

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO
Judge Philip A. Brimmer

Civil Action No. 13-cv-00840-PAB-KLM
(Consolidated with Civil Action Nos. 15-cv-01743-PAB-KLM and 15-cv-02135-PAB-KLM)

FIBER, LLC, a Wyoming limited liability company,

Plaintiff,

v.

CIENA CORPORATION, a Delaware corporation,
CIENA COMMUNICATIONS, INC., a Delaware corporation, and
FINISAR CORPORATION, a Delaware Corporation,

Defendants,

FIBER, LLC, a Wyoming limited liability company,

Plaintiff,

v.

VIAVI SOLUTIONS, INC., f/k/a JDS Uniphase Corporation,
LUMENTUM HOLDINGS, INC.,
LUMENTUM INC., and
LUMENTUM OPERATIONS, LLC,

Defendants,

FIBER, LLC, a Wyoming limited liability company,

Plaintiff,

v.

ALCATEL LUCENT USA, INC., a Delaware corporation, and
FINISAR CORPORATION, a Delaware corporation,

Defendants.

ORDER

On December 2, 2016, the Court held a claim construction hearing on the terms identified in the parties' Joint Disputed Claim Terms Chart [Docket No. 139]. Both sides filed briefs in support of the respective interpretations of the disputed terms. Docket Nos. 147, 162, 165.

I. BACKGROUND

On April 2, 2013, Fiber, LLC ("Fiber") filed suit against Ciena Communications, Inc. and Ciena Corporation alleging patent infringement. Docket No. 1. Subsequently, Fiber filed suit against additional defendants asserting identical infringement claims.¹ See Docket Nos. 55, 119 (consolidating cases). Fiber claims that defendants have infringed U.S. Patent No. 6,430,332 (the "'332 Patent") [Docket No. 147-1] and U.S. Patent No. 7,095,917 (the "'917 Patent") [Docket No. 147-2] (collectively, the "patents"). The '332 Patent was issued on August 6, 2002, while the '917 Patent was issued on August 22, 2006. Docket No. 147-1 at 2; Docket No. 147-2 at 2.

A. The Inventions

The '917 patent is a continuation of the '332 Patent and they therefore share the same specification. The inventions described in both patents involve fiber optics and "relate[] generally to optical switching and more particularly to non-electrical switching of laser communication signals." '332 Patent col. 1 ll. 9-11.

The patents describe that, in the field of fiber optic transmissions, "optical signals are transmitted along such fibers and are switched from one fiber to another by means

¹Plaintiff did not sue defendant Finisar Corporation, which joined two of the consolidated cases as an intervenor defendant. See Docket Nos. 85, 89; Case No. 15-cv-02135, Docket Nos. 40, 44.

of an optical switch.” *Id.* at col. 1 ll. 15-17. The prior art used an “alignment signal emitter” to switch optical signals “to selectively point the end of a given fiber in one fiber group toward the end of a given fiber in another fiber group.” *Id.* col. 1 ll. 20-22. The invention is meant to reduce complexity and costs, while increasing the speed and reliability, of optical switching. *Id.* col. 1 ll. 30-35.

B. The Claims at Issue

The independent claims of the '332 Patent and '917 Patent contain the relevant terms for which the parties request construction.

Claim 123 of the '332 Patent provides:

An optical beam switching system for transmitting an optical beam from any one of a complete set of sources of said switching system to any one of a complete set of optical receptors of said switching system comprising:

a plurality of first movable mirrors mounted across a first area of free space from the sources and across a second area of free space from the optical receptors, for directing said optical beam from at least one source to a selected one of the optical receptors, said plurality of first movable mirrors mounted across a first area of free space from the sources such that a plurality of first optical pathways are defined between the sources and the first movable mirrors, said first movable mirrors comprising substantially a complete set of movable mirrors included in said switching system for directly interfacing with said sources free from any intervening movable mirrors and said first optical pathways comprising substantially a complete set of pathways included in said switching system between said sources and said first movable mirrors, said plurality of first movable mirrors further mounted across a second area of free space from the receptors such that a plurality of second optical pathways are defined between the first movable mirrors and the receptors, the second optical pathways comprising substantially a complete set of pathways included in said switching system between the first movable mirrors and the receptors;

said sources, first movable mirrors and receptors being configured such that there is a first three dimensional region that is traversed

by at least most of said second pathways and at least most of said first pathways are located wholly outside said first region;

a control for transmission of the optical beam from the source to a selected optical receptor by means of controlling a controlled mirror, by causing one of the first movable mirrors to direct the optical beam to a selected optical receptor; and

a data gathering and transmitting element for use in providing a feedback signal regarding the current orientation of the controlled mirror or the current location of the optical beam to the control, in either case for the purpose of adjusting the position of the relevant controlled mirror to minimize transmission loss of the optical beam to the optical receptor by fine tuning said orientation of said relevant controlled mirror based on said feedback signal.

'332 Patent col. 22-23 ll. 54-68, 1-32.

Claim 27 of the '917 Patent describes the following:

An optical beam switching system for transmitting an optical beam from at least one source to at least one of a plurality of optical receptors comprising:

at least one source of an optical beam;

at least one first beam directing device mounted across a first area of free space from the source;

at least one additional beam directing device;

at least one second beam directing device mounted across a second area of free space from the first beam directing device;

a plurality of optical receptors;

a control operative for at least one of 1) positioning a first beam directing device to direct the optical beam from at least one source to at least one additional beam directing device, 2) positioning at least one additional beam directing device to direct the optical beam from said additional beam directing device to a second beam directing device, and 3) positioning a second beam directing device to direct the optical beam from said second beam directing device to a selected one of said plurality of optical receptors; and

at least one data gathering and transmission element to provide an indication regarding the current orientation of the controlled beam directing device or the current location of the optical beam to the control for adjusting at least one of the beam directing devices.

'917 Patent col. 10 ll. 31-57.

Claim 53 of the '917 Patent describes:

An optical beam switching system for transmitting an optical beam from at least one source to at least one of a plurality of optical receptors comprising:

at least one source of an optical beam;

at least one first beam directing device mounted across a first area of free space from the source;

a plurality of optical receptors mounted across a second area of free space from the first beam directing device;

a control so that a first beam directing device will be positioned to direct the optical beam from at least one source to a selected one of said plurality of optical receptors; and

at least one data gathering and transmission element to provide an indication regarding the current orientation of the controlled beam directing device or the current location of the optical beam to the control for adjusting at least one of the beam directing devices.

'917 Patent col. 12 ll. 19-37.

One embodiment of the invention described in the specification utilizes a microelectromechanical ("MEM") movable mirror to switch beams from one fiber to another. By contrast, defendants' allegedly infringing devices utilize liquid crystal on silicon ("LCOS"), a more recently developed switching technology, to perform such switching. A MEM mirror employs a reflective surface to redirect light. Docket No. 166 at 9-10, ¶ 21. The parties dispute the exact parameters of a MEM mirror, *compare id.* with Docket No. 163 at 13, ¶¶ 30-32, but both parties agree that some embodiments of

a MEM mirror feature a reflective surface that is physically rotated to redirect light. See Docket No. 166 at 9-10, ¶ 21; Docket No. 163 at 13, ¶ 31.

