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

PAVILION TECHNOLOGIES, INC,
v.
COMPUTER ASSOCIATES INTERNATIONAL, INC.

No. A-01-CA-507-SS

April 8, 2003.

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ORDER

SAM SPARKS**, District Judge.**

BE IT REMEMBERED on the *8th* day of April 2003 the Court reviewed the file in the above-styled cause, specifically the Reports and Recommendations of the Special Master Regarding claim construction of the patents-in-suit [# 212-17], Pavilion Technologies, Inc.'s objections thereto [# 218] and Computer Associates International, Inc.'s objections thereto [# 219] and response to Plaintiff's objections [# 225]. Having considered the Reports and Recommendations, the objections thereto, the arguments and evidence presented at the *Markman* hearing, the *Markman* briefs, the case file as a whole and the applicable law, the Court enters the following opinion and orders.

Analysis of the Parties' Objections

I. Pavilion Technologies, Inc's Objections

The plaintiff, Pavilion Technologies, Inc. ("Pavilion"), objects to the Special Master's recommended constructions of "neural network," "process control ... for controlling a process for producing a product having at least one product property," "controller," "executable" and "said constrained substantially natural language format." As to the first four terms, Pavilion contends the Special Master misapplied the legal standards for claim construction set forth by the Federal Circuit and impermissibly narrowed the ordinary meaning of the claim terms. Accordingly, the Court will first discuss the relevant legal standards.

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," and remain focused throughout on the claim language. CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed.Cir.2002); Interactive Gift Express, Inc. v. CompuServe, Inc., 256 F.3d 1323, 1331 (Fed.Cir.2001). Courts must acknowledge the ' "heavy presumption' that a claim term carries its ordinary and customary meaning" as understood by a person skilled in the art, unless the patentee demonstrates "an express intent to impart a novel meaning to claim terms." CCS Fitness, 288 F.3d at 1366 (citation omitted); Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed.Cir.2002). Additionally, "unless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art." Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed.Cir.2002).

The first step in claim construction is determining the ordinary meaning of the claim term to a person of ordinary skill in the art at the time of the invention. Dictionaries, encyclopedias and treatises, so long as they were "publicly available at the time the patent is issued," FN1 are "reliable sources of information on the established meanings that would have been attributed to the terms of the claims by those of skill in the art." Texas Digital, 308 F.3d at 1203. The Federal Circuit recently noted "these materials may be the most meaningful sources of information to aid judges in better understanding both the technology and the terminology used by those skilled in the art to describe the technology." Texas Digital, 308 F.3d at 1203. Because dictionaries and other objective sources assist courts in determining the ordinary meaning of the claim terms, the Federal Circuit warned, "[c]onsulting the written description and prosecution history as a threshold step in the claim construction process, before any effort is made to discern the ordinary and customary meanings attributed to the words themselves, invites a violation of our precedent counseling against importing limitations into the claims." Texas Digital, 308 F.3d at 1204. Thus, the Federal Circuit in *Texas Digital* acknowledged a "presumption in favor of a dictionary definition." Texas Digital, 308 F.3d at 1204.

The presumption that the claim terms should be construed in accordance with their ordinary and customary meaning, as defined by contemporary dictionaries and encyclopedias, is rebutted under certain circumstances. Two situations are particularly relevant to this case. First, a claim term will not receive its ordinary meaning if "the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." CCS Fitness, 288 F.3d at 1366. Inventors act as their own lexicographers by "us[ing] the specification to supply implicitly or explicitly new meanings for claim terms." Rambus, Inc. v. Infineon Tech., Inc., 318 F.3d 1081, 1088 (Fed.Cir.2003). Another situation is where the "intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention." CCS Fitness, 288 F.3d at 1366-67. The Court considers whether "the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." Texas Digital, 308 F.3d at 1204. Therefore, it is appropriate to examine the patent specification and prosecution history after determining the ordinary meaning of the claim terms as defined by objective sources such as dictionaries.

The battle in this case is not so much over the ordinary meaning of the claim terms (although even that is not "undisputed," contrary to Pavilion's misleading assertion in its brief) but over whether the ordinary meaning has been further limited by the patents at issue in this case. Computer Associates International, Inc.

("Computer Associates") argues certain terms are limited beyond their ordinary meaning because the specification redefines the term or restricts the ordinary meaning of the term, or both. Pavilion objects to Computer Associates' proposed definitions and certain of the Special Master's recommendations on the grounds that they improperly restrict the claim terms to the preferred embodiment. It is well-established Federal Circuit law that an invention is not ordinarily limited to its preferred embodiment, and "an accused infringer cannot overcome the 'heavy presumption' that a claim term takes on its ordinary meaning simply by pointing to the preferred embodiment or other structures or steps disclosed in the specification or prosecution history." Teleflex, 299 F.3d at 1327. As discussed below, the Court's constructions are not based upon the preferred embodiment disclosed in the specification.

A. neural network

Pavilion objects to the Special Master's construction of "neural network." This term appears in U.S. Patent Nos. 5,640,493 ("the '493 patent"), 5,121,467 ("the '467 patent), 5,224,203 ("the '203 patent") and 5,282,261 ("the '261 patent"). The written descriptions in these four patents are substantially similar. Pavilion specifically objects to the last sentence of the Special Master's construction to the extent it construes the "neural network" to (1) make predictions and (2) be trained with output values as well as input values. According to Pavilion, these requirements only correspond to a certain type of neural network-supervised learning networks-whereas the ordinary meaning of the term and the patents encompass unsupervised learning networks as well.

Pavilion contends the ordinary meaning of "neural network" at the time of the invention included both unsupervised and supervised neural networks. Pavilion points to the 1991 Artificial Intelligence Dictionary, which refers to both supervised and unsupervised networks and includes the following sentences:

The typical neural network consists of neurons (nodes), an activation or transfer function for each neuron, a schema or pattern for connecting them, and an updating (learning) function for changing the weights used in the connections. In multilayer networks, the weighted sum of a group of neurons is the input of other neurons. Processing may be feedforward only, or may also include feedback for error correction. Learning is usually supervised in single layer networks, but is generally unsupervised (self-organizing) in multilayer networks.

