IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TAKADU LTD.,

Plaintiff,

v.

INNOVYZE LLC,

Defendant.

Civil Action No. 21-291-RGA

MEMORANDUM OPINION

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Attorneys for Defendant.

March 17, 2023

/s/ Richard G. Andrews
ANDREWS, U.S. DISTRICT JUDGE:

Before me is the issue of claim construction of multiple terms in U.S. Patent No. 7,920,983 (the "'983 patent"), U.S. Patent No. 8,341,106 (the "'106 patent"), and U.S. Patent No. 9,053,519 (the "'519 patent") ("the Asserted Patents").

The parties submitted a Joint Claim Construction Brief (D.I. 63) and Appendix (D.I. 64), and I heard oral argument on February 22, 2023. The parties submitted additional letters after the hearing. (D.I. 68; D.I. 72).

I. BACKGROUND

"The Asserted Patents address technological problems related to water utility networks . . . ." (D.I. 63 at 1). The '983 Patent, filed March 4, 2010, and issued on April 5, 2011, teaches the use of statistical analyses to predict water meter data to identify irregularities in water consumption more accurately. (*See id.* at 9-10). The '106 Patent, filed on December 7, 2011, and issued on December 25, 2012, teaches the use of statistical analyses to more accurately identify "events" or anomalies in a water distribution network. (*Id.* at 11-12). The '519 Patent, filed on February 13, 2012, and issued on June 9, 2015, teaches the use of geographical information system (GIS) data of elements in a water network to generate a mathematical graph of the water network to improve how the network is operated and managed. (*Id.* at 12-14).

II. LEGAL STANDARD

"It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "'[T]here is no magic formula or catechism for conducting claim construction.' Instead, the court is free to attach the appropriate

weight to appropriate sources 'in light of the statutes and policies that inform patent law.'" *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (alteration in original) (quoting *Phillips*, 415 F.3d at 1324). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Of these sources, "the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted).

"[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1312–13 (citations and internal quotation marks omitted). "[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent." *Id.* at 1321 (internal quotation marks omitted). "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court's construction is a determination of law. *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317–19 (quoting *Markman*, 52 F.3d at 980). Extrinsic evidence

may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id*.

III. CONSTRUCTION OF DISPUTED TERMS

There are thirty claims at issue across the three patents: '983 Patent claims 1-3, 5, 10, 12-13, 16, and 19-20; '106 Patent claims 1-4, 7, 22-23, 27, and 29; '519 Patent claims 1-5, 16-19, 22, and 27. (D.I. 63 at 9, 11-12). The following claims are representative for claim construction purposes.

'983 Patent

> 1. A computerized method for monitoring a water utility network, the water utility network comprising at least a network of pipes for delivering water to consumers and a plurality of meters positioned within the water utility network, the method comprising:
> receiving meter data, the meter data representing a plurality of parameters measured by the meters, the parameters including at least flow or pressure of the water through the pipes;
> receiving secondary data from one or more sources external to the meters, the secondary data representing one or more conditions affecting flow or consumption of water in a region serviced by the water utility network;
> analyzing the meter data by ***statistically predicting meter data*** for a first meter based on second meter data from the water utility network and secondary data, wherein the second meter data comprises meter data other than the received first meter data, and comparing the received first meter data with ***the predicted meter data*** for the first meter to identify one or more water utility network events comprising at least one or more leakage events by detecting an anomaly if the received first meter data deviates from ***the predicted meter data*** for the first meter by a ***statistical deviation***; and
> reporting the one or more water network events to a user via a user interface.
>
> 16. A computerized system for monitoring a water utility network, the water utility network comprising a network of pipes for delivering water to consumers and a plurality of meters positioned within the water utility network, the system comprising:
> a network information database for storing meter data representing a plurality of parameters measured by the meters, the parameters including at least flow or pressure of the water through the pipes, and secondary data from one or more sources external to the meters, the secondary data representing one or

more conditions affecting flow or consumption of water in a region serviced by the water utility network;

an ***analysis engine*** configured to analyze the meter data by ***statistically predicting meter data*** for a first meter based on second meter data from the water utility network and secondary data, wherein the second meter data comprises meter data other than the received first meter data, and comparing the received first meter data with ***the predicted meter data*** for the first meter to identify anomalies;

an ***event classification engine*** configured to identify water utility network events based on the anomalies, the water network events comprising leakage events and informational events regarding quantity or quality of water flowing through the pipes and operation of the water utility network; and

an event database for storing water utility network event data representing the one or more water network events identified by the ***event classification engine***.

('983 Patent, col. 25:16-41; 26:41-27:3 (disputed terms italicized and bolded)).

'106 Patent

1. A computerized method performed using a processor for identifying related events in a water network monitoring system, the events represented by stored event data derived from data received from one or more sources including sensor data received from a plurality of sensors in the water network, each event data comprising data identifying an event and one or more characteristics of the event, the method comprising:

retrieving event data from an event database, the event data representing a plurality of events which have been processed from anomalies received from the water network monitoring system and which each contain a plurality of data fields including event start time and event magnitude;

identifying at least two events from the event data as being candidate events that are likely to constitute parts of a composite event, the identified candidate events each being determined by the water network monitoring system not to ***be statistically significant enough to be reported as events by themselves***;

selecting an event combination rule, the event combination rule including one or more tests to determine whether the candidate events are related and can be combined to form a composite event of a given event type;

comparing one or more event characteristics between the at least two candidate events based on the event combination rule;

determining, based at least in part on the comparison, that at least two candidate events are related to one another and are processible as a single event of the given event type; and

reporting the determination of the at least two candidate events as being related and as the single event of the given event type to a user via a user interface.

('106 Patent, col. 24:16-48 (disputed terms italicized and bolded)).

