

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CAMBRIDGE INDUSTRIES USA, INC.,

Petitioner,

v.

APPLIED OPTOELECTRONICS, INC.,

Patent Owner.

Case IPR2025-00435

Patent No. 10,042,116

**PATENT OWNER'S REQUEST TO DIRECTOR FOR DISCRETIONARY
DENIAL OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 10,042,116**

(Pursuant to Director's Memorandum of March 26, 2025)

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EXHIBITS

Exhibit No.	Description
2001	Acting Director Stewart’s March 26, 2025 Memorandum entitled “Interim Processes for PTAB Workload Management”
2002	Petitioner's Invalidity Contentions in <i>Applied Optoelectronics, Inc. v. Cambridge Industries USA, Inc.</i> , case no. 3-24-cv-01010 JD (N.D. CA)
2003	Scheduling Order in <i>Applied Optoelectronics, Inc. v. Accelight Technologies, Inc.</i> , case no. 4:24-cv-09041-HSG (N.D. CA)

I. INTRODUCTION

This request is submitted by Patent Owner Applied Optoelectronics, Inc. (“AOI”) to the Director of the United States Patent and Trademark Office (“USPTO”) pursuant to the Director’s March 26, 2025 Memorandum “Interim Processes for PTAB Workload Management” (the “Memorandum,” Exhibit 2001). This is AOI’s separate brief, pursuant to the Memorandum, requesting a discretionary denial of the petition (the “Petition”) of Cambridge Industries USA, Inc. (“Petitioner” or “CIG USA”) for an *inter partes* review (“IPR”) of U.S. Patent No. 10,042,116 (the “’116 Patent”, Exhibit 1001) entitled “Techniques for Direct Optical Coupling of Photodetectors to Optical Demultiplexer Outputs and an Optical Transceiver Using the Same”. This brief is timely as it is submitted within two months of the February 28, 2025 date on which the PTAB entered its Notice of Filing Date Accorded to Petition.¹ See Paper 3.

Pursuant to the Memorandum and the relevant factors, the Director should exercise their discretion and deny institution of an IPR of the ’116 Patent.

¹ AOI will separately file its Patent Owner’s Preliminary Response by the due date of May 28, 2025.

II. FACTUAL BACKGROUND

A. The '116 Patent

The application for the '116 Patent was filed on April 25, 2016 as application no. 15/137,823 with 20 claims, including three independent claims. See "'116 Patent File History", Exhibit 1002.

During prosecution, on June 7, 2017, the Office issued a restriction between claims 1-19 directed to an AWG chip and claim 20 directed to a method of forming an AWG chip. On August 7, 2017, AOI filed its response to the restriction, electing claims 1-19, and withdrawing claim 20.

On August 21, 2017, the Office issued its first substantive, non-final office action. The Office rejected independent claim 1 and dependent claims 2-11 as anticipated under 35 U.S.C. § 102(a)(1) by U.S. Patent No. 7,532,783 to Bai. The Office also rejected independent claim 12 and dependent claims 13-19 under 35 U.S.C. § 103 as obvious over U.S. Patent No. 7,941,053 to Dallesasse in view of Bai or U.S. Patent No. 7,058,263 to Welch, et al.

On October 6, 2017, AOI filed an Information Disclosure Statement, listing three references and a PCT Search Report.

On January 29, 2018, AOI filed an amendment in which it amended independent claims 1 and 12 and dependent claims 2, 4, and 13, and withdrew

claim 20. On January 29, 2018, AOI also filed an Information Disclosure Statement that listed U.S. Patent Application Publication No. 2016/0149662 to Soldano, et al; U.S. Patent Application Publication No. 2016/0349451 to Shen, et al; and three other references. On April 16, 2018 AOI filed an Information Disclosure Statement, listing two references. *Id.*

On June 4, 2018, the Office mailed a Notice of Allowance, in which all claims (1-19) were allowed and claim 20 was cancelled. The Office included a reason for allowance, that neither Bai alone nor Dallesasse in view of Bai disclosed all of the limitations of the claims. *Id.*

The '116 Patent issued on August 7, 2018 with 19 claims, including two independent claims.

B. The Litigation Between AOI and Petitioner

On February 20, 2024, AOI filed a lawsuit against Petitioner for patent infringement entitled *Applied Optoelectronics, Inc. v. Cambridge Industries, Inc.*, case no. 3:24-cv-01010-JD (N.D. CA) (the “Litigation”). The complaint alleges that Petitioner infringes eight of AOI’s patents, including the '116 Patent. AOI filed a First Amended Complaint on April 25, 2024.

On May 16, 2024, the parties exchanged initial disclosures. On June 6, 2024, AOI served its infringement contentions, stating that Petitioner infringes

claims 1, 3, 4, 10-13, 15, and 16 of the '116 patent. On October 15, 2024, Petitioner served its amended invalidity contentions. Petitioner's contentions state that claims 1, 3, 4, 10-13, 15, and 16 are invalid under either § 102 or § 103 on five grounds based on five different references, the following grounds of which are relevant here: (1) anticipated by or obvious over U.S. Patent No. 9,768,901 to Soldano; and (2) anticipated by or obvious over U.S. Patent Application Publication No. 2016/0349451 to Shen, et al. See "Petitioner's Invalidity Contentions", Exhibit 2002.

On August 8, 2024, the District Court entered its scheduling order setting the following pre-trial dates: a claim construction hearing on April 10, 2025, fact discovery cut-off on September 29, 2025, expert discovery cut-off on December 29, 2025, dispositive motion cut-off on January 28, 2026, and pre-trial conference on May 21, 2026. The court set a jury trial for June 8, 2026. See Scheduling Order, Exhibit 1015.

On November 7, 2024, Petitioner filed its answer and counterclaims against AOI. In its counterclaims, Petitioner alleges that each of the eight patents-in-suit is invalid. On November 15, 2024, AOI filed its answer to the counterclaims.

Pursuant to the District Court's Scheduling Order, between October 2024 and March 2025, AOI and Petitioner exchanged proposed terms for claim

construction, exchanged preliminary claim constructions and extrinsic evidence, filed a Joint Claim Construction Statement and Prehearing Statement, exchanged damage contentions, and filed opening, responsive, and reply claim construction briefs.

On March 19, 2025, AOI and Petitioner jointly filed a Notice to Court of Filing of Petitions for *Inter Partes* Review, informing the District Court that Petitioner had filed petitions for IPR of five of the eight patents-in-suit. On April 4, 2025, the District Court issued an order staying the case pending further order, vacating the claim construction hearing set for April 10, 2025, and requiring the parties to file joint status reports on the status of the PTAB proceedings every 90 days beginning on July 7, 2025.

C. The Additional Litigation Involving the '116 Patent

In addition to the Litigation against Petitioner, AOI has filed another patent infringement suit against another defendant, Accelight Technologies, Inc. (“Accelight”), entitled *Applied Optoelectronics, Inc. v. Accelight Technologies, Inc.*, case no. 4:24-cv-09041-HSG (N.D. CA) (the “Additional Litigation”). The complaint, filed on December 13, 2024, alleges infringement of six AOI patents, including the '116 Patent. Four of the other patents-in-suit are also the subject of the Litigation and are the subject of separate petitions for IPR that Petitioner filed

on January 17, 2025, the same day that Petitioner filed the Petition that is the subject of this request.² Thus, the Litigation with Petitioner and Additional Litigation share five patents-in-suit, all of which are the subject of separate petitions for IPR that Petitioner filed in January 2025.

