United States District Court,
N.D. Illinois, Eastern Division.

INFORMATION TECHNOLOGY INNOVATION, LLC,
Plaintiff.
v.
MOTOROLA, INC. and Freescale Semiconductor, Inc., Defendants, Counterclaim Plaintiffs,
and Third-Party Plaintiffs.
v.
Information Technology Innovation, LLC, Robert W. Atherton, and Willis E. Higgins,
Counterclaim Defendants and Counterclaim Plaintiffs.

and

Brooks Automation, Inc., Third-Party Defendant, Counterclaim Plaintiff,
and Counterclaim Defendant.

Oct. 4, 2005.

Background: Owner of patent for process of modeling manufacturing plants sued manufacturers of electronic products for infringement.

Holdings: Construing claims, the District Court, Kennelly, J., held that:
(1) "delineating" set of factory operating rules meant setting forth with accuracy, or in detail, group of prescribed guides for how manufacturing plant would work;
(2) "processing time parameters" were set of values that determined duration of one or more of series of actions in manufacturing process;
(3) identification of "stochastic" phenomena meant determining which events or things in manufacturing process occurred randomly;
(4) requirement that chosen model contain "descriptions of dynamic interactions of part lots and machines in plant" meant that chosen model had to contain descriptions of changes in way that groups of like parts and machines acted upon one another; and
(5) requirement that process steps and product flows "change in time as result of manufacturing plant conditions" meant that such variables were altered in response to factory conditions.

Claims construed.

4,796,194. Construed.

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David L. Witcoff, Charles Edward Juister, Marc Scott Blackman, Jones Day, Chicago, IL, Michael John Newton, Jones Day, Dallas, TX, for Defendants and Counter Claimant.

MEMORANDUM OPINION AND ORDER

KENNELLY**, District Judge.**

Information Technology Innovation, LLC ("ITT") has sued Motorola, Inc., Brooks Automation, Inc., and Freescale Semiconductor, Inc. for infringement of U.S. Patent No. 4,796,194, which relates to processes for modeling manufacturing plants. This case is before the Court for construction of the disputed claim language in the patent-in-suit.

Facts

The asserted claims of the '194 patent, entitled "Real World Modeling and Control Process," involve a modeling and control process for distributed factories having fabrication sequences. A distributed manufacturing plant is capable of manufacturing a variety of products through ordered sequences of process steps. This type of factory is commonly used to manufacture modern electronics products, including semiconductor components. The archetype of a distributed factory is a wafer-fabrication plant that has the ability simultaneously to manufacture products by more than 1000 processes, averaging over 100 steps each.

The approach to modeling and manufacturing control in the prior art was to start with a theoretical mathematical treatment of the problem. The '194 patent, in contrast, starts with a definition of how the factory actually operates, and develops a simulation of the behavior of the factory that can then be compared to the factory's actual operations to refine the model.

ITI asserts claims 1, 18, and 34 against each defendant. The defendants filed a joint brief containing their proposed claim construction. In addition to the briefs submitted, the parties presented oral argument and submitted additional material on claim construction during a September 7, 2005 hearing.

Discussion

[1] Claim construction of the patent-in-suit, which involves questions of law to be determined by the Court, is the first step in any patent infringement case. *See* Mars, Inc. v. H.J. Heinz Co., 377 F.3d 1369, 1373 (Fed.Cir.2004); Markman v. Westview Instruments, Inc., 52 F.3d 967, 977-78 (Fed.Cir.1995). In Phillips v. AWH Corp., 415 F.3d 1303 (Fed.Cir.2005), the Federal Circuit clarified the approach courts should use when analyzing claim language. District courts are directed to focus at the outset on how the patentee used the claim term in the claims, specification, and prosecution history rather than beginning the analysis by consulting dictionaries or similar sources. Id. at 1321. Criticizing the over-reliance on dictionaries that resulted from the methodology adopted in Texas Digital Systems, Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed.Cir.2002), the court noted that "heavy reliance on the dictionary divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract." Id. at 1315.

[2] [3] The claim term's ordinary and customary meaning, as understood by persons who were skilled in the relevant technology at the time the patent application was filed, continues to serve as the baseline

interpretation of the proper scope of the claim. The appropriate inquiry involves analyzing the disputed terms in the context of the disputed claim itself, as well as in the context of the patent as a whole. The Federal Circuit took pains in Phillips to emphasize that in addition to evaluating the claims of a patent in dispute, the specification is the "single best guide to the meaning of a disputed term." Id. (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996)). If the specification indicates that the patentee defined the term in a manner that differs from its generally conceived meaning or disavowed claim scope, the inventor's intention is dispositive. Id. at 1317. In short, claims are to be construed consistently with the specification.

