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Paper 32
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCL CORPORATION, TCL COMMUNICATION TECHNOLOGY HOLDINGS, LTD., TCT MOBILE LIMITED, TCT MOBILE INC., and TCT MOBILE (US) INC.,
Petitioners,

v.

TELEFONAKTIEBOLAGET L. M. ERICSSON,
Patent Owner.

Case IPR2015-01650
Patent 6,535,815 B2

Before PATRICK R. SCANLON, BARBARA A. BENOIT, and STACY B. MARGOLIES, *Administrative Patent Judges*.

MARGOLIES, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. §318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, TCL Corporation, TCL Communication Technology Holdings, Ltd., TCT Mobile Limited, TCT Mobile Inc., and TCT Mobile (US) Inc. (collectively, "Petitioners") challenge the patentability of certain claims of U.S. Patent No. 6,535,815 (Ex. 1001, "the '815 patent"), owned by Telefonaktiebolaget LM Ericsson ("Patent Owner"). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. This Final Written Decision is issued concurrently with Final Written Decisions in IPR2015-01772 and IPR2015-01878, which also involve challenges to the patentability of certain claims of the '815 patent.

For the reasons discussed below, Petitioners have shown by a preponderance of the evidence that claims 1–3, 8–12, and 15–19 ("the challenged claims") of the '815 patent are unpatentable.

A. Procedural History

Petitioners filed a Petition for *inter partes* review of claims 1–3, 8–12, and 15–19 of the '815 patent. Paper 2 ("Pet."). On February 1, 2016, we instituted an *inter partes* review of claims 1–3, 8–12, and 15–19 of the '815 patent on certain asserted grounds of unpatentability. Paper 6 ("Dec.").

Subsequent to institution, Patent Owner filed a Patent Owner Response to the Petition (Paper 17, "PO Resp."), to which Petitioners filed a Reply (Paper 22, "Pet. Reply"). An oral hearing was held on October 26, 2016. A transcript of the hearing has been entered into the record. Paper 31 ("Tr.").

B. Related Matters

The parties identify the following district court proceedings in which the '815 patent has been asserted: *Ericsson Inc. v. TCL Commc'n Tech. Holdings, Ltd.*, No. 2:15-cv-11 (E.D. Tex. 2015) and *Ericsson Inc. v. Apple Inc.*, No. 15-cv-290 (E.D. Tex. 2015). Pet. 1–2; Paper 5, 2–3.

The parties also identify other matters that would affect, or be affected by, a decision in this proceeding. *See* 37 C.F.R. § 42.8(b)(2); Pet. 1–2; Paper 5, 2–3; Paper 12, 1–2; Paper 16, 1–2.

Claims of the '815 patent also are subject to *inter partes* review in IPR2015-01772 and IPR2015-01878.

C. The '815 Patent

The '815 patent is directed to a mobile terminal equipped with a GPS receiver that, in response to a request for its current position, determines whether aiding data stored in its memory is sufficient to meet a specified qualify of service. Ex. 1001, Abstract. The '815 patent explains that a GPS receiver typically determines its location by computing distances between the GPS receiver and a number of space-based satellites. *Id.* at 1:12–14. According to the patent, a GPS receiver reads aiding data contained in GPS signals acquired from satellites and computes its location based on that data. *Id.* at 1:17–20, 4:41–48. The '815 patent explains that this process can be time consuming, often requiring several minutes—a prohibitive amount of time for some applications. *Id.* at 1:20–22.

The '815 patent describes a method and system that "avoids unnecessary requests for aiding data, thereby reducing network traffic" and "reduc[ing] charges . . . incurred by users for retrieving aiding data from the network." *Id.* at 2:35–40.

Figure 1 of the ’815 patent, below, illustrates mobile communication system 10 that supports communications with GPS-equipped mobile terminals 100:

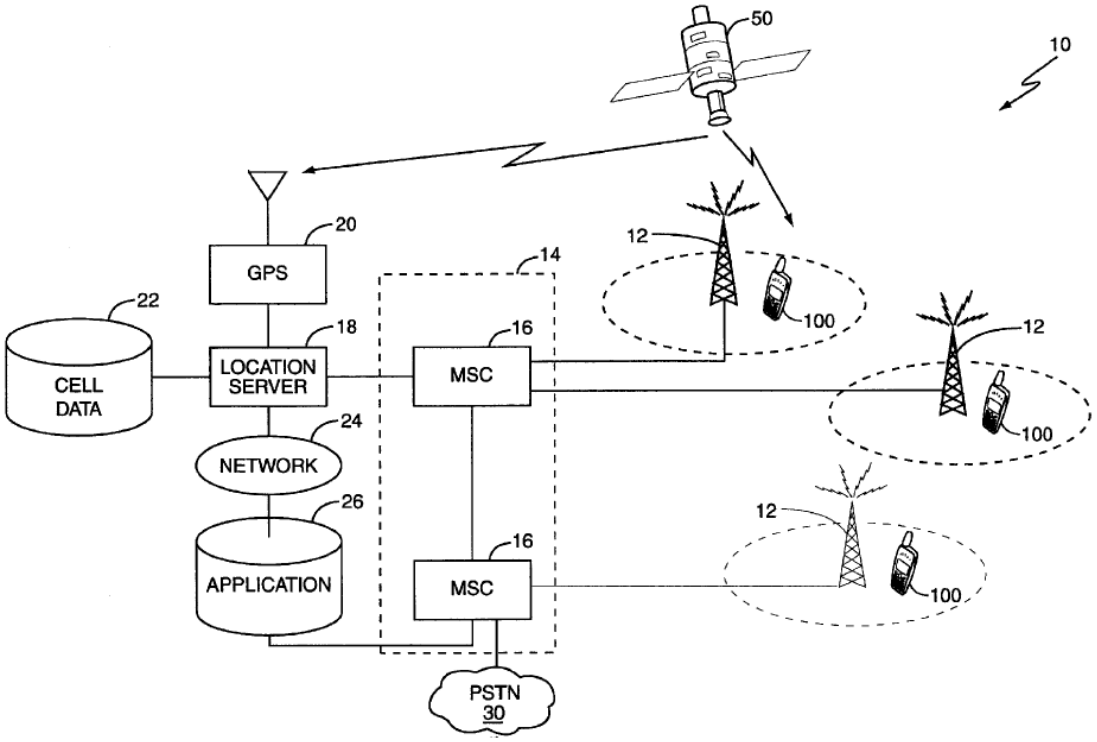


FIG. 1

Id. at 3:11–14. As illustrated in Figure 1 above, mobile communication system 10 includes mobile terminals 100, base stations 12, and core network 14 having one or more mobile switching centers (MSCs). *Id.* at 3:14–17. Location server 18 provides aiding data to mobile terminals 100 when needed to perform position calculations. *Id.* at 3:34–38. According to the patent, “[t]he aiding data includes information broadcast by the satellites 50 in the GPS constellation, including precise orbits (ephemeris) and clock corrections, corrections for ionospheric and propagation delays, and coarse long-term orbits (almanac).” *Id.* at 3:42–46. Position application 26 may be a location-dependent information service that provides location-specific

information, such as the nearest restaurant, to a requesting mobile terminal. *Id.* at 4:4–9. The '815 patent states that positioning application 26 may execute on application servers external to mobile terminal 100 (either within or outside of mobile communication network 10) or may execute within mobile terminal 100 or core network 14. *Id.* at 3:58–65.

Figure 2 of the '815 patent, shown below, illustrates components of mobile terminal 100:

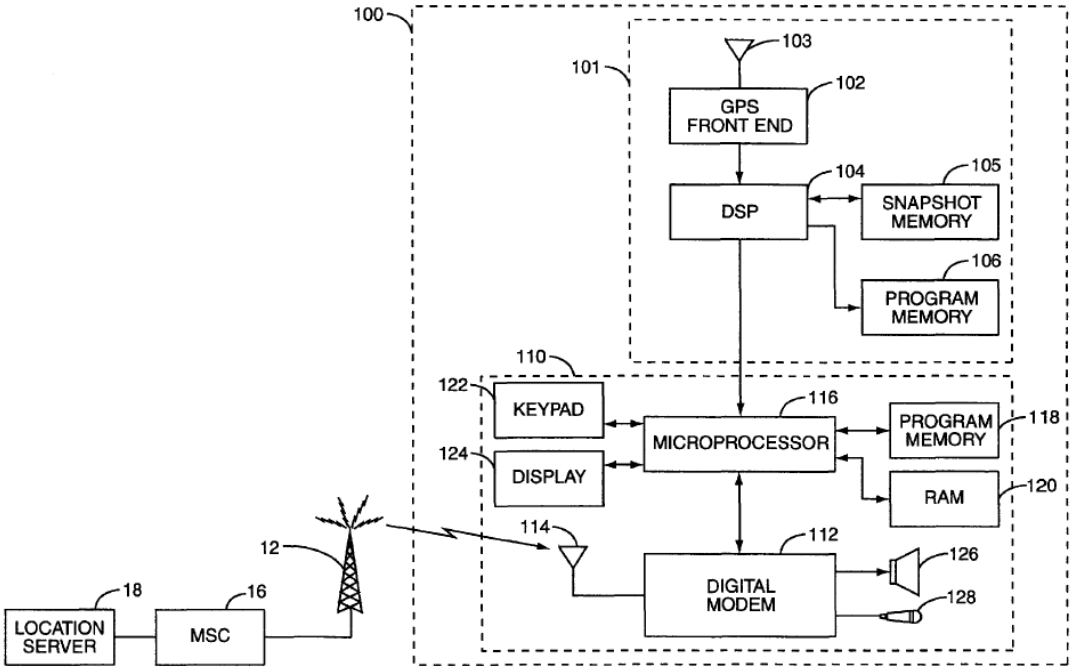


FIG. 2

Id. at 4:9–10. As illustrated in Figure 2 above, mobile terminal 100 includes snapshot memory (also called data memory) 105 that stores aiding data that is extracted from GPS signals or received from the network. *Id.* at 4:41–43.

