United States District Court,
W.D. Texas, Austin Division.

PAVILION TECHNOLOGIES, INC,
Plaintiff.
v.
EMERSON ELECTRIC CO., Emerson Process Management L.L.L.P., and Emerson Process Management Power & Water Solutions Inc,
Defendants.

No. A-05-CA-898-SS

Sept. 5, 2006.

Frederick G. Michaud, Jeffrey D. Mills, Joseph R. Knight, Baker Botts L.L.P., Washington, DC, John A. Halbleib, Weil, Gotshal & Manges LLP, Truman H. Fenton, Baker Botts LLP, Paula Diane Heyman, Phillip Morris Products SA, Austin, TX, for Plaintiff.

Jeffrey A. Andrews, Bruce James Cannon, Locke Lord Bissell & Liddell LLP, Houston, TX, for Defendants.

ORDER

SAM SPARKS**, District Judge.**

BE IT REMEMBERED on the ***31st*** day of August 2006, the Court reviewed the file in the above-styled cause, and specifically the Report and Recommendation of the Special Master regarding claim construction of the patents-in-suit [# 74], Plaintiff Pavilion Technologies, Inc.'s ("Pavilion") objections thereto [# 78], and Defendants' Emerson Electric Co., Emerson Process Management L.L.L.P., and Emerson Process Management Power & Water Solutions Inc.'s (collectively, "Emerson") objections thereto [# 79]. Having considered the Report and Recommendation, the objections, the transcript and exhibits from the *Markman* hearings, the claim construction briefs, responses, and replies, the case file as a whole, and the applicable law, the Court enters the following opinion and orders.

Background

This is a patent infringement action involving seven different patents owned by Plaintiff Pavilion: U.S. Patent No. 5,167,009 ("the '009 Patent"); U.S. Patent No. 5,224,203 ("the '203 Patent"); U.S. Patent No. 5,282,261 ("the '261 Patent"); U.S. Patent No. 5,640,493 ("the '493 Patent"); U.S. Patent No. 5,386,373 ("the '373 Patent"); U.S. Patent No. 5,548,528 ("the ' 528 Patent"); and U.S. Patent No. 5,826,646 ("the '646 Patent") (collectively "patents-in-suit"). As Pavilion explains in its opening claim construction brief,

The patents-in-suit disclose and claim inventions relating to the use of predictive models such as neural

networks to solve some very challenging problems in process control. Before these inventions, process engineers had long faced difficulties in measuring certain process variables and product properties, where, for example: (1) measuring the variable or property is impossible, unreliable and/or very expensive; or (2) the measurement is attainable only after a lengthy time delay. The patented inventions solve these problems, allowing a process control engineer without computer expertise to create and implement complex predictive networks for process control.

E.I. du Pont de Nemours and Company ("DuPont") obtained the first four of the patents-in-suit based upon its pioneering process-control research in the late 1980s and early 1990s. Pavilion acquired these patents from DuPont .... Two of the patents in this case developed by Pavilion cover emissions monitoring systems that have earned approval from the Environmental Protection Agency to create "virtual sensors" used in lieu of hardware sensors to monitor and report plant emissions. A third Pavilion patent covers an invention for automatically determining which process variables have the greatest sensitivity upon the output being modeled.

Pl.'s Claim Constr. Br. at 1.

Although the parties have agreed on the interpretations of certain claim terms, numerous terms remain in dispute. After conducting two hearings and receiving extensive briefing, the Special Master has issued his Report and Recommendation on the constructions to be applied to the remaining disputed claim terms. The Court now accepts and adopts the Special Master's recommended constructions, as modified herein.

I. Claim Construction Principles

The Court begins its claim construction analysis with a review of the relevant claim construction principles. The claim language in a patent defines the scope of the invention. SRI Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 (Fed.Cir.1985) (en banc). A claim term means "what one of ordinary skill in the art at the time of the invention would have understood the term to mean." Markman v. Westview Instruments, Inc., 52 F.3d 967, 986 (Fed.Cir.1995), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). When construing claims, courts begin with "an examination of the intrinsic evidence, *i.e.* the claims, the rest of the specification and, if in evidence, the prosecution history." CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed.Cir.2002); Interactive Gift Express, Inc. v. Compu Serve, Inc., 256 F.3d 1323, 1331 (Fed.Cir.2001).

The words in the claims themselves are of primary importance in the analysis. Both the plain language of the claims and the context in which the various terms appear, "provide substantial guidance as to the meaning of particular claim terms." Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed.Cir.2005). The specification also plays a significant role in the analysis. The Federal Circuit has repeatedly reaffirmed the principle that the specification "is always highly relevant.... Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." Id. at 1315 (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996)). In interpreting the effect the specification has on the claim limitations, however, courts must pay special attention to the admonition that one looks "to the specification to ascertain the meaning of the claim term as it is used by the inventor in the context of the entirety of his invention, and not merely to limit a claim term." Interactive Gift, 256 F.3d at 1332 (internal quotation marks and citations omitted).

The final form of intrinsic evidence the Court considers is the prosecution history. Although the prosecution

history "represents an ongoing negotiation between the PTO and the applicant" and therefore "often lacks the clarity of the specification and thus is less useful for claim construction purposes," it can nonetheless "often 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.