On March 28, 2025, AOI and defendant Accelight jointly filed a Notice to Court of Filing of Petitions for *Inter Partes* Review, informing the District Court that Petitioner had filed petitions for IPR of five of the six patents-in-suit. In the Joint Case Management Statement, defendant Accelight stated that one of the issues in the case was whether the asserted claims of the patents-in-suit were invalid. At the case management conference held on April 22, 2025, the court indicated that the case would move forward, and stated that it would set claim construction deadlines.

On April 23, 2025, the court entered a Scheduling Order which set the following dates: invalidity contentions and documents on May 30, 2025; exchange of proposed terms for claim construction on June 13, 2025; exchange of

² AOI is filing Requests to the Director for Discretionary Denial of Petitioner's other four Petitions for IPR on grounds similar to this Request on the same day as this Request is filed.

preliminary constructions and extrinsic evidence on July 7, 2025; damages contentions on July 22, 2025; a Joint Claim Construction Statement and Prehearing Statement to be filed on July 30, 2025; claim construction discovery cut-off on August 29, 2025; opening, responsive, and reply claim construction briefs to be filed on September 16, 2025, September 30, 2025, and October 7, 2025, respectively; a technical tutorial on October 17, 2025; and a claim construction hearing on October 31, 2025. *See* Exhibit 2003.

D. The Petition for *Inter Partes* Review

On January 17, 2025, 11 months after AOI filed its complaint in the Litigation and seven months after AOI served its infringement contentions in the Litigation, Petitioner filed its Petition for IPR of the '116 Patent, PTAB Case IPR2025-00435. On the same date, Petitioner also filed petitions for IPR of four of the other AOI patents in the Litigation: U.S. Patent Nos. 9,523,826; 10,313,024; 10,788,690; and 10,379,301.

In the Petition for IPR of the '116 patent, Petitioner challenges claims 1-19. Petitioner asserts six grounds of invalidity: (1) claims 1-11 are anticipated by U.S. Patent No. 9,768,901 to Soldano; (2) claims 1-11 are anticipated by U.S. Patent Application Publication No. 2016/0349451 to Shen (based on the Shen provisional application); (3) claims 12-19 are obvious over Soldano in view of U.S. Patent No.

5,351,327 to Lurie or U.S. patent no. 4,978,193 to Tomita; (4) claims 12-19 are obvious over Shen in view of Soldano in further view of Lurie or Tomita; (5) claims 1-11 are obvious over Japan patent publication JP 2012-034314A to Kanazawa in view of Japan patent publication JP 2003-215371A to Sasaki; and (6) claims 12-19 are obvious over Kanazawa in view of Sasaki in further view of Lurie or Tomita. The Petition relies on the 95-page declaration of Petitioner's expert, Dr. Andrew G. Kirk. See Exhibit 1003. Petitioner's other four petitions for IPR of the other four patents also rely on a declaration of Dr. Kirk.

On February 28, 2025, the PTAB issued its Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response (Paper 3).

Pursuant to the Notice of Filing Date, Patent Owner's Preliminary Response is due three months from the Notice date, by May 28, 2025. Pursuant to the PTAB's "Consolidated Trial Practice Guide – November 2019," the PTAB will determine whether to institute an IPR within three months of the date the Patent Owner's Preliminary Response was filed or was due, by about August 28, 2025. Pursuant to 35 U.S.C. § 316(a)(11), the PTAB will set the trial date for the IPR within one year of the notice of institution, no later than about August 28, 2026.

**III. INSTITUTION OF *INTER PARTES* REVIEW SHOULD BE DENIED
PURSUANT TO THE DIRECTOR'S DISCRETION.**

The Director should exercise their discretion pursuant to the Memorandum of March 26, 2025 (Exhibit 2001) and deny institution of IPR on the '116 Patent.

The following factors support a discretionary denial:

- Art relied upon in the Petition was also cited by AOI in Information Disclosure Statements filed in the PTO (the “Office”) and considered by the Office during prosecution.
- There is significant overlap between the issues in the Petition and in the Litigation. Many of the same claims are challenged, and some of the grounds, the key art, and some of the arguments are substantially the same in the Petition as in the Litigation.
- There has been significant investment in the Litigation in that substantive issues have already been addressed by the parties.
- There are settled expectations in the enforcement of the '116 Patent in that the patent has been in force for over six years.
- Petitioner’s arguments on unpatentability are weak.
- The Petition relies heavily on the declaration of an expert.
- Petitioner and the defendant are the same party.

- The '116 Patent is one of the patents-in-suit in the Additional Litigation between AOI and defendant Accelight, and claim construction and the validity of the '116 Patent may well be adjudicated before the PTAB's decision in an IPR would be due.
- There are no relevant changes in the law that affect patentability.
- Four of the other five patents asserted by AOI in the Litigation are each the subject of an IPR filed by Petitioner on the same date as this Petition.

Each of these factors is discussed separately below in sections A through J.

A. The Petition is Based in Part on Art Presented to the Office.

The Director may consider whether the same or substantially the same prior art or arguments were previously before the Office during prosecution. 35 U.S.C. § 325(d); *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GMBH*, IPR2019-01469, Paper 6, pp.7-8 (Feb. 13, 2020) (precedential); *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, p. 17 (Sept. 6, 2017) (precedential).

Pursuant to § 325(d), the Board uses a two-part test for this factor: (1) whether the same or substantially the same art or arguments were previously presented to the Office; and, if the first part is met, (2) whether the petitioner has

shown that the Office erred in a material way with respect to patentability.

(*Advanced Bionics, supra*, at p. 8.) If the first part is met, and the petitioner does not demonstrate material error by the Office, “the Director generally will exercise discretion not to institute IPR.” *Id.* at p. 9.

“If reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability. At bottom, this framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown.”

Id.

The Board may use the *Becton, Dickinson* factors (*Becton, Dickinson and Company v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8, pp. 17-18 (December 15, 2017) (precedential section)) to apply the two-part *Advanced Bionics* test. *Advanced Bionics, supra*, at p. 9. These factors are non-exclusive and are to be “read broadly” (*id.* at p. 10): (a) the similarities and differences between the asserted art and the prior art involved during examination; (b) the cumulative nature of the asserted art and the prior art evaluated during examination; (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (d) the extent of the overlap between the arguments made during examination and the manner in which the petitioner relies on the prior art; (e) whether the petitioner has pointed out sufficiently how the examiner erred in their evaluation of the asserted

prior art; and (f) the extent to which additional evidence and facts presented in the petition justifies reconsideration of the prior art or arguments.

According to *Advanced Bionics*, factors (a), (b), and (d) are used to determine if the same or substantially the same art or arguments were previously presented to the Office. Factors (c), (e), and (f) are then applied to determine if the petitioner has shown that the Office made a material error. *Id.*

Here, Petitioner makes six arguments for invalidity of claims 1-19: (1) claims 1-11 are anticipated by U.S. Patent No. 9,768,901 to Soldano; (2) claims 1-11 are anticipated by U.S. Patent Application Publication No. 2016/0349451 to Shen (based on the Shen provisional application); (3) claims 12-19 are obvious over Soldano in view of U.S. Patent No. 5,351,327 to Lurie or U.S. patent no. 4,978,193 to Tomita; (4) claims 12-19 are obvious over Shen in view of Soldano in further view of Lurie or Tomita; (5) claims 1-11 are obvious over Japan patent publication JP 2012-034314A to Kanazawa in view of Japan patent publication JP 2003-215371A to Sasaki; and (6) claims 12-19 are obvious over Kanazawa in view of Sasaki in further view of Lurie or Tomita.

