The opinion in support of the decision being entered today is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DEAN IRVIN, LEE SWEETAPPLE, and GREG GERTEN

Appeal No. 2007-0277
Application No. 10/270,236
Technology Center 3600

Decided July 17, 2007[1]:

Before HUBERT C. LORIN, LINDA E. HORNER, and ANTON W. FETTING, *Administrative Patent Judges*.

LORIN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal from a decision of the Examiner rejecting claims 13-16 and 38.[2] 35 U.S.C. § 134 (2002). We have jurisdiction under 35 U.S.C. § 6 (b) (2002).

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[1] The appeal has been taken on Brief. Appellants confirmed attendance at an oral hearing scheduled for 9:00 a.m., June 6, 2007, but did not appear.

Claims 13-16 and 38 are rejected under 35 U.S.C. § 103(a) (2002) over Huston (US Patent 5,751,244) in view of Whyntie (WO 89/05460).

We AFFIRM and REMAND.

Appellants, in the Appeal Brief[3], argue the claims as a group. Pursuant to the rules, the Board selects representative claim 13 to decide the appeal. 37 CFR § 41.37(c)(1)(vii) (2006). Accordingly, all the claims stand or fall with claim 13.

Claim 13 reads as follows:

> 13. A method for detecting errors in GPS accuracy, comprising:
> receiving GPS-related data at a marker,
> calculating, from the GPS-related data, at least one derived GPS parameter for the marker;
> comparing the at least one derived GPS parameter with a corresponding at least one expected GPS parameter; and
> issuing a warning if the comparison indicates an irregularity between any of the derived GPS parameters and any of the corresponding expected GPS parameters;
> wherein the expected GPS parameter and the derived GPS parameter comprise at least one of: a quantity of GPS satellites received by the marker, a set of specific satellites received by the marker, a signal-to-noise ratio associated with a GPS satellite signal received by the marker, a carrier-to-noise ratio associated with a GPS satellite signal received by the marker, a satellite pseudorange determined by the marker, a rate of change of a satellite pseudorange, the satellite pseudorange being determined by the marker, a rate of change of a signal-to-noise ratio associated with a GPS satellite signal received by the marker, a rate of change of a carrier-to-noise

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[2] Claims 2-12 and 17-37 have been indicated as allowable over the art of record. Final Rejection, p. 3. Claim 1 has been cancelled.

[3] Our decision will make reference to Appellants' Appeal Brief ("Appeal Br.," filed Apr. 19, 2006), the Examiner's Answer ("Answer," mailed Jun. 23, 2006), and to the Reply Brief ("Reply Br.," filed Aug. 23, 2006).

> ratio associated with a GPS satellite signal received by the marker, a power associated with a GPS satellite signal received by the marker, and an in-band power density of a signal received from a GPS satellite by the marker.

The invention is directed to a method of detecting errors in GPS accuracy. The method involves the use of three pieces of information:

- *GPS-related data*;
- *a derived GPS parameter*; and
- *an expected GPS parameter*. GPS-related data is received at a marker and, based on that data, a derived GPS parameter is calculated. The derived GPS parameter is then compared with a corresponding expected GPS parameter and a warning is issued if the comparison indicates an irregularity between the derived GPS parameter and the corresponding expected GPS parameter.[4]

In accordance with the method set forth in claim 13, the derived GPS parameter and the expected GPS parameter comprise at least one of the following:

- a quantity of GPS satellites received by the marker,
- a set of specific satellites received by the marker,
- a signal-to-noise ratio associated with a GPS satellite signal received by the marker,
- a carrier-to-noise ratio associated with a GPS satellite signal received by the marker,

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[4] The Specification (p. 2, ll. 15-20) describes the method in more simple terms:

> According to an embodiment of the invention, there is provided a method for detecting errors in GPS accuracy. The method includes determining an initial GPS position of a marker, receiving GPS signals at the marker, calculating, from the GPS signals, a GPS coordinate position of the marker, comparing the GPS coordinate position and the initial GPS position, and issuing a warning if the GPS coordinate position differs from the initial GPS position by more than a predetermined amount.