Besides the intrinsic evidence, the Court may also consult dictionaries, treatises, and expert or inventor testimony-i.e., extrinsic evidence-in the claim construction analysis. *Id*. Although useful, the Court must be mindful that such evidence "is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Id*. at 1319. Indeed, the Court's task, at all times, is to determine the patent's limitations as they have been expressed through the claim terms themselves. Comark Commc'ns, Inc. v. Harris Corp., 156 F.3d 1182, 1186-87 (Fed.Cir.1998).

II. Terms in Dispute

A. "input data"

The term "input data" appears in claims 1, 8, and 20 of the '009 Patent; claims 1, 20, and 33 of the '203 Patent; claims 1 and 15 of the ' 261 Patent; and Claims 9 and 10 of the '493 Patent. Pavilion has argued that the Court need not apply a construction to the term because the plain and ordinary meaning applies-that input data is simply data input to the neural network. Rep. & Rec, Attach. 2 at 1. Emerson has argued the Court should construe "input data" to mean: "a data value produced by the sampling of a sensor signal from a sensor." Id. The Special Master recommends the Court adopt Pavilion's proposal and apply no construction to the term. Id.

Emerson presented two arguments against the "non-construction" the Special Master recommends to the Court: (1) the Court has a duty to construe the terms in dispute, and thus, a non-construction is legally improper; and (2) Pavilion's proposal is incorrect because the common specification in the ' 009, '203, and '493 Patents specifically defines the term "input data" in the manner it has proposed.

First, with respect to Emerson's argument that the Court has a duty to construe claim terms, the Court agrees with this argument in principal, but it disagrees that the Court must attach a special construction to a term in order to fulfill its duty. Instead, the Court properly refuses to attach a special construction to a term when the ordinary meaning of the term applies. Mentor H/S, Inc. v. Med. Device Alliance, Inc., 244 F.3d 1365, 1380 (Fed.Cir.2001). FN1

FN1. Emerson takes the same position in its objections with respect to all of the Special Master's recommended non-constructions. Because the Court agrees with the Special Master that the plain meaning of the word or phrase should apply in each instance where a non-construction is recommended, the Court holds that special constructions on these contested claim terms are unnecessary to assist the presentation of issues to the jury or to aid the Court in resolving the parties' summary judgment motions.

The Court also rejects Emerson's argument that the specification expressly adopts its proffered definition of the term "input data." Emerson relies on the following passage from the "preferred method of operation" section in the common specification of the '009, '203, and '493 Patents:

A representative example of step and module **102** is shown in FIG. **2,** which is described as follows. The

order pointer **120,** as shown in FIG. **2,** indicates that input data **1220** and training input data **1306** are stored in parallel in the historical database **1210.** Specifically, input data from sensors **1226** (see FIGS. **12** and **13**) are produced by sampling at specific time intervals the sensor signal **1224** provided at the output of the sensor **1226.** This sampling produces an input data value or number or signal. Each of these is called an input data **1220** as used in this application. The input data is stored with an associated timestamp in the historical database **1210,** as indicated by a step and module **202.** The associated timestamp that is stored in the historical database with the input data indicates the time at which the input data was produced, derived, calculated, etc.

'009 Patent, col. 16, *ll*. 24-40; '203 Patent, col. 16, *l*. 55-col. 17, *l*. 2; '493 Patent, col. 15, *ll*. 50-64.

According to Emerson, the sampling of a sensor signal is intended to be a definition of input data in this paragraph. However, the surrounding context makes clear this cannot be the case. The patent later indicates that the sampling of a sensor signal is not the only kind of data encompassed within the meaning of input data, but instead is one particular example. In the section describing "Preferred Structure (Architecture)," the patent clarifies that "[a]ny data source system can be utilized by the current invention. It should also be understood that such source system could either be a storage device, or an actual measuring or calculating device." '009 Patent, col. 40, *ll*. 32-35. The broad array of potential sources of input data is confirmed by the last sentence of the paragraph on which Emerson relies, which shows that input data is not limited to data that has been "sampled," but also includes data that has been "produced, derived, calculated, etc." '009 Patent, col. 16, *ll*. 38-40. Accordingly, the Court agrees with the recommendation of the Special Master and leaves the term "input data" without a special limiting construction.

B. "storing means" ('009 Patent, **claim 1 and** '203 Patent, **claim 33)**

The phrase "storing means" appears in asserted claims 1 and 8 of the ' 009 Patent and claim 33 of the '203 Patent. The parties agree that the term "storing means" is a means-plus-function claim term, and that the term has one meaning in claim 1 of the '009 Patent and claim 33 of the '203 Patent and a different meaning in claim 8 of the '009 Patent.

Pavilion has offered the following means-plus-function construction of "storing means," the term is used in claim 1 of the '009 Patent and claim 33 of the '203 Patent:

The function is storing a first training input data with an associated first timestamp, and a first input data indicated by the associated first timestamp.

The structure is a memory, such as random access memory (RAM), one or more disks, or a combination thereof, and a callable routine, disk access, or network access, and equivalents thereof.

Rep. & Rec, Attach. 2 at 1.

Emerson has offered the following construction:

Functions:

This means-plus-function limitation recites two functions.
The recited functions are: (1) storing a first training input data with an associated first timestamp; and (2) storing a first input data indicated by the associated first time stamp.