The '815 patent discloses that, "[a]ccording to the present invention," positioning application 26 "running either within the mobile terminal 100 itself or in the mobile communication network 10" requests a position update from mobile terminal 100. *Id.* at 5:26–29. Microprocessor 116

"determines a desired quality of service (QoS)." *Id.* at 5:29–30. The '815 patent explains:

> To make this determination of QoS, microprocessor 116 may, for example, prompt the user with a menu of choices related to desired positioning quality of service (QoS). One such menu could contain selections such as "Most accurate," "Fastest," "Least Expensive." In this example, the user chooses the desired QoS from the menu. Alternatively, the positioning application 26 executing in microprocessor 116 could automatically utilize a default QoS value, which the user has previously chosen for a particular application and stored in data memory 120. The QoS parameters could also be supplied to the mobile terminal 100 by the requesting application.

Id. at 5:30–42. The '815 patent discloses that, depending on the desired QoS, the microprocessor "may provide aiding data stored in its own data memory 120 to the GPS receiver 101 to use in performing position calculations, or it may instruct the GPS receiver 101 to acquire current aiding data from a GPS satellite 50." *Id.* at 5:42–48.

Figure 3 of the '815 patent, shown below, illustrates a flow chart of a procedure implemented in mobile terminal 100 for acquiring aiding information:

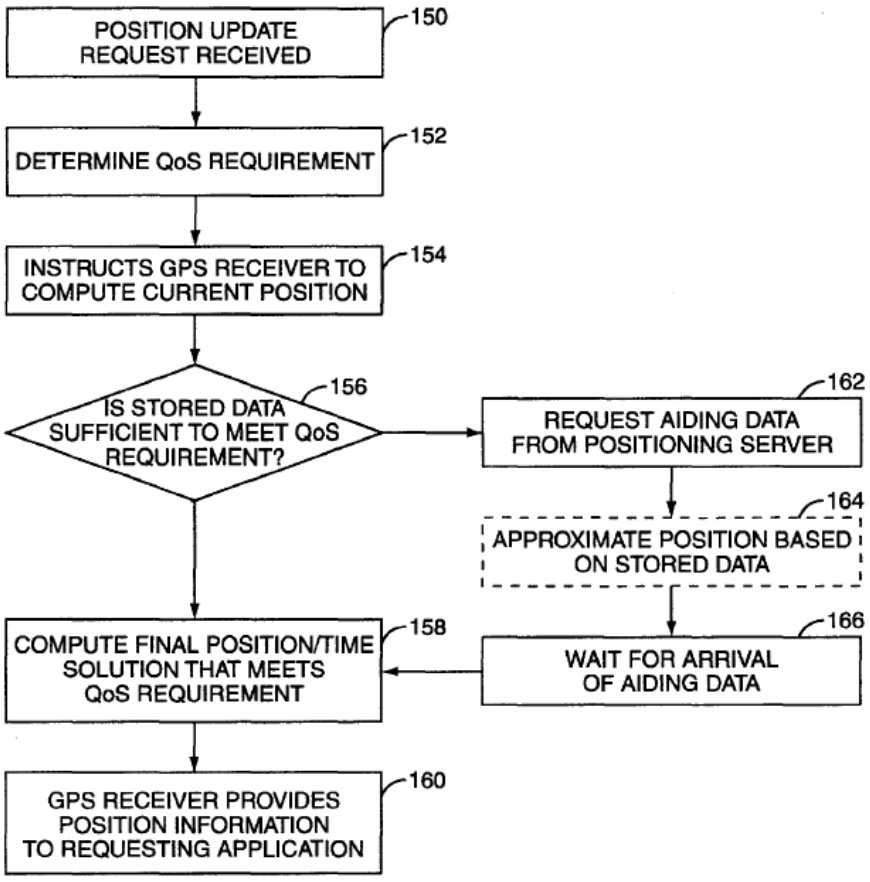


FIG. 3

Id. at 2:47–49, 5:52–53. As illustrated in Figure 3 above, at block 150, microprocessor 116 of mobile terminal 100 receives a position request for the mobile terminal's current position. *Id.* at 5:53–55. The request could originate from positioning application 26 running either on the mobile terminal or external to the mobile terminal. *Id.* at 5:55–58. The position request also could be responsive to a request by mobile terminal 100 for information, such as the nearest restaurant. *Id.* at 5:58–61.

At block 152, microprocessor 116 determines the desired quality of service (QoS) for making position estimates. *Id.* at 5:62–63. The '815 patent states that microprocessor 116 may prompt the user with a menu of

choices related to desired QoS, positioning application 26 could specify a QoS value in the position request, or a default QoS value stored in data memory 120 could be used. *Id.* at 5:62–6:4.

At block 154, microprocessor 116 instructs GPS receiver 101 to compute the current position of mobile terminal 100 based on the specified QoS. *Id.* at 6:6–9. Next, at block 156, either GPS receiver 101 or microprocessor 116 estimates if the currently stored aiding data is sufficient to meet the desired QoS requirements. *Id.* at 6:13–18. If the data is sufficient, GPS receiver can use the stored aiding data to acquire the GPS satellite signals and compute a position/time solution, per block 158, and returns that position/time solution to the requesting application, per block 160. *Id.* at 6:43–49. If the stored aiding data is not sufficient to meet the desired QoS requirements, then in block 162 either GPS receiver 101 or microprocessor 116 requests aiding data from location server 18. *Id.* at 6:54–57. GPS receiver 101 or microprocessor 116 optionally estimates position based on the data stored in memory (block 164) as it waits for the arrival of the aiding data (block 166). *Id.* at 6:57–65. Once GPS receiver or microprocessor 116 has received the new aiding data, it computes the position/time solution that is expected to meet QoS requirements (block 158), and provides that position information to the requesting application (block 160). *Id.* at 7:10–13, 7:18–21.

D. Illustrative Claims

Among the challenged claims, claims 1 and 17 are independent. Claims 1, 8, and 17 are illustrative of the challenged claims and read as follows:

> 1. A method implemented by a mobile terminal for determining the current position of a mobile terminal, said method comprising:
>
> receiving a request for said current position of said mobile terminal;
>
> determining a desired quality of service;
>
> determining whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service; and
>
> obtaining additional aiding data from a remote source if said stored aiding data is insufficient to compute said estimate of said current position meeting said desired quality of service.
>
> 8. The method of claim 1 wherein said determining a desired quality of service comprises receiving a specified quality of service from a requesting application.
>
> 17. A mobile terminal comprising:
>
> a positioning receiver;
>
> a processor for computing current position based on navigation signals received by said positioning receiver; said processor programmed to:
>
> determine a desired quality of service for the computation of current position;
>
> determine whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service; and
>
> obtain additional aiding data from a remote source external to the mobile terminal if said stored aiding data is insufficient to compute said estimate of said current position meeting said desired quality of service.

Id. at 7:30–43, 7:60–62, 8:25–40.

E. Asserted Grounds of Unpatentability

We instituted an *inter partes* review of claims 1–3, 8–12, and 15–19 of the '815 patent on the following grounds:

Reference(s)	Basis	Challenged Claim(s)
King[1]	35 U.S.C. § 102[2]	1–3, 8, 9, 11, 12, 15–19
King and Gilbert[3]	35 U.S.C. § 103	10

II. DISCUSSION

A. Principles of Law

To prevail in challenging Patent Owner's patent claims, Petitioners must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir.

[1] U.S. Patent No. 6,313,787, filed Nov. 12, 1999, issued Nov. 6, 2001 (Ex. 1026, "King").
[2] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), revised 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Because the challenged patent was filed before March 16, 2013, we refer to the pre-AIA version of §§ 102 and 103 in this decision.
[3] U.S. Patent No. 6,377,891, filed Feb. 12, 1999, issued Apr. 23, 2002 (Ex. 1022, "Gilbert").

2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, a petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

Petitioners assert that certain claims of the '815 patent are unpatentable under 35 U.S.C. § 102 as anticipated by King. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). The elements must be arranged as recited in the claim, but identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990); *see also Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

Petitioners also assert that claim 10 of the '815 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over King and Gilbert. A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). "A determination of whether a patent claim is invalid as obvious under § 103

requires consideration of all four *Graham* factors, and it is error to reach a conclusion of obviousness until all those factors are considered." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc) (citations omitted). "This requirement is in recognition of the fact that each of the *Graham* factors helps inform the ultimate obviousness determination." *Id.*

B. Level of Ordinary Skill

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. "The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* at 1579. In a given case, one or more factors may predominate. *Id.* Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovention Toys, LLC v. MGA Entm't, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) ("A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.").

Petitioners' declarant Dr. Goldberg opines that one of ordinary skill in the art

> would have had either: (1) a graduate degree in computer engineering, electrical engineering, applied physics or a related field, and at least three years' experience in the design and development of GPS based location services, systems, and/or devices or (2) a bachelor degree in computer engineering, electrical engineering, applied physics or a related field, and at least five years' experience in the design and development of GPS based location services, systems, and/or devices.

Ex. 1051 ¶ 64. Dr. Goldberg explains that he determined the characteristics of a hypothetical person of ordinary skill in the art of the '815 patent as of December 22, 2000 based on his review of the '815 patent and prior art references cited in the '815 patent and referenced in his declaration and on his "knowledge of positioning technologies for mobile terminals equipped with a positioning receiver, including [his] work on multiple GPS based navigational and tracking technologies, which included a product line for tracking people and cargo using cellular phones equipped with GPS receivers." *Id.*

Patent Owner does not challenge Dr. Goldberg's testimony regarding the level of skill in the art. *See generally* PO Resp. However, Mr. Blackburn, Patent Owner's declarant, opines that a person of ordinary skill in the art

> would probably have had a graduate degree in computer engineering, electrical engineering, applied physics, or a related field, and at least three years' experience in the design and development of GPS *or cellular* location services, systems, and/or devices or (2) a Bachelor's degree in computer engineering, electrical engineering, applied physics, or a related field, and at least five years' experience in the design, *analysis,*

> *and/or* development of GPS, *cellular and PSTN* location services, systems, and/or devices.

Ex. 2004 ¶ 11 (emphases added). As illustrated by the emphasized words above, Mr. Blackburn's proposed level of ordinary skill differs slightly from Dr. Goldberg's. Patent Owner, however, does not cite the above testimony in its Patent Owner Response. Nor does Patent Owner or Mr. Blackburn explain the reason for including cellular and PSTN location services, or for adding analysis as an alternative in the description of experience in the field. *See generally* PO Resp.

