United States District Court,
M.D. Tennessee, Nashville Division.

QUADRASCAN TECHNOLOGIES, LLC, and QST Holdings, LLC,
Plaintiffs.
v.
GAYLE TECHNOLOGIES, INC., Thomas L. Gayle, and James E. Gayle,
Defendants.

Dec. 12, 2007.

Angela Holt, Ann I. Dennen, Lanier, Ford, Shaver & Payne, P.C., Huntsville, AL, Keith C. Dennen, Rachel C. Nelley, Bone, McAllester & Norton, PLLC, Nashville, TN, for Plaintiffs.

Wayne Edward Ramage, Baker, Donelson, Bearman, Caldwell & Berkowitz, PC, Nashville, TN, for Defendants.

MEMORANDUM

ALETA A. TRAUGER**, District Judge.**

This is a patent infringement case in which plaintiffs Quadrascan Technologies, LLC and QST Holdings, LLC allege that defendants Gayle Technologies, Inc., Thomas L. Gayle, and James E. Gayle have infringed U.S. Patent No. 6,983,642, which is owned by QST Holdings, LLC and for which Quadrascan Technologies, LLC holds an exclusive license. The matter is now before the court for claim construction under Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed.Cir.1995), *aff'd* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The parties filed a Joint Claim Construction Statement (Docket No. 48), initial claim construction briefs (Docket Nos. 61 and 63), and reply briefs (Docket Nos. 68 and 69). A *Markman* hearing was held on November 19, 2007. Subsequent to that hearing, the defendants filed additional exhibits at the court's request (Docket No. 106), and the plaintiffs filed a post-hearing brief FN1 (Docket No. 109).

FN1. Though given the opportunity to do so, the defendants declined to file a post-hearing brief.

BACKGROUND

U.S. Patent No. 6,983,642 (the "642 Patent"), entitled System and Method for Automatically Judging the Sealing Effectiveness of a Sealed Compartment, embodies a device that checks sealed compartments for leaks.FN2 In its most obvious application, the device embodied by the 642 Patent is used by car manufacturers to test cars on assembly lines for leaks before the cars leave the factory. QST Holdings, LLC ("QST") owns the 642 Patent, and Quadrascan Technologies, LLC ("Quadrascan") holds a license to manufacture and sell the device embodied by the 642 Patent under the trade name "QuadraSonic Array."

FN2. These facts are drawn from the plaintiffs' Complaint (Docket No. 1), the defendants' Answer and Counterclaim (Docket No. 15), and the parties' initial claim construction briefs (Docket Nos. 61 and 63).

Traditionally, car manufacturers tested the seals on cars for leaks by dousing new cars in water. If water entered the sealed compartment, a leak was detected, but the car also was damaged or ruined in the process. By contrast, the QuadraSonic Array uses ultrasound waves to test for leaks, thereby avoiding damage to a car in the event that a leak is detected. With the QuadraSonic Array, an ultrasonic transmitter is placed within a car and emits ultrasonic energy of a specified frequency. The car then moves down an assembly line and through the opening of an arch structure that supports ultrasonic receivers. The ultrasonic receivers detect the presence and amplitude of any ultrasonic energy that escapes from the car. Based on the amount of ultrasonic energy that is detected by the receivers and the position of the car relative to the arch when the ultrasonic energy is detected, it is possible to determine the location of the potential leak and to correct that leak without damaging the car.

The plaintiffs assert that the QuadraSonic Array initially was conceived of by Michael Stumpf, a long-time employee of General Motors ("GM"), who presented his design to GM, which agreed to build a prototype. According to the plaintiffs, GM contracted with defendant James Gayle to build a prototype of the QuadraSonic Array and provided Mr. Gayle with information that the plaintiffs allege was "a trade secret and ... otherwise confidential or proprietary in nature, including specifically, the design for the QuadraSonic Array." (Compl.para. 17) The plaintiffs claim that this information was provided to Mr. Gayle on the condition that the prototype design would remain confidential and that Mr. Gayle would not disclose the prototype design to third parties.

According to the plaintiffs, after Mr. Gayle completed building a prototype of the QuadraSonic Array and was paid by GM for his services, GM conveyed its rights in the QuadraSonic Array to Mr. Stumpf, the employee who conceived of the idea initially, who in turn conveyed those rights to QST. QST applied to the United States Patent and Trademark Office ("PTO") for a patent on May 3, 2002. On January 10, 2006, the PTO issued the 642 Patent, which contains twelve patent claims, to QST. QST subsequently entered into an exclusive licensing agreement with Quadrascan.

The plaintiffs further allege that Mr. Gayle disclosed the QuadraSonic Array prototype design to the other defendants, and that the defendants used the prototype design to manufacture a device that allegedly infringes the 642 Patent. This device was initially called the "Cargate Arch" and is now called the "Cargate Tunnel." The plaintiffs allege that, on December 17, 2001, Mr. Gayle filed a provisional application with the PTO, and that, on December 17, 2002, he filed a utility patent application, claiming priority to the provisional patent application (collectively, the "Gayle Patent Application"). The plaintiffs allege that the Gayle Patent Application effectively seeks patent protection for a device that is an embodiment of the QuadraSonic Array. The Gayle Patent Application is still pending before the PTO.

