

United States District Court,
W.D. Michigan, Southern Division.

POLYVISION CORPORATION,
Plaintiff.

v.

SMART TECHNOLOGIES INC. and Smart Technologies Corporation,
Defendants.

Smart Technologies, Inc,
Plaintiff.

v.

PolyVision Corporation and Paragram Sales Company, Inc,
Defendants.

Nos. 1:03-CV-476, 1:04-CV-713

June 1, 2007.

Background: Patent owner brought action against competitor alleging infringement of patents relating to self-tensioning membrane digitizer feature in electronic whiteboard technology. Competitor counterclaimed alleging infringement of its patents on touch-sensitive interactive whiteboard products. Court set forth to construe disputed claims.

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

- (1) term, "pretension," meant flexible member was pushed in direction to impart or store spring tension in that member before attachment of membrane to flexible member;
- (2) preamble did not have to be considered patent claim limitation due to applicant's use of "self-tensioning membrane digitizer" phrase in preamble;
- (3) phrase, "support structure," meant digitizer having membrane attached in support structure that included flexible walls which were pretensioned to deflect and maintain tension on membrane to keep it spaced from underlying substrate despite expansion or contraction;
- (4) phrase, "spacer means," meant suitable insulator such as plastic in form of peripheral spacer rail establishing separation between membrane and underlying conductive surface and structural equivalents thereof;
- (5) phrase, "peripheral flexible member," meant flexible structure or element consisting of one or more components that extended from edge of support structure which included at least two independently flexible sections;
- (6) prosecution history that provided definition of "peripheral flexible member" did not limit scope of claim to disclosed embodiments;
- (7) phrase, "independently flexible sections," meant separate sections or parts of peripheral flexible member that could be pushed, moved, or flexed independently of each other; and
- (8) term, "integral," meant one-piece construction of base and flexible member.

Claims construed.

5,448,263, 5,838,309, 6,141,000, 6,337,681, 6,747,636. Construed.

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CLAIM CONSTRUCTION

QUIST, District Judge.

The instant consolidated patent cases concern patents relating to electronic "whiteboard" technology. In the lead case, *PolyVision Corporation v. Smart Technologies Inc., et al.*, Case No. 1:03-CV-476, the plaintiff, PolyVision Corporation ("PolyVision"), alleges that the defendants, Smart Technologies Inc. and Smart Technologies Corporation (collectively "Smart"), have infringed PolyVision's patent, United States Patent No. 5,838,309 (the "'309 patent"), by making, using, and selling electronic whiteboards that infringe claims 6, 10, and 20 of the '309 patent. In the later-filed case, *Smart Technologies Inc. v. PolyVision Corporation, et al.*, Case No. 1:04-CV-713, Smart alleges that PolyVision and Defendant Paragram (a seller or distributor of PolyVision's products), have infringed Smart's patents, United States Patent Nos. 5,448,263 (the "'263" patent), 6,141,000 (the "'000 patent"), 6,337,681 (the "'681 patent"), and 6,747,636 (the "'636 patent") (collectively the "Martin patents"), by making, using, and selling touch-sensitive interactive whiteboard products that infringe at least one claim of each of those patents. PolyVision and Smart deny infringing each others' patents, and both allege that the others' patent(s) is invalid and unenforceable.

[1] The first step in determining whether a patent has been infringed is for the court to determine, as a matter of law, the scope and the meaning of the asserted patent claims. *See* *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed.Cir.1998). In accordance with the Court's Case Management Orders, the parties have filed their briefs setting forth their positions regarding the proper interpretation of the disputed claims of all patents in suit. In addition, the Court heard oral argument and received additional materials on March 5, 2007. The Court's construction of the disputed terms follows.

Principles of Claim Construction

[2] [3] [4] [5] [6] [7] Construction of patent claims is a matter of law. *See* *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454-56 (Fed.Cir.1998) (en banc). When there is a dispute regarding the meaning of language used in a claim, the court must ascertain the scope of the exclusive rights claimed in the patent. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995) (en banc), *aff'd* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Proper claim construction begins with the language of the claims themselves. *See* *Vitronics Corp. v. Conceptor, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996). "In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.'" 35 U.S.C. s. 112, para. 2.' " *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298 (Fed.Cir.2003) (quoting *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331 (Fed.Cir.2001)). The Federal Circuit has reiterated that claim terms should be given their ordinary and customary meaning as they would be understood by "a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed.Cir.2005) (en banc). This "starting

point is based on the well-settled understanding that inventors are typically persons skilled in the field of the invention and that patents are addressed to and intended to be read by others of skill in the pertinent art." *Id.* Apart from the language of the claim, a court must also consider the written description, "because it is relevant not only to aid in the claim construction analysis, but also to determine if the presumption of ordinary and customary meaning is rebutted." *Brookhill-Wilk 1, LLC*, 334 F.3d at 1298. In fact, the specification is usually "the single best guide to the meaning of a disputed term." *Vitronics*, 90 F.3d at 1582. The prosecution history may also be relevant because it may "inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 415 F.3d at 1317.

[8] [9] [10] [11] A court may also resort to extrinsic evidence, such as dictionaries, treatises, and expert or inventor testimony. *See id.* Technical dictionaries may be helpful in providing an understanding "of particular terminology to those of skill in the art of the invention." *Id.* at 1318. Likewise, expert testimony is useful for explaining the technology at issue and how the particular invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of ordinary skill in the art, or to establish that a particular claim in the patent or in prior art has a particular meaning in the pertinent field. *See id.* However, unlike extrinsic evidence, intrinsic evidence, i.e., the specification and prosecution history, is created contemporaneously with the claims and is generally more reliable and thus entitled to greater weight. *See id.* at 1320-21.

[12] [13] Although both intrinsic and extrinsic evidence can prove useful in arriving at the correct construction, "the court's focus [must] remain[] on understanding how a person of ordinary skill in the art would understand the claim terms." *Id.* at 1323. This means that the court should resist the temptation to import limitations from the specification into the claims. *Id.* Thus, "[t]he 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." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa'* per *Azioni*, 158 F.3d 1243, 1250 (Fed.Cir.1998)).

Analysis

I. The '309 Patent

[14] In the lead case, PolyVision alleges that Smart has infringed the ' 309 patent, entitled "Self-Tensioning Membrane Touch Screen." In particular, PolyVision alleges that Smart whiteboard Model Nos. 540, 560, and 580 infringe claims 6, 10, and 20 of the '309 patent. The stated purpose of the '309 patent is to provide a self-tensioning membrane digitizer (whiteboard) that automatically maintains tension in the membrane to keep it spaced from the underlying substrate regardless of expansion or contraction due to age or fatigue or changes in humidity or temperature. (Col. 2, ll.1-8.) As noted above, claims 6, 10, and 20 of the 309 patent are in dispute. Claims 6 and 10 depend upon claim 1, and claim 20 depends upon claim15. The following claim terms are in contention.

A. "pretensioned" (claims 6 and 10)

PolyVision's proposed construction	Smart's proposed construction
Having tension, tautness, or stress in the installed condition.	Flexible member is pushed in a direction to impart or store spring tension in that member before the attachment of the membrane to the flexible member.

This term appears in the phrase "a peripheral flexible member ... *pretensioned* counter to the tension of said tensioned membrane." PolyVision contends that pretensioned refers only to the condition or state of the

flexible member having tension in its installed configuration, while Smart contends that this term refers to the process of applying spring tension to the flexible member.