JMX 33, Tab 5, at JMX 33.78. Computer Associates' proffered definition of "neural network," published in the 1991 Computer Glossary, is "[a] modeling technique that is based on the observed behavior of biological neurons and is used to mimic the performance of a system." JMX 35, Tab 5, at JMX 35.34. While Computer Associates' definition does not explicitly refer to the use of inputs and outputs to train a neural network or to the network's predictive function, Computer Associates' expert testified the definition requires the use of inputs and outputs. *See* JMX 29, at para. 54. Computer Associates has not offered a definition of "neural network" that explicitly excludes unsupervised networks. While the ordinary meaning of "neural network" at the time of the invention is not "undisputed," Pavilion has provided objective evidence that the ordinary meaning included supervised and unsupervised learning networks, and for the purposes of this claim construction, the Court will accept its definition as the ordinary meaning.

The next question is whether the specification redefines the claim term or disavows the scope of the claim term. The specification demonstrates the inventions claimed in Pavilion's neural network patents predict outcomes, and the inventions could not be accomplished without any prediction. The specification states: "The present invention contemplates other types of neural network configurations for use with neural

network 1206. All that is required for neural network 1206 is that the neural network be able to be trained and retrained so as to provide the needed predicted values utilized in the process control. '493 Patent at 11:21-25; *see also* '467 Patent at 11:52-57; ' 261 Patent at 11:59-65; '203 Patent at 11:65-12:2. This statement indicates all embodiments of the invention, not just the preferred or representative embodiment, are required to perform a predictive function. FN2

The description of the invention also demonstrates the neural networks must make predictions: "the present invention essentially utilizes neural nets to provide predicted values of important and not readily obtainable process conditions 1906 and/or product properties 1904 to be used by a controller 1202 to produce controller output data 1208 used to control the process 1212." ' 493 Patent at 9:37-43; *see also* '467 Patent at 9:54-59; '261 Patent at 9:62-67; '203 Patent at 9:67-10:4. This description is not limited to the preferred embodiment or a representative embodiment; it is a general explanation of how the invention uses neural networks. Additionally, the inventor identified the benefit of using neural networks in the invention as making predictions without requiring the developer to create equations, as other computer statistical models do: "Neural networks are superior to computer statistical models because neural networks do not require the developer of the neural network model to create the equations which relate the known input data and training values to the desired predicted values (output data)." '493 Patent at 12:59-63; *see also* '467 Patent at 13:31-35; '261Patent at 13:37-41; '203 Patent at 13:49-53.

Finally, the inventor's explanation of "neural network technology as applicable to the neural network 1206 of the system and method of the present invention" includes the following description:

Artificial or computer neural networks are computer simulations of a network of interconnected neurons.... However, neural networks used in neural network 1206 of the present invention are computer simulations (or possibly analog devices) which provide useful predicted values based on input data provided at specified intervals.

'493 Patent at 9:67-10:13; *see also* '467 Patent at 10:20-36; '261 Patent at 10:27-43; '203 Patent at 10:34-49.FN3 Thus, the specification distinguishes this invention from other neural networks-in other words, from the ordinary meaning of neural networks-because the neural network claimed in the invention provides useful predictions. The above quotations from the written description of the inventions demonstrate the inventor's intent to distinguish the neural network in the inventions from the ordinary meaning of the term, thereby overcoming the presumption that claim terms receive the full range of their ordinary meaning as defined by contemporaneous dictionaries.

The specification also reveals the inventor's intent that the neural networks in the inventions be trained using both input and output data. The inventor states one of the advantages of the inventions' use of neural networks is the "neural network 1206 learns the relationships automatically in the training step 104." '493 Patent at 12:64-65; *see also* '467 Patent at 13:36-37; ' 261 Patent at 13:42-43; '203 Patent at 13:54-55. Unless the neural network used both output and input data as inputs, there would be no relationships between numbers for the neural network to learn. Pavilion argues the inventions should not be limited to training with input and output data because the specification states "the present invention contemplates various approaches for training neural network 1206." '493 Patent at 12:1-2; *see also* '467 Patent at 12:38-39; '261 Patent at 12:43-45; '203 Patent at 12:51-53. The specification then lists various approaches, none of which involves training with input data only and all of which require the neural networks to use output data to make predictions. Additionally, all of the figures depicting the training aspect of the invention illustrate the neural network's use of output data. *See, e.g.,* Figs. 1, 3, 10, 33 & 34. Accordingly, the Court finds the

Special Master did not improperly limit the ordinary meaning of neural network but merely followed the inventor's limitations as set forth in the specifications.

Pavilion contends the Special Master improperly limited the inventions to the preferred embodiment. Pavilion points, for example, to this statement: "Referring now to FIG. 21, a representative embodiment of a feed forward neural network will now be described. This is only illustrative of one way in which a neural network can function." '493 Patent at 11:27-30; *see also* '467 Patent at 11:60-63; '261 Patent at 11:67-12:2; '203 Patent at 12:5-8. However, the Special Master's construction does not limit neural networks to the "feed forward" function in this embodiment. As for the statement that "the present invention contemplates various approaches for training neural network 1206," as discussed above, all approaches described in the specifications use output data and make predictions, and the Special Master's construction does not limit the invention to any of the specific training methods listed (such as back propagation). '493 Patent at 12:1-2; *see also* '467 Patent at 12:38-39; '261 Patent at 12:43-45; '203 Patent at 12:51-53.

Finally, Pavilion points to statements in the written description that it argues illustrate the inventor's intent to encompass all possible neural networks. For example:

The neural network 1206 must contain a neural network model. As stated above, the present invention contemplates all presently available and future developed neural network models and architectures. As shown in FIG. 22, the neural network model 2202 can have a fully connected 2220 aspect, or a no feedback 2222 aspect. These are just examples. Other aspects or architectures for the neural network model 2202 are contemplated.

'493 Patent at 36:63-37:2; *see also* '467 Patent at 39:28-36; '261 Patent at 39:38-46; '203 Patent at 39:44-52. The Special Master's construction of "neural network" neither requires nor precludes a fully connected or no feedback aspect, and includes no restriction on the architecture of the network. The written description also states: "It should be understood that neural networks, as used in the present invention, can be implemented in any way. For example, the preferred embodiment uses a software implementation of a neural network 1206. It should be understood, however, that any form of implementing a neural network 1206 can be used in the present invention, including physical analog forms." '493 Patent at 29:50-56; *see also* '467 Patent at 31:51-58; '261 Patent at 31:60-67; '203 Patent at 31:64-32:3. Again, the construction does not require any specific implementation of the neural network, physical or otherwise; it merely requires the neural network to behave as the patents assert it will.