Structure:

The corresponding structure is: a computer programmed to implement the algorithm/steps illustrated in Figure 2 of the '009/ '203 Patent (reproduced below) in which: (1) training input data is stored "in an historical database ... in accordance with a specified training input data storage interval;" and (2) in parallel, input data is separately stored in the historical database "with an associated timestamp [that] indicates the time at which the input data was [sampled]" at an "input data storage interval [that] can be different from the training input data storage interval:"

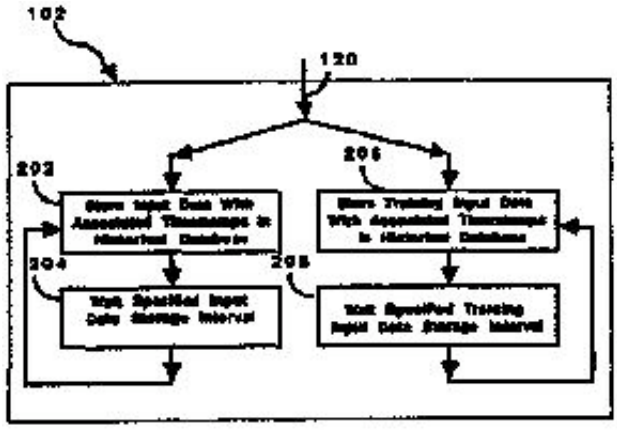

FIG. 2

Id. at 1-2. In his Report and Recommendation, the Special Master proposes that the Court adopt Pavilion's construction. Rep. & Rec, Attach. 2, at 1.

1. Pavilion's Objections

Pavilion has not objected to the Report and Recommendation on this particular construction. However, in its objections, Pavilion notes that although the Special Master included the phrase "and equivalents thereof" in some of his recommended means-plus-function recommendations, he did not do so in all of them. Pavilion contends that the phrase should be included in every case.

The Court disagrees. Although the Court notes that Pavilion is correct that a means-plus-function claim covers not only the "structure, material, or acts described in the specification," but also the "equivalents thereof," 35 U.S.C. s. 112, para. 6, it is unnecessary to place the phrase "and equivalents thereof" into the claim constructions to give effect to this principle. Indeed, the Court notes that both sides have recommended jury instructions that would fully inform the jury that for each means-plus-function claim, the claim covers not only the structure recited in the specification, but also its equivalents. Pl.'s Prelim. Proposals Jury Instrs. & Verdict Form Questions at 4-5, Defs.' Supp. Submission Per Court's June 26, 2006 Order, Ex. B at 1-2. Accordingly, the Court holds that rather than include the phrase "and equivalents thereof" for every means-plus-function claim construction, it is simpler and more appropriate to delete this language from each of these constructions and handle the issue of equivalents in the jury instractions on the issue of infringement.

2. Emerson's Objections

Emerson objects to the Special Master's construction in its entirety. According to Emerson, any time a computer performs the function in a means-plus-function claim element, the structure necessarily includes not only the computer hardware, but also the software or algorithm through which the computer performs the function. Thus, according to Emerson the Special Master's construction of the structure of the "storing means" is defective because it describes only a general purpose computer and leaves out the corresponding software/algorithm requirement.

Emerson has failed to demonstrate that the Special Master erred in selecting Pavilion's proposed construction. Significantly, Emerson has not explained how its own proposed construction fares any better under the standard it advocates. The parties essentially agree on what the function of the storing means is; namely, it is storing a first training input data with an associated first timestamp, and storing a first input data indicated by the associated first timestamp. As Emerson must concede, the disclosures in the specification only constitute corresponding structure to the extent they perform this function. *See* Northrop Grumman Corp. v. Intel Corp., 325 F.3d 1346, 1352 (Fed.Cir.2003) ("[S]tructure disclosed in the specification is corresponding structure only if the specification or the prosecution history clearly links or associates that structure to the function recited in the claim.... Features that do not perform the recited function do not constitute corresponding structure and thus do not serve as claim limitations."). However, as explained in more detail below, the material that Emerson proposes as its algorithm does not in any way relate to the storing function. Thus, Emerson's proposed construction is no more successful than Pavilion's is at setting forth an algorithm for "storing."

In addition to the fact that Emerson has failed to demonstrate that its own proposed construction would satisfy the algorithm requirement it would have the Court apply, the applicability of the algorithm requirement is dubious in this case anyway. The Court considers addresses each of these two points separately.

a. The Inferiority of Emerson's Proposal

Initially, the Court finds that Emerson's proposed construction fails to satisfy the standard Emerson has identified as governing in this case. The purported "software/algorithm" portion of Emerson's proposed construction has nothing to do with the recited function. The algorithm identified by Emerson consists of little more than a restatement of the function with two additional limitations: (1) that the two data described in the claim must be stored in parallel; and (2) that a waiting interval follows the storage of each data. Emerson has entirely failed to explain what role either of these two additional limitations play in the storage of the two data in the claim (nor has it argued that the limitations can otherwise be ascertained from the claim language).