’519 Patent

1. A computer-implemented method for modeling a utility network, the method comprising:

retrieving geographical information system (GIS) data and asset management data of one or more assets of the utility network, wherein the GIS data and asset management data do not indicate connections between the one or more assets and wherein the GIS data includes coordinate data associated with the one or more assets;

generating, via a processing device, one or more mathematical graph elements from the one or more assets;

creating, via the processing device, probable connections between the one or more mathematical graph elements based on the GIS and asset management data, wherein creating probable connections comprises ***snapping a plurality of junctions based on coordinate data***;

generating, via the processing device, a mathematical graph based on the probable connections, the mathematical graph including one or more asset characteristics of the one or more assets;

analyzing, via the processing device, the determined junctions, wherein analyzing comprises ***determining if an analyzed junction appears between only two other junctions*** and ***merging the two other junctions*** if the analyzed junction appears between only two other junctions;

identifying, via the processing device and by analyzing the mathematical graph, one or more flow monitoring zones (FMZs) in the utility network, wherein identifying one or more FMZs is based upon analyzing junction locations; and

storing the mathematical graph data for use by one or more systems.

(’510 Patent, col. 22:55-23:19 (disputed terms italicized and bolded)).

A. “statistically predicting meter data” (’983 Patent claims 1, 16, and 19).

a. *Plaintiff’s proposed construction*: Plain and ordinary meaning, which is “computing one or more expected values for a first meter using a statistical method.”

b. *Defendant’s proposed construction*: Plain and ordinary meaning, which is “generating a likely distribution of predicted values.”

c. *Court’s construction*: Plain and ordinary meaning, which is “computing one or more expected values using a statistical method.”

The parties agree that the plain and ordinary meaning of the term should apply, but they disagree as to what the plain and ordinary meaning is. The parties dispute whether “statistically

predicting" requires generating a distribution of predicted values, as opposed to just a single predicted value.

Plaintiff argues that any method that falls within the realm of statistics would be covered by this claim term. (Markman Hearing Tr. 10:23-11:7). Plaintiff cites to the specification as evidence that methods that do not require generating a distribution of values, like "independent attribute selection," "exhaustive attribute selection," and "incremental attribute selection," are described. (D.I. 63 at 19-20 (citing '983 Patent, col. 15:45-16:48)).

Plaintiff contends that claim differentiation dictates that the term must be broader than Defendant's proposed construction. Claim 11 in the '983 Patent, which depends on claim 1, recites "wherein statistically predicting meter data for the first meter comprises calculating a statistical distribution of likely values for the first meter" ('983 Patent, col. 26:16-18). Plaintiff argues that the term in claim 1 must include a broader definition than in claim 11 (i.e., include generating a single predicted value). (D.I. 63 at 20).

Defendant argues that the patent specification and prosecution history support its construction. Defendant cites to Figures 4 and 5 in the patent specification, which recite "Predict likely distribution of values," and, "Predict likely value distribution of the selected attributes," respectively, as steps in the process. (D.I. 63 at 21 (citing '983 Patent, at Fig. 4, Fig. 5, 14:28-37, 15:38-44)).

Defendant cites to claim 1 of U.S. Patent No. 9,568,392 (the "'392 Patent"), a continuation of the '983 Patent, for support.[1] Claim 1 of the '392 Patent has the same claim term, but also recites that "received meter data" is compared with "the likely distribution of predicted values."

[1] Plaintiff alleged Defendant infringed the '392 Patent in its original complaint but has since dropped the patent. (D.I. 63 at 3 n.1).

Defendant argues "the likely distribution of predicted values" is the output from "statistically predicting meter data." (D.I. 63 at 22). Defendant contends that because "statistically predicting meter data" in the '392 Patent, which has the same specification, generates a "likely distribution of predicted values," the term should have the same meaning here. (*Id.*).

Defendant argues that Plaintiff distinguished the Angelis prior art on the basis that the prior art "compared actual meter data to a single data point . . . and argued the prior art used 'simple fixed bound' analysis and 'fixed-bound alerts.'" (D.I. 63 at 29).

Defendant contends that claim differentiation favors its construction over Plaintiff's. Defendant explains that claim 11 of the '983 Patent requires "statistically predicting meter data" to calculate a statistical distribution of likely values rather than generate a statistical distribution of likely values. (*Id.* at 23). Defendant reads claim 11 as narrowing claim 1 by requiring the distribution be calculated rather than generated, not by requiring a distribution of likely values being generated. (*Id.* at 23-24).

I agree with Plaintiff's construction. First, while the specification describes using methods which generate a distribution of values, those parts of the specification are describing specific embodiments, not the invention generally. (*See, e.g.*, '983 Patent, col. 9:51-56 ("In one embodiment, ..."); col. 14:28-30 ("FIG. 4 presents a flow diagram illustrating in further detail a method . . . according to embodiments of the present invention."); col. 15:18-19 ("FIG. 5 presents a flow diagram illustrating a method for prediction of values in step 403 of FIG. 4.")).

Second, I am not persuaded that claim 1 of the '392 Patent requires the "statistically predicting meter data" to mean "generating a likely distribution of values" in the '983 Patent. Claim 1 of the '392 Patent includes the term "likely distribution of predicted values." That language is absent here. While the same claim terms in related patents are presumed to carry the

same meaning, the difference in meanings, if any,[2] can be ascribed to the difference in the surrounding claim language. *See Omega Eng'g, Inc, v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) ("[W]e presume, unless otherwise compelled, that the same claim term in the same patent or related patents carries the same construed meaning.").