As for training methods, the specification states "any presently available or future developed training method is contemplated by the present invention.... Examples of aspects of training methods include back propagation 2246, generalized delta 2248, and gradient descent 2250, all of which are well known in the art." '493 Patent at 37:59-65; *see also* '467 Patent at 40:29-36; ' 261 Patent at 40:39-47; '203 Patent at 40:44-52. The construction does not limit the claims to any of the listed examples of training methods; the only limitation, that the network be trained with input and output data, is required by the specifications.

While the Court believes the Special Master's construction of "neural network" is consistent with the above statements and does not limit the inventions in the ways the statements warn against, the Court also believes an inventor cannot avoid the limitations he has unambiguously disclosed and expand the scope of his invention simply by inserting generic language stating the invention is boundless, such as "the present invention contemplates all presently available and future developed neural network models and architectures." '493 Patent at 36:63-37:2; *see also* '467 Patent at 39:28-36; '261 Patent at 39:38-46; '203

Patent at 39:44-52. A recent Federal Circuit case rejected a similar attempt by an inventor to expand the breadth of an invention during claim construction by relying on the following statement in the specification: "any approach may be used to introduce the cloned DNA into CHO cells and to select and grow the transformed cells for expression of the protein." Biogen v. Berlex Lab., Inc., 318 F.3d 1132, 1136 (Fed.Cir.2003) (quoting the patent-in-suit). The patentee argued the patent was "not limited to any specific method of introduction of the human interferon DNA, and that the larger invention is the use of selected Chinese hamster ovary cells to produce the human interferon" and introduced evidence that "a person skilled in the field of the invention would have understood that either method could be used to introduce both interferon DNA and marker DNA into these cells." Biogen, 318 F.3d at 1136. The defendant responded "except for these few general undeveloped sentences the entire specification is directed solely to the invention whereby a single DNA construct is used to carry linked interferon and marker genes into the Chinese hamster ovary cell." Biogen, 318 F.3d at 1136. Notwithstanding the inventor's quite familiar statement, the Federal Circuit rejected the patentee's proposed claim construction, finding: "The specification describes only linked DNA sequences and transformation procedures using single constructs linking human interferon and dihydrofolate reductase marker genes to transfect Chinese hamster ovary cells.... The specification does not describe or present details of any other configuration for introducing these genes." Biogen, 318 F.3d at 1136-37. This case involves similar general statements in a specification that otherwise limits the inventions, which, as the Federal Circuit held, cannot cure limitations that are apparent throughout the specification.

Even if such a statement did render the invention limitless and the Court were to construe it as such, this construction would be improper because it would likely lead to invalidation of the patents. The Federal Circuit has cautioned courts to construe claims "to preserve, rather than defeat, their validity." Eastman Kodak Co. v. Goodyear Tire & Rubber Co., 114 F.3d 1547, 1556 (Fed.Cir.1997); *see also* Wang Lab. v. America Online, Inc., 197 F.3d 1377, 1383 (Fed.Cir.1999) ("However, the claims are not properly construed to have a meaning or scope that would lead to their invalidity for failure to satisfy the requirements of patentability.").

Finally, this is not a case where the inventor could not possibly have contemplated the invention's use in unsupervised learning networks. *See, e.g.,* Watson & Chalin Manuf., Inc. v. Boler Co., 227 F.Supp.2d 633, 639 (E.D.Tex.2002) ("The inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not." (quoting Roberts v. Ryer, 91 U.S. 150, 157, 23 L.Ed. 267 (1875)). The claim construction dispute here does not concern Computer Associates' attempt to limit the invention to the uses known at the time of the invention and to exclude novel uses. Pavilion maintains both types of neural networks were well-known in the art at the time of the inventions. As the specification illustrates, the inventor made a conscious choice to limit the inventions to networks that use output data and make predictions. Accordingly, Pavilion's objections to the Special Master's construction of "neural network" are overruled.

B. "process control ... for controlling a process for producing a product having at least one product property"

Pavilion objects to the Special Master's construction of the term "process control ... for controlling a process for producing a product having at least one product property" as "a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the best possible product properties." This term appears in asserted claims of the ' 493 patent, '467 patent and '203 patent.

First, Pavilion contends the Court should not construe this term at all because it is found only in the preamble of the claims. For example, claim 4 of the '493 patent states: "A computer neural network process control method adopted for predicting output data provided to a controller used to control a process for producing a product having at least one product property, the computer neural network process control method comprising the steps of...." '493 Patent, Claim 4. Pavilion argues this preamble language is not intended to be a limitation on the claims but merely recites a purpose or intended use of the invention.

Courts determine whether a phrase in a preamble limits the invention by reviewing the entire patent "to gain an understanding of what the inventors actually invented and intended to encompass by the claim." Catalina Marketing Int'l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed.Cir.2002) (quoting Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1257 (Fed.Cir.1989)); *see also* Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc., 98 F.3d 1563, 1572-73 (Fed.Cir.1996) ("Whether a preamble stating the purpose and context of the invention constitutes a limitation of the claimed process is determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history."). Generally, "preamble language merely extolling benefits or features of the claimed invention does not limit the claim scope without clear reliance on those benefits or features as patentably significant." Catalina Marketing, 289 F.3d at 809. Additionally, when the invention is structurally complete as defined in the claim body and the preamble merely states a "purpose or intended use for the invention," the preamble is not limiting. Catalina Marketing, 289 F.3d at 808 (quoting Rowe v. Dror, 112 F.3d 473, 478 (Fed.Cir.1997)). In the context of apparatus or composition claims, not at issue in this case, preambles describing the use of an invention do not limit the claims. Catalina Marketing, 289 F.3d at 809.

Under certain circumstances where the preamble is "necessary to give life, meaning, and vitality" to a claim, preamble language is properly construed to limit the claims. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed.Cir.1999) (citations omitted). One such circumstance is when the body of the claim refers back to the term in the preamble as an antecedent basis. Bell Communications Research, Inc. v. Vitalink Communications Corp. ., 55 F.3d 615, 620 (Fed.Cir.1995). This situation applies to this case, where the body of several claims references "the process" introduced in the preamble and the "controller" or "regulatory controller" used in the process control method outlined in the preamble.

