

United States Court of Appeals for the Federal Circuit

2008-1516

PARAGON SOLUTIONS, LLC,

Plaintiff-Appellant,

v.

TIMEX CORPORATION,

Defendant-Appellee.

James D. Liles, Porter, Wright, Morris & Arthur LLP, of Cincinnati, Ohio, argued for plaintiff-appellant. With him on the brief was Bryan R. Faller, of Columbus, Ohio.

John R. Horvack, Jr., Carmody & Torrance LLP, of New Haven, Connecticut, argued for defendant-appellee. With him on the brief was Fatima Lahnin.

Appealed from: United States District Court for the Southern District of Ohio

Judge Michael R. Barrett

United States Court of Appeals for the Federal Circuit

2008-1516

PARAGON SOLUTIONS, LLC,

Plaintiff-Appellant,

v.

TIMEX CORPORATION,

Defendant-Appellee.

Appeal from the United States District Court for the Southern District of Ohio in case no. 1:06-CV-677, Judge Michael R. Barrett.

DECIDED: May 22, 2009

Before BRYSON, LINN, and MOORE, Circuit Judges.

LINN, Circuit Judge.

Paragon Solutions, LLC (“Paragon”) appeals from a final judgment of noninfringement in favor of Timex Corporation (“Timex”) in a suit alleging that certain Timex products, including Timex’s Bodylink watches, infringed Paragon’s U.S. Patent No. 6,736,759 (the “759 patent”). Following claim construction, the parties stipulated that the accused products did not infringe, and the district court entered the final judgment of noninfringement on the stipulation. Paragon Solutions, LLC v. Timex Corp., No. 1:06-CV-677 (S.D. Ohio July 10, 2008) (“Final Judgment”); Paragon Solutions, LLC v. Timex Corp., No. 1:06-CV-677 (S.D. Ohio Apr. 23, 2008) (“Claim Construction Op.”). Because we conclude that the district court’s constructions of the claim terms “data

acquisition unit” and “display unit” were incorrect, and because we reject Timex’s asserted alternative basis for affirmance based on the claim term “displaying real-time data,” we vacate and remand.

I. BACKGROUND

The '759 patent discloses an exercise monitoring system. '759 patent col.2 ll.66-67. The claimed monitoring system includes a “data acquisition unit,” which itself includes both an “electronic positioning device” and a “physiological monitor.” Id. col.27 ll.66-67. When the user wears the system during exercise, the electronic positioning device—one embodiment of which is a GPS device—tracks “at least one of” the user’s “location, altitude, velocity, pace, [or] distance traveled.” Id. col.3 ll.8-10. The physiological monitor retrieves “physiological data” from a user during exercise, namely, blood oxygen level or heart rate. Id. col.3 ll.11-13, 40, 50-51. Data from both the electronic positioning system and the physiological monitor are provided to a “display unit,” which displays data to the user in “real-time.” Id. col.28 ll.3-5, 13-14. Figures 1 and 3 are exemplary illustrations of the disclosed exercise monitoring system:

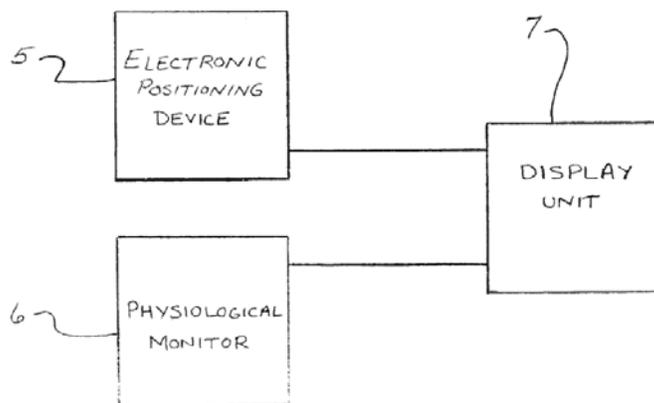


FIG. 1

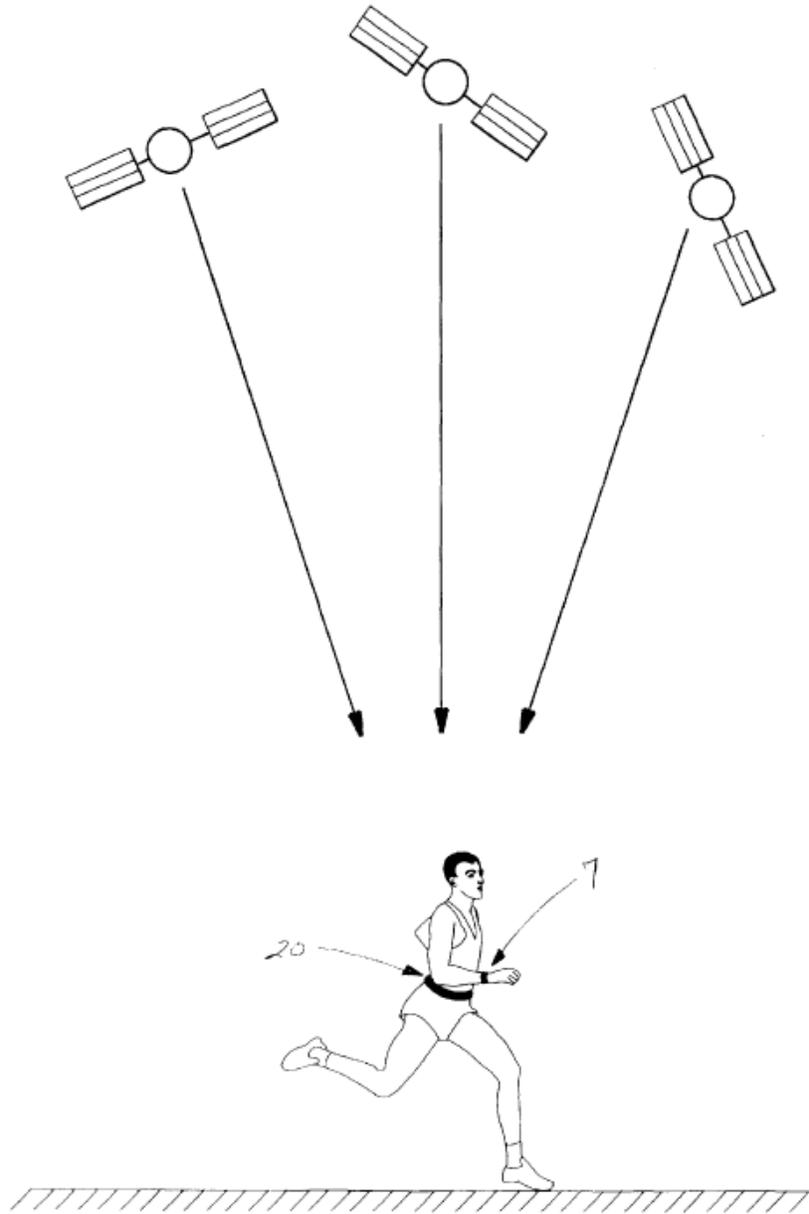


FIG. 3

The '759 patent has two independent claims, reproduced as follows, with disputed portions emphasized:

1. An exercise monitoring system, comprising:
 - (a) a data acquisition unit comprising an electronic positioning device and a physiological monitor, said data acquisition unit configured to be worn by a subject performing a physical activity; and

- (b) a display unit configured for displaying real-time data provided by said electronic positioning device and said physiological monitor, said display unit separate from said data acquisition unit;

wherein said display unit is configured to be worn by the subject, worn by someone other than the subject, or attached to an apparatus associated with the physical activity being performed by the subject so as to be visible to the subject while performing the physical activity, and

further wherein said system is configured such that said display unit displays real-time data comprising at least one of a subject's location, altitude, velocity, pace, and distance traveled.

29. An exercise monitoring system, comprising:

- (a) an electronic positioning device configured to receive electromagnetic signals from three or more sources so that said monitoring system can determine at least one of a subject's velocity or pace, wherein said electronic positioning device is provided as part of a data acquisition unit;
- (b) a physiological monitor;
- (c) a display unit configured to be worn by a user and for simultaneously displaying real-time data provided by said electronic positioning device and said physiological monitor, wherein said display unit is separate from said electronic positioning device; and
- (d) an alarm, wherein said alarm is activated when a subject's velocity or pace does not meet a predetermined target.

Id. col.27 l.66-col.28 l.16, col.30 ll.11-27 (emphases added).

Of particular relevance to this case are the structural relationships among the electronic positioning device, the physiological monitor, and the display unit. As recited in claim 1, the electronic positioning device and the physiological monitor are both part of a data acquisition "unit." Id. col.27 ll.66-67. The '759 patent refers to the data acquisition unit interchangeably as a "data acquisition component." See id. col.3 ll.15-16 (describing "data acquisition unit (or component)"). Likewise, the display unit is referred to interchangeably as a "unit" and a "component." Id. col.3 l.3 (describing "a

display unit (or component)"). Concerning the structure of the data acquisition unit, the specification states that "the data acquisition component of a monitoring system according to the present invention may even comprise multiple structures which are physically separate from each other." Id. col.8 ll.36-39. The claims and specification also indicate that the data acquisition unit—including its component parts—and the display unit are physically separate from each other. See, e.g., id. col.28 ll.5-6 (claiming "said display unit separate from said data acquisition unit") (emphasis added); id. col.3 ll.14-17 ("The electronic positioning device and the physiological monitor may be provided as part of a user-wearable data acquisition unit (or component) which is separate from the display unit.") (emphasis added).

The structural relationships among the electronic positioning device, the physiological monitor, and the display unit were also addressed during the prosecution of the '759 patent. Prior to its second amendment, claim 1 did not include the claim term "data acquisition unit." Instead, it recited:

1. (amended) An exercise monitoring system, comprising:
 - (a) an electronic positioning device;
 - (b) a physiological monitor, and
 - (c) a display unit configured for displaying data provided by said electronic positioning device and said physiological monitor;

wherein said system is configured such that said display unit displays at least one of a subject's location, altitude, velocity, pace, and distance traveled.

Defendant Timex Corporation's Opening Claim Construction Statement, Doc. No. 21 Ex. 2 ("Doc. 21"), Part M, Paragon Solutions, LLC v. Timex Corp., No. 1:06-CV-677 (S.D. Ohio July 23, 2007) (J.A. 289). The examiner rejected claim 1 (amended) as

anticipated by U.S. Patent No. 6,013,007 (“Root”), which the examiner concluded “disclose[d] an electronic positioning device, a physiological monitor, [and] a display unit.” Doc. 21, Ex. 2-N (J.A. 295) (citations omitted).

In response, the applicants further amended claim 1 to recite:

1. (twice amended) An exercise monitoring system comprising:
 - (a) a data acquisition unit comprising an electronic positioning device and [; (b)] a physiological monitor, said data acquisition unit configured to be worn by a subject performing a physical activity; and
 - (b[c]) a display unit configured for displaying real-time data provided by said electronic positioning device and said physiological monitor, said display unit separate from said data acquisition unit;

wherein said display unit is configured to be worn by the subject, worn by someone other than the subject, or attached to an apparatus associated with the physical activity being performed by the subject so as to be visible to the subject while performing the physical activity, and

further wherein said system is configured such that said display unit displays real-time data comprising at least one of a subject’s location, altitude, velocity, pace, and distance traveled.

Doc. 21, Ex. 2-P (J.A. 310). The applicants also made similar amendments to application claim 18—which ultimately issued as claim 29. Id. (J.A. 311).

Explaining the addition of the claim term “data acquisition unit” to claim 1, the applicants remarked:

[C]laim 1 has been amended to require that the electronic positioning device and physiological monitor are provided as a data acquisition unit which is configured to be worn by a subject performing a physical activity. Claim 1 has also been amended to require that the display unit is separate from the data acquisition unit and is configured to display real-time data. . . .

