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(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, 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).

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))

(88) **Date of publication of the international search report:**
 07 December 2017 (07.12.2017)

(48) **Date of publication of this corrected version:**
 02 November 2017 (02.11.2017)

(15) **Information about Correction:**
 see Notice of 02 November 2017 (02.11.2017)

Previous Correction:
 see Notice of 21 September 2017 (21.09.2017)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/061727

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.:

1-3, 11-13

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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/061727

A. CLASSIFICATION OF SUBJECT MATTER

INV. G01S15/89 G01S15/87 G01S15/93 G01S7/24 G01S7/62
G01S13/86 G01S13/93 G01C21/00 G01C21/20 G05D1/06
H04N5/232

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)

G01S G01C G05D H04N

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, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2010/117278 A1 (APTOMAR AS [NO]; SKJELTEN HAAKON [NO]; MORAEUS JONAS AAMODT [NO]; SOLB) 14 October 2010 (2010-10-14) page 4, lines 28-34; figure 1 page 6, line 18 - page 9, line 10; figure 1 -----	1-3, 11-13
Y	US 2012/320224 A1 (MIYOSHI TAKASHI [JP] ET AL) 20 December 2012 (2012-12-20) paragraph [0172] - paragraph [0178]; figure 5 -----	1-3, 11-13
Y	GB 2 525 175 A (NOKIA TECHNOLOGIES OY [FI]) 21 October 2015 (2015-10-21) page 8, line 6 - line 19 -----	3,13



Further documents are listed in the continuation of Box C.



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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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

"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

3 August 2017

Date of mailing of the international search report

02/10/2017

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/061727

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010117278 A1	14-10-2010	AU 2009344227 A1 EP 2417596 A1 WO 2010117278 A1	01-12-2011 15-02-2012 14-10-2010
US 2012320224 A1	20-12-2012	JP 5868618 B2 JP 2013005101 A US 2012320224 A1	24-02-2016 07-01-2013 20-12-2012
GB 2525175 A	21-10-2015	GB 2525175 A WO 2015158953 A1	21-10-2015 22-10-2015

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-3, 11-13

reduce or eliminate jitter between images

2. claims: 4, 14

remove unpopulated pixel locations generated by the rotating and translating the received image

3. claims: 5, 6, 15, 16

providing unobstructed images

4. claims: 7, 17

determine an estimated range to the object, an estimated velocity of the object, and/or an estimated relative position of the object

5. claims: 8, 18

generate a three dimensional point cloud model of the object

6. claims: 9, 19

produce augmented reality views

7. claims: 10, 20

accurately identify each object