[4] In addition, courts should consider the patent's prosecution history, if it is in evidence, as it provides evidence of how the inventor and the Patent and Trademark Office understood the claims. If the inventor unequivocally disavowed a particular meaning to obtain the patent or otherwise limited the scope of the invention during the course of the prosecution, "the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender." Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1324 (Fed.Cir.2003).

[5] Though the Federal Circuit emphasized the primary role intrinsic evidence should play in discerning the proper scope of claims, it did not preclude the use of extrinsic evidence altogether. Judges remain free to consult dictionaries or comparable sources to assist in understanding the meaning of words and to gain a better understanding of the underlying technology. Phillips, 415 F.3d at 1322. In particular, the court noted that dictionaries may be helpful in determining the ordinary meaning of certain non-technical, commonly understood words. *See* id. at 1314. Thus, dictionaries, and particularly technical treatises, may continue to inform claim construction, so long as a court does not adopt a definition that contradicts the intrinsic evidence. Id. at 1322-23.

[6] As an initial matter, ITI maintains that the majority of claim terms at issue do not require definition. It argues that the claim terms have clear ordinary meanings and that the terms are already used in their normal sense. Thus, the constructions proposed by ITI are alternatives should the Court conclude that a definition is necessary. ITI has cited no authority, however, for the proposition that it is unnecessary to construe a disputed limitation when its meaning is obvious to one of the parties. The Federal Circuit has held that claim construction is necessary "when the meaning or scope of technical terms and words of art is unclear and in dispute and requires resolution to determine the issue before the court." Eli Lilly and Co. v. Aradigm Corp., 376 F.3d 1352, 1360 (Fed.Cir.2004) (quoting United States Surgical Corp. v. Ethicon, Inc., 103 F.3d 1554, 1568 (Fed.Cir.1997)). The very fact that the meaning of a particular limitation is disputed suggests that the meaning is not entirely clear from the language used in the patent and that the Court must construe the term. The Court agrees with ITI that certain terms may not require elaborate interpretation, *see* Brown v. 3M, 265 F.3d 1349, 1352 (Fed.Cir.2001), but ITI's suggestion that entire limitations in dispute do not require construction is at odds with the purpose of claim construction.

Additionally, defendants request that the Court postpone consideration of several limitations in dispute, as they intend to argue that these limitations are invalid for indefiniteness. These limitations include "actual operation of the plant" in claim 1; "defining" (as a single word) in claims 1, 18, and 34; "determining a set of parameters that describe the plant" in claim 18; "simulating the dynamic behavior of the plant using the chosen factory-specific dynamic model" in claim 18; "dynamic, real world modeling of a manufacturing plant" in claim 34; and "both of which change in time as a result of manufacturing plant conditions" in claim 34.

ITI submitted proposed constructions regarding these terms. With the exception of "defining," which defendants define within the context of the limitations in which the word appears, defendants have proposed no alternative constructions. Accepting defendants' proposal would-assuming they do not ultimately prevail on the indefiniteness issue-effectively allow them to force a delay in the claim construction process. The Court will not allow this. Defendants have waived their right to present alternative constructions of the terms. The Court adopts ITI's unchallenged proposed constructions, without prejudice to defendants' later argument concerning indefiniteness. ITI's proposed constructions are listed under the appropriate claims.

1. Claim 1

The parties dispute several terms found in claim 1, which discloses:

A process for modeling a manufacturing plant, which comprises delineating a set of factory operating rules which define how part lots interact with machines in actual operation of the plant, defining the manufacturing plant by specifying machines in the plant and at least batch size and processing time parameters of each machine, defining products manufactured in the plant, providing fabrication sequences consisting of process steps for the products manufactured in the plant, assigning the process steps to the machines, defining at least time and yield characteristics of each process step, identifying which phenomena in the manufacturing plant are stochastic in nature, and assigning distributions and parameters of the distributions to the stochastic phenomena.

a. Modeling

The term "modeling" appears in the preambles of claims 1, 18, and 34. In each instance, the parties dispute whether the term constitutes a claim limitation. Defendants contend that the preamble language acts as a limitation and thus must be construed; ITI makes the converse argument. Both sides agree, however, that the issue need not be resolved at this stage, as they are in agreement on the proper construction of the term should the Court determine that "modeling" constitutes a claim limitation. Because the question of whether "modeling" limits the claim is not an issue of construction, but instead bears on the infringement analysis, the Court agrees that it makes sense to table the issue. Should the Court later conclude that the term is a claim limitation, we will construe it according to the parties' agreed meaning: to produce a representation or simulation of.

