

United States District Court,
D. Delaware.

HONEYWELL INTERNATIONAL, INC, and Honeywell Intellectual Properties Inc,
Plaintiff.

v.

NIKON CORPORATION, et al,
Defendants.

Civil Action No. 04-1337-JJF

Dec. 9, 2008.

Background: Patent owner filed action against competitor alleging infringement of patent pertaining to liquid crystal display (LCD) providing enhanced brightness while at same time reducing undesirable "moire" interference effects. Court set forth to construe disputed claims.

Holdings: The District Court, Farnan, J., held that:

- (1) terse preamble that simply referred to "display apparatus" was not claim limitation;
- (2) clear reliance had not been made on preamble that referred to "display apparatus," as required to make preamble claim limitation;
- (3) clear and unmistakable disavowal of scope of claim did not occur, as required for prosecution history estoppel;
- (4) phrase, "light source," meant source for illuminating LCD panel;
- (5) reference to tailoring light transmission in "vertical" viewing angle in particular exemplary application did not limit application of viewing angle to only vertical position;
- (6) specification did not require claims to be limited to "parallel" lens arrays;
- (7) lens arrays did not have to have different pitches; and
- (8) phrase, "first and second lens arrays, each having a plurality of individual lenslets," meant two lens arrays, each consisting of member separate from light source and having plurality of light refracting structures.

Ordered accordingly.

5,280,371. Construed.

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MEMORANDUM OPINION

FARNAN, District Judge.

This is a patent infringement case brought by Honeywell International Inc. and Honeywell Intellectual Properties, Inc. (collectively "Honeywell") alleging infringement of United States Patent No. 5,280,371 ("the '371 patent"), which pertains to a liquid crystal display providing enhanced brightness while at the same time reducing undesirable "moire" interference effects. The parties briefed their respective positions on claim construction, and the Court conducted a Markman hearing on the disputed terms. This Memorandum Opinion provides tentative constructions of the disputed terms.

BACKGROUND

The patent-in-suit relates to a liquid crystal display ("LCD") apparatus for providing a tailored variation of luminance with viewing angle. Briefly, this is achieved through the use of two lens arrays that are inserted between a light source and an LCD panel. Due to total internal reflection of light around the periphery of each lens array, the lens arrays channel light from the light source into a desired range of viewing angles. The patent teaches that, in addition to providing additional luminance tailoring, two lens arrays may be employed to reduce the moire interference effects caused by the interaction of a single lens array and the LCD panel. The patent further teaches that these moire effects can be reduced even more by introducing a slight rotation between the lens array and LCD panel.

DISCUSSION

I. The Legal Principles of Claim Construction

[1] [2] Claim construction is a question of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-78 (Fed.Cir.1995), *aff'd*, 517 U.S. 370, 388-90, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). When construing the claims of a patent, a court considers the literal language of the claim, the patent specification and the prosecution history. *Id.* at 979. Of these sources, the specification is "always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips v. AWH Corporation*, 415 F.3d 1303, 1312-17 (Fed.Cir.2005)(quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996)). However, "[e]ven when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction.'" *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed.Cir.2004)(quoting *Teleflex, Inc.*

v. Ficosa N. Am. Corp., 299 F.3d 1313, 1327 (Fed.Cir.2002)).

[3] [4] A court may consider extrinsic evidence, including expert and inventor testimony, dictionaries, and learned treatises, in order to assist it in understanding the underlying technology, the meaning of terms to one skilled in the art and how the invention works. Phillips, 415 F.3d at 1318-19; Markman, 52 F.3d at 979-80. However, extrinsic evidence is considered less reliable and less useful in claim construction than the patent and its prosecution history. Phillips, 415 F.3d at 1318-19 (discussing "flaws" inherent in extrinsic evidence and noting that extrinsic evidence "is unlikely to result in a reliable interpretation of a patent claim scope unless considered in the context of intrinsic evidence").

[5] [6] In addition to these fundamental claim construction principles, a court should also interpret the language in a claim by applying the ordinary and accustomed meaning of the words in the claim. Envirotech Corp. v. Al George, Inc., 730 F.2d 753, 759 (Fed.Cir.1984). If the patent inventor clearly supplies a different meaning, however, then the claim should be interpreted according to the meaning supplied by the inventor. Markman, 52 F.3d at 980 (noting that patentee is free to be his or her own lexicographer, but emphasizing that any special definitions given to words must be clearly set forth in patent). If possible, claims should be construed to uphold validity. In re Yamamoto, 740 F.2d 1569, 1571 (Fed.Cir.1984).

II. The Meaning of the Disputed Terms

Honeywell asserts that Defendants infringe claim 3 of the '371 patent. In full, this claim recites:

3. A display apparatus comprising:

a light source;

a liquid crystal panel mounted adjacent to said light source for receiving light from said light source; and first and second lens arrays, each having a plurality of individual lenslets, disposed between said light source and said liquid crystal panel for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel, wherein at least one of said first and second lens arrays is rotated about an axis perpendicular to said liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel.

('371 patent, col. 6, ll. 23-42.)

For the reasons that follow, the Court construes the disputed terms as follows:

A. A Display Apparatus

Honeywell's Construction	Defendants' Construction
A display apparatus is a direct view LCD module.	A liquid crystal display (LCD) module, i.e., the light source, lens arrays, and liquid crystal panel.

Honeywell contends that the preamble, and hence the claim, should be limited to "direct view" LCD displays. Honeywell argues that the specification refers to viewing "from the front" of the display and that the concept of viewing angle would be meaningless if projection optics and a projection screen were inserted between the LCD and the viewer. (D.I. 1014 in 04-1338-JJF at 17-18.) FN1 Honeywell further notes that during prosecution the patentees stated that the Hamada prior art reference was a "projection apparatus," such that there would be no suggestion to combine it with "direct view" prior art to render the claimed subject matter obvious. (D.I. 1046 at 4.) According to Honeywell, this establishes that the claims are limited to "direct view" displays.