As Emerson describes it, the algorithm required for a computer-implemented, means-plus-function claim element consists of the "steps, formulae, and procedures to enable the specially-programmed computer to perform the claimed function." Defs.' Objs. at 12. Thus, one would expect to find in Emerson's proposal either a series of steps that the computer takes when it undertakes to store data, or perhaps, a series of line commands the computer follows, or some similar description of how the storing function is accomplished. However, Emerson's proposal includes nothing of the sort. Rather than set forth a description of what discrete steps the computer goes through when it stores the data, Emerson's proposal jumps to the end of the "storing" process and suggests that there are limitations on where the data will be stored ("the parallel limitation") and on what happens after the storage is complete ("the waiting interval limitation").FN2

FN2. The Court notes that the waiting interval depicted in Figure 2 of the '009 and '203 Patents can only take place *after* the storing is complete because, as Pavilion has argued, the language in the claims calls for only the storage of a *first* input data and a *first* training input data. Because the upper boxes depicted in Figure 2 are sufficient to accomplish storage of the first item of each type of data, a computer implementing the method depicted in Figure 2 would have completed the storing step described in the claim before any waiting interval could take place.

The Court also holds that Emerson's description of the hardware aspect of the structure is inferior to the description contained in the proposal adopted by the Special Master. With respect to hardware, Emerson employs the single word "computer," but cites no evidence of this usage in the specification. The Special Master's construction, on the other hand, is amply supported by the specification. First, the specification recites that the historical database can be implemented using a "random access memory (RAM) database, ... a disk-based database, or as a combination of RAM and disk-based databases." '009 Patent, col. 31, 17-21. Similarly, the specification expressly links the functions of storage and retrieval to "callable routines, disk access, and network access." Id., col. 39, *ll*. 34-39.

Emerson contends that the callable routines, disk access, and network access are not clearly linked to the corresponding structure because they are described in connection with a "neural network" as opposed to a "historical database" or a "database." This is a specious argument. First of all, the specification makes plain that historical database capabilities may be integrated into the neural network software, and that the two can operate together in "a single software system." '009 Patent, col. 31, *ll*. 5-7; *see also* id., col. 31, *ll*. 3-5 (noting that "it may be desirable to implement the essential historical database functions as part of the neural network software"); id., Figure 12 (depicting the neural network and the historical database as residing in the same system). Thus, the line between the functions of the historical database and the functions of the neural network is not a bright one, and one can easily assume that the description here is ultimately meant to link the storage and retrieval functions to the database.FN3

FN3. Indeed, it is not clear from the context of the patent that there is any storage or retrieval that the neural network must accomplish except as those functions relate to a database.

Second, the only discussion of the means for performing the storage and retrieval functions occurs in the specification's passages dealing with callable routines, disk access, and network access. *See* id., col. 39, *ll*. 34-39 ("Neural network **1206** must also have a data retrieval function **2208** and a data storage function **2210.** Examples of these functions are callable routines **2230,** disk access **2232,** and network access **2234.** These are merely examples of retrieval and storage functions."); *see also* id., Figure 22 (linking callable routines, disk access, and network access with the data retrieval function and the data storage function). Had there been a discussion in the specification of storage and retrieval in a different context, Emerson might have a colorable argument. However, given that the foregoing citations are the *only* references to the means by which storage and retrieval (of any kind) are accomplished, Emerson does not have a leg to stand on.

b. Emerson's Legal Principle

The Court also holds that the cases on which Emerson relies for the principle that Pavilion must disclose a particular algorithm for storing and retrieving are inapposite here, and that no special algorithm must be

disclosed in connection with the performance of these functions. First, Emerson cites the Federal Circuit's opinion in WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339 (Fed.Cir.1999). In that case, the patented invention was "a slot machine that decreases the probability of winning while maintaining the external appearance of a standard mechanical slot machine." Id. at 1343. The slot machine made use of electronically controlled reels, the stopping positions of which were determined by a computerized random number generator. *Id*. Several of the limitations in the patent were written in means-plus-function format. *Id*. at 1347. One of the limitations was a "means for assigning a plurality of numbers representing said angular positions of said reel, said plurality of numbers exceeding said predetermined number of radial positions such that some rotational positions are represented by a plurality of numbers." *Id*. at 1346. All parties in the case agreed that the specification disclosed the following material in connection with the structure for performing the "assigning" limitation: "a microprocessor, or computer, to control the operation of the slot machine, including the operation of the machine in the assignment of numbers to reel stop positions." *Id*. at 1347. The parties disagreed, however, about whether this description along with a general reference to "any table, formula, or algorithm for determining correspondence between the [randomly selected] numbers and rotational positions of the reel" was sufficient to describe the disclosed structure, or whether the corresponding structure was limited to the specific algorithm FN4 disclosed in the specification. *Id*. at 1348.

FN4. The Court set out the disclosed "assigning" algorithm as follows:
1) the range of single numbers exceeds the number of stop positions; 2) each single number is assigned to only one stop position; 3) each stop position is assigned at least one single number; and 4) at least one stop position is assigned more than one single number.

WMS Gaming, 184 F.3d at 1348.
The district court adopted the broader approach and held that it was sufficient to say that the assigning means was "an algorithm executed by a computer." *Id*. The Federal Circuit reversed, explaining:

[T]he court erred by failing to limit the claim to the algorithm disclosed in the specification. The structure of a microprocessor programmed to carry out an algorithm is limited by the disclosed algorithm. A general purpose computer, or microprocessor, programmed to carry out an algorithm creates "a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software."

Id. (citing In re Alappat, 33 F.3d 1526, 1545 (Fed.Cir.1994) (en banc)). The court then encapsulated its holding with the following rule: "In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." *Id*. at 1349.