Third, I find the prosecution history does not support narrowing the claim term to require generating a likely distribution of values. The prosecution history shows that the patentee distinguished Angelis on the basis that Angelis "is otherwise silent with regard to statistically predicting meter data as claimed." (D.I. 64, Ex. 11 at 15). The patentee emphasized that Angelis "only discusses processing the meter data with the additional data to determine 'whether the meter data indicates a possibly erroneous reading such as a leak, theft, damaged meter, and so forth,' . . . but Angelis is silent with regard to statistically predicting meter data based on the secondary data." (*Id.*). I don't read these statements to distinguish Angelis on the basis that a distribution of likely values is generated by the patentee's invention.

Fourth, I am not persuaded that the only difference between claim 1 and claim 11 of the '983 Patent is that claim 1 covers generating distributions and claim 11 covers calculating distributions. The phrase "statistical distribution of likely values" does not appear in claim 1. I do not read the appearance of this term in claim 11 to mean it is also an implicit limitation in claim 1.

Therefore, I agree with Plaintiff's construction. I find, however, the phrase "for a first meter" to be unnecessary as it is recited in the surrounding claim language. (*See* '983 Patent , col.

[2] I have not construed the meaning of the term in the '392 Patent. I do not read Plaintiff's earlier argument in its Answer to Defendant's motion to dismiss to require such a construction either. (*See* D.I. 13 at 12 ("Independent claim 1 describes a method of statistically predicting meter data . . . such as by calculating a statistical distribution of likely values . . . .")). Therefore, another issue with Defendant's argument is that it is premised on a claim construction that the parties have not stipulated to and that I have not provided.

25:29-30 ("statistically predicting meter data for a first meter"); col. 26:55 (same); col. 28:5-6 (same)). I construe "statistically predicting meter data" to mean "computing one or more expected values using a statistical method."

B. "the predicted meter data" ('983 Patent claims 1, 16, and 19).

a. *Plaintiff's proposed construction*: Plain and ordinary meaning, no construction required.

b. *Defendant's proposed construction*: Plain and ordinary meaning, which is "the likely distribution of predicted values generated by statistically predicting meter data."

c. *Court's construction*: Plain and ordinary meaning, no construction required.

The dispute with respect to this term mirrors the dispute for "statistically predicting meter data." The parties agree that this term refers to the output of "statistically predicting meter data." (D.I. 63 at 29; Markman Hearing Tr. 47:3-7). I agree that the claim language makes this clear.

Therefore, given my construction of "statistically predicting meter data," I find no construction is required for this term.

C. "statistical deviation" ('983 Patent claim 1)

a. *Plaintiff's proposed construction*: Plain and ordinary meaning, which is "a difference measured in relative or statistical terms as large enough to indicate an anomaly." [3] In the alternative, "a statistically significant difference measured in relative terms."[4]

b. *Defendant's proposed construction*: Plain and ordinary meaning, which is a "difference from the mean predicted value taking into account the likely distribution of predicted values." In the alternative, "statistically significant bound which takes into account the likely distribution of predicted values."[5]

[3] Plaintiff proposed a new construction at the Markman Hearing (Markman Hearing Tr. 59:4-14), which it clarified in a letter after the hearing. (D.I. 68 at 1).

[4] Plaintiff proposed the alternative construction in the letter after the hearing. (D.I. 68 at 1).

[5] Defendant proposed this alternative construction in a letter responding to Plaintiff's new proposed constructions. (D.I. 72 at 2).

c. *Court's construction*: "statistically significant difference"

At the Markman Hearing, Plaintiff agreed that "statistical deviation" means "a difference at a level of statistical significance to indicate an anomaly." (Markman Hearing Tr. 30:21-23). Plaintiff has added the "relative terms" language to its constructions to address Defendant's concern that a fixed bound would be included. I noted at the Markman Hearing that "to indicate an anomaly" is not necessary when the claim term is read in the context of the claims and Plaintiff agreed. (*Id.* at 31:15-23).

Defendant opposes Plaintiff's two proposed constructions for being vague. (D.I. 72 at 1). Defendant argues that the phrase "difference measured in relative . . . terms" is "broad enough to include the 'fixed-bound' prior art that [Plaintiff] distinguished during prosecution." (*Id.*). Defendant contends that Plaintiff's alternative construction is also vague because it "characterizes the 'statistically significant difference' as one that is 'measured in relative terms.'" (*Id.*). Defendant argues that it is "the boundary between significant and insignificant" that is relative, "not that the comparison of the actual and predicted data is 'measured in relative terms.'" (*Id.* (citing '983 Patent, col. 11:1-8)).

At the Markman Hearing, however, Defendant argued "as long as it's a relative bound that has been set by the user that takes into account the distribution, it would be a statistical deviation." (*Id.* at 48:12-14). Defendant takes issue that a jury may not understand "statistical significance" or that experts may not agree on "statistical significance." (*Id.* 48:24-49:4). Defendant, however, concedes that "statistical significance necessarily is going to take into account distribution." (*Id.* at 60:15-20).

I construe "statistical deviation" to mean "statistically significant difference." Both parties agree that "statistical deviation" does not cover a "fixed-bound" analysis. (*Id.* at 48:12-14 (Defendant arguing it's a relative bound that is covered), 56:21-57:12 (Plaintiff stating a fixed

bound analysis is not covered by the scope of the patent)). As do I. The parties do not seem to dispute over the scope of this term, but rather the wording presented to the jury. I believe that "statistical significance" is suitable and does not need further construction as it is a term of art that would be well understood by a person of ordinary skill in the art (POSA). (*See* Markman Hearing Tr. 29:6-8).

I find the phrase "measured in relative terms" from Plaintiff's proposed construction is unnecessary as both parties agree, as do I, that statistical significance must be measured in relative terms. Adding that phrase does not impact the scope of the term. At best the phrase is redundant and at worst it introduces confusion. Likewise, I do not see why the additional language in Defendant's alternative construction is necessary as Defendant already agrees that statistical significance accounts for the distribution. (Markman Hearing Tr. 60:15-20 ("[S]tatistical significance necessarily is going to take into account the distribution . . . .")).

