



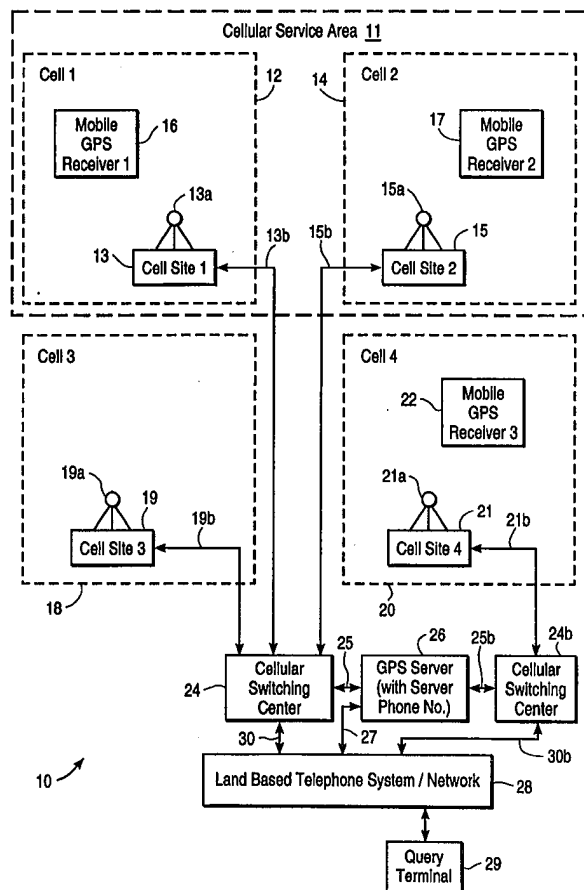
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US97/21260 (22) International Filing Date: 20 November 1997 (20.11.97) (30) Priority Data: 08/759,523 4 December 1996 (04.12.96) US 08/842,559 15 April 1997 (15.04.97) US (71) Applicant: SNAPTRACK, INC. [US/US]; Suite 250, 4040 Moorpark Avenue, San Jose, CA 95117 (US). (72) Inventor: KRASNER, Norman, F.; 117 Coventry Court, San Carlos, CA 94070 (US). (74) Agents: SCHELLER, James, C., Jr. et al.; Blakely, Sokoloff, Taylor & Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (US).		(81) Designated States: AL, AM, AT, AT (Utility model), AU (Petty patent), AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 13 August 1998 (13.08.98)

(54) Title: AN IMPROVED GPS RECEIVER UTILIZING A COMMUNICATION LINK

(57) Abstract

Methods and apparatuses for deriving an approximate Doppler for a satellite positioning system (SPS) receiver from an approximate location which is obtained from a cellular communication system information source. In one embodiment, an approximate location of the SPS receiver is derived from the information source and this approximation location is used to determine approximate Dopplers to a plurality of SPS satellites at a given time. The approximate Dopplers are then used to reduce processing time in either determining pseudoranges to the SPS satellites or acquiring signals from the SPS satellites. In another aspect of the invention, a reference signal is used to provide a local oscillator signal which is used to acquire SPS signals in an SPS receiver. This reference signal is extracted from a data signal modulated on a carrier frequency. The data signal on the carrier frequency is transmitted from, in one example, a wireless cell site which is communicating with the SPS receiver which has a cellular based communication receiver.



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 97/21260

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G01S5/14 G01S1/04 H04B7/185 G01S5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G01S H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 365 450 A (SCHUCHMAN LEONARD ET AL) 15 November 1994 see the whole document	1,23,49, 74
Y		2-5,14, 15,19, 20, 44-48, 55,61, 72,73
X	DE 44 24 412 A (ESG ELEKTRONIKSYSTEM UND LOGIS) 18 January 1996 see column 3, line 42 - column 4, line 51; claims 1-13	68-71
Y		72,73
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

2 June 1998

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Inter. Appl. Application No
PCT/US 97/21260

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 15636 A (HIGHWAYMASTER COMMUNICATIONS I) 23 May 1996 see claims 1-23,44-50; figures 1,2 ---	68-70
Y	US 4 445 118 A (TAYLOR RALPH E ET AL) 24 April 1984 cited in the application see the whole document ---	2-5,14, 15,19, 20, 44-48, 55,61
P,X, L	WO 97 14049 A (SNAPTRACK INC) 17 April 1997 see claims 147-156; figures 1A,1B ---	1-5,14, 15,19, 20,23, 44-49, 55,61,74
P,X	GB 2 308 033 A (SYMMETRICOM INC) 11 June 1997 see page 3, line 26 - page 15, line 5 see page 15, line 17 - page 21, line 5; claims 1-14 ---	68-71
A	US 5 323 322 A (MUELLER K TYSEN ET AL) 21 June 1994 see column 2, line 60 - column 13, line 5 -----	68-73

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 97/21260

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-11, 14-23, 28-30, 44-49, 55-61, 68-74
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-11,14-23,28-30,44-49,55-61,74
transmission of approximate Doppler to receiver
2. Claims: 12-13,24-27,39-40,42-43,51-54
transmission of pseudorange from receiver to remote station
3. Claim : 41
position determination is initiated by cell site
4. Claims: 31-38,62-64
use of supplied local oscillator in receiver
5. Claim : 50
transmission of satellite ephemeris data to receivers
6. Claims: 65-67
use of a frequency synthesizer in a combined SPS receiver
and a communication receiver
7. Claims: 68-73
applying differential correction data for increased accuracy

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/21260

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US 5323322 A	21-06-1994	NONE	