- a satellite pseudorange determined by the marker,
- a rate of change of a satellite pseudorange, the satellite pseudorange being determined by the marker,
- a rate of change of a signal-to-noise ratio associated with a GPS satellite signal received by the marker,
- a rate of change of a carrier-to-noise ratio associated with a GPS satellite signal received by the marker,
- a power associated with a GPS satellite signal received by the marker, and
- an in-band power density of a signal received from a GPS satellite by the marker.

The Examiner has rejected claims 13-16 and 38 under 35 U.S.C. 103(a) over Huston (US 5,751,244) in view of Whyntie (WO 89/05460).

ISSUES

The Examiner argues that Huston teaches all the claimed limitations but for the step of "issuing a warning if the comparison indicates an irregularity between any of the derived GPS parameters and any of the corresponding expected GPS parameters." To meet that limitation, the Examiner relies upon Whyntie. The combination of Huston and Whyntie, the Examiner argues, would lead "a person having ordinary skill in the art to incorporate such well known warning feature as taught in Whyntie into the Huston et al method so that a more informative method can be provided to the user in the event that an error in GPS accuracy is detected in the Huston et al system." Answer 4.

Appellants make three rebuttal arguments.

First, Appellants argue that Huston and Whyntie compare a desired GPS position with a detected GPS position "but do not compare any of the GPS parameters listed in claim 13." Appeal Br. 4. According to Appellants "[i]n the Huston and Whyntie references, the comparison is based solely on GPS position, *i.e.*, the finished product. In contrast, the invention of claim 13 is directed to comparing parameters related to the GPS position, but which are not the GPS position itself." Appeal Br. 5.

Second, Appellants argue that Huston discloses, at col. 6, lines 28-36, comparing a pseudorange determined from a new satellite to the GPS receiver to a calculated range from the corrected position to the new satellite and thus derive a range correction to the pseudorange. Appeal Br. 6. Appellants argue that this disclosure fails to meet the claim because it compares different parameters; *i.e.*, no parameter (e.g., pseudorange or calculated range) is compared to a *corresponding* expected parameter. According to Appellants, Huston compares a pseduorange with a calculated range, not for instance a corresponding expected pseudorange.

Third, Appellants argue that neither Huston nor Whyntie suggest the claimed warning step. According to Appellants, Whyntie teaches warning when a buoy strays from its GPS position, as in contrast to the method of claim 13 where the warning results from an irregularity between the derived GPS parameter and the corresponding expected GPS parameter. Appeal Br. 6-7.

The Examiner responds to the arguments in this way. First, the Examiner argues that Huston's discussion involving pseudoranges (relying on col. 5, ll. 3-11

and col. 6, ll. 32-37) describes comparing an apparent range and an estimated range. According to the Examiner, "apparent range" and "estimated range" correspond to the claimed *derived GPS parameter* and *expected GPS parameter*. Answer 5. Second, the Examiner argues that Huston's estimated range corresponds to an "expected pseudorange" because their functions are the same. Answer 6. Third, the Examiner argues that Whyntie was merely cited "to show the feature of issuing a warning . . . is well known in the GPS art." Answer 6.

Appellants reply that, first, the claim calls for comparing a derived parameter and a corresponding expected parameter; second, because the Examiner notes that Huston compares pseudorange and an estimated range, the Examiner concedes that Huston does not compare a derived parameter and a corresponding expected parameter (e.g., expected pseudorange); and, third, Whyntie teaches a warning system responsive to a particular situation rather than responsive to differences in GPS parameters. Reply Br. 2-4. Appellants also take issue with the Examiner's view that an "estimated range" and "expected parameter" correspond to each other on the grounds that they have the same function. Reply Br. 3.

Accordingly, the issue is whether the Examiner erred in finding (a) that Huston suggests the step of "comparing the at least one derived GPS parameter with a corresponding at least one expected GPS parameter" and (b) that Whyntie suggests the step of "issuing a warning if the comparison indicates an irregularity between any of the derived GPS parameters and any of the corresponding expected GPS parameters."

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

Claim Construction

Re the step of "comparing the at least one derived GPS parameter with a corresponding at least one expected GPS parameter".