The Federal Circuit reaffirmed this principle in *Harris Corp. v. Ericsson Inc.,* 417 F.3d l241, 1253 (Fed.Cir.2005). *Harris* involved a patent concerning cellular phones and "the way wireless signals are processed." *Id*. at 1245. The court explained that when modern cellular phones transmit digital signals, they transmit them in "packets," also referred to as "symbols," which can become distorted as they travel to reach their destination. *Id*. The distortion that occurs must be addressed by the receiving device so that the symbols may be reduced to a set of discrete values that can be correctly interpreted. *Id*. The patent in *Harris* disclosed "a two-step symbol decoding algorithm, the first step being the calculation of nondiscrete estimates and the second being the selection of discrete decisions based on the estimates." *Id*.

The claims at issue included a means-plus-function limitation the court referred to generally as a "time domain processing means." *Id*. at 1246. The dispute between the parties was whether these claims covered a product making use of a one-step process or were instead limited to "the two-step process for dealing with intersymbol interference" disclosed in the specification. *Id*. The Federal Circuit held that *WMS Gaming* required that it adopt the latter approach, stating, "[a] computer-implemented means-plus-function term is limited to the corresponding structure disclosed in the specification and equivalents thereof, and the corresponding structure is the algorithm." *Id*. at 1253.

Emerson argues that this case involves a straightforward application of the ru le enunciated in *WMS Gaming* and *Harris*. Specifically, it argues that because the parties agree that a computer (or the components thereof) constitute the hardware structure of the storing means, the Court has no choice but to incorporate the disclosed algorithm. However, the Court disagrees that the *WMS Gaming* rule should be construed so broadly. Rather, because the storing and retrieving functions in the claims at issue are different in kind than the functions performed in *WMS Gaming* and *Harris,* the Court holds that those cases have no application here.

With respect to the patents at issue in both *WMS Gaming* and *Harris,* a person attempting to implement the invention would need to know much more than that a general purpose computer would be used in order to practice the claimed invention. A computer programmed to assign numbers to stopping positions is a "special purpose computer" because it is only capable of assigning numbers after it has been specially programmed to perform that task. Similarly, "time domain processing" is not a function of a general purpose computer in the absence of special programming.

Storage and retrieval, on the other hand, are entirely different. Every general purpose computer is capable of storing and retrieving data. Thus it can hardly be said that a particular algorithm is necessary to convert the general purpose computer into a machine capable of performing the functions recited in the claims as was the case with the computers at issue in *WMS Gaming* and *Harris*. Indeed, as the inventor of the patent in issue, Richard Skeirik, testified, a person could implement the "storing" function of the claims simply using "off-the-shelf" products. Hr'g of July 21, 2006, Tr. at 38.

That no particular programming is necessary to enable the storing means disclosed in the claims is underscored by the fact that the specification contemplates the possibility that devices other than computers may perform the storing function. Indeed, the specification recites that the historical database need not even make use of a digital means. *See* '009 Patent, col. 31, *ll*. 23-26 ("The present invention contemplates any computer or analog means of performing the functions of the historical database **1210**").FN5 If no digital means is required at all, it is difficult to imagine why a special-purpose computer would be required.FN6

FN5. Whether an analog device constitutes an equivalent of the disclosed structure for the storing means is a question the Court does not address since that will be a question for the jury to decide.

FN6. Another example of a generic computing function that requires no specialized programming is a simple arithmetical operation. One can easily conceive of a means-plus-function claim limitation describing a means for calculating the sum of a pair of numbers and a specification that discloses a particular brand of pocket calculator as the structure for performing that function. Were Emerson's view to prevail, the structure would be limited to the specific calculator described, along with the code that enabled this very basic

operation to take place. It seems unfathomable that this would be the result contemplated by the Federal Circuit when it drew a distinction between "[a] general purpose computer ... [and] a special purpose computer ... programmed to perform particular functions pursuant to instructions from program software." WMS Gaming, 184 F.3d at 1348 (internal quotation marks omitted); *see also* In re Bernhart, 57 C.C.P.A. 737, 417 F.2d 1395, 1399-1400 (C.C.P.A.1969) ("[I]f a machine is programmed *in a certain new and unobvious way,* it is physically different from the machine without that program; its memory elements are differently arranged.") (emphasis added) (cited in WMS Gaming, 184 F.3d at 1348).

Accordingly, the Court articulates the following exception to the *WMS Gaming* rule: When a computer-implemented means-plus-function claim limitation performs a function that any general purpose computer can perform using only off-the-shelf software, and no specialized software or algorithm is disclosed in the specification, then the corresponding structure consists of the general purpose computer (or, in an appropriate case such as this one, the relevant individual components of the computer) disclosed in the specification and nothing more. *See* Med. Instrumentation & Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1214 (Fed.Cir.2003) (stating in dicta that "there would be no need for a disclosure of the specific program code if software were linked to the ... function and one skilled in the art would know the kind of program to use"). Because the storing means at issue falls within the coverage of this exception, the Court holds the Special Master's proposed construction, as modified, is the correct one.

C. "storing means" ('009 Patent, **claim 8), "retrieving means"** ('009 Patent, **claim 1 and** '203 Patent, **claim 33) "retrieving means"** ('009 Patent, **claim 8)**

The Court does not separately discuss the other use of the term "storing means" or the two different uses of the term "retrieving means." The issues discussed in the foregoing section are more or less the same as the issues presented by these terms, although there are a few minor variations in the details.FN7 With the exception of the Court's holding that the phrase "and equivalents thereof" should not be included in any of the constructions of the means-plus-function claim elements, the Court fully adopts each of the Special Master's proposed constructions for these claim terms.

