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(54) Title: METHOD AND DEVICE FOR TRACKING THE PATH OF AN OBJECT

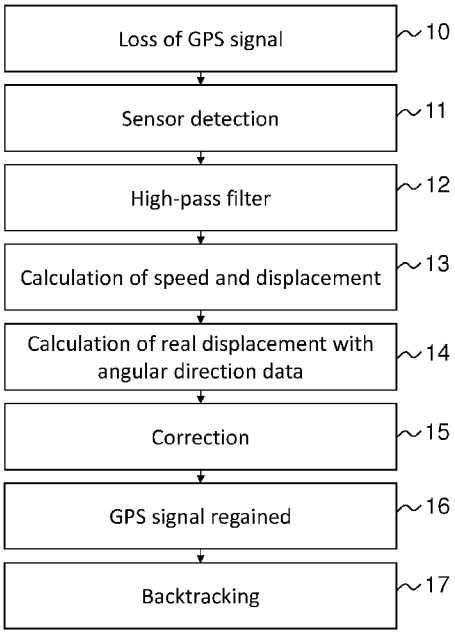


Fig. 1

(57) Abstract: Method for tracking the path of an object, comprising the following steps : a) detecting an acceleration signal from at least one accelerometer; b) calculating the displacement of said object starting from said acceleration signal; c) detecting an orientation signal from at least one magnetometer and/or orientation meter; d) estimating the position of the object instant by instant on the basis of the signals generated by said sensors, e) detecting a rotation signal from at least one gyroscope; f) comparing the change of the orientation signal in two subsequent instants with a predetermined value; g) when the change exceeds such predetermined value, correcting the orientation signal on the basis of the signal generated by the gyroscope.

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TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/053924

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01C21/12 G01C21/16 G01C21/18
ADD.

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)
G01C

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/253880 A1 (JOSEPH BENJAMIN E [US] ET AL) 26 September 2013 (2013-09-26)	10,14-16
Y	figures 4A, 4B, 8 paragraph [0004] - paragraph [0007] paragraph [0019] - paragraph [0023] paragraph [0033] - paragraph [0041] paragraphs [0049], [0074] - [0076], [0091]	1-6,11, 12

X	US 2011/239026 A1 (KULIK VICTOR [US]) 29 September 2011 (2011-09-29)	10,14-16
Y	paragraphs [0028], [0034] - [0036], [0045] - [0047]; figures 2,5,6	11,12

Y	US 2007/156337 A1 (YANNI MAMDOUH [CA]) 5 July 2007 (2007-07-05) paragraph [0075]; figures 2b, 20c	4-6,11, 12

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 September 2016	20/01/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Pascheka, Patrick

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Form PCT/ISA/210 (second sheet) (April 2005)

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 2014/203970 A1 (TAYLOR DAVID W A [US] ET AL) 24 July 2014 (2014-07-24) paragraphs [0226] - [0227]	11,12
Y	US 8 275 544 B1 (WELLS RANDY LOUIS [US] ET AL) 25 September 2012 (2012-09-25) column 31, line 60 - column 31, line 65	3
Y	WO 2015/035501 A1 (INVENSENSE INC [US]) 19 March 2015 (2015-03-19) abstract, background, example 1	1-6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2016/053924

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 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 fees, this Authority did not invite payment of additional fees.

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.:

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.:

1-6, 10-12(completely); 14-16(partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ 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: 1-6, 10-12(completely); 14-16(partially)

   Method and corresponding device for tracking the path of an object, using acceleration, orientation and position sensors, to provide the technical effect of tracking the path of an object especially in the the case that a GPS signal is temporarily lost.

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2. claims: 7-9, 13(completely); 14-16(partially)

   Method for post-processing a tracked path using initial and final positions and backwards correction, to provide the technical effect of improving the accuracy of a tracked path after a period without GPS connection

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3. claims: 17, 18

   Device for supporting (i.e. a mount for) a tablet to be attached to an underwater sea scooter, using a housing seat for said tablet, providing the technical effect of attaching (and removing) a tablet to (and from) said underwater sea scooter

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2016/053924

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 2015035501 A1	19-03-2015	NONE	