An LCOS device uses changes in electric voltage to refract light inside a layer of liquid crystal material. *Id.* at 13-14, ¶ 34. The voltage changes the index of refraction and thereby changes the speed at which a light beam travels through the liquid crystal. *Id.* After passing through the crystal layer, the light beam reflects off a layer of aluminum, passes through the liquid crystal layer again, doubling the delay, and exits the LCOS device in the intended direction. *Id.* An LCOS device redirects a beam of light without the device or the reflective aluminum being repositioned in any way. The only change to the device is a change to the voltage applied to the liquid crystal. *Id.* An advantage of an LCOS device is that it has no moving parts and is therefore not subject to mechanical failures. *Id.* at 14, ¶ 35.

Another technological issue involved in the parties' dispute is the use of wavelength-selective switches ("WSS"). A beam of light transmitted through a fiber can be made up of a single wavelength or multiple wavelengths. *Id.* at 10, ¶ 23. A WSS, like other optical switches, is a device that is capable of reflecting an optical beam to control the direction an optical beam moves in. Docket No. 148 at 18, ¶ 46. However, unlike other devices that can reflect a beam, a WSS is generally used as part of an optical switch that uses wavelength-division-multiplexing ("WDM") to reconfigure the constituent components of a beam of light. Docket No. 163 at 12, ¶ 28. A WSS functions by first splitting an optical beam into wavelength-specific light beams, a process referred to as demultiplexing. *Id.*, ¶ 29. After the beam is demultiplexed, the

wavelength-specific beams are redirected to their desired destination, where the beam can be combined into one or more WDM light beams, referred to as multiplexing. *Id.* A critical question underlying the parties' proposed constructions is whether the scope of the claims at issue encompass a device that allows for WDM or uses WSS.

II. LEGAL STANDARDS FOR PATENT CLAIM CONSTRUCTION

Claim construction is a question of law for the court, *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 837 (2015), guided by Federal Circuit precedent. See *SunTiger, Inc. v. Scientific Research Funding Group*, 189 F.3d 1327, 1333 (Fed. Cir. 1999). The Federal Circuit has made clear that “there is no magic formula or catechism for conducting claim construction.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed. Cir. 2005) (en banc). Nevertheless, there are several key sources and doctrines that should be consulted and applied, but “[t]he sequence of steps used by the judge in consulting various sources is not important; what matters is for the court to attach the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law.” *Id.*

The starting point is the “bedrock principle” that “the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The words of the claims “are generally given their ordinary and customary meaning,” *id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)), which is “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention,” *id.* at 1313; see *CCS*

Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed. Cir. 2002) (“Generally speaking, [courts] indulge a ‘heavy presumption’ that a claim term carries its ordinary and customary meaning.”). In those instances when the claim language “involves little more than the application of the widely accepted meaning of commonly understood words,” construction is relatively straightforward and “the ordinary meaning . . . may be readily apparent even to lay judges.” *Phillips*, 415 F.3d at 1314. When the claim terms have a particular meaning in the field, however, courts “look[] to ‘those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.’” *Id.* (quoting *Innova*, 381 F.3d at 1116). These sources include “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *Id.*

The context in which a term is used, both in the asserted claim as well as in other claims of the patent, can be valuable and instructive. *Id.* at 1314. In addition, the patent specification – the text and figures of the patent that precede the claims – “is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582). With that said, “the claim requirement presupposes that a patent applicant defines his invention in the claims, not in the specification.” *Johnson & Johnston Associates Inc. v. R.E. Service Co., Inc.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002); see *PSC Computer Products, Inc. v. Foxconn Int’l, Inc.*, 355 F.3d 1353, 1359 (Fed. Cir. 2004) (“[T]he claims of a patent limit the invention, and specifications cannot

be utilized to expand the patent monopoly”) (quoting *United States v. Adams*, 383 U.S. 39, 48-49 (1966)).

If necessary, courts may also consider the patent’s prosecution history – the official record of the patent application and subsequent process before the U.S. Patent and Trademark Office, which “provides evidence of how the PTO and the inventor understood the patent.” *Phillips*, 415 F.3d at 1317. Nevertheless, “because the prosecution history represents an ongoing negotiation between the PTO and the applicant, . . . it often lacks the clarity of the specification and thus is less useful for claim construction purposes.” *Id.* And, although courts may consult extrinsic evidence such as “expert and inventor testimony, dictionaries, and learned treatises,” such evidence is “less significant than the intrinsic record,” i.e., the specification and prosecution history, and courts must be wary not to use extrinsic evidence to override the meaning of the claim terms demonstrated by the intrinsic evidence. *Id.* at 1317-19 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). That is, “extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence.” *Id.* at 1319.

In short, a court must construe the claim terms as they would be viewed by “the ordinary artisan after reading the entire patent.” *Id.* at 1321. This is important in order to respect the public notice function of patents:

The patent system is based on the proposition that claims cover only the invented subject matter. As the Supreme Court has stated, “[i]t seems to us that nothing can be more just and fair, both to the patentee and the public, than that the former should understand, and correctly describe, just what he

has invented, and for what he claims a patent.”

Id. at 1321 (quoting *Merrill v. Yeomans*, 94 U.S. 568, 573-74 (1876)).

III. ANALYSIS

A. Person of Ordinary Skill in the Art

Patent claims are to be construed through the eyes of a person of ordinary skill in the art (“POSITA”) at the time of the invention. According to Dr. David Smith, plaintiff’s expert, a POSITA “would be a degreed professional in Physics, Electrical Engineering or an allied technical field, with three or more years of work or research experience in fiber optic technology including familiarity with optical switching technology in the mid-to-late 1990s time frame.” Docket No. 148 at 8, ¶ 22. Similarly, James Walker, the defendants’ expert, states that a POSITA would be “someone with either (a) a post-graduate degree in mechanical or electrical engineering or a relevant science such as physics or optics, and at least three years of relevant post-graduate experience in optical systems and optical MEMS technology; or (b) an undergraduate degree in mechanical or electrical engineering . . . and at least five years of relevant experience.” Docket No. 163 at 8-9, ¶ 18.

The Court finds that Dr. Smith’s definition of a POSITA is apt. A POSITA with respect to the patents at issue is an individual with a relevant technical degree, at least 3 years of experience working with fiber optic technology and a familiarity with optical switching technology, including optical MEMS technology.

B. Optical Beam

The ’332 and ’917 patents involve the switching of optical signals transmitted

through optical fibers. Claim 123 of the '332 patent discusses an “optical beam switching system for transmitting an optical beam from any one of a complete set of sources of said switching system to any one of a complete set of optical receptors of said switching system.” '332 Patent col. 22 ll. 54-57. Claims 27 and 53 of the '917 patent similarly refer to “an optical beam switching system.” '917 Patent col. 10 ll. 17-19; col. 12 ll. 51-54. Plaintiff contends that “optical beam” means “a light signal used in fiber optic communication.” Docket No. 147 at 11. Plaintiff’s expert offers a slightly different construction: “a light signal carried by an optical fiber.” Docket No. 148 at 27, ¶ 70. Defendants argue that “optical beam” is limited to “all light transmitted from a single source.” Docket No. 162 at 16.