We determine that the level of ordinary skill proposed by Petitioners' declarant is consistent with the challenged patent and the asserted prior art, and we therefore adopt Dr. Goldberg's definition of the level of ordinary skill in the art for the purposes of the analysis below. However, our analysis would not differ if we were to adopt Mr. Blackburn's definition.

C. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as 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). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with

reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Petitioners propose constructions for a number of terms. Pet. 17–25. Patent Owner "generally agrees that the constructions proposed by [Petitioners] are in keeping with how a [person of ordinary skill in the art] would have understood those terms," except that Patent Owner maintains that Petitioners' proposed construction of "quality of service" must be construed as part of the larger phrase "determining a desired quality of service." PO Resp. 10. Patent Owner proposes a construction for the larger phrase, PO Resp. 10–20, with which Petitioners disagree, Pet. Reply 2–11. For purposes of this decision, we determine that only "quality of service" (as recited in claims 1 and 17) requires express construction, as explained below.

Independent claim 1 recites "determining a desired quality of service." Independent claim 17 similarly recites a processor programmed to "determine a desired quality of service for the computation of current position." Petitioners assert that the phrase "quality of service" means "an indication of grade or level of performance associated with a computed position estimate." Pet. 17 (emphasis omitted). Petitioners argue that even though the specification of the '815 patent does not explicitly define "quality of service," the specification provides examples that are consistent with Petitioners' proposed construction. *Id.* at 17–19. Petitioners also argue that the applicant's statements during prosecution are consistent with Petitioners' construction, and that Petitioners' construction is supported by the prior art. *Id.* at 19–20.

Patent Owner argues that the larger phrase "determining a desired quality of service" should be construed, and that it means "ascertaining a quality of service associated with a computed position estimate as a function of any user- or position application-selectable input related to quality of service." PO Resp. 11–12 (emphasis omitted). Patent Owner maintains that its construction is consistent with the specification and prosecution history of the '815 patent. *Id.* at 12–20. Patent Owner argues that the term "desired" reflects that "a QoS value or parameter (*i.e.*, a QoS input) is *selected* by a user or a positioning application." *Id.* at 13 (emphasis added). Patent Owner maintains that the three embodiments for determining a desired quality of service described in the '815 patent enable the user of the mobile terminal or the positioning application "to *choose* a QoS input . . . using the mobile terminal." *Id.* at 15 (emphasis added). Patent Owner also argues that the desired QoS is not sent from the cellular network to the mobile terminal. *Id.* at 16 (citing Ex. 2004 ¶ 50). Patent Owner asserts that, during prosecution, "the Examiner distinguished a mobile terminal 'determining a desired quality of service' and [cited prior art reference] Havinis's teaching of a network communicating quality of service parameters to a mobile terminal as part of a positioning request," as Petitioners assert. *Id.* at 18.

For the reasons explained below, we conclude that "determining a desired quality of service" is not limited to determining a quality of service "as a function of any user- or position application-selectable input related to quality of service," as Patent Owner asserts. We also determine that the broadest reasonable interpretation of the phrase "quality of service" is "an

indication of grade or level of performance associated with a computed position estimate."

First, the '815 patent and its prosecution history do not support Patent Owner's narrow reading. The '815 patent discloses that a GPS receiver can optimize the time for estimating its current position and minimize radio network traffic "based on one or more quality of service (QoS) parameters." Ex. 1001, 2:54–58. The patent explains that "[t]hese QoS parameters may be computed internally within the mobile terminal or *received in a position request from the network*." *Id.* at 2:58–60 (emphasis added). The patent further explains that the microprocessor in the mobile terminal determines a desired QoS. *Id.* at 5:29–30, Fig. 2. Specifically, the '815 patent discloses:

> To make this determination of QoS, microprocessor 116 may, for example, prompt the user with a menu of choices related to desired positioning quality of service (QoS). One such menu could contain selections such as "Most accurate," "Fastest," "Least Expensive." In this example, the user chooses the desired QoS from the menu. Alternatively, the positioning application 26 executing in microprocessor 116 could automatically utilize a default QoS value, which the user has previously chosen for a particular application and stored in data memory 120. *The QoS parameters could also be supplied to the mobile terminal 100 by the requesting application.*

Id. at 5:30–42 (emphasis added); *see also id.* at 5:62–6:4 (similarly disclosing that the positioning application 26 could specify a QoS value in the position request). The '815 patent discloses that the requesting application (the positioning application 26 that requests the position update) may be external to the mobile terminal 100, either within or outside of the mobile communication network 10 (shown in Figure 1). *Id.* at 3:58–60.

Thus, the specification of the ’815 patent discloses that “determining a desired quality of service” includes receiving a QoS parameter or value from an application external to the mobile terminal and within or outside the communication network. The specification also discloses that the QoS parameter may be received in a position request from the network. The specification describes selection of menu choices for only one of the embodiments. The specification does not require selection of an input (by either the user or the position application) to indicate a desired QoS.

Moreover, the claims of the ’815 patent do not support Patent Owner’s narrow reading. Dependent claim 8 recites “[t]he method of claim 1 wherein determining a desired quality of service comprises receiving a specified quality of service from a requesting application.” *Id.* at 7:60–62. Thus, the “determining a desired quality of service” of claim 1 at least encompasses the embodiment recited in claim 8 in which a specified quality of service comes from a requesting application. As explained above, the ’815 patent discloses that that requesting application may be external to the mobile terminal itself. Also, claim 8 does not require that the desired quality of service be a selectable input. Dependent claim 10—which recites that the determining a desired quality of service comprises “prompting a user to input said desired quality of service; and receiving input from said user indicating said desired quality of service”—covers such a feature. But claim 1 is not so limited.

Furthermore, Patent Owner’s arguments based on the prosecution history of the ’815 patent lack merit. First, Patent Owner’s attempt to limit the claims based on the applicant’s characterization of its invention is unpersuasive. PO Resp. 17–18. The passages in the file history in which the

applicant describes the invention "by way of example" essentially repeat the description in the specification of the three embodiments for determining a desired quality of service and do not clearly disavow claim scope such that the determining requires a user- or position application-selectable input. *Compare* Ex. 1002, 48, 60, *with* Ex. 1001, 5:30–42. Second, Patent Owner's reliance on the Examiner's allowance of the claims over the Havinis reference also lacks merit. *See* PO Resp. 18–20. The applicant did not distinguish Havinis based on the "determining a desired quality of service" limitation; rather, the applicant distinguished Havinis based on the last two limitations of claim 1. Ex. 1002, 62–63; *see also id.* at 48–51. The Examiner did not interpret the phrase "a desired quality of service" or distinguish a mobile terminal determining a desired quality of service from a network communicating quality of service parameters to a mobile terminal, as Patent Owner argues. *See* PO Resp. 18–20.

Petitioners' proposed construction of "quality of service," on the other hand, is consistent with the '815 patent specification. The specification, for example, describes evaluating criteria such as "accuracy," "time-to-first-fix" and "sensitivity." Ex. 1001, 6:9–24. The specification also gives the following examples of quality of service: "Most accurate," "Fastest," and "Least Expensive." *Id.* at 5:33–36. Moreover, Petitioners' declarant, Dr. Goldberg, persuasively testifies that the attributes of accuracy, time-to-first-fix (TTFF), sensitivity, speed, and cost are all indications of a grade or level of performance that is to be associated with the computed position estimate. Ex. 1051 ¶ 155. Petitioners' proposed construction also is supported by the applicant's statements during prosecution of the '815 patent and a description of quality of service in a prior art reference as

referring to, for example, accuracy, periodicity, and response time. *See* Pet. 19–20 (citing Ex. 1002, 50; Ex. 1005, 5; Ex. 1051 ¶¶ 155–157). Patent Owner does not challenge Petitioners' proposed construction of the shorter phrase "quality of service." *See* PO Resp. 10–20. We determine that the common term "desired"—for which there is no special definition or disavowal in the specification—need not be expressly construed. *See* Pet. Reply 3–4.

For the foregoing reasons, the broadest reasonable interpretation of "determining a desired quality of service," as recited in claim 1, and "determine a desired quality of service," as recited in claim 17, is not limited to "ascertaining a quality of service associated with a computed position estimate as a function of any user- or position application-selectable input related to quality of service," as proposed by Patent Owner. We also determine that, contrary to Patent Owner's unsupported argument, the desired QoS may be received from the cellular network. Moreover, for the reasons explained above, we determine that the broadest reasonable interpretation of "quality of service" is "an indication of grade or level of performance associated with a computed position estimate."

D. Asserted Anticipation by King

Petitioners contend that claims 1–3, 8, 9, 11, 12, and 15–19 are unpatentable under 35 U.S.C. § 102(e) as anticipated by King. Pet. 3, 25–53. Relying in part on the testimony of Dr. Goldberg, Petitioners explain how King discloses each claim limitation. *Id.* at 29–53 (citing Ex. 1051).

With support of the declaration of Mr. Blackburn (Ex. 2004), Patent Owner challenges Petitioners' contentions. PO Resp. 9–37. In reply,

Petitioners maintain their position that the claims are unpatentable as anticipated by King. Pet. Reply 12–26.

