

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONITOR TECHNOLOGIES, INC.,
Petitioner,

v.

CENTRAK, INC.,
Patent Owner.

Case IPR2014-01219
Patent 8,604,909 B1

Before LINDA M. GAUDETTE, JUSTIN T. ARBES, and
CHARLES J. BOUDREAU, *Administrative Patent Judges*.

BOUDREAU, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

On July 30, 2014, Petitioner, Sonitor Technologies, Inc., filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–14, 16–24, and 26–28 of U.S. Patent No. 8,604,909 B1 (Ex. 1001, “the ’909 patent”). Patent Owner, CenTrak, Inc., timely filed a Preliminary Response (Paper 8, “Prelim. Resp.”), including a copy of a “Disclaimer in Patent under 37 CFR 1.321(a)” filed November 5, 2014, wherein Patent Owner disclaimed claims 27 and 28 of the ’909 patent. Prelim. Resp. 1 n.1; Ex. 1.¹ We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Upon consideration of the Petition and the Preliminary Response, we conclude that the information presented in the Petition does not establish a reasonable likelihood that Petitioner would prevail in showing the unpatentability of any of claims 1–14, 16–24, or 26 on the grounds set forth in the Petition. With respect to claims 27 and 28, 37 C.F.R. § 42.107(e) provides that “[n]o *inter partes* review will be instituted based on disclaimed claims.” Accordingly, we deny Petitioner’s request to institute an *inter partes* review of claims 1–14, 16–24, and 26–28 of the ’909 patent.

¹ We note that exhibits filed by a patent owner must be numbered sequentially in the “2001–2999” range. 37 C.F.R. § 42.63(c).

II. BACKGROUND

A. Related Matters

The '909 patent is asserted in *CenTrak, Inc. v. Sonitor Technologies, Inc.*, Civil Action No. 1:14-cv-00183-RGA, filed February 12, 2014, in the United States District Court for the District of Delaware. Pet. 1.

B. The '909 Patent (Ex. 1001)

The '909 patent, entitled “Methods and Systems for Synchronized Ultrasonic Real Time Location,” issued on December 10, 2013, from U.S. Patent Application No. 12/986,519, filed January 7, 2011, as a division of U.S. Patent Application No. 12/016,547, filed January 18, 2008. The '909 patent also claims the benefit of U.S. Provisional Application No. 60/881,269, filed January 20, 2007.

The '909 patent generally relates to “real-time location” (RTL) systems for determining the location and identity of portable devices (e.g., tags that may be attached to people or equipment), using signals sent between the devices and fixed base stations. Ex. 1001, Abstract.

The Background of the Invention (Ex. 1001, col. 1, ll. 23–61) explains that RTL systems using radio frequency (RF) and infrared (IR) transmitters were known in the prior art but that the prior art systems have various drawbacks. Conventional tag-based IR transmitters, for example, require a line-of-sight connection with IR receivers, making them prone to lack of reception if the line of sight is blocked and limiting their reliability. *Id.* at col. 1, ll. 29–40. Also, because the receivers are “open” at all times, they are generally hard-wired for power and connectivity, increasing the installation complexity and cost. *Id.* at col. 1, ll. 40–44. An alternative arrangement employs transmitters with substantially higher transmission power in the

base stations and receivers in the tags; this helps with reliability, but not with the need for hard-wiring. *Id.* at col. 1, ll. 45–51. Also, high burst repetition rates from the transmitters can result in interference with, for example, television remote controls in hospital rooms, whereas systems that transmit relatively infrequently in order to avoid causing interference are problematic because they need to search continuously for IR signals with an open IR receiver and thereby drain battery power in the tags. *Id.* at col. 1, ll. 51–61.

The invention of the '909 patent addresses these problems by synchronizing the tags and the base stations so that the tags can save power by being in a sleep mode when the base station is not transmitting. *Id.* at col. 3, ll. 63–67. This is achieved by sending “timing synchronization information” (“TSI”) to the tags. *Id.* at col. 3, ll. 54–56. The invention uses the TSI to synchronize activation of the portable devices’ receivers with the transmission timing of the base stations. *Id.* at col. 3, ll. 56–61.

C. Illustrative Claims

Of the challenged claims, claims 1, 3, 4, 7, 8, 12, 13, 16, and 26 are independent.

Independent claims 1, 3, 4, 7, 8, 12, and 13, as well as dependent claims 2, 5, 6, 9–11, 14, and 18–24, are directed to systems “for determining a location and an identity of a portable device,” including: (1) means for transmitting timing synchronization information; (2) a plurality of stationary ultrasonic base stations configured to (a) receive the TSI and (b) transmit a corresponding ultrasonic location code, representing the location of the base station, in a time period based on the received TSI; and (3) a plurality of portable devices configured to (a) receive the TSI, (b) detect the ultrasonic location codes in the time periods based on the received TSI, and

(c) transmit an output signal that includes a portable device ID representative of the portable device as well as the detected location code. Claim 1 is illustrative:

1. ^[1.1] A system for determining a location and an identity of a portable device, the system comprising:
 - ^[1.2] means for transmitting timing synchronization information including a plurality of RF transceivers coupled to a backbone network and ^[1.3] a time server generating the timing synchronization information;
 - ^[1.4] wherein each of the plurality of RF transceivers periodically transmits a request to the time server to receive the timing synchronization information;
 - ^[1.5] a plurality of stationary ultrasonic base stations, each ultrasonic base station configured ^[1.6] to receive the timing synchronization information and ^[1.7] to transmit a corresponding ultrasonic location code in a time period based on the received timing synchronization information, each ultrasonic location code representative of a location of the respective ultrasonic base station; and
 - ^[1.8] a plurality of portable devices, each portable device configured to ^[1.8.1] 1) receive the timing synchronization information, ^[1.8.2] 2) detect the ultrasonic location codes from the ultrasonic base stations and ^[1.8.3] 3) transmit an output signal including a portable device ID representative of the portable device and the detected location code,
 - ^[1.9] wherein each portable device is synchronized to detect the ultrasonic location code in the time period based on the received timing synchronization information.