1. The Specification gives no special meaning to the terms "derived," "expected," and "GPS parameter."

2. The Specification uses the term "parameter" and "data" interchangeably.

3. "Location," for example, is described in the Specification as a GPS-related data:

> Once in operation, interference detector 100 will receive GPS signals from the GPS network in the manner noted above. The resulting *GPS related data* (e.g., one or more of *location*, number of satellites, signal-to-noise ratio, etc.) are compared with the expected GPS parameters. Deviation between the parameters of the received GPS signals and one or more of the expected GPS parameters (either by any amount or by a predetermined amount of tolerance as may be preset or set at the time of the comparison) represents an irregularity that indicates that local interference is blocking the clean receipt of GPS.

Specification, p. 7, ll. 7-14.

4. "Location" is also described as a GPS parameter.

> "Various known or *expected GPS parameters* for each of the interference detectors 400 are stored in a memory in monitoring unit 410, including *location*, number of GPS satellites . . . ."

Specification, p. 12, ll. 13-15.

5. The term "derived" appears in the Specification in three places:

- "This [local interference] can reduce the accuracy of the coordinates *derived* by the GPS receiver by several hundred meters." P. 1, l. 31 – p. 2, l. 1.

- "… the range of error represents how far a later-*derived* GPS coordinate can be from the initial position without generating a warning." P. 4, ll. 30-31.

- "GPS receiver 102 selects the best combination of available GPS signals from the satellite network and *derives*/calculates the resulting GPS coordinates of interference detector 100." P. 5, ll. 5-7.

6. The "expected GPS parameter" is one which "can be entered manually or computed automatically from known or calibrated information and stored in appropriate memory in either or both of the interference detector 100 or the monitoring unit 200." Specification, p. 6, ll. 26-28.

Obviousness

7. The Examiner found that:

> [C]olumn 5, lines 3-11 and column 6, lines 32-37 of the Huston et al reference teach a method for detecting errors in GPS accuracy comprising the steps of receiving GPS-related data at a marker (see the GPS receiver), calculating at least one derived GPS parameter (see apparent range of GPS receiver position) and comparing the at least one derived GPS parameter with the expected parameter (see the estimated range) to determine the error in GPS accuracy. Further the derived GPS parameter and the expected GPS parameter used in the comparing step in Huston et al is a satellite pseudorange (see col. 6, lines 33-34) and as such meets the "at least one of" limitation as required in claim 13.

Answer 4.

8. Column 5, lines 3-11 of Huston read as follows:

> [The method of calibrating a GPS satellite range signal for errors,

> includes the steps of: …] selecting another GPS satellite not a member of said first set of GPS satellites; determining an apparent range of said GPS receiver positioned at said second location to said other GPS satellite; calculating an estimated range from said GPS receiver positioned at said second location to said other satellite using said corrected position; and calculating a range error correction for said other GPS satellite based on the difference between said estimated range and apparent range.

9. Column 6, lines 32-37 of Huston read as follows:

> [This dynamic calibration of a new satellite is performed by first determining a corrected position of the GPS receiver. This corrected position is obtained by determining an apparent position and applying the current error correction. Col. 6, ll. 28-31.] Second, a range from the corrected position to the new satellite is computed. Next, a pseudorange from the new satellite to the GPS receiver is determined using the conventional GPS technique. Finally, the pseudorange is compared to the computed range to derive a range correction to the pseudorange.

10. Appellants admit that a "pseudorange" is a GPS parameter. See Specification, e.g., p. 12, l. 18.

11. The Examiner found that the only difference between the claimed subject matter and Huston is the step to "issuing a warning."

> The difference between the claimed invention and that disclosed in Huston et al is that the latter does not disclose the claimed feature of issuing a warning if there is a difference or irregularity between the derived parameter and the corresponding expected parameter. However, such missing feature in Huston et al is clearly taught in the abstract of the Whyntie reference.

Answer 4.

12. Whyntie discloses issuing a warning when received GPS-position data does not match stored position data.

> The GPS [positional] data is received by the receiver 6 and input to the

> processor 7. The processor 7 then compares the present position of the buoy 1 with the stored initial position and if the present position is outside a preprogrammed error range the processor displays a warning signal on a display 11.