ANALYSIS

The plaintiffs' lawsuit alleges a number of claims, including infringement of the 642 Patent, violations of the Federal Unfair Competition Lanham Act and the Tennessee Consumer Protection Act, breach of contract, tortious interference with existing and prospective business relationships, intentional interference with existing contract, conversion, and civil conspiracy.FN3 The only issue before the court at the present,

however, is the construction of certain terms contained in the 642 Patent. During the *Markman* hearing, the plaintiffs presented the testimony of Dr. Howard Penrose FN4 and Frank Caprio,FN5 and the defendants presented the testimony of James Gayle.FN6 The court accepted into evidence a number of exhibits, including the witnesses' reports and the prosecution history of the 642 Patent. Additionally, the court requested, and the defendants subsequently filed with the court, the prosecution history to date with respect to the Gayle Patent Application.

FN3. Additionally, the defendants have asserted a counterclaim alleging that James Gayle is the true inventor of the QuadraSonic Array, that the plaintiffs fraudulently misrepresented the inventorship of the QuadraSonic Array to the PTO with the intent of misleading the PTO into issuing the 642 Patent, that the plaintiffs attempted to enforce the 642 Patent knowing it is invalid, that the plaintiffs interfered with the defendants' business relationships, and that the plaintiffs attempted to monopolize the market in violation of the federal antitrust statutes.

FN4. The defendants objected to the plaintiffs' proffer of Dr. Penrose as an expert in the field of ultrasound leak detection. The defendants did not, however, object to the plaintiffs' presenting Dr. Penrose's testimony regarding the opinions stated in his report and the court's receiving those opinions and giving them the weight it deemed appropriate.

FN5. The defendants objected to the plaintiffs' proffer of Mr. Caprio as an expert in the field of patent law. Although skeptical of the value of Mr. Caprio's testimony, the court agreed to hear the testimony and give it the weight it deemed appropriate, as the defendants had sufficient notice of the plaintiffs' intention to call Mr. Caprio as a witness and did not move to exclude Mr. Caprio's testimony prior to the *Markman* hearing.

FN6. The plaintiffs objected to the defendants' proffer of Mr. Gayle as an expert in the field of ultrasound systems. Hesitant to qualify Mr. Gayle as an expert, given his limited education in the field and unresolved questions about the extent of his personal technical experience in the field, the court declined to rule on the question of whether to qualify Mr. Gayle as an expert, instead finding that he is a person of ordinary skill in the art and permitting him to testify as to how one of ordinary skill in the art would understand the 642 Patent.

I. Claim Construction Principles

There are two steps to a patent infringement analysis: first, the meaning and scope of the relevant patent claims must be determined, and, second, the alleged infringing device must be compared to the construed claims to determine whether the patent has been infringed. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995). The first question, which is at issue here, is a matter of law for the court. *Id*.

In construing a disputed claim term, the term is given its "ordinary and customary meaning," unless a patentee has manifested an intent to use the term differently. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). The ordinary and customary meaning of a term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." Phillips v. AWH Corp., 415 F.3d 1303, 1313 (Fed.Cir.2005). To determine the meaning of a disputed claim term, a court may

consider, in addition to the language of the patent's claims, the patent's specification and its prosecution history. Markman, 52 F.3d at 979; *see also* Alloc, Inc. v. Int'l Trade Comm'n, 342 F.3d 1361, 1368 (Fed.Cir.2003) (stating that, to determine the meaning of a disputed claim term, "a court immerses itself in the specification, the prior art, and other evidence, such as the understanding of skilled artisans at the time of invention, to discern the context and normal usage of the words in the patent claim"). "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." Vitronics, 90 F.3d at 1582.

A patent's specification, which "contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it," provides context for a court construing a disputed claim term. Vitronics, 90 F.3d at 1582. The specification is relevant to determining the ordinary and customary meaning of a disputed claim term because "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." Phillips, 415 F.3d at 1313. Additionally, a patent's prosecution history is useful in that it "contains the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims." Vitronics, 90 F.3d at 1582. As the prosecution history "constitutes a public record of the patentee's representations concerning the scope and meaning of the claims," Hockerson-Halberstadt, Inc. v. Avia Group Int'l, 222 F.3d 951, 957 (Fed.Cir.2000), it may limit the construction of disputed claim terms if certain constructions were disclaimed or disavowed by the patentee during the course of prosecution, *see* Vitronics, 90 F.3d at 1582-83. Additionally, the prosecution history provides evidence of "how the PTO and the inventor understood the patent." Phillips, 415 F.3d at 1317. A court may not, however, rely on either the specification or the prosecution history to overcome the "heavy presumption" that the ordinary meaning of claim language controls. CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed.Cir.2002); *see also* Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1344 (Fed.Cir.1998) ("Even within the intrinsic evidence, however, there is a hierarchy of analytical tools. The actual words of the claim are the controlling focus.").

In addition to considering intrinsic evidence-the language of the patent's claims, the specification, and the prosecution history-courts also, in certain limited circumstances, may consider extrinsic evidence in construing a disputed claim term. Markman, 52 F.3d at 980. Extrinsic evidence includes "all evidence external to the patent and the prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Id*. A court may rely on extrinsic evidence " 'to aid the court in coming to a correct conclusion' as to the 'true meaning of the language employed' in the patent." *Id*. Extrinsic evidence, however, "is less significant than the intrinsic record in determining the legally operative meaning of claim language," Phillips, 415 F.3d at 1317.FN7 Thus, when intrinsic evidence renders the meaning of a disputed claim term unambiguous, reliance on extrinsic language is inappropriate. Vitronics, 90 F.3d at 1583 ("In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence."); Hockerson-Halberstadt, 222 F.3d at 955 ("If the meaning of a claim is unambiguous from the intrinsic evidence, then a court may not rely on extrinsic evidence for purposes of claim construction."). Moreover, extrinsic evidence may not be used to "vary or contradict the claim language" or to "contradict the import of other parts of the specification." Vitronics, 90 F.3d at 1584.