Ex. 1001, claim 1 (bracketed paragraph numbering added by Petitioner, Pet. 6–8).

Independent claims 16 and 26 are directed to ultrasonic base stations that include: (1) an RF receiver coupled to a time server via a backbone network and configured to receive TSI from the time server via the

backbone network; and (2) an ultrasonic transmitter configured to transmit an ultrasonic location code, representing the location of the base station, in a time period based on the received TSI. Claim 26 is illustrative:

26. ^[26.1] An ultrasonic base station, comprising:
^[26.2] a radio frequency (RF) receiver configured to receive timing synchronization information; and
^[26.3 & 26.4] an ultrasonic transmitter configured to transmit an ultrasonic location code in a time period based on the received timing synchronization information, the ultrasonic location code representative of a location of the ultrasonic base station,
^[26.5] wherein the RF receiver is configured to receive beacons in predetermined time slots, the beacons including the timing synchronization information and respective time delay information relative to a unified time of origin.

Ex. 1001, claim 26 (bracketed paragraph numbering added by Petitioner, Pet. 35–36).

D. Evidence Relied Upon

Petitioner's patentability challenges are based upon the following references:

References	Patents/Printed Publications	Exhibit
Carter	US 6,958,677 B1	1003
Amorai-Moriya	US 6,141,293	1004
Marco	A. Marco et al., <i>Location-based services for elderly and disabled people</i> , 31 COMPUTER COMM. 1055 (2008) (available online January 1, 2008)	1005
Mills	David L. Mills, <i>Internet Time Synchronization: The Network Time Protocol</i> , 39(10) IEEE TRANSACTIONS COMM. 1482 (1991)	1007

Petitioner also relies on the Declaration of Robert Kline-Schoder, Ph.D. regarding U.S. Patent No. 8,604,909 (Ex. 1002).

E. The Asserted Grounds of Unpatentability

Petitioner challenges the patentability of the challenged claims on the following seven grounds:

References	Basis	Claims Challenged
Carter and Mills	§ 103(a)	1, 5, 9–11, 14, 16–18
Carter	§ 102(b)	7, 8, 12, 13, 21–24
Amorai-Moriya	§ 102(b)	3, 7, 8, 26
Amorai-Moriya and Mills	§ 103(a)	4
Amorai-Moriya and Carter	§ 103(a)	19
Marco	§ 102(a)	1–7, 9–12, 14, 16, 17, 26
Marco and Carter	§ 103(a)	18–21, 23

III. CLAIM CONSTRUCTION

In an *inter partes* review proceeding, we assign claim terms of an unexpired patent their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Within that framework, terms generally are given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner asks us to construe three phrases: (1) “means for transmitting timing synchronization information,” as recited in claims 1, 3,

4, 7, 8, 12, and 13; (2) “means for receiving the output signal from each of the portable devices,” as recited in claim 2; and (3) “backbone network,” as recited in claims 1, 9, and 16. Pet. 4–6. Patent Owner responds to Petitioner’s proposed construction of only the first of these terms and additionally asks us to construe two other terms: (4) “detect the ultrasonic location codes,” as recited in claims 1, 3, 4, 7, 8, 12, and 13; and (5) “time delay information,” as recited in claims 3 and 26. Prelim. Resp. 8–16.

A. “detect the ultrasonic location codes”

Patent Owner argues that although Petitioner has not proposed a definition for the phrase “detect the ultrasonic location codes,” the Petition appears to conflate detecting the location codes with simply receiving the ultrasonic signal itself. Prelim. Resp. 12. Patent Owner argues that this position disregards the specification and claims of the ’909 patent, which repeatedly draw a firm distinction between merely detecting or receiving an ultrasonic signal, on the one hand, and detecting the base station location code included in that ultrasonic signal, on the other, and is also in conflict with the ordinary meaning of the term “detect.” *Id.* at 12–13. Patent Owner, accordingly, urges us to construe the phrase to mean “to recover the location codes from the [ultrasonic] signal.” *Id.* at 14.

We agree with and adopt Patent Owner’s proposed construction as the broadest reasonable interpretation of “detect the ultrasonic location codes” in view of the ’909 patent and the ordinary usage of the term “detect” in the art. As pointed out by Patent Owner, for example, “claim 7 states that the portable device is configured to ‘detect the ultrasonic location codes from the ultrasonic signals transmitted by the ultrasonic base stations.’ (Emphasis added),” whereas claim 18 merely “states instead that the portable devices

‘receive ultrasonic signals’” and does not recite “detect[ing] the ultrasonic location codes.” *Id.* at 13. We further agree with Patent Owner that such construction is also consistent with the ordinary meaning of “detection” in the art. *See id.* (citing Alliance for Telecommunications Industry Solutions (ATIS) Telecom Glossary at <http://www.atis.org/glossary/definition.aspx?id=7128> (defining “detection” as “[t]he recovery of information from an electrical or electromagnetic signal”) (Ex. 3001)).²

Accordingly, for purposes of this decision, we construe “detect the ultrasonic location codes” to mean “recover the ultrasonic location codes from the ultrasonic signal.”