P. 4, ll. 18-22.

13. The Specification admits that warning users is known.

> Monitoring unit 200 receives the warnings and can display information on the status of interference detector 100 on display 210. Typically, interference detector 100 would be displayed on the map in green if its GPS coordinates are within the range of error, red if outside the range of error, or yellow if one of the other types of warning is received. Of course, various other forms of alerting users of warning conditions are possible. By way of non-limiting example, a single LED on a panel or an audio alarm can be sued to alert a user of the warning.

Specification, p. 5, l. 28 – p. 6, l. 3.

PRINCIPLES OF LAW

Claim construction

1. Claims define that which Appellants regard to be their invention. *In re Moore*, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971).

2. Claims are given their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004).

Obviousness

3. Section 103 forbids issuance of a patent when "the differences between the

subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Court set out a framework for applying the statutory language of §103, language itself based on the logic of the earlier decision in *Hotchkiss v. Greenwood*, 11 How. 248 (1851), and its progeny. *See* 383 U.S., at 15-17. The analysis is objective:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

Id., at 17-18. "While the sequence of these questions might be reordered in any particular case, the factors continue to define the inquiry that controls. If a court, or patent examiner, conducts this analysis and concludes the claimed subject matter was obvious, the claim is invalid under § 103." *KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007).

ANALYSIS

Claim Construction

To resolve the issue, the terms "derived GPS parameter" and "expected GPS parameter" must first be construed.

In arguing that Huston and Whyntie compare positions and not GPS parameters (Appeal Br. 4), Appellants appear to give the term "parameter" as used in claim 13 a special meaning that would distinguish it from information, such as location, that one would normally obtain from a GPS receiver as used in Huston and Whyntie. However, the claim suggests no special meaning for "parameter" that would distinguish it from information, such as location normally obtained from GPS receivers. Furthermore, the Specification lists location, for example, as the type of information that fall under the term "parameter." FF 2-4.

Regarding the term "derived," the Specification gives it no special meaning. The Specification uses the term "derived" to describe the transformative act performed by the GPS receiver in converting satellite signals into GPS coordinates. FF 5. Accordingly, in light of the Specification, one of ordinary skill in the art would understand "derived" GPS parameter to mean the GPS parameter that the GPS receiver gives, such as coordinates (i.e., location).

Regarding the term "expected," the Specification attributes no special meaning to this term either except to say that the source of the "expected" GPS parameter may come "from known or calibrated information." FF 6. In light of this, one of ordinary skill in the art reading claim 13 would understand "expected" GPS parameter to mean that particular GPS-related information which one would expect the GPS receiver to give. The claim does not indicate how the "expected" GPS parameter should be determined. Accordingly, claim 13 broadly encompasses using "expected" GPS parameters no matter how they are determined.

Accordingly, based on the broadest reasonable construction of the claim in

light of the specification as it would be interpreted by one of ordinary skill in the art, the step in claim 13 of "comparing the at least one derived GPS parameter with a corresponding at least one expected GPS parameter" is construed to mean comparing a GPS parameter the receiver gives with a GPS parameter that one would expect a GPS receiver to give.

Obviousness

Huston discloses a technique for calibrating GPS receivers to account for GPS satellite signal errors. FF 8. The technique involves comparing an apparent range of the GPS receiver to a satellite with an estimated range of the GPS receiver to the satellite. FF 8. Huston further discloses that, where the satellite is a new satellite, the calibration involves comparing a pseudorange from the new satellite to the GPS receiver with a computed range. FF 9.

Huston's pseudorange is a GPS parameter. FF 10. Therefore, Huston discloses the limitation in the claim "wherein the expected GPS parameter and the derived GPS parameter comprise at least one of: . . . a satellite pseudorange determined by a marker . . . ."

Huston's pseudorange is determined using conventional GPS techniques. FF 9. Therefore, Huston's pseudorange is a GPS parameter that the GPS receiver gives. Since we have construed the claimed "derived GPS parameter" to mean a GPS parameter that the GPS receiver gives, Huston's pseudorange meets that limitation.