Therefore, I construe "statistical deviation" to mean "statistically significant difference."

D. "be statistically significant enough to be reported as events by themselves" ('106 patent claims 1, 23, and 29)

a. *Plaintiff's proposed construction*: "have a statistical deviation individually sufficient to report as an event according to a test or rule"

b. *Defendant's proposed construction*: "differ from mean predicted value taking into account the likely distribution of predicted values"

c. *Court's construction*: Plain and ordinary meaning.

Defendant argues that only the phrase "be statistically significant" needed to be construed. (*Id.* at 53:17-19). I agree. I do not see the phrase "according to a test or a rule" as adding anything as that is not subsumed by "be statistically significant." The remaining language in Plaintiff's proposed construction is not necessary as it is recited in the claim.

At the Markman Hearing, I determined "statistical significance" is a term of art and therefore does not need further construction. (Markman Hearing Tr. 29:6-8, 29:24-30:1). Therefore, I construe this term to have its plain and ordinary meaning.

E. "analysis engine" ('983 patent claims 16 and 19)

a. *Plaintiff's proposed construction*: "one or more software modules and databases configured to reside on hardware and perform the claimed analysis functions"

b. *Defendant's proposed construction*: Indefinite. "Analysis engine" is a means-plus-function claim term subject to § 112, ¶ 6 with insufficient structure.

c. *Court's construction*: Indefinite. "Analysis engine" is a means-plus-function claim term subject to § 112, ¶ 6 with insufficient structure.

The parties dispute whether "analysis engine" should be construed under 35 U.S.C. § 112, ¶ 6 as a means-plus-function limitation.

There is a presumption that § 112, ¶ 6 does not apply because the claim term does not recite the word "means." *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). "When a claim term lacks the word 'means,' the presumption can be overcome and § 112, [¶] 6 will apply if the challenger demonstrates that the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function.'" *Id.* at 1349 (quoting *Watts v. WL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)). "What is important is . . . that the term, as the name for structure, has a reasonably well understood meaning in the art." *Greenberg v. Ethicon Endo–Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996).

Defendant argues that "analysis engine" is subject to § 112, ¶ 6 because "engine" is a nonce word. Defendant cites to dictionary definitions to argue "'[e]ngine,' in the context of computer science, merely refers to software and/or hardware for performing a specified function." (D.I. 63

at 46). Defendant's expert states that "analysis" does not "clarify a specific structure for the claimed engine." (*Id.* at 47 (citing D.I. 64, Ex. 12, ¶¶ 38-39)).

Plaintiff counters that a POSA "would understand the 'engine' terms as having sufficient structure to avoid overcoming the presumption that §112(6) does not apply." (*Id.* at 51). Plaintiff's expert states that "'engine' in this context is understood as a collection of one or more subprograms that serve a central purpose indicated by the name of the engine." (*Id.* (citing D.I. 64, Ex. P, ¶ 17)). Plaintiff also cites to dictionary definitions to show that "engine" is "[a] processor or portion of a program that determines how the program manages and manipulates data." (D.I. 64, Ex. 8 at 193). Plaintiff contends that a POSA "would further understand that software engines tend to be named according to what they do." (D.I. 63 at 51 (citing D.I. 64, Ex. P, ¶ 17)).

I agree with Defendant that "analysis engine" is a means-plus-function limitation. Defendant has overcome the presumption that "analysis engine" is not subject to § 112, ¶ 6 by showing the claim fails to "recite sufficiently definite structure." *See Williamson*, 792 F.3d at 1349. The parties agree that an "engine" in this context refers to a program or part of a program to perform a function or manages data. (*See* D.I. 63 at 45-46). "Engine" appears to be synonymous with "module," which is recognized as a common "nonce" word. *Williamson*, 792 F.3d at 1350 (finding "module" to mean "a generic description for software or hardware that performs a specified function" to be a "well-known nonce word"); *see also Parity Networks, LLC v. ZyXEL Commc'ns, Inc.*, 2020 WL 8569299, at *6 (C.D. Cal. Dec. 22, 2020) (finding "engine" was a nonce word in the term "multicast engine"). *But see Stragent, LLC v. Amazon.com, Inc.*, 2011 WL 13152568, at *4 (E.D. Tex. June 27, 2011) (finding "engine" conveyed structure and was not subject to § 112, ¶ 6).

The term "analysis" does not add sufficient structure to take the term out of § 112, ¶ 6. Defendant's expert states that a POSA "would not have been familiar with a specific combination of software and/or hardware referred to as an 'analysis engine.'" (D.I. 64, Ex. 12, ¶ 38). I do not read Plaintiff's expert to contradict Defendant's expert's statements. Plaintiff's expert states, "A [POSA] would further understand that these engines are part of the novelty of the inventions described and therefore not predate the patent . . . ." (D.I. 64, Ex. P, ¶ 21). If the "analysis engine" is part of the novelty of the invention, it would follow that a POSA would not recognize the "analysis engine" as a sufficiently definite structure or a common name for a class of structures. Plaintiff's expert does not state that the term is commonly used to connote structure nor that the term is used to reference conventional programs that a POSA would recognize as an "analysis engine." *Cf. Dyfan, LLC v. Target Corp.*, 28 F.4th 1360, 1368-69 (Fed. Cir. 2022) (finding § 112, ¶ 6 did not apply to "code" or "application" because of unrebutted expert testimony that the terms connoted structure and a POSA would "have known of off-the-shelf code and applications" for performing the function); *Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003, 1008 (Fed. Cir. 2018) (finding § 112, ¶ 6 did not apply to "user interface code" or "program" because a POSA could discern these are "specific references to convention graphical user interface programs or code, existing in prior art at the time of the inventions").

