimile)
Attorney for Patent Owner