FN1. Unless otherwise noted, docket item numbers in this Memorandum Opinion refer to Civil Action No. 04-1338-JJF, which is the action where the parties filed their claim construction briefs. Civil Action Nos. 04-1338-JJF, 04-01536-JJF and 05-00874-JJF, have been consolidated into Civil Action No. 04-01337-JJF, as reflected in the caption of this Memorandum Opinion.

Defendants respond that the term need not be limited to a "direct view" display and point out that the specification describes the "present invention" as being a liquid crystal "display apparatus comprising" a light source, lens arrays, and liquid crystal panel. (*See* '371 patent, col. 1, l. 62-col. 2, l. 1; D.I. 1016 at 11.) Honeywell responds that these components are set forth in the body of the claim such that it makes little sense to redundantly include them in the construction of a preamble term. (D.I. 1014 at 18-19.)

[7] [8] [9] A threshold matter the Court must decide is whether the preamble of this claim should even be viewed as a limitation. The Court concludes that, in this case, the preamble is not a claim limitation and that it thus requires no construction. "In considering whether a preamble limits a claim, the preamble is analyzed to ascertain whether it states a necessary and defining aspect of the invention, or is simply an introduction to the general field of the claim." *On Demand Mach. Corp. v. Ingram Indus.*, 442 F.3d 1331, 1343 (Fed.Cir.2006). Furthermore, "if the body of the claim describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention the preamble is generally not limiting unless there is clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art." *Intirtool, Ltd. v. Texar Corp.*, 369 F.3d 1289, 1295 (Fed.Cir.2004) (citations omitted). Here, the terse preamble simply refers to a "display apparatus," which, in the Court's view, is nothing more than a statement of the general field of the claim. Indeed, the word "display" is not relied upon later in the claim to describe the details of the invention, which, in and of itself, provides further corroboration for the Court's conclusion that the preamble is not a limitation. *See Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed.Cir.2003) ("When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.").

[10] [11] As to Honeywell's argument that the patent should be limited based on the prosecution history, the Court notes that the patentees simply argued that the field of "direct view" displays was distinct from the field of "projection" displays, such that there would be no suggestion to combine references from these fields. Furthermore, in making this argument, the patentees did not at any point refer to the preamble or suggest that this argument was connected to the preamble, thus making it difficult to conclude that there was "clear reliance" on the preamble such that it should be a claim limitation. *See Intirtool*, 369 F.3d at 1295. Furthermore, with regard to the Hamada reference specifically, the patentees clarified that Hamada addressed a specific problem in the area of projection devices, thus arguing that it would be especially unreasonable to use Hamada in combination with "direct view" devices in an obviousness analysis. However, the patentees at no point made any concrete statement distinguishing the '371 patent from the prior art on the basis of the '371 patent being confined to "direct view" display devices. Thus, even if the Court were to conclude that the preamble was a claim limitation, the Court does not find any "clear and unmistakable" disavowal of claim scope. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed.Cir.2004) ("Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentees has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.") (citations omitted).

With regard to Honeywell's argument that it would make no sense to discuss viewing angle in the context of a projection device, the Court notes that this is unsupported attorney argument. Defendants, on the other hand, point out that their expert, Dr. Elliot Schlam, opined on the importance of the viewing angle concept in the context of display devices other than "direct view" devices. (*See* D.I. 1018 at para. 10, 12.)

Specifically, Dr. Schlam notes that in the 1980s rear projection LCD displays had been modified to transmit light in a limited range of vertical viewing angles, since this is where viewer's eyes were most often located. The Court finds this testimony persuasive, providing further support for the Court's conclusion that the claims are not limited because the viewing angle concept is somehow relevant only in the context of direct view devices.

B. A Light Source

Honeywell's Construction	Defendants' Construction
A light source for illuminating the claimed liquid crystal panel.	A source of distributed light.

[12] Honeywell contends that the term "light source" has a plain and ordinary meaning requiring no specialized knowledge to understand. (D.I. 1014 at 19.) Essentially, Honeywell's position is that no construction of this term is necessary. Defendants argue that the specification describes the "present invention" as including a prior art light source with a diffuser, such that "distributed" light is generated. (D.I. 1016 at 12.) Defendants further contend that LCD panels do not generate their own light, and to function properly their entire surface must be illuminated, necessitating the use of "distributed" light. (*Id.*)

The Court finds no compelling reason to limit the term "light source" to a source of "distributed" light. On the contrary, the Court concludes that the specification calls for a broader construction. First, the patent confirms that light can be "distributed" to varying degrees. Specifically, the patent explains that the lens array may provide an additional diffusing effect on top of those already provided by a conventional diffuser. ('371 patent, col. 5, ll. 29-38.) In these circumstances, the addition of the word "distributed" does not meaningfully clarify the claim, but rather leads to a debate about whether a particular light source distributes light sufficiently such that it may be called a "distributed" light source. Notably, the specification also explains that the diffusing effects of the lens array and diffuser "mask [] undesired spatial artifact from the light source." (*Id.*, col. 5, ll. 34-38.) Referring to "spatial artifacts" from the "light source," the specification confirms that a "light source" need not always provide fully "distributed" light.FN2 For these reasons, the Court concludes that a "light source" is, as Honeywell contends, nothing more than a source for illuminating the LCD panel.

FN2. At the Markman hearing, Defendants equated "distributed" light with the need to illuminate every pixel of an LCD display. (*See* D.I. 326 at 97-98.) To the extent Defendants intended for their proposed construction to explicitly call for a "light source that illuminates every pixel," the Court concludes that there is no reason to construe the claim limitation as setting forth certain minimum performance standards.