PolyVision's primary support for its proposed construction is a definition from a mechanical engineering dictionary, which defines pretension as: "The amount of tensile load applied to a bolt or tie-rod when it is installed, but not subjected to its working environment." *Dictionary of Mechanical Engineering* (4th ed.1996). PolyVision contends that this definition shows that engineers use the term "pretensioned" to refer to a member that is stressed in its installed condition. It further argues that this definition comports with the usage of the term in the written description, which states:

In this *pretensioned condition*, any expansion or contraction will be accommodated by a deflection outwardly or inwardly, respectively, of section 46 and its counterpart sections so that an opposing or counter tension or force, arrow 30, is always being applied to membrane 24 to keep it taut and away from surface 18.

(Col. 3, ll.57-62.)

The primary difficulty with PolyVision's proposed construction is that it is based upon a technical dictionary definition that really has no relevance to the subject matter of the invention at issue. The definition refers to a bolt or a tie-rod, neither of which is a subject of the patent, and the definition in fact refers to a measurement of tensile strength, which is not addressed in the patent. More importantly, although Phillips acknowledges that such extrinsic evidence has its place in construing a patent, it counsels that it is less reliable for a number of reasons but, primarily, because it "is not part of the patent and does not have the specification's virtue of being created at the time of patent prosecution for the purpose of explaining the patent's scope and meaning." Phillips, 415 F.3d at 1318.

Turning to the written description, the Court notes that the description and drawings disclose a substantial basis for concluding that the inventor intended the term "pretension" to connote imparting spring tension to the flexible member. The summary of the invention discloses the focus of the invention as follows:

The invention results from the realization that a truly self-tensioning membrane digitizer can be effected by attaching the membrane in a support structure that includes flexible walls which are *pretensioned* to deflect and maintain tension on the membrane to keep it spaced from the substrate despite expansion or contraction of the membrane....

....

In a preferred embodiment the flexible sections may be *pretensioned* outward relative to the frame or they may be *pretensioned* inward relative to the frame....

(Col. 2, ll. 9-14, 26-28 (italics added).) According to this language, then, to accomplish the purpose of the invention, some force or tension must be applied to the flexible walls themselves in order to allow the opposing flexible walls to maintain the tension on the membrane. This is the essence of "self-tensioning."

Fig. 1, set forth below, illustrates this application where the flexible walls are "pretensioned" or pushed inward relative to the frame.

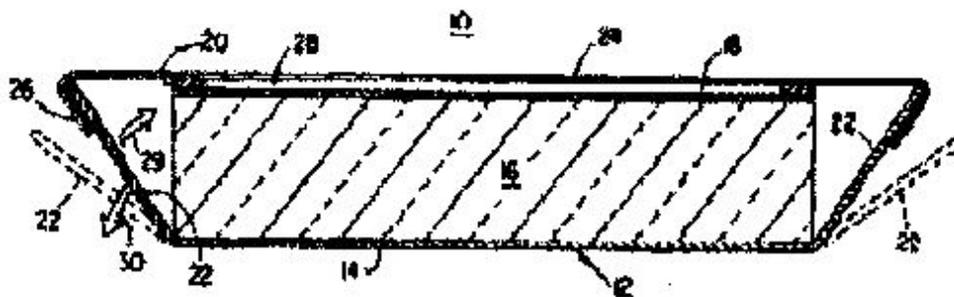


FIG. 1

The specification explains that "[f]lexible wall 22 is pretensioned by pushing inwardly as indicated by arrow 29 toward base 14 and toward digitizer area 28 before membrane 24 is attached to wall 22 at 26." (Col. 3, ll.32-35.) It further explains that flexible wall 22 is in the phantom position indicated by the dotted line and then, after being pushed, assumes the position shown in the full line 22. (Col. 3, ll.35-38.) In that position, "flexible wall 22 applies a counter tensioning force as indicated by arrow 30 which pulls membrane 24 taut across digitizer area 28 over pacer 20." (Col. 3, ll.38-40.)

Fig. 5, shown below, shows a different construction in which the flexible sections are pretensioned by applying an outward force.

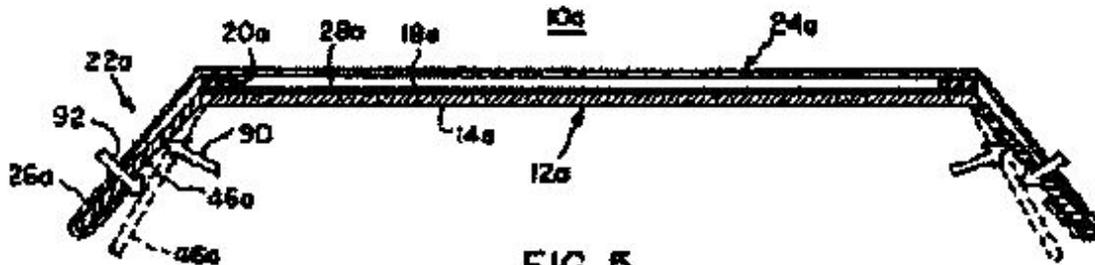


FIG. 5

The flexible wall 22a is pushed outwardly in the direction shown by arrow 90, and the membrane is attached to the flexible wall. (Col. 4, ll.24-27.) "After the attachment is complete at 26a, the now *pretensioned* wall 22a tends to return to its initial position, exerting a tensioning force 92 which stretches membrane 24 tautly over spacers 20a establishing a separation between membrane 24 and conductive surface 18a." (Col. 4, ll. 24-29 (emphasis added).) Similarly, Fig. 9 shows an embodiment of the invention using compressible foam members in place of flexible walls. Column 4, lines 54-67, which describe that particular embodiment, states that "[p]eripheral compressible member 22c is *pretensioned* by compressing it inwardly toward substrate 16c in the direction of arrow 29c." (emphasis added.) It also notes that after compression, the membrane is attached to the bottom of the substrate and the compression member is then released, pulling the membrane taut across the digitizer area. (Col. 4, l.67-Col. 5, ll.1-4.)

Consistent with this construction, Fig. 4 shows a "jig" or a box "which can be used to pretension" the flexible walls "while the membrane is being attached." (Col. 2, ll.60-62.) The specification explains that the

digitizer is placed into the jig, forcing the peripheral flexible wall 22 inwardly while membrane 24 is attached to flexible wall 22. (Col. 2, ll.65-67-Col. 4, ll.1-2.)

Based upon the foregoing, the Court concludes that Smart's proposed construction is consistent with the patent and accurately describes the term "pretension" as used by the inventor. (Col. 3, ll. 48-52 (stating that "[t]he pretensioning of flexible wall 22 is done simply by applying a lateral force 29, FIG. 3A, to each of the flexible wall sections, for example section 46, while membrane 24 is being attached at 26 to flexible section 46").)