FN7. With respect to dictionaries, the Court of Appeals for the Federal Circuit provides this additional guidance:
Although technical treatises and dictionaries fall within the category of extrinsic evidence, as they do not

form a part of the integrated patent document, they are worthy of special note. Judges are free to consult such resources at any time to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.

Vitronics, 90 F.3d at 1584 n. 6.

II. Construction of Disputed Claim Terms

The parties disagree as to the construction of two general terms and one so-called meansplus-function term that corresponds to a number of functions. FN8 The disputed general term "mounted on an arch" appears in Claim 1. The disputed general term "data archive" appears in Claim 3. The disputed means-plus-function term "signal processing means" first appears in Claim 1, and is associated with functions ennumerated in Claims 1, 2, 3, and 6.FN9 In their entirety, the relevant claims provide as follows:

FN8. The proper standard for evaluating a means-plus-function term is discussed in detail in Section II.C. *infra*.

FN9. The parties initially disputed various additional claim terms but reached agreements with respect to a number of these terms prior to, and during the course of, the *Markman* hearing. (*See* Tr. at 5-6, 42-45; Docket No. 76)

1. Apparatus for automatically indicating sealing effectiveness of a sealed compartment, comprising:
an ultrasonic transmitter for generating energy of a specified frequency within the sealed compartment;

an array of ultrasonic receivers *mounted on an arch* disposed outside the sealed compartment for sensing ultrasonic energy of the specified frequency and producing output signals in accordance therewith;

means for producing a relative movement of the sealed compartment and the arch such that the sealed compartment passes through the arch; and

signal processing means for automatically sampling the output signals of said ultrasonic receivers during the relative movement of the sealed compartment and the arch, and for indicating the sealing effectiveness of the sealed compartment by comparing the sampled output signals to thresholds establishing levels of ultrasonic energy that will be sensed when the sealed compartment is effectively sealed.

2. The apparatus of claim 1, including detection means for detecting a relative position of the sealed compartment and the arch, and wherein the *signal processing means coordinates the sampling of the ultrasonic receiver output signals with the detected relative position.*

3. The apparatus of claim 1, wherein the *signal processing means includes means ...for transferring the stored output signals to a data archive.*

...

6. The apparatus of claim 4,FN10 wherein the *signal processing means identifies a zone of the sealed compartment corresponding to a sampled output signal that is above a respective threshold ....*

FN10. Claim 4 simply provides another modification to the original apparatus of Claim 1.

(Docket No. 1, Ex. A, Cols. 4-5) (emphasis of disputed terms added)

A. "Mounted on an arch"

The parties disagree as to the construction of the term "mounted on an arch," which is used in the 642 Patent to describe the placement of the ultrasonic receivers. The parties agree that the term "mounted" means "fixed securely to a support" but disagree as to the meaning of the words "on" and "arch." (Docket No. 48 at 14)

With respect to the term "on," FN11 the parties agree that the term is used to indicate position, but dispute whether it requires direct physical contact between two items. The plaintiffs allege that direct physical contact is not required (Docket No. 61 at 23-29), while the defendants allege that direct contact is required (Docket No. 63 at 14-16).FN12 With respect to the term "arch," the parties agree that the term refers to a structure spanning an opening that may be shaped like an inverted U, but dispute whether the structure must be "curved or bowlike" to constitute an arch. The plaintiffs allege that the structure need not be curved or bowlike and that a structure such as a rectangular door frame constitutes an arch. (Docket No. 61 at 23-29) By contrast, the defendants allege that a structure must be curved to constitute an arch.FN13 (Docket No. 63 at 14-16) As a practical matter, if the defendants' interpretation is accepted, the 642 Patent would describe only arrays in which ultrasonic receivers are mounted to, and in direct physical contact with, a curved arch. By contrast, the plaintiffs' interpretation would encompass such arrays as well as arrays in which ultrasonic receivers are mounted on, for example, plates, and the plates then mounted on the arch, or to arrays in which ultrasonic receivers are supported by the arch but physically separated from the arch by means of shims, spacers, or other such devices, or to arrays in which segments of the arch are straight instead of curved.

FN11. As counsel for the defendants noted during the *Markman* hearing, only in the arena of patent law would parties litigate over the meaning of this seemingly simple preposition. (Tr. at 28)

FN12. The plaintiffs argue by analogy that a picture may be hung *on* a wall even though there may be no direct contact between the picture itself and the wall-that is, the picture may be in contact with the frame, which is in contact with the frame hardware, which is in contact with the wall hardware, which is in contact with the wall. The plaintiffs also analogize the ultrasonic receivers to a cup that is placed on a coaster that rests on a table, asserting that one would refer to the cup as being on the table, essentially ignoring the intermediate role played by the coaster, even though the cup and the table are not in direct contact and are in fact separated by the coaster. Although these analogies are useful, there are limits to them. For example, the table itself rests on the floor, and yet one would not say that the cup (or the coaster, for that matter) is on the floor. At some point, the significance of the intermediate item-such as the table-becomes large enough that it would be disingenuous or incorrect to ignore that item. That said, spacers, shims, plates, and the like constitute relatively insignificant intermediate items-rather like the coaster and unlike the table.