FN7. For instance, Emerson's proposed construction of "retrieving means," as the term is used in claim 1 of the '009 Patent and claim 33 of the '203 Patent, does not include a waiting interval. Instead, it requires that the two data described in the claim be retrieved in a specific order and that a step of "choosing [a] training input data time" take place between the two retrievals. Rep. & Rec, Attach. 2 at 3. As was the case with its proposed algorithm for the storing means, Emerson has failed to explain how its proposed order of operations or intervening step of choosing a training input data time performs the function of retrieving.

D. "data pointer"

The term "data pointer" appears in claims 1, 8, and 18 of the '009 Patent and in claims 1, 20, and 33 of the '203 Patent. Pavilion contends "data pointer" is "a variable data structure that specifies information regarding one or more characteristics of data located in another memory or database." Rep. & Rec, Attach. 2 at 4. Emerson proposes that the Court should construe a data pointer as "a variable data structure that specifies information regarding the source or destination of data located in another memory or database and the type of data (e.g., current value, historical value, time-weighted average, controller setpoint, controller adjustment amount)." The Special Master recommends that the Court adopt Pavilion's proposed construction.

Although Emerson does not specifically reurge its own proposed construction of the term "data pointer" in its objections, it does argue that the Special Master's recommendation is defective, citing two grounds: (1) the construction does not "clearly indicate[ ] what constitutes a 'characteristic of data,' " and (2) it does not "clearly indicate[ ] whether a data pointer must be ***capable*** of specifying more than one 'characteristic of data' (even though that capability need not be exploited in actual use)." Defs.' Objs. at 2 (emphasis in original). The Court finds that the Special Master's construction is sufficiently clear on both points. First, although the Special Master did not specially construe the term "characteristic of data," the parties never sought a construction of that term. In any event, the ordinary meaning of the words in this phrase should be applied. Representative examples of "characteristic[s] of data" are set out in detail in dependent claims 9 through 15 of the '009 Patent. '009 Patent, col. 44, *ll*. 37-61 (listing the following characteristics: data location, data type, data item number, time interval boundary, point in time, and limit value).

Second, the Special Master's construction is plainly a rejection of Emerson's argument that a "data pointer" must be capable of specifying more than one characteristic of the data. The Court agrees with this construction.

As Pavilion has argued, the specification emphasizes the flexibility of the data pointer:

The data specification show in FIG. **29** is representative of the preferred mode of implementing the present invention. However, it should be understood that various other modifications of the data specification could be used to give more or less flexibility depending on the complexity needed to address the various data sources which may be present. The present invention contemplates any variation on this data specification method.

Id., col. 43, *ll*. 21-29. *See also id.,* col. 39, *ll*. 25-28 ("These data pointers, also called data specifications, can take a number of forms and can be used to point to data used for a number of purposes.").

Moreover, Emerson's argument that the data pointer must specify-or, as it has more recently argued, be capable of specifying-information regarding both the source or destination of the data and the data type would fly in the face of the principle that, normally, "dependent claims are not to be read into the independent claims from which they depend." Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111, 1123 (Fed.Cir.2004) (quoting Karlin Tech., Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 971-72 (Fed.Cir.1999)). In this case, were the Court to hold that the ability to specify a data location or a data type were inherent in the nature of a "data pointer," then dependent claims 9 and 10 of the patent would be entirely superfluous. *See* '009 Patent, col. 44, *ll*. 37-39 (claiming the system of claim 8, wherein the data pointer "comprises means for storing a specification of a data location"); *see also* id., col. 44, *ll*. 40-42 (claiming the system of claim 8, wherein the data pointer "comprises means for storing a specification of a data type").

Emerson argues the doctrine of claim differentiation should not apply because the intrinsic evidence clearly contemplates a multi-part data pointer that includes the ability to specify a data type and a data location. The Court disagrees. In particular, the specification describes a particular implementation of a data pointer in which no data location information is required at all:

An extension of the modular concept is the specification of data using pointers. Here again, the user (developer) is offered the easy specification of a number of data retrieval or data storage functions by

simply selecting the function desired and specifying the data needed to implement the function. For example, the retrieval of a time-weighted average from the historical database is one such predefined function. By selecting a data type such a[s] time-weighted average, the user (developer) need only specify the specific measurement desired, and the starting and ending time boundaries and the predefined retrieval function will use the appropriate code or function to retrieve the data. This significantly simplifies the user's access to data which may reside in a number of different process data systems.

'009 Patent, col. 37, *ll*. 52-66. This passage clearly indicates the possibility that data pointers could be used to retrieve data from a multitude of sources or destinations without actually specifying the location of the data. That is, in this example, only a data type and a data value are entered, and those specifications are sufficient to allow data to be retrieved from all sources.

Because the Special Master's recommended construction of the term "data pointer" is most consistent with the intrinsic evidence, and because Emerson's objections are ultimately unconvincing, the Court adopts the Special Master's recommended construction as its own.