Another instance where the preamble is limiting is when "the preamble is essential to understand limitations or terms in the claim body." Catalina Marketing, 289 F.3d at 808. The term at issue in this case gets at the heart of what the invention is-a process control method to control a process and produce a product having at least one product property-without which the steps following the preamble would make little sense. The specification and prosecution history confirm the importance of the "process control ..." term to the essence of the invention. *See, e.g.,* '493 Patent at 6:34-38; '467 Patent at 6:46-50; '203 Patent at 6:49-51; *see also* JMX 31, Ex. 7, at 16. Accordingly, the Court holds it is appropriate to construe this term as limiting the claims.

Pavilion objects to the Special Master's inclusion of the word "manufacturing" in the construction because it contends the construction is contrary to the ordinary meaning of the term "process control," which includes non-manufacturing processes as well.FN4 Pavilion points to the definition of "process control" in the American National Standard Dictionary for Information Systems as "[a]utomatic control of a process, in which a computer system is used to regulate usually continuous operations or processes." JMX 33, Tab 19, at JMX 33.271. Pavilion contends that dictionary and other respected technical dictionaries at the time the patent was issued do not limit process controls to manufacturing processes.FN5 *See also* JMX 33, Tab 30, at

JMX 33.370-33.371 (IEEE glossary defining "process control" as "Automatic control in which a computer is used to regulate continuous operations such as chemical processes, military operations, or manufacturing operations."). Contrary to Pavilion's assertion that the ordinary meaning is undisputed, Computer Associates cites several definitions that do appear to limit the term to manufacturing or industrial processes. However, for purposes of this order, the Court will assume the ordinary meaning of "process control" was not limited to manufacturing processes.

Computer Associates maintains the specification expressly limits the process control method to the manufacturing context. It points to the following language in the specification as evidence of the inventor's intent to limit the definition of "process control" to include only manufacturing processes: "Process control is the collection of methods used to produce the best possible product properties in a manufacturing process." '493 Patent at 1:48-50; *see also* '467 Patent at 1:39-41; '203 Patent at 1:46-48. Pavilion contends this is not a definition and points to a case where the Federal Circuit held the following language was not a specialized definition of the term "data block": "The sequence of inquiries on the CRT screen for a data block follows the sequence: data block number, machine mode, control mode, X dimension, Y dimension, Z dimension, feed rate, pack rate and tool number." IMS Tech., Inc. v. Haas Automation, Inc., 206 F.3d 1422, 1433 (Fed.Cir.2000). The Federal Circuit found that language merely describes the preferred embodiment and does not limit "data block" to that specific sequence of variables. This case differs because the definition appears not in a description of the preferred embodiment but in the section explaining the background of the invention and the related art. Moreover, this definition does not go so far as to limit the invention to a particular structure or sequence of steps, but it is a general description of what the phrase "process control" means in the context of the invention.

More importantly, this express definition of "process control" is not the only place where the specification limits the ordinary meaning to manufacturing processes, but this limitation recurs often in the written description. The description of the "field of the invention" states: "The present invention relates generally to monitoring and control of manufacturing processes, particularly chemical processes, and more specifically, to neural networks used in process control of such processes." '493 Patent at 1:29-32; *see also* '467 Patent at 1:20-23; '203 Patent at 1:27-30. The discussion of related art then describes the importance of regulating the quality of products in manufacturing processes. *See, e.g.,* '493 Patent at 1:51-60 ("Process control is very important in the manufacture of products.... In the final analysis, the effectiveness of the process control used by a manufacturer can determine whether the manufacturer's business survives or fails."). Additionally, in describing the five basic steps in a process control method, the specification refers to the "manufactured product." '493 Patent at 3:43-57; *see also* '467 Patent at 3:41-52; '203 Patent at 3:47-61.

Pavilion contends the invention is not limited to manufacturing processes because the specification refers to the cusum and Shewhart supervisory control modules, which can be used outside of manufacturing processes, depicted in Figure 16, a representative embodiment of the neural network. '493 Patent at 32:5-16; *see also* '467 Patent at 34:15-27; '203 Patent at 34:27-39. Both parties agree these modules can be used outside the manufacturing context. However, in the context of these patents, the modules are used in manufacturing processes, because the invention is expressly limited to such processes. Pavilion also points to the reference to ISO 9000 standards used in the field of quality control, which it argues is not limited to the manufacturing context. *See, e.g.,* '467 Patent at 1:25-29 ("Quality of products is increasingly important.... For example, in Europe, quality is the focus of the ISO (International Standards Organization, Geneva, Switzerland) 9000 standards."). Again, while the concept of quality control and the ISO 9000 standards used in quality control may not be limited to manufacturing processes, these patents are limited to such processes. The written description's reference to these standards and supervisory control modules does

not broaden the scope of the patents. The specification does not include an embodiment where the inventions can be used outside the manufacturing context, but it incorporates these concepts that are not intrinsically limited to manufacturing into the context of these inventions, which are so limited. The intrinsic evidence indicates the inventor expressly limited "process control" within the context of these inventions to manufacturing processes, and Pavilion's objection to the Special Master's inclusion of this limitation in his construction is overruled.

Pavilion also objects to the Special Master's use of the word "best" in the construction of "process control." The construction states the process control method controls the process "in order to achieve the best possible product properties." Pavilion contends "desired" is more appropriate than "best" because the product properties sought might not be the "best" and process controls are intended to allow the user to achieve whatever product properties she wants at that time. While the specification refers to "best" product properties, it also refers to "desired" product properties: "In recent years, there has been a great push towards the automation of process control. The motivation for this is that such automation results in the manufacture of products of desired product properties where the manufacturing process that is used is too complex, too time-consuming, or both, for people to deal with manually." '493 at 3:37-42. Accordingly, the Court sustains Pavilion's objection and replaces the phrase "best possible product properties" with "desired product properties."

C. "controller"

The Special Master's recommended construction of "controller" is "a regulatory controller or a supervisory controller of a type typically used in a manufacturing process." Pavilion objects to the phrase "of a type typically used in a manufacturing process" because it is extraneous and confusing, and the ordinary meaning of "controller" does not limit it to use in a manufacturing process. The Court agrees this phrase is confusing and unnecessary because it does not actually limit the term to manufacturing processes but merely provides an example of a context in which a controller may be used. The construction of "process control" adopts the inventor's limitation of the invention to the manufacturing process, and the construction of "controller" need not do so as well. Accordingly, Pavilion's objection is granted and the construction is amended to read "a regulatory controller or a supervisory controller."