FN13. To the extent that the parties dispute the meaning of the term "mounted on an arch," the only issues before the court are whether something must be in direct contact to be "on" something else and whether a structure must be curved to constitute an "arch." The parties make a number of additional arguments regarding the scope of the term, but those arguments are far more specific and address not the construction of the term but rather the term's application to the defendants' allegedly infringing device. Such issues-for example, whether the "silhouette template" that characterizes the defendants' Cargate Tunnel device is properly considered an arch under the 642 Patent, and whether the 642 Patent embodies a device that includes ultrasonic receivers on the floor beneath the arch, as does the Cargate Tunnel-are issues of fact involving the question of infringement of the 642 Patent, and are not issues of claim construction.

The ordinary meaning of the word "on" does not require actual physical contact between the object item (such as a picture or an ultrasonic receiver) and the subject item (such as a wall or an arch). This construction is consistent with the specification of the 642 Patent. Nowhere in the specification does it suggest that the receivers must be in direct contact with the arch. Instead, with respect to the location of the ultrasonic receivers, the specification provides only that "[t]he arch *supports* an array of ultrasonic sensors or receivers." (Docket No. 1, Ex. A, Col. 2 (emphasis added)) The specification's use of the term "supports" makes clear that the arch provides the structure that ultimately holds the ultrasonic receivers in place, but that physical contact is not required to do so. It is certainly possible to support an item without being in direct contact with it as, for example, pillars may support the deck of a bridge, even though the pillars and the deck may not be in direct contact and may only be connected by cables or other such supplemental structures. Finally, dictionary definitions are consistent with this interpretation; Merriam-Webster defines "on" as a function word that *may* be used "to indicate position in contact with," but that may also be used "to indicate position in close proximity to." Thus, physical contact is not necessarily required.

Additionally, the ordinary meaning of the word "arch" does not require a curved or bowlike structure. The specification of the 642 Patent is particularly illuminating here. The specification refers repeatedly to an arch structure and contains a figure with a drawing of the structure to which it refers as an arch. That figure depicts a structure that spans an opening, but that, notably, is *not* curved or bowlike, but rather is angular and squared-off, comprising straight segments with no curvature.FN14 (Docket No. 1, Ex. A, Fig. 2) Moreover, the specification describes the arch as "simply a fixed tubular frame fixtured to support the receivers and associated cables." (Docket No. 1, Ex. A, Col. 2) It adds that the arch "may be designed to be configurable (i.e., collapsible or expandable) in height, width and even length in order to maintain reasonably close spacing of the receivers relative to any given type of vehicle passing under the arch." (*Id.*) Thus, the specification makes clear that the precise configuration of the arch is flexible, and accounts for a variety of structures that may not necessarily be curved but that act functionally to position the ultrasonic receivers as close to the car as possible. Nowhere does the specification require or even suggest that the arch must be curved. Again, dictionary definitions are consistent with this interpretation. Merriam-Webster defines an "arch" as "a typically curved structural member spanning an opening and serving as a support" or, alternatively, as "something resembling an arch in form or function." Thus, though an arch may "typically" be curved, it is not necessarily so, particularly if the structure in question serves the same function as a curved arch.

FN14. To the extent that the depicted structure resembles an inverted U, it resembles a squared-off U rather than a curved U.

The defendants assert that the prosecution history precludes the interpretation of the term "mounted on an arch" advanced by the plaintiffs. They claim that the prosecution history reveals that the plaintiffs added that term to their claims after their initial application was rejected by the PTO as anticipated by the prior art, which was disclosed in two prior-issued patents. Both of those patents-the Blaser patent and the Rademacher patent-involve ultrasonic leak detection systems that employ ultrasonic receivers attached to robotic arms, as opposed to ultrasonic receivers mounted on an arch. (Pl.'s Ex. 5) The plaintiffs added the term "mounted on an arch" to distinguish their claims from the prior art, and the PTO subsequently issued the 642 Patent. The defendants argue that the addition of the term "mounted on an arch" constituted a limitation of the plaintiff's patent claims. (Docket No. 63 at 16)

In making this argument, however, the defendants overstate the import of the prosecution history in this case. Although the addition of the term "mounted on an arch" to the 642 Patent effectively limited the scope of the plaintiffs' claims, it did so only with respect to the subject matter to which that addition pertained-that is, the subject matter of the Blaser and Rademacher patents. Thus, the addition of the "mounted on an arch" language limits the scope of the 642 Patent to exclude devices involving ultrasonic receivers attached to robotic arms, but it does not limit the scope of the 642 Patent to exclude a variety of other devices that may be encompassed by the ordinary meaning of the term "mounted on an arch"-such as devices in which the arch is angular rather than curved, or those in which the receivers are not in direct contact with the arch. Thus, the prosecution history discloses no reason to limit the scope of the plaintiffs' claims as the defendants assert.