PolyVision contends that Smart's construction must be rejected because it improperly reads manufacturing limitations into a product claim. PolyVision cites *AFG Industries, Inc. v. Cardinal IG Co.*, 375 F.3d 1367 (Fed.Cir.2004), and *3M Innovative Properties Co. v. Avery Dennison Corp.*, 350 F.3d 1365 (Fed.Cir.2003), as support for this argument. However, those cases are distinguishable from the instant case because the products involved in those cases-multiple layers in a glass product in *AFG Industries* and "multiple embossed patterns" in connection with pressure sensitive adhesives in *3M Properties Co.*-were not tied to any specific manufacturing process. In contrast, regardless of whether the "jig" shown in Fig. 4 or some other method is used, the flexible sections must be pretensioned by exerting an inward or outward force, as the case may be, in order to obtain the self-tensioning feature of the invention. PolyVision further contends that Smart's proposed construction, which states a process involving pushing the flexible walls inward or outward and then attaching the membrane, is at odds with the plain language of the patent that "[t]he flexible sections are attached to the membrane and pretensioned counter to the tension of the tensioned membrane for deflecting to maintain tension on the membrane to sustain the spaced relationship of the membrane relative to the structure." (Col. 2, ll. 21-25.) The Court disagrees. Rather than stating that the membrane may first be attached to the flexible sections before they are "pretensioned," the quoted language merely describes the purpose of the flexible sections in the invention as: (1) attached to the membrane; and (2) pretensioned. Finally, the Court rejects PolyVision's argument that limiting the term "pretension" to the process described in the preferred embodiment is improper. The inventors chose to act as their own lexicographers in defining the term "pretension" and the preferred embodiment, as well as the remainder of the specification, show the precise meaning of this term. *See Phillips*, 415 F.3d at 1316.

B. "self-tensioning membrane digitizer" (claims 6, 10, and 20)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: An apparatus that converts a signal into digital form (or digitizer) where the apparatus maintains a thin sheet (or membrane) in tension.	A digitizer having a membrane attached in a support structure that includes flexible walls which are pretensioned to deflect and maintain tension on the membrane to keep it spaced from an underlying substrate despite expansion or contraction.

[15] [16] [17] This phrase is the preamble. PolyVision contends that no construction is required because the phrase is self-explanatory and because it would be improper to construe the preamble as a limitation in these circumstances. Whether the preamble should be considered a limitation on the claim language depends on its nature. A preamble can be considered a claim limitation when it is " 'necessary to give life, meaning and vitality' to the claim." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed.Cir.1999). In other words, if the preamble recites structure that is important to the invention or necessary to give the claim meaning, it will be regarded as limiting. *See Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed.Cir.2006). On the other hand, the preamble is not limiting where the "patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Rowe v. Dror*, 112 F.3d 473, 478 (Fed.Cir.1997). In the latter circumstance, "the preamble is of no significance to claim construction because it cannot be said to constitute or explain a claim limitation." *Pitney Bowes, Inc.*, 182 F.3d at 1305. Smart contends that construction is required because the self-

tensioning aspect is the primary focus of the invention and that term was coined by the inventors, thus, there is no accepted meaning.

In this case the claim language discloses all of the structure necessary for the invention. The preamble does not provide further structure but is merely descriptive of the purpose of the invention—a digitizer that has a self-tensioning membrane. While it may arguably be desirable to further define "self-tensioning," as noted above, the pretensioning aspect of the invention in the claim language provides sufficient context to the meaning of "self-tensioning." Thus no construction is necessary.

C. "support structure" (claims 6, 10, and 20)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: A structure serving as a support or foundation.	Structure used to support the claimed membrane and the claimed conductive surface underlying the membrane.

[18] PolyVision contends that this term is basic and needs no construction. Smart, on the other hand, contends that the term is unclear because its meaning depends upon the context in which it is used. Smart notes, for example, that the support structure "includes flexible walls which are pretensioned to deflect and maintain tension on the membrane," (Col. 2, ll.11-13), "may include a base and a support substrate mounted on the inside of the base," (Col. 2, ll.30-32), and "may include a base and the spacer means may be mounted on the outside of the base." (Col. 2, ll. 34-36.) In addition, Smart notes, claims 1-14 of the patent state that the "support structure" includes "spacer means," but claims 15-25 contain no such requirement. FN1 While the term "support structure" seems relatively clear, Smart's construction provides further clarity by emphasizing that it is the part of the invention that supports the membrane and the underlying conductive surface, regardless of whether the embodiment includes a support substrate or spacer means. The Court will thus adopt this construction, although it will omit Smart's references to the membrane and the conductive surface as "claimed" because it is clear that those elements are set forth in the claims, and adding the word "claimed" would not serve any purpose.

FN1. Smart is correct on this assertion only in part, because claims 20 and 21 specify spacer means mounted on the support substrate or base, which are part of the support structure.

D. "tensioned" (claims 6 and 10)

Although the parties initially identified this as a disputed term, it appears that they have agreed upon Smart's definition as "stretched tautly."

E. "spacer means" (claims 6, 10, and 20)

PolyVision's proposed construction	Smart's proposed construction
An element that maintains a space between the membrane and the conductive element.	A suitable insulator such as plastic in the form of a peripheral spacer rail establishing a separation between the membrane and the underlying conductive surface.

[19] [20] [21] [22] [23] Initially, the Court must determine whether this term is a means-plus-function limitation under 35 U.S.C. s. 112 para. 6, which provides: "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." This type of "claiming applies only to purely functional limitations that do not provide the structure that performs the recited function." Phillips, 415 F.3d

at 1311. A claim limitation that actually uses the word "means" gives rise to a rebuttable presumption that s. 112, para. 6 applies. *Personalized Media Commc'n, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 703-04 (Fed.Cir.1998). The presumption is rebutted where the claim, in addition to the functional language, recites structure sufficient to perform the claimed function in its entirety. *See Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1375 (Fed.Cir.2003). PolyVision contends that although the limitation invokes a s. 112, para. 6 claim element, it identifies sufficient structure to rebut the presumption. This argument fails because "spacer" or "spacer means" is not definite structure. *See Unidynamics Corp. v. Automatic Products International, Ltd.*, 157 F.3d 1311, 1319 (Fed.Cir.1998) (holding that the recitation of "spring means" did not disclose sufficient structure to take the claim element out of the ambit of s. 112, para. 6). FN2 The claim is thus limited to the structure disclosed in the specification for performing the "spacing" function and its equivalents.

FN2. The Court further notes that no evidence, whether intrinsic or extrinsic, indicates that the term "spacer" has an established meaning in the art for performing a specified function. *See Watts v. XL Sys., Inc.*, 232 F.3d 877, 880-81 (Fed.Cir.2000) ("As an aid in determining whether sufficient structure is in fact recited by a term used in a claim limitation, this court has inquired into whether the term, as the name for structure, has a reasonably well understood meaning in the art.") (internal quotations omitted).

The specification identifies the structure as "peripheral rail 20," that is "a suitable insulator such as plastic." (Col. 3, ll 20-23; Col. 3, ll. 46-47 (stating that "[s]ubstrate 16 rests on base 14, and supports peripheral spacer rail 20").) Smart's proposed construction corresponds to the structure disclosed in the patent, and the Court will adopt it, with an amendment to include "structural equivalents thereof."

F. "a peripheral flexible member extending from said support structure and including at least two independently flexible sections attached to said membrane" (claims 6 and 10)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: peripheral flexible member : A structure or element (consisting of one or more components) that extends from the support structure at the edge (periphery) of the support structure and is flexible in at least some part.	peripheral flexible member : A peripheral flexible wall, a peripheral compressible member of foam, silicone, or rubber, or a compressible tube, which includes at least two flexible sections that are flexible independently of each other. ^[FN3]
including at least two independently flexible sections attached to said membrane : Having a minimum of two flexible portions, where each portion can be separately flexed, and the flexible portions are attached to the membrane.	including at least two independently flexible sections attached to said membrane : Independent, separate, or distinct sections of the claimed "peripheral flexible member"; having at least two component parts that are flexible independently with respect to each other and both of which are attached to the membrane.