Construing a means-plus-function claim term is a two-step process. *Williamson*, 792 F.3d at 1351. The first step is to identify the claimed function. "The identified function must be the function 'explicitly recited in the claim.'" *Nichia Corp. v. TCL Multimedia Tech. Holdings*, 2017 WL 5719267, at *8 (D. Del. Nov. 28, 2017) (quoting *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999)).

Defendant argues the claimed functions are "analyz[ing] the meter data by statistically predicting meter data for a first meter based on second meter data from the water utility network and secondary data, wherein the second meter data comprises meter data other than the received first meter data, and comparing the received first meter data with the predicted meter data for the first meter to identify anomalies." (D.I. 63 at 48). I agree as this language tracks with the language used in claim 16 and claim 19. (*See* '983 Patent, col. 26:54-61, 28:5-14).

The second step is "to determine what structure, if any, disclosed in the specification corresponds to the claimed function." *Williamson*, 792 F.3d at 1351. "Structure disclosed in the specification qualifies as 'corresponding structure' if the intrinsic evidence clearly links or associates that structure to the function recited in the claim." *Id.* at 1352.

Defendant argues that the specification does not disclose any corresponding structure. (D.I. 63 at 47-48). Defendant contends that because "the 'analysis engine' performs functions that must be performed by a specially programmed computer processor," the specification must disclose an algorithm for performing those functions. (D.I. 63 at 47). Defendant's expert states "the specification does not, in my opinion, instruct a person of ordinary skill in the art to use any specific complete algorithm for any recited function." (D.I. 64, Ex. 12, ¶ 45).

Plaintiff does not dispute that the specification must disclose an algorithm. Plaintiff provides a series of citations to the specification to show algorithms are disclosed. (D.I. 63 at 53).[6] At the Markman Hearing, I asked Plaintiff to "show me an algorithm for how the analysis engine or the event classification engine actually does its thing." (Markman Hearing Tr. 74:4-6). Plaintiff

[6] Plaintiff fails to distinguish the citations that are supposed to apply to "analysis engine" from those that are supposed to apply to "event classification engine."

claimed attribute selection, best fit, linear regression, and generating a likely distribution of values were algorithms for the "analysis engine." (*Id.* at 74:11-14).

I find there is insufficient structure disclosed in the specification. As an initial matter, I do not believe that a conclusory statement that algorithms are disclosed followed by string cites are sufficient to demonstrate that "the intrinsic evidence clearly links or associates that structure to the function recited in the claim." *Williamson*, 792 F.3d at 1352. I also do not find the disclosure in the specification to set forth specific algorithms for performing the claimed functions. For example, '983 Patent, col. 6:18-46 describes "The Water Network Analysis Engine," but the description just describes the data to be analyzed (i.e., the inputs) and what is identified (i.e., the outputs). How the analysis is accomplished or performed is not described.

I am not persuaded by Plaintiff's identification of algorithms at the Markman Hearing that the specification discloses the required algorithms. Neither Plaintiff's expert nor Defendant's expert identifies these as algorithms for the "analysis engine." Plaintiff's expert notes that the specification describes embodiments using "predictor modules for generating a statistical distribution of likely values of the meter data" and "anomaly detector modules for comparing" meter data (D.I. 64, Ex. P, § 22), but I do not believe this is sufficient disclosure of algorithms providing the necessary structure. *See Arendi S.A.R.L. v. LG Elecs., Inc.*, 2019 WL 3891150, at *13 (D. Del. Aug. 19, 2019) (stating the issue is "whether a POSA would recognize the ***specification itself*** as disclosing a particular algorithm or algorithms for implementing the . . . function").

Therefore, I find the term "analysis engine" to be subject to § 112, ¶ 6 and indefinite because insufficient structure is disclosed in the specification.

F. "event classification engine" ('983 Patent claims 16)

a. *Plaintiff's proposed construction*: "one or more software modules and databases configured to reside on hardware and perform the claimed event classification functions"

b. *Defendant's proposed construction*: Indefinite. "Event classification engine" is a means-plus-function claim term subject to § 112, ¶ 6 with insufficient structure.

c. *Court's construction*: Indefinite. "Event classification engine" is a means-plus-function claim term subject to § 112, ¶ 6 with insufficient structure.

The dispute with respect to this term mirrors the dispute at issue in "analysis engine."

I find that "event classification engine" is subject to § 112, ¶ 6 for the same reasons that "analysis engine" was subject to § 112, ¶ 6. "Engine" is operating as a nonce word. *See supra* Section III.E. Plaintiff does not explain nor provide evidence that "event classification" is a term in common use that provides sufficient structure. Defendant's expert, however, states a POSA "would not have been familiar with a specific combination of software and/or hardware referred to as an 'event classification engine.'" (D.I. 64, Ex. 12, ¶ 43). Defendant has overcome the presumption that § 112, ¶ 6 does not apply to "event classification engine."

Defendant argues that the claimed function for "event classification engine" is "identify[ing] water utility network events based on the anomalies, the water network events comprising leakage events and informational events regarding quantity or quality of water flowing through the pipes and operation of the water utility network." (D.I. 63 at 50). Plaintiff seems to agree. (*Id.* at 49 (describing the functions as "including identifying water utility network events such as leak events or water flow quality based on anomalies")). I agree with Defendant's construction as it comes from the language of the claims.

Like "analysis engine," I find the term "event classification engine" is indefinite because the specification fails to disclose adequate structure. Defendant's expert states that a POSA could

program a computer to perform the recited functions, but a POSA would not be instructed "to use any specific complete algorithm for any of the recited functions." (D.I. 64, Ex. 12, ¶ 45).