The extrinsic evidence regarding the term "mounted on an arch" also is consistent with this construction.FN15 The defendants themselves have used the term "arch" on numerous occasions to describe structures that are not curved, but rather are angular like the structure depicted in the 642 Patent's specification. For example, when the defendants initially manufactured their allegedly infringing device, they named it the "Cargate Arch" and published promotional materials with photographs that depict a structure that is angular rather than curved in appearance. (*E.g.,* Pl.'s Ex. 12) FN16 Additionally, the Gayle Patent Application initially described an "arch-like structure" and depicted that arch in drawings as an angular structure. (Docket No. 106, Ex. A) Moreover, in considering the Gayle Patent Application, the PTO cited the 642 Patent as grounds for rejecting the defendants' claims, specifically noting that the arch structure in the 642 Patent may be "configurable to any given type of object." (Docket No. 106, Ex. C) Thus, both the defendants themselves *and the PTO* have manifested an understanding of the term "mounted on an arch" as encompassing, at the very least, angular structures rather than curved structures.FN17

FN15. The intrinsic evidence alone is sufficient to construe the meaning of the term "mounted on an arch," and the extrinsic evidence is considered here only to the extent that it sheds additional light on the parties' arguments.

FN16. Notably, after the plaintiffs filed the instant lawsuit, the defendants altered the nomenclature used to describe their device in their promotional materials and began referring to it as the "Cargate Tunnel," rather than the Cargate Arch, although the pictures that accompany that description also depict a squared-off structure like the structure the defendants used previously to illustrate the Cargate Arch. (*Compare* Pl.'s Ex. 12 *with* Pl.'s Ex. 15) Mr. Gayle was questioned at the hearing on the defendants' use of the term "arch," and his explanation was less than illuminating. He claims that the defendants changed the product's name as a result of a change in the design and that the current product no longer constitutes an arch, but he was unable to explain the defendants' use of identical pictures to illustrate both the Cargate Arch and the Cargate

Tunnel. (Tr. at 128-30, 143-46)

FN17. Neither the prosecution history of the Gayle Patent Application nor, for that matter, the prosecution history of the 642 Patent, address whether the term "mounted on an arch" requires direct contact between the ultrasonic receivers and the arch itself.

Finally, the testimony and reports of the plaintiffs' two witnesses are consistent with this interpretation. Dr. Penrose stated in his report that "it does not matter whether the receivers are located directly on a specific type of structure." (Pl.'s Ex. 2 at 4) He additionally testified on the basis of his experience in automobile manufacturing plants and as one of ordinary skill in the art that he would interpret "mounted on an arch" to mean that the ultrasonic receivers are "located with the arch," though they may be physically separated from the arch by spacers or shims, which he testified is standard in an "industrial environment." (Tr. at 53) Mr. Caprio likewise opined that "[o]ne of ordinary skill in the art would understand 'on' 'to mean the general location of the ultrasonic receivers" (Pl.'s Ex. 3 at 5), and further testified that the term does not require direct contact between the receivers and the arch (Tr. at 78). Additionally, Mr. Gayle conceded at the hearing that an angular door frame constitutes an arch, and that ultrasonic receivers attached to arms-and thus not in direct contact with the arch-may nonetheless be considered to be mounted on the arch. (Tr. at 132-33)

In sum, the term "mounted on an arch" shall be construed as "fixed securely, though not necessarily in direct contact with, a support structure that spans an opening." This interpretation is commanded by the ordinary meaning of the term based on the intrinsic evidence, including the 642 Patent's specification and prosecution history, and is consistent with the extrinsic evidence.

B. "Data archive"

The parties disagree as to the construction of the term "data archive." The plaintiffs allege that the term means "a repository or collection of information," whereas the defendants claim that it means "a long-term storage area for backup copies of data files or for data files that are no longer in active use." (Docket No. 48 at 16) In essence, the parties agree that the term "data archive" involves a location for the storage of information, but dispute whether the term requires storage for a certain length of time or for a particular purpose.

The claim itself and the specification provide additional information about the meaning of the term "data archive" as it is used in the 642 Patent. FN18 Claim 3 provides for a two-part storage method: information initially is stored in a "means for storing" information, and subsequently is transferred to a data archive. (Docket No. 1, Ex. A, Col. 5) The specification contains a figure that illustrates this two-part storage method and shows one element, labeled "memory," which corresponds to the initial means for storing information, and a second element, labeled "data archive," to which the information is transferred. (*Id.*) Moreover, the specification makes clear that the purpose of storing information in the data archive is so that "archived data for a given set of vehicles can then be analyzed for quality control purposes." (*Id.*) Finally, Merriam-Webster defines an archive as "a place where public records or historical documents are preserved" or "a repository or collection especially of information."

FN18. There is nothing in the 642 Patent's prosecution history that bears on the interpretation of the term

"data archive."

The 642 Patent makes clear that the ordinary meaning of the term "data archive" is a repository for the collection or storage of information. It is worth noting, however, that the term as used in the 642 Patent and as defined in the dictionary necessarily implies the maintenance of information in that repository for at least some length of time. If data were transferred to a repository and than immediately erased, no collection would ever be formed and no storage effected. Additionally, if data were not stored for a period of time sufficient both to collect data for analysis and to permit a user to analyze the data, then the data archive would not serve its purpose as stated in the 642 Patent. However, such storage need not necessarily be "long-term," as the defendants suggest. The length of time may indeed be quite short-an archive may exist for mere minutes or hours, and by no means needs to be maintained indefinitely-but nevertheless information must be stored for some period of time for a repository to constitute an archive and to serve the purpose provided by the 642 Patent.