We have reviewed the Petition, Patent Owner's Response, and Petitioner's Reply, as well as the relevant evidence discussed in those papers. For the reasons that follow, we determine that Petitioners have shown by a preponderance of the evidence that claims 1–3, 8, 9, 11, 12, and 15–19 are unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

1. Summary of King

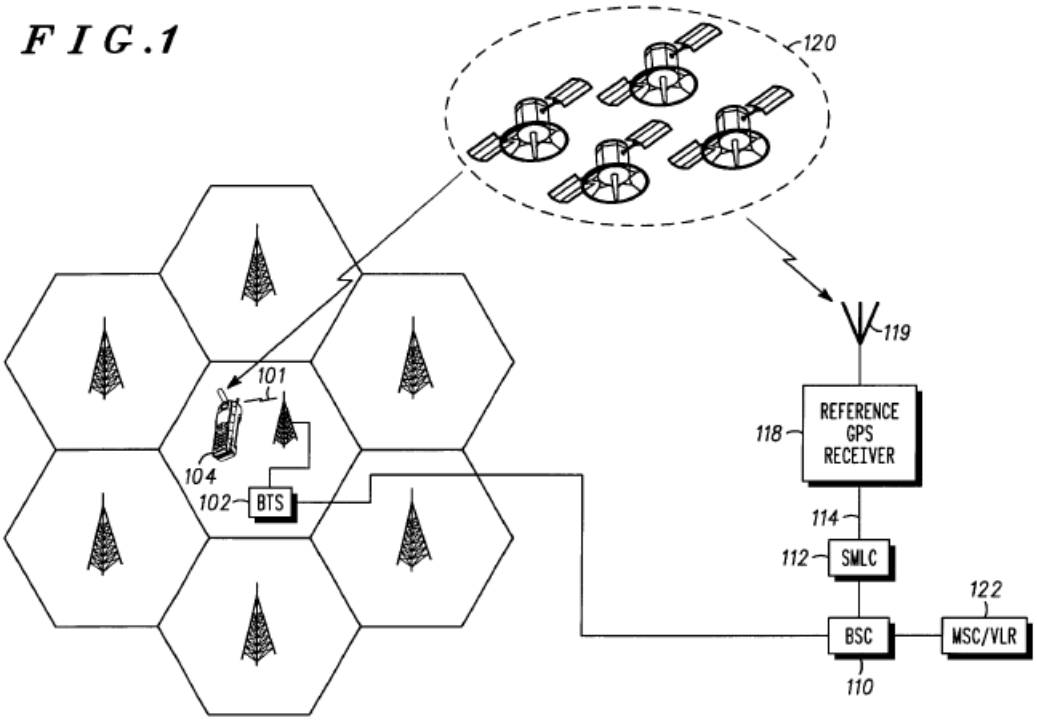
King is a U.S. patent titled "Method and Apparatus for Assisted GPS Protocol." Ex. 1026, [54]. King issued November 6, 2001 from an application filed November 12, 1999, and is prior art under 35 U.S.C. § 102(e) to the '815 patent, which issued March 18, 2003 from an application filed December 22, 2000. *Compare* Ex. 1026, [22], *with* Ex. 1001, [22].

King discloses a cellular network protocol that minimizes data flow between the cellular infrastructure and a mobile handset equipped with a GPS receiver. Ex. 1026, Abstract, 10:29–31. King explains as background that a conventional GPS receiver detects transmissions from GPS satellites, and using data and timing from those transmissions, calculates the positions of the satellites, and from those positions, calculates its position. *Id.* at 1:54–58. According to King, a processor capable of performing such calculations is relatively expensive and consumes large amounts of power. *Id.* at 2:17–24. Also according to King, acquisition of data from the GPS satellites may take many seconds or several minutes, thereby rapidly depleting the battery of the mobile handset. *Id.* at 2:25–33.

King also describes as background that an Assisted GPS system includes a GPS satellite sending the ephemeris and clock correction data to a base station of a radio communication system and the base station transmitting this data over a conventional communication link to a mobile station. *Id.* at 2:36–43. According to King, in such a system, the mobile station then uses the ephemeris and clock correction data to calculate satellite position, and in turn, its own position. *Id.* at 2:43–46.

King describes an improved Assisted GPS system in which a mobile station "can determine its location with a high degree of accuracy while achieving low power consumption and low cost objectives." *Id.* at 5:16–21. In particular, King describes a cellular network protocol that "reduces the required traffic flow (bandwidth) between the mobile station and the network." *Id.* at 27:26–36. King's Assisted GPS system is illustrated in Figure 1 below:

F I G . 1



Id. at 5:25–28. As illustrated in King's Figure 1 above, the Assisted GPS system includes GPS satellites 120, location-capable mobile stations (handsets) 104, Base Transceiver Station (BTS) 102, Base Station Controller (BSC) 110, Base Station Subsystem (BSS)-based Serving Mobile Location Center (SMLC) 112, GPS reference receiver 118, GPS reference receiver antenna 119, and Mobile services Switching Center (MSC) and Visitor Location Register (VLR) 122. *Id.* at 5:28–42. According to King, GPS reference receiver 118 receives and tracks signals from multiple GPS satellites 120 to generate differential correction data which eventually is sent to handsets 104. *Id.* at 5:43–46. King discloses that GPS reference receiver 118, which is coupled to SMLC 112 via serial link 114, transmits the differential correction data and ephemeris and clock correction data to SMLC 112. *Id.* at 5:33–37, 5:51–55. SMLC 112 collects the ephemeris and differential correction data and prepares messages sent to mobiles stations 104. *Id.* at 5:55–58.

Figures 9A and 9B of King illustrate a flowchart of the operation of the handset for delivery of ephemeris and differential correction data. *Id.* at 4:20–24. Figure 9A is shown below:

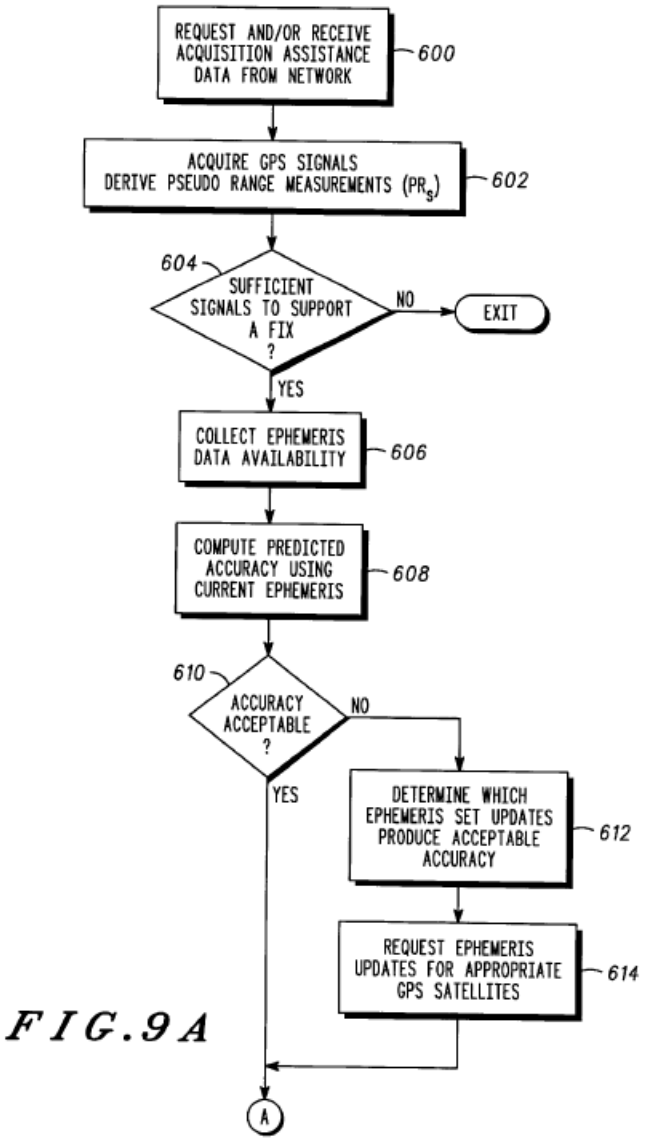


FIG. 9A

Figure 9A above illustrates steps pertaining to determining whether the handset has sufficient ephemeris data or whether it needs to request additional ephemeris data. *Id.* at 4:20–24, 12:23–28. At step 600, the handset receives acquisition assistance data from the cellular infrastructure. *Id.* at 12:6–11. At step 602, the handset determines pseudo range measurements for the GPS signals of suitable signal strength. *Id.* at 12:12–15. At step 604, the handset determines if sufficient pseudo ranges are available to support a position fix. *Id.* at 12:15–20. King discloses that if

sufficient satellites are available, available ephemeris data is collected and examined at step 606, and the resultant position fix accuracy is computed at step 608. *Id.* at 12:20–23. According to King, "[i]f the predicted accuracy is adequate, appropriate differential correction data can be requested as in [step 616, shown in Figure 9B]. If the accuracy is not adequate, however, a determination of which satellites' ephemeris data needs to be upgraded is made in 612, and requests are made for updated ephemeris for only these satellites in 614." *Id.* at 12:23–28.

King discloses that "[i]t is recognized that the accuracy requirements for different classes of users will vary. Therefore, an algorithm is defined which each handset can mechanize to predict the effects of ephemeris age upon the resultant solution accuracy." *Id.* at 16:17–21. According to King, "[t]his algorithm further reduces the data transmission requirements, since it will request a new ephemeris if, and only if, it is dictated by the mobile's accuracy requirements." *Id.* at 16:21–24. King also discloses that for a request for ephemeris data, the Base Station (BS) or Base Station Subsystem (BSS)-based Serving Mobile Location Center (SMLC) "need only send ephemeris data for currently visible satellites that are not already stored in the handset's memory or that violate the 'ephemeris age limit' parameter as specified by the particular mobile (the autonomous user end-application should set this based on the application['s] position accuracy requirements)." *Id.* at 22:20–26.

King explains that, in using the protocol illustrated in Figure 9A, "control of the transfer of data for each [handset's] position computations resides within the handset itself. Such a protocol will therefore minimize

data transactions within the cellular network, as each transfer is driven by a mobile handset's need." *Id.* at 12:36–40.

King further discloses "[a]nother aspect of the present invention" in which an algorithm is used to "determine[s] when to request an ephemeris update from the cellular infrastructure." *Id.* at 22:53–59. According to King, the objective of the algorithm is "to minimize the number of ephemeris update requests." *Id.* at 22:63–64. King explains that the number of requests is minimized by modeling the effect of ephemeris age on the GPS pseudo range residual, using this model in the solution method (if a Weighted Least Squares algorithm is used), producing the solution accuracy with the current set of ephemeris data, and if the predicted solution accuracy is excessive, by basing the handset ephemeris update request upon the effect of the ephemeris update on the predicted solution accuracy. *Id.* at 22:64–23:6.

2. Analysis

a. Independent claim 1

i. Preamble

Petitioners contend that King discloses the preamble of claim 1—"[a] method implemented by a mobile terminal for determining the current position of a mobile terminal"—by, for example, disclosing a "mobile station architecture which can determine its location with a high degree of accuracy while achieving low power consumption and low cost objectives," Pet. 30 (quoting Ex. 1026, 5:16–21) and that the mobile handset itself can determine its position, *id.* (citing Ex. 1026, 12:3–40; Ex. 1051 ¶ 188).

