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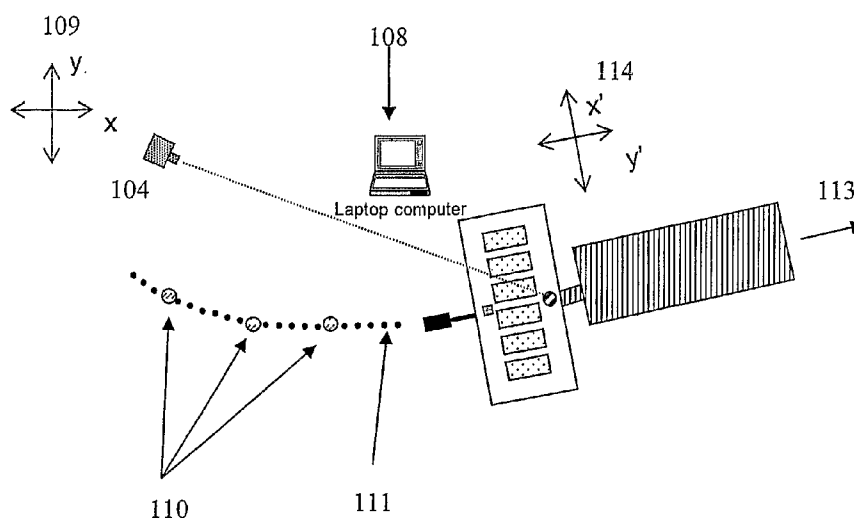
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[Continued on next page]

(54) Title: METHOD FOR CORRECTING A 3D LOCATION MEASURED BY A TRACKING SYSTEM ASSUMING A VERTICAL OFFSET



(57) Abstract: Position measurements by a tracking system associated with a survey tool are corrected for tilt. The tracking station typically incorporates some offset from the surface across which a survey is conducted, and the offset will be subject to angular displacement as the tool tilts with respect to its normal orientation. The tracking system records the 3D position of the survey tool, with angular offset errors. In the disclosed examples, an inertia! measurement unit (IMU), a dual axis inclinometer or a combination of two single axis inclinometers measures the amount of angular offset. The angular offset data is used to correct the position data, e.g. to reduce or eliminate errors caused by the angular offset, e.g. from vertical. If the tool provides measurement data, e.g. GPR readings, processing of the measurement data from the survey tool uses the corrected position data, e.g. to produce images of sub-surface features or objects.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/08442

A. CLASSIFICATION OF SUBJECT MATTER

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USPC: 702/5

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. : 702/5,2,150; 701/205,207,208,213,214,215,220,223; 324/326; 342/357.01,357.02,357.03,357.06,357.08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

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.
X	US 5,471,218 A (TALBOT et al.) 28 November 1995 (28.11.1995), see entire document.	1-17,19-23
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Y		18
Y	US 2003/0112170 A1 (DOERKSEN et al.) 19 June 2003 (19.06.2003), see entire document.	18
A	Lloret, Polen, Inertial + Total Station + GPS for High Productivity Surveying, 1990 IEEE, pages 338-346.	1-23



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:		"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

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Continuation of B. FIELDS SEARCHED Item 3:
USPGPUB, USPAT, USOCR, EPO, JPO, DERWENT, IBM_TDB search notes: survey\$4 and (laser near theodolite), survey\$4 and
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