

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
 INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) 25 May 2018	
Applicant's or agent's file reference WO40697	FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/CN2017/100036	International filing date (day/month/year) 31 August 2017
International Patent Classification (IPC) or both national classification and IPC G01S 7/481(2006.01)i; G01S 17/08(2006.01)i	
Applicant SZ DJI TECHNOLOGY CO., LTD.	

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/ STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA China 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088	Date of completion of this opinion 21 May 2018	Authorized officer HE, Li
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established 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 purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
 - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>2-6, 8, 10-13, 15-29, 31-39, 41-42, 44-57, 59-67</u>	YES
	Claims	<u>1, 7, 9, 14, 30, 40, 43, 58</u>	NO
Inventive step (IS)	Claims	<u>none</u>	YES
	Claims	<u>1-67</u>	NO
Industrial applicability (IA)	Claims	<u>1-67</u>	YES
	Claims	<u>none</u>	NO

2. Citations and explanations :

[1] The following comments based reasoned expectation in the box No. VIII:

[2] **Reference**

[3] D1: US2017242106A1 (24.08.2017)

[4] D2:US2011169117A1 (14.07.2011)

[5] **I. Novelty and Inventive Step**

[6] D1 discloses a method for detecting and ranging an targeted range point (see description, paragraphs [0031]-[0034], [0044]-[0055], [0061], claims 1-58, figures 1A,2,3A,6A-6B). The method comprises: transmitting laser pulse by a lidar transmitter toward a targeted rang point; sensing light by a light sensor via selected subset of photodetector pixels (sensed light includes reflection of transmitted lidar pulse), the light sensor can take the form of an APD array; processing the photodetector signal (corresponding to accumulated photocurrent) for using in computing range information with respect to the rang point by a read out integrated circuit (ROIC).

[7] D1 discloses a lidar system and a lidar receiver apperatus for detecting and ranging an targeted range point. The lidar system comprises: a lidar transmitter configured to transmit a lidar pulse toward the targeted range point, an APD array is configured to receive a reflection of transmitted lidar pulse from the targeted range point, a ROIC coupled to read and process the photodetector signal (corresponding to accumulated photocurrent) for using in computing range information with respect to the rang point. The lidar receiver comprises: an APD array is configured to receive a reflection of transmitted lidar pulse from the targeted range point, a ROIC coupled to read and process the photodetector signal (corresponding to accumulated photocurrent) for using in computing range information with respect to the rang point.

[8] D2 discloses an avalanche photodiode detector, the following features are disclosed (description, paragraphs [0031]-[0032], [0091], figure 1): bump bonds, or other suitable connection technologies as are known in the art, are provided to connect the photodiodes of the array to circuit of the ROIC. The APD detector focal plane array stack includes a microlens array that is positioned adjacent to the APD detector array substrate. The APD array has a detection wavelength of 1550 nm.

[9] Therefore, claims 1, 9, 40 do not meet the requirements of the PCT Article 33 (2) and 33 (3).

[11] For dependent claims 5, 24, 52, D1 discloses the following features (see description, paragraph [0033]): The light sensor can take the form of a silicon avalanche photodiode array. The other additional features are considered as common designs.

[12] For dependent claims 6, 32, 60, D2 discloses the following features (see description, paragraph [0032], figure 1): bump bonds, or other suitable connection technologies as are known in the art, are provided to connect the photodiodes of the array to circuit of the ROIC. The other additional features are considered as common designs.

[13] For dependent claims 7,14,43, the additional features are disclosed by D1 (see description, paragraph [0034], figure 3A).

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Box No. V

Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability;
citations and explanations supporting such statement

- [14] For dependent claims 29, 57, D2 discloses the following features (see description, paragraph [0031], figure 1): The APD detector focal plane array stack includes a microlens array that is positioned adjacent to the APD detector array substrate. The other additional features are considered as common designs.
- [15] For dependent claims 30, 58, the additional features are disclosed by D1 (see description, paragraph [0061]).
- [16] For dependent claims 38, 66, the additional features are disclosed by D2 (see description, paragraph [0091]): The APD array has a detection wavelength of 1550 nm. The other additional features are considered as common designs.
- [17] For dependent claims 2-4, 8, 10-13, 15-23, 25-28, 31, 33-37, 39, 41-42, 44-51, 53-56, 59, 61-65, 67, the additional features are common designs.
- [18] Therefore, claims 7, 14, 30, 43, 58 do not meet the requirements of the PCT Article 33 (2) and 33 (3).
- [19] Claims 2-6, 8, 10-13, 15-29, 31-39, 41-42, 44-57, 59-67 meet the requirements of the PCT Article 33 (2), but do not meet the requirements of the PCT Article 33 (3).
- [20] **II. Industrial applicability**
- [21] Claims 1-67 meet the requirements of the PCT Article 33 (4).

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- [1] The subjects of claims 25-28 are not coincided with the subject of claim 9, so claims 25-28 do not meet the criteria set out in PCT Article 6. The comments on the novelty, inventive step and industrial applicability in the box No. VIII are based on the following reasoned expectation: the subjects of claims 25-28 are modified as “the