b. Delineating a set of factory operating rules

[7] ITI contends that the limitation "delineating a set of factory operating rules" means to set forth a group of prescribed guides for conduct or action in manufacturing. According to defendants, the language should be construed as meaning to set forth in detail a group of prescribed guides for how a manufacturing plant works. The sole point of contention is the phrase "in detail" inserted by defendants, who argue that this is necessary to give the word "delineating" its ordinary meaning. *See* Pl's Reply at 5 ("[T]he defendants' proposal is acceptable without the words 'in detail.' "). In its reply, ITI maintains that the meaning of delineating is straightforward and that substituting an everyday word with its definition is pointless.

The term "delineate" fits within the category of non-technical terms that have widely accepted meanings and do not require elaborate interpretation. *See* Phillips, 415 F.3d at 1314. In such situations, the Federal Circuit has approved the use of general purpose dictionaries to help determine the ordinary meaning of the terms. Id. Defendants provide the Court with Webster's definition of "delineate": to describe, portray, or set forth with accuracy or in detail. Webster's Ninth New Collegiate Dictionary 336 (1986). The definition ITI cites

also includes the language "set forth with accuracy or detail." *See* Pl's brief at 5. Because the parties agree on the appropriate definition of delineate, and ITI points to no intrinsic evidence showing that the patentee intended a different meaning for the term, the Court adopts the following construction of the limitation: setting forth with accuracy, or in detail, a group of prescribed guides for how a manufacturing plant works.

c. Processing time parameters

[8] The parties dispute the meaning of the phrase "processing time parameters." ITI proposes that the limitation means a set of values that determine the duration of one or more of a series of actions in manufacture. Defendants' proffered construction is: quantities (such as the mean or a variance) that describe random fluctuations in processing times. ITI contends that defendants' construction is too narrow because not all parameters pertain to random fluctuations. The Court agrees.

Nowhere does the patent suggest that processing time parameters must involve means and variances or that the term "parameters" is limited to describing random fluctuations in processing times. The specification describes the second step of the invention's algorithm as determining the parameters that describe the specific factory. U.S. Patent No. 4,796,194, col. 5, lines 26-28. Parameters are determined for many aspects of the factory other than processing time, including the factory's products, fabrication sequences, machines, equipment reliability, and set-up time. *See* id., col. 5, lines 48-50; col. 7, lines 21-22. These parameters are defined in terms of data structures of the individual factory model. Id., col. 5, lines 28-29. The term "parameters" should not be defined in a manner that would not make sense in the context of other types of factory variables. In addition, the specification states that "fabrication sequence parameters ... define allowable process flows." Id., col. 11, lines 1-2. This does not indicate that the parameters describe random fluctuations in process flows.

Finally, defendants place too heavy an emphasis on their proffered dictionary definition of "parameters." They argue that ITI's proposal ignores the express dictionary definition of parameters, which includes mean and variance as descriptive terms. But although dictionaries can inform claim construction, the focus should remain on the how the term is used within the patent. Courts must be careful to not adopt a definition that contradicts the intrinsic evidence. Phillips, 415 F.3d at 1322-23. But even so, the definition that defendants propose is only one possible definition of "parameter." The same dictionary includes the following definitions of "parameter": "any of a set of physical properties whose values determine the characteristics or behavior of something" and "something represented by a parameter: a characteristic element." Webster's Ninth New Collegiate Dictionary 854 (1986). These definitions align with ITI's interpretation. In short, the Court accepts ITI's proposed construction: a set of values that determine the duration of one or more of a series of actions in manufacture.

d. Providing fabrication sequences

[9] The parties dispute the meaning of the limitation "providing fabrication sequences" found in claim 1. IPI interprets the phrase to mean providing an alterable series of operations for the manufacture of a part or parts. Defendants argue that to provide a sequence of process operations, it is necessary for the patented method to include both the type of the processing operations being modeled and the order in which those operations are conducted. Thus, defendants propose that the limitation should be construed to mean supplying the type and order of process operations that are required to complete the products manufactured in the plant with the type and order of process operations being capable of changing during modeling.