Similarly, independent claim 18 has been amended to specify that the electronic positioning device is provided as part of a data acquisition unit which is separate from the display unit. . . .

The Root patent describes a monitor for providing an athlete with performance data. In contrast to the structure required by independent claims 1 and 18, as amended herein, the monitor described in Root is a unitary structure in which the data acquisition unit and the display screen are provided as a single unit.

Id. (J.A. 307-08). The claims were allowed as amended. Doc. 21, Ex. 2-Q (J.A. 316).¹

Paragon alleged that various Timex products,² including Timex's Bodylink watches, infringed at least claims 1 and 29 of the '759 patent. The parties stipulated that "[t]he accused Timex products include at least three components: (1) a watch with a display, (2) a GPS transceiver, and (3) a heart rate monitor." Stipulation and Order of Non-Infringement, Doc. No. 42 ("Stipulation"), ¶ 6, Paragon Solutions, LLC v. Timex Corp., No. 1:06-CV-677 (S.D. Ohio July 10, 2008) (J.A. 525). The parties also stipulated that, "[f]or all of the accused Timex products, the electronic positioning device (GPS transceiver) and the physiological monitor (heart rate monitor) are located in separate physical structures" and "data is separately provided by the physiological monitor and the electronic positioning device to the display." Stipulation ¶¶ 8, 9 (J.A. 526).

Additionally, as relevant to the limitation requiring that the "display unit displays real-time data," the parties stipulated that the accused Timex products operate as follows:

The heart rate monitor measures the time between successive heart beats to calculate an instant heart rate. The monitor averages the last four valid

¹ After allowance but prior to issuance, the applicants further amended Claim 29, but that amendment is not relevant to this appeal.

² Paragon identified seven accused Timex products as exemplary: T59551, T5C391, T5E671, T5F011, T5G311, T5J985, T59561, and T56311.

rates (valid defined as a rate between 30 and 240 and linearly related). The average heart rate is wirelessly transmitted to the watch every two seconds. The wireless transmission takes 0.06 [seconds] (sixty milliseconds) to complete. Once the information is received by the watch, there is an additional delay of approximately .1 - 1 second before the watch will display the individual's heart rate depending on the other functions that the watch must complete first (e.g. updating the time or date).

...

The GPS transceiver wirelessly transmits the speed of the unit and the distance the unit has traveled since it was powered on every 3.57 seconds. The wireless transmission takes .25 seconds to complete. The watch uses the information from the GPS transceiver to calculate speed (based on an algorithmic smoothing of the GPS speed reported), average speed (calculated based on the distance traveled reported by the GPS and the time measured by the watch), pace (calculated based on distance traveled over 17.85 seconds and then inverted), average pace (calculated based on average speed and then inverted), and distance traveled (calculated based on the difference between the GPS report of distance traveled and whatever watch event has been selected—e.g. a split or start of workout). Once the information is received by the watch, there is an additional delay of approximately .1 to 1 second before the watch will display the requested information depending on the other functions that the watch must complete first (e.g. updating the time or date).

Id. ¶¶ 13-16 (J.A. 526-27).

Following briefing and a Markman hearing, the district court construed disputed claim terms including “data acquisition unit,” “display unit,” and “displaying real-time data.” Claim Construction Op. at 2-9. Relying on the doctrine of prosecution disclaimer, the district court construed “data acquisition unit” as “one structure that includes the electronic positioning device and the physiological monitor.” Id. at 5. The district court construed “display unit” as “a unit for displaying real-time data provided by the data acquisition unit.” Id. at 7. Finally, the district court construed “displaying real-time data” as “displaying data substantially immediately without contextually meaningful delay so that the information is displayed in a time frame experienced by people.” Id. at 9. The

parties stipulated to noninfringement, subject to Paragon's right to appeal the district court's claim constructions. Stipulation ¶ 18 (J.A. 527-28); Final Judgment at 1.

The district court entered final judgment of noninfringement, and Paragon timely appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. DISCUSSION

A. Claim Construction

Claim construction is an issue of law, Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-71 (Fed. Cir. 1995) (en banc), that we review de novo, Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc). We determine the ordinary and customary meaning of undefined claim terms as understood by a person of ordinary skill in the art at the time of the invention, using the methodology in Phillips v. AWH Corp., 415 F.3d 1303, 1312-19 (Fed. Cir. 2005) (en banc). “[T]he court looks to those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. Those sources include the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” Id. at 1314 (internal quotation marks and citations omitted).

1. “data acquisition unit”

The district court construed “data acquisition unit” to mean “one structure that includes the electronic positioning device and the physiological monitor.” Claim Construction Op. at 5. Paragon disagrees, having argued to the district court that “data acquisition unit” meant “an assemblage of inter-related components that unify the function of acquiring data from an electronic positioning device and a physiological

monitor.” Id. at 2. On appeal, Paragon offers a slightly modified proposed construction: “an assemblage of inter-related components that perform the function of acquiring data from an electronic positioning device and a physiological monitor.” Reply Br. of Plaintiff-Appellant Paragon Solutions, LLC at 29. Timex argues that the district court’s construction was correct. The dispute between the parties thus reduces to the question of whether the data acquisition unit must be a single structure, or whether it can be made up of physically separate structures.

a. Claim Language

Each party argues that the claim language supports its construction. Timex argues that the claims “are written in structural terms,” specifying a data acquisition unit that is “separate from” the display unit. Br. of Appellee Timex Corp. at 31. Paragon argues that claim 7, which depends from claim 6 and, in turn, claim 1, shows that the data acquisition unit may be made up of separate structures. Claim 6 recites “[t]he system of claim 1, wherein said electronic positioning device comprises a GPS device, and further wherein said data acquisition unit further comprises a support member, and said GPS device and said physiological monitor are provided on said support member.” ’759 patent col.28 ll.30-34. Thus, in claim 6, the “data acquisition unit” comprises a support member for both a GPS device (the electronic positioning device) and a physiological monitor. Claim 7 recites “[t]he system of claim 6, wherein said GPS device and said physiological monitor are removably secured to said support member.” Id. col.28 ll.35-37 (emphasis added). Because the GPS device and the physiological monitor are each “removably secured” to the support member, it stands to reason that they may be separate structures that are separately removable from the support member. Thus, claim 7’s recitation of a “removably secured” electronic positioning

device and the physiological monitor suggests that the data acquisition unit may be made up of separate physical structures.