Defendants acknowledge that “optical beam” as used in the patents is not limited to light of a single wavelength. Docket No. 162 at 18. The intent of defendants’ proposed construction is to narrow the definition of “optical beam” to exclude devices like WSS that multiplex or demultiplex a beam in the switch. *Id.* at 17. To support their construction, defendants argue that claim 123 refers to “[a]n optical beam,” and each subsequent reference to an optical beam refers to that original beam, suggesting that the optical beam has a single source and is not demultiplexed or multiplexed as part of the switching process. *Id.* at 16. Defendants highlight the repeated singular usages of “beam” throughout the specification. *Id.* Defendants also point out that the patents “do not claim or disclose separating multiplexed beams or recombining those separated beams.” *Id.* at 17.

Defendants’ proposed construction too narrowly defines the term “optical beam.” Defendants concede that a POSITA would understand the claim term “to include

multiplexed signals” under either of the proposed constructions. *Id.* at 18. Defendants do not explain why the term “optical beam” should carry so much weight.

Another issue is whether the term “optical beam” should be defined as a “signal” or as “light.” The invention at issue relates to “optical switching and more particularly to non-electrical switching of laser communication signals.” ’332 Patent col. 1 ll. 9-11. The objective of the invention is to more efficiently switch “signals,” not simply light. While Mr. Walker might be right that “optical cross-connects also have utility in applications other than fiber optic telecommunications,” Docket No. 163 at 17, ¶¶ 46, the term optical beam, read in the context of the patent, refers to communication signals.

The Court finds that Dr. Smith’s proposed construction of “optical beam” is supported by the intrinsic and extrinsic evidence. Docket No. 148 at 27, ¶ 70. Accordingly, optical beam will be defined as a light signal carried by an optical fiber.

C. Source, Receptor

The disputed claims in the patents use the terms “source” and “receptor” throughout. Claim 123 of the ’332 Patent states:

An optical beam switching system for transmitting an optical beam from any one of a complete set of **sources** of said switching system to any one of a complete set of optical **receptors** of said switching system comprising:

a plurality of first movable mirrors mounted across a first area of free space from the **sources** and across a second area of free space from the optical **receptors**, for directing said optical beam from at least one **source** to a selected one of the optical **receptors**
. . . a plurality of first optical pathways are defined between the **sources** and the first movable mirrors . . .

’332 Patent col. 22 ll. 53-66 (emphasis added). In addition, claim 27 of the ’917 Patent

states:

An optical beam switching system for transmitting an optical beam from at least one source to at least one of a plurality of optical receptors comprising:

...

a control operative for at least one of 1) positioning a first beam directing device to direct the optical beam from at least one **source** to at least one additional beam directing device, 2) positioning at least one additional beam directing device to direct the optical beam from said additional beam directing device to a second beam directing device, and 3) positioning a second beam directing device to direct the optical beam from said second beam directing device to a selected one of said plurality of optical **receptors**;

'917 Patent col. 10 ll. 31-33, 42-51 (emphasis added). The specifications for the patents do not include the terms "source" or "receptor."

Plaintiff's proposed construction is to define both "source" and "receptor" as an optical fiber. Docket No. 147 at 14. Defendants argue that "source" should be defined as the "end of an optical fiber from which the optical beam is emitted" and receptor should be construed as the "end of an optical fiber at which the optical beam is received." Docket No. 162 at 19.

Plaintiff's proposed definition is problematic. Defining both terms as the same thing ignores how the terms are used in the claims. The claims do not use "source" and "receptor" interchangeably; instead, each term appears to have a distinct meaning. "Different claim terms are presumed to have different meanings." *Bd. of Regents of the Univ. of Texas Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008). According to the '332 patent, the optical beam is transmitted "from" sources "to" receptors. '332 patent, col. 22 ll. 61-62. Thus, the optical beam is emitted from a

source and received by a receptor, indicating that sources and receptors have distinct functions not apparent by defining them simply as “optical fiber.”²

“Source” will be construed as “the end of an optical fiber from which an optical beam is emitted.” “Receptor” will be construed as “the end of an optical fiber at which an optical beam is received.”

D. Movable Mirror

The '332 patent refers, in several places, to a “movable mirror.”³ For instance, claim 123 refers to “movable mirrors mounted across a first area of free space from the sources and across a second area of free space from the optical receptors.” '332 Patent col. 22 ll. 58-60. The parties dispute whether a “movable mirror” must itself move or whether a movable mirror can encompass a device, such as an LCOS, which can direct or steer an optical beam without moving except for an alignment of molecules caused by electrical changes to one of its layers. See Docket Nos. 147 at 15; 162 at 18.

By the plain language of the claim term, the mirror must be movable or be able to move. Plaintiff states that the definition of “movable mirror” should not exclude an LCOS device because, although the “device as a whole does not move, . . . the liquid

²Plaintiff’s expert objects to defendants’ focus on the “ends” of the optical fibers, stating that it is “inappropriate because the inputs and outputs of the optical switching system . . . may be further adapted” Docket No. 148 at 22, ¶ 54. However, the fiber nevertheless has an end, as plaintiff’s expert acknowledges, *id.*, and therefore Fiber’s definition of “source” and “receptor” as an “optical fiber” has the same alleged issue. Docket No. 148 at 22, ¶ 53 (“both Plaintiff and Defendants acknowledge that the **source** and **receptor** are ultimately, indeed, **optical fibers.**”) (emphasis in original).

³The term “movable mirror” is not used in the '917 Patent, which uses the term “beam directing device.”

crystal ('LC') molecules controllably move.” Docket No. 147 at 16. This interpretation has two problems. First, the Court agrees with defendants that the last limitation in Claim 123 of the '332 patent indicates that a “controlled mirror” is one of the “movable mirrors,”⁴ and that the feedback signal is used to “adjust[] the position of the relevant controlled mirror.” '332 Patent col. 23 ll. 24-33. This limitation is also consistent with the specification, which refers to changes in the movable mirror’s position. '332 Patent col. 1 ll. 58-61 (“the LED’s provide signals for controlling the position of the movable mirror so that any two mirrors in an array can be positioned to reflect a light beam”); col. 3 ll. 47-48 (“mirror position control”); col. 6 ll. 33-35 (“The middle or neutral position of mirror assembly **41** . . .”). “[A]djusting the position” of a mirror is not consistent with merely re-orienting the alignment of molecules within a layer of an LCOS. Rather, it implies changing the physical position of the entire mirror. This implication is consistent with what a POSITA would understand the term “movable mirror” to mean. Mr. Walker states that “[i]n [his] 32 years of experience in this field, [he has] never heard LCOS described as a ‘movable mirror.’” Docket No. 163 at 21; see *a/so* Docket No. 162-1 at 185, p. 184, ll. 8-18 (Dr. Smith states that he is aware of “one reference” to an LCOS as an “electronically steerable array” but that “[t]hat’s about as close as [he had] seen it”).

Second, even if the term “mirror” is construed more narrowly to include just the reflective surface, as opposed to the structure that holds or houses the reflective

⁴Claim 123 of the '332 patent states that a “controlled mirror” is controlled “by causing one of the first movable mirrors to direct the optical beam to a selected optical receptor.” '332 Patent col. 23 ll. 19-23.

surface, the reflective surface of an LCOS device does not move. Rather, the liquid crystal layer above the reflective surface moves.