B. “time delay information”

Patent Owner argues that the ’909 patent makes clear that the phrase “time delay information,” as recited in claims 3 and 26, specifically refers to the “delay until the next transmission.” Prelim. Resp. 15–16 (citing Ex. 1001, col. 6, ll. 32–39, col. 8, ll. 16–21, 24–29).

Although each instance of the phrase “time delay” in the ’909 patent specification refers to a time delay “to a next beacon transmission time” (*see, e.g.*, Ex. 1001, col. 8, ll. 17–18, 20–21), “to an IR . . . transmission time” (*e.g., id.* at col. 8, l. 26), or both (*id.* at col. 6, ll. 30–31, 33–35, col. 8, ll. 11–13), we do not find such usage to constitute a sufficiently clear, deliberate, and precise definition as to overcome the presumption that the

² Although we have exercised our discretion to consider the cited definition and enter a copy as Ex. 3001, we note that Patent Owner was required to file a copy of this evidence as an exhibit rather than simply citing to a web address. *See* 37 C.F.R. § 42.63(a) (“All evidence must be filed in the form of an exhibit.”). We also note that the same definition is set forth in Federal Standard 1037C (1996). *See* http://www.its.bldrdoc.gov/fs-1037/dir-011/_1584.htm (Ex. 3002).

phrase should be given its ordinary and customary meaning. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (inventor may define specific terms used to describe invention, but must do so “with reasonable clarity, deliberateness, and precision” and, if done, must “‘set out his uncommon definition in some manner within the patent disclosure’ so as to give one of ordinary skill in the art notice of the change” in meaning); *see also In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004) (“We have cautioned against reading limitations into a claim from the preferred embodiment described in the specification, even if it is the only embodiment described, absent clear disclaimer in the specification.”).

Moreover, we cannot discern how construing the phrase “time delay information” would add any clarity to the claim phrase itself. Accordingly, we conclude that no explicit construction of “time delay information” is either warranted or necessary.

C. Remaining Terms

We conclude that it is not necessary for our determination of whether to institute *inter partes* review of the ’909 patent to construe expressly any additional claim terms.

IV. ANALYSIS

We now turn to Petitioner’s asserted grounds of unpatentability and Patent Owner’s arguments in the Preliminary Response.

Asserted Ground of Obviousness of Claims 1, 5, 9–11, 14, and 16–18 over Carter and Mills

Carter is directed to an object location monitoring system that includes beacons spatially distributed throughout an area to be monitored

and transponders that attach to the objects to be tracked. Ex. 1003, Abstract, col. 1, ll. 44–47. Each beacon intermittently transmits an RF or ultrasonic (“US”) interrogation signal, and transponders that are in range of the beacon receive and echo back the interrogation signal. *Id.* at col. 1, ll. 47–50. Each beacon retransmits its interrogation signal, and any transponder response thereto as received by the beacon, to a receiver that measures a time difference between the two signals. *Id.* at col. 1, ll. 50–53. This time difference reflects the signal propagation time and, thus, the distance between the beacon and the transponder. *Id.* at col. 1, ll. 53–55. A receiver analyzes the retransmitted signals from multiple beacons and uses a triangulation method to determine the location of each transponder based on the transponder’s distances from a set of beacons. *Id.*, at col. 1, ll. 55–59.

Petitioner alleges Carter teaches every element of independent claims 1 and 16 of the ’909 patent except that “(1) Carter may not expressly disclose more than one RF transceiver [1.2] in its ultrasonic embodiment and (2) Carter does not expressly disclose the ultrasonic transceivers periodically transmitting a request to the time server for the TSI [1.4].” Pet. 9, 11–13, 15–16. Petitioner alleges those features are provided by the combination with Mills. *Id.* at 9, 11–12, 15–16.

Mills provides an overview of the Network Time Protocol (NTP). See Ex. 1007, 1482. Mills teaches that NTP had been in regular operation on the Internet for several years to synchronize distributed systems. *Id.* at 1482. NTP is said to be easily implemented and usable in a variety of operating system and networking environments. *Id.* at 1485.

Claim 1 of the ’909 patent recites, *inter alia*, “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location

codes from the ultrasonic base stations.” With respect to that limitation, Petitioner alleges:

Carter discloses a plurality of transponders 32 that correspond to the portable devices of the claim. [1.8] Each transponder in Carter operates by listening for and echoing the interrogation signals of nearby beacons. As each interrogation signal includes a beacon ID portion, the transponder is configured to detect the code [1.8.2]. (Ex. 1002 at 75 and 79; Ex. 1003 at 4:11-13 and 3:27-28.)

Pet. 12–13.

We agree with Patent Owner (*see* Prelim. Resp. 24) that Petitioner has not explained adequately how the cited portions of Carter describe portable devices that “recover” the location codes from the ultrasonic signal as required by the claim 1 limitation “detect the ultrasonic location codes.” *See supra* Section III.A. The portions of Carter cited by Petitioner merely state, respectively, that “[e]ach transponder 32 operates generally by listening for and echoing the interrogation signals of nearby beacons 30 during an assigned transponder timeslot,” and the “interrogation signal includes a beacon ID portion and a portion for measuring distances to nearby transponders 32.” Ex. 1003, col. 4, ll. 11–13, col. 3, ll. 27–28.