The claim itself indicates what is meant by the phrase "fabrication sequence." Claim 1 reads "providing

fabrication sequences *consisting of process steps for the products manufactured in the plant*." (emphasis added). Consistent with this definition, the specification defines a fabrication sequence as "a sequence of process operations that are required to complete a product." U.S. Patent No. 4,796,194, col. 11, lines 39-40. Among other things, the patent provides that allowable variations include changes in the attributes of a small set of process steps and the addition or deletion of one or more process steps. Id., col. 11, lines 53-56. The term is more nuanced than what is conveyed by defendants' inclusion of "type and order of process operations." Similarly, the defendants have not convinced the Court that the insertion of "during the modeling" is necessary.

Both parties' definitions include the notion that fabrication sequences are "alterable" or "capable of changing." Though the patent makes it clear that this is the case, the Court does not find that the term itself encompasses this meaning. If it did, the patent's references to "*dynamic* fabrication sequences" would be repetitive. Moreover, claim 17, which is dependent upon claim 1, discloses "[t]he process for modeling a manufacturing plant of claim 1 in which the fabrication sequences are dynamic, time-varying fabrication sequences." As a dependent claim, claim 17 must be narrower in scope than claim 1. *See* Nazomi Communications, Inc. v. Arm Holdings, PLC, 403 F.3d 1364, 1370 (Fed.Cir.2005) (noting that the concept of claim differentiation normally means that limitations stated in dependent claims are not to be read into the independent claim from which they depend). Claim 17 adds the limitation that the fabrication sequences of claim 1 are dynamic and time-varying. The Court therefore adopts the following construction of the phrase "providing fabrication sequences" in claim 1: providing a series of operations for the manufacture of a part or parts.

e. Assigning the process steps to the machines

[10] ITI proposes that the limitation "assigning the process steps to the machines"should be construed as designating the operations that a particular machine, machines, or workstation will carry out during manufacturing. Defendants argue that ITI's meaning is incorrect, as the patent requires that each machine perform a single fundamental operation and that each machine must be assigned a process step. Thus, defendants' proffered construction of the phrase involves specifying the fundamental operation (for example, in semiconductor manufacturing: depositing, patterning, etching, or doping) performed by each machine in the model.

The specification defines a process step as "the fundamental operation performed on a machine." U.S. Patent No. 4,796,194, col. 11, lines 29-30. The term "operations," however, is used interchangeably with "process steps." *See* id., col. 11, lines 23-25 ("In this embodiment each workstation is qualified to perform only a specified set of process steps or operations."). Defendants aptly note that "the fundamental operation performed on a machine" might indicate that each machine performs only one fundamental operation. But the language is also open to the interpretation that each machine performs a fundamental operation, but is not limited to only that operation.

Defendants' reading does not find support in the claims or specification; the patent nowhere specifies that each machine is limited to one operation. ITI's interpretation, however, is consistent with the specification. Example two provides a representation of two simplified semiconductor wafer fabrication processes. In describing the process, the patent states that "[r]eal semiconductor fabrication sequences may have 250 process steps using 50 workstations and 200 pieces of equipment." If 200 machines are capable of performing 250 process steps in one embodiment of the invention, it would appear that some machines must be capable of performing multiple process steps. Similarly, the specification indicates that workstations are

groupings of like machines. Id., col. 11, lines 16-17. It further states that "[w]orkstations may perform more than one step in a single process sequence." Id., col. 8, lines 30-32.

In addition, defendants have provided no intrinsic support for their contention that each machine must be assigned a process step. Indeed, the specification clearly contemplates that certain machines might be unavailable for processing as a result of planned downtime or random failures. *See* id., col. 12, lines 21-26. And figure 1 demonstrates that a fabrication sequence can skip certain machines.

The Court is unwilling to adopt defendants' proposal that providing examples of fundamental operations within the definition will aid the jury's understanding of the meaning of fundamental operations. The cited operations apply to only one embodiment of the invention. The Court therefore adopts the following interpretation of the limitation: designating the fundamental operation or operations that a machine will carry out during manufacturing.

f. Defining at least time and yield characteristics of each process step

[11] According to ITI, the limitation "defining at least time and yield characteristics of each process step" should be construed as determining the duration of a stage of manufacturing and the portion of the parts or lots that successfully complete that stage, where the duration and portion can vary in a random manner. Defendants propose that the correct interpretation is: for each process step, fixing distinctly at least the standard process time, set-up time, and yield, and the probability characteristics of fluctuations in the standard process time, set-up time, and yield. The Court believes that both proposals contain superfluous language.