Plaintiff only provides a string cite with a conclusory statement that an algorithm is described. I find this to be insufficient for the reasons stated above. *See supra* Section III.E. Plaintiff's expert cites to part of the specification that recites "an event classification engine configured to identify water utility network events based on the anomalies, the water network events comprising leakage events and other events regarding quantity or quality of water flowing through the pipes and network devices and operation of the water utility network," as an example of the description of the term. (D.I. 64, Ex. P, ¶ 23 (citing '983 Patent, col. 5:3-23)). This part of the specification, however, just describes what the "event classification engine" does, not an algorithm or structure for accomplishing its functions.

Therefore, I find "event classification engine" is subject § 112, ¶ 6 and indefinite due to insufficient structure.

G. "junction" ('519 Patent claims 1, 16, and 22)

a. *Plaintiff's proposed construction*: "joinder of elements together in a place"

b. *Defendant's proposed construction*: "connection between two or more pipes"

c. *Court's construction*: "connection between two or more pipes"

At the Markman hearing, I ruled that the claim term "junction" only refers to connections between pipes. (Markman Hearing Tr. 88:20-89:4). Therefore, I adopt Defendant's proposed construction of "connection between two or more pipes."

H. "snapping a plurality of junctions based on coordinate data" ('519 Patent claims 1, 16, and 22)

a. *Plaintiff's proposed construction*: "storing elements as junctions based on matching coordinates in the GIS coordinate data"

b. *Defendant's proposed construction*: "automatically creating junctions where coordinates of pipe ends match (exactly or based on criteria)"

c. *Court's construction*: "automatically creating junctions where coordinates of pipe ends match"

Because I have already construed "junction" to mean "a connection between two or more pipes," *see supra* Section III.G, it is clear that "pipe ends," not "elements" must match. The remaining dispute with respect to this term comes down to the meaning of the word "snapping."

Plaintiff argues that "snapping" means "storing" the information where coordinates match because the connections may not actually exist and, instead, are just probable connections that are stored on the computer. (Markman Hearing Tr. 94:1-5). Plaintiff's primary concern with using the verb "creating" is that the jury may mistakenly believe that the pipes are connected or become connected in reality. (*Id.* at 94:8-16). Plaintiff argues that Defendant's construction that "snapping" be an automated process improperly imports a limitation from the "background of the invention" section of the '519 Patent.

Defendant argues that "creating" is the proper verb because (1) storing data appears as a separate claim element and (2) the specification describes "snapping" as creating pipe connections. (D.I. 63 at 63-64). Defendant contends that "snapping" is an automated process because the invention generally is for "automated modeling and analysis of networks" and statements in the prosecution history indicate that "snapping" is meant to be an automated process. (*Id.* at 63, 65).

I do not believe that a jury would be confused by the word "creating" in this context. The relevant part of the claim recites "wherein creating probable connections comprises snapping a plurality of junctions based on coordinate data." ('519 Patent, col. 22:67-23:2). It is clear that probable connections, not real ones, are being created from "snapping." Furthermore, as Defendant points out, "storing the mathematical graph data" is recited as a separate claim limitation.

(Markman Hearing Tr. 107:6-11). Therefore, I agree with Defendant that "snapping" means "creating" junctions.

The remaining dispute is whether "snapping" must be an automated process. I think it is clear from the context of the claim and the prosecution history that it is. The claim recites "creating, via a processing device, probable connections . . . ." ('519 Patent, col. 22:55-65). The statements that Defendant cites to, while not referring to "snapping" specifically, do show how the patentee characterizes the invention generally. (*See* '519 Patent, col. 2:43-48 (describing a need for improved analysis of networks using automated modeling); D.I. 64, Ex. 10 at 10 (describing prior art that disclosed a processing step of an operator manually reviewing the drawings as "antithetical to the claimed inventions use of 'automated analysis and functions'"). Therefore, I agree with Defendant's proposed construction.

I do not find the language regarding GIS coordinate data from Plaintiff's proposed construction to be necessary. The claim recites that coordinate data is part of the GIS data. ('519 Patent, col. 22:61-62). I also find the parenthetical from Defendant's proposed construction as unnecessary because it does not impact the scope of the claim.

Therefore, I construe "snapping a plurality of junctions based on coordinate data" to mean "automatically creating junctions where coordinates of pipe ends match."

I. "determining if an analyzed junction appears between only two other junctions" ('519 patent claims 1, 16, and 22)

a. *Plaintiff's proposed construction*: "determining whether a junction being analyzed is located between only two other junctions"

b. *Defendant's proposed construction*: Plain and ordinary meaning, which is "determining if a junction is directly connected to only two other junctions"

c. *Court's construction*: "determining whether a junction being analyzed is located between only two other junctions"

The parties are in close agreement on this term. The dispute is whether the analyzed junction must be "located between" or "directly connected to" only two other junctions.

Plaintiff argues the phrase "located between" is proper because (1) "[t]he claim is talking about using coordinate data to determine the locations of things" (Markman Hearing Tr. 95:12-17), and (2) the specification recites, "For each junction, a determination is made whether there (sic) the junction is between only two other junctions." ('519 Patent, col. 11:16-18).

Defendant argues that "directly connected" is proper because the specification describes checking "if a first junction is found to be connected to a second junction via two pipes connected only be a third junction, then the connection between the first and second junctions is merged into a single logical pipe . . . ." ('519 Patent, col. 18-22). Defendant argues "directly connected" or "connected" is necessary because "located between" creates uncertainty because a junction may be located between more than two junctions, even though those other junctions are not part of the same modeled pipeline. (D.I. 63 at 67-68).

I agree with Plaintiff's proposed construction. The phrase "located between" tracks closely with the claim language "appears between." This is supported by the specification, which recites "a determination is made whether there the junction is between only two other junctions." ('519 Patent, col. 11:16-18). "Is between" is synonymous with "located between," especially since the underlying analysis is based in part on the coordinate data of the junctions. While the specification recites checking if an analyzed junction is connected to two other junctions, the specification describes this as an example. (*Id.* at col. 18-22 ("For example, ...")). I am not persuaded by Defendant's hypothetical that "located between" would lead to uncertainty as to which junctions should be merged. I think a POSA would understand that "located between" would mean a junction is located between only two other junctions as represented by the graphical network model.