With respect to Soldano and Shen, the key art in four of the six grounds, the first part of the *Advanced Bionics* test is met because the same art was previously presented to the Office in Information Disclosure Statements. The Soldano Patent

Application Publication (which is essentially the same as Soldano) and Shen were both listed in an Information Disclosure Statement and considered by the Office (as indicated by the statement typed on the IDS “All references considered except where lined through”). See, File History, Ex. 1002, p. 22.

The second part of the *Advanced Bionics* test is also met. Factor (e) is not present or satisfied by Petitioner because Petitioner has not shown that the Office made a material error in evaluating Soldano and Shen -- Petitioner has failed to show how the Office erred in not finding the claims anticipated as Petitioner’s expert opines. Factor (f) is not present or satisfied by Petitioner because Petitioner offers no other evidence to justify reconsideration of the prior art or arguments.

With respect to Petitioner’s grounds that the claims are obvious over Lurie, Tomita, Kanazawa, or Sasaki, these references were not before the Office. However, Lurie, Tomita, Kanazawa, and Sasaki are substantially similar art to Soldano and Shen, and are therefore cumulative. For example, all fail to disclose “wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate” as required in claim 1 of the ’116 Patent. Thus, Lurie, Tomita, Kanazawa, and Sasaki do not change the conclusion that substantially the

same art was previously presented to the Office, and Petitioner cannot show material error by the Office.

Therefore, pursuant to *Advanced Bionics*, the Director should exercise their discretion and deny institution of IPR based on this factor.

B. The Issues in the Petition Have Significant Overlap with the Issues in the Litigation.

The Director may consider whether there is significant overlap between the issues raised in the Petition and in the Litigation. See *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, p. 6 (March 20, 2020) (precedential). “[I]f the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding, this fact has favored denial.”

Here, there is significant overlap in the issues raised in the Petition and in the Litigation.

First, many of the same claims are challenged in the Petition (claims 1-19) as are challenged in the Litigation (claims 1, 3, 4, 10-13, 15, and 16).

Second, the key art relied upon in the Petition (Soldano and Shen, the primary references in four of the six grounds) is also relied upon in the Litigation.

Third, two of the grounds for invalidity in the Petition (anticipation by Soldano and anticipation by Shen) are the same as two of the grounds asserted in the Litigation. In the Petition, Petitioner argues that claims 1-11 are anticipated by

Soldano; in the Litigation, Petitioner argues that claims 1, 3, 4, 10-13, 15, and 16 are anticipated by or obvious over Soldano. In the Petition, Petitioner argues that claims 1-11 are anticipated by Shen; in the Litigation, Petitioner argues that claims 1, 3, 4, 10-13, 15, and 16 are anticipated by or obvious over Shen.

Fourth, the arguments in the Petition are substantially the same as the arguments in the Litigation with respect to the key art relied upon in the Petition (Soldano and Shen). Petitioner's arguments in the Petition as to where the claim limitations are found in the prior art, on a limitation-by-limitation basis, are substantially the same in both proceedings. This is demonstrated by a comparison of the Declaration of Andrew G. Kirk in Support of Petition (Exhibit 1003 at pp. 36-44 as to Soldano and pp. 55-63 as to Shen) filed in the PTAB with Petitioner's Amended Invalidity Contentions and claim charts filed in the Litigation (Exhibit 2002 at Ex. E-5 as to Soldano and Ex. E-1 as to Shen).

Thus, there is significant overlap in the challenged claims, the grounds, the art, and the arguments. Moreover, the Litigation involves three other references and three other grounds not asserted in the Petition. And the Litigation also involves seven other patents. Thus, the Litigation will need to go forward regardless of whether IPR is instituted. The fact that the Litigation involves additional challenges to the '116 Patent weighs in favor of a denial. *See Next*

Caller Inc. v. Trustid, Inc., IPR 2019-00963, Paper 8, p. 12 (October 28, 2019)
(informative).

Accordingly, this factor favors denial of institution.

C. The Parties Have Invested in the Litigation by Addressing Substantive Issues.

Pursuant to the District Court's Scheduling Order, between October 2024 and March 2025, AOI and Petitioner exchanged proposed terms for claim construction, exchanged preliminary claim constructions and extrinsic evidence, filed a joint claim construction statement and pre-hearing statement, exchanged damage contentions, and filed opening, responsive, and reply claim construction briefs.

Thus, the parties have spent significant time and effort in conducting discovery, in the claim construction process, and in briefing claim construction.

This factor weighs in favor of denial of institution.

D. There Are Settled Expectations in the '116 Patent.

The '116 Patent was issued on August 7, 2018. The patent has been in force for over six years, almost one third of the life of the patent. Thus, there are settled expectations of the parties that the '116 Patent is valid and enforceable.

This factor weighs in favor of denial of institution. *See Memorandum, Exhibit 2001, at p. 2.*

E. Petitioner's Arguments on Unpatentability are Weak.

The Director may consider the strength of the petitioner's unpatentability challenge in determining whether to discretionarily deny institution of IPR.

Memorandum, Exhibit 2001, at p. 2; *Apple Inc. v. Fintiv, Inc.*, *supra*, pp. 14-15. If the merits are a "close call," that fact weighs in favor of denying institution if other factors favoring denial are present. *Id.* at p. 15.

Here, Petitioner is unlikely to succeed on the merits because the cited references fail to disclose all the limitations of the '116 Patent. The following are just a few sample instances of this failure.³

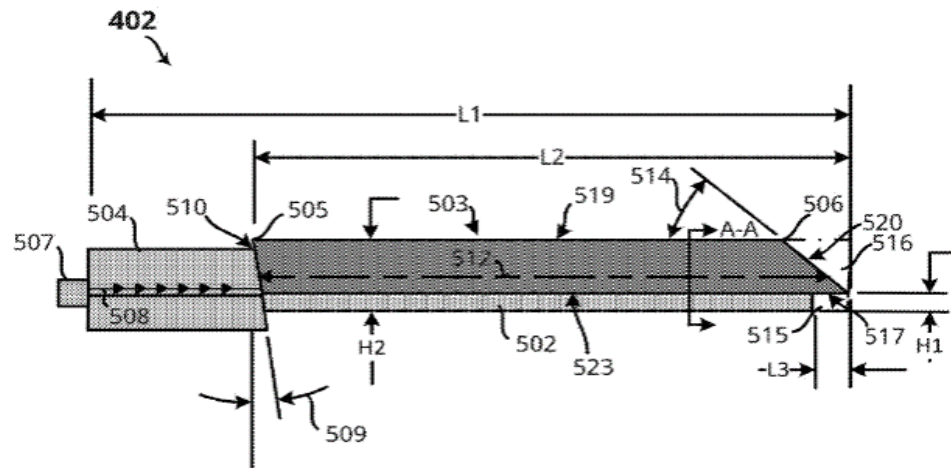
1. Overview of the '116 Patent

The '116 Patent is directed to an arrayed waveguide grating (AWG) device for use in an optical transceiver that and can de-multiplex an optical signal into

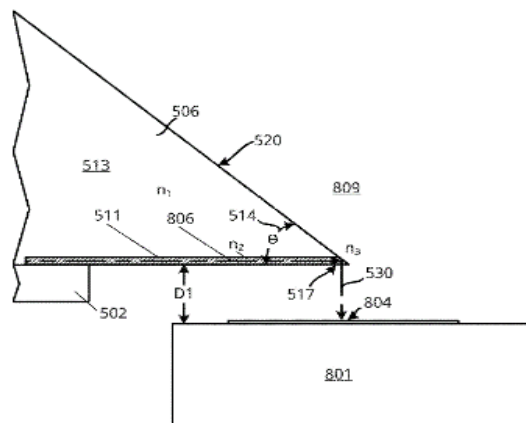
³ For purposes of this Request to the Director for Discretionary Denial, AOI will only discuss Soldano, Chen, and Kanazawa, the primary references relied upon by CIG USA in its Petition, and will only discuss a few specific examples of limitations the cited references fail to disclose.