Patent Owner does not dispute Petitioners' contentions that King discloses a mobile terminal or that King discloses that the mobile terminal

determines its current position. *See* PO Resp. 20–21, 24–38. Patent Owner does argue that because King does not disclose that the mobile terminal itself determines a desired quality of service, King does not disclose that the claimed method, which includes the step of determining a desired quality of service, is "implemented by a mobile terminal." *Id.* at 2, 24–25.

We agree with Petitioners' analysis (Pet. 30) and adopt it as our own. We also agree with Petitioners' analysis of the "determining a desired quality of service" step, as discussed below. Accordingly, we determine that Petitioners have shown that King discloses a method implemented by a mobile terminal for determining the current position of a mobile terminal.

ii. Receiving a request

Petitioners rely on Figures 5 and 6 of King and the accompanying descriptions for showing that King discloses the next limitation of claim 1—"receiving a request for said current position of said mobile terminal." Pet. 30–32 (citing Ex. 1026, Figs. 5, 6, 6:24–27, 8:38–9:54). Petitioners contend that King discloses receiving location requests from within the mobile station (as illustrated in Figure 5) and external to the mobile station (as illustrated in Figure 6). *Id.* Petitioners also contend that because King teaches that a mobile station is capable of calculating its own position and/or obtaining GPS aiding data via its integrated GPS receiver, the mobile station must receive some request to determine its location. *Id.* at 32 (citing Ex. 1051 ¶ 193).

Patent Owner does not dispute Petitioners' contentions that King discloses the receiving step of claim 1. *See* PO Resp. 20–21, 24–38.

We agree with Petitioners' analysis (Pet. 30–32) and adopt it as our own. We determine that Petitioners have shown that King discloses receiving a request for said current position of said mobile terminal.

iii. Determining a desired quality of service

Claim 1 next recites "determining a desired quality of service." We determine above that the broadest reasonable construction of "quality of service" is "an indication of grade or level of performance associated with a computed position estimate." *See supra* Section II.C.

Petitioners contend that King discloses this limitation by disclosing determining whether a predicted accuracy is adequate. Pet. 32–34 (citing Ex. 1026, 9:11–17, 12:20–40, 15:66–16:11, 16:17–25, 27:55–58; Ex. 1051 ¶¶ 195–202). We agree and adopt Petitioners' analysis as our own. *See* Pet. 32–34. As Petitioners cite, King discloses "a method which each mobile can use to determine when an ephemeris update is needed, *based on an accuracy prediction and a threshold which is unique to each mobile station.*" Ex. 1026, 27:55–58 (emphasis added); *see also* Pet. 33. King also discloses that "[i]t is recognized that the accuracy requirements for different classes of users will vary. Therefore, *an algorithm is defined which each handset can mechanize to predict the effects of ephemeris age upon the resultant solution accuracy*." *Id.* at 16:17–21 (emphasis added). According to King, "[t]his algorithm further reduces the data transmission requirements, since it will request a new ephemeris if, and only if, it is dictated by the mobile's accuracy requirements." *Id.* at 16:21–24.

Moreover, as Petitioners argue, King describes using a specified accuracy requirement as the quality of service:

> If sufficient satellites are available, the available ephemeris data is collected and examined 606, and the resultant fix accuracy is

> computed in step 608. *If the predicted accuracy is adequate*, appropriate differential correction data can be requested as in 616. *If the accuracy is not adequate*, however, a determination of which satellites' ephemeris data needs to be upgraded is made in 612, and requests are made for updated ephemeris for only these satellites in 614.

Ex. 1026, 12:20–40 (emphases added); *see also* Pet. 33. Petitioners also cite Dr. Goldberg's testimony, which we find persuasive and supported by King, in arguing that King must determine a desired quality of service parameter—i.e., the specified accuracy—to determine whether the predicted accuracy is adequate. Ex. 1051 ¶¶ 198–200 (citing Ex. 1026, 16:17–21, 22:20–29, 22:56–23:13).

Patent Owner argues that King does not disclose the claimed "determining a desired quality of service." PO Resp. 20–21, 24–31. Patent Owner maintains that the mobile station in King requests a new ephemeris data update if and only if the GPS ephemeris data's age is too old to satisfy an accuracy requirement for positioning of the mobile station. *Id.* at 22. Patent Owner argues that this accuracy requirement is "a QoS parameter *provided by the network*." *Id.* (emphasis added). According to Patent Owner, in King, mobile station 101 receives the accuracy requirement from base station controller 110 of a cellular network that predetermines the accuracy requirement. *Id.* Patent Owner argues that because King discloses a cellular network sending a predetermined accuracy requirement to a mobile station, King does not disclose a "mobile terminal . . . determining a desired quality of service." *Id.* at 24; *see also* 22–23 (arguing that, in King, "the QoS is sent from the network to the mobile station rather than determined by the mobile station").

Specifically, Patent Owner argues that King's accuracy requirement is not a "desired" quality of service.[4] *Id.* at 25. Patent Owner argues that King's accuracy requirement such as cellular handsets being locatable within 100 meters 67% of the time is a requirement of the Federal Communications Commission that is predetermined by the cellular network. *Id.* at 25–26. Specifically, Patent Owner argues that King's accuracy requirement "is predetermined by the cellular network, ***not*** by a user or a positioning application," and "is ***not*** a QoS input which can prioritize criteria according the user or positioning application's preference." *Id.* at 27; *see also id.* at 28 (arguing that a "*desired* quality of service" is "a user- or positioning application-selectable input related to QoS, ***not*** merely an indication of grade or level of performance associated with a computed position estimate").

Patent Owner also argues that even if King's accuracy requirement can be considered a "desired quality of service," King does not disclose a mobile terminal "*determining* a desired quality of service" because, in King, the mobile station merely receives the predetermined accuracy requirement from the cellular network. *Id.* at 29–31.

Patent Owner's arguments are premised on a faulty claim construction and an improper attempt to read an embodiment from the specification into the claim. First, Patent Owner's arguments that King does not disclose a

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[4] Patent Owner does not challenge Petitioners' contention that King's accuracy requirement is a "quality of service." *See id.* at 22 (arguing that King's accuracy requirement is "a QoS parameter provided by the network"), 25 ("King at Fig. 5 discloses the base station controller of the cellular network sending the QoS (e.g., the predetermined accuracy requirement)").

mobile terminal "determining" a "desired" quality of service because, in King, the mobile station receives a QoS parameter from the network are based on Patent Owner's proposed construction, which we do not adopt. *See supra* Section II.C. As explained in the claim construction section above, Patent Owner's proposal to limit "determining a desired quality of service" to "ascertaining a quality of service associated with a computed position estimate as a function of any user- or position application-selectable input related to quality of service" unreasonably limits the claim to one embodiment in the specification. *See supra* Section II.C. Moreover, as explained above, Patent Owner's claim construction argument that the desired QoS is not sent from the cellular network to the mobile terminal is unreasonably narrow in light of express disclosures in the '815 patent specification that determining a desired quality of service includes receiving a specified quality of service from a source external to the mobile terminal. *See id.* Thus, Patent Owner's arguments distinguishing King because King's mobile terminal receives a QoS from the cellular network, and that King's mobile terminal does not determine the desired QoS, rest on a proposed claim construction which we do not adopt.

Patent Owner's remaining arguments distinguishing King are based on requirements not recited in the claim—that the quality of service be chosen by a user or a positioning application, and that the quality of service be an input which can prioritize criteria according the user or positioning application's preference. The disputed limitation merely recites "determining a desired quality of service" without specifying the source of desired quality of service or requiring multiple options for prioritizing criteria (such as the options of most accurate, fastest, or least expensive).

Although one embodiment in the '815 patent specification is providing a user with the ability to select from a number of options, claim 1 is not specific to that embodiment. Indeed, as explained above, claim 1 at least encompasses the subject matter of dependent claims 8, 9, and 10, and only claim 10 is directed to prompting a user to input the desired quality of service. And, claim 10 is not limited to a "selectable input" and does not require input which can prioritize criteria according the user or positioning application's preference. In sum, Patent Owner's arguments that King does not disclose "determining a desired quality of service" are based on an unreasonably narrow reading of this claim limitation.

Accordingly, for the above reasons, we determine that Petitioners have shown that King discloses "determining a desired quality of service," as recited in claim 1.

iv. Determining whether aiding data stored in said mobile terminal is sufficient

Claim 1 of the '815 patent next recites "determining whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service." Petitioners contend that King discloses this limitation. Pet. 34–38 (citing, e.g., Ex. 1026, Figs. 14, 16, 4:20–24, 12:20–28, 15:14–62, 22:52–23:14, 24:21–54; Ex. 1051 ¶¶ 203–209). We agree with Petitioners' analysis and adopt it as our own. As Petitioners contend, King discloses that the age of aiding data such as ephemeris data can impact accuracy. *Id.* at Figs. 14, 16, 15:14–62; *see also* Ex. 1051 ¶¶ 85, 134–136, 208, 209; Pet. 35. In addition, Petitioners rely on Figure 9A below, which shows steps pertaining to determining whether the handset has sufficient ephemeris data or whether it needs to request additional ephemeris data:

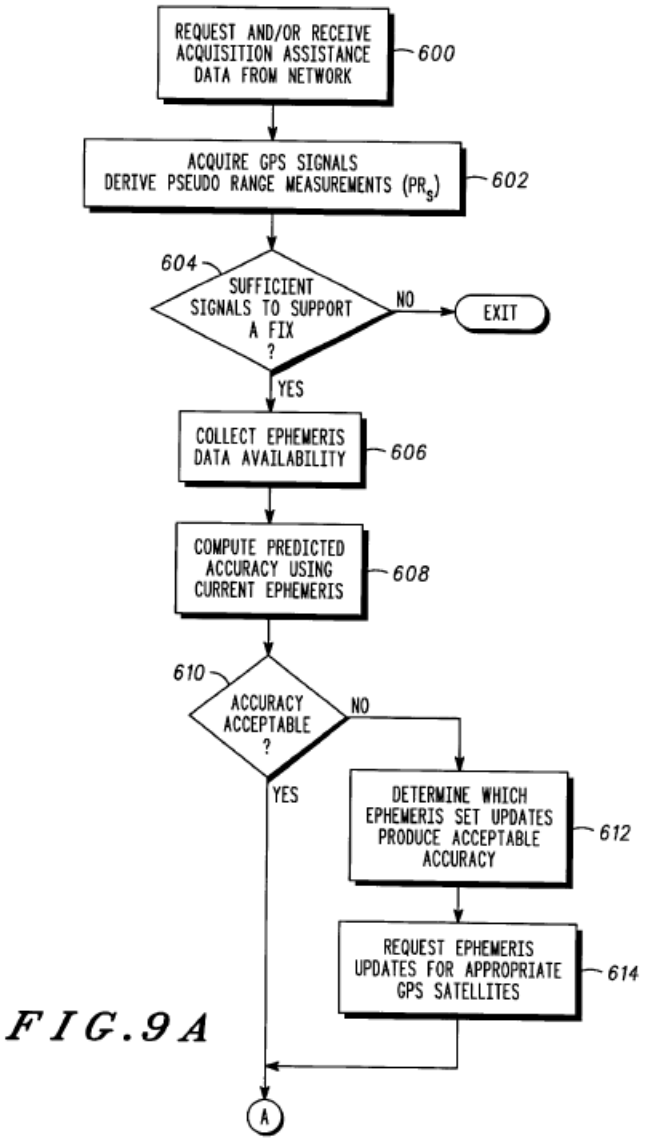

FIG. 9A

Ex. 1026, 4:20–24, 12:23–28. As Petitioners argue, Figure 9A above illustrates step 610, in which the mobile terminal determines whether a predicted accuracy based on ephemeris data stored in the mobile terminal is sufficiently accurate. Specifically, King discloses that "the available ephemeris data is collected and examined [in step] 606. *If the predicted accuracy is adequate*, appropriate differential correction data can be requested as in [step] 616 [shown in Figure 9B]. *If the accuracy is not adequate*, however, a determination of which satellites' ephemeris data

needs to be upgraded is made in [step] 612 . . . ." *Id.* at 12:20–28 (emphases added). King thus discloses determining whether the ephemeris data stored in the mobile data is sufficient to compute an estimate of the current position meeting the desired accuracy. *See* Ex. 1051 ¶¶ 205–209.

Petitioners additionally cite to King's disclosure of an "Algorithm for Embedment into Cellular Handset for Determining an Optimum Procedure for Updating the Handset Ephemeris." Pet. 36–37 (citing Ex. 1026, 22:52–23:14). King describes the algorithm as follows:

> Another aspect of the present invention is *a method, which can be implemented in a cellular handset, to determine when to request an ephemeris update from the cellular infrastructure*. Since the error which is induced by the ephemeris age can be compensated using appropriately generated differential corrections, the method is only intended to be used when the handset is operating autonomously. *The objective of the method is to minimize the number of ephemeris update requests.* The number of requests is minimized by explicitly modeling the effect of ephemeris age upon the GPS pseudo range (PR) residual; by using this model in the solution method (if a Weighted Least Squares (WLS) algorithm is utilized); *by predicting the solution accuracy with the current set of ephemeris data; and, finally, if the predicted solution is excessive, by basing the handset ephemeris update request upon the effect of the ephemeris update on the predicted solution accuracy*.

Id. at 22:56–23:6 (emphases added). As set forth above, King discloses updating ephemeris data based on how its age affects accuracy. As Petitioners argue, with Dr. Goldberg's support, one of ordinary skill in the art would have understood that King's updating aiding data such as ephemeris data according to an age limit was directly linked to quality of service such as accuracy. *See* Pet. 37; Ex. 1051 ¶ 209; Ex. 1026, 22:56–23:6, 24:21–54. For example, King discloses a test that "can be used to

determine if one or more ephemeris updates produces a significant reduction in the predicted navigation error." Ex. 1026, 24:40–42.

Patent Owner does not challenge Petitioners' contention that King discloses "determining whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service," other than arguing that, because King fails to teach determining a desired quality of service, King necessarily fails to teach this limitation. PO Resp. 31.

Because we agree with Petitioners' analysis of the evidence, as discussed above, we determine that Petitioners have shown that King discloses "determining whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service."

v. Obtaining additional aiding data

Claim 1 next recites "obtaining additional aiding data from a remote source if said stored aiding data is insufficient to compute said estimate of said current position meeting said desired quality of service." Petitioners contend, and we agree, that King discloses this claim limitation by disclosing, in Figure 9A and the accompanying description, that the handset determines whether to update ephemeris data based on whether the predicted accuracy is adequate. Pet. 38–39 (citing Ex. 1026, 12:20–40, 16:37–40, Ex. 1051 ¶ 207). Specifically, King discloses that "[i]f the accuracy is not adequate, . . . a determination of which satellites' ephemeris data needs to be upgrade is made in [step] 612, and requests are made for updated ephemeris for only these satellites in [step] 614." Ex. 1026, 12:23–28. Petitioners also contend, and we agree, that King discloses obtaining additional aiding data

from a remote source, such as the Serving Mobile Location Center (SMLC) 112 shown in Figure 1, if the desired quality of service cannot be met. Pet. 39–40 (citing Ex. 1026, 5:55–57; Ex. 1051 ¶¶ 212, 216); *see also* Ex. 1026, 8:42–45, 8:59–9:6. Petitioners also contend, and we agree, that King discloses using the additional aiding data to compute the estimate of the current position meeting the desired quality of service. Pet. 40 (citing Ex. 1026, 12:29–35); *see also* Ex. 1026, 8:45–48; Ex. 1051 ¶ 216.

Patent Owner does not challenge Petitioners' contention that King discloses this limitation. *See* PO Resp. 20–21, 24–38.

Because we agree with Petitioners' analysis of the evidence, as discussed above, we determine that Petitioners have shown that King discloses "obtaining additional aiding data from a remote source if said stored aiding data is insufficient to compute said estimate of said current position meeting said desired quality of service."

vi. Other Patent Owner arguments

Patent Owner raises two additional arguments for why King does not anticipate. PO Resp. 31–38. First, Patent Owner argues that King does not yield the same results as the '815 patent. *Id.* at 31–35. Second, Patent Owner argues that Petitioners improperly rely on two distinct methods in King. *Id.* at 36–38. For the reasons explained below, both arguments lack merit.

Patent Owner first argues that, unlike King, the '815 patent enables the user or positioning application to input one or more QoS values (e.g., fastest, least expensive, or most accurate) so that the user or positioning application can prioritize criteria according to the user or positioning application's preference. *Id.* at 31–32. Patent Owner argues that King does

not allow the user or positioning application to "select a QoS with descriptive terms to prioritize criteria according to the user or positioning application's preference" and "[c]onsequently . . . does not yield the same results" as the features claimed in the '815 patent. *Id.* at 32 (emphasis omitted). Patent Owner asserts that "King's technology has . . . no flexibility or intelligence to trade off the accuracy requirement for the least expensive or fastest delivery of a positioning service." *Id.* (emphasis omitted); *see also id.* at 32–35. This argument is merely a repeat of Patent Owner's argument that determining a desired quality of service requires ascertaining a quality of service as a function of a user- or position application-selectable input related to quality of service. Patent Owner again is seeking to limit the claim to a particular embodiment described in the specification. *See* Ex. 1001, 5:30–36 (describing an embodiment in which a menu containing selections for "Most accurate," "Fastest," and "Least Expensive" are presented to the user for selection). For the reasons explained in the claim construction section above, Patent Owner's argument is meritless. *See supra* Section II.C.

Patent Owner also argues that because Petitioners rely on distinct modes of operation in King—an assisted GPS mode and an autonomous mode—Petitioners' anticipation challenge fails. PO Resp. 36–38. Specifically, Patent Owner asserts that Figures 5, 9A, and 9B of King relate to a mobile terminal operating in an assisted GPS mode (receiving differential GPS ("DGPS") data from a cellular network), whereas the use of an embedded algorithm to determine when to request an ephemeris update is limited to when the mobile terminal operates in an autonomous mode (i.e., non-assisted GPS). *Id.* at 37–38. Petitioners respond in reply that Patent

Owner's argument is based on a misreading of King. Pet. Reply 25. Petitioners argue that, according to King, updates to aiding data other than DGPS data can still be received in the autonomous mode. *Id.* at 25–26 (citing Ex. 1026, 22:56–23:6; Ex. 1056 ¶ 33). Petitioners also cite testimony from Dr. Goldberg that an ordinarily skilled artisan would have immediately recognized that King's algorithm could be used in embodiments where aiding data is received from the network. *Id.* at 26 (citing Ex. 1056 ¶ 33).

We determine that Petitioners have established that King discloses the limitations as recited and arranged in claim 1. *See Net MoneyIN*, 545 F.3d at 1371. Petitioners rely on King's disclosures of features used for updating ephemeris data. For example, the portion of Figure 9A on which Petitioners rely relates to determining whether additional ephemeris data should be requested based on whether accuracy is acceptable (i.e., steps 610, 612, and 614). *See* Pet 32–37; *see also* Ex. 1026, Fig. 9A, 12:20–28. Likewise, King's disclosure of an embedded algorithm for determining an optimum procedure for updating the handset ephemeris relates to determining when to request additional ephemeris data. *See* Ex. 1026, 22:53–23:6. Petitioners therefore are not relying on distinct modes of operation in King; rather, Petitioners rely on features all pertaining to updating ephemeris data. Ex. 1026, Fig. 9A, 12:20–28, 22:53–23:6; *see also* Ex. 1056 ¶ 32.

Moreover, King describes the embedded algorithm as "[a]nother aspect of the present invention . . . which can be implemented in a cellular handset[] to determine when to request an ephemeris update *from the cellular infrastructure.*" *Id.* at 22:56–69. King explains that "[s]ince the error which is induced by the ephemeris age can be compensated using appropriately generated differential corrections, the method is only intended

to be used when the handset is operating autonomously." *Id.* at 22:59–63. Thus, as Petitioners argue, by "autonomous mode," King here means without using differential GPS. *See* Pet. Reply 25.