FN3. The Court notes that Smart's construction has changed over time, although this proposed construction is taken from Smart's materials presented at the March 7, 2007, hearing. For example, a prior proposed construction required that the peripheral flexible member "be a unitary flexible member extending from the periphery of the support structure," while the present proposed construction does not include such a condition. Smart continued to advance the unitary requirement in its claim construction brief by asserting the Claim 1 does not read on a particular embodiment, but it has apparently abandoned that position.

[24] [25] The claim language itself, as well the written description, shows that the term "peripheral flexible member" refers to the part of the invention that extends from the edge of the support structure and is

attached to the membrane and "pretensioned," such as the flexible wall 22 shown in Fig. 1. Smart contends that the prosecution history provides the definition of "peripheral flexible member" as a peripheral flexible wall, a peripheral compressible member of foam, silicone, or rubber, or a compressible tube. (Prosecution History Appendix at PLV 00472.) While the prosecution history does provide some support for this argument, it would be improper to limit the claim term to those embodiments because the inventors did not limit the peripheral flexible member to those embodiments. Rather, they stated that "the peripheral flexible member in any form prevents sagging of the flexible membrane" and that "[t]he flexible member could be," but did not have to be, one of those embodiments. Thus, the prosecution history does not constitute a clear disavowal, as is required to limit the scope of the claim to the disclosed embodiments. *See NTP, Inc. v. Research In Motion, Ltd.*, 392 F.3d 1336, 1361-62 (Fed.Cir.2004).

To the extent that Smart continues to assert that the peripheral flexible member must be a "unitary" or one-piece component, such as that shown in Fig. 1, the Court rejects the assertion. The prosecution history, upon which Smart relies, states that the flexible member may be a compressible tube. Fig. 10, which illustrates that embodiment, shows that the compressible tube member would not be unitary. This conclusion is also supported by the specification, which states that "[t]he base and the flexible sections may be integral," (Col. 2, 1.40), and shows an embodiment in Fig. 7 where the peripheral wall consists of separate parts and "is not integral with [the] base." (Col. 4, 1.42.)

The Court concludes that PolyVision's construction is more accurate, although as Smart notes, there is no support in the patent for the phrase "flexible in at least some part." All of the intrinsic evidence shows that the peripheral member must be "flexible." Accordingly, the Court will adopt the following construction for "peripheral flexible member": A flexible structure or element (consisting of one or more components) that extends from the edge of the support structure which includes at least two independently flexible sections.

[26] With regard to the phrase "independently flexible sections," the specification shows that it merely means separate sections or parts of the peripheral flexible member that may be pushed, moved, or flexed independently of each other. (Col. 2, ll. 20-21; Col. 3, ll. 31-34; Figs. 1, 2, 5.)

G. "base" (claims 6, 10, and 20)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: The bottom part or layer of a structure.	A rigid foundation upon which the support substrate is mounted.

PolyVision contends that this term needs no construction. It offers a construction based upon the dictionary definition of "base" in the event that construction is required. PolyVision notes that in the preferred embodiments the base as shown is numbered "14" and is the bottom part of the structure. Smart contends that the term must be construed because it serves a particular function in the invention. That is, Smart notes, the base must be rigid because all of the embodiments show the base as supporting the tension between the membrane and the flexible members. As support, Smart cites Fig. 5, which shows the invention with an inverted base and identifies the base as number "14a" without a support substrate. Smart points out, correctly, that it is obvious from this example that the base would need to be rigid, because if it were not, the membrane would not remain tensioned. Smart also notes that in describing the embodiment that includes a support substrate, the specification states that "[b]ase 14 may be metal or plastic" and that the "substrate spacer 16 may be formed of polystyrene or polyurethane foam, or glass," (Col. 3, ll.26-29), thus indicating that the base must provide the support for the tension of the membrane and the peripheral flexible member. PolyVision counters that Smart's argument is refuted by the specification, which shows that the "base" and "flexible wall" are part of the same one-piece element.

The Court agrees with PolyVision that it would be improper to read the term "rigid" into the claim. While it

is certainly true that in the embodiment shown in Fig. 5, the base must be rigid in order to provide support to maintain pressure on the membrane, the same is not necessarily true in the embodiment shown in Fig. 1. As indicated above, the specification states that the substrate spacer may be formed of polystyrene or polyurethane foam, or glass. While the Court is no expert in the area, it can see no reason why a very dense foam spacer or even a glass spacer could not provide the rigidity needed to keep the membrane tensioned, even if the base is not rigid. Accordingly, the Court concludes that no construction is required.

H. "support substrate" (claims 6, 10, and 20)

The Court will adopt Smart's proposed construction of this term in light of PolyVision's counsel's agreement to the construction at the Markman hearing.

I. "said base and flexible sections are integral" (claim 10)

PolyVision's proposed construction	Smart's proposed construction
The base and flexible section components form a complete unit.	The base and flexible sections are formed as a single piece.

[27] The dispute here is over the meaning of the term "**integral**." PolyVision's proposed construction is based upon a dictionary definition of the term "integral," and a similar definition from Vanguard Products Corp. v. Parker Hannifin Corp., 234 F.3d 1370 (Fed.Cir.2000). Smart contends that the specification, drawings, and prosecution history inform the proper meaning, which is a single piece. Smart notes that the specification distinguishes "integral" from "separate": "Base 14 may be ... separate or integrally formed with peripheral flexible wall 22." (Col. 3, ll.27-28.) Smart also points out that the drawings differentiate between the base and flexible sections formed as a single piece (integral) and formed as separate pieces joined together. Fig. 3B depicts a digitizer in which the base and flexible sections are formed as a single piece, while Fig. 7 shows the base and flexible sections formed of separate pieces joined together. The specification recognizes this distinction when it states that "digitizer 10b, FIG. 7, is constructed similarly to digitizer 10a with the exception that peripheral wall 22b is not integral with base 14b." (Col. 4, ll.40-44.)

The Court finds that Smart's proposed construction, which is based upon the specification, is consistent with Phillips and accurately reflects the inventors' intent to limit the term "integral" to a one-piece construction of the base and flexible member. The Court will thus adopt that construction.

J. "flexible member" (claim 20)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: A flexible part (consisting of one or more components) of an apparatus.	A flexible wall, a compressible member of foam, silicone or rubber, or a compressible tube.

[28] This term is similar to "peripheral flexible member," which the Court construed above. For the reasons stated above, the Court rejects Smart's proposed construction. Consistent with the above construction, the Court construes the term as: A flexible structure or element (consisting of one or more components) that is attached to the support structure.

K. "biased to tension said membrane" (claim 20)

PolyVision's proposed construction	Smart's proposed construction
No construction required. Alt.: Influenced by or exerting a force so as to cause tension in said membrane.	The flexible member is pushed in a direction to impart or store spring tension in that member before the attachment of the membrane to the flexible member.

[29] As both parties acknowledge, the word "biased" does not appear in the specification or prosecution history of the '309 patent. Based upon its review of the intrinsic evidence, the Court concludes that the inventors intended this term to have the same meaning as "pretensioned." Therefore, the Court will adopt Smart's proposed construction of the term "biased", which is the same as "pretensioned."