Despite the claim language implying that “movable mirrors” change position, plaintiff argues that claim differentiation supports its proposed construction. Docket No. 147 at 15-16. Claim differentiation “is ultimately based on the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.” *Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999). This doctrine means that limitations in a dependent claim should not be incorporated into independent claims. *Id.* In this case, claim 125,⁵ which is dependent on claim 123, refers to a “movable mirror [that] is movable about at least two axes of rotation.” ’332 Patent col. 23 ll. 38-39. Plaintiff argues that, based on claim differentiation, if claim 125 refers to two axes of rotation, claim 123 must include a mirror with “no axis of rotation – that is, a reflective device whose internal components move to direct or steer an optical beam.” Docket No. 147 at 16. However, the mirrors in claim 123 could still rotate on at least one axis.

The doctrine of claim differentiation creates a presumption that limitations in dependent claims reflect different scopes, but that such a presumption is overcome where the written description or other evidence requires it. *Seachange Int’l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1370 (Fed. Cir. 2005); *see also Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1376 (Fed. Cir. 2001) (doctrine of claim

⁵Plaintiff also points to claim 124, but that claim has been invalidated. A cancelled claim is void *ab initio* and cannot be relied upon for claim differentiation purposes. *See Fresenius USA, Inc. v. Baxter Int’l, Inc.*, 721 F.3d 1330, 1346 (Fed. Cir. 2013).

differentiation is not a “hard and fast” rule of construction)). In this case, the adjective “movable” modifies the word “mirror”; any construction that fails to require that the mirror itself change position would ignore the claim language. Thus, any presumption created by claim 125 has been overcome.

The term “movable mirror” will be construed as “a reflective surface that changes position to change the direction of an optical beam.”

E. At Least One of (1)[...] (2)[...] (3)[...]

Claim 27 of the '917 patent requires the following:

a control operative for at least one of 1) positioning a first beam directing device to direct the optical beam from at least one source to at least one additional beam directing device, 2) positioning at least one additional beam directing device to direct the optical beam from said additional beam directing device to a second beam directing device, and 3) positioning a second beam directing device to direct the optical beam from said second beam directing device to a selected one of said plurality of optical receptors.

'917 Patent col. 10 ll. 42-52. According to defendants, the phrasing of claim 27 should be interpreted conjunctively and require three positionable beam directing devices.

Docket No. 162 at 41. Plaintiff insists that no construction is necessary and that only one positionable beam directing device is required by claim 27. Docket No. 147 at 26.

Defendants rely on *SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870 (Fed. Cir. 2004). See Docket No. 162 at 42. In *SuperGuide*, the Federal Circuit held that, where the phrase “at least one of” precedes a list of categories, joined by “and” instead of “or,” and each listed category “is further comprised of many possible values,” then the phrase “at least one of” modifies each category in the list.

SuperGuide, 358 F.3d at 886. In other words, the phrase “at least one of” may require

at least one item for each category, instead of one item from any one category.

However, “numerous courts have declined to follow the *SuperGuide* court’s construction of ‘at least one of’ where the facts before them called for a different understanding of the term.” *Fujifilm Corp. v. Motorola Mobility LLC*, 2015 WL 1265009, at *8 (N.D. Cal. Mar. 19, 2015). Unlike in *SuperGuide*, the categories in claim 27 are not comprised of many possible values. *Id.* (distinguishing a claim on the same grounds). Claim 27 concerns positioning a beam directing device, which, unlike a program start time, is a discrete object, not a category of values. See *SuperGuide Corp.*, 358 F.3d at 886. In addition, claim 27 refers to “at least one data gathering and transmission element to provide an indication regarding the current orientation of *the controlled beam directing device.*” ’917 Patent col. 10 ll. 51-53 (emphasis added). The claim language also states: “at least one of . . . 2) positioning at least one additional beam directing device.” ’917 Patent col. 10 ll. 42-46. Defendants’ proposed construction would render the subsequent “at least one additional” superfluous, as each category would presumptively include one or more of the described beam directing device.

Read in the context of the patent, the language in claim 27 does not fit the facts in *SuperGuide*. The Court agrees with Fiber that no construction is necessary.

F. Beam Directing Device

Claim 27 of the ’917 Patent states, in part:

a control operative for at least one of 1) positioning a first **beam directing device** to direct the optical beam from at least one source to at least one additional **beam directing device**, 2) positioning at least one additional **beam directing device** to direct

the optical beam from said additional **beam directing device** to a second **beam directing device**, and 3) positioning a second **beam directing device** to direct the optical beam from said second **beam directing device** to a selected one of said plurality of optical receptors;

'917 Patent col. 10 ll. 42-52 (emphasis added). Claim 53 of the '917 Patent describes, in part:

An optical beam switching system for transmitting an optical beam from at least one source to at least one of a plurality of optical receptors comprising:

a control so that a first **beam directing device** will be positioned to direct the optical beam from at least one source to a selected one of said plurality of optical receptors;

'917 Patent col. 12 ll. 20-22, 28-31 (emphasis added).

Fiber suggests that the Court define beam directing device to mean “a fixed or controllable device that directs or steers an optical beam.” Docket No. 147 at 17. Defendants argue that the term “beam directing device” is not a term of art and that a POSITA would not be able to understand the scope of the invention with reasonable certainty. Docket No. 162 at 25. In the alternative, they state that the only acceptable construction is “a controllable device that changes its position to change the direction of an optical beam.” *Id.*

A claim term is indefinite if it fails, “viewed in light of the specification and prosecution history, [to] inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). “An accused infringer must [] demonstrate by clear and convincing evidence” that a claim term is indefinite. *Haemonetics Corp. v. Baxter Healthcare*

Corp., 607 F.3d 776, 783 (Fed. Cir. 2010) (citing *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249-50 (Fed. Cir. 2008)). The key question is whether the intrinsic evidence provides “a general guideline and examples sufficient to enable a person of ordinary skill in the art to determine [the scope of the claims].” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1335 (Fed. Cir. 2010).

Claim 27 of the '917 patent differs from claim 123 of the '332 patent in that the term “beam directing device” replaces the term “movable mirrors.” The term “beam directing device” is not mentioned in the specification. During the claim construction hearing, plaintiff suggested that it can be inferred that Fiber’s use of “beam directing device” was intended to broaden the scope of claim 27 as compared to claim 123. However, the Court’s first task is to construe the term in the context of the claim language and the specification.

Defendants argue that all three beam directing devices must be controllable and therefore capable of being positioned. As a result, contrary to plaintiff’s position, defendants claim that one of them cannot be fixed. Docket No. 162 at 26. The Court does not agree with defendants’ interpretation that a beam directing device cannot be fixed. “[A]t least one of” the three types must be subject to control, not all three of them. A controlled beam directing device directs the optical beam to another beam directing device. Claim 27 does not require that this other beam directing device be controlled or not controlled. This means that the control changes the position of one “device” to control the direction of the optical beam to another beam directing device, which can be either controlled or not controlled. The Court therefore reads claim 27 to mean that a controlled “beam directing device” is capable of changing its position, i.e.

the device itself moves to change the angle of the surface relative to an optical beam striking it. However, if the beam from a controlled device is directed to another beam directing device that is not controlled, that beam directing device can be fixed. This accords with figures 1 and 2, which show at least one fixed mirror. Similarly, claim 53 discusses positioning “a first beam directing device” and “adjusting at least one of the beam directing devices.” ’917 Patent col. 12 ll. 25-36. This language suggests that only one of several beam directing devices need be positioned or controlled.