C. For Providing A Predetermined Variation With Viewing Angle Of Light Transmission From Said Light Source Through Said Lens Arrays And Said Liquid Crystal Panel

Honeywell's Construction	Defendants' Construction
The lens arrays provide a variation of light transmission with viewing angle; as a result of the arrays, the transmission of light through the liquid crystal panel varies with the angle from which the panel is viewed.	Predetermined variation with vertical viewing angle.

[13] Though the parties asked the Court to construe a rather lengthy claim phrase, the dispute here is really only about the term "viewing angle." While not explicitly contending that the term requires no construction, Honeywell's proposed construction alters the claim language only slightly, merely clarifying that it is the lens arrays that provide the variation in the viewing angle. Defendants, on the other hand, contend that the

"viewing angle" should be limited to the vertical direction. In so arguing, Defendants note that in one instance the specification describes the "present invention" as being for the purpose of providing a tailored variation of luminance as a function of "vertical viewing angle." (*See* '371 patent, col. 1, l. 62-col. 2, l. 3; D.I. 1016 at 18-19.) Defendants further contend that the only embodiment set forth in the patent is directed to tailoring intensity along the vertical direction, and that the patent is so focused on the vertical direction that it should be so limited. (D.I. 1016 at 19-21.)

In response, Honeywell contends that Defendants are improperly trying to limit the claims to the preferred embodiment. (D.I. 1014 at 31.) According to Honeywell, the patent's reference to tailoring light transmission in the "vertical" viewing angle is only a reference used to describe a particular application (i.e., airplane cockpits). (*Id.*) Honeywell cites to other broader language in the specification that allegedly allows for tailoring in any direction depending on the application (*See* '371 patent, col. 1, ll. 13-17; *id.* col. 1, ll. 56-61; *id.* col. 3, ll. 15-23; D.I. 1014 at 32.) Honeywell further contends that there is nothing in the specification or file history constituting a clear and unmistakable disclaimer of claim scope necessary to limit the claim to a "vertical" viewing angle. (D.I. 1014 at 32-33.)

[14] The Court concludes that Defendants' position that the patent is limited to "vertical" luminance tailoring is an errant construct of the patent's description of a particular exemplary application (i.e., airplane cockpits). Indeed, at the Markman hearing, Defendants made much of the patent's description of airplane cockpits, arguing that "[t]he first thing to understand is that the only application that's discussed in this patent is aircraft cockpits, avionics." (D.I. 1106 at 81:20-22.) However, the Court will not limit claims to examples in the specification. *See* *Astra Aktiebolag v. Andrx Pharms., Inc. (In re Omeprazole Patent Litig.)*, 483 F.3d 1364, 1372 (Fed.Cir.2007) ("Absent some clear intent to the contrary, this court does not import examples from the specification into the claims."); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed.Cir.2005).

The patent repeatedly explains-using explicit language-that the particular "vertical" luminance profile desirable in avionics is merely an example of how the invention may be applied. The following language from the specification is illustrative:

-> "There are commercially available liquid crystal displays for use in various applications, including *for example* aircraft cockpit displays. However, a *typical characteristic* of the liquid crystal panel used therein is a wide variation of the light transmission of the liquid crystal panel with viewing angle, *especially* the vertical viewing angle." ('371 patent, col. 1, ll. 11-17.) FN3

FN3. Emphasis added unless otherwise noted.

-> "This variation of brightness or luminance with [vertical] viewing angle is generally undesirable and particularly undesirable in those cases where the information being displayed on the liquid crystal display is critical to an operation *such as* controlling or navigating an aircraft." (*Id.*, col. 1, ll. 23-28.)

-> "In *certain applications, such as for example an aircraft cockpit*, the typical vertical viewing angle is fixed within a relatively narrow range and it would therefore be desirable to concentrate a higher percentage [sic] of the energy from the light source within a particular range of viewing angles." (*Id.*, col. 1, ll. 33-39.)

-> "As can be seen in the curves of FIG. 3, the luminance emitted from the lower gray-levels of the LCD system increases significantly with increasing vertical viewing angle. This variation presents an undesirably large luminance increase with angle when the information being presented is low-level luminance information, *such as* for avionics applications including weather radar or attitude director indicator presentations." (*Id.*, col. 3, ll. 1-8.)

Citing *Akeva L.L.C. v. Adidas-Salomon AG*, 208 Fed.Appx. 861, 863-64 (Fed.Cir.2006), Honeywell suggests that the Court should disregard language in the specification suggesting usefulness of the invention in applications other than avionics. (D.I. 1049 at 20; *see also* D.I. 1014 at 31 (Honeywell's citations to specification portions suggesting the use of the invention in other applications).) In *Akeva*, the language at issue was the "catch-all" phrase appearing at the end of nearly every patent specification stating that "it is intended that the present invention cover all possible combinations of the features shown in the different embodiments, as well as modifications and variations of this invention, provided they come within the scope of the claims and their equivalents." *Id.* Noting that the specification, "when read as a whole," demonstrated the limited scope of the invention, the Federal Circuit in *Akeva* declined to place much credence in the "catch-all" phrase. (*Id.* at *5-*8.)