Moreover, there is no evidence that the ordinary meaning of the term "data archive," as evidenced by the 642 Patent, necessitates that the stored information comprise "backup" files or files that are not in use, as the defendants claim. In fact, the specification provides ample evidence of the purpose of storage in the data archive-information is stored for subsequent analysis. There is nothing in the 642 Patent that suggests that the information in a data archive must be "backup" or not otherwise in use. FN19

FN19. As the intrinsic evidence makes the ordinary meaning of the term "data archive" clear, there is no need to resort to or rely on extrinsic evidence. It is worth noting, however, that the extrinsic evidence is largely consistent with the interpretation commanded by the intrinsic evidence. Dr. Penrose testified that "data archive" refers to the storage of information "for a given period of time," that the period of time may be short or long, depending on the purpose for which the information is to be used, and that the information must be accessible during this time. (Tr. at 57) Mr. Caprio was not questioned on the meaning of the term "data archive" during the hearing, but stated in his report that, to one of ordinary skill in the art, a data archive means "to store data," and does not require long-term storage or storage of information that is not in use. (Pl.'s Ex. 3) Mr. Gayle did not testify as to the meaning of the term "data archive."

Thus, the term "data archive" will be construed as "a repository in which information is collected or stored for some period of time such that it may be analyzed for quality-control purposes."

C. "Signal processing means"

Finally, the parties dispute the construction of the means-plus-function term "signal processing means." A means-plus-function term is a claim element "expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof." 35 U.S.C. s. 112, para. 6. Such claim elements are "construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." *Id*. Whenever a patent uses the term "means" in association with a function, there is a presumption that it is a means-plus-function claim. Callicrate v. Wadsworth Mfg., Inc., 427 F.3d 1361, 1368 (Fed.Cir.2005). The only cases in which the presumption does not apply are those in which a claim uses the term "means" but does not specify an associated function, or in which the claim specifies a function but also provides sufficient structure for performing that function. Rodime PLC v. Seagate Tech., Inc., 174 F.3d 1294, 1302 (Fed.Cir.1999). In construing means-plus-function claim terms, a

court must first identify the function performed by the means and then determine the structure disclosed in the patent's specification that performs that function. Asyst Tech., Inc. v. Empak, Inc., 268 F.3d 1364, 1369 (Fed.Cir.2001). A means-plus-function term is considered indefinite if there is no structure provided in the specification corresponding to the function. Biomedino, LLC v. Waters Techs. Corp., 490 F.3d 946, 950 (Fed.Cir.2007).

The parties agree that the term "signal processing means" should be construed as a means-plus-function term and additionally agree that the functions performed by the signal processing means include "automatically sampling the output signals of [the] ultrasonic receivers ... [and] indicating the sealing effectiveness of the sealed compartment," "coordinat[ing] the sampling of the ultrasonic receiver output signals," "identif[ying] a zone of the sealed compartment," and "transferring the stored output signals to a data archive." FN20 (Docket No. 48 at 4-8, 10; *see also* Docket No. 1, Ex. A, Col. 5). The parties disagree, however, as to the corresponding structures for performing those functions.

FN20. The 642 Patent provides that the "signal processing means" serves a number of additional functions, but the parties do not dispute the structures corresponding to those additional functions, and thus they will not be addressed here.

1. Means for sampling ultrasonic signals and indicating sealing effectiveness

The 642 Patent's specification provides substantial direction regarding the structure corresponding to the signal processing means.FN21 The specification provides for "a signal processor 24, which may be a conventional computer work station." (Docket No. 1, Ex. A., Col. 2) The specification also includes Figure 3, which it describes as "generally illustrat[ing] the above-described functionality of signal processor 24 and its associated output devices." (Docket No. 1, Ex. A, Col. 3) The illustration of signal processor 24 contained in Figure 3 includes a number of components, each of which is further described in the accompanying text description in the 642 Patent's specification. With respect to the sampling and indicating functions, the specification provides that "signal processor 24 begins collecting data generated by ultrasonic receivers 20, and generates and stores an ultrasonic signal profile for each receiver 20.... As the profiles are being generated, the individual signal values are compared with a threshold (which may be a single value or a multi-value profile) to determine if the ultrasonic energy emitted from the vehicle ... exceeds the threshold." (Docket No. 1, Ex. A., Cols. 2-3) The specification further provides that, if the amount of energy emitted exceeds the threshold, signal processor 24 activates a red lamp and an alarm, and if the amount of energy emitted does not exceed the threshold, signal processor 24 activates a green lamp. (Docket No. 1, Ex. A., Col. 3)

FN21. There is nothing in the 642 Patent's prosecution history that bears on the interpretation of the term "signal processing means."

The plaintiffs contend that the 642 Patent discloses multiple embodiments that can perform the function of sampling ultrasonic signals and indicating sealing effectiveness. The plaintiffs further claim that, although Figure 3 depicts one possible embodiment that corresponds to this function, other embodiments are possible, and the term extends to such alternative embodiments. (Docket No. 61 at 45-53) The defendants argue, by contrast, that the term is indefinite or, in the alternative, that the means for sampling ultrasonic signals and indicating sealing effectiveness entirely and exclusively comprises the elements of signal processor 24, as

illustrated in Figure 3 and the accompanying text description. (Docket No. 63 at 20-23)