As already mentioned, "process step" is defined in the specification as the fundamental operation performed on a machine. Defendants seem to assume that all process steps include certain attributes, namely, a process time, a vector of parameters describing conditional setup times, a standard yield, and parameters for random yield distributions. But the relevant part of the specification states, "*[i]n this embodiment,* the attributes of each process step include a process time, a vector of parameters describing conditional setup times, a standard yield, and parameters for distribution describing random yield and process-time fluctuations." U.S. Patent No. 4,796,194, col. 11, lines 30-34 (emphasis added). Clearly, the patent leaves open the possibility that other embodiments of the invention might contain process steps with different attributes. The limitation at issue should not be defined using attributes that might apply only to certain embodiments of the invention.

It is relatively clear from the specification that "yield," here used as a noun, is used in a way consistent with its common meaning: the result or quantity produced. Taking together the definitions of "process step" and "yield," the Court interprets the limitation to mean determining at least the duration of, and the result or quantity produced by, each fundamental operation performed on a machine.

g. Identifying which phenomena in the manufacturing plant are stochastic in nature

[12] The parties agree on the meanings of the words "phenomena" and "stochastic" in the limitation "identifying which phenomena in the manufacturing plant are stochastic in nature." The central dispute appears to concern whether the limitation contains multiple steps. ITI maintains that the proper interpretation is noting observable facts or events that are random. Defendants' proffered construction includes two steps: as to those events or things that are selected to be observed in the manufacturing plant, determining which of them occur randomly. Though the Court is cognizant that the term "which" indicates

that certain phenomena will be identified from a group of phenomena, we do not believe that the claim language supports defendants' reading. Moreover, the specification does not support defendants' contention that this limitation involves two distinct steps. At the same time, ITI's definition overlooks some claim language. The proper construction is: determining which events or things in the manufacturing process occur randomly.

h. Assigning distributions and parameters of the distributions to the stochastic phenomena

ITI proposes that the limitation "assigning distributions and parameters of the distributions to the stochastic phenomena" should be interpreted to mean selecting quantities whose values represent the probabilities that govern the value of a random variable. In contrast, defendants construe the language to mean specifying the probability characteristics of each of the random events or things that are selected to be observed in the manufacturing plant.

The parties' arguments for their respective positions are terse, to put it mildly. The Court is unable to discern the major difference between the two constructions. Moreover, we question whether either is appropriate, as the parties' constructions do not seem to account for the distinction between "distributions" and "parameters of distributions." If the limitation still requires construction, the parties will need to submit supplemental arguments containing better explanations.

2. Claim 18

Claim 18 discloses

A process for modeling a distributed manufacturing plant which has fabrication sequences consisting of process steps, in which a model describing actual operation of the plant is obtained, which comprises choosing a dynamic model for the plant from a group of specimen sequenced-dynamic-factory models, determining a set of parameters that describe the plant, describing the parameters in terms of data structures of the chosen model, the chosen factory-specific dynamic model containing descriptions of the dynamic interactions of part lots and machines in the plant, simulating the dynamic behavior of the plant using the chosen factory-specific dynamic model, comparing predictions obtained with the simulation using the model with observed manufacturing trends in the plant, and using the comparison to refine the model.

a. Distributed manufacturing plant

[13] [14] ITI suggests that the phrase "distributed manufacturing plant" appears in the preamble and appears to argue that the language does not constitute a claim limitation. A preamble is considered a claim limitation only if, when read in the context of the claim as a whole, it recites essential structure or steps or is "necessary to give life, meaning, and vitality" to the claim. Eaton Corp. v. Rockwell Intern. Corp., 323 F.3d 1332, 1339 (Fed.Cir.2003) (quoting Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed.Cir.2002)). If, therefore, the limitations in the body of the claim "rely upon and derive antecedent basis from the preamble," then the preamble acts as a necessary component of the claimed invention and constitutes a limitation. Id. Several limitations within claim 18 derive antecedent basis from the "distributed manufacturing plant" language in the preamble. Specifically, the claim mentions "the plant," six times, which clearly refers to the "distributed manufacturing plant" language in the preamble. Accordingly, the phrase constitutes a claim limitation and must be construed.

[15] ITI contends that the limitation refers to a plant which makes a variety of products using different

machines. Defendants counter that the phrase means a manufacturing plant consisting of unconnected machines that are spread out over the manufacturing plant. Defendants claim that the patent supports its inclusion of "unconnected" in the definition. They cite a sentence under the section "Description of the Prior Art" that states, "Most manufacturing plants or factories are distributed in that they consist of heterogeneous, unconnected workstations." U.S. Patent No. 4,796,194, col. 1, lines 21-23. Because this sentence appears within a discussion describing prior art and the term does not appear elsewhere in the patent, the Court is hesitant to conclude that the claim phrase denotes a manufacturing plant with unconnected workstations. When defining terms, courts are directed to give words their broadest reasonable construction that is consistent with the use of the term in the patent. *See* In re Am. Acad. of Sci. Tech Ctr., 367 F.3d 1359, 1364 (Fed.Cir.2004). In short, the Court sees no reason to limit distributed manufacturing plants to those with unconnected workstations.