In the Court's view, the situation here is far different from *Akeva*. Indeed, the language in the '371 specification referring to other embodiments is not boilerplate "catch-all" legalese, but rather reflects a deliberate effort by the patentee to use an example to help describe the invention and its embodiments. For instance, after explaining that a diffuser ordinarily provides constant luminance with viewing angle, the specification explains that this is undesirable "[i]n certain applications, such as for example, an aircraft cockpit," where a pilot's viewing angle generally remains fixed. ('371 patent, col. 1, ll. 29-39.) Then, in the paragraph that immediately follows, the specification describes in general terms-without making any reference to "vertical" angles-the problem addressed by the patent: "provid [ing] a tailored variation of luminance with viewing angle while also providing a concentration of the light energy from the light source within a predetermined range of viewing angles." (*Id.*, col. 1, ll. 40-45.) Pairing a description of a specific, concrete use of the invention with a generalized description of the invention, the specification thus uses an example in the usual way to clarify the broader concept. Likewise, at col. 4, l. 46 to col. 5, l. 15, the specification describes some optimizations used to achieve the desired luminance profiles for the "particular application in question," including the use of certain specific lens array shapes. In concluding this passage, the patent describes the general concept: lens array shape "may be selected as desired to obtain the required concentration of luminance and variation of luminance with *vertical and horizontal viewing angle for a particular application*." (*Id.*, col. 5, ll. 12-15; *see also id.* col. 3, ll. 1-23 (describing the invention in general terms after describing a problem encountered with prior art LCD displays when used in avionics)). Using a particular case to introduce the general concept, this language, rather than being dispensable boilerplate, represents the standard mode of using an example to convey an idea. The Court will not punish the patentees for attempting to make their specification more accessible in this manner.

Defendants repeatedly point to a passage in the Summary of The Invention where the "present invention" is characterized as being for the purpose of providing a "tailored variation of luminance from the liquid crystal display as a function of *vertical viewing angle*." (*Id.*, col. 1, l. 62-col. 2, l. 3.) Though the Defendants are correct that such language can often be limiting, "such language must be read in context of the entire specification and the prosecution history." *Rambus Inc. v. Infineon Techs. AG*, 318 F.3d 1081, 1094 (Fed.Cir.2003). Along these lines, the Court notes that the Background of the Invention characterizes "[t]his invention" as pertaining to "tailored variation of luminance with viewing angle" and makes no reference to "vertical" viewing angle. (*Id.*, col. 1, ll. 6-10.) Likewise, in three instances, the Summary Of The Invention characterizes the "present invention" as pertaining to "viewing angle" generally, without limiting the discussion to the "vertical" direction. (*See id.*, col. 1, ll. 48-61.) Against the backdrop of this evidence-and the additional evidence described above-the Court will not limit the patent on the basis of one statement referring to the "present invention."

Defendants further argue that the patent distinguishes itself from prior art on the basis of an alleged focus on "vertical" viewing angle. (*See* D.I. 1016 at 19.) However, in describing the prior art displays, the patent explains that they exhibit a "wide variation of light transmission with viewing angle, *especially* the vertical viewing angle." ('371 patent, col. 2, ll. 62-65; *see also id.*, col. 1, ll. 12-17 (describing the prior art using

similar language).) By using the word "especially," the specification actually confirms explicitly that the patent is not limited to "vertical" viewing angle and that the invention may in fact be used in connection with some other viewing angle.

Indeed, even when discussing the "specific implementation" where luminance gain along the vertical axis is desired, the patent confirms that tailoring in the horizontal direction is also contemplated. Specifically, in a passage discussing the use of a second lens array to accomplish the desired reduction in luminance with increased vertical viewing angle, the patent explains that the use of even more lens arrays led to too steep of a variation with horizontal viewing angle, which "was not desirable for the particular application in question." (Id., col. 4, ll. 46-52.) Thus, the patent explains, for the "particular application in question," the use of two lens arrays provided the best "tradeoff" to achieve a steep "roll off" with vertical angle while maintaining a smooth luminance distribution in the horizontal angles. (Id., col. 4, ll. 52-58.) Describing an example where the horizontal luminance profile could not be too peaked, this passage demonstrates that the '371 patent is in fact concerned with luminance tailoring in the horizontal direction. Interestingly, in their opening brief, Defendants argue that this particular passage supports their construction because the described example included a preference for a "steep variation" in vertical viewing angle. (D.I. 1016 at 19.) However, in their answering brief, Defendants argue that the same passage's similarly expressed preference for a smooth variation in horizontal luminance also supports their construction. (D.I. 1049 at 20-21.) But, Defendants' proposed construction ignores horizontal viewing angle completely, and suggests that the '371 patent's "objective is to avoid tailoring the horizontal angle." (Id. at 20.) As set forth above, this construction-which asks the Court to implausibly conclude that the claims no longer cover an embodiment of the invention when rotated 90 (deg.) on its side-is at odds with the specification as a whole, and will be rejected. For these reasons, the Court concludes that this term requires no construction.FN4

FN4. Honeywell concedes that the "primary" difference between the competing constructions is whether the predetermined variation is limited to the "vertical" viewing angle. (D.I. 1014 at 31.) Beyond that difference, Honeywell's construction merely clarifies that the lens arrays are responsible for providing the luminance tailoring and that light transmission varies with viewing angle. But these concepts are apparent from the claims, which explicitly state that the "lens arrays" are "for providing a predetermined variation with viewing angle of light transmission." ('371 patent, col. 6, ll. 33-36.) Thus, although the Court selected neither party's proposed construction, the dispute between the parties is in fact fully resolved.