N number of channel wavelengths. The AWG device can include an AWG chip, with the AWG chip providing a planar lightwave (PLC) circuit configured to demultiplex channel wavelengths and launch the same into output waveguides. A region of the AWG chip may be tapered such that light traveling via the output waveguides encounters an angled surface of the tapered region and reflects towards an output interface region of the AWG chip. Thus, detector devices may optically couple to the output interface region of the AWG chip directly, and can avoid losses introduced by other approaches which couple an output of an AWG to detectors by way of a fiber array or other intermediate device. Exhibit 1001, Abstract.

Figure 5A (reproduced below) shows one example of the direct-coupling AWG device 402. As shown, the AWG device 402 includes an AWG chip 503 having a first end 505 coupled to an input coupling region 504 and having a second end 506, with the second end 506 being proximal to a direct coupling interface 517 or region. The input coupling region 504 can include an optical coupling port 507, with the optical coupling port 507 being configured to receive and optically couple to a fiber of the optical coupling receptacle 215. *Id.* at 7:60-65.



The AWG device is formed on a substrate such as a silicon wafer or any other suitable substrate, and may include depositing sequential layers of cladding and core material thereon.” *Id.* at 3:35-38. The ’116 Patent explains “formation of the AWG chip 503 can include removing a portion of the substrate generally indicated at 515 to expose the output interface region 517. The exposed output interface region 517 may be polished to ensure a suitable optical coupling.” *Id.* at 9:46-49. Figure 8 shows this direct coupling end of the AWG device:



2. Soldano (Exhibit 1005)

Soldano (Exhibit 1005) is directed to an assembly of waveguide wavelength multiplexers and demultiplexers, together with continuous wave (CW) laser transmitters that interface to grating couplers on a silicon photonics chip, providing CW sources, multiplexed output and optionally multiplexed input, all using a single photonic lightwave circuit (PLC). Ex. 1005, Abstract.

In short, Soldano provides a method of coupling light in and out of silicon photonics chips using a PLC as an intermediate material. *Id.* at 2:64-66. As explained, “by fabricating waveguide multiplexers and demultiplexers in glass PLCs, multi-wavelength fibers are broken down to individual wavelengths before entering or exiting the silicon and so each grating coupler in the silicon can be used only at a single wavelength, compensating for the limited optical bandwidth of the silicon grating coupler.” *Id.* at 2:66-3:5.

FIG. 3 of Soldano shows the overall structure in accordance with aspects of the invention as follows:

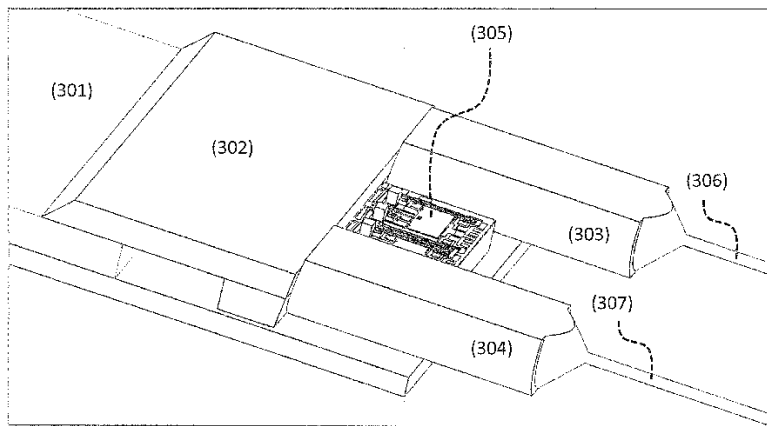


Fig 3

As explained in Soldano, multi-wavelength light enters through fiber 306. This fiber is glued into a capillary 303 that is aligned to the PLC 302. This light is then demultiplexed into four individual channels in the PLC 302. The other end of the PLC includes a structure for directing, or deflecting, this light down into the silicon photonics chip 301. A MEMS coupling structure 305 couples light from lasers into the PLC. *Id.* at 7:62-8:31.

FIG. 5 of Soldano shows a detail of the side polish of the PLC and the grating coupler:

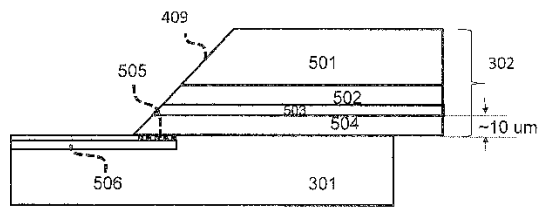


Fig 5

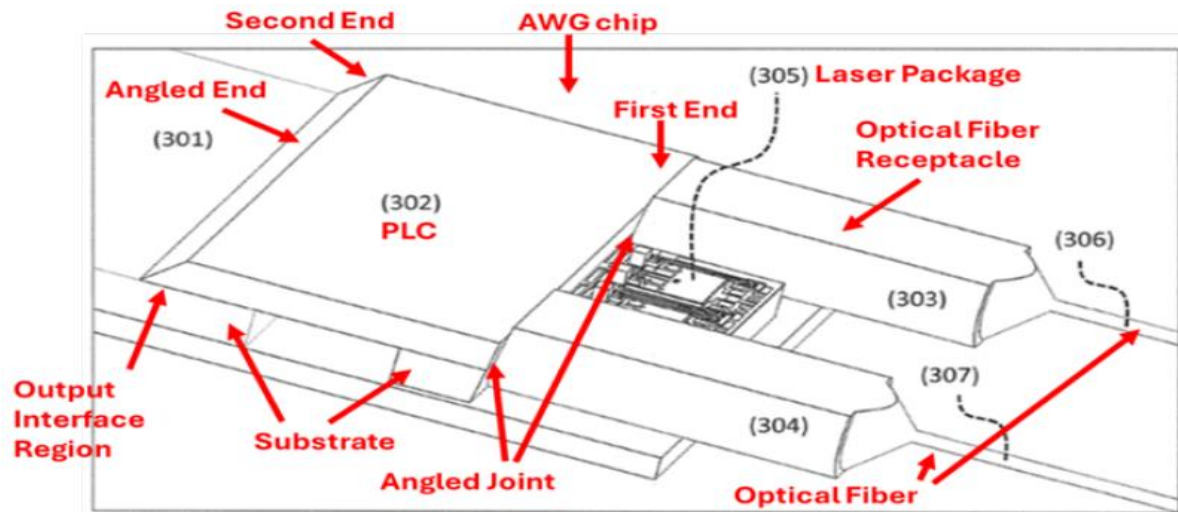
As explained in Soldano, the PLC wafer 302 includes a silicon substrate 501 on which various layers of glass are formed. The wafer is polished at an angle and then attached upside down to the silicon photonics chip 301. The PLC waveguides have two outer cladding regions 502 and 504, and a higher index core region 503. When the wafer is placed on the silicon photonics chip 301, the angle polish 409 causes the beam to reflect against the polished surface, diffract through the roughly 10 um of top cladding 504 and imping on the grating coupler 505. *Id.* at 9:52-63.