Unlike the method to which claim 1 of the ’909 patent is directed, Carter uses a triangulation method to determine transponder locations based on the transponders’ distances from a set of beacons. Ex. 1003, Abstract. Patent Owner persuasively explains:

[T]he cited language in Carter explains that the portable devices receive and echo back whatever signal is received from the US base station. There is no description in Carter of any mechanism in any of the described portable devices to actually detect the ultrasonic location code from the ultrasonic signal.

Importantly, as explained in Carter, the portable devices simply echo back whatever signals they receive from the US base stations, and the base stations measures a round-trip delay time—from the time it transmitted the ultrasound signal until the time it received the echo—to calculate distance. The distances between the portable device and each of several base stations are line segments that can then be used in a trigonometric formula to determine the location of the object associated with the portable device.

The '909 patent describes and claims a completely different type of location method.[] In the '909 method, the portable device receives the US base station ID, appends its own portable device ID, and then transmits both IDs together in a message, preferably via RF, to an RF base station. Both IDs are then sent to the server, which determines that the asset is at a particular location because the asset has forwarded the ID associated with a particular US base station, and the location of the US base station is known. . . .

. . . [I]n Carter, there is absolutely no use or reason for the portable device—the tag—to detect the location code of the base station. The portable device is only used to echo the ultrasound signal back to the US base station, so that round trip delay time can be measured by the base station. This is precisely why the portable devices, advantageously, according to Carter, never actually detect the US base station ID. (Ex. 1003, col. 4, lines 27-40) (emphasis added.)

Prelim. Resp. 24–26.

Claim 1 also recites the limitation “wherein each of the plurality of RF transceivers periodically transmits a request to the time server to receive the timing synchronization information.” Ex. 1001, claim 1. Claim 16 similarly recites “wherein the ultrasonic base station periodically transmits a request to the time server, via the backbone network, to receive the timing synchronization information.” *Id.*, claim 16. As noted above, Petitioner acknowledges that Carter does not expressly disclose transceivers

periodically transmitting a request to the time server for the timing synchronization information, but contends that feature is provided by the combination with Mills. *See* Pet. 9. With respect to the “request . . . to receive the timing synchronization information” limitation, Petitioner asserts “Mills discloses a ‘procedure-call’ class of operation where elements send NTP messages to a peer indicating its willingness to be synchronized by the peer [1.4].” Pet. 12 (citing Ex. 1002, 67, 79; Ex. 1007, 1486). Petitioner further states that, in the procedure-call class, “an NTP server operating in client mode sends an NTP message to a peer operating in server mode, which then interchanges the addresses, inserts the requested timestamps, recalculates the checksum and optional authenticator and returns the message immediately.” *Id.* at 10.

Although Petitioner’s assertions accurately reflect Mills’ disclosure, we do not find, either in the portions of Mills cited by Petitioner or elsewhere in Mills, any teaching or suggestion of RF transceivers transmitting to a time server “requests . . . to receive . . . timing synchronization information.” Rather, we understand Mills to describe only a subnet of time servers that synchronize with one another and distribute timing information to computers on the network. In the “procedure-call” class of operation described in the passage quoted in the Petition, one time server makes a procedure call to another time server to establish a common timing. *See* Ex. 1007, 1486. Indeed, Mills explains that the Network Time Protocol (NTP)—to which the Mills reference is directed—is a protocol “used to organize and maintain a set of time servers.” *Id.* at 1484.

Patent Owner persuasively argues:

[I]f the teaching of Mills were used by one of ordinary skill in the art to modify the system of Carter, the most that these combined teachings would show is that the time servers 36 of Fig. 7 in Carter, which distribute the timing information (Ex. 1003, Fig. 1), would use the system of Mills to arrive at a common clock. However, distribution of any timing information to the ultrasound base stations 30, shown in Fig. 7 of Carter, and installed at a completely different part of the network, would still utilize “local routing algorithms and time daemons.” as taught in Mills. Nothing in Mills suggests that the computers receiving TSI should periodically request synchronization information from the time servers.

Thus, the suggested combination is missing a claim limitation – it would still not provide a system in which an “ultrasonic base station periodically transmits a request to the time server, via the backbone network, to receive the timing synchronization.”

Prelim. Resp. 19.

Because, on this record, Petitioner has not identified sufficient evidence to support its contention that the combination of Carter and Mills teaches or suggests (a) “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations,” as recited in claim 1, or (2) that either a plurality of RF transceivers or an ultrasonic base station “periodically transmits a request to the time server to receive the timing synchronization information,” as recited in independent claims 1 and 16, respectively, we conclude that the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging claim 1 or claim 16, or any of dependent claims 5, 9–11, 14, 17, and 18, under 35 U.S.C. § 103(a) over the combination of Carter and Mills.