The next issue is whether a non-controlled beam directing device can encompass an LCOS. Defendants are correct that the specification does not describe an LCOS and does not suggest that one of the fixed mirrors in the figures is capable of directing an optical beam as opposed to simply reflecting a beam at the corresponding angle to which the beam struck it.⁶ Docket No. 162 at 27-28; Docket No. 163 at 23, ¶ 68. However, the phrase under construction is “beam directing device,” which, by its own terms, states that the device is capable of “directing” an optical beam. While the specification discusses only MEM mirrors, the patent need not disclose every existing technology. *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1370 (Fed. Cir. 2008). The question is whether the literal scope of a valid claim encompasses the technology at issue, irrespective of when it was developed or whether it is part of an intended embodiment of the invention. *Id.* at 1371-72 (“Our case law allows for after-arising technology to be captured within the literal scope of valid claims that are drafted broadly

⁶Defendants argue that the inventor “confirmed that he never worked with LCOS and did not intend LCOS to be part of his invention.” Docket No. 162 at 28. However, the testimony of the inventor is irrelevant to claim construction. *Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 1347 (Fed. Cir. 2008).

enough.”) (*citing SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 878-80 (Fed. Cir. 2004)). Only if the patent contains a clear disavowal of claim scope will the meaning of the claim term be restricted from its ordinary meaning. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1320 (Fed. Cir. 2005). There is no such disavowal in this case. When read in context of the specification, the term “beam directing device” would sufficiently inform a POSITA of the scope of the invention. The disclosed embodiments encompass both movable and fixed mirrors.

The Court finds that defendants have not presented clear and convincing evidence that a POSITA would not understand the meaning of the term “beam directing device.”⁷ When read in context of the specification, the term “beam directing device” would sufficiently inform a POSITA of the scope of the invention. The term “beam directing device” will be construed to mean “a fixed or controllable device that directs an optical beam.”

G. [First/Additional/Second] Beam Directing Device

Claim 27 of the '917 patent refers to a “first beam directing device . . . additional beam directing device . . . [and a] second beam directing device.” '917 Patent col. 10 ll. 42-52. Plaintiff argues that the terms refer to the sequence in which an optical beam moves through the optical switching system and require no construction. Docket No.

⁷The Court notes that defendants hold several patents that refer to a “beam steering device.” See, e.g., U.S. Patent No. 7,630,599 [Docket No. 147-14], col. 2 ll. 26-34 (referring to “beam steering devices . . . using (i) a two-dimensional pixelated MEMS mirror array or (ii) a LC on silicon (LCOS) micro-display”). Beam steering device would be known by a POSITA to encompass both an LCOS and a MEM mirror. Docket No. 148 at 44-45, ¶ 108. Defendants filed the application for the '599 Patent in 2007, just one year after plaintiff obtained the '917 Patent.

147 at 20. Defendants argue that the terms should be construed to mean the following:

first beam directing device: the beam directing device to which an optical beam is first transmitted from a source.

additional beam directing device: the beam directing device to which an optical beam is transmitted from a first beam directing device, and from which the optical beam is transmitted to a second beam directing device.

second beam directing device: the beam directing device to which an optical beam is last transmitted before transmission to an optical receptor.

Docket No. 162 at 30. To support their proposed construction, defendants argue that the use of “first” and “second” connotes distinct structures. *Id.*

The Court agrees with Fiber that the terms refer to the sequence and no construction is necessary for [first/additional /second] beam directing device.

H. [First/Second] Area of Free Space

Claim 123 of the '332 Patent requires “a plurality of first movable mirrors mounted across a first area of free space from the sources and across a second area of free space from the optical receptors, for directing said optical beam from at least one source to a selected one of the optical receptors.” '332 Patent col. 22 ll. 54-57.

The specification makes no mention of the terms to be construed. Plaintiff argues that the references to a first and second area of free space are self-explanatory and do not require construction or, in the alternative, that the areas of free space should be construed as “a first and second region of open space, that is, usually air or a vacuum.”

Docket No. 147 at 20. Defendants state that this term should be construed as the “first and second areas of free space are spatially separated such that they do not share a common free space region.” Docket No. 162 at 31.

Defendants' interpretation relies on the prosecution history, specifically, plaintiff's differentiation of claim 123 from Patent No. 2,617,054 ("the Nippon Patent"). The Nippon Patent requires "that the input pathways between the input ports and the input mirrors, the mirror interface pathways between successive mirrors, and the output pathways between the output mirrors and output ports, all traverse a common free space region between the parallel mounting plates." Docket No. 162-16 at 17 (emphasis in original). The Nippon Patent, however, did not disclose or suggest an optical switch where "intermediate (mirror-to-mirror) paths are spatially separated from input and output paths, or where input paths are spatially separated from output paths." Docket No. 147-24 at 17. While the patent prosecution establishes that spatial separation of input and output pathways is an aspect of the invention, defendants provide no persuasive basis for reading this limitation into the claim term "[First/Second] Area of Free Space." The Court finds that the claim term speaks for itself and adequately informs a POSITA of the limits of the invention.

No construction is necessary for the term [first/second] areas of free space.

I. First Three Dimensional Region That is Traversed by at Least Most of Said Second Pathways and at Least Most of Said First Pathways are Located Wholly Outside of Said Region

Claim 123 of the '332 Patent includes a limitation that

said sources, first movable mirrors and receptors being configured such that there is a first three dimensional region that is traversed by at least most of said second pathways and at least most of said first pathways are located wholly outside said first region.

'332 Patent col. 23 ll. 14-18. Plaintiff argues that this claim term should be construed as "the first and second areas of free space are not exactly the same." Docket No. 147

at 22. Defendants argue that the claim term is indefinite. Docket No. 162 at 33. The term does not appear in the specification.

Plaintiff's expert states that the claim's reference to the different spatial regions distinguishes the '332 Patent from prior art, namely, the Nippon Patent. Docket No. 148 at 34-35, ¶ 86. The Nippon Patent required that the pathways between the mirrors in the system "all traverse a common free space region between the parallel mounting plates." Docket No. 162-16 at 17. In order to differentiate the Nippon Patent, plaintiff argued during prosecution that the '332 Patent describes an invention wherein "the movable mirrors are optically connected across a switch interface region, and input and output pathways are provided separate from this region." *Id.* According to plaintiff:

This aspect of the invention has important advantages, especially in the context of a MEMS based switch. First, it allows for greater flexibility in switch design. For example, a MEMS substrate can be angled relative to input/output optical axis to reduce a tilt angle of the mirror. The Nippon Patent requires that the mounting plates are parallel. Moreover, the claimed invention allows for separation of MEMS mirror structure and circuitry from the port mounting structure. The present invention thus provides a practical configuration for MEMS mirror switch implementation. However, as noted above, other MEMS mirror switch designers apparently have not recognized the desirability (or, perhaps, the possibility) of servo control of a mirror based on feedback regarding mirror or beam position. It is respectfully submitted that the invention of Claims 47, 63, 79, 95, 123 and 135 and their dependent claims, that are directed to such structure that facilitates MEMS switch implementation with feedback control based on mirror or beam position for fine tuning is not disclosed or suggested by any of the art of record, considered alone or in any proper combination.