Later in the section describing prior technology, the specification states in generalterms that "[a] distributed manufacturing plant is capable of fabricating a variety of products through ordered-process sequences of process steps. Each process step can be performed by at least one workstation in the factory." U.S. Patent No. 4,796,194, col. 1, lines 27-30. The Court concludes that "distributed manufacturing plant" should be construed as a factory that makes a variety of products using machines in workstations throughout the plant.

b. Choosing a dynamic model for the plant from a group of specimen sequenced-dynamic-factory models

[16] The parties dispute the limitation "choosing a dynamic model for the plant from a group of specimen sequenced-dynamic-factory models." ITI submits that this phrase should be interpreted to mean selecting a representation or simulation that is marked by change of a manufacturing plant that has fabrication sequences and which makes a variety of products using different machines. Defendants suggest that the Court should construe the limitation as "selecting a dynamic model from a group of models. Creating or selecting data or data files that describe the manufacturing plant (for example, process flows, products, equipment, residence times, yields, equipment failure or repair rates, setup time requirements, start rates, lot sizes, dispatch schemes, or initial positions of lots) is not 'choosing a dynamic model.' "

The parties agree that the ordinary meaning of "dynamic model" is a representation or simulation marked by change. It is unclear why defendants do not use this definition in their proposed construction, but it is sufficient that they acknowledge the agreement in their brief. *See* Defs' Brief at 9. The primary difference between the parties' proffered definitions seems to be that defendants wish to insert an exclusion to show that there is a distinction between the model itself and the data files that go into the model. ITI, in contrast, maintains that although a model is chosen, that model has certain data associated with it, and the claim does not exclude the possibility of creating or selecting data. During oral argument, defendants clarified that they are not asserting that the invention cannot use data files, but are simply arguing that the selection of data files in a particular model is not the act of choosing a model from a group of models for a particular simulation. Defendants contend that the specification and prosecution history confirm their reading of the claim language.

According to the specification, the invention

provides a standard class of specimen models for distributed factories which have fabrication sequences. Members of this class are called sequenced-dynamic-factory (SDF) models. The class is defined by sets of fundamental rules for the definitions of fabrication sequence, queues, scheduling rules, batching, set-up

times, yield, reliability, and other variables. A choice of rules from each set defines an individual model.... An individual model from the class above is chosen; the choice is based upon the match between the dynamic characteristics of the model and those of the factory.

U.S. Patent No. 4,796,194, col. 5, lines 34-47.

Turning to the prosecution history, claim 18 was amended to specify that a dynamic model is chosen "from a group of specimen sequenced-dynamic-factory models." Feb. 22, 1988 Amendments at 2, Defs' Ex. B. The inventor, Robert Atherton, explained that the change was made to distinguish the present invention from the model used in prior art, specifically, the Dayhoff-Atherton paper. *See* id. at 4. He explained that the model depicted in the Dayhoff-Atherton paper was "a single, fixed model which is used with different fabrication processes. The fixed model is used with different manufacturing processes by providing a data file that is specific to a particular manufacturing process.... There is no selection from a group of specimen sequenced-dynamic-factory models." Id. In Atherton's affidavit attached to the amendments, he further elaborates on the Dayhoff-Atherton model:

In that model "the entire manufacturing plant [is] represented as a queueing network." The queueing network is discussed further in terms of "servers," "service times," and a network of "multiple deterministic paths." The factory is described to the model in terms of the parameters of the queueing network called out in a nomenclature of factory terms. Examples include "residence times, yields, equipment failure or repair rates, setup time requirements, start rates, lot sizes."

Atherton Decl. para. 4, Defs' Ex. C.