D. "executable"

Pavilion objects to the Special Master's recommended construction of "executable," which states: "For an inference rule to be 'executable,' is must have already been translated into computer code (either source code or machine instructions that can be run by the computer's CPU)." This term appears in the '499 patent. Pavilion contends this construction is contrary to the ordinary meaning of "executable," which includes rules that are capable of being interpreted by the computer's CPU at runtime. However, the explanation of executable rules in the patent-and the Special Master's construction of the term-is actually broader than Pavilion's proposed construction. The invention allows the user to enter inputs, which can be automatically translated into source code and converted into machine instructions upon which the CPU can operate. *See* '499 Patent at 110:43-56; 137:12-17 ("This source code can then be compiled and linked, as described above, to provide an expert procedure which is callable at run-time."). In the invention, therefore, rules that have not yet been turned into machine instructions are executable, unlike executable rules as in the ordinary meaning of the term. *E.g.*, JMX 29, Ex. G (Dictionary of Computing) at 219 (defining "executable form" as "a program having been either written in, or translated by a language processor into, machine language, and that is now ready for computer execution").FN6 Pavilion seems to object that the recommended construction requires a compiler to translate the source code into machine instructions, but it does not-in fact, it expands

the meaning of executable to avoid that requirement. Therefore, Pavilion's objection to the construction of "executable" is overruled.

E. "said constrained substantially natural language format"

Pavilion objects to the Special Master's construction of "said constrained substantially natural language format," which appears in the ' 499 patent, because it contends the phrase simply refers back to another phrase and therefore should not be construed. Pavilion focuses on the word "said" as a signal that this phrase incorporates earlier claim language-"a constrained format which is readily understandable by a user who is not necessarily competent in any computer language." '499 Patent, Claim 1. While the Court agrees this phrase refers back to earlier claim language, the Special Master construed "constrained format" and "readily understandable ..." separately, and this term includes the additional language "substantially natural language format." Therefore, the definition of this term is not obvious simply because the term refers back to earlier claim language, and the Special Master properly construed it. Pavilion's objection is overruled.

II. Computer Associates' Objections

Computer Associates objected specifically to two terms and incorporated all of its proposed constructions and previously filed briefs by reference. For obvious reasons, the Court cannot give individual attention to every instance where the Special Master chose to adopt a different construction than Computer Associates'.

A. "control objective"

Computer Associates objects to the Special Master's construction of "control objective" in the '043 patent as "the desired process condition of a particular batch process step that is maintained by the control means." Computer Associates contends the only listed "control means" in the patent are the controllers, so the Court should replace "control means" with "controllers of the process control system." *See* '043 Patent at 16:35-38 ("The controllers 804 (or control means) of the present invention seek to maintain batch process conditions at desired values."). If Computer Associates believes the control means should be limited to controllers under 35 U.S.C. s. 112, para. 6, it is welcome to make that argument to support an invalidity or noninfringement determination, but the Court need not insert that limitation into its construction of "control objective." The Court is not construing "control means," which is not in the claim language of the asserted claim. Accordingly, Computer Associates' objection is overruled.

B. "said constrained substantially natural language format"

Computer Associates objects to the Special Master's construction of "said constrained substantially natural language format" to the extent it includes the word "unreasonably" instead of "substantially." The recommended construction is "the constrained format permits entry of phrases and expressions substantially similar to ordinary speech and not bound unreasonably by the syntax, terms, phrases or rules of a particular technical field or computer program." This construction already includes the word "substantially" once, and whether a format is bound by particular syntax or rules is appropriately a less quantitative standard. Whether something is reasonable or unreasonable is not "in the eye of the beholder" as Computer Associates suggests; instead, the reasonableness standard is used in many areas of law. The Court finds the word "unreasonably" is appropriate in this situation and overrules Computer Associates' objection.

In accordance with the foregoing:

IT IS ORDERED that the Report and Recommendations of the Special Master regarding the patents-in-suit [# 212-17] are ACCEPTED in part and REJECTED in part, as discussed above;

IT IS FURTHER ORDERED that the attached construction of the contested patent claims 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 SUBMIT by April 25, 2003 a list of agreed terms and their constructions to be incorporated into the attached claim chart.

UNITED STATES PATENT NO. 4.920.499

Actual Claim Language	Court's Claim Construction
CLAIM 1	
An expert system comprising: a processor connected to receive inputs from a plurality of **sources;**	A "**source**" is a source of input information.
a collection of inference rules which are **executable** by said processor;	For an inference rule to be "**executable,**" it must have already been translated into computer code (either source code or machine instructions that can be run by the computer's CPU).
and one or more output **channels,** connected so that said processor provides outputs on said output channels in accordance with inputs received on said input channels;	A "**channel**" is path or connection between the expert system and another system or device, that can be used to send or receive information.
wherein said processor is also configured to, on command of a user, present said inference rules in a **constrained format**	A "**constrained format**" is a format that limits the manner in which a user can input or edit information.
which is **readily understandable by a user who is not necessarily competent in any computer language,**	"**Readily understandable by a user who is not necessarily competent in any computer language**" means a format that the user can easily understand without having: (1) a high skill level in computer programming; or (2) memorized the strict syntactical format of inference rules or computer programming languages.
and permit said user to alter said executable rules by modifying said rules within **said constrained substantially natural language format.**	"**Said constrained natural language format**" means that the constrained format permits entry of phrases and expressions substantially similar to ordinary speech and not bound unreasonably by the syntax, terms, phrases or rules of a particular technical field or computer program.
CLAIM 3	
A computer-based system for building an expert system, comprising:	
rule generation logic, which when activated provides to a user **functional structures**	"**Functional structures**" refers to a series of visual interfaces, including screen menus and templates, which allow the user to view, select, enter or edit information used to configure an expert system.

for **rules according to a limited set of predetermined types,**	**"For rules according to a limited set of predetermined types"** means that there is a pre-set number of rule types; in other words, there is a fixed universe of rule types.
wherein said rule generat[ion] logic presents said **functional structures** for all of said rules in a format which is **readily understandable by a user who is not necessarily competent in any computer language,**	**"Readily understandable by a user who is not necessarily competent in any computer language"** means a format that the user can easily understand without having: (1) a high skill level in computer programming; or (2) memorized the strict syntactical format of inference rules or computer programming languages.
and which is **not user-alterable except in restricted portions** thereof;	**"Not user-alterable except in restricted portions"** means the format of the functional structures cannot be readily altered by the user, except in certain restricted portions.
and wherein said rule generation logic translates user inputs in accordance with said **functional structures** into a complete **executable** set of rules which defines an expert system.	For an inference rule to be **"executable,"** it must have already been translated into computer code (either source code or machine instructions that can be run by the computer's CPU).