Huston's estimated/computed range involves calculating the range of the

GPS receiver to a satellite. The computation is disclosed as including a correction to take into account an error. FF 9. One of ordinary skill in the art reading Huston would understand that a GPS range computation that includes an error correction amounts to a GPS-range that one would expect the GPS receiver to give. Since we have construed the claimed "expected GPS parameter" to mean particular GPS-related information which one would expect the GPS receiver to give, irrespective of how it is determined, Huston's estimated/computed range meets that limitation.

Appellants argue that Huston fails to meet the claim because it compares different parameters. According to Appellants, Huston compares a pseduorange with a calculated range, not with a corresponding expected pseudorange. Appeal Br. 6. Appellants argue that because the Examiner notes that Huston compares a pseudorange and an estimated range, the Examiner concedes that Huston does not compare a derived parameter and a corresponding expected parameter (Reply Br. 2-4).

This argument implies that claim 13 limits the comparing step to being made between the same two parameters. We find nothing in the claim which requires that both the derived and expected GPS parameters must be, for example, pseudoranges. So long as Huston shows comparing a derived and a corresponding expected GPS parameter wherein "the expected GPS parameter and the derived parameter comprise at least one of . . . [pseudorange]," Huston meets the limitation. In that regard, Huston's two compared parameters "comprise at least one of . . . [pseudorange]."

Even if we were to assume for argument's sake that to meet the claim, both

of Huston's two compared parameters would have to be pseudoranges, Appellants fail to show fault in the Examiner's logic that Huston's computed/estimated range corresponds to an expected pseudorange. "As well known in the art, the reason that 'pseudorange' instead of just 'range' is called because the calculated range is not a true range due to the clock errors existed [*sic*] between the GPS receiver and the GPS satellite." Answer 6. Appellants do not explain the significance of the difference, if there is one, between the range Huston calls a "pseudorange" and the range Huston estimates. Other than showing that Huston does not explicitly mention an "estimated pseudorange," Appellants provide no convincing explanation as to why Huston's estimated range does not correspond to an estimated pseudorange.

For the foregoing reasons, we find, in agreement with the Examiner, that given the broadest reasonable construction of claim 13 in light of the specification as interpreted by one of ordinary skill in the art, Huston discloses the step of "comparing the at least one derived GPS parameter with a corresponding at least one expected GPS parameter".

Accordingly, we also agree with the Examiner that the only difference between the claimed subject matter and Huston is the step to "issuing a warning." FF 11.

As to the step of "issuing a warning," the Examiner relies on Whyntie. It discloses issuing a warning when received GPS-position data does not match stored position data. FF 12. Appellants take issue with the relevance of Whyntie because, according to Appellants, the warning Whyntie issues results from a

change in a buoy location, not irregularities between expected and derived GPS parameters.

Appellants' argument is not persuasive. Issuing a warning is well known. Not only do Appellants admit this (FF 13) but Whyntie clearly shows issuing a warning in the same context as it is used in the method claimed, i.e., when comparing given and expected GPS coordinates. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 127 S.Ct. at 1739, 82 USPQ2d at 1395. In that regard, Appellants have submitted no evidence to show that adding the known step of issuing a warning to the Huston method yields an unpredictable result. We therefore find no error in the Examiner's rejection.

REMAND

The application is remanded to the Examiner for re-consideration of the allowance of claims 2-12 and 17-37 in light our affirmance of the rejection of claims 13-16 and 38. For example, we see little difference, if any, between claim 13 and claim 18. Claim 18 differs from claim 13 only in including the steps of "identifying, in response to said issuing [i.e., issuing a warning], a potential source of local interference; and neutralizing the source of local interference" (see claim 17 on which claim 18 depends). This additional step is admitted to be well known in the art. See the Specification, p. 5, ll. 17-23 ["With the resulting warning of the presence of interference, *known* techniques can be used to locate the source of the interference and neutralize the same . . . if the interference were being generated by

a spark gap in a generator at an airport, the generator would be located and repaired to remove the spark gap."] There is nothing on the record to explain why claim 18 has been indicated as allowable when the only difference between it and claim 13, which the Examiner rejected, is the addition of a well known step of removing an obstruction to the GPS signal causing the interference.

CONCLUSION OF LAW

On the record before us, Appellants have failed to show that the Examiner erred in rejecting the claims over the prior art.

DECISION

The decision of the Examiner to reject claims 13-16 and 38 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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