D. First And Second Lens Arrays, Each Having A Plurality Of Individual Lenslets

Honeywell's Construction	Defendants' Construction
<p>A lenslet is a light-refracting structure. A lens array is a structure that contains a pattern of independently operating light refracting structures (lenslets).</p>	<p>I) Two lens arrays each consisting of a member separate from the light source and having a plurality of lenslets.</p> <p>II) The lens arrays are arranged such that the lenslets on the first and second lens arrays:</p> <ul style="list-style-type: none"> a) face toward the liquid crystal panel; b) are parallel to each other, and parallel to the horizontal axis of the liquid crystal panel (aside from any "slight misalignment") c) have different pitches from each other and from the liquid crystal panel
	<p>d) provide a variation of light transmission with vertical viewing angle.</p>

1. Preliminary Matters

As an initial matter, the Court notes that in the briefing, Defendants contend that their proposed construction is for the lengthy concatenated term "first and second lens arrays, each having plurality of individual lenslets ... for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel." However, in the Joint Claim Construction Statement, Defendants set forth the above construction for only the phrase "first and second lens arrays, each having plurality of individual lenslets." (D.I. 991, Exh. A at 3.) For the Markman briefing, Defendants have, with an ellipsis, linked to this a clause from the claim that includes the words "viewing angle."

For the phrase "for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel," the Defendants' entry in the Joint Claim Construction Statement includes a reference only to Part II.d of their proposed construction, which addresses the discrete issue of whether the claimed "viewing angle" is restricted to the "vertical" direction. (*See id.* at 8.) In the Court's view, the "viewing angle" issue is best handled separately from issues pertaining to the physical layout and structure of the "lens arrays," which are addressed by Honeywell's proposed construction and Parts I and II.a-II.c of Defendants' construction. Indeed, Defendants state in their briefing that "Predetermination [sic] Variation of Light Transmission with Viewing Angle Refers to a Predetermined Variation with Vertical Viewing Angle." (D.I. 1016 at 18.) Thus, Defendants connect the "viewing angle" issue to a discrete claim term (i.e. "predetermined variation of light transmission with viewing angle"). Accordingly, the Court will treat Defendants' proposed construction for this term as including Parts I and Parts II.a-II.c in the table above. However, Part II.d of Defendants' construction will be treated as the proposed construction for "predetermined variation of light transmission with viewing angle." (*See supra* Part II.C.)

2. The Parties' Contentions

Honeywell contends that the claimed "lens array" is used not for focusing purposes but for the purpose of orienting light rays to a particular range of angles. By requiring that the recited "lenslets" operate independently of one another, rather than in concert for focusing purposes, Honeywell argues that its construction properly distinguishes the claimed structures from traditional focusing lenses. (D.I. 1014 at 22-23.)

Defendants take a different approach with their proposed construction. Briefly, Defendants contend that when the claim refers to the "first and second lens arrays," it is referring to a pair of lens arrays with a set of five specific attributes. (*See generally* D.I. 1016 at 13-20.) First, Defendants contend that the lens arrays must be (1) parallel and (2) horizontally oriented because the only embodiment described in the specification is designed to maintain a wide horizontal viewing angle and a narrow vertical viewing angle. (*Id.* at 13-15; D.I. 1049 at 18.) According to Defendants, this *cannot* be done without parallel horizontally oriented lens arrays. (D.I. 1016 at 13-15.) Second, Defendants contend that the two lens arrays must have different pitch. (*Id.* at 15-16.) Were this not the case, Defendants argue, the alleged invention could not achieve its stated purpose of reducing moire interference effects. (*Id.* at 16.) Defendants further contend that the ' 371 patent disparages the use of two lens arrays with the same pitch as leading to moire effects. (*Id.* at 15-16.) Third, Defendants contend that the lens arrays must face the liquid crystal panel. (*Id.* at 16-17.) Defendants apparently understand their proposed construction to mean that the curved/angled surfaces of the lenslets must face toward the LCD display. If the curved/angled surfaces of the lenslets do not face the LCD display, Defendants contend, light would be transmitted "off-axis," which is supposedly contrary to the invention's alleged purpose of providing only "on-axis" luminance gain. (*Id.*) Finally, Defendants contend that each lens array must be a member separate from the light source. (*Id.* at 17-18.) Defendants argue that this must be so because the only embodiments depicted in the specification show the lens arrays as being physically distinct from the light source. (*Id.* at 18.) Moreover, Defendants contend, the specification

explains that the lens arrays are "between" a diffuser and a light source, and that it is impossible for this to be so if the lens arrays are part of the light source. (*Id.*)

3. Whether the Claims Require "Horizontally Oriented" Lens Arrays With Lenslets "Facing" The Liquid Crystal Panel

In view of the Court's conclusion that the patent is not limited to luminance tailoring in the vertical direction, the Court cannot conclude that the patent is limited to "horizontally oriented" lens arrays, which Defendants contend must be a limitation because this is "required" for vertical luminance tailoring. Likewise, for the reasons set forth above, the Court cannot conclude that the patent is limited to providing "on-axis" luminance gain such that the curved/angled face of the lens array must be directed to the LCD panel. As the '371 patent explains, "[o]ther lens array shapes may be selected as desired to obtain the required concentration of luminance and variation of luminance with vertical and horizontal viewing angle for a particular application." ('371 patent, col. 5, ll. 12-15.) This passage, calling out the possibility of differently shaped lens arrays, embraces the notion of "flipped" lens arrays that could be used to create off-axis luminance peaks. Likewise, this passage counsels against adopting the portion of Honeywell's construction calling for "independently" operating lens arrays, which is essentially an attempt to exclude from the scope of the claims lens arrays with a particular shape, such as Fresnel lenses. (*See* D.I. 1014 at 22-23.) Though a Fresnel lens array has a focal length, a lens array of this shape may nonetheless be useful "for a particular application."