Timex next argues that the recitation in claim 29 that “said electronic positioning device is provided as part of a data acquisition unit” suggests that the data acquisition unit must be a single structure that encompasses the electronic positioning device. ’759 patent col.30 ll.15-17 (emphasis added). Paragon counters by pointing out that, although claim 29 recites that the electronic positioning system is part of the data acquisition unit, by reciting “a physiological monitor” in a separate limitation, with no mention of the “data acquisition unit,” it is apparent that the data acquisition unit may be separate from and need not include the physiological monitor. Contrary to Timex’s argument, it is our view that the recitation of a “data acquisition unit” in claim 29 casts doubt on—rather than supports—the district court’s construction of data acquisition unit as “one structure that includes the electronic positioning device and the physiological monitor.” Claim Construction Op. at 5 (emphasis added).

From the foregoing, it can be appreciated that while the claim term “unit” might suggest that the data acquisition unit is a single structure, the separate recitation of a physiological monitor in claim 29 and the recitation of “removably secured” elements in claim 7 can be read to suggest persuasively that the data acquisition unit may be multiple structures. We turn next to the specification. See Phillips, 415 F.3d at 1315 (“The claims, of course, do not stand alone. Rather, they are part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims. For that reason, claims must be read in view of the specification, of which they are a part.”) (citations and internal quotation marks omitted).

b. Specification

In the specification, Paragon's proposed construction finds strong support in one key sentence:

Of course, the data acquisition component of a monitoring system according to the present invention may even comprise multiple structures which are physically separate from each other.

'759 patent col.8 ll.36-39. As discussed above, the '759 patent refers interchangeably to the "data acquisition component" and the "data acquisition unit." See id. col.3 ll.15-16.

The drawings of the '759 patent—in particular figure 1 and its associated text—are also instructive. Figure 1, reproduced supra, depicts one embodiment of the exercise monitoring system. Id. col.7 ll.30-32. In that figure, only three structures are shown and described: an electronic positioning device, a physiological monitor, and a display unit. Id. fig.1. Each structure is shown separate from each of the other structures. Id. Figure 1 is consistent with and supports the conclusion that the electronic positioning device and the physiological monitor may be separate structures. Timex seeks to avoid the implications of figure 1 by arguing that the specification discloses two separate embodiments, only one of which is claimed. Specifically, Timex concedes that, in the configuration depicted in figures 1 and 2, "the electronic positioning device is separate from the physiological monitor." Br. of Appellee Timex Corp. at 32. However, according to Timex, figures 3, 4, and 5 introduce a single-structure data acquisition unit, and it is only this second embodiment—with a data acquisition unit—that is claimed. Id. But in the section that appears between the discussion of figures 2 and 3, the specification makes clear that the invention is not so limited. See '759 patent col.8 ll.6-8 ("An exercise monitoring system according to the

present invention may comprise a single structure, or may be subdivided into one or more component structures.”); id. col.8 ll.36-40 (“[T]he data acquisition component of a monitoring system according to the present invention may even comprise multiple structures which are physically separate from each other.”). In light of this language, we disagree with Timex that the structural configuration depicted in figure 1 is nothing more than an unclaimed embodiment.

c. Prosecution History

The district court did not suggest that either the claim language or the specification compelled a construction of “data acquisition unit” that was limited to a single structure. Rather, the district court reasoned that the applicants’ statements during prosecution in response to the Patent Office’s “notification of problems due to the preexisting Root patent” resulted in a clear and unmistakable disavowal of “the concept of an assemblage of inter-related parts and embrace[d] a single structure unit concept.” Claim Construction Op. at 5. Specifically, the district court relied on the applicants’ amendment of claim 1 “to require that the electronic positioning device and physiological monitor are provided as a ‘data acquisition unit,’” and on the applicants’ argument that the amendment overcame Root “by separating the data acquisition unit from the display unit which in Root are apparently provided in a single unit.” Id. at 4.

We cannot agree with the district court’s interpretation of the prosecution history. The examiner rejected claim 1 as anticipated by Root because Root disclosed an electronic positioning device, a physiological monitor, and a display unit. Doc. 21, Ex. 2-N (J.A. 295). Root disclosed all three elements in a single structure. See, e.g., Root fig.6. To overcome Root, the applicants amended the claims to separate out the display unit from the remaining structure. The way that the applicants chose to express this

separation was to characterize the electronic positioning device and the physiological monitor collectively as a “data acquisition unit,” then to add the limitation requiring that the display unit be separate from the data acquisition unit. See ’759 patent col.27 ll.66-67, col.28 ll.5-6; Doc. 21, Ex. 2-P (J.A. 308) (“[C]laim 1 has been amended to require that the electronic positioning device and physiological monitor are provided as a data acquisition unit Claim 1 has also been amended to require that the display unit is separate from the data acquisition unit”). The applicants argued that this amendment overcame Root, because “the monitor described in Root is a unitary structure in which the data acquisition unit and the display screen are provided as a single unit.” Doc. 21, Ex. 2-P (J.A. 308).

“[A] patentee may limit the meaning of a claim term by making a clear and unmistakable disavowal of scope during prosecution.” Cohesive Techs., Inc. v. Waters Corp., 543 F.3d 1351, 1361 (Fed. Cir. 2008) (quoting Computer Docking Station Corp. v. Dell, Inc., 519 F.3d 1366, 1374 (Fed. Cir. 2008)). By amending the claims to require a separate data acquisition unit and display unit, and by remarking that this distinguished the “unitary structure” of Root, the applicants clearly and unmistakably disavowed a single structure that encompassed an electronic positioning device, a physiological monitor, and a display unit. The claimed exercise monitoring system must be at least two structures. However, there is nothing in the amendment or the applicants’ comments that clearly and unmistakably disavows a monitoring system with more than two structures. Thus, there was no clear and unmistakable disavowal of a “data acquisition unit” made up of physically separate structures.