The Court does not believe that either the specification or prosecution history requires defendants' reading of the limitation. The distinction Atherton made between the current invention and the Dayhoff-Atherton model involved selecting a model from a group of available models as opposed to simply selecting different data for a single model. The specification similarly makes it clear that a model is chosen based on a match between the characteristics of the model and the factory. Defendants' exclusion is unnecessary and an issue for infringement, not claim construction. Taking both sides' positions into account, the Court adopts the following construction: selecting a representation or simulation that is marked by change of a manufacturing plant from a group of such models.

c. Determining a set of parameters that describe the plant

[17] ITI submits the following construction for the limitation "determining a set of parameters that describe the plant: selecting values that describe a particular factory. As defendants have failed to provide a competing definition, the Court adopts ITI's construction without prejudice to defendants' later indefiniteness argument." Moreover, this construction is consistent with the definition of "parameters" adopted with respect to the "processing time parameters" limitation in claim 1.

d. Describing the parameters in terms of data structures of the chosen model

[18] ITI proposes that the limitation "describing the parameters in terms of data structures of the chosen model" means: a data structure is a table of data including structural relationships, or an organizational scheme, such as a list or record or array, applied to data so that it can be used. Defendants suggest that the Court adopt the following construction: representing the parameters by a table of data including structural relationships, or an organizational scheme, such as a list or record or array.

The parties' constructions are virtually identical; no true dispute exists. The only term either party defines with any elaboration is "data structures," and the parties appear to be in full agreement on the appropriate meaning of this term. Thus, the Court construes the limitation to mean describing the parameters using a table of data, including structural relationships or an organizational scheme, such as a list, record, or array.

e. The chosen factory-specific model containing descriptions of the dynamic interactions of part lots and machines in the plant

[19] ITI contends that the proper construction of the limitation "the chosen factory-specific model containing descriptions of the dynamic interactions of part lots and machines in the plant" is: the model chosen describes how groups of like parts and machines act upon each other in a real plant. Defendants' position is that the language should be interpreted as: the chosen model contains descriptions of how the type and order of process steps change during the time the model is run.

Defendants maintain that ITI's construction is flawed because it lacks any reference to the "dynamic" nature of the interactions. They emphasize that the dynamic interactions between part lots and machines arise due to changes in the path of the lots through the machines in the factory, i.e., changes in fabrication sequences. The Court agrees with defendants' reasoning. But defendants' interpretation incorporates the "type and order" language that the Court previously rejected in the context of defining "fabrication sequences." In their response brief, defendants suggest that "dynamic interactions" means changes in the way that the part lots and machines act upon one another. Defs' Resp. at 22. The Court believes this sentence best describes how someone skilled in the technology would interpret the ordinary and customary meaning of the phrase. Incorporating the meaning of "lots"-the specification states that "[l]ots are composed of like parts and follow a fabrication-sequence," U.S. Patent No. 4,796,194, col. 10, lines 66-68-the Court construes the limitation to mean: the chosen model contains descriptions of changes in the way that groups of like parts and machines act upon one another.

f. Simulating the dynamic behavior of the plant using the chosen factory-specific dynamic model

[20] ITI proposes that the limitation "simulating the dynamic behavior of the plant using the chosen factory-specific model" should be construed as using the model to represent the factory and changes occurring in it. The Court adopts ITI's unchallenged construction without prejudice to defendants' indefiniteness contention.

g. Comparing predictions obtained with the simulation using the model with observed manufacturing trends in the plant, and using the comparison to refine the model

[21] The parties dispute the proper construction of the limitation "comparing predictions obtained with the simulation using the model with observed manufacturing trends in the plant, and using the comparison to refine the model." ITI again asserts that the limitation need not be construed, but it provides the Court with the following construction should we determine one is necessary: reviewing similarities and differences between results of the simulation and factory information in order to improve upon the simulation. In this instance, defendants agree with ITI that many of the words in the claim phrase do not need to be construed. The only truly contested term is "refine." Defendants contend that the proper construction is: using the comparison of predictions obtained from the model with observed manufacturing trends in the plant to change the model to improve the model so that it more accurately reflects the actual operations of the plant. In short, the parties agree that the goal of this step is to improve the model, but defendants believe their interpretation makes it clear that the purpose is to make sure the model more accurately reflects the actual

operations of the plant.

The specification states that "[p]redictions obtained with the simulation are compared with observed manufacturing trends in the plant. The comparison is used to refine choice of fundamental rules and parameters in the model." U.S. Patent No. 4,796,194, col. 5, lines 12-16. Defendants' reading is certainly an implicit goal of the invention, but as ITI notes, their proposed added language appears nowhere in the patent. Moreover, the additional language is unnecessary to convey the plain and ordinary meaning of "refine" as used in the patent. The Court construes the limitation to mean using the comparison of predictions obtained from the simulation with observed manufacturing trends in the plant to improve upon the simulation.