a. Soldano does not disclose the “substrate” limitation

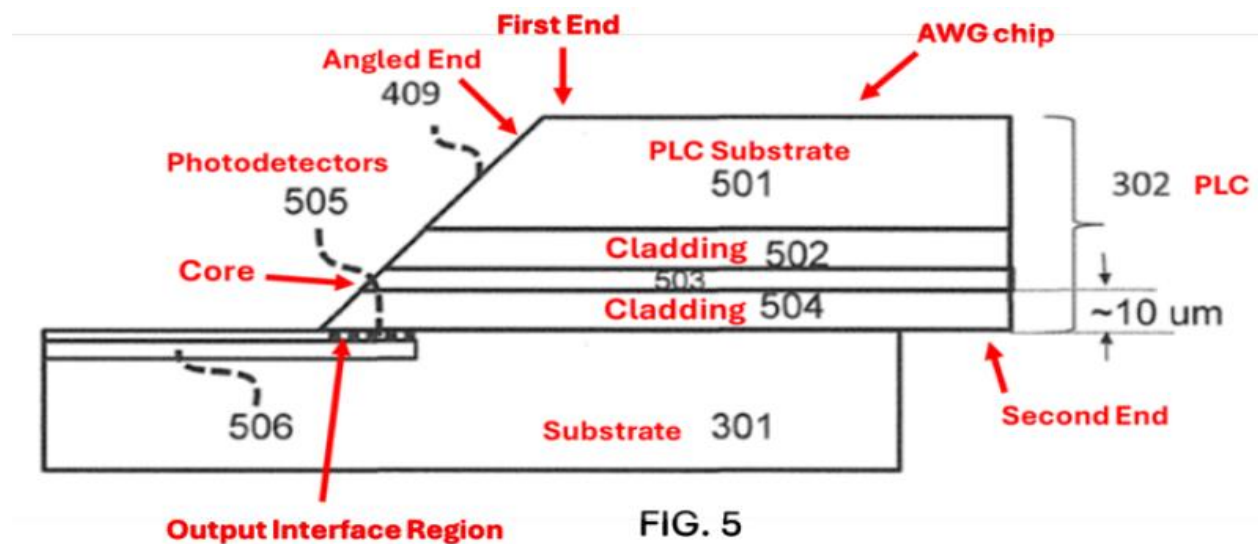
Claim 1 of the '116 Patent requires an “AWG chip comprising A substrate...” Petitioner and its expert argue Soldano discloses that the AWG chip is supported atop the silicon photonics chip (301), which serves as a substrate.

Petition at p. 19; Exh. 1003 at ¶86. However, silicon photonics chip 301 is not an

element of the AWG chip (identified as the PLC 302) in Soldano as shown by
Petitioner's own annotations of Figure 3:



Petitioner further points to Figure 5 of Soldano as annotated by Petitioner as follows:



Soldano explains, “FIG. 5 shows a detail of the side polish of the PLC and the grating coupler. The PLC wafer 302 includes a silicon substrate 501 on which various layers of glass are formed. The wafer is polished at an angle and then attached upside down to the silicon photonics chip 301.” Again, Soldano makes clear item 301 identified by Petitioner is separate from the PLC 302, and therefore not part of the AWG Chip.

Finally, Petitioner and its expert also confusingly point to item 303 in Soldano as the substrate. *Id.* (“Soldano discloses a planar lightwave circuit (PLC) (302) is disposed on the substrate (303)”; Exh. 1003 at ¶87. However, Soldano discloses that item 303 is a fiber capillary. Soldano at 7:64-65 (“This fiber is glued into a capillary 303 that is aligned to the PLC 302”).

As a result, Petitioner has not shown that Soldano discloses the “substrate”.

- b. Soldano does not disclose the “wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate” limitation*

Claim 1 of the ’116 Patent also requires “a tapered region disposed at the second end of the AWG chip configured to receive light via the plurality of output waveguides and reflect the same towards an exposed output interface region of the AWG chip, wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received

light through the substrate.”

Soldano fails to disclose “wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate.” Exhibit 1001, Claim 1 (emphasis added). And, specifically, Soldano fails to disclose the AWG’s feature of emitting lights towards the same side as the substrate without passing through the substrate.

The ’116 Patent describes that the AWG is formed on a substrate. *Id.* at 3:35-40. The ’116 Patent then describes that a portion of the substrate is removed to make exposed area 515. *Id.* at 9:45-50. And, specifically, the ’116 Patent provides formation of the AWG chip 503 can include removing a portion of the substrate generally indicated at exposed area 515 to expose the output interface region 517. *Id.*

Fig. 5A of the ’116 Patent shows as follows with exposed area 515 identified to expose the output interface region 517:

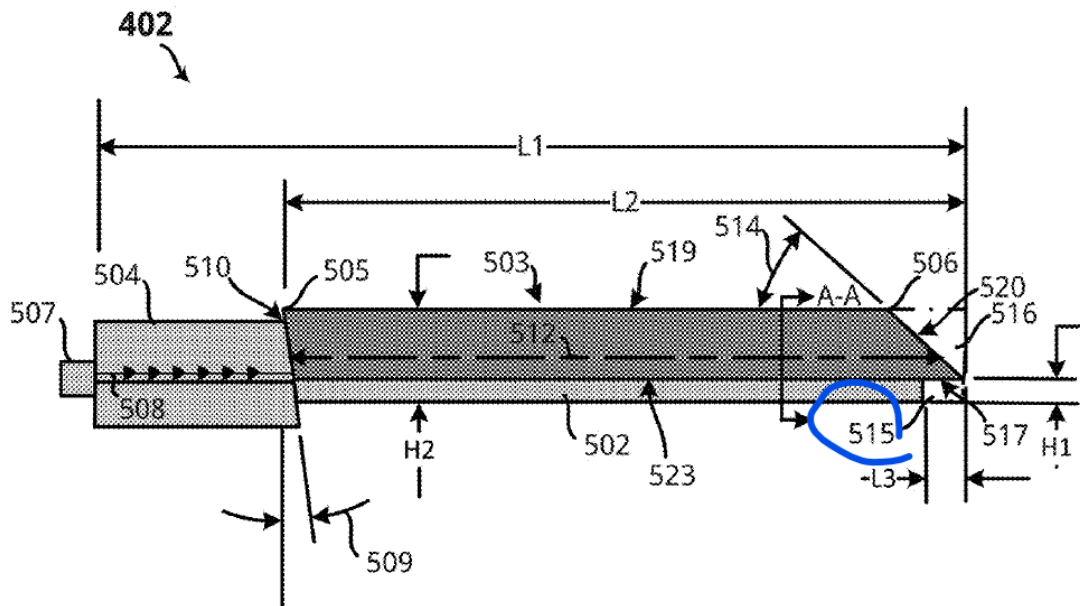


FIG. 5A

Petitioner and its expert argue Soldano discloses a tapered region (409) is located at second end of the AWG chip, which receives light via the plurality of output waveguides and reflects the light towards exposed output interface region of the AWG chip, such that exposed output interface region emits received light from the AWG chip on the same side as the substrate (301) without passing the received light through the substrate. Petition at p. 20; Ex. 1003, ¶ 89

However, Soldano provides that when the wafer is placed on the silicon photonics chip 301, the angle polish 409 causes the beam to reflect against the polished surface, diffract through the roughly 10 um of top cladding 504 and imping on the grating coupler 505. Ex. 1005 (Soldano) at 9:58-62.

FIG. 5 of Soldano shows a detail of this as follows:

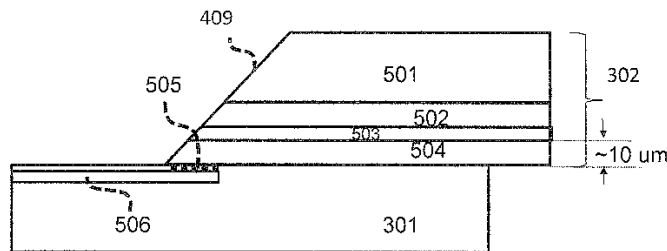


Fig 5

Thus, the PLC wafer (as the AWG chip) when placed on the silicon photonics chip (as the substrate) could not have “exposed” output interface region allowing for the received light to be transmitted without passing through the substrate. Further, there is no gap (space) between where the light is outputted and where the outputted light is received.