CLAIM 4

A computer-based method for processing data according to expert knowledge, comprising the steps of:

providing inputs, including numeric inputs, from one or more **sources** to a processor;	**A "source"** is a source of input information.
executing in said processor a collection of **executable** inference rules on said inputs;	For an inference rule to be **"executable,"** it must have already been translated into computer code (either source code or machine instructions that can be run by the computer's CPU).
providing outputs on one or more output channels in accordance with inputs received on said input **channels** and in accordance with said inference rules;	A **"channel"** is path or connection between the expert system and another system or device, that can be used to send or receive information.
and also, when commanded by an authorized user, displaying said inference rules in a **constrained format** which is understandable by a user who is not necessarily competent in any computer language,	A **"constrained format"** is a format that limits the manner in which a user can input or edit information.
and permitting said user to alter said executable rules by editing said rules within **said constrained substantially natural language format.**	**"Said constrained natural language format"** means that the constrained format permits entry of phrases and expressions substantially similar to ordinary speech and not bound unreasonably by the syntax, terms, phrases or rules of a particular technical field or computer program.

CLAIM 6

A computer-based method for building an expert system,	**"Functional structures"** refers to a series of visual interfaces, including screen menus and templates, which allow the user to view,

comprising the steps of: providing to a user **functional structures,**	select, enter or edit information used to configure an expert system.
for rules according to a limited set of predetermined types,	**"For rules according to a limited set of predetermined types"** means that there is a pre-set number of rule types; in other words, there is a fixed universe of rule types.
in a format which is **readily understandable by a user who is not necessarily competent in any computer language,**	**"Readily understandable by a user who is not necessarily competent in any computer language"** means a format that the user can easily understand without having: (1) a high skill level in computer programming; or (2) memorized the strict syntactical format of inference rules or computer programming languages.
and which is **not readily user-alterable except in restricted portions** thereof;	**"Not user-alterable except in restricted portions"** means the format of the functional structures cannot be readily altered by the user, except in certain restricted portions.
and translating user inputs in accordance with said **functional structures** into a complete **executable** set of rules which defines an expert system.	For an inference rule to be **"executable,"** it must have already been translated into computer code (either source code or machine instructions that can be run by the computer's CPU).
CLAIM 8	
A computer-based method for building an expert system, comprising the steps of:	**"Functional structures"** refers to a series of visual interfaces, including screen menus and templates, which allow the user to view, select, enter or edit information used to configure an expert system.
providing to a user, at an interactive interface, templates embodying **functional structures for rules according to a limited set of predetermined types,**	**"For rules according to a limited set of predetermined types"** means that there is a pre-set number of rule types; in other words, there is a fixed universe of rule types.
in a format which is **readily understandable by a user who is not necessarily competent in any computer language,**	**"Readily understandable by a user who is not necessarily competent in any computer language"** means a format that the user can easily understand without having: (1) a high skill level in computer programming; or (2) memorized the strict syntactical format of inference rules or computer programming languages.
and which is **not readily user-alterable except in restricted portions** thereof;	**"Not user-alterable except in restricted portions"** means the format of the functional structures cannot be readily altered by the user, except in certain restricted portions.
translating user inputs in accordance with said **functional structures** into a complete executable set of rules which defines an expert system;	
and **storing both said executable rule set and also said user inputs in accordance with said functional structures.**	**"Storing both said executable rule set and also said user inputs in accordance with said functional structures"** means storing both the set of inference rules and the user inputs of the previous step, in accordance with the functional structures

CLAIM 16	
The system of claim 1, wherein said inference rules defines a substantially real-time expert control system.	

CLAIM 18	
The system of claim 1, wherein said processor is connected to provide control parameter definitions to **controllers** in a manufacturing process which is operating substantially continuously.	A "**controller**" is a regulatory controller or a supervisory controller.

UNITED STATES PATENT NO. 5.058.043

Actual Claim Language	Court's Claim Construction
CLAM 1	
An expert system based **batch process** control method, comprising the steps of:	A "**batch process**" is a way of producing a product using a sequence that is carried out over time and has the following characteristics:
(a) initiating the **batch process;**	(1) the process starts at some point in time and later the process is finished;
(b) **monitoring, using knowledge in the expert system which defines an endpoint condition** in the batch process, for said endpoint condition; and	(2) the process is defined by a series of steps in which: (a) each step performs some different task in producing the end result; (b) each step requires different process conditions; (c) each step includes a definition of when it is over; and (d) the steps take place in a specific order.
(c) changing, using the expert system, a **control objective** of the batch process when the expert system detects said endpoint condition.	In addition to their use as a way of producing a product, batch processes may also be used to periodically shut down continuous processes that produce a product to allow the replacement of equipment or replenishment of materials to prevent deterioration in performance of the continuous process over time. Finally, batch processes may be used for starting up and shutting down continuous processes that require complex conditions to be established before they can be started up and run properly. "**Monitoring ...**": no construction necessary. A "**control objective**" is the desired **process condition** of a particular batch process step that is maintained by the control means. A "**process condition**" is a condition of a process that can be measured and controlled.

UNITED STATES PATENT NO. 5.640.493

Actual Claim Language	Court's Claim Construction
CLAIM 1	
A method for **constructing training sets** for a neural network,	"**Constructing,**" "**developing**" and "**retrieving**": no construction necessary.

comprising the steps of:

(1) **developing** a first training set for a **neural network** by:

A "**neural network**" is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.

(a) **retrieving** from an **historical database** first **training input data** having a first **timestamp(s);**

(b) selecting a first training input data time based on said first **timestamp(s);**

(c) retrieving a first input data **indicated by said first training input data time;** and

(2) developing a second training set for said **neural network** by:

(a) retrieving from said **historical database** second **training input data** having a second **timestamp(s);**

A "**historical database**" is a special type of database in which at least some of the data is stored with associated time stamps.