Asserted Ground of Anticipation of Claims 7, 8, 12, 13, and 21–24 by Carter

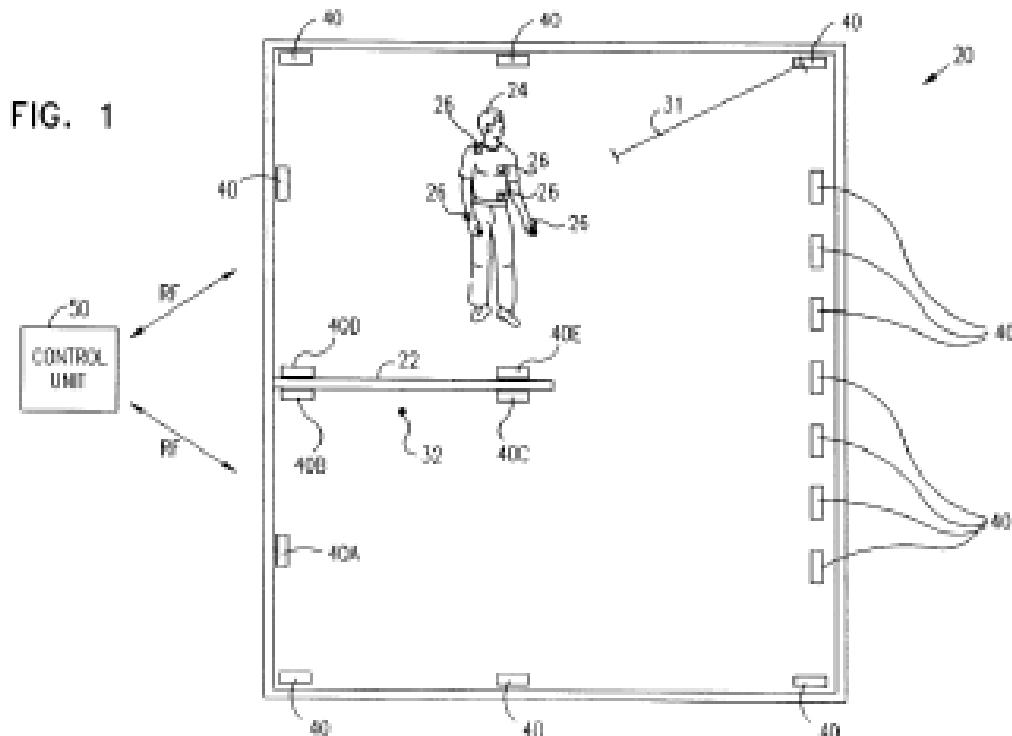
Identically to claim 1, independent claims 8, 12, and 13 each recite “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations.” Independent claim 7 similarly recites “a plurality of portable devices, each portable device . . . being configured to . . . detect the ultrasonic location codes from the ultrasonic signals transmitted by the ultrasonic base stations.” Petitioner does not separately address these limitations in connection with its asserted ground for these claims, but relies on the discussion of the analogous limitation in claim 1. *See* Pet. 16–17.

For the reasons stated in the discussion of Petitioner’s asserted ground based on Carter and Mills above, Petitioner has not explained adequately how Carter discloses “a plurality of portable devices, each portable device . . . being configured to . . . detect the ultrasonic location codes from the ultrasonic signals transmitted by the ultrasonic base stations,” as recited in claim 7, or “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations,” as recited in claims 8, 12, and 13. Accordingly, we conclude that the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging any of claims 7, 8, 12, or 13, or of claims 21–24, which depend, respectively, from claims 7, 8, 12, and 13, under 35 U.S.C. § 102(b) over Carter.

Asserted Ground of Anticipation of Claims 3, 7, 8, and 26 by Amorai-Moriya

Amorai-Moriya is directed to a system for tracking an object within a surveillance area. Ex. 1004, Abstract. Figure 1 from Amorai-Moriya,

reproduced below, illustrates an embodiment of Amorai-Moriya's system that includes "transmitting units" 26 fixed to object 24 to be tracked and three or more "background units" 40 distributed in surveillance area 20 to receive and determine the propagation time of ultrasound waves transmitted from the transmitting units. *Id.* at col. 3, ll. 1–9, col. 11, ll. 46–65.



As shown in the embodiment of Figure 1, above, Amorai-Moriya's system for tracking an object includes control unit 50 that periodically initiates position-determining cycles by transmitting an RF "trigger signal" to be received by both the transmitting units and the background units. *Id.* at col. 12, ll. 38–42. In response to the trigger signal, the transmitting units transmit frequency-distinct ultrasound waves and then return to a pause state until another trigger signal is received, and each background unit opens a time window in which it is enabled to receive ultrasound waves. *Id.* at

col. 12, ll. 55–61. The background units determine the frequency and arrival time for each wave received while the window is open and transfer that information to the control unit along with the identification of the specific background unit. *Id.* at col. 12, l. 61–col. 13, l. 5. The control unit uses the propagation times to calculate the position of the transmitting unit via a triangulation method. *Id.* at col. 16, ll. 12–16. In an alternative embodiment, Amorai-Moriya also discloses that the transmitting and receiving functions can be reversed such that ultrasound waves may be transmitted from the background units to the object, rather than vice versa. *Id.* at col. 7, ll. 58–67.

Claims 3 and 8 of the '909 patent both recite, *inter alia*, “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations.” As discussed above, claim 7 similarly recites “a plurality of portable devices, each portable device . . . being configured to . . . detect the ultrasonic location codes from the ultrasonic signals transmitted by the ultrasonic base stations.”

Petitioner asserts with respect to this limitation in claim 3 that Amorai-Moriya teaches transmitting unique IDs by ultrasound (Pet. 28 (citing Ex. 1004, col. 9, ll. 20–22)) and that those codes “are, at least in the embodiment of Ex. 1004 at 7:58-67, transmitted by the ultrasonic base stations (the background units) and received by the portable devices (the transmitting units)” (Pet. 29 (citing Ex. 1004, col. 3, ll. 15–22, col. 7, ll. 58–67)). Petitioner relies on the same assertions for claims 7 and 8. Pet. 33, 34.

In view of our above determination that the broadest reasonable interpretation of the phrase “detect the ultrasonic location codes” is “to recover the ultrasonic location codes from the ultrasonic signal,” and not

simply to receive the signal, we agree with Patent Owner that Petitioner has not explained adequately how the cited portions of Amorai-Moriya describe “detect[ing]” location codes. Prelim. Resp. 33.