The defendants assert that the description of signal processor 24 as a "conventional computer work station" is insufficiently descriptive to allow one of ordinary skill in the art to create a structure to perform the sampling and indicating functions. The defendants base their indefiniteness claim on the fact that the 642 Patent does not specify that a conventional computer workstation must be configured with appropriate software and hardware to perform the sampling and indicating functions. However, Mr. Gayle's own testimony during the hearing belies this assertion. When asked specifically how a conventional computer workstation could be modified to perform the required functions, Mr. Gayle easily described the software and configuration modifications that would enable an otherwise conventional computer workstation to perform the required functions. (Tr. at 134-36) It may well be true, as Mr. Gayle alluded, that one without experience and knowledge in the art might not be able to construct means for performing the required functions based on the description in the 642 Patent. But that is not what the law requires; a patent is evaluated for definiteness not from the viewpoint of a lay person but, instead, "from the viewpoint of one skilled in the art." Budde v. Harley Davidson, 250 F.3d 1369, 1376 (Fed.Cir.2001); Bancorp Servs., L.L.C. v. Hartford Life Ins. Co., 359 F.3d 1367, 1372 (Fed.Cir.2004) ("In ruling on a claim of patent indefiniteness, a court must determine whether those skilled in the art would understand what is claimed when the claim is read in light of the specification."). As Mr. Gayle himself is of ordinary skill in the art, FN22 the fact that he could describe how to modify a conventional computer workstation to perform the required functions clearly establishes that the 642 Patent is sufficiently descriptive and does not suffer from indefiniteness as the defendants assert.

FN22. Mr. Gayle's testimony was admitted on the grounds that he is of ordinary skill the art, and Mr. Gayle himself acknowledged this during his testimony. (Tr. at 116-17, 137)

Additionally, the 642 Patent can hardly be characterized as indefinite because the specification does not merely describe the signal processing means as a "conventional computer workstation," but in fact, in Figure 3 and the accompanying text description, provides a highly detailed description of the elements that signal processor 24 may embody. Dr. Penrose and Mr. Caprio testified that this description was sufficient to describe to one of ordinary skill in the art a structure for performing the sampling and indicating functions. (Tr. at 61, 80) Moreover, Mr. Gayle himself testified that the specification of the 642 Patent-including both the illustration of signal processor 24 contained in Figure 3 and the accompanying text description-provided a description of signal processing means sufficient to replicate the device. (Tr. at 119-20, 134)

Finally, the defendants claim that, if the term is not indefinite, then it must be interpreted to include precisely those elements contained in the illustration of signal processor 24 contained in Figure 3 and the accompanying text description. However, means-plus-function terms are interpreted to include not only the structures disclosed in a patent for performing the particular function, but also any equivalents to those disclosed structures. *See* 35 U.S.C. s. 112, para. 6. Moreover, the 642 Patent's specification describes Figure 3 as "generally" illustrating the components of signal processor 24 (Docket No. 1, Ex. A, Col. 3), and it further states that signal processor 24 "may" comprise a "conventional computer work station" (Docket No. 1, Ex. A, Col. 2). Thus, the specification makes quite clear that the structure disclosed in Figure 3 and the accompanying text description is but one possible embodiment of the signal processing means for sampling ultrasonic signals and indicating sealing effectiveness. Additionally, Dr. Penrose testified that there are embodiments of signal processing means for performing the required functions other than the structure described in the 642 Patent's specification. (Tr. at 60-61) And although Mr. Gayle asserted during his

testimony that the 642 Patent provides a single embodiment of a structure that could perform the required functions (Tr. at 134), his testimony essentially drew the erroneous legal conclusion that the Patent "requires" that a particular structure be used to perform the stated functions, when in fact the law protects not only the structure specified in the patent but also any equivalents to that structure. *See* 35 U.S.C. s. 112, para. 6. Nothing in Mr. Gayle's testimony indicates that the specified structure is the only structure that could possibly perform the required functions. Thus, the 642 Patent discloses that signal processor 24-the signal processing means-need not necessarily comprise all of the elements contained in the illustration in Figure 3 nor must it comprise those elements exclusively, as the defendants contend.

In summary, the signal processing means for performing the sampling and indicating functions will be construed as signal processor 24, as it is described in the specification of the 642 Patent, including the relevant portion of Figure 3, and any equivalents to that structure.

2. Means for coordinating the sampling of ultrasonic signals with the detected relative position [of the sealed compartment]

The parties additionally dispute the structure that corresponds to the function of coordinating the sampling of ultrasonic signals, which also is performed by the signal processing means. The plaintiffs contend that the 642 Patent discloses that signal processor 24 is the structure disclosed by the patent for this function (Docket No. 61 at 61-64), while the defendants argue that the term is indefinite or, in the alternative, that the means for coordinating the sampling of ultrasonic signals with the detected relative position of the sealed compartment entirely and exclusively comprises the elements of signal processor 24 as illustrated in Figure 3 and the accompanying text description (Docket No. 63 at 25).

The 642 Patent's specification provides that signal processor 24 is involved in the coordinating function. The specification states, "When the motion detector 36 indicates that a vehicle 10a is about to enter arch 18, the signal processor 24 begins collecting data generated by the ultrasonic receivers 20, and generates and stores an ultrasonic signal profile for each receiver 20." (Docket No. 1, Ex. A, Col. 3) Moreover, as the 642 Patent provides an extensive illustration and text description of the components of signal processor 24 as discussed in Section II.C.1. *supra,* there is no basis for the defendants' claim that this term is indefinite. Finally, the defendants' argument that signal processor 24 must be interpreted to include precisely those elements contained in the illustration of signal processor 24 in Figure 3 and the accompanying text description is again without merit, as discussed in Section II.C.1. *supra,* as the term includes not only that specific structure but also any equivalents to that structure.