Therefore, I adopt Plaintiff's proposed construction of "determining whether a junction being analyzed is located between only two other junctions."

J. "merging the two other junctions" ('519 patent claims 1, 16, and 22)

a. *Plaintiff's proposed construction*: "connecting the two other junctions into a single junction"

b. *Defendant's proposed construction*: "the connection between the two other junctions is merged into a single logical pipe and the analyzed junction is eliminated"

c. *Court's construction*: "merging the connection between the two other junctions into a single pipe and eliminating the analyzed junction"

Plaintiff argues that its construction comes from the specification. Plaintiff cites to step 405 of Figure 4, which recites, "Merge connection between two other junctions into logical pipe." ('516 Patent, Fig. 4). Plaintiff contends Defendant's construction improperly reads in a limitation from an embodiment in the specification into the claim term. (D.I. 63 at 70). Plaintiff argues that eliminating the analyzed junction is not part of the "merging" step because it is recited as a separate step in the specification. (Markman Hearing Tr. 97:3-8; *see also* '519 Patent, col. 11:21-23).

Defendant argues that its construction is supported by the specification. Defendant argues that the specification states that the other two junctions are "'merged' into a single logical pipe, step 405." ('519 Patent, col. 11:20-22). Defendant contends that while it is citing to an example in the specification, the part it cites to is reciting an example of the invention generally, not an example of merging. (D.I. 63 at 72).

I disagree with Plaintiff's construction. In its brief, Plaintiff states, "Step 405 states 'merge connection between two other junctions into logical pipe [i.e., a junction.].'" (D.I. 63 at 70 (alteration in original)). I, however, construed "junction" to mean "connection between two or more pipes." I do not see how "logical pipe" in that sentence can mean a junction. Forming a single

pipe would, if anything, imply that a connection between pipes is eliminated because one pipe is formed from what were previously two distinct pipes. Therefore, I reject Plaintiff's construction.

I agree with the substance of Defendant's proposed construction. The specification describes the merging process through an example. To help clarify the example, I have created Figures A-C, shown below, to illustrate the example. The specification recites:

> "For example, if a first junction is found to be connected to a second junction via two pipes connected only by a third junction, then the connection between the first and second junctions is merged into a single logical pipe, . . . , and the third junction is eliminated as a junction."

('519 Patent, col. 11:18-23). That is what Defendant's proposed construction describes:

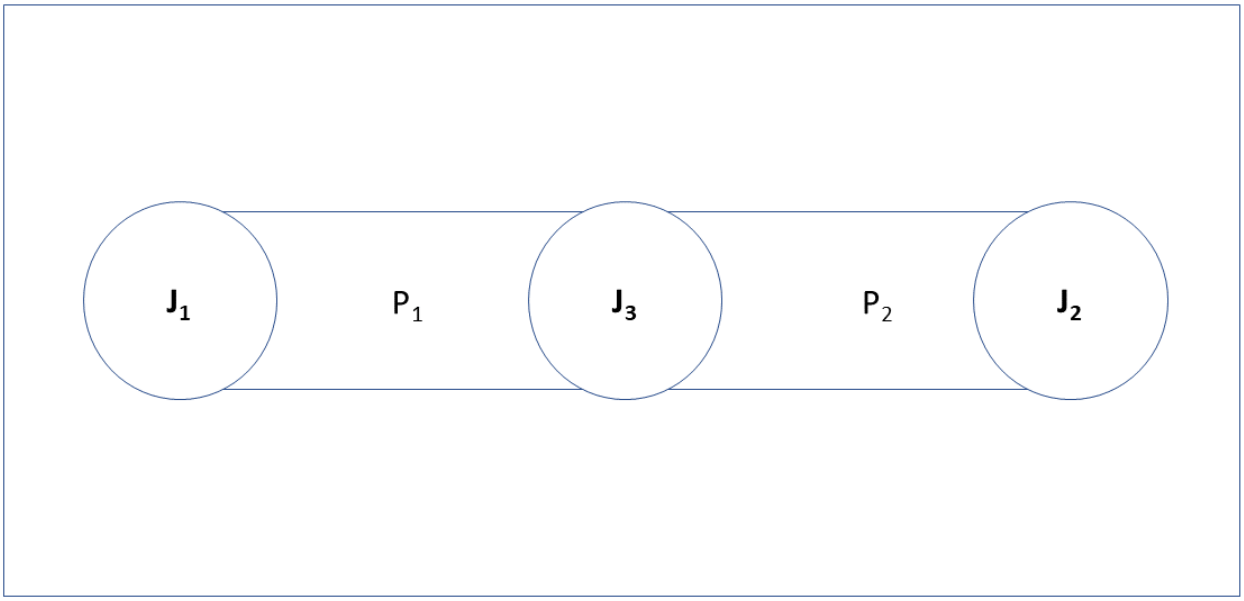

Fig. A: Representing a modeled pipe connection. J_3 is the analyzed junction. J_1 is a junction that is connected to a second junction, J_2, via two pipes, P_1 and P_2, which are connected by a third junction, J_3.