Amorai-Moriya’s disclosed system differs from the invention of claims 3, 7, and 8 of the ’909 patent in its use of signal propagation time, rather than base station location codes, to determine the location of an object. *See, e.g.*, Ex. 1004, col. 3, ll. 28–31 (explaining that “propagation information including the measured time intervals and/or arrival times is transferred, preferably by RF transmission, to the control unit, which calculates precise position coordinates of the objects in the surveillance area”), col. 5, l. 66–col. 6, l. 1 (“The control unit calculates the position of each transmitting unit according to the arrival times of the waves.”), col. 9, ll. 34–35 (“Preferably, calculating coordinates of the object includes using a triangulation method.”). Patent Owner has persuasively argued that Amorai-Moriya’s system does not require the tag to detect the actual location code from the ultrasonic signal. Prelim. Resp. 33. Patent Owner explains:

[A]s with Carter, because the location methodology described in Amorai does not locate objects by associating them with a specific US base station based upon the US base station ID, there is no need for the portable devices to incur the additional processing power required to decode and retransmit any US base station ID. . . .

Importantly, [Amorai-Moriya] explains that each transmitting unit transmits on a unique frequency, and the receiver simply determines frequency as a function of time. (Ex. 1004, col. 3, lines 25-27) No suggestion is made for the portable devices to detect any US location code, nor is there any need to, given the location methodology [Amorai-Moriya] uses.

Id. at 33–34.

Claim 3 additionally recites “at least one RF transceiver configured to periodically transmit beacons in predetermined time slots . . . , the beacons including the timing synchronization information and respective time delay information relative to a unified time of origin.” Claim 26 similarly recites the limitation “wherein the RF receiver is configured to receive beacons in predetermined time slots, the beacons including the timing synchronization information and respective time delay information relative to a unified time of origin.”

With respect, specifically, to the claim phrase “the beacons including the timing synchronization information *and respective time delay information* relative to a unified time of origin” (emphasis added), Petitioner argues:

The RF trigger signals of Amorai-Moriya include timing synchronization information, as they are used by the system components to synchronize transmission and receipt of ultrasounds signals. (See Ex. 1004 at 12:55-62).

The RF trigger signals of Amorai-Moriya can also include respective time delay information relative to a unified time of origin. For example, Amorai-Moriya teaches that “in other preferred embodiments of the present invention, each triggering signal initiates transmission of a sequence of ultrasound waves, rather than initiating only one transmission. The transmitting unit includes an inner timer which initiates the transmission at predetermined intervals.” (Ex. 1004 at 6:24-28). Further: “In response to trigger signal 43, each transmitting unit 26 transmits at a predetermined rate a sequence of ultrasound waves 52, preferably with a constant interval 54 between consecutive waves 52. Preferably, trigger signal 43 is followed by, or otherwise includes, indication of the number of waves 52 in the group.” (Ex. 1004 at 13:46-52). By indicating the number of waves in the group, to be transmitted at a predetermined interval, the trigger signal of Amorai-Moriya includes respective time delay information

relative to a unified time of origin (the time the trigger signal is sent). (Ex. 1002 at 199-203).

Pet. 31–32.

Although the portions of Amorai-Moriya quoted by Petitioner disclose a triggering signal that initiates transmission of a sequence of ultrasonic waves, optionally including an indication of the number of waves to be transmitted, and also disclose that the transmissions occur at predetermined intervals, those portions also make clear that it is an inner timer in the transmitting unit—rather than time delay information transmitted with the timing synchronization information—that sets the transmission intervals. *See* Ex. 1004, col. 6, ll. 24–28, col. 13, ll. 46–52. In contrast, claims 3 and 26 recite beacons that include time delay information in addition to the timing synchronization information. We discern no disclosure of time delay information being included either in triggering signals or otherwise being transmitted in Amorai-Moriya. Accordingly, we agree with Patent Owner that Petitioner has not shown that Amorai-Moriya “teach[es] that the proper interval (i.e., the delay time) until the next transmission should be sent in the trigger signal itself from the means for transmitting the TSI.” Prelim. Resp. 32. Rather, Amorai-Moriya “teaches the opposite—that the interval is preset in the ultrasound transmitting unit.” *Id.*

Because Petitioner has not identified persuasive evidence that Amorai-Moriya discloses “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations,” as recited in claims 3 and 8; “a plurality of portable devices, each portable device . . . being configured to . . . detect the ultrasonic location codes from the ultrasonic signals transmitted by the

ultrasonic base stations,” as recited in claim 7; or “beacons including the timing synchronization information and respective time delay information relative to a unified time of origin,” as recited in claims 3 and 26, we conclude that the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging any of claims 3, 7, 8, or 26 under 35 U.S.C. § 102(b) over Amora-Moriya.

Asserted Ground of Obviousness of Claim 4 over Amora-Moriya and Mills

Claim 4, like claim 3, recites “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations.” Petitioner relies on the same arguments regarding Amora-Moriya for this limitation as for the corresponding limitation in claim 3, relying on the combination with Mills only for the teaching or suggestion of the limitation “at least one of the RF transceivers configured to periodically transmit a request to another one of the RF transceivers to receive the timing synchronization information.” Pet. 37–38. We conclude, for the reasons set forth in connection with Petitioner’s asserted ground based on Amora-Moriya alone, that Petitioner has not identified evidence to show, or otherwise explained how, Amora-Moriya teaches portable devices “configured to . . . detect the ultrasonic location codes from the ultrasonic base stations.” Because Petitioner does not argue that Mills teaches or suggests that element, we also conclude the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging claim 4 under 35 U.S.C. § 103(a) over the combination of Amora-Moriya and Mills.