3. Claim 34

Six disputed limitations appear in claim 34, which discloses:

In a process for dynamic, real world modeling of a manufacturing plant including the steps of specifying machines in the manufacturing plant and defining lots of parts manufactured in the plant, the improvement which comprises defining dynamic fabrication sequences as an ordered sequence of process steps and an ordered sequence of product flow, both of which change in time as a result of manufacturing plant conditions.

a. Dynamic, real world modeling of a manufacturing plant

[22] ITI proposes the following construction of the limitation "dynamic, real world modeling of a manufacturing plant": a changeable representation of an actual factory. The Court adopts this construction without prejudice to defendants' indefiniteness argument.

b. Defining lots of parts manufactured in the plant

[23] ITI requests that the Court construe "defining lots of parts manufactured in the plant" to mean determining attributes of groups of like parts. According to defendants, the phrase should be interpreted to mean fixing distinctly the essential qualities of the components, not the finished products, that are manufactured in the plant.

The specification states that "[l]ots are composed of like parts and follow a fabrication-sequence." U.S. Patent No. 4,796,194, col. 10, lines 66-68. The patent discusses lots in terms of their "attributes" at least twice. *See* id., col. 11, lines 1, 5. Thus, ITI's construction is more in keeping with the use of "lots" in the specification. Similarly, defendants' addition of "essential qualities" is unnecessary. Defendants cite the following definition of "defining": "to determine or identify the essential qualities or meaning of." Webster's Ninth New Collegiate Dictionary 333 (1986). Reliance on a dictionary definition is secondary to defining the term in the context in which it is used within the patent itself. Moreover, "essential qualities" is not indispensable language even within the cited definition, and "attributes" conveys the same sentiment.

To define "parts" would confuse the issue, as "lots" are defined in terms of parts and the word "parts" already appears separately in the limitation. The Court is confident that the jury will have no trouble understanding that a part is not equivalent to a finished product.

In sum, the Court adopts the following construction: determining attributes of groups of like parts

manufactured in the plant.

c. Defining dynamic fabrication sequences

ITI interprets "defining dynamic fabrication sequences" to mean an ordered series of operations for the manufacture of a part or parts that is marked by activity or change. Defendants, in comparison, request that the Court adopt the following construction: to fix distinctly the type and order of process operations that are required to complete a product, with the type and order of those process operations changing during the modeling.

Based on the way the claim is phrased, it is not clear to the Court that any definition is required. The limitation must be viewed within the context of surrounding language, and claim 34 reads: "the improvement which comprises defining dynamic fabrication sequences as an ordered sequence of process steps and an ordered sequence of product flow, both of which change in time as a result of manufacturing plant conditions." To accept either parties' interpretation would render the claim language largely redundant, as the claim itself describes a fabrication sequence as an ordered sequence of process steps and an ordered sequence of product flow that change over time. Thus, no construction appears to be necessary.

d. An ordered sequence of process steps

[24] The parties now appear to be in agreement on the proper construction of "an ordered sequence of process steps." In its bench book for the Markman hearing, ITI concedes that either parties' proposal can be used. Defendants' proffered construction involves specifying the order in which each process step must take place. In its bench book, ITI proposes a construction with slight variations: specifying the order in which process steps take place. The Court agrees with ITI that the words "each" and "must" are unnecessary; in fact, including "must" runs counter to the concept that the order of the steps can change as a result of manufacturing plant conditions, as the portion of claim 34 immediately following this limitation provides. The Court therefore construes the limitation to mean specification of the order in which process steps take place.

e. An ordered sequence of product flow

[25] ITI's recommended construction of "an ordered sequence of process flow" is "a minor variation of a process flow, that is, of steps that have been assigned to a workstation." Defendants construe the limitation to mean specifying the order in which each minor variation of the process steps must take place.

The specification defines each "product flow" as a minor variation of the basic process flow. U.S. Patent No. 4,796,194, col. 11, lines 48-49. "Process flow" is described as "a restricted class of fabrication sequence" in which "each of the ordered sequence of process steps is assigned to a workstation." Id., col. 11, lines 43-45. Together, these definitions supply the appropriate construction of the limitation: a minor variation in the order of process steps assigned to a workstation.

f. Both of which change in time as a result of manufacturing plant conditions

[26] ITI's proffered construction of the limitation "both of which change in time as a result of manufacturing plant conditions" is: process steps and product flows that are altered in response to factory conditions. The Court adopts ITI's proposal with one minor change that better fits with the claim language: process steps and product flows are altered in response to factory conditions.

Conclusion

The disputed claim terms are construed in accordance with the conclusions set forth in this Memorandum Opinion and Order. The case is set for a status hearing on November 2, 2005 at 9:30 a.m.

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