Id. (emphasis in original). The examiner relied on this distinction with respect to spatial separation in finding that the subject matter of the '332 Patent was allowed, noting that the "intermediate (mirror-to-mirror) pathways are spatially separated from input (source-to-mirror) and output (mirror-to-receptor) pathways, which had not been taught

in prior arts.” Docket No. 162-16 at 65.

Statements made during the prosecution of a patent may limit the scope of the claim terms. *Computer Docking Station Corp. v. Dell, Inc.*, 519 F.3d 1366, 1374-75 (Fed. Cir. 2008). However, in order to limit the scope, such statements must be “a clear and unmistakable disavowal of scope during prosecution.” *Id.* at 1374 (quoting *Purdue Pharma L.P. v. Endo Pharms., Inc.*, 438 F.3d 1123, 1136 (Fed. Cir. 2006)). “Prosecution disclaimer does not apply to an ambiguous disavowal.” *Id.* at 1375. In this case, plaintiff did not agree to limit the applicability of the claim terms; instead, plaintiff argued that the claim terms are distinct from and improve upon the prior art by not using a “common free space region.” Docket No. 162-16 at 17. Because plaintiff’s statements made during the prosecution were not a disavowal, the relevant inquiry must focus on the intrinsic evidence.

Claim 123 provides that the “first optical pathways” are “between said sources and said first movable mirrors” while the “second optical pathways” are “between the first movable mirrors and the receptors.” ’332 Patent col. 23 ll. 3-6, 9-10. The “first three dimensional region” is the space containing most of the pathways between the movable mirrors and the receptors, and less than a majority of the pathways between the movable mirrors and the sources. The first three dimensional region is therefore defined by “more than a majority” and “less than a majority” boundaries. Such boundaries would enable a POSITA to discern the relevant regions by reference to the manner in which pathways overlap. Moreover, a POSITA would be aware of the prior art, such as the Nippon patent, allowing some degree of overlap in pathways between sources and receptors. See Docket No. 148 at 36, ¶ 88.

The claim term “first three dimensional region that is traversed by at least most of said second pathways and at least most of said first pathways are located wholly outside of said region” is construed as “the three dimensional region containing at least most of the pathways between the first movable mirrors and the receptors but having less than a majority of the pathways between the sources and the first moveable mirrors.”

J. Substantially a Complete Set of [Movable Mirrors/Pathways]

Claim 123 of the '332 Patent states that the invention comprises:

a plurality of first movable mirrors mounted across a first area of free space from the sources and across a second area of free space from the optical receptors, for directing said optical beam from at least one source to a selected one of the optical receptors, said plurality of first movable mirrors mounted across a first area of free space from the sources such that a plurality of first optical pathways are defined between the sources and the first movable mirrors, **said first movable mirrors comprising substantially a complete set of movable mirrors included in said switching system for directly interfacing with said sources** free from any intervening movable mirrors and **said first optical pathways comprising substantially a complete set of pathways included in said switching system between said sources and said first movable mirrors**, said plurality of first movable mirrors further mounted across a second area of free space from the receptors such that a plurality of second optical pathways are defined between the first movable mirrors and the receptors, the second optical pathways comprising substantially a complete set of pathways included in said switching system between the first movable mirrors and the receptors;

'332 Patent col. 22-23 ll. 58-67, 1-13 (emphasis added). The term “substantially a complete set of” is found only in the claims, not the intrinsic evidence.

According to plaintiff, the language “substantially a complete set” means “substantially at least one or more.” Docket No. 147 at 24. According to plaintiff’s expert, an improved construction over Fiber’s construction is “at least most.” Docket

No. 148 at 31, ¶ 78. Defendants urge that the term is indefinite because “substantially” is a term of degree without boundaries. Docket No. 162 at 34.

The term “substantially,” standing alone, can be used “when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002). “When a ‘word of degree’ is used, the court must determine whether the patent provides some standard for measuring that degree.” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010) (quotation omitted). A claim term is indefinite when the patent fails to provide sufficient guidance to enable a POSITA to compare potentially infringing products and determine “whether interference . . . is substantial.” *Sonix Tech. Co. v. Publications Int’l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017) (quoting *Enzo*, 599 F. 3d at 1336).

In this instance, neither the claim terms nor the specification provides any standard for measuring the meaning of the term “substantially complete set.” Unlike other cases where “substantially” is used to avoid a strict numerical boundary, see *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001), the phrase here modifies the term “complete set.” There is nothing in the specification that clarifies what portion of a “complete set” would be a “substantially complete set.” It might be a majority or, as plaintiff originally urged, “at least one.”

Because there is no basis for a POSITA to determine the meaning of the term “substantially a complete set,” the Court finds that the term is indefinite.

K. A Control

Defendants argue that the references in the '332 Patent and '917 Patent to “a control” are means-plus-function references. Docket No. 162 at 36. A means-plus-function claim term will cover only the relevant structure disclosed in the written description, as well as that structure’s equivalents. 35 U.S.C. § 112, ¶ 6; see *CCS Fitness*, 288 F.3d at 1369 (discussing 35 U.S.C. § 112, ¶ 6).⁸ If a claim term uses the word “means,” a rebuttable presumption applies that the claim term is means plus function; conversely, if a claim term does not use the term “means” there is a rebuttable presumption that the term is *not* means plus function. *Id.*

Claim 123 of the '332 Patent requires a “control for transmission of the optical beam from the source to a selected optical receptor by means of controlling a controlled mirror.” '332 Patent col. 23 ll. 19-21. Claim 27 of the '917 Patent describes “a control operative” for “at least one of 1) positioning a first beam directing device to direct the optical beam from at least one source to at least one additional beam directing device, 2) positioning at least one additional beam directing device to direct the optical beam from said additional beam directing device to a second beam directing device, and 3) positioning a second beam directing device to direct the optical beam from said second beam directing device to a selected one of said plurality of optical receptors.” '917

⁸35 U.S.C. § 112, ¶ 6 was amended and replaced with § 112(f), which applies to any patent application filed on or after September 16, 2012. See *MobileMedia Ideas LLC v. Apple Inc.*, 780 F.3d 1159, 1168 n.3 (Fed. Cir. 2015); see also Leahy-Smith America Invents Act, Pub. L. No. 112-29 § 4(e) (2012) (“The amendments made by this section . . . shall apply to any patent application that is filed on or after [the] effective date.”). Because the '332 and '917 Patents were filed before September 16, 2012, the Court refers to the pre-amendment version of § 112.

Patent col. 10 ll. 42-52. Claim 53 of the '917 Patent requires “a control so that a first beam directing device will be positioned.” *Id.* col. 12 ll. 28-31.

Although the claim terms do not use the word “means,” a limitation lacking the term “means” may nevertheless be found to be a means-plus-function term if it is shown that “the claim term fails to ‘recite sufficiently definite structure’ or else recites ‘function without reciting sufficient structure for performing that function.’”