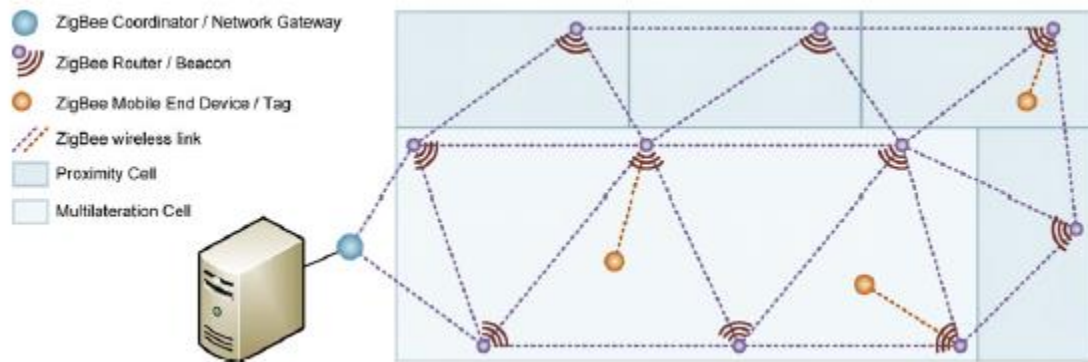
Asserted Ground of Obviousness of Claim 19 over Amorai-Moriya and Carter

Claim 19 depends from claim 3 and, therefore, includes the limitation “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations.” Because we conclude, for the reasons set forth in connection with Petitioner’s asserted grounds based on various combinations of Carter, Mills, and Amorai-Moriya, that Petitioner has not shown how Amorai-Moriya or Carter discloses that limitation, we also conclude that the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging claim 19 under 35 U.S.C. § 103(a) over the combination of Amorai-Moriya and Carter.

Asserted Ground of Anticipation of Claims 1–7, 9–12, 14, 16, 17, and 26 by Marco³

Marco describes a system for providing location-based services for the elderly and the disabled, using existing ZigBee radiofrequency and ultrasound positioning technology to measure distances between mobile devices, or “tags,” and beacons with known locations. Ex. 1005 at 1055, 1057. An overview of the system architecture is shown in Figure 1 from Marco, reproduced below. *Id.* at 1057.

³ Petitioner asserts that Marco was “published at least as early as Jan. 1, 2008,” and is prior art under 35 U.S.C. § 102(a) because the challenged claims are only entitled to the benefit of parent U.S. Patent Application No. 12/016,547, filed January 18, 2008, not U.S. Provisional Application No. 60/881,269, filed January 20, 2007. Pet. 2–3. We need not resolve this issue, however, because even assuming that Marco is prior art, Petitioner has not shown a reasonable likelihood of prevailing on its asserted grounds based on the reference.



The embodiment of Figure 1, above, shows beacons forming a ZigBee mesh network backbone, into which the tags are also connected. *Id.* at 1058. The RF transmitters in the network also double as ultrasound beacons that transmit ultrasound “chirps” that are detected by the tags. *Id.* at 1059. The tags measure the time-of-flight of the chirps. *Id.* A ZigBee coordinator acts as the network gateway into a computer that configures the systems and receives the transmit time of the ultrasound signals as measured by the tags. *Id.* at 1058. With these transit times, it can identify the proximity or multilateration cell containing the tag and compute its location. *Id.* Marco also describes a multi-hop broadcast synchronization (MBS) method that synchronizes the nodes in the system to a global network time (GNT). *Id.* at 1059.

As discussed above in connection with Petitioner’s asserted ground based on Carter and Mills, independent claims 1 and 16 of the ’909 patent recite, *inter alia*, the limitation “wherein each of the plurality of RF transceivers periodically transmits a request to the time server to receive the timing synchronization information.” With respect to this limitation, Petitioner asserts:

Marco establishes a ZigBee grid network with a multi-hop broadcast synchronization (MBS) method that includes one or

more time servers (e.g., time stampers) that provide timing synchronization information in response to requests. (Ex. 1005 at 1059; Ex. 1005 at Fig. 2). Propagators in the Marco system transmit the GNT broadcast synchronization messages. (Ex. 1005 at 1059). That the response from a time stamper to a previous synchronization message is said to be sent by the propagator “in the next synchronization message” shows that the synchronization messages (“requests”) are periodic. (Ex. 1005 at 1059). Accordingly, elements 1.3 and 1.4 are taught by Marco. (Ex. 1002 at 258-260).

Pet. 43.

Upon review of Marco, Petitioner’s argument, and the cited paragraphs 258–260 of Dr. Kline-Schoder’s Declaration, we discern no disclosure in Marco of a plurality of RF transceivers periodically transmitting requests to a time server to receive timing synchronization information, as recited in claims 1 and 16. Petitioner relies on the sentence “*Time-stampers* notify the propagators of the arrival timestamp of the previous broadcast message, which will be sent by the propagator in the next synchronization message” (Ex. 1005, 1059), as evidence of Marco’s disclosure of this limitation. Pet. 43. But as Patent Owner correctly explains (Prelim. Resp. 36–37), based on the context in which that sentence appears, Marco is not discussing RF transceivers periodically requesting timing synchronization information from a time server, but instead describing a method to propagate global network time (GNT) to the nodes of Marco’s network, and the “next synchronization message” refers simply to the subsequent “hop” in Marco’s multi-hop broadcast synchronization (MBS) method. Ex. 1005, 1059.