We conclude that, read in light of the specification, the claim term “data acquisition unit” is not limited to a single structure but may comprise multiple physically separate structures, and that the applicants did not make a clear and unmistakable disavowal of multiple physically separate structures during prosecution. We therefore construe “data acquisition unit” as used in the ’759 patent as “a structure or set of structures that includes at least the electronic positioning device and the physiological monitor.”

2. “display unit”

The district court construed “display unit” to mean “a unit for displaying real-time data provided by the data acquisition unit.” Claim Construction Op. at 7. Paragon disagrees. Paragon argued to the district court that “a display unit” should be construed as “an assemblage of inter-related components that unify the function of displaying data from the electronic positioning device and the physiological monitor.” Id. at 5. On appeal, Paragon argues that the district court’s construction was wrong in three respects, each of which we address in turn.

First, Paragon argues that the district court was wrong to construe “display unit” as displaying data “provided by the data acquisition unit.” Rather, Paragon argues, the claim language permits the data to be provided by the individual components of the data acquisition unit—namely, the electronic positioning device and the physiological monitor. We agree with Paragon. Claim 1 recites “a display unit configured for displaying real-time data provided by said electronic positioning device and said physiological monitor.” ’759 patent col.28 ll.3-5 (emphasis added). The claim unambiguously states that the data provided to the display unit comes from both the electronic positioning device and the physiological monitor. Likewise, the specification

makes clear that the electronic positioning device and the physiological monitor may be independently in communication with the display unit, to provide data used in the display. See, e.g., id. col.3 ll.3-5 (disclosing “a display unit (or component) configured for displaying data provided by the electronic positioning device and the physiological monitor”); id. col.7 ll.32-34 (“The system of FIG. 1 generally comprises an electronic positioning device **5** and a physiological monitor **6**, both of which are in electrical communication with a display unit **7**.”); id. figs.1 & 2. Nothing identified by the parties in the prosecution history undermines the conclusion that the display unit displays data provided either independently or over a common transmission path from both the electronic positioning device and the physiological monitor.

The district court’s construction combined the sources of data by incorrectly substituting “data acquisition unit” for “said electronic positioning device and said physiological monitor.” Because we have determined that the data acquisition unit may be made up of multiple structures, it is important to make clear that the data displayed by the display unit may be obtained from the claimed electronic positioning device and the claimed physiological monitor either separately or over a common transmission path.

Second, Paragon argues that “display unit” should not be limited to a single structure, just as “data acquisition unit” should not be limited to a single structure. Preliminarily, we note that there is nothing in the district court’s construction that would appear to limit “display unit” to a single structure. The district court merely concluded that the display unit must be a “unit”—which is the exact claim term. Moreover, there is no reason why the word “unit” in the term “display unit” would be limited to a single

structure, when the patentee used the word “unit” in “data acquisition unit” to refer to one or more structures. “We apply a ‘presumption that the same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.’” PODS, Inc. v. Porta Stor, Inc., 484 F.3d 1359, 1366 (Fed. Cir. 2007) (quoting Fin Control Sys. Pty., Ltd. v. OAM, Inc., 265 F.3d 1311, 1318 (Fed. Cir. 2001)); see also, e.g., Phillips, 415 F.3d at 1314 (“Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims.”). The parties have identified nothing in the claims, the specification, or the prosecution history that would suggest that “unit” in “display unit” means anything different from “unit” in “data acquisition unit.” The claimed “display unit” may therefore be multiple structures.

Finally, Paragon argues that “display unit” should not have been construed to require “displaying real-time data,” because the claim recites merely that the display unit is “configured for displaying real-time data.” ’759 patent col.28 l.3 (emphasis added). Contrary to Paragon’s argument, the district court did not construe “display unit” to require “displaying real-time data.” Rather, it construed “display unit” as “a unit for displaying real-time data.” Claim Construction Op. at 7 (emphasis added). The district court explained further that “‘for’ denotes a function for which the display unit is configured.” Id. Paragon was therefore wrong to characterize the district court’s construction as requiring the display unit to actually “display[] real-time data,” rather than merely be configured to do so.

In sum, we modify the district court’s construction of “display unit” and construe “display unit” as used in the ’759 patent as “a structure or set of structures, separate from the data acquisition unit, for displaying real-time data provided by both the electronic positioning device and the physiological monitor independently or over a common transmission path.”

3. “displaying real-time data”

The district court construed “displaying real-time data” to mean “displaying data substantially immediately without contextually meaningful delay so that the information is displayed in a time frame experienced by people.” Claim Construction Op. at 9. As an alternative basis for affirmance, Timex argues that this construction was incorrect and that its products cannot infringe under the correct construction. Both before the district court and on appeal, Timex argues that “displaying real-time data” means “displaying the measured parameter at the given moment in time that the measurement of the parameter occurs.” Id. at 8. Paragon argues that the district court’s construction was correct and that Timex’s proposed construction would require instantaneous display, which is not possible in practice.

a. Claim Language

Although not addressed by the district court or the parties, we find important aspects of the claim language itself to provide at least some insight into the meaning of “real-time.” Specifically, claim 1 recites that the “display unit configured for displaying real-time data” is “separate from [the] data acquisition unit” that includes the electronic positioning device and the physiological monitor that provide the data. ’759 patent col.28 ll.3-6. Thus, when the claimed system is in operation, the displayed data must first be acquired by the electronic positioning device and the physiological monitor and

then transmitted to the display unit for display. Even assuming that this transmission happens at the speed of light, it still takes a non-zero amount of time. Thus, what the claims describe as “displaying real-time data” cannot possibly mean displaying data literally instantaneously, because the claims themselves require a transmission that necessarily takes some time, however minute that might be.