As a result, Petitioner has not shown that Soldano discloses the “a tapered region disposed at the second end of the AWG chip configured to receive light via the plurality of output waveguides and reflect the same towards an exposed output interface region of the AWG chip, wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate

without passing the received light through the substrate” limitation.

3. Shen (Exhibits 1008 (U.S. Patent App. Pub. No. US 2016/0349451) and 1009 (U.S. Provisional Patent App. 62/166,015))

Shen (Exhibits 1008 (U.S. Patent App. Pub. No. US 2016/0349451) and 1009 (U.S. Provisional Patent App. 62/166,015)) is directed to an optical connection module includes a substrate, an arrayed wavelength grating structure, an optical detector, and an oblique surface. The arrayed wavelength grating structure is disposed on the substrate and the arrayed wavelength grating structure is configured to transmit a light. The optical detector is disposed on the substrate, and the optical detector is configured to detect the light propagating through the arrayed wavelength grating structure. The oblique surface is configured to redirect the light from the arrayed wavelength grating structure to the optical detector.

Exhibit 1007, Abstract.

Figure 1 of Shen shows a cross-section view of an optical connection module 10 in accordance with Shen:

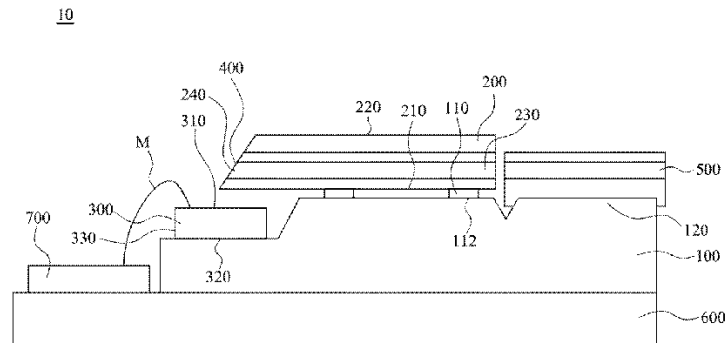


Fig. 1

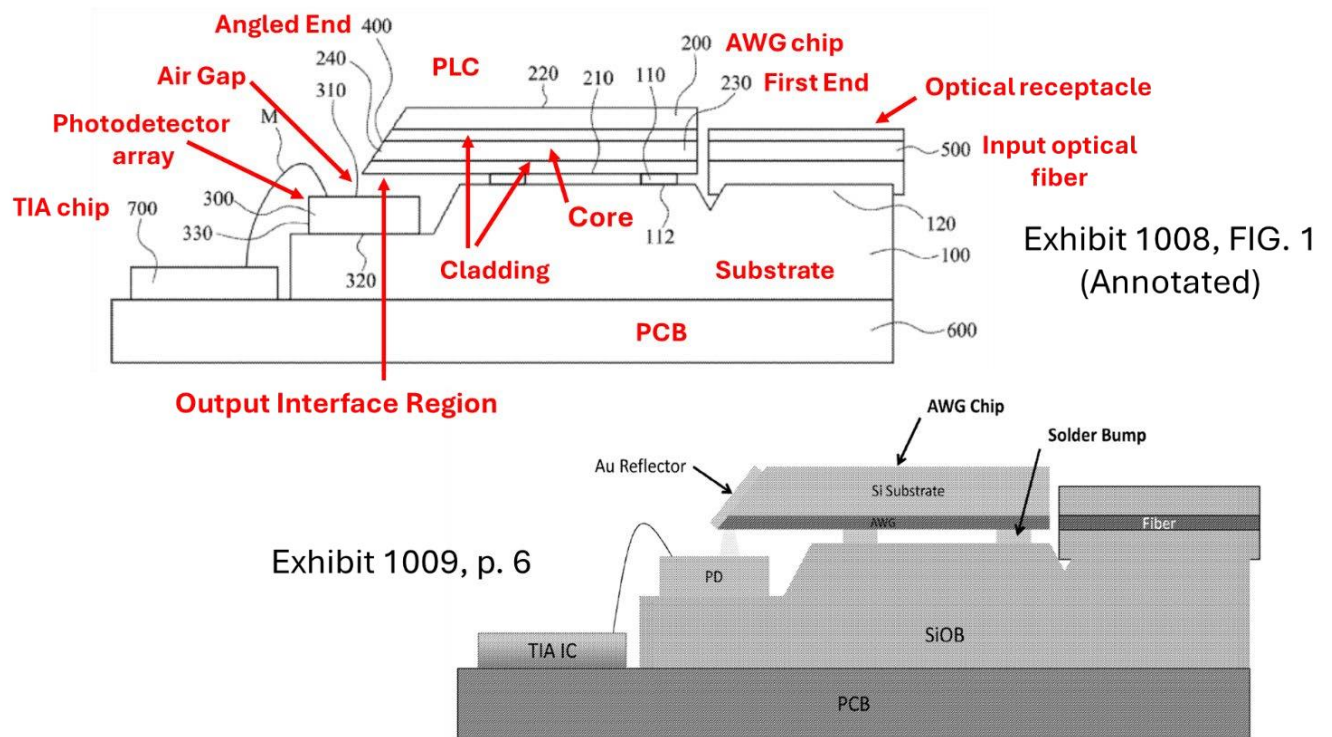
As shown in Figure 1, an optical connection module 10 may include a substrate 100, an arrayed wavelength grating (AWG) structure 200 disposed on the substrate 100, an optical detector 300 disposed on the substrate 100, and an oblique surface 400. The AWG structure 200 is configured to transmit a light. The optical detector 300 is configured to detect the light which propagates through the AWG structure 200. The oblique surface 400 is configured to redirect the light from the AWG structure 200 to the optical detector 300. *Id.* at ¶33.

a. Shen does not disclose the “substrate” limitation

Claim 1 of the '116 Patent requires an “AWG chip comprising A substrate...” Petitioner and its expert argues “Shen discloses that the AWG chip (200) is supported atop a silicon optical bench (SiOB) (100), which serves as substrate.” Petition at p. 31; Exh. 1003 at ¶142. However, silicon optical bench (SiOB) (100) is not an element of the AWG chip (identified also as item 200).

Instead, Shen provides “an arrayed wavelength grating (hereafter abbreviated as AWG) structure 200 disposed on the substrate 100.” Exhibit 1008 at ¶33.

This is show in Shen by Petitioner’s own annotations of Figure 1:



Petition at p. 30.

As a result, Petitioner has not shown that Shen discloses an “AWG chip comprising A substrate...”.

b. *Shen does not disclose the “a tapered region disposed at the second end of the AWG chip configured to receive light via the plurality of output waveguides and reflect the same towards an exposed output interface region of the AWG chip, wherein the*

*exposed output interface region emits the received light from the
AWG chip on the same side as the substrate without passing the
received light through the substrate” limitation*

Claim 1 of the '116 Patent requires “a tapered region disposed at the second end of the AWG chip configured to receive light via the plurality of output waveguides and reflect the same towards an exposed output interface region of the AWG chip, wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate.” Exhibit 1001, Claim 1. Shen fails to disclose this limitation, and specifically fails to disclose “an exposed output interface region of the AWG chip” and “wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate.”