In summary, the signal processing means for performing the coordinating function will be construed as signal processor 24, as it is described in the specification of the 642 Patent, including the relevant portion of Figure 3, and any equivalents to that structure.

3. Means for identifying a zone of a sealed compartment

The parties next dispute the structure that corresponds to the function of identifying a zone of a sealed compartment, which also is performed by the signal processing means. The plaintiffs contend that the 642 Patent discloses that signal processor 24 is the structure disclosed by the patent for this function (Docket No. 61 at 81-82), while the defendants argue that the term is indefinite or, in the alternative, that the means for identifying a zone of a sealed compartment entirely and exclusively comprises the elements of signal processor 24 as illustrated in Figure 3 and the accompanying text description (Docket No. 63 at 26-27).

The 642 Patent's specification provides that signal processor 24 is involved in the identifying function. The specification states, "In addition to simply indicating that a vehicle has failed the leak test, the signal processor 24 can be easily programmed to pinpoint the location of the leakage ...." (Docket No. 1, Ex. A, Col. 3) Moreover, as the 642 Patent provides an extensive illustration and text description of the components of signal processor 24 as discussed in Section II.C.1. *supra,* there is no basis for the defendants' claim that this term is indefinite. Finally, the defendants' argument that signal processor 24 must be interpreted to include precisely those elements contained in the illustration of signal processor 24 in Figure 3 and the accompanying text description is again without merit, as discussed in Section II.C.1. *supra,* as the term includes not only that specific structure but also any equivalents to that structure.

In summary, the signal processing means for performing the identifying function will be construed as signal processor 24, as it is described in the specification of the 642 Patent, including the relevant portion of Figure 3, and any equivalents to that structure.

4. Means for transferring stored signals to a data archive

Finally, the parties dispute the structure that corresponds to the function of transferring stored signals to a data archive, which also is performed by the signal processing means. The plaintiffs contend that the 642 Patent discloses that the structure that corresponds with this function is signal processor 24 and communication cable 22 (Docket No. 61 at 67-70), while the defendants allege that the term is indefinite or, in the alternative, that the means for transferring stored signals is solely communication cable 22 (Docket No. 63 at 25).

With respect to the means for transferring stored signals, the 642 Patent's specification provides, "The signal processor 24 additionally transfers the stored signal profiles from individual vehicles 10a-10c, along with the respective vehicle identification numbers, to a data archival system 760 via communication cable 62." (Docket No. 1, Ex. A., Col. 3) This makes clear that the structure that performs this function encompasses signal processor 24 coupled with communication cable 62. Moreover, this interpretation makes intuitive sense. Even though the data may be transferred along a route provided by the cable, a cable lacks the ability to initiate a transfer itself, and thus would not alone be sufficient for transferring data. It is only in connection with signal processor 24 that data may be transferred via communication cable 62. This interpretation further is consistent with Dr. Penrose's testimony during the hearing that the 642 Patent provides sufficient detail to construct a system incorporating a means for transferring data (Tr. at 67), and with Mr. Caprio's opinion that the term refers to both elements (Pl's Ex. 3).

In summary, the signal processing means for performing the transferring function will be construed as signal processor 24, as it is described in the specification of the 642 Patent, including the relevant portion of Figure 3, and any equivalents to that structure, and communication cable 62 and any equivalents FN23 to that structure.

FN23. It is worth reiterating that, as a means-plus-function term, the signal processing means for transferring extends not only to the structure disclosed by the patent but also any equivalents such as wireless means for transferring data, which Dr. Penrose testified would be understood by one of ordinary skill in the art to be an equivalent means of performing the transferring function. (Tr. at 64-66)

CONCLUSION

For the reasons articulated in this opinion, the court construes the disputed terms as follows:

"Mounted on an arch" shall be construed as "fixed securely, though not necessarily in direct contact with, a support structure that spans an opening."

"Data archive" shall be construed as "a repository in which information is stored for some period of time such that it may be analyzed for quality control purposes."

"Signal processing means" for sampling and indicating, for coordinating, and for identifying shall be construed as signal processor 24, as it is described in the specification of the 642 Patent, and any equivalents to that structure.

"Signal processing means" for transferring shall be construed as signal processor 24, as it is described in the specification of the 642 Patent, and any equivalents to that structure, and communication cable 62 and any equivalents to that structure.

An appropriate order will enter.

ORDER

For the reasons articulated in the accompanying memorandum, the disputed claim terms in U.S. Patent No. 6.983,642 will be construed as follows:

"Mounted on an arch" shall be construed as "fixed securely, though not necessarily in direct contact with, a support structure that spans an opening."

"Data archive" shall be construed as "a repository in which information is stored for some period of time such that it may be analyzed for quality control purposes."

"Signal processing means" for sampling and indicating, for coordinating, and for identifying shall be construed as signal processor 24, as it is described in the specification of the 642 Patent, and any equivalents to that structure.

"Signal processing means" for transferring shall be construed as signal processor 24, as it is described in the specification of the 642 Patent, and any equivalents to that structure, and communication cable 62 and any equivalents to that structure.

It is so Ordered.

Entered this 11th day of December 2007.

M.D.Tenn.,2007.
Quadrascan Technologies, LLC v. Gayle Technologies, Inc.