II. The Martin Patents

[30] In the consolidated case, Smart alleges that PolyVision has infringed the '263 patent, entitled "Interactive Display System," the '000 patent, entitled "Projection Display System with Touch Sensing on-Screen, Computer Assisted Alignment Correction and Network Conferencing," the '681 patent, entitled "Projection Display System with Pressure Sensing at Screen, and Computer Assisted Alignment Implemented by Applying Pressure at Displayed Calibration Marks," and the 636 patent, entitled "Projection Display and System with Pressure Sensing at Screen, and Computer Assisted Alignment Implemented by Applying Pressure at Displayed Calibration Marks." Smart asserts claims 1 and 4 of the '263 patent; claims 27 and 28 of the '000 patent; claims 17, 21, 38, 41, 57, 58, 71, and 72 of the '681 patent; and claims 1-17 of the '636 patent.

A. The '263 patent

1. "means for receiving said control signals and in response generating and projecting graphic images onto said touch sensitive display screen at said locations" (claims 1 and 4)

PolyVision's proposed construction	Smart's proposed construction
Controller, and structural equivalents thereof, for receiving information as to where pressure had been applied on a touch-sensitive screen, and in response generating a control signal to cause the projector means to project a graphic image on the display screen where the pressure had been applied.	Computer structure/steps (i.e., a computer programmed with appropriate software) that receives control signals and generates graphic images in response to the control signals, and a projector that projects the graphic images onto a touch-sensitive display screen, and "structural" equivalents thereof.

[31] Claim 1 claims "[a]n interactive display system." The parties agree that this disputed phrase is a means-plus-function limitation under s. 112, para. 6, and the Court must therefore look to the specification to determine the structure that corresponds to the function. Although the parties agree on the function performed by this limitation, they disagree on the structure. The parties further agree that the structure identified to accomplish the stated function is, at least in part, the "electronic touch screen controller 3." (Col. 3, ll. 37-38; Fig. 1.) The dispute concerns whether the structure is limited to the electronic touch screen controller, as PolyVision contends, or whether it includes the software that would be necessary to perform the identified function, as Smart contends. As support for its argument, PolyVision notes that the specification, at several points, shows that the structure is the controller identified as item 3. (Col. 4, ll. 45-46; Col. 5, ll. 51-55; Fig. 1.) Smart, on the other hand, cites the program flow charts set forth in Figs. 20-22 of the patent, as well as various cases, to support its assertion that the structure includes software that would perform the claimed function.

The Court concludes that the structure to perform the function is the controller described and shown in the specification, (Col. 3, ll.36-39), and not software that would perform the function. It is undisputed that the specification says nothing about software or an algorithm for performing the function of receiving signals from the touch-sensitive screen and projecting graphic images onto the touch sensitive screen. The flow charts in Figs. 20-22 do not describe a means for performing this function. While it is true, as PolyVision agrees, that software could perform this function, the fact remains that there is no mention of software. The cases Smart cites do not support its argument and are distinguishable. For example, in WMS Gaming, Inc.

v. International Game Technology, 184 F.3d 1339 (Fed.Cir.1999), the court held that the structure for assigning numbers to certain angular positions of a reel was the computer programmed to perform the disclosed algorithm. No such algorithm is disclosed in this case. Similarly, in Eolas Technologies Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed.Cir.2005), the court was confronted with the issue of whether software code claimed in a patent qualified as a "patented invention" for purposes of 35 U.S.C. s. 271(f). See id. at 1338-39. As the court noted, the patent claimed software code in conjunction with a physical structure, both of which would qualify as a part of the claimed invention for purposes of s. 271(f). See id. at 1339. The difference in this case, of course, is that no software code is claimed in the '263 patent. Accordingly, the Court concludes that PolyVision's proposed construction is the proper construction.

2. "in a multi-tasking environment" FN4

FN4. According to Smart, PolyVision belatedly identified this and several other claim terms as requiring construction and, therefore, Smart did not have an opportunity to address these terms in its brief on claim construction. Smart asserts that these terms do not require construction but that if the Court concludes otherwise, they should be given their plain and ordinary meanings, which Smart has identified for the Court.

PolyVision's proposed definition	Smart's proposed definition
Computer is capable of performing more than one task at the same time.	A computer performs or appears to perform more than one task at a time.

This term is part of the phrase "a computer for executing one or more applications program in a multi-tasking environment." (Col. 15, ll.32-33.) The Court concludes that the term requires no construction because, as Polyvision concedes, the term would be clear to a person of ordinary skill in the art. If construction were required, however, the Court would adopt Smart's construction using "performs or appears to perform more than one task at a time," because Smart has demonstrated that in the context of computers, "multitasking" includes the "appearance" of performing several tasks at once, even though only one program is being executed. For example, Smart notes that Windows does not perform more than one task at a time but operates at such a speed that it appears to perform more than one task at a time. It also cites the definition of multitasking from [http:// www. webopedia. com/ TERM/ m/ multitasking. html](http://www.webopedia.com/TERM/m/multitasking.html), which states that "[i]n multitasking, only one CPU is involved, but it switches from one program to another so quickly that it gives the appearance of executing all of the programs at the same time."

3. "driver means in said computer for receiving said control signals and in response generating a command to a selected one of said applications programs for updating said screen video displays in accordance with said applied pressure to said touch-sensitive display screen" (claims 1 and 4).

PolyVision's proposed construction	Smart's proposed construction
A software program that receives and processes control signals and, in response, generates a command to a selected application program for updating the screen video display in accordance with the pressure applied to the touch-sensitive display screen.	A driver structure and/or steps in a computer that receives control signals and, in response to the control signals, generates a command to a selected application program for updating the screen video display in accordance with the pressure applied to the touch-sensitive display screen, and structural equivalents thereof.

[32] This is a means-plus-function limitation, requiring the Court to examine the specification for the structure for performing the specified function. Referring to Fig. 19, the specification states that "a memory resident device driver is loaded." (Col. 11, ll.50-51.) It further states, referring to Fig. 9 and the installation and testing steps of the custom network structure, that "[o]n entry (700), the software driver for the custom network adaptor or controller (located in computer 5) is loaded (701)." (Col. 7, ll.25-27.) Essentially, the

specification calls for a driver, which, as used in the ordinary sense by one skilled in the art, is a program that controls a device. PolyVision's construction, which identifies the driver means as software, is an accurate definition.

4. "projector means connected to said one or more computers for receiving and projecting said screen video displays onto said display screen" (claim 1)

PolyVision's proposed construction	Smart's proposed construction
An LCD projector panel projected by an overhead projector.	A projector that receives screen video displays from one or more computers and projects the screen video displays onto a display screen, and structural equivalents thereof.

[33] The term at issue is "projector means," although it is unclear whether the parties disagree over the construction of this term. In the chart attached to its claim construction brief, PolyVision stated that the parties were in agreement regarding the construction of this limitation, although the parties' Markman hearing materials addressed this claim term. There is no dispute that this is a means-plus-function limitation and that the specification must be consulted to determine the structure. The specification discloses that:

An overhead projector 7 is oriented so as to project an image onto the surface of touch-sensitive screen 1. The image is generated by means of LCD projector panel 9 which is connected to the graphics output of the personal computer 5.

(Col. 3, ll.40-44.) This configuration is shown in Fig. 1, with the LCD projector panel placed on top of the overhead projector. The specification also states that an integrated unit, with the LCD panel incorporated into the projector, would also be within the scope of the claim. (Col. 15, ll.12-15.) Accordingly, this term is properly construed to mean a structure formed from an overhead projector and a separate LCD panel, an integrated overhead projector/LCD panel unit, and structural equivalents thereof.