(b) selecting a second **training input data** time based on said second **timestamp(s);**

"Training input data" is actual or correct output information of a process, or actual measurement data regarding a parameter of a process, used to train a neural network.

(c) retrieving a second input data indicated by said second **training input data** time.

	A **"timestamp"** is information that identifies the time that specific data was taken, produced, derived, measured or calculated.

CLAIM 2

The method of claim 1, further comprising a step of:

(3) searching said **historical database** in either a forward time direction or a backward time direction so that said second **training input data** is the next **training input data** in time to said first **training input data** in said forward time direction or said backward time direction, whichever is used.

A **"historical database"** is a special type of database in which at least some of the data is stored with associated time stamps.

	"Training input data" is actual or correct output information of a process, or actual measurement data regarding a parameter of a process, used to train a neural network.

CLAIM 4

A computer **neural network process control** method adapted for predicting output data provided to a **controller** used **to control a process for producing a product having at least one product property,** the computer **neural network** process control method comprising the steps of:

A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.

"Process control ... to control a process for producing a product having at least one product property" is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties.

	A "**controller**" is a regulatory controller or a supervisory controller.
(1) monitoring for the availability of new **training input data** by monitoring for a change in an associated **timestamp** of said **training input data;**	"**Monitoring,**" "**constructing,**" "**retrieving**" and "**corresponding**"**:** no construction necessary.
(2) constructing a training set by retrieving first input data **corresponding to said training input data;**	"**Training input data**" is actual or correct output information of a process, or actual measurement data regarding a parameter of a process, used to train a neural network.
(3) training the **neural network** using said training set; and	A "**timestamp**" is information that identifies the time that specific data was taken, produced, derived, measured or calculated.
(4) predicting the output data from second input data using the **neural network.**	

CLAIM 9	
A method for constructing training sets for a **neural network,** comprising the steps of:	A "**neural network**" is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.
(a) retrieving, from an **historical database, training input data** having a **timestamp(s);**	A "**historical database**" is a special type of database in which at least some of the data is stored with associated time stamps.
(b) selecting a **training input data** time based on said **timestamp(s);** and	"**Training input data**" is actual or correct output information of a process, or actual measurement data regarding a parameter of a process, used to train a neural network.
(c) retrieving an input data indicated by said	A "**timestamp**" is information that identifies the time that specific data was taken, produced, derived, measured or calculated.

training input data time.	

CLAIM 15	
A computer **neural network process control** method adapted for predicting output data provided to a **controller** used **to control a process for producing a product having at least one product property,** the computer **neural network** process control method comprising the steps of:	A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network. **"Process control ... to control a process for producing a product having at least one product property"** is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties. A **"controller"** is a regulatory controller or a supervisory controller.
(1) presenting to a user a template for a partially specified **neural network;**	**"Monitoring ...", "constructing"** and **"retrieving":** no construction necessary.
(2) entering data into said template to create a complete **neural network** specification;	**"Training input data"** is actual or correct output information of a process, or actual measurement data regarding a parameter of a process, used to train a neural network.
(3) **monitoring for the availability of new training input data;**	
(4) constructing a training set by retrieving first input data corresponding to said **training input data;**	
(5) training the **neural network** using said training set, said training step further including using a **neural network** representative of said complete **neural network** specification; and	
(6) predicting the output data from second input data using the **neural network.**	

UNITED STATES PATENT NO. 5,121,467

Actual Claim Language	Court's Claim Construction

CLAM 1	
A computer-based **process control** method adapted to control a process using a **regulatory controller,**	A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.
the **process producing a product having at least one product property,** the computer-based process control method comprising the steps of:	
(1) predicting, using a **neural network,** output data from input data;	
(2) **supplying said output data** to the **regulatory controller** for controlling the process; and	
(3) using an expert system to make a decision, using data from the process, to directly or indirectly control the **regulatory controller.**	**"Process control ... producing a product having at least one product property"** is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties.
	A **"regulatory controller"** is a controller that regulates a process by adjusting the process in conformity with rules or control parameters.
	"Supplying ...": no construction necessary.

CLAIM 3	
A computer-based **process control** method adapted to	**"Process control ... producing a product having at least one product property"** is a method for controlling the process conditions of a

control a process using a **controller,** the process **producing a product having at least one product property,** the computer-based process control method comprising the steps of:

manufacturing process that produces a product in order to achieve the desired product properties.

A **"controller"** is a regulatory controller or a supervisory controller.

(1) predicting, using a **neural network,** output data from input data;

A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.

(2) supplying said output data to an expert system; and

(3) using said expert system to make a decision, using said output data, to directly or indirectly control the **controller.**

	"Supplying ...": no construction necessary.
CLAIM 19	
A computer **neural network process control** system adapted to control a process using a **controller,** the **process producing a product having at least one product property,** the computer-based process control system comprising:	**A "neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network. **"Process control ... to control a process ... producing a product having at least one product property"** is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties.
A **"controller"** is a regulatory controller or a supervisory controller.	
(a) an actuator, for changing a controllable state of the	An **"inference engine"** processes the rules in the knowledge base to reach a decision by (1) evaluating the rules to determine if the available

process in accordance with a state of said actuator;	information matches the premises or conclusion of a rule in order to derive further information, and (2) "chaining" or repeating the evaluation process using the original and all further derived information until no further information can be derived.
(b) an expert system, connected to use data from the process to make a decision as indicated by decision data, comprising:	
(1) a knowledge base, and	
(2) an **inference engine** responsive to said knowledge base; and	**"[A] neural network, comprising predicting means for predicting output data in accordance with said decision data and in accordance with weights, said neural network connected to adjust said state of said actuator in accordance with said output data"** means the neural network uses decisions of the expert system as input. The output of the neural network depends on the weights between its internal layers of data processing elements or nodes. The output of the neural network is a prediction used to adjust the state of an actuator.
(c) **a neural network, comprising predicting means for predicting output data in accordance with said decision data and in accordance with weights, said neural network connected to adjust said state of said actuator in accordance with said output data.**	

UNITED STATES PATENT NO. 5,282,261

Actual Claim Language	Court's Claim Construction
CLAIM 1	
A computer **neural network process control** method for **controlling a process for producing a product having at least one product property,** comprising the steps of:	A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.
	"Process control ... for controlling a process for producing a product having at least one product property" is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties.

