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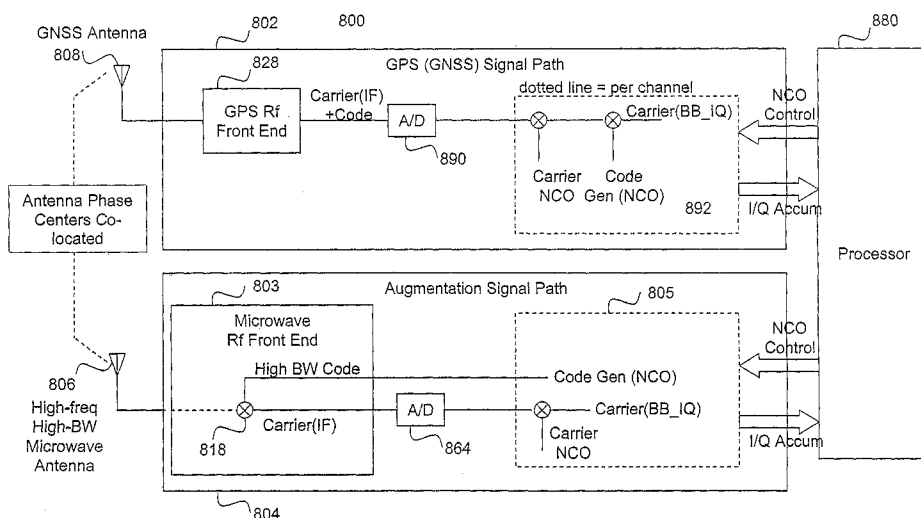
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18 May 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MULTIPLE FREQUENCY ANTENNA STRUCTURES AND METHOD FOR RECEIVING NAVIGATION OR RANGING SIGNALS



(57) Abstract: In a local positioning system, augmentation of the land-based system is provided by receiving signals from a GNSS. The signals from the land-based positioning system have a code phase accuracy better than one wavelength of a carrier of the signals from the GNSS. Different decorrelation may be used for signals from a satellite than from a land-based transmitter, such as using a digital decorrelator for signals from the satellite and an analog decorrelator for signals from a land-based transmitter. The receivers may include both a GNSS antenna and a local antenna. The phase centers of the two antennas are within one wavelength of the GNSS signals from each other. The local antenna is sized for operation in the X or ISM-bands of frequencies. The GNSS antenna is a patch antenna where the microwave antenna extends away from the patch antenna in at least one dimension.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC: G01S 3/02(2006.01) USPC: 342/464 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) U.S. : 342/357.02, 357.06, 450, 457, 463, 464 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 practicable, search terms used) Please See Continuation Sheet		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,198,439 B1 (DUFRANE et al.) 6 March 2001 (06.03.2001), entire document.	1-3, 5, 7, 8, 16, 18 and 20-26
Y	US 5,216,611 A (MCELREATH) 1 June 1993 (01.06.1993), entire document.	1-3, 5, 7, 8, 16, 18 and 20-26
Y	ZIMMERMAN et al. Experiments in the use of the global positioning system for space vehicle rendezvous. PhD dissertation, December 1996.	3, 10, 16, 23 and 24
Y	IEE standard letter designations for radar-frequency bands. IEEE std, 521-1984, November 1984.	5, 18, 24 and 26
Y	US 5,982,324 A (WATTERS et al.) 9 November 1999 (09.11.1999), entire document.	1-4, 8-13, 15-17, 19, 20, 22, 23 and 27
Y	NavTalk Cellular Phone/GPS Receiver: Owners Manual and Reference Guide. Garmin Corporation, p. 28 and 104, January 2000.	1-4, 8-13, 15-17, 19, 20, 22, 23 and 27
Y	US 6,556,942 B1 (SMITH) 29 April 2003 (29.04.2003), entire document.	4, 9-13, 17 and 27
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* Special categories of cited documents:		
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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,112,497 (LAYLAND et al.) 5 September 1978 (05.09.1978), entire document.	4, 9-13, 17 and 27
Y, P	US 2005/0105951 A1 (RISHEQ) 19 May 2005 (19.05.2005), entire document.	19
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A, P		6 and 14
Y	US 3,641,576 (FARBANISH) 8 February 1972 (08.02.1972), entire document.	19
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A		6 and 14
Y, E	US 2005/0280598 A1 (WEBB et al.) 22 December 2005 (22.12.2005), entire document.	19
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A, E		6 and 14

INTERNATIONAL SEARCH REPORT

International application No.

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Continuation of B. FIELDS SEARCHED Item 3:

EAST: US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB

Search terms: loop, microwave, landing, antenna, laminate, print\$5, cellular, center, wavelength, phase, position locator, GPS!, MLS!