As discussed, the '116 Patent describes that the AWG is formed on a substrate. *Id.* at 3:35-40. The '116 Patent then describes that a portion of the substrate is removed to make exposed area 515. *Id.* at 9:45-50. And, specifically, the '116 Patent provides formation of the AWG chip 503 can include removing a portion of the substrate generally indicated at exposed area 515 to expose the output interface region 517. *Id.*

Fig. 5A of the '116 Patent shows as follows with exposed area 515 identified to expose the output interface region 517:

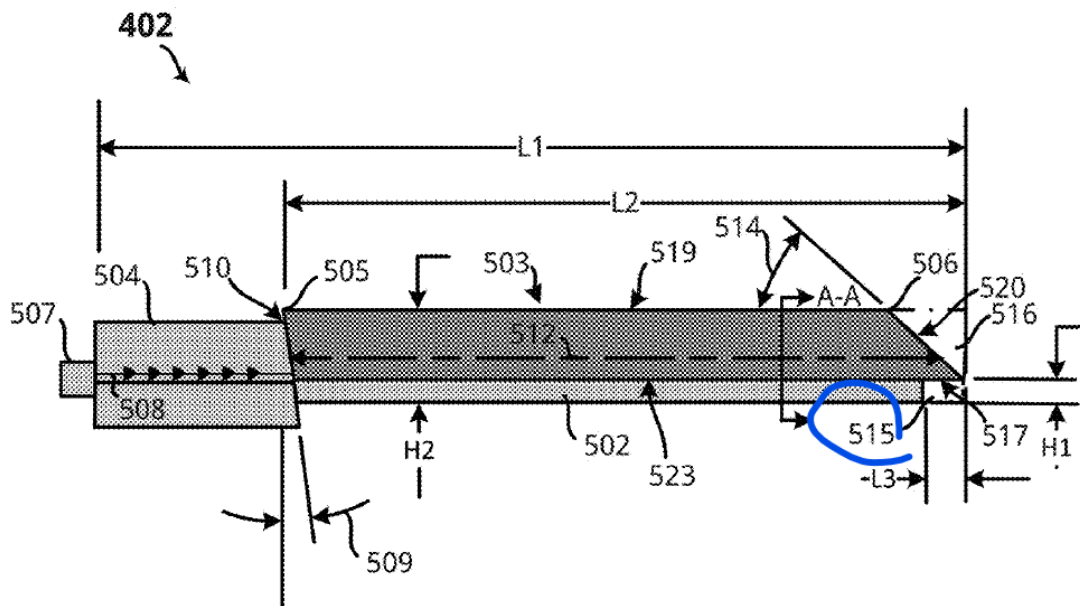


FIG. 5A

Petitioner argues “Shen discloses a tapered region (400) located at second end of the AWG chip (200), which receives light via the plurality of output waveguides (278) and reflects the light towards exposed output interface region of AWG chip....The exposed output interface region emits received light from the AWG chip on the same side as substrate (100) without passing it through the substrate.” Petition at p. 32,

However, Shen discloses “[t]he AWG layer 270 is sandwiched between the first cladding layer 250 and the second cladding layer 260, and may have an end

part 272 where the oblique surface 400 is located.” Exhibit 1008 at ¶41.

This is shown in Shen by Figure 2:

200

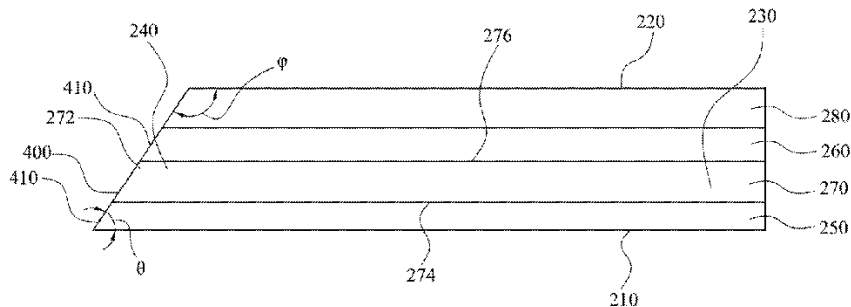


Fig. 2

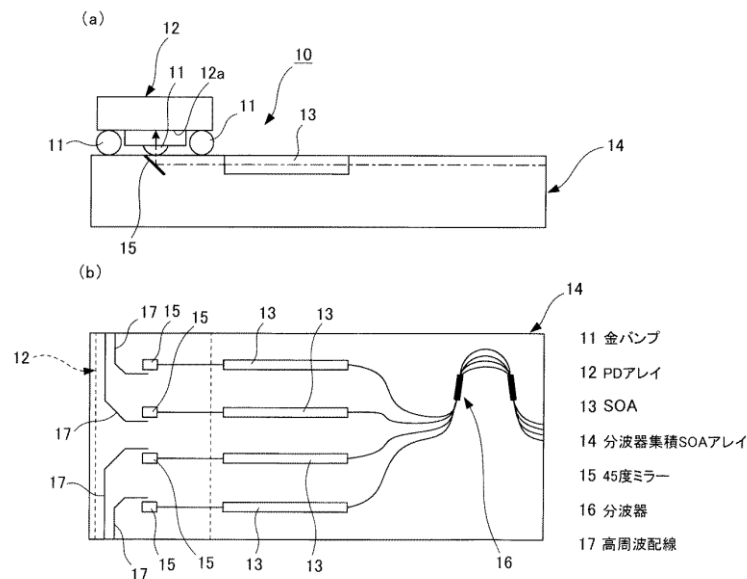
Petitioner has not shown that Shen discloses the “a tapered region disposed at the second end of the AWG chip configured to receive light via the plurality of output waveguides and reflect the same towards an exposed output interface region of the AWG chip, wherein the exposed output interface region emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate” limitation.

4. Kanazawa (Exhibits 1010 and 1011 (English Translation))

Kanazawa (Exhibits 1010 and 1011 (English Translation)) discloses a multi-channel optical receiver capable of compensating for received optical power and achieving miniaturization. The invention has: a demultiplexer (16) that splits

incoming light into a number of channels; a corresponding number of semiconductor optical amplifiers (13) that individually amplify the light split by the demultiplexer (16); a corresponding number of mirrors (15) that reflect the light output from each of the semiconductor optical amplifiers (13), all integrated onto a substrate (14); and a photodetector array (12) that integrates a corresponding number of photodetectors to detect the light guided from each mirror (15), so that the light from the demultiplexer (16) enters each photodetector via the mirrors (15); the photodetector array (12) is mounted on the surface of the substrate (14) using flip-chip assembly.