Second, claim 1 identifies five types of “real-time data,” at least one of which must be displayed: “location, altitude, velocity, pace, and distance traveled.” Three of these types of real-time data—location, altitude, and distance traveled—require the electronic positioning device to receive three or more signals that enable the device to calculate a position. See, e.g., '759 patent col.3 ll.6-10 (“The electronic positioning device is configured to receive electromagnetic signals from three or more sources so that the monitoring system can determine at least one of a subject’s location, altitude, velocity, pace, and distance traveled.”); id. col.6 ll.46-52 (“The electronic positioning device uses electromagnetic signals from three or more sources in order to provide data indicative of one or more of the subject’s location, altitude, velocity, pace and/or distance traveled. By way of example, the electronic positioning component may comprise a GPS device which utilizes signals from satellites of the Global Positioning System”). Receiving and processing these signals necessarily takes a non-zero amount of time. See, e.g., id. col.9 ll.27-28 (describing “processing of GPS signals in order to determine the subject’s location”).

Moreover, the other two of the claimed types of real-time data—velocity and pace—are calculations of the rate of movement. Because a rate of movement is simply distance moved over time (or time over distance moved), calculation of a rate of

movement necessarily requires the passage of a non-zero amount of time. More particularly, calculation of a rate of movement requires sufficient time to have elapsed to allow for a meaningful measurement. Similarly, in dependent claim 14, the “physiological monitor comprises a heart rate monitor.” Id. col.28, ll.51-52. The measurement of a heart rate necessarily requires the passage of time between at least two heartbeats.

Thus, from the claim language alone, it is clear that in this case “real-time” cannot mean instantaneous, and must permit at least some amount of time to pass to allow for both the processing limitations of the system and the time required to accurately measure the data that is to be displayed.

b. Specification

Each of the parties relies heavily on the specification for its construction of “real time.” Timex first points out that the specification is critical of prior art that does not provide “instantaneous” feedback, because “[h]uman nature requires instantaneous feedback for motivation and encouragement.” ’759 patent col.1 ll.29-30; see also id. col.23 ll.50-52 (criticizing prior art because runner cannot determine “instantaneous velocity”). Timex is correct that the specification criticizes the prior art as failing to provide “instantaneous” feedback. However, taken in context, the specification’s criticisms are targeted at systems that do not provide any feedback during the course of the physical activity itself, so that the person engaged in the activity would have the opportunity to modify his activity in response. Specifically, immediately following the sentence concerning “instantaneous feedback for motivation and encouragement,” the specification states:

[M]any athletes also do not know how to train effectively for maximal improvement. For example, competitive runners may have difficulty determining whether their pace on a particular day of training is too fast or too slow.

Id. col.1 ll.31-36. The specification also includes a section entitled “Analytical and Training Methods,” in which it describes in detail the use of the electronic monitoring system—including various alarms—to allow the user to modify his or her activity in response to data collected and displayed during the activity. See id. col.23 l.28-col.27 l.63. Thus, the specification’s criticism of prior art as not providing “instantaneous” feedback cannot be read as suggesting that the patented invention displays data literally instantaneously. Rather, the criticism of prior art is more appropriately read to distinguish the invention’s “real-time” display from prior art methods that stored data for review only after the activity was complete, so that the user could not make modifications during the course of the activity. Thus, the specification supports a construction of “real-time” in this case that precludes intentionally delaying the display of data by storing it for later review. The specification’s references to “instantaneous” feedback do not preclude some delay to allow for the processing limitations of the system and the time required to accurately measure the data that is to be displayed.

Timex also relies on the specification’s references to providing data “at any given moment.” See ’759 patent col.13 ll.4-8 (disclosing that “an individual can use the GPS device of the monitoring system . . . in order to determine their velocity at any given moment (e.g., in miles per hour), their pace at any given moment (e.g., in terms of minutes per mile)”); id. col.13 ll.16-29 (disclosing that “a heart rate monitor device incorporated into a monitoring system according to the present invention may display a subject’s heart rate at any given moment”). The problem with Timex’s reliance on the

language “at any given moment” is that this language is no more or less clear than “real-time.” The term “at any given moment” might mean literally instantaneously, or it might allow for the passage of some amount of time. As the district court recognized, Timex’s “given moment” language is therefore unhelpful in ascertaining the meaning of “real time.”

In addition to the portions of the specification identified by the parties and the district court, we note two additional aspects of the specification relevant to the construction of “displaying real-time data.” First, the specification expressly states that the invention can be practiced using commercially available technology. See ’759 patent col.12 ll.1-4 (“In order to provide the above-described functionality, the GPS device utilized in embodiments of the present invention may employ conventional, commercially-available components.”); id. col.14 ll.52-55 (“The oximeter device utilized in embodiments of the present invention may employ commercially-available components in order to provide the functionality described above.”). Plainly, the commercial GPS technology available at the time of filing—November 9, 1999—was not able to display data literally instantaneously. Thus, the fact that the specification describes embodiments using commercially available products confirms that “displaying real-time data” does not require instantaneous display.

Second, like the claims, the specification expressly describes measuring rate data, which necessarily requires the passage of time. See, e.g., ’759 patent col.3 ll.6-10 (“The electronic positioning device is configured to receive electromagnetic signals from three or more sources so that the monitoring system can determine at least one of a subject’s location, altitude, velocity, pace, and distance traveled.”) (emphases added);

id. col.3 ll.11-13 (“The physiological monitor may be chosen from the group consisting of: an oximeter and a heart rate monitor.”) (emphasis added); id. col.22 ll.16-23 (describing a display unit with regions displaying “the subject’s heart rate (in beats per minute)” and “the subject’s velocity (in miles per hour or kilometers per hour) or the subject’s pace (e.g., in minutes per mile)”). In this respect, the specification again confirms that that “displaying real-time data” must permit the passage of time required to accurately measure the data that is to be displayed.