4. Whether The Lens Arrays Must Be "Parallel"

[15] Defendants are correct that the specification depicts and describes nothing but two parallel lens arrays. At most, it could be said that the patent discusses oblique lens arrays implicitly when it mentions the possibility of horizontal and vertical luminance tailoring. (*Id.*) Nevertheless, the Court will not limit the claims to "parallel" lens arrays. The cases cited by Defendants in support of their position confirm that the claims should not be so limited. For instance, Defendants cite *On Demand Mach. Corp. v. Ingram Indus.*, 442 F.3d 1331, 1340 (Fed.Cir.2006), for the proposition that the claims "cannot be of broader scope than the invention set forth in the specification." However, in *On Demand*, the Federal Circuit construed a claim term narrowly when the specification repeatedly reinforced the narrow meaning, and even distinguished devices embodying a broader understanding of the term. *Id.* With respect to the issue of "parallel" lens arrays, this type of guidance simply is not present in the '371 specification. Rather, the '371 patent, instead of criticizing oblique lens arrays, stays silent on the topic. Such silence is not a sound basis on which to limit the claims. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed.Cir.2004) (requiring "explicit disclaimer" not just the "mere absence of any reference to [a] structure in the specification" to limit claim scope); *LG Philips LCD Co. v. Tatung Co.*, No. 04-343-JJF, 2007 WL 5787789, at *8, 2007 U.S. Dist. LEXIS 43557, at *24-*25 (D. Del. June 15, 2007) ("The mere absence of a description of alternative embodiments in the common specification such as a flat screen monitor does not ... rise to the level of words of manifest exclusion or restriction.") (citations omitted).

5. Whether The Lens Arrays Must Have Different Pitch

[16] Whether the lens arrays must have different pitch presents a complex issue. The patent explains that a second lens array may be introduced to eliminate moire patterns caused by the interaction of the LCD panel and a first lens array. ('371 patent, col. 4, ll. 26-34.) The patent further teaches that to eliminate moire, this second lens array must have a different pitch than the first lens array. (*Id.*) But the patent also teaches an additional method for eliminating moire, specifically, the slight rotation of the lens array relative to the LCD. (*Id.*, col. 5, ll. 21-27.) Stating that this slight rotation may be used to eliminate "residual" moire that remains even after a second lens array is introduced, the patent suggests that both moire-reducing techniques should always be used together. (*Id.*, col. 5, ll. 15-27.) However, as the Federal Circuit explained, "[d]ifferences among claims can also be a useful guide in understanding the meaning of

particular claim terms." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed.Cir.2005). Here, differences in the claims strongly suggest that claim 3 of the '371 patent does not require lens arrays with different pitch. Indeed, claims 1 and 2 of the '371 patent are specifically directed to the use of lens arrays with different pitches, and make no mention of any lens array rotations. Claim 3, by contrast, refers to the "slight misalignment" of lens arrays and makes no reference to lens array pitch. Furthermore, rather than including a plethora of claims with undifferentiated scope, the '371 patent includes only three claims narrowly directed to two distinct concepts. In these circumstances, the Court will not incorporate the "pitch" concept from claim 1 into claim 3.

6. Whether The Lens Arrays Must Be Separate From The Light Source

[17] [18] The Court concludes that the lens arrays must be separate from the light source. "The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed.Cir.2005) (quoting *Renishaw PLC v. Marposso Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed.Cir.1998)). Here, the claim refers to the lens arrays and light source separately and, more importantly, requires the lens arrays to be "*disposed between* [the] light source and [the] liquid crystal panel." As Defendants note, it makes little sense to speak of the lens array as being "between" the light source and lens array if they are in fact part of either the light source or LCD panel. (D.I. 1049 at 16.) Furthermore, this understanding of the claim is fully aligned with the specification. Indeed, the specification shows nothing other than lens arrays that are separate structures from the light source, (*see* '371 patent, Figs. 2, 4A, 4B, 7, 10), and repeatedly describes the lens arrays as being "inserted" between the light source and LCD panel. (*Id.*, col. 3, ll. 24-52.) Further, the specification states unequivocally that an "air gap must be present" at the interface of a diffuser, which is typically part of the light source, and the lens array, further suggesting that the lens array is a separate member from the light source. The Court thus concludes that the claims and specification are aligned in requiring the lens arrays to be separate structures from the light source. FN5

FN5. Honeywell cites cases dealing with whether, in an infringement analysis, an accused product may infringe if multiple claim components are present in a single structure of the accused product. As Defendants correctly note, these cases are simply not pertinent to the instant topic of claim construction.

7. The Court's Construction of "Lenslet"

Finally, as to the meaning of the term "lenslet," the Court notes that the term appears nowhere in the specification. Honeywell proposes that a "lenslet" be defined as a "light-refracting structure," but offers little support for this broad definition. Though Defendants object that Honeywell's proposed construction finds little support in the intrinsic record, they offer no counterproposal. (D.I. 1049 at 14.) Nevertheless, Defendants appear to agree that the lens array operates, in part, through a refraction process. (*See* D.I. 1016 at 22 ("The air gap ensures that light rays are refracted to the extent desired by the '371 patent...."); D.I. 1049 at 25.) Furthermore, the specification depicts light refraction at the interface of the light source and lens array. (*See* '371 patent, Fig. 6.) Accordingly, the Court will adopt Honeywell's definition for the term "lenslet."

8. The Court's Construction Of "First And Second Lens Arrays, Each Having A Plurality Of Individual Lenslets"

The net result of the foregoing analysis is that the term "first and second lens arrays, each having a plurality of individual lenslets" will be construed to mean "two lens arrays, each consisting of a member separate from the light source and having a plurality of light refracting structures."

E. Disposed Between Said Light Source And Said Liquid Crystal Panel

Honeywell's Construction	Defendants' Construction
No construction necessary.	Positioned between the light source and the liquid crystal panel, with a purposeful and defined air gap at the interface of the light source and the one of the lens arrays closest to the light source.