5. "generating via said projector means a plurality of alignment images onto said display screen at predetermined locations" (claims 1 and 4)

PolyVision's proposed definition	Smart's proposed definition
Generating and projecting alignment images at a known point on the touch sensitive screen.	The alignment images are generated and projected onto the display screen at locations that are predetermined relative to the image being projected.

[34] The dispute here is whether the alignment images are projected on a predetermined location of the display screen, as PolyVision contends, or at locations that are predetermined relative to the image itself, as Smart asserts. PolyVision contends that the language of the claim and the specification, (Col. 8, ll., 28-29 ("The marker is projected at a known point on the touch-sensitive screen 1.")), plainly shows that the alignment images are projected onto predetermined locations on the display screen. As Smart correctly notes, however, the purpose of the calibration routine is to determine the location of the projected image on the display screen, which may be unknown due to the random position of the projected image, through the sequence of alignment marks. The specification states:

FIG. 12 represents the touch board alignment procedure which ensures that the image on the touch-sensitive screen 1 corresponds with the image appearing on the display of computer 5. The purpose of this alignment procedure is to determine the position of the projected image on the touch-sensitive screen and to determine the corrections required to compensate for image projection problems.

(Col. 8, ll.10-17.) Given the purpose of this procedure-to correct for image projection problems, it would

make no sense for the alignment marks to be projected onto the display screen at predetermined points having no relationship to the image; there would be no need for the alignment procedure because the image would already be aligned with the display screen. Accordingly, the Court concludes that Smart's construction is correct.

6. "keystoning caused by planar misalignment between said projector means and said display screen" (claims 1 and 4)

PolyVision's proposed construction	Smart's proposed construction
Image distortion that occurs when the projection axis is not at a right angle with the plane of the display screen.	Image distortion that occurs when the projection axis deviates from a 90 (deg.) angle (i.e., is non-orthogonal) with the plane of the display screen.

[35] The parties' constructions are essentially the same, with the exception that Smart's construction uses the phrase "deviates from a 90 degree angle (i.e., is non-orthogonal)," while PolyVision uses the phrase "is not at a right angle." Smart notes that its construction is proper because it uses a phrase found in the specification ("deviates from a 90 (deg.) angle") and that the mathematical term "non-orthogonal" accurately describes the condition of "keystoning." PolyVision contends its construction is clearer and would be more easily understood by a lay jury. While PolyVision is correct that its construction is clearer, the Court will adopt Smart's definition because it is consistent with the intrinsic evidence and other claim elements rely upon the term "non-orthogonal" to describe keystoning.

7. "means for storing said screen video displays" (claim 4)

PolyVision's proposed construction	Smart's proposed construction
A computer.	Computer structure/steps that store screen video displays, and structural equivalents thereof.

[36] The parties agree that the structure for this means-plus-function limitation is a computer. The only dispute is whether the structure is a computer and structural equivalents thereof, or a "computer structure/steps." The Court agrees with PolyVision that the claim term is properly defined solely as a computer, and structural equivalents, because the patent discloses a computer as the means for performing the identified function, without mentioning "structure/steps." (Col. 15, ll.32-36.)

B. The '000 patent

Based upon the parties' submissions, it appears that no dispute remains regarding the claim terms at issue in the '000 patent. To the extent that there is any dispute regarding "projection means," the Court will apply the same construction as "projector means" in the '263 patent.

C. The '681 patent

The parties have agreed on constructions for the terms "calibration marks" (claims 17, 21, 38, 41, 57, 58, 71, 72), "coupleable" (claims 17, 21, 38, 41), and apparently "uncoupled" (claims 17, 21, 38, 41, 57, 58, 71, 72), at least as far as they both assert that this term means "not connected." Thus, only two disputes remain.

1. "Control apparatus for displaying a computer-generated image" (claims 17, 21, 38, 41)

PolyVision's proposed construction	Smart's proposed construction
A controller for displaying a computer generated image.	Asserts that plain and ordinary meaning is: Hardware and/or software for displaying a computer-generated image.

[37] PolyVision argues that this phrase requires construction because the term "control apparatus" is not defined anywhere in the specification, although it is clear that claim 1 is directed to the controller 3 referenced throughout the specification (for example in Fig. 1). Smart contends that the language is clear and its plain and ordinary meaning must, under Federal Circuit law discussed above, include hardware and/or software for displaying the image. Although Smart contends that PolyVision's construction improperly limits the claim to structure, when the controller must also include software, the Court concludes that PolyVision's construction correctly identifies the control apparatus as the "controller 3" without excluding the software for the controller from the scope of the claim.

2. "large-screen display surface" (claims 17, 21, 38, 41, 57, 58, 71, 72)

[38] PolyVision contends that this term cannot be construed because it is not mentioned or defined in the specification, has no particular meaning in the art, and is indefinite. PolyVision points out that it is well-known in the art that display surfaces for a projector may range from a few inches in diagonal width to over twelve feet in diagonal width, and without further guidance from the claim, any attempt to give meaning to "large-screen" would be arbitrary and lacking any support in the specification. Smart contends that the term is not indefinite and should be given its plain and ordinary meaning: "A display surface that is sufficiently large to be viewable concurrently by one or more groups of users."

[39] [40] [41] "Because [] claims perform the fundamental function of delineating the scope of the invention [pursuant to 35 U.S.C. s. 112, para. 2], the purpose of the definiteness requirement is to ensure that the claims delineate the scope of the invention using language that adequately notifies the public of the patentee's right to exclude." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed.Cir.2005) (internal citation omitted). A claim is not indefinite solely because construction proves to be a difficult task. *See Exxon Research & Eng'g Co. v. United States*, 265 F.3d 1371, 1375 (Fed.Cir.2001). Nor is a claim indefinite even though the construction is one over which reasonable persons can disagree. *See id.* "Because a claim is presumed valid, a claim is indefinite only if the 'claim is insolubly ambiguous, and no narrowing construction can properly be adopted.'" *Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1338-39 (Fed.Cir.2003) (quoting *Exxon Research*, 265 F.3d at 1375).

Although the Court believes that this is a close question, it concludes that a person skilled in the art would understand the term "large-screen display surface." First, the specification provides some basis for giving context to the term "large screen." First, it must be large enough so that "several user groups can view the projected screen output." (Col. 4, ll.42-44.) Second, Fig. 1 is a drawing of the interactive display system, and it shows the display screen as being much larger than the computer screen and the overhead projector, in fact, perhaps 4-6 times as large as those items. This information reveals that the term "large-screen display" is intended to encompass display screens that would be used to present information to large groups of people in a classroom or conference setting. It would exclude the scenario discussed at the hearing of several college students crowding around a small television. Finally, PolyVision's expert, Dr. Robert S. Dezmelyk, indicated that he understood what "large-screen" meant. He said that it would be at the "larger end of the scale" for digitizers, meaning that it would be larger than a 24 by 36 inch digitizer. (Dezmelyk Dep. at 167.) Dr. Dezmelyk was also able to ascertain whether certain of PolyVision's products had large-screen displays, and he stated that PolyVision's IBID product line had small screens. (*Id.* at 262.) This provides a sufficient basis to allow this Court or a jury to determine whether the accused product is a "large-screen" device. *See Aero Prods. Int'l, Inc. v. Intex Recreation Corp.*, 466 F.3d 1000, 1016 (Fed.Cir.2006) (citing the plaintiff's expert's testimony regarding his understanding of the disputed terms as support for the conclusion that the terms would be understandable to a person of ordinary skill in the art).