We also credit and find persuasive, as supported by King, Dr. Goldberg's testimony (i) that the features on which Petitioners rely are all applicable to assisted GPS; (ii) that the use of DGPS data does not exclude the use of other aiding data such as ephemeris data; and (iii) that an ordinarily skilled artisan would have recognized that King's embedded algorithm could be used with the steps illustrated in Figures 5, 9A, and 9B of King. Ex. 1056 ¶¶ 32–34. Indeed, the final point is corroborated by the claims of King, which illustrate that the embedded algorithm is one way of computing the predicted accuracy per step 608 of Figure 9A. Specifically, claim 1 of King recites a method for determining a location of the mobile radio handset that includes receiving a point-to-point ephemeris message that includes ephemeris data, receiving a point-to-point differential correction message that includes differential correction data, and determining a prediction of an accuracy of the computed location. Ex. 1026, 28:17–46. According to King, Figures 9A and 9B "are a flowchart of the operation of the handset . . . for request/receive and point-to-point delivery of ephemeris and differential correction data in accordance with the preferred embodiment of the present invention." *Id.* at 4:20–24. Claim 3 of King depends from claim 1 and recites that the step of determining a prediction of the accuracy comprises determining a prediction based on covariance information derived by a Weighted Least Square fixing method. *Id.* at 28:53–58. King discloses a Weighted Least Square fixing method only in connection with the embedded algorithm. *See id.* at 22:53–24:35.

For the above reasons, we do not agree with Patent Owner that Petitioner relies on two distinct methods in King.

vii. Conclusion

Having reviewed the parties' arguments and supporting evidence, for the reasons explained above, we determine that Petitioners have shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

b. Independent claim 17

Petitioners contend that King discloses each limitation of independent claim 17. Pet. 11–18. With respect to the preamble ("a mobile terminal") and the first limitation (that the mobile terminal include "a positioning receiver"), Petitioners contend, and we agree, that King discloses a wireless communication device such as an assisted GPS enabled cellular radiotelephone. Pet. 50–51 (citing Ex. 1026, Fig, 8, 1:48–58, 10:29–31, 10:60–11:7). Patent Owner does not challenge Petitioners' contention that King discloses a mobile terminal comprising a position receiver.

Claim 17 also recites that the mobile terminal includes "a processor for computing current position based on navigation signals received by said positioning receiver." Petitioners contend, and we agree, that King discloses this limitation in that it discloses a microprocessor for controlling and/or performing various features of a mobile terminal including the processes discussed above in connection with claim 1. Pet. 51 (citing Ex. 1026, Fig. 8, 10:33–50, 11:58–12:2). Patent Owner does not challenge Petitioners' contention that King discloses this limitation.

Claim 17 next recites "said processor programmed to" perform three functions that are either identical or nearly identical to those recited in claim

1: determine a desired quality of service for the computation of current position, determine whether aiding data stored in said mobile terminal is sufficient to compute an estimate of said current position meeting said desired quality of service, and obtain additional aiding data from a remote source external to the mobile terminal if said stored aiding data is insufficient to compute said estimate of said current position meeting said desired quality of service. *Compare* Ex. 1001, 8:29–40, *with id.* at 7:35–43. With respect to each of these three limitations, Petitioners rely on their analysis of the corresponding limitation in claim 1. Pet. 51–52. For the reasons set forth above in connection with claim 1, we determine that Petitioners have shown that King discloses each of these limitations of claim 17.

Accordingly, having reviewed the parties' arguments and supporting evidence, for the reasons explained above, we determine that Petitioners have shown by a preponderance of the evidence that claim 17 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

c. Dependent claims 2, 3, 8, 9, 11, 12, 15, 16, 18, and 19

i. Claim 2

Claim 2 recites "[t]he method of claim 1 wherein obtaining additional aiding data from a remote source comprises obtaining additional aiding data from a mobile communication network." Petitioners contend that King discloses the additional limitation of claim 2. Pet. 41–42 (citing, e.g., Ex. 1026, Fig. 1, 5:24–27, 5:43–46, 5:55–57, 5:62–6:5). Patent Owner does not raise any arguments specific to claim 2 or challenge Petitioners' contention that King discloses the limitation added by claim 2. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 41–42, and determine that Petitioners have shown by a preponderance of the evidence that claim 2 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

ii. Claim 3

Claim 3 recites "[t]he method of claim 1 wherein obtaining additional aiding data from a remote source comprises obtaining additional aiding data from at least one satellite." Petitioners contend that King discloses the additional limitation of claim 3. Pet. 42–43 (citing, e.g., Ex. 1026, Fig. 8, 5:43–46, 5:51–54, 10:60–11:7, 11:34–39). Patent Owner does not raise any arguments specific to claim 3 or challenge Petitioners' contention that King discloses the limitation added by claim 3. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 42–43, and determine that Petitioners have shown by a preponderance of the evidence that claim 3 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

iii. Claim 8

Claim 8 recites "[t]he method of claim 1 wherein determining a desired quality of service comprises receiving a specified quality of service from a requesting application." Petitioners contend that King discloses the additional limitation of claim 8. Pet. 44–45 (citing, e.g., Ex. 1026, 17:35–60). Patent Owner does not raise any arguments specific to claim 8 or challenge Petitioners' contention that King discloses the limitation added by claim 8. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 44–45, and determine that Petitioners have shown by a preponderance of the evidence that claim 8 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

iv. Claim 9

Claim 9 recites "[t]he method of claim 1 wherein determining a desired quality of service comprises determining a default setting for said desired quality of service." Petitioners contend that King discloses the additional limitation of claim 9. Pet. 45–46 (citing, e.g., Ex. 1026, 16:17–24, 17:56–60, 22:20–26, 22:52–24:55). Patent Owner does not raise any arguments specific to claim 9 or challenge Petitioners' contention that King discloses the limitation added by claim 9. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 45–46, and determine that Petitioners have shown by a preponderance of the evidence that claim 9 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

v. Claim 11

Claim 11 recites "[t]he method of claim 1 further comprising computing said current position of said mobile terminal." Petitioners contend that King discloses the additional limitation of claim 11. Pet. 46–47 (citing, e.g., Ex. 1026, 5:1–23, 8:45–48, 10:46–50[5], 12:29–35). Patent Owner does not raise any arguments specific to claim 11 or challenge Petitioners' contention that King discloses the limitation added by claim 11. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 46–47, and determine that Petitioners have shown by a preponderance of the evidence that claim 11 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

[5] Petitioners' cite to "10:46–40" is an obvious typographical error. Pet. 47.

vi. Claim 12

Claim 12 recites "[t]he method of claim 11 wherein computing said current position of said mobile terminal comprises computing said current position of said mobile terminal based on said stored aiding data." Petitioners contend that King discloses the additional limitation of claim 12. Pet. 48 (citing, e.g., Ex. 1026, 12:12–40). Patent Owner does not raise any arguments specific to claim 12 or challenge Petitioners' contention that King discloses the limitation added by claim 12. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 48, and determine that Petitioners have shown by a preponderance of the evidence that claim 12 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

vii. Claim 15

Claim 15 recites "[t]he method of claim 11 wherein computing said current position of said mobile terminal comprises computing said current position based on said additional aiding data obtained from said remote source." Petitioners contend that King discloses the additional limitation of claim 15. Pet. 48–49. Patent Owner does not raise any arguments specific to claim 15 or challenge Petitioners' contention that King discloses the limitation added by claim 15. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 48–49 (referring to Petitioners' analysis of claims 1, 2, 3, and 11), and determine that Petitioners have shown by a preponderance of the evidence that claim 15 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

viii. Claim 16

Claim 16 recites "[t]he method of claim 11 wherein computing said current position of said mobile terminal comprises computing said current position using a last known location of said mobile terminal." Petitioners contend that King discloses the additional limitation of claim 16. Pet. 49 (citing, e.g., Ex. 1026, 12:32–35). Patent Owner does not raise any arguments specific to claim 16 or challenge Petitioners' contention that King discloses the limitation added by claim 16. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 49, and determine that Petitioners have shown by a preponderance of the evidence that claim 16 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

ix. Claim 18

Claim 18 recites "[t]he mobile terminal of claim 17 wherein the remote source is a network." Petitioners contend that King discloses the additional limitation of claim 18. Pet. 52. Patent Owner does not raise any arguments specific to claim 18 or challenge Petitioners' contention that King discloses the limitation added by claim 18. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 52 (referring to Petitioners' analysis of claim 2), and determine that Petitioners have shown by a preponderance of the evidence that claim 18 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

x. Claim 19

Claim 19 recites "[t]he mobile terminal of claim 17 wherein the remote source is a satellite." Petitioners contend that King discloses the additional limitation of claim 19. Pet. 53. Patent Owner does not raise any

arguments specific to claim 19 or challenge Petitioners' contention that King discloses the limitation added by claim 19. *See* PO Resp. 35.

We agree with and adopt Petitioners' analysis, *see* Pet. 53 (referring to Petitioners' analysis of claim 3), and determine that Petitioners have shown by a preponderance of the evidence that claim 19 is unpatentable under 35 U.S.C. § 102(e) as anticipated by King.

E. Asserted Obviousness over King and Gilbert

Petitioners contend that claim 10 of the '815 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over King and Gilbert. Pet. 3, 53–60. Petitioners cite to the prior art references and rely on declaration testimony of Dr. Goldberg. *Id.* at 53–60 (citing Ex. 1051). Furthermore, Petitioners provide analysis purportedly explaining how the combination would have conveyed to one of ordinary skill in the art the claim limitations and provide reasons why one of ordinary skill in the art would have combined the teachings of the references. *Id.* at 56–60.

With support of the declaration of Mr. Blackburn (Ex. 2004), Patent Owner challenges Petitioners' contentions, arguing that a person of ordinary skill in the art would not have been motivated to combine the references in the manner proposed by Petitioner. PO Resp. 38–42. In reply, Petitioners maintain their position that claim 10 would have been obvious in view of the teachings of King and Gilbert. Pet. Reply 26–27.

We have reviewed the Petition, Patent Owner's Response, and Petitioner's Reply, as well as the relevant evidence discussed in those papers. For reasons that follow, we determine that Petitioners have shown by a preponderance of the evidence the subject matter of claim 10 would have been obvious in view of the teachings of King and Gilbert.

1. Summary of Gilbert

Gilbert is a U.S. patent titled "User Interface for Global Positioning System Receiver." Ex. 1022, [54]. Gilbert issued April 23, 2002 from an application filed February 12, 1999, and is prior art under 35 U.S.C. § 102(e) to the '815 patent, which issued March 18, 2003 from an application filed December 22, 2000. *Compare* Ex. 1022, [22], *with* Ex. 1001, [22].