[19] Honeywell contends that this term has a plain and ordinary meaning and that no construction is required. (D.I. 1014 at 28.) Defendants, on the other hand, contend that this claim term requires a "purposeful and defined" air gap between the light source and the lens arrays. Defendants note that the specification explains that an air gap "must" be present between a diffuser, which sits in front of the light source, and the lens array and that this statement limits the patent. Defendants further contend that the air gap is necessary for total internal reflection because it "ensures that light rays are refracted to the extent desired by the '371 patent...." (D.I. 1016 at 21-22.) Honeywell responds that the specification's single reference to an air gap is impertinent because it refers to a gap between the light source and diffuser, and the claims do not require a diffuser in the first place. (D.I. 1046 at 20-21.)

[20] To the extent Defendants argue that the Court's construction should somehow reflect the fact that the specification unequivocally states that an air gap "must" be present, the Court agrees. Indeed, this statement is made in connection with the patent's description of the feature at the heart of the invention: the directional intensification of light due to total internal reflection around the lens array periphery. ('371 patent, col. 3, l. 38-col. 4, l. 16.) This air gap is not portrayed as being merely exemplary, but is described as a requirement for the functioning of the invention. As such, every embodiment shown in the patent depicts a gap between the light source and lens array. The public is entitled to rely on these representations. *See, e.g., Microsoft Corp. v. Multi-Tech Sys., 357 F.3d 1340, 1351 (Fed.Cir.2004)* ("Because maintaining the integrity of the voice data is central to the functioning of the claimed inventions, we read Multi-Tech as having defined the term 'multiplexing' to require the prioritization of voice data over computer data.").

However, to the extent Defendants argue that this air gap must be "purposeful and defined," the Court cannot agree. In the Court's view, the language "purposeful and defined," adds ambiguity to the claim rather than clarity. Second, expert witness testimony in this case confirms that those of skill in the art interpret the "air gap" requirement much more narrowly. Specifically, Defendants' experts have testified that the "air gap" requirement pertains to ensuring an optical discontinuity that provides a change in index of refraction. For instance, Defendants' expert Robert D. Smith-Gillespie testified that he would "define" the "air gap" requirement in terms of an optical discontinuity:

A. Well, the concept of-of an air gap is-is-basically means that there's not optical coupling. That means that the index of refraction between the material-between one material and another is such that there's a-a discontinuity.

A. Well, the concept of-of an air gap is-is-basically means that there's not optical coupling. That means that the index of refraction between the material-between one material and another is such that there's a-a discontinuity.

Q. Just an optical discontinuity; right?

A. In most cases what you want to do is have a high index to a low index or a low index to a high index. If you mate the two parts, quote, optically, then there would be no difference in index of refraction that would cause the scattering effects or whatever it is you're looking for.

Q. When you were talking earlier about bonding materials,-

A. Yes.

Q. -those are the sort of things that you would use to mate something optically; right?

A. Correct.

Q. Okay. And those are the kinds of things that would eliminate any air gap; right?

A. Yes.

Q. Okay. An air gap, however, for the pure function-function of functioning as an air gap just needs to have that change in the index of refraction; correct?

A. That-that's true. That's the way I would define it.

(D.I. 1046, Exh. J at 133-34 (objections omitted).)

Likewise, Defendants' other expert, Dr. Elliot Schlam, testified that only an optical discontinuity was required for the invention to work:

Q. As a technical matter you don't need to have an air gap as long as there's an optical discontinuity; correct?

A. Yes, as long as there's an optical discontinuity.

(D.I. 1046, Exh. K at 242.) Accordingly, the Court concludes that the "air gap" requirement should be understood in terms of an optical discontinuity. Such a construction vindicates the specification's unequivocal teachings calling for an air gap and at the same time clarifies the meaning of the term in a way consistent with the understanding of those skilled in the art. Thus, the Court concludes that the phrase "disposed between said light source and said liquid crystal panel" means "positioned between the light source and the liquid crystal panel, with an optical discontinuity at the interface of the light source and the lens array closest to the light source."

F. Wherein At Least One Of The Lens Arrays Is Rotated About An Axis Perpendicular To The Liquid Crystal Panel In Order To Provide A Slight Misalignment Between Said Lenslets And Said Liquid Crystal Panel

Honeywell's Construction	Defendants' Construction
A slight misalignment is a misalignment of typically 2-16 degrees between an axis of the lens array and an axis of the pixel arrangement in the liquid crystal panel.	One or more of the lens arrays is intentionally rotated at an angle of not less than 2 degrees and not more than 16 degrees in relation to the horizontal axis of the liquid crystal panel.

[21] The dispute here is about the meaning of "slight misalignment." Though the parties agree that the term includes rotations between 2 and 16 degrees, the parties dispute whether these angles represent hard limits (Defendants' position) or not (Honeywell's position). The parties further dispute whether the rotation must be measured with respect to a horizontal axis (Defendants' position) or any axis of the LCD panel (Honeywell's position) and whether the rotation must be intentional (Defendants' position) or not (Honeywell's position).

Honeywell contends that the term "slight misalignment" should be understood functionally: So long as a rotation accomplishes the moire reducing function, it falls within the claim. (D.I. 1014 at 35.) Defendants

contend that because the claim uses the word "slight," the rotations should be limited to small rotations. (D.I. 1016 at 23.) According to Defendants, the specification explicitly dictates that "slight" rotations are those of a "few degrees" measured relative to the horizontal axis of the LCD display and contains no other disclosure suggesting otherwise. (*Id.* at 23-24.)

Defendant Innolux submitted separate briefing on this term providing further argument in support of Defendants' construction. Innolux notes that Honeywell has accused products of infringing having angles of rotation ranging from 1 to 44 degrees. (D.I. 1000 at 12.) Because Honeywell's construction includes no reference axis, Innolux argues, Honeywell's proposed construction encompasses all rotations except those of 45 degrees, which represents the maximum rotation from either a vertical or horizontal axis. (*Id.*) Innolux contends that such a construction renders the claim term "slight" superfluous and fails to apprise the public of the scope of the '371 patent. (*Id.* at 11-13.) With respect to Honeywell's functional understanding of the claim term, Innolux contends that Honeywell failed to acquire claims including functional language and should not now be able to "rewrite" the claim to include such language. (D.I. 1045 at 3-4.)