Independent claim 1, as well as independent claims 3, 4, and 12, also recites “a plurality of portable devices, each portable device configured to

. . . detect the ultrasonic location codes from the ultrasonic base stations.” Claim 7 similarly recites “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic signals transmitted by the ultrasonic base stations.” Petitioner asserts that “[t]he Marco system performs this function by timed transmission of ultrasonic chirps that act as an identification code, which can in turn be decoded into location information. (Ex. 1005 at 1062). Marco thus discloses this claim element. (Ex. 1002 at 267).” Pet. 45.

In view of our above construction of the phrase “detect the ultrasonic location codes,” we again disagree with Petitioner’s conclusion. Although the ultrasonic chirps disclosed by Marco can act as an identification code (see Ex. 1005, 1062), we agree with Patent Owner that, “[a]s explained in the lower right hand column of p. 1059 of Marco, the tag simply measure[s] a time of flight of the ultrasound chirp. It never actually detects any ultrasonic location code, as required by the claims of the 909 patent – nor is there any need to do so.” Prelim. Resp. 37.

As discussed in connection with Petitioner’s asserted ground based on Amora-Moriya, independent claims 3 and 26 recite “at least one RF transceiver configured to periodically transmit beacons in predetermined time slots . . . , the beacons including the timing synchronization information and respective time delay information relative to a unified time of origin” and “wherein the RF receiver is configured to receive beacons in predetermined time slots, the beacons including the timing synchronization information and respective time delay information relative to a unified time of origin,” respectively. Petitioner asserts:

Regarding element 3.9, the propagator node N9 of Marco constitutes an RF transceiver and broadcasts synchronization messages. (Ex. 1005 at 1059). The synchronization messages are broadcast to multiple nodes and thus constitute beacons as claimed. The synchronization messages must also be “periodic” in order to maintain synchronization. The propagator node N9 emits synchronization messages according to some schedule, and therefore they are transmitted in predetermined time slots. (See Ex. 1005 at 1059). The synchronization messages are received by the ultrasonic base station nodes, e.g., N6 and N10. (Ex. 1005 at Fig. 2). The synchronization messages from propagator nodes are also received by the plurality of portable devices (the tags). (Ex. 1005 at 1059).

These synchronization messages include timing synchronization information and respective time delay information relative to a unified time of origin. For example, with respect to timing synchronization information, Marco teaches that “the arrival timestamp of the previous broadcast message” is transmitted by node N9 in the “next broadcast message.” (Ex. 1005 at 1059). With respect to the time delay information, Marco teaches that the synchronization messages allow the recipient nodes to establish a common time reference point with other nodes of the network, in order to synchronize the network with the “global time provider” node N1. (Ex. 1005 at Fig. 2; Ex. 1005 at 1059). The arrival timestamps in the synchronization messages constitute time delay information relative to a unified time of origin, since the time-stamper node N10 will have previously been synchronized with the “global time provider” node N1 (by the action of nodes N1 and N6). (Ex. 1005 at 1059). The clock of the “global time provider” node N1 defines a unified time of origin for the network. Accordingly, Marco teaches this element and anticipates claim 3. (Ex. 1002 at 276-280).

Pet. 48–49.

Although Petitioner asserts that “[t]hese synchronization messages include timing synchronization information and respective time delay

information relative to a unified time of origin,” we find no support for that conclusion in the cited Figure 2, page 1059, or elsewhere in the Marco reference. In particular, we disagree with Petitioner’s assertion that “[t]he arrival timestamps in the synchronization messages constitute time delay information relative to a unified time of origin, since the time-stamper node N10 will have previously been synchronized with the ‘global time provider’ node N1 (by the action of nodes N1 and N6).” Pet. 49 (citing Ex. 1005, 1059).

Because Petitioner has not shown that Marco discloses “wherein each of the plurality of RF transceivers periodically transmits a request to the time server to receive the timing synchronization information,” as recited in claims 1 and 16; “detect the ultrasonic location code,” as recited in claims 1, 3, 4, 7, and 12; or “beacons including the timing synchronization information and respective time delay information relative to a unified time of origin,” as recited in claims 3 and 26, we conclude that the Petition does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging any of claims 1, 3, 4, 7, 12, 16, or 26, or of any of dependent claims 2, 5, 6, 9–11, 14, and 17, under 35 U.S.C. § 102(a) over Marco.

Asserted Ground of Obviousness of Claims 18–21 and 23 over Marco and Carter

Claims 18–21 and 23 depend from claims 1, 3, 4, 7, and 12, respectively, and, therefore, each includes the limitation “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the ultrasonic base stations,” as recited in claims 1, 3, 4, and 12, or the limitation “a plurality of portable devices, each portable device configured to . . . detect the ultrasonic location codes from the

ultrasonic signals transmitted by the ultrasonic base stations,” as recited in claim 7. Because we have already concluded, as discussed above, that neither Carter nor Marco discloses at least those limitations, we conclude that the Petition also does not establish a reasonable likelihood of Petitioner prevailing at trial in challenging claims 18–21 or 23 under 35 U.S.C. § 103(a) over the combination of Marco and Carter.

V. CONCLUSION

We conclude that Petitioner has not shown a reasonable likelihood that it would prevail in demonstrating that any of the challenged claims of the ’909 patent are unpatentable.

VI. ORDER

Upon consideration of the record before us, it is

ORDERED that the Petition is denied, and an *inter partes* review is not instituted with respect to any claims of U.S. Patent No. 8,604,909 B1.

IPR2014-01219
Patent 8,604,909 B1

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