E. "and/or"

In its final objection,FN8 Emerson argues that the Special Master erroneously recommended a non-construction for the phrase "data pointer(s) to individually specify at least one input, at least one output, and/or at least one training input," which appears in claims 1 and 20 of the ' 203 Patent. According to Emerson, the use of the term "and/or" renders the entire claim fatally indefinite. Emerson feigns confusion over the meaning of this phrase, explaining that the words "and" and "or" have "different and mutually-incompatible meanings" and thus there is no way to ascertain what this claim means. However, most, if not all, ordinary speakers of the English language should recognize that "and/or" has a particularized meaning that is distinct from the individual words "and" and "or." *See* AM. COLLEGE HERITAGE DICTIONARY 53 (4th ed.2002) (describing "and/or" as a conjunction "[u]sed to indicate that either or both of the items connected by it are involved").

FN8. Although Emerson indicates that it "formally objects to all recommended constructions that are different from those [it] proposed," it has only asked that "the Court's attention [be] directed to" the objections addressed herein. Defs.' Objs. at 1. Indeed, the Special Master's Report and Recommendation addresses 29 different claim construction issues. The Court has reviewed the file in its entirety and approves of each of the Special Master's recommended constructions. However, in the absence of specific objections, it would be an unnecessary drain on the Court's resources to individually discuss all 29 of the constructions that are in dispute, especially in light of the fact that the Court has made clear to the parties that it will permit only 8 claims to be presented to the jury at the trial in this matter.

Had Emerson simply complained that the patentee's use of "and/or" was sloppy draftsmanship or a sign of intellectual laziness, it would have made a compelling argument. Indeed, as a number of commentators have pointed out, the term "and/or" has no place in strong, effective writing. *See* BRYAN A. GARNER, DICTIONARY OF MODERN LEGAL USAGE at 56 (2d ed. 1995) ("A legal and business expression dating from the mid-19th century, *and/or* has been vilified for most of its life-and rightly so."); *see also* United States v. Taylor, 258 F.3d 815, 819 (8th Cir.2001) ("Strunk and White describe 'and/or' as a 'device, or shortcut, that damages a sentence and often leads to confusion or ambiguity.' ") (quoting WILLIAM STRUNK, JR. & E.B. WHITE, THE ELEMENTS OF STYLE 40 (4th ed.2000)).

Indefmiteness, on the other hand, is another matter entirely. Even those commentators that have criticized "and/or" as sloppy have found it sufficiently meaningful that it may be readily understood. *See* Garner, *supra,* at 56 ("*And/or,* though undeniably clumsy, does have a specific meaning (*x* and/or *y = xoryor both*")) (italics in original); Taylor, 258 F.3d at 819 ("However clumsy the 'and/or' may be as a writing device, it sufficiently conveys the intent of the government to retain discretion over whether to seek a s. 3553(e) reduction 'and/or' a s. 5K1.1 reduction."). Indeed, even the Federal Circuit has used the term "and/or" in one of its claim constructions. *See* SuperGuide Corp. v. DirecTV Enters., Inc., 358 F.3d 870, 881 (Fed.Cir.2004) ("We therefore construe 'radio frequency information' to mean the information received from the mixer, microcontroller, *and/or* a television station that is carried on or derived from a radio frequency signal.") (emphasis added).

Although the Court has serious doubts that any juror would have nearly the difficulty in deciphering this phrase that Emerson claims to have had-and, accordingly, it agrees with the Special Master that no construction is necessary-the Court finds it will simplify matters to adopt the following simple construction of the disputed phrase:

The term "and/or" as it is used in the phrase "using data pointers to specify at least one input, at least one output, and/or at least one training input" indicates that any combination of one or more of the items in the series may be specified using data pointers.

F. Remaining Disputed Terms

In light of the fact that neither party has specifically objected to the Special Master's construction of the remaining disputed claim terms and phrases, the Court adopts them without further discussion.

Conclusion

In accordance with the foregoing:

IT IS ORDERED that Defendants' Unopposed Motion to Substitute Defendants' Opening Claim Construction Brief [# 39] is GRANTED.

IT IS FURTHER ORDERED that Defendants' request for an oral hearing on its objections is DENIED.

IT IS FURTHER ORDERED that the Report and Recommendation of the Special Master regarding claim construction of the patents-in-suit [# 74], as modified herein, is ACCEPTED. For ease of reference, the Court attaches to this order a copy of each of the constructions it adopts herein.

IT IS FURTHER ORDERED that the construction of each of the patent claim terms adopted herein will be incorporated into any jury instructions given in the above-styled cause and will be applied by the Court in ruling on the issues raised in summary judgment motions.

IT IS FINALLY ORDERED that the parties shall file a current list of all agreed-upon claim constructions within ten (10) days of the date of this order, which the Court will incorporate into any jury instructions given in the above-styled cause and will apply in ruling on the issues raised in summary judgment motions.

SIGNED this the *31st* day of August 2006.

