

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 1115963	FOR FURTHER ACTION	
See Form PCT/ISA/220 as well as, where applicable, item 5 below.		
International application No. PCT/US2018/065039	International filing date (<i>day/month/year</i>) 11/12/2018	(Earliest) Priority Date (<i>day/month/year</i>) 07/12/2018
Applicant DIDI RESEARCH AMERICA, LLC		

This international search report has been prepared by this International Search Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed.

a translation of the international application into _____ which is the language of a translation furnished for the purpose of international search (Rules 12.3(a) and 23.1(b)).

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (see Box No. II).

3. **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 7

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2018/065039

A. CLASSIFICATION OF SUBJECT MATTER**G02B 26/10 (2006.01) G01S 17/93 (2006.01) G01S 7/481 (2006.01)**

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G02B, G01S, B81B

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)

FAMPAT: LiDAR, LADAR, laser radar, light detection and ranging, beam, steer, deflect, scan, MEMS, MOEMS, micro machine, mirror, reflector, optics, array, matrix, plurality, rotation, tilt, second, actuator, drive, axis, orthogonal, perpendicular, 激光雷达, 激光探测和测距, 微机电, 微型机械, 微镜, 光线, 光束, 引导, 偏转, 偏向, 阵列, 排列, 转动, 驱动, 致动, 促动, 传动, 倾斜, 倾角, 垂直, 正交, 轴 and related terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/0242363 A1 (WEISS Y. ET AL.) 19 September 2013 Para. [0013]-[0014], [0050], [0157]-[0183], Fig. 2-3	1-20
A	US 2016/0146939 A1 (SHPUNT A. ET AL.) 26 May 2016 Whole document, especially para. [0025], Fig. 1	
A	CN 106353891 A (SHANXI UNIVERSITY OF SCIENCE & TECHNOLOGY) 25 January 2017 Whole document, especially para. [0005], [0021], Fig. 1 of the original non-English language document (a machine translation is enclosed only for your reference)	
A	US 2018/0275249 A1 (CAMPBELL S. R. ET AL.) 27 September 2018 Whole document	
A	US 2007/0053035 A1 (CHO J. W. ET AL.) 8 March 2007 Whole document	

 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

15/03/2019

(day/month/year)

Date of mailing of the international search report

15/03/2019

(day/month/year)

Name and mailing address of the ISA/SG

**Intellectual Property Office of Singapore**

51 Bras Basah Road

#01-01 Manulife Centre

Singapore 189554

Email: pct@ipos.gov.sg

Authorized officer

Fang Zheng (Dr)

IPOS Customer Service Tel. No.: (+65) 6339 8616

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/US2018/065039

Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013/0242363 A1	19/09/2013	US 2008/0123167 A1 EP 1815670 A2 US 2011/0286066 A1 WO 2006/051544 A2 IL 165212 A EP 2362634 A2 US 2014/0327945 A1 EP 2597859 A1	29/05/2008 08/08/2007 24/11/2011 18/05/2006 31/05/2012 31/08/2011 06/11/2014 29/05/2013
US 2016/0146939 A1	26/05/2016	WO 2016/085587 A1 CN 107111128 A EP 3224650 A1	02/06/2016 29/08/2017 04/10/2017
CN 106353891 A	25/01/2017	NONE	
US 2018/0275249 A1	27/09/2018	WO 2018/175757 A1 US 9869754 B1	27/09/2018 16/01/2018
US 2007/0053035 A1	08/03/2007	KR 20070028919 A	13/03/2007