(1) operating the process with one or more sensors connected to sense **process conditions** and produc[e] at least one process condition measurement for each sensor;	A **"process condition"** is a condition of a process that can be measured and controlled.
(2) predicting with a **neural network** first output data using said at least one process condition measurement as input data by summing at least two weighted inputs to an element of said **neural network;**	**"Computing controller output 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 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 sensor or product property input data.
(3) controlling an actuator with a supervisory and/or regulatory process controller by **computing controller output data using said first output data as controller input data in place of a sensor input data and/or a product property input data;** and	A **"controller"** is a regulatory controller or a supervisory controller.
(4) changing a controllable process state, using said actuator, in accordance with said **controller** output data.	

UNITED STATES PATENT NO. 5,224,203

Actual Claim Language	Court's Claim Construction
CLAIM 1	
A computer **neural network process control** method adapted for predicting output data provided to a **controller** used **to control a process for producing a product having at least one product property,** the computer neural network process control method comprising the steps of:	A **"neural network"** is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network. **"Process control ... to control a process for producing a product having at least one product property"** is a method for controlling the process conditions of a manufacturing process that produces a product in order to achieve the desired product properties.

	A "**controller**" is a regulatory controller or a supervisory controller.
(1) configuring the **neural network** by specifying at least one **specified interval,** and by using **data pointer(s)** to individually specify at least one input, at least one output, and/or at least one training input;	"**Configuring ...**": No construction necessary.
(2) training, either on-line or off-line, the **neural network** to produce a trained **neural network;**	A "**specified interval**" is a fixed interval of time that will be used by the computer system to create a neural network that predicts output data each time that interval elapses. The interval may be in units of time or may be the period between well-defined events (even if the length of that period as measured in units of time may be variable).
(3) at said at least one **specified interval,** predicting with said trained **neural network** second output data using second input data; and (4) controlling the process in accordance with said second output data.	A "**data pointer**" is a variable data structure that specifies information regarding one or more characteristics of data located in another memory or database.

CLAIM 12	
The computer **neural network** process control method of claim 1, wherein said step (1) of specifying using **data pointers** further comprises a step of specifying a data location.	A "**neural network**" is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network.
	A "**data pointer**" is a variable data structure that specifies information regarding one or more characteristics of data located in another memory or database.

CLAIM 16	
The computer **neural network** process control method of claim 1, wherein said step (1) of specifying using **data pointers** further comprises a step of specifying a high limit value and/or a low limit value.	A "**neural network**" is a software simulation tool that is essentially an interconnected collection of nodes in which each node combines a weighted collection of inputs to give an output. The interconnected nodes are arranged in hierarchical layers. The outputs of nodes in a lower layer (that is, a layer closer to the inputs of the neural network) are provided as weighted inputs to the nodes of higher layers. The neural network predicts output values derived from weighted input values after being "trained" with known historical input and output values to learn the optimal weights for each input to each node in the network. A "**data pointer**" is a variable data structure that specifies information regarding one or more characteristics of data located in another memory or database.

FN1. Computer Associates objects to dictionaries, encyclopedias and treatises submitted by Pavilion that were published after the issuance of the relevant patent-in-suit. *See* Objections and Responses, # 178, 183, 188, 190. The '467 patent issued on June 9, 1992. The other three neural network patents-in-suit have similar specifications to the '467 patent, although the latest was issued in June 1997. To the extent the specifications and claim terms are identical in these patents, the relevant ordinary meaning is at the time the first patent was issued. The Court will not consider any definitions published after the issue date of the relevant patent and, with respect to the neural network patents, will not consult any sources published after the issue date of the '467 patent.

FN2. Pavilion also objects that the Court's construes "neural network" by defining its function, not what it is. Pavilion points to the Court's decision not to construe the term "buffer/control logic" in a recent, unrelated patent case. This analogy is misguided because, unlike "buffer/control logic," the meaning of "neural network" is not plain. Moreover, in that case, the claim language following the term described its function and construing the term by describing its function would have been redundant. The definition of neural network (as an interconnected collection of nodes) would be meaningless and certainly useless to a jury without a description of the function of the neural network, which is presumably why the inventor decided to explain the concept of neural network in the patents by describing their function in the context of the inventions.

FN3. In its objections, Pavilion cites this passage as "the one place where the specification does provide a general definition of 'neural network.' " Pavilion's Obj. at 14.

FN4. Pavilion spends several pages quoting deposition testimony of Computer Associates' expert to demonstrate the parties do not dispute that the term "process control" applies to manufacturing as well as non-manufacturing processes. However, an expert's testimony about how he thinks dictionaries defined a term is not one of the "objective sources that serve as reliable sources of information on the established meanings" the Federal Circuit extolled in *Texas Digital*-in fact, the reason that court found dictionaries so reliable is they "are unbiased reflections of common understanding *not influenced by expert testimony*." Texas Digital, 308 F.3d at 1203 (emphasis added). Therefore, Pavilion's extensive reliance on Computer Associates' expert's supposed admissions about the ordinary meaning of terms is misplaced.

FN5. Pavilion also refers to two unrelated patents to support its definition of "process control." United States Patent No. 5,150,289 (filed July 1990 and issued September 1992 to The Foxboro Company) states "[w]hile process control is typically employed in the manufacturing industry, it also has application in the service industry." JMX 33, Tab 26 at 1:9-1:17. Pavilion contends this patent demonstrates process control can be used outside the manufacturing context. However, the Foxboro patent, unlike the patents-in-suit, expressly states in the specification process control in the invention applies to the service industry in addition to the common application in the manufacturing context. The other patent Pavilion cites, U.S. Patent No. 5,341,288, includes similar express language expanding the context of process controls. If at all, these patents are only relevant to the ordinary meaning of "process control" at the time the patents-in-suit were issued, not to the meaning of "process control" within the context of the patents-in-suit, which have different language in their specifications.

FN6. Pavilion cites a dictionary definition of "executable file" that states: "The standard utilities described as compilers can produce executable files, but other unspecified methods of producing executable files may also be provided." JMX 26, Tab 5 (IEEE Standard Dictionary). This vague definition is not very helpful. Pavilion also points to the '043 patent specification, but the claim being construed is not asserted in the '043 patent.

W.D.Tex.,2003.
Pavilion Technologies, Inc. v. Computer Associates Intern., Inc.