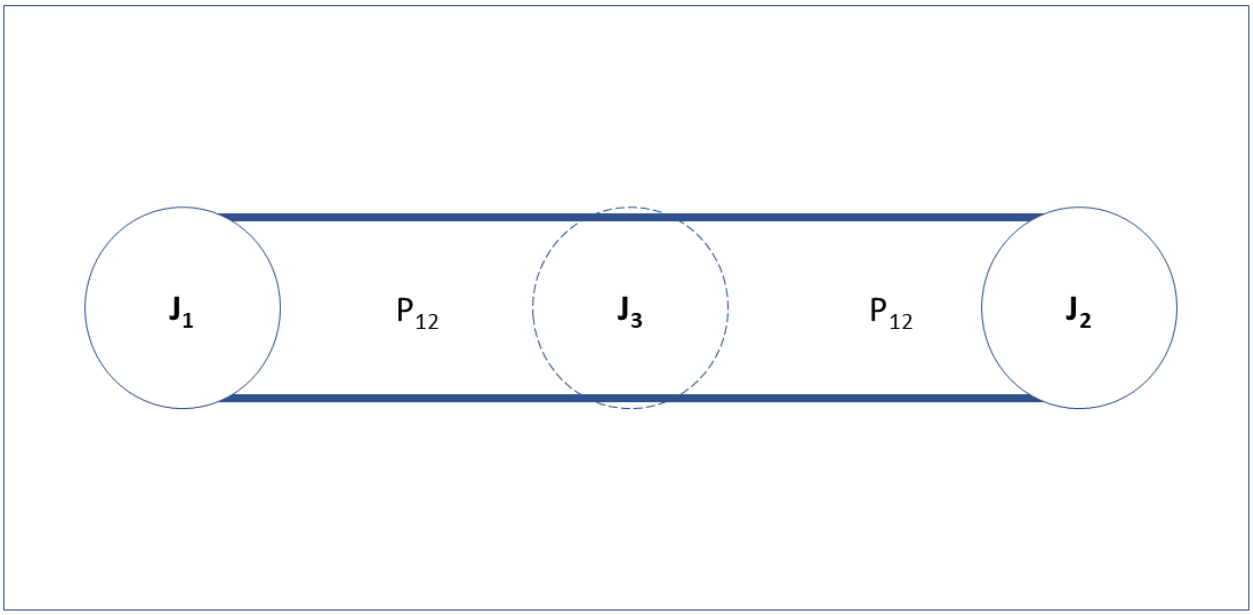

Fig. B: Representing a step where J_1 and J_2 are being merged as they are now connected by a single pipe, P_{12}.

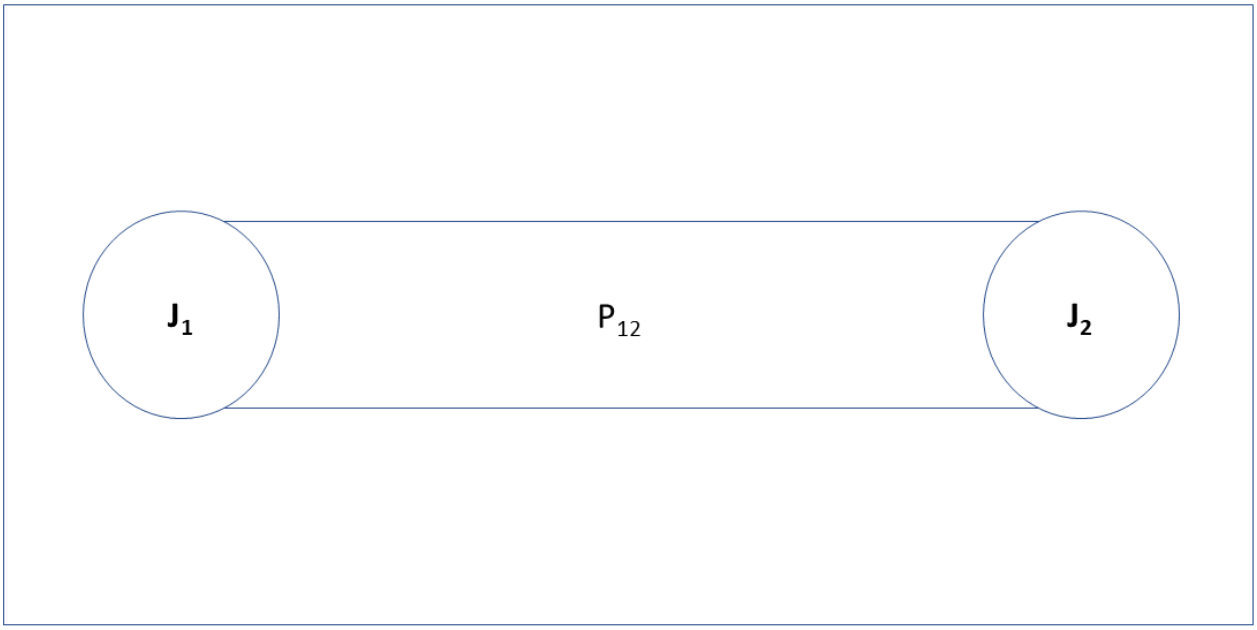

Fig. C: The two merged junctions are now connected by a single pipe. J_3 is eliminated from the network model as are the two pipes that connected at J_3.

I disagree with Plaintiff that the analyzed junction (i.e., J_3 in Figures A-C) does not need to be eliminated as part of the merging process. If two junctions (i.e., J_1 and J_2) being merged in the graphical model are represented to be connected through a single pipe (P_{12} in Fig. B and Fig.

C), there is no longer a pipe connection at the J_3 location and, therefore, no junction at the J_3 location. Based on reading the surrounding claim language, and the specification, it would not make sense to preserve J_3 if the graphical model has itself eliminated the modeled pipes that connect at that location.

Therefore, I agree with Defendant's proposed construction. I, however, am striking the word "logical" from the construction because I believe it may introduce confusion for the jury and is not necessary. I believe the context of this claim makes it clear that the pipe is a graphical representation that is part of a network model.

Therefore, I construe "merging the two other junctions" to mean "merging the connection between the two other junctions into a single pipe and eliminating the analyzed junction."

IV. CONCLUSION

Within five days the parties shall submit a proposed order consistent with this Memorandum Opinion.