Massachusetts Inst. of Tech. & Elecs. for Imaging, Inc. v. Abacus Software, 462 F.3d 1344, 1353 (Fed. Cir. 2006) (citation omitted). “[A] means-plus-function clause is indefinite if a person of ordinary skill in the art would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim.” *AllVoice Computing PLC v. Nuance Commc’ns, Inc.*, 504 F.3d 1236, 1241 (Fed. Cir. 2007) (citing *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1381-82 (Fed. Cir. 1999)).

Several courts have found that the word “control,” standing alone, is a means-plus-function term because “control” is simply “a device or mechanism used to regulate or guide the operation of a machine, apparatus, or system.” *ABT Sys., LLC v. Robertshaw Controls Co.*, 2013 WL 1498997, at *4 (N.D. Ill. Apr. 11, 2013); see also *Ergo Licensing, LLC v. CareFusion 303, Inc.*, 673 F.3d 1361, 1363 (Fed. Cir. 2012); *Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1325 (Fed. Cir. 2004). Generic nonce words like “mechanism,” “means,” “element,” and “device” are other examples of words that typically fail to connote definite structures. *Abacus Software*, 462 F.3d at 1354.

The term “control” is used in the claims of the patents in relation to a function:

aligning a mirror or positioning a beam directing device. In each instance, the word control could be replaced by “means” without substantially changing the meaning of the claims. See *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349-50 (Fed. Cir. 2015). Even plaintiff’s proposed construction refers only to the function of the control. See Docket No. 147 at 31 (requesting that the construction of the terms encompass “the concepts of beam steering and aligning”). Plaintiff argues that the term “control” is not means plus function because the patent specification discloses an input, a calculation, and an output. Docket No. 147 at 27-28. However, the claim language in this case does not disclose how the control accomplishes the desired output, namely, the fine tuning of a moveable mirror or beam directing device. Cf. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1303 (Fed. Cir. 2014), *overruled on other grounds by Williamson*, 792 F.3d at 1349.

The Court therefore finds that the presumption that the term “control” is not means plus function has been overcome. The control terms are means-plus-function terms because they are directly tied to a function of positioning and aligning the mirror or beam directing device and a POSITA would not understand the term to describe the relevant structure.

Construction of a means-plus-function limitation is a two-step process. “First, the court must determine the claimed function. Second, the court must identify the corresponding structure in the written description of the patent that performs the function.” *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1311 (Fed. Cir. 2012) (*quoting Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1332 (Fed. Cir. 2006));

see also *ABT Sys.*, 2013 WL 1498997, at *4 (language in a patent specification may support an argument that a limitation denotes structure). A means-plus-function limitation covers only “the corresponding structure . . . described in the specification and equivalents thereof.” 35 U.S.C. § 112, ¶ 6. To determine whether a means-plus-function term discloses sufficient structure, the relevant inquiry is “to look at the disclosure of the patent and determine if one of skill in the art would have understood that disclosure to encompass” the technology at issue. *Blackboard, Inc. v. Desire2Learn Inc.*, 574 F.3d 1371, 1385 (Fed. Cir. 2009) (quoting *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1212 (Fed. Cir. 2003)). “It is not proper to look to the knowledge of one skilled in the art apart from and unconnected to the disclosure of the patent.” *Id.*

Plaintiff relies on the following portion of the specification to incorporate structure from another patent:

LED's mounted in an array adjacent [sic] a first movable mirror 29, as disclosed below, provide radiation which is detected by detector 16. Radiation from the LED's in the array associated with the first movable mirror is received in a radiation guide of another, selected fiber and individually measured by control 100 (FIG. 7a). The position of the associated movable mirror of the selected fiber is adjusted until radiation received from each LED from the first mirror is substantially equal, as described in relation to moving fiber ends in U.S. Pat. No. 5,177,348, *supra*.

'332 Patent col. 5 ll. 40-50; '917 Patent col. 5 ll. 37-46. However, this reference to U.S. Pat. No. 5,177,348 (the "'348 Patent") [Docket No. 147-21] relates to mirror positioning and is not descriptive of the control. As Dr. Smith notes in connection with his discussion of the term “data gathering and transmission element,” in which the same passage of the '348 Patent is referred to, “the purpose of the data gathering and

transmission element is to provide information to the control that allows the control to optimize optical beam coupling to the selected receptor.” Docket No. 148 at 64, ¶ 150. In other words, the reference to the '348 Patent in the cited portion of the specification discusses data gathered related to mirror positioning which is then sent to the control. It does not indicate structures of the control.

In addition, while a patentee may incorporate prior art or other extrinsic material in order to demonstrate structure, the “material must be explicitly referenced and clearly linked to the function in question.” *Bristol Co. Ltd. P’ship v. Bosch Rexroth Inc.*, 684 F. Supp. 2d 1245, 1269 (D. Colo. 2010). The reference to the '348 Patent in the above-quoted portion of the specification is not “clearly linked to the function in question.”

Dr. Smith also argues that the structure of the control in the '332 and the '917 Patents “is the drive circuitry and actuator required to tilt a tiltable mirror,” Docket No. 148 at 50, ¶ 123, just as the control in the '348 Patent “is a piezoelectric actuator used to bend or move a fiber attached to the piezo-motor.” *Id.* However, the '348 Patent distinguishes between the “servo control” and the motor. See '348 Patent col. 11 ll. 27-28. And, as defendants point out, Dr. Smith’s discussion of “control” in relation to Figure 7b of the '332 and '917 Patents, Docket No. 148 at 51, ¶ 125, makes the same mistake in identifying the mechanism that moves the mirror as the control even though Figure 7a locates the control [100] as being distinct from that mechanism. Docket No. 162 at 39-40.

Plaintiff cites references in the patent prosecution to “radiation emitters, servo-control units, [and] data collection units” in controlling the alignment of the mirror or device. Docket No. 147-22 at 32; see *also* Docket No. 147-2 at 2 (Examiner Pak noting

the structure of the control). This language appears to come from the '348 Patent's disclosure of a "radiation responsive means [] having a radiation guide, as well as the detector and the microprocessor-based, closed-loop ('feedback type') servo control for each fiber." '348 Patent col. 7 ll. 60-63. As noted, these structures relate to data gathering, as opposed to structure of the control itself.

While plaintiff's expert argues that "a POSITA would have been fully aware of the choices of controllable device technology capable of achieving optical beam alignment," Docket No. 148 at 52, ¶ 126, the relevant inquiry is whether the patents disclosed those means of control. *Biomedino, LLC v. Waters Technologies Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007) ("The inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure."); *Blackboard*, 574 F.3d at 1385. Plaintiff does not point to any additional structures disclosed in the patent. See Docket No. 147 at 28-29.

The Court finds that the term "control" is means plus function and the specification does not disclose any corresponding structure. Accordingly, the term "control" is indefinite.

L. Data Gathering and Transmission Element

Defendants argue that the term "data gathering and transmission element" is a means-plus function term. As discussed above, because the claim term does not use the word "means," there is a rebuttable presumption that it is not a means-plus function term. "Element" is a nonce word that, standing alone, fails to connote sufficient structure. *Abacus*, 462 F.3d at 1354.