Paragon defends the district court’s construction by referring to a separate portion of the specification—the only part of the specification in which the term “real-time data” actually appears. That portion of the specification states that “[t]he systems and methods of the present invention, for example, provide real-time data and feedback useful to individuals performing a physical activity (such as athletes).” ’759 patent col.6 ll.39-41. According to Paragon, this sentence supports the district court’s construction of real-time as “substantially immediately without contextually meaningful delay.” Claim Construction Op. at 9. In essence, in the views of both Paragon and the district court, the amount of delay that the system can impose and still be “displaying real-time data” depends on the use to which the system is being put. Under the district court’s construction, if the system is being used in a “context” in which the delay is “meaningful,” then the “displaying real-time data” limitation is not met; if, however, the system is being used in a “context” in which the delay is not “meaningful,” the display is in “real-time” and the limitation is met. Thus, the district court offers as an example that, “for a runner, [data must be displayed] presumably within the stride” to meet the “displaying real-time data” limitation. Id. at 8.

The problem with construing “displaying real-time data” as used in the claims of the ’759 patent to preclude “contextually meaningful delay” is that such a construction injects a use limitation into a claim written in structural terms. “[A]pparatus claims cover what a device is, not what a device does.” Hewlett-Packard Co. v. Bausch & Lomb, Inc., 909 F.2d 1464, 1468 (Fed. Cir. 1990). If the district court’s construction were correct, then the same apparatus might infringe when used in one activity, but not infringe when used in another. For example, consider a device that had a delay of thirty seconds between the time at which it calculated a user’s velocity and the time that it displayed it. A thirty-second delay might be insignificant in some contexts—including “walking,” “climbing,” and “snowshoeing,” all of which are listed in the specification as activities for which the patented invention is suitable. ’759 patent col.4 ll.52, 54. By contrast, a thirty-second delay in determining velocity would be highly significant in other contexts—for example, short- and middle-distance running or skiing. See id. col.4 l.53. Moreover, the wide variety of contexts disclosed as suitable uses for the claimed exercise monitoring system would render it nearly impossible to determine in advance whether the delay in a particular system would be sufficient to avoid infringement. See, e.g., id. col.4 l.53 (listing “flying” as suitable physical activity); id. col.4 l.53 (listing “singing” as suitable physical activity); id. col.5 ll.38-39 (describing use of invention to monitor activity of “horses and camels”); id. col.7 ll.27-28 (describing use of invention for “rehabilitating an injured animal”). See also, e.g., Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1311 (Fed. Cir. 1999). (discussing importance of public notice function in claim construction). Absent an express limitation to the contrary, any use of a device that meets all of the limitations of an apparatus claim written in structural terms

infringes that apparatus claim. See, e.g., Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 809 (Fed. Cir. 2002) (holding that “a patent grants the right to exclude others from making, using, selling, offering to sale, or importing the claimed apparatus or composition for any use of that apparatus or composition” (emphasis added)); see also Roberts v. Ryer, 91 U.S. 150, 157 (1875) (“The inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not.”). Construing a non-functional term in an apparatus claim in a way that makes direct infringement turn on the use to which an accused apparatus is later put confuses rather than clarifies, frustrates the ability of both the patentee and potential infringers to ascertain the propriety of particular activities, and is inconsistent with the notice function central to the patent system. See, e.g. PSC Computer Prods., Inc. v. Foxconn Int'l, Inc., 355 F.3d 1353, 1361 (Fed. Cir. 2004) (emphasizing “the important public notice function of patents—the mechanism whereby the public learns which innovations are the subjects of the claimed invention, and which are in the public domain”); see also Halliburton Energy Servs., Inc. v. M-I LLC, 514 F.3d 1244, 1255 (Fed. Cir. 2008) (emphasizing that claim language should “provide a clear-cut indication of the scope of subject matter embraced by the claim” and noting “that the patent drafter is in the best position to resolve the ambiguity in the patent claims”).

c. Prosecution History

Timex argues that the prosecution history supports its construction requiring instantaneous display of data. Specifically, Timex argues that “the applicants stressed the ‘real-time data’ limitation in their Remarks to overcome the Examiner’s rejections” and “argued that the ‘real-time data’ limitation was supported by the specification,” which “disparages non-instantaneous systems.” Br. of Appellee Timex Corp. at 58.

To the contrary, we conclude that the prosecution history offers further evidence that “real-time,” as used in this case, does not mean instantaneous. After claims 1 and 18 were rejected as anticipated by Root, the applicants amended the claims to add the “displaying real-time data” limitation. Doc. 21, Ex. 2-P (J.A. 310); id., Ex. 2-Q (J.A. 318). In their remarks, the applicants stated, “Furthermore, the personal computer depicted in Fig. 7 of Root cannot be used to display real-time data, as required by claim 1. Rather, the personal computer in Fig. 7 of Root will merely display performance data after the athlete has completed their activity.” Doc. 21, Ex. 2-P (J.A. 308). The applicants similarly remarked that “Claim 18 also requires that the display unit display real-time data acquired by the electronic positioning device.” Id. (J.A. 309). The applicants’ remarks distinguishing Root therefore echo the criticism of the prior art in the specification. In the applicants’ view, the invention is preferable because it does not intentionally delay the display of data by storing it for later review after the athlete has completed his or her activity (as in Root). Rather, in this invention, the data is displayed without any intentional delay—i.e., in “real time.”

d. Extrinsic Evidence

The district court relied heavily on extrinsic evidence—namely, a dictionary definition—in construing “displaying real-time data.” Specifically, the district court relied on a Microsoft Computer Dictionary, which defined “real time” as “[o]f or relating to a time frame imposed by external constraints.” Claim Construction Op. at 9 (quoting Microsoft Computer Dictionary 375 (4th ed. 1999)).