[22] "[W]hen a claim term is expressed in general descriptive words, [courts] will not ordinarily limit the term to a numerical range that may appear in the written description or in other claims." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed.Cir.1998). The law is thus well settled that this is a case where the claims should not be limited. The Federal Circuit's guidance in *Conoco, Inc. v. Energy & Env'tl. Int'l, L.C.*, 460 F.3d 1349, 1358 (Fed.Cir.2006), is instructive. In *Conoco*, the Federal Circuit declined to limit the term "water-alcohol mixture" to a composition that was at least 30 percent water. *Id.* at 1358. The specification at issue stated that "the amount of alcohol employed in the suspending material *may vary widely* but it *usually* forms between 0 and 70 weight percent of the suspending material, and more usually between about 30 and 50 weight percent." *Id.* at 1357 (quoting U.S. Pat. No. 5,244,937) (emphasis in original). The Federal Circuit noted that this language referred to a preferred embodiment and was not used in a context intended to limit the claims. *Id.* at 1358. In fact, the Federal Circuit noted, by using the words "may vary widely" and "usually," the specification made clear that the stated numerical ranges were not limiting. *Id.* As in *Conoco*, the '371 patent refers to a numerical range not in a limiting context, but in the context of an extended description of an exemplary embodiment that also sets forth suggested lens array frequencies and particular lens array shapes. ('371 patent, col. 4, l. 59-col. 5, l. 28.) Furthermore, similar to *Conoco*, by using the word "[t]ypically," the '371 specification confirms that the stated "2 to 16 degree[]" rotation is not a limitation. Other cases are in accord with *Conoco*. *See, e.g., Innovad, Inc. v. Microsoft Corp.*, 260 F.3d 1326, 1332-33 (Fed.Cir.2001) (holding that the term "small volume" was not limited to being smaller than 4.4 cubic inches when the specification related the term to a function and provided no specialized meaning for the term); *Brassica Protection Products LLC v. Sunrise Farms (In re Cruciferous Sprout Litig.)*, 301 F.3d 1343, 1348 (Fed.Cir.2002) (declining to construe a claim term in terms of a specific numerical limit when, among other reasons, the patent included no indication that the claim term should be so limited). Accordingly, with respect to the magnitude of the rotation, the Court will adopt Honeywell's proposed construction, which, by explaining that the rotation is "typically 2-16 degrees," confirms to one of ordinary skill in the art the size of the rotation without specifically limiting it to a certain numerical range.

[23] A remaining question is the proper reference axis for the rotation. In view of the Court's conclusion that the patent is not limited to vertical luminance tailoring, the axis for the rotation cannot strictly be the horizontal axis, as Defendants contend. At the same time, as Honeywell correctly notes, the term "slight" cannot be "mere surplusage," (D.I. 1014 at 34), which is what it would be unless some reference is identified for measuring the rotation angle. The specification explains that the purpose of the slight rotation is to cause a small change in the spatial frequency difference of the lens array and LCD array, thereby eliminating residual moire. ('371 patent, col. 5, ll. 21-28). Likewise, the claim itself states that the rotation is to provide a "slight misalignment between said lenslets and said liquid crystal panel." ('371 patent, claim 3.) In light of this, the Court is inclined to understand the rotation from a functional perspective, as Honeywell contends. (D.I. 1014 at 35.) However, in this regard, Honeywell's proposed construction is unsatisfactory

because it simply refers to "an axis" of the lens array without regard to whether the liquid crystals along that axis are actually causing moire effects. In the Court's view, the rotation must be relative to the axis of the LCD panel that is actually interacting with the lens array to cause moire. Accordingly, the Court concludes that a "slight misalignment" means "a misalignment of typically 2-16 degrees between an axis of the lens array and an axis of the pixel arrangement causing moire effects." FN6

FN6. Defendants ask the Court to construe "slight misalignment" to also be an "intentional" rotation. Honeywell, in asking for a functional understanding of the term "slight misalignment," has signaled to the Court that it does not actually dispute the notion that the slight misalignment is intentional. Accordingly, the Court sees no reason to include the term "intentional" in its construction of this term. Nevertheless, the Court notes that slight unintentional rotations due to manufacturing variability, for instance, are not understood to be within the scope of the claims.

CONCLUSION

For the reasons discussed, the Court has tentatively construed the disputed terms and/or phrases of the '371 patent provided herein. An Order consistent with this Memorandum Opinion will be entered setting forth the tentative meanings of the disputed terms and/or phrases in the '371 patent.

ORDER

At Wilmington, this 9 day of December 2008, for the reasons discussed in the Memorandum Opinion issued this date;

IT IS HEREBY ORDERED that the following terms and/or phrases in United States Patent No. 5,280,371 ("the '371 patent") are tentatively assigned the following meanings:

1. The term "**display apparatus**" requires no construction.
2. The term "**light source**" means "a source for illuminating the LCD panel."
3. The term "**for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel**" requires no construction.
4. The term "**first and second lens arrays, each having a plurality of individual lenslets**" means "two lens arrays, each consisting of a member separate from the light source and having a plurality of light refracting structures."
5. The term "**disposed between said light source and said liquid crystal panel**" means "positioned between the light source and the liquid crystal panel, with an optical discontinuity at the interface of the light source and the lens array closest to the light source."
6. The term "**slight misalignment**" means "a misalignment of typically 2-16 degrees between an axis of the lens array and an axis of the pixel arrangement causing moire effects."

D.Del.,2008.

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