Gilbert discloses a GPS receiver that has a user interface for allowing a user to "specify[] a desired quality of position estimate to be provided by the receiver." Ex. 1022, 2:36–47, 3:59–62; *see also id.* at Abstract. Figure 1A of Gilbert, shown below, illustrates the components of GPS receiver 10 having user interface 22:

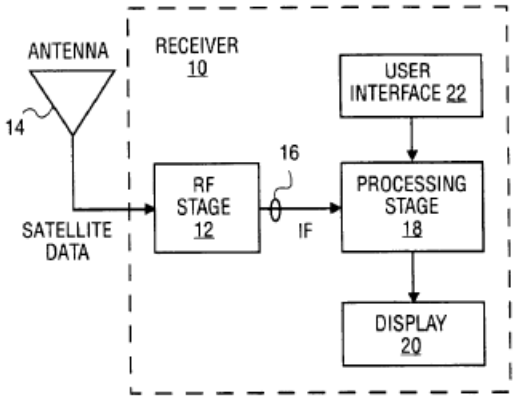

FIG. 1A

Id. at 3:1–3. As shown in Figure 1A above, GPS receiver 10 includes RF stage 12 which receives satellite data signals collected by antenna 14. *Id.* at 3:47–48. RF stage 12 produces intermediate frequency signals 16, which are provided to processing stage 18. *Id.* at 3:50–53. According to Gilbert, processing stage 18 operates on IF signals 16 to determine the position of receiver 10, and relies in part on user input received from user interface 22. *Id.* at 3:59–65.

Gilbert discloses that "user interface 22 provides means for setting parameters of receiver 10, those parameters specifying a qualitative or quantitative value such as desired quality of the position estimate [or] speed of acquisition." *Id.* at 4:27–31. Gilbert also discloses that the user application will dictate optimal performance. For example, according to Gilbert, "[i]n some instances a user requires fast acquisition of the signals needed to compute location. At other times, acquisition time is not as important as the accuracy or level of precision of the location determined." *Id.* at 4:16–20. Gilbert discloses that the user interface may come in various forms, such as a slide bar control. *Id.* at Figs. 6, 7, 2:48–52, 3:30–42, 5:15–54. Figure 7, shown below, illustrates a slide bar control interface:

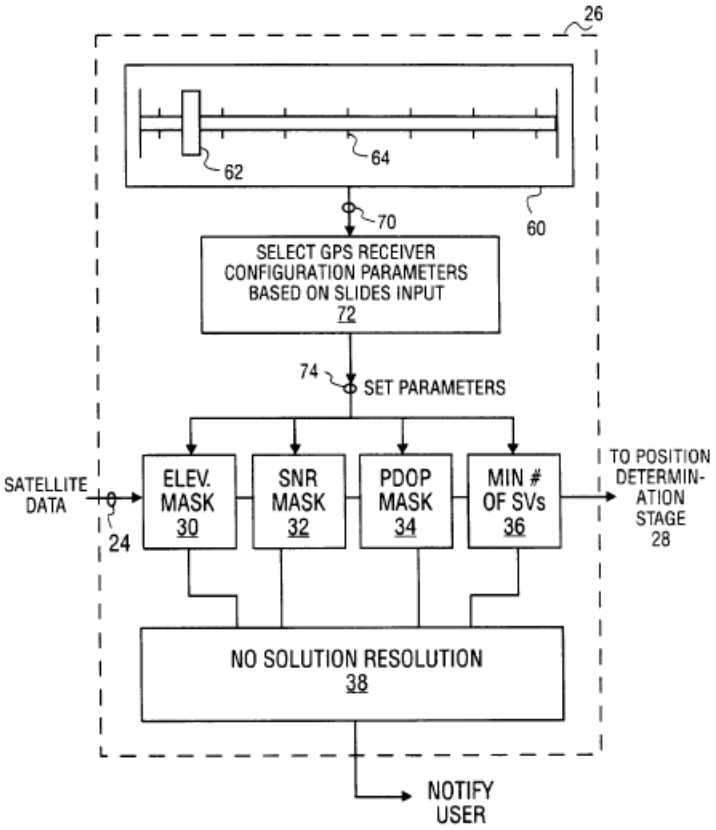

FIG. 7

Figure 7 of Gilbert, above, illustrates "an exemplary configuration of a complete slide bar interface 26 which provides means for setting configuration parameters for GPS receiver 10 in response to user input which specifies a desired quality of position estimate to be provided by receiver 10." *Id.* at 8:30–34. Gilbert explains that "user input may be received using a slide bar control," as shown in Figure 7, that "may allow the user to choose from a number of predetermined settings . . . , each corresponding to a set of GPS receiver configuration parameters." *Id.* at 8:35–41.

2. Analysis

Claim 10 recites "[t]he method of claim 1 wherein determining a desired quality of service comprises: prompting a user to input said desired quality of service; and receiving input from said user indicating said desired quality of service."

Petitioners contend that the combination of King and Gilbert discloses the limitations added by claim 10. Pet. 59–60 (citing Ex. 1022, Abstract, 8:30–51, Ex. 1051 ¶¶ 279–283); *see also id.* at 53–56 (describing Gilbert). Specifically, Petitioners contend that Gilbert teaches presenting a user with a user interface configured to accept user input via a slider bar control interface, and that the user input accepted via the interface is a desired quality of service. *Id.* at 59–60 (citing, e.g., Ex. 1022, 8:30–51). Petitioners also articulate reasons why a person having ordinary skill in the art at the time of the invention would have been motivated to allow a user in the system of King to specify, via user input as taught by Gilbert, a desired quality of service. *Id.* at 56–59 (citing Ex. 1051 ¶¶ 270–278; Ex. 1022,

2:29–32, 4:17–24; Ex. 1026, 22:55–23:6; Ex. 1034, 15–16; Ex. 1025, 6; Ex. 1020, 96).

Patent Owner argues that, in Gilbert, the operating parameters that are adjusted by user input "are limited to those that affect the accuracy of the position estimate," and that "neither the Petition nor Gilbert teaches how a Gilbert-type user input . . . can be translated to King's accuracy requirement that is correlated to the age of ephemeris data such that King's mobile terminal could determine whether stored ephemeris data is sufficient to compute" a position estimate. PO Resp. 39–40. Patent Owner also argues that there is no teaching in King or Gilbert of "how to translate the Gilbert-type user input to King's accuracy requirement that correlates to King's algorithm." *Id.* at 41. Patent Owner further argues that Gilbert's user input is used to filter satellite data but Gilbert fails to teach determining whether to request updated aiding data in response to the user input. *Id.* at 42.

We determine that Petitioners have shown that the combination of King and Gilbert teaches the limitations of claim 10. As explained above, we determine that Petitioners have shown that King discloses all of the limitations of claim 1, from which claim 10 depends. Moreover, we agree with Petitioners' analysis that Gilbert teaches prompting a user to input said desired quality of service and receiving input from said user indicating said desired quality of service. Pet. 59–60 (citing Ex. 1022, Abstract, 8:30–51, Ex. 1051 ¶¶ 279–283); *see also id.* at 53–56 (describing Gilbert); Ex. 1022, Fig. 7, 2:36–47, 3:59–65, 4:16–20, 4:27–31, 8:30–41.

We also determine that Petitioners, with support of Dr. Goldberg, provide persuasive articulated reasoning with rational underpinning for its proposed combination to support the legal conclusion of obviousness.

Pet. 56–59 (citing, e.g., Ex. 1051 ¶¶ 270–278); *see KSR*, 550 U.S. at 418. Petitioners contend, and we agree, that both King and Gilbert are directed to systems and methods that involved GPS calculation of position estimates. Pet. 56 (citing Ex. 1026, Abstract, 12:3–35, 16:18–24; Ex. 1022, 2:29–32; Ex. 1051 ¶ 271). Petitioners also persuasively contend that King and Gilbert implement quality of service for the same reasons—to allow control over desired accuracy and speed of the GPS positioning estimate. *Id.* at 57 (citing Ex. 1026, 22:55–23:6; Ex. 1022, 4:17–24). Petitioners also rely on Dr. Goldberg's testimony that a person of ordinary skill in the art would have been motivated to allow a user to input a desired quality of service in addition to or as an alternative to a requesting application's accuracy requirement or a mobile terminal-specific accuracy requirement given that King and Gilbert are directed to technologies in the same field (GPS positioning). Pet. 56–57 (citing Ex. 1051 ¶ 274). Petitioners further rely on Dr. Goldberg's testimony that allowing a user to select a quality of service when that quality of service directly affects the user experience (such as accuracy of a position estimate) is a natural and logical extension of application/mobile station-provided quality of service. *Id.* at 57–58 (citing Ex. 1051 ¶ 275). We credit and find persuasive the testimony of Dr. Goldberg, who provides sufficient explanation and factual corroboration to support his opinion.

Patent Owner's arguments lack merit because they do not address the specific feature of Gilbert on which Petitioners rely—the user interface. *See* Pet. 59–60. Petitioners do not rely on Gilbert for its teachings of how it adjusts operating parameters or that it filters satellite data that is already received. *Id.* Petitioners sufficiently explain why an ordinarily skilled

artisan would have combined Gilbert's teaching of *a user interface* to prompt a user to input a desired quality of service and to receive input from the user indicating a desired quality of service with the teachings of King. Pet. 56–59. Moreover, Patent Owner's arguments are without merit because a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements. *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012). Rather, the relevant inquiry is what the combined teachings of the references would have suggested to one having ordinary skill in the art. *Id.* at 1333.

For these reasons, we determine that Petitioners have provided persuasive motivation for combining Gilbert's teaching of a user interface to prompt a user to input a desired quality of service and receiving that input with King's system.

Accordingly, we determine that Petitioners have shown by a preponderance of the evidence the subject matter of claim 10 would have been obvious in view of the teachings of King and Gilbert.

III. CONCLUSION

Based on the evidence and arguments, Petitioners have demonstrated by a preponderance of the evidence that (i) claims 1–3, 8, 9, 11, 12, and 15–19 are unpatentable under 35 U.S.C. § 102(e) as anticipated by King, and (ii) claim 10 is unpatentable under 35 U.S.C. § 103(a) as obvious over King and Gilbert.

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–3, 8–12, and 15–19 of U.S. Patent No. 6,535,815 have been shown to be unpatentable;

FURTHER ORDERED that, because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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