Plaintiff argues that the term “data gathering and transmission element,” read in light of the specification and prosecution history, would connote structure to a POSITA and therefore is not means-plus-function. Docket No. 147 at 29. Plaintiff is correct that the limitation provides context for how the data gathering and transmission element performs its function:

a data gathering and transmitting element for use in providing a feedback signal regarding the current orientation of the controlled mirror or the current location of the optical beam to the control, in either case for the purpose of adjusting the position of the relevant controlled mirror to minimize transmission loss of the optical beam to the optical receptor by fine tuning said orientation of said relevant controlled mirror based on said feedback signal.

'332 Patent col. 23 ll. 24-32. Similarly, the '917 patent requires a “data gathering and transmission element to provide an indication regarding the current orientation of the controlled beam directing device or the current location of the optical beam.” '917 Patent col. 10 ll. 51-54; col. 12 ll. 31-34. The specification also provides a specific example of a feedback system by reference to the '348 Patent. '332 Patent col. 5 ll. 40-50. Defendants concede that the data gathering and transmission element of the '348 Patent “describes a very similar corresponding structure” as the '332 Patent and the '917 Patent. Docket No. 162 at 46. Defendants additionally acknowledge that the disclosure of this structure is sufficiently linked to the '348 Patent. *Id.* Consistent with these limitations, plaintiff’s prosecution of the patent described “components for collection of data (through radiation emitters, servo-control units or data collection units).” Docket No. 147-22 at 32.

The mere fact that the specification provides some structure, however, does not prevent a finding that a claim term is means-plus-function – indeed all means-plus-

function terms require disclosure of structure. *Noah*, 675 F.3d at 1311. Defendants argue that the specification fails to provide “particular structural significance” to the term. Docket No. 162 at 44. The term itself is directed to a function: the gathering and transmission of data regarding the position of the mirror or beam directing device. Moreover, the Court finds that “[d]ata gathering and transmission element” does not independently connote structure to a POSITA. The specification does not use the term “data gathering and transmission element,” and neither the claim nor the specification imparts “structural significance” to the claim term. *Williamson*, 792 F.3d at 1351.

The Court therefore finds that defendants have overcome the presumption that the term “data gathering and transmission element” is not means plus function. Accordingly, the term must be limited to the structure disclosed in the specification. The only structure disclosed is the reference to the ’348 Patent. Data gathering and transmission element will be limited to the structure disclosed in the patent: the ’348 Patent’s description of a radiation guide, a detector, and a microprocessor-based, closed loop (feedback type) servo control. See ’348 Patent col. 3 ll. 60-64.

M. Adjusting the Position of the Relevant Controlled Mirror / Adjusting at Least One of the Beam Directing Devices / Positioning a . . . Beam Directing Device / A . . . Beam Directing Device Will be Positioned

Plaintiff argues that the terms “adjusting” and “positioning” do not require a physical repositioning of a movable mirror or beam directing device. Instead, plaintiff urges a construction that provides that adjusting the position of a controlled mirror, adjusting a beam directing device, or positioning a beam directing device means “applying the control signal to [the movable mirror / beam directing device] so as to

steer and align the reflected beam.” Docket No. 147 at 34. Defendants argue that adjusting and positioning requires “rotating [the movable mirror / beam directing device] into a different position.” Docket No. 162 at 47.

The parties’ dispute involves the issue of whether the claims are broad enough to encompass LCOS devices. Similar to the dispute over construction of the term “movable mirror” and “beam steering device,” the issue is, in the case of the ’332 Patent, whether the controlled mirror can be “adjusted” without physically moving it and, in the case of the ’917 Patent, whether the “beam directing device” can be “positioned” without physically moving the device.

The last limitation in Claim 123 of the ’332 Patent refers to a “data gathering and transmitting element” used for “adjusting the position of the relevant controlled mirror.” ’332 Patent col. 23 ll. 24-29. Fiber suggests that this limitation should be defined as “applying the control signal to the relevant controlled reflective device so as to steer and align the reflected beam.” Docket No. 139 at 7. Fiber’s definition does not require any movement by the “reflective device.” However, the claim language indicates that the mirror itself moves (“adjusting the position of the . . . mirror”). In this regard, the Court agrees with defendants that “Fiber’s proposal is inconsistent with the actual claim language itself, which plainly requires adjusting the position of the mirror . . . , not the beam.” Docket No. 162 at 49. Thus, and for the reasons noted in the Court’s construction of the term “moveable mirror,” the Court construes the terms “adjusting the position of the relevant controlled mirror” in the ’332 Patent to mean “rotating or tilting the relevant controlled mirror to a different position.”

The last limitation in claims 27 and 53 of the ’917 Patent requires a “data

gathering and transmission element” for “adjusting at least one of the beam directing devices.” ’917 Patent col. 10 ll. 52-56; col. 12 ll. 32-36. Unlike otherwise similar language in claim 123 of the ’332 Patent, this limitation does not say “adjusting the position of” the relevant reflective device, but rather “adjusting” the device. The word “position” has been omitted. As a result, the term “adjusting . . . [a] beam directing device” does not necessarily imply movement of the device. Instead, the device could be controlled, as an LCOS can be controlled, to change its reflective properties to change the angle of a beam reflected from it. Thus, the Court construes the term “adjusting at least one of the beam directing devices” in claims 27 and 53 to mean “changing the position of the reflective device or changing the reflective properties of the reflective device.”

The second to last limitation in claim 27 of the ’917 Patent requires a “control operative” for “positioning” a beam directing device. ’917 Patent col. 10 ll. 42-52. Fiber suggests the same definition of this term as the “adjusting” term in claim 123 of the ’332 Patent. Docket No. 139 at 8. Defendants, however, argue that “‘Position’ is consistently used in the specification to refer to the angle or physical orientation of the movable mirror. See, e.g., Ex. A, at 6:33-34, 1:58-60, Figs. 3a, 3b.” Docket No. 162 at 51. Defendants are correct that the term “position” is used in the specification to denote a physical orientation, usually in reference to a part that is capable of being moved. ’917 Patent col. 5 ll. 27-35 (“The first movable mirror **29** selects the target position for creating an optical path. . . . By operating the second movable mirror the incident angle of the beam can be changed.”); col. 5 ll. 42-43 (“The position of the associated movable mirror of the selected fiber is adjusted”; col. 6 ll. 34-35 (“The []

independent rotation of mirror **29** of mirror portion **47** about the two axes . . .”).

Moreover, as noted above, the last limitation uses language to describe changing the beam directing device that does not depend upon positioning, “adjusting at least one of the beam directing devices,” ’917 Patent col. 10 ll. 56-57, but did not do so here. Fiber construes the term “positioning a . . . beam directing device” to mean “applying a control signal to a beam directing device so as to steer and align the reflected beam.” Docket No. 139 at 8. Fiber’s proposed construction does not require any change of physical orientation of the device itself. Because the plain and ordinary meaning of the word “positioning” in this limitation means changing the physical orientation of the device, the Court will construe the term (and the term “beam directing device will be positioned” in claim 53) to mean “changing the physical orientation of a beam directing device.”

IV. CONCLUSION

Accordingly, the patent claim terms presently at issue will be construed in accordance with the foregoing.

DATED September 6, 2017.

BY THE COURT:

s/Philip A. Brimmer
PHILIP A. BRIMMER
United States District Judge