CLAIM CONSTRUCTION CHART

Claim Term	Construction
storing means ('009 Patent, Claim 1 '203 Patent, Claim 33)	The function is storing a first training input data with an associated first timestamp, and a first input data indicated by the associated first timestamp.
	The structure is a memory, such as random access memory (RAM), one or more disks, or a combination thereof, and a callable routine, disk access, or network access.
storing means ('009 Patent, Claim 8)	The function is storing at least one data value in independently addressable storage.
	The structure is a memory, such as RAM, one or more disks or a combination thereof, and a callable routine, disk access, or network access.
retrieving means ('009 Patent, Claim 1 '203 Patent, Claim 33)	The function is retrieving from the storing means the first training input data and the input data indicated by the associated first timestamp.
	The structure is a callable routine, disk access, or network access.
retrieving means ('009 Patent, Claim 8)	The function is independently retrieving from the storing means each of the at least one data value(s).
	The structure is a callable routine, disk access, or network access.
data pointer	A "data pointer" is a variable data structure that specifies information regarding one or more characteristics of data located in another memory or database.
predicting means ('009 Patent, claim 1)	The function is predicting output data in accordance with second input data specified by the second data pointer.
	The structure is the feed forward approach depicted in Figure 21 of the '009 Patent.
predicting means ('009 Patent, claim 8)	The function is predicting output data.
	The structure is the feed forward approach depicted in Figure 21 of the '009 Patent.
using data pointer(s) to individually specify at least one input, at least one output, and/or at least one training input	The term "and/or" as it is used in the phrase "using data pointers to specify at least one input, at least one output, and/or at least one training input" indicates that any combination of one or more of the items in the series may be specified using data pointers.
training means	The function is training the neural network using the first training input data

	specified by the first data pointer and the first input data specified by the second data pointer to produce a trained neural network.
	There are three disclosed structures for performing the function: the back propagation approach depicted in Figure 34, generalized delta, and gradient descent.
using said first output data as controller input data in place of a sensor input data and/or a product property input data	"Using said first output data as controller input data in place of a sensor input data and/or a product property input data" means that the method requires controlling an actuator with a supervisory or regulatory process controller, by computing controller output data using neural network output data in place of a sensor or product property input data.
modular neural network process control system	A "modular neural network process control system" is a process control system in which the neural network is implemented in modular form. Modular signifies that the neural network may be implemented as a discrete block that can be added to a process control system.
timing and sequencing means	The function is triggering the neural network module, in accordance with module timing specifications, to perform the "predicting" step of the method of claim 15 in the '261 Patent.
	The disclosed structure is a timing method with associated timing parameters. The following examples of timing methods are disclosed: a fixed time interval, new data entry, after another module, on program request, on expert system request, when all teaming data updates, and batch sequence methods. The following examples of timing parameters are disclosed: the time interval, the module specification, the sequence specification, and the data item specification.
entire claim ('493 Patent, Claim 9)	"Retrieving, from an historical database, training input data having a timestamp" means that training input data, stored in the historical database with a timestamp, is retrieved from the historical database, but this phrase does not require retrieval of the timestamp.
constructing a training set by retrieving first input data corresponding to said training input data including the steps of	"Retrieving, from an historical database, training input data having a timestamp" means that training input data, stored in the historical database with a timestamp, is retrieved from the historical database, but this phrase does not require retrieval of the timestamp.
only select ones of the control values to the plant and select ones of the sensor values of the plant;	The select control values and select sensor values described in the third clause of claim 63 of the '373 Patent are the same values as those mentioned in the second clause of the claim.
virtual sensor predictive network for storing a representation of the plant	A "virtual sensor predictive network for storing a representation of the plant" in claim 62 of the '373 Patent is a computer implementation of a network which is capable of replacing an actual sensor by predicting the output of the sensor based on a stored representation of the plant. A "virtual sensor predictive network" includes, but is not limited to, a neural network.

	A "representation of the plant" is a stored model of the plant representing how the plant operates in response to plant variables. The representation of the plant is learned from a measured pollutant level, control values to the plant, and sensor values from the plant. The representation of the plant is stored in the virtual sensor predictive network.
non-linear virtual sensor predictive network	A "non-linear virtual sensor predictive network" is a "virtual sensor predictive network," wherein the relationship between the inputs and outputs is non-linear.
virtual sensor neural network	A "virtual sensor neural network for storing a representation of the plant" in claim 74 of the '373 Patent is a virtual sensor predictive network which uses a neural network that is capable of replacing an actual sensor by predicting the output of the actual sensor based on a stored representation of the plant.

	A "representation of the plant" is a stored model of the plant representing how the plant operates in response to plant variables. The representation of the plant is learned from a measured pollutant level, control values to the plant, and sensor values from the plant. The representation of the plant is stored in the virtual sensor neural network.
storing a representation of the plant in association with the determination process in a virtual sensor predictive network	A "virtual sensor predictive network" in claim 1 of the '528 Patent is a computer implementation of a network which is capable of replacing an actual sensor by predicting the output of the sensor based on a stored representation of the plant. A "virtual sensor predictive network" includes, but is not limited to, a neural network.

	A "representation of the plant" is a stored model of the plant representing how the plant operates in response to plant variables. The representation of the plant is learned from a measured pollutant level, control values to the plant, and sensor values from the plant. The representation of the plant is stored in the virtual sensor predictive network.
the determination process	"The determination process" is a process for determining the actual level of the select output parameter output by the plant and the associated control values to the plant in addition to the associated sensor values.
non-linear predictive network having stored therein a representation of a plant	"Non-linear predictive network having stored therein a representation of the plant" is a system that predicts an output using a computer model of the plant representing how the plant operates in response to plant variables, wherein the relationship between the inputs and outputs is non-linear.
sensitivity processor	"Sensitivity processor" is that part of the computer system that interprets and executes instructions to determine sensitivities of each of the output variables of a configurable network as a function of each of the input variables, that is, how much each input to the configurable network affects the outputs.
central processor	"Central processor" is that part of a computer system that interprets and executes instructions to determine which input variables are input to a configurable network, controls a training system and controls a sensitivity processor.

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