We have made clear that “dictionaries and treatises can be useful in claim construction,” particularly insofar as they help the court “to better understand the underlying technology and the way in which one of skill in the art might use the claim

terms.” Phillips, 415 F.3d at 1318. However, we find the dictionary definition relied on by the district court too vague to be of significant help in resolving the dispute in this case. The cited definition sheds no light on whether “real-time” means “instantaneous” or, if not, how much of a delay is permissible.

Moreover, we note that definitions of “real-time” in other technical dictionaries suggest that a real-time process cannot involve intentional delay or storage for later processing. See Rudolf F. Graf, Modern Dictionary of Electronics 627 (7th ed. 1999) (including definition of “real time” as “The performance of a computation during the actual time that the related physical process transpires in order that results of the computations are useful in guiding the physical process”); id. (including definition of “real-time operation” as “Data-processing technique in which information is utilized as events occur and the information is generated, as opposed to batch processing at a time unrelated to the time the information was generated”); IEEE 100: The Authoritative Dictionary of IEEE Standards Terms (7th ed. 2000) (including definition of “real time” related to “software” as “Pertaining to a system or mode of operation in which computation is performed during the actual time that an external process occurs, in order that the computation results can be used to control, monitor, or respond in a timely manner to the external process. Contrast: batch.”); Steven M. Kaplan, Wiley Electrical and Electronics Engineering Dictionary 639 (2004) (including definition of “real-time” as “In computers, that which is processed, or otherwise acted upon, without any delay.”); Harry Newton, Newton’s Telecom Dictionary 758 (22d ed. 2006) (“In data processing or data communications, real time means the data is processed the moment

it enters a computer, as opposed to BATCH processing where the information enters the system, is stored and is operated on [at] a later time.”).

For the foregoing reasons, we modify the district court’s construction of “displaying real time data” to reflect that, while the data need not be displayed instantaneously, it must be displayed without any intentional delay, taking into account the processing limitations of the system and the time required to accurately measure the data. We therefore construe “displaying real-time data,” as used in the claims of this case, as “displaying data without intentional delay, given the processing limitations of the system and the time required to accurately measure the data.”

B. Infringement

The district court entered judgment of noninfringement as a result of Paragon’s stipulation that the accused Timex products did not infringe based on the district court’s construction of disputed claim terms. Final Judgment at 1. Because we have modified the constructions of “data acquisition unit” and “display unit,” we vacate the district court’s judgment of noninfringement. See, e.g., Howmedica Osteonics Corp. v. Wright Med. Tech., Inc., 540 F.3d 1337, 1339 (Fed. Cir. 2008) (“Because we conclude that the construction of [a] claim term was incorrect, we cannot sustain the stipulated judgment [of noninfringement].”).

As an alternative basis for affirmance, Timex argues that its accused products cannot meet the “displaying real-time data” limitation under “any proper construction.” Br. of Appellee Timex Corp. at 58. Specifically, Timex argues that the parties have stipulated that, in the accused products, there is at least a 2.16-second delay in the display of heart rate data and a 3.92-second delay in the display of speed, pace, or distance. See Stipulation ¶ 16 (J.A. 527). Timex argues that this delay demonstrates

that the accused Timex products do not display data in real time, and that it is therefore entitled to judgment of noninfringement as a matter of law.

As we have held, “displaying real-time data” in the claims of this case permits some delay, but does not permit an intentional delay, given the processing limitations of the system and the time required to accurately measure the data. The stipulation does not make clear whether there is any intentional delay in the display of data in the accused Timex products. To the contrary, the stipulation indicates that at least some portion of the 2.16-second and 3.92-second delays are attributable to processing limitations. See id. ¶ 13 (J.A. 526) (“The wireless transmission takes 0.06 (sixty milliseconds) to complete.”); id. (“Once the information is received by the watch, there is an additional delay of approximately .1 - 1 second before the watch will display the individual’s heart rate depending on the other functions that the watch must complete first (e.g. updating the time or date).”); id. ¶ 16 (J.A. 527) (“The wireless transmission takes .25 seconds to complete.”); id. (“Once the information is received by the watch, there is an additional delay of approximately .1 to 1 second before the watch will display the requested information depending on the other functions that the watch must complete first (e.g. updating the time or date).”) The stipulation also strongly suggests that at least some part of the delay is attributable to the time required to accurately measure the data—in particular, sampling of various rates. See id. ¶ 13 (J.A. 526) (“The monitor averages the last four valid rates (valid defined as a rate between 30 and 240 and linearly related). The average heart rate is wirelessly transmitted to the watch every two seconds.”); id. ¶ 16 (J.A. 527) (discussing calculation of pace as “based on distance traveled over 17.85 seconds and then inverted”).

At oral argument, counsel for Timex argued for the first time that the accused Timex products incorporate an intentional delay between the time at which data is acquired, and the time at which it is displayed. See Oral Arg. at 28:54-29:10, available at <http://oralarguments.cafc.uscourts.gov/mp3/2008-1516.mp3> (“The Court: Are you suggesting you have a built-in delay here? Timex: We do. . . . It’s an issue of battery. Battery life. Maintaining battery life.”). Because the parties’ stipulation makes no mention of any intentional delay between the time at which data is acquired and the time at which it is displayed for the purpose of maintaining battery life, and because the factual question of whether the accused products incorporate such an intentional delay precludes us from concluding as a matter of law that Timex’s accused products do not satisfy the “displaying real-time data” limitation, we reject Timex’s alternative basis for affirmance.

III. CONCLUSION

For the foregoing reasons, we modify the district court’s claim constructions. As used in the ’759 patent, “data acquisition unit” means “a structure or set of structures that includes at least the electronic positioning device and the physiological monitor”; “display unit” means “a structure or set of structures, separate from the data acquisition unit, for displaying real-time data provided by both the electronic positioning device and the physiological monitor independently or over a common transmission path”; and “displaying real-time data” means “displaying data without intentional delay, given the processing limitations of the system and the time required to accurately measure the data.” Accordingly, we vacate the judgment of noninfringement and remand for further proceedings consistent with this opinion.

VACATED AND REMANDED

COSTS

Each party shall bear its own costs.