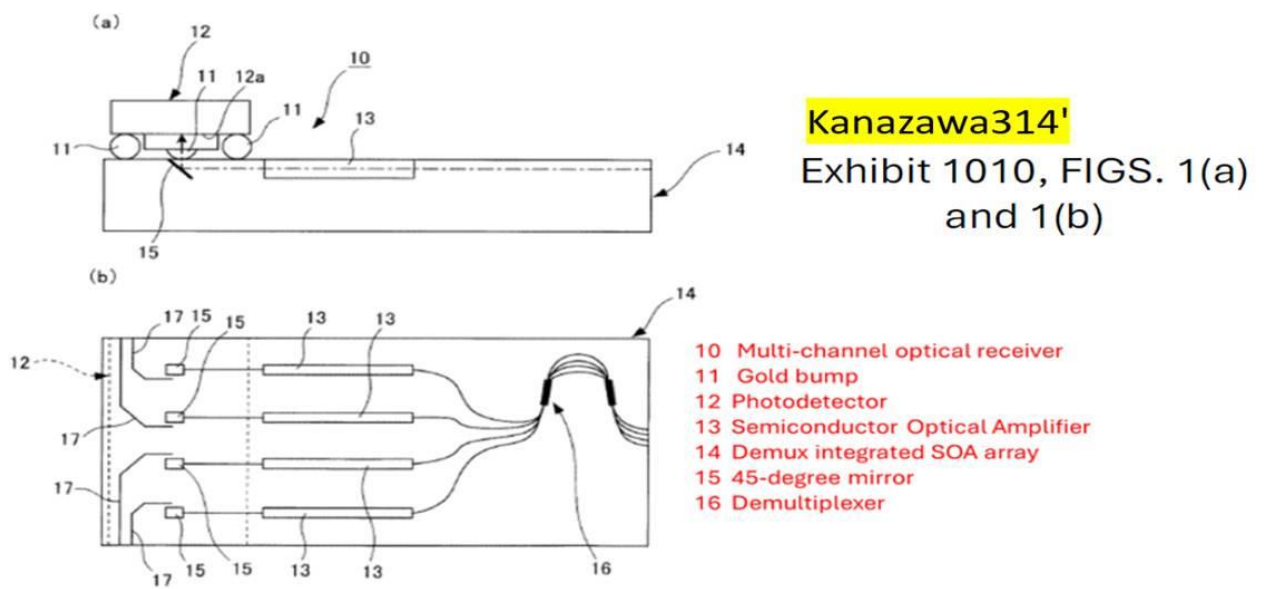
This is shown in Figure 1 of Kanazawa as follows:



a. Kanazawa fails to disclose the “substrate” limitation

Claim 1 of the '116 Patent requires an “AWG chip comprising A

substrate...” Petitioner and its expert argue “As construed by Patentee, Kanazawa discloses that the AWG chip (14) is disposed adjacent to a photodetector array (12) that is disposed on a substrate.” Petition at p. 44; Exh. 1003 at ¶202 (emphasis added). Petitioner then provides its own annotations to Figure 1 of Kanazawa as follows:



However, as shown in this figure and by Petitioner’s own admissions, the substrate and photodetector array (12) is not an element of the identified AWG chip (14). Instead, it is disposed “adjacent to it.”

As a result, Petitioner has not shown that Kanazawa discloses the “substrate”.

F. The Petition Relies Almost Exclusively on the Declaration of an Expert.

An over-reliance on expert testimony may weigh in favor of discretionary denial of an IPR. *See Next Caller Inc., supra*, p. 14 (informative); *see also* Memorandum, Exhibit 2001, at p. 2.

The Petition is based almost exclusively on the 95-page Declaration of Andrew Kirk, Petitioner's expert (Exhibit 1003). As can be seen from the Petition, every limitation of every challenged claim cites to Exhibit 1003 (*see*, Petition, pp. 18-23 for anticipation by Soldano; pp. 24-30 for obvious over Soldano in view of Lurie or Tomita; pp. 30-35 for anticipation by Shen; pp. 35-41 for obvious over Shen in view of Soldano in further view of Lurie or Tomita; pp. 32-49 for obvious over Kanazawa in view of Sasaki; pp. 49-57 for obvious over Kanazawa in view of Sasaki in further view of Lurie or Tomita), and the Declaration of Dr. Kirk discusses every limitation of every claim (*see*, Kirk Declaration, Exhibit 1003, pp. 36-44 for anticipation by Soldano; pp. 44-55 for obvious over Soldano in view of Lurie or Tomita; pp. 55-63 for anticipation by Shen; pp. 63-73 for obvious over Shen in view of Soldano in further view of Lurie or Tomita; pp. 74-84 for obvious over Kanazawa in view of Sasaki; pp. 85-95 for obvious over Kanazawa in view of Sasaki in further view of Lurie or Tomita).

Accordingly, this factor weighs in favor of denial.

G. Petitioner and the Defendant Are the Same Party.

Here, the fact that Petitioner and the defendant in the Litigation are the same party weighs in favor of denial of institution. *See Apple Inc. v. Fintiv, Inc., supra*, pp. 13-14.

H. The Validity of the '116 Patent May Be Adjudicated by a District Court Before the PTAB's Decision Is Due if IPR is Instituted.

The Director may consider whether another forum has already adjudicated the validity of the challenged claims in determining whether to discretionarily deny institution of IPR. Memorandum, Exhibit 2001, at p. 2.

Here, the '116 Patent is one of the patents-in-suit in the Additional Litigation between AOI and defendant Accelight, filed on December 13, 2024. As noted above, five of the six patents-in-suit in the Additional Litigation are also in suit in the Litigation with Petitioner and are the subject of petitions for IPR filed by Petitioner.

In the Additional Litigation, the District Court has ordered the case to move forward, despite the parties' notifying the court that five of the six patents-in-suit are the subject of petitions for IPR filed by Petitioner. On April 23, 2025, the court entered a Scheduling Order which set all of the dates pertaining to claim construction between June 2025 and October 2025 (exchange of proposed terms, exchange of preliminary constructions and extrinsic evidence, damages

contentions, a Joint Claim Construction Statement and Prehearing Statement, claim construction discovery cut-off, opening, responsive, and reply claim construction briefs, and a technical tutorial), and set a claim construction hearing on October 31, 2025. *See* Exhibit 2003.

Defendant Accelight has stated that the validity of the asserted claims of the patents-in-suit is in issue and that it will be taking discovery on invalidity. The court has set invalidity contentions and documents due on May 30, 2025. *Id.*

Thus, the validity of the '116 Patent may well be adjudicated in the Additional Litigation before the PTAB's decision in an IPR, which would be due on or about August 28, 2026 if IPR is instituted. Accordingly, this factor weighs in favor of denial.

I. There Are No Relevant Changes in the Law that Affect Patentability.

There have been no changes in the law or judicial precedent regarding patentability since the '116 Patent issued. Accordingly, this factor weighs in favor of denial of institution. *See* Memorandum, Exhibit 2001, p. 2.

J. Petitioner Filed Petitions for IPR for Four of the Other Patents Asserted by AOI in the Litigation on the Same Date as this Petition.

The Director may consider all relevant circumstances in determining whether to discretionarily deny institution of IPR. *See* Memorandum, Exhibit

2001, p. 3; *Apple Inc. v. Fintiv, Inc.*, *supra*, p. 14. The Litigation involves eight AOI patents, five of which are the subject of petitions for IPR filed by Petitioner, including the '116 Patent. These facts indicate that Litigation will need to go forward regardless of the petitions for IPR. Therefore, it would be more efficient for the validity of the '116 Patent to be resolved in the Litigation, and the PTAB could conserve its resources by denying institution. *See, Next Caller Inc.*, *supra*, p. 14, fn. 13, with similar facts (informative). Therefore, this factor weighs in favor of denial.

IV. CONCLUSION

For the reasons set forth above, the Director should exercise their discretion pursuant to the Memorandum of March 26, 2025 and deny institution of IPR on the '116 Patent.

Dated: April 28, 2025

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CERTIFICATE UNDER 37 C.F.R. SECTION 42.24

AOI certifies that the word count in this Request, as determined by the Microsoft Word word-processing system is 6,958 words. This Request is in compliance with the 14,000-word limit pursuant to the Director's Memorandum of March 26, 2025 and 37 C.F.R. §42.24.

Dated: April 28, 2025

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CERTIFICATE OF SERVICE

The undersigned hereby certifies service on the Petitioner, pursuant to 37 C.F.R. §42.6(e) and by agreement of counsel, by electronic (e-mail) delivery of a true copy of the foregoing **PATENT OWNER'S REQUEST TO DIRECTOR FOR DISCRETIONARY DENIAL OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 10,042,116 (Pursuant to Director's Memorandum of March 26, 2025)**, which was served on April 28, 2025 to the following Counsel for Petitioner via e-mail:

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