D. The '636 patent

The parties have agreed upon constructions for the terms "coupled" (claims 1-5, 11, 14), "spaced from"

(claims 4-9), "mapping" (claims 4-9), "without physically adjusting the projector or the display screen" and "without physically adjusting the display screen" (claims 4-9; 6-9). In addition, the Court adopts the same construction for the phrases "in a multi-tasking environment" and "large-screen display surface" as set forth above. Several other terms or phrases remain in dispute.

1. "alignment structure, in said computer" (claim 1)

PolyVision's proposed construction	Smart's proposed construction
The combination of hardware and software within the computer that provides for alignment.	Hardware and/or software within the computer that provides for alignment.

[42] PolyVision contends that the term "alignment structure" is properly construed to mean both the hardware and the software in the computer that performs the alignment function on the touch-sensitive display screen. Smart contends that no construction is required because it contends, as it did above regarding the phrase "means for receiving said control signals and in response generating and projecting graphic images onto said touch sensitive display screen at said locations" in the '263 patent, that Federal Circuit case law holds that computer structure includes the software that is necessary to perform the claimed function. Although the Court rejected Smart's argument above, it notes that the instant claim language supports the conclusion that it includes not only the hardware but also the software for performing the alignment function. Finding little or no difference between the parties' proposed constructions, the Court concludes that PolyVision's construction comports with the claim language, and the Court will adopt that construction.

2. "Windows(TM) operating system environment"; "Windows(TM) software on the computer" (claims 8, 14-19)

[43] The issue raised by PolyVision regarding this term is whether, because the inventor used the Windows trademark in these claims, this limitation is indefinite and not capable of construction or, alternatively, should be construed as "Microsoft Windows Version 3.0" because that is the operating system disclosed in the specification and because it was the only product at the time of filing that could have been used in the invention disclosed in the '636 patent. (Col. 11, ll. 20-25, 35-40; Col. 13, ll. 44-58.)

[44] [45] [46] [47] To be valid, claims must comply with the definiteness requirement of s. 112, para. 2, which "focuses on whether the claims, as interpreted in view of the written description, adequately perform their function of notifying the public of the patentee's right to exclude." *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379 (Fed.Cir.2000). A claim will be considered indefinite if it does not reasonably apprise those skilled in the art of its scope. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383-84 (Fed.Cir.2005). Because a trademark identifies the source of a product rather than a product itself, *see Tumblebus, Inc. v. Cranmer*, 399 F.3d 754, 762 n. 10 (6th Cir.2005), the use of a trademark in a patent may render a claim indefinite. The Manual of Patent Examining Procedure ("MPEP") addresses this issue:

The presence of a trademark or trade name in a claim is not, *per se*, improper under 35 U.S.C. s. 112, second paragraph, but the claim should be carefully analyzed to determine how the mark or name is used in the claim....

If the trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim scope does not comply with the requirements of the 35 U.S.C. 112, second paragraph. *Ex parte Simpson*, 218 U.S.P.Q. 1020 (Pat. & Tr. Office Bd.App.1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. In fact, the value of a trademark would be lost to the extent that it became descriptive of a product, rather than used as an identification of a source or origin of a product. Thus, the use of a trademark or trade name in a claim to identify or describe a material or product would not only render a claim indefinite, but would also

constitute an improper use of the trademark or trade name.

MPEP s. 2173.05(u) (2001). FN5

FN5. Although the MPEP does not have the force of law, it "is well known to those registered to practice in the PTO and reflects the presumptions under which the PTO operates." *Critikon, Inc. v. Becton Dickinson Vascular Access, Inc.*, 120 F.3d 1253, 1257 (Fed.Cir.1997). As such, the Court will rely on the MPEP to provide the proper framework for dealing with Smart's use of a trademark in its patent.

The United States Patent and Trademark Office Board of Appeals and Interferences has sustained examiners' rejections in several instances upon grounds that inclusion of a trademark rendered the claim indefinite. For example, in *Ex parte Simpson*, 1982 WL 52193, 218 U.S.P.Q. 1020 (Pat.& Tr. Office Bd.App.1982), the matter cited above in the quoted section of the MPEP, the Board rejected the appellants' argument that the use of the trademark "Hypalon" was permissible because the mark was well known and satisfactorily defined in the literature discussing the product, an elastometric chlorosulphonated polythene, or synthetic resin. The Board rejected the argument, noting that the reference to the mark was uncertain in scope because it disclosed nothing about how much chlorosulphonated polythene must be present in the material used in the claimed combination before infringement occurred:

On the one hand, the claim language may be very narrowly construed to a particular chlorosulphonated ethylene having a specific group of additives employed by the owner of the "Hypalon" trademark to produce the desired properties, or on the other hand the claim language might be asserted by appellants ... to broadly encompass every *synthetic resin*.

Id. at 1021-22. The Board concluded that the appellant's manner of use of the trademark as merely descriptive of the product not only failed to comply s. 112, para. 2 by staking out the boundaries of the claim, but was also an improper use of the "Hypalon" trademark. *Id.* at 1022 & 1022 n. 2. *See also* EX PARTE SCHWARTZ, 1998 WL 1708024, at (Bd.Pat.App. & Interf.1998) (affirming the examiner's rejection of the claim for indefiniteness because it was not clear "exactly what composition of gelatinous elastomer is encompassed by 'a synthetic polymer gel of the type used in the Kitecko Ultrasound Standoff Pad manufactured by 3M Corporation of St. Paul Minnesota' ").

Smart contends that its use of "Windows(TM)" in the claims at issue was not improper because it used the trademark not as a noun to assert a limitation, but rather as an adjective to modify the nouns "operating system environment" and "software." Smart asserts that its use of "Windows(TM)" in this manner served to distinguish the Windows family of operating systems from other such families, such as MacOS, Sun version Unix, SCO Unix, and HP-UX. The Court rejects this argument because it cannot discern any material difference between using a mark to identify products and using a mark to distinguish Microsoft Windows from other families of operating systems. The fact remains that the claim may still be indefinite because it does not refer to any specific product in the ever-expanding family of Microsoft products. Moreover, EX PARTE KITTEN, 1999 WL 33134953 (Bd.Pat.App. & Interf.1999), does not support Smart's claim that its use of the "Windows(TM)" trademark is proper. In *KITTEN*, the Board noted that although the claim used trademarks to identify the three proprietary products used to produce the subject fertilizer, the appellant filed product sheets in support of the application which identified the makeup and uses of the products. The Board observed: "Based on these product sheets and because claim 13 further limits the fertilizer used in claim 1 to a fertilizer prepared from these well-identified proprietary products, we do not find the use of the trademarks renders claim 13 unclear or confusing." *Id.* at *2.

[48] [49] In spite of the Court's inclination to conclude that the use of the claims' reference to "Windows(TM)" renders the claims indefinite, the Court concludes that it is proper to construe the claims as

being limited to "Microsoft Windows Version 3.0" as set forth in the specification, in light of the Federal Circuit's admonition that "claims are generally construed so as to sustain their validity, if possible." *Whittaker Corp., by its Technibilt Div. v. UNR Indus., Inc.*, 911 F.2d 709, 712 (Fed.Cir.1990). It is undisputed that the Microsoft Windows Version 3.0 operating system was the only Windows(TM) software disclosed in the '636 patent and was the most recently available Windows(TM) operating system at the time of filing. "The literal scope of the term is limited to what it was understood to mean at the time of filing." *Kopykake Enters. v. Lucks Co.*, 264 F.3d 1377, 1383 (Fed.Cir.2001). According to PolyVision's expert, Robert Dezmelyk, Windows 3.0 and Windows 3.1 relied on the earlier Microsoft disk operating system, or "MS-DOS," for much of their internal operations. (Dezmelyk Decl. para. 4, PolyVision Br. Supp.3d Mot. Summ. J. Ex. C.) In these systems, Windows was simply a graphical interface that ran on the DOS operating system, and applications programs would run on DOS within the graphical interface of Windows 3.0 or 3.1. (*Id.*) Dezmelyk further states that beginning with Windows 95, Microsoft eliminated the DOS requirement for its Windows platform, making Windows a true operating system that is not a mere graphical user interface shell for DOS. (*Id.* para. 5.) *See also* [http:// www. webopedia. com/ TERM/ D/ DOS. html](http://www.webopedia.com/TERM/D/DOS.html) (noting that later versions of Windows helped to alleviate some of the DOS limitations for modern computer applications); [http:// en. wikipedia. org/ wiki/ History of Microsoft Windows](http://en.wikipedia.org/wiki/History_of_Microsoft_Windows) (describing features of Windows 95). Because "Windows(TM)" includes a number of programs that were not known or released until after Smart filed its patent application and that do not significantly rely upon DOS, Smart may not claim the benefit of those programs, which could not have been known to the inventor or to persons of ordinary skill in the art at the time of the invention in the '636 patent. *See Schering Corp. v. Amgen Inc.*, 222 F.3d 1347, 1353 (Fed.Cir.2000) (holding that the term "leukocyte interferon" was limited to the understanding of those in the scientific community at the time the application was filed that it meant an interferon polypeptide that originates from leukocytes and not subsequently discovered subtypes of leukocyte interferon). Accordingly, the Court will limit the term "Windows(TM)" to include Windows 3.0 and Windows 3.1, as well as prior versions of Windows.

3. "sequentially display four calibration marks" (claims 13, 17-19)

PolyVision's proposed construction	Smart's proposed construction
Four calibration marks are displayed individually in four separate successive images.	Four calibration marks are displayed in four separate successive images.

[50] PolyVision contends that this claim limitation is ambiguous and requires construction because it can be construed in one of two ways: (1) that four calibration marks are displayed in sequence any number of times; and (2) that an individual calibration mark is displayed four times in sequence. Smart contends that the term is unambiguous and should be given its plain meaning, although it offers a construction that essentially permits either meaning.

[51] The Court agrees with PolyVision that the term is ambiguous and requires construction. The specification and drawings support PolyVision's construction. Figs. 12 and 13a-13d illustrate that four individual calibration screens with alignment images are presented in sequence. The written description confirms this as well, describing a "first alignment image" or "calibration screen," a "second calibration screen," a "third calibration screen," and finally a "fourth calibration screen." (Col. 8, ll. 17-18, 45-47, 62-64; Col. 9, ll. 11-13.) Smart argues that this construction improperly imports limitations from the specification into the claim language. However, the Court disagrees. As noted above, Phillips not only authorizes, but requires courts to resort to the written description in order to resolve claim construction issues. The Court believes that construing the claim language as PolyVision suggests constitutes a permissible use of the intrinsic record and not an improper limitation of the claim language.

4. "non-orthogonal misalignment between said projector and said touch-sensitive display screen" (claims 1-3, 10); "non-orthogonal misalignment between the projected image and the display screen"

(claims 4-5)

PolyVision's proposed construction	Smart's proposed construction
Misalignment between the projector and the touch-sensitive display screen that occurs when the projection axis is not at a right angle with the surface of the display screen.	Misalignment wherein the projection axis deviates from a 90 (deg.) angle (i.e., is non-orthogonal) relative to the plane (i.e., surface) of the touch-sensitive display screen.

[52] The parties have presented similar definitions which are materially indistinguishable, at least to this Court. Because the Court has adopted Smart's construction of similar claim language above, it will also adopt Smart's construction regarding these claim terms.

5. "a plurality of calibration images including a calibration marker" (claims 6-9); "a plurality of alignment images including an alignment marker" (claims 11-13); "a plurality of calibration marks" (claims 14-16)

PolyVision's proposed construction	Smart's proposed construction
More than one individual mark or target serving as touch points for the calibration process.	Indicia serving to indicate the positions to be used in calibrating the large-screen display surface, at least one of said indicia being a visible marker.

[53] PolyVision argues that the term plurality should be given its ordinary meaning, as "more than one," as set forth in its proposed construction. Smart contends its construction will avoid limiting the claim to the specific embodiments set forth in the specification. However, as set forth above, the Court believes that resort to the specification is permissible and necessary in order to properly construe the claim language. In addition, as PolyVision correctly notes, Smart's proposed construction, which includes the phrase "at least one of said indicia being a visible marker," is at odds with the requirement of "a plurality." The Court will thus accept PolyVision's construction.

6. "compensate for projected image/display surface non-orthogonal misalignment" (claims 6-9)

PolyVision's proposed construction	Smart's proposed construction
Correct trapezoidal image distortion that occurs when the projection axis is not a right angle with the plane of the display screen.	Image distortion wherein an image is projected along an axis that is not orthogonal with the display surface.

[54] The parties' constructions regarding this claim limitation do not differ significantly. The Court notes, however, that PolyVision's inclusion of the word "trapezoidal" is based upon claim 9, which includes that term, while claim 6 does not. In line with its treatment of the claim language including the phrase "non-orthogonal misalignment" set forth above, the Court will adopt Smart's construction, which does not include "trapezoidal."

7. "project via said projector a plurality of alignment instructions onto said touch-sensitive display screen at predetermined locations" (claim 10)

PolyVision's proposed construction	Smart's proposed construction
More than one alignment instructions is projected at a known point on the touch sensitive screen.	The alignment instructions are projected on the touch sensitive display screen at locations that are predetermined relative to the images being projected.

[55] In accordance with its construction of the similar phrase "generating via said projector means a

plurality of alignment images onto said display screen at predetermined locations" in the '263 patent, and in accordance with its construction of the claims including the term "a plurality," as set forth above, the Court will construe this phrase as "more than one alignment instruction are projected on the touch sensitive display screen at locations that are predetermined relative to the images being projected."

8. "a calibration image having a calibration marker inside the edges of the computer-generated image" (claims 17-19)

PolyVision's proposed construction	Smart's proposed construction
No construction required.	Images including indicators of position inside the edges of the computer-generated image that are used in calibrating the interactive display.

In light of its prior constructions pertaining to "calibration image" and "calibration marker," the Court agrees with PolyVision that no construction is required.

9. "correct for keystoneing distortions of the computer-generated image" (claims 17-19)

PolyVision's proposed construction	Smart's proposed construction
Correct image distortion that occurs when the projection axis is not at right angle with the plane of the display screen.	Correct for image distortion due to the computer-generated image not being projected orthogonally to the plane of the interactive display.

[56] Consistent with other similar claim terms pertaining to correction of "keystoneing" or non-orthogonal projection of the computer-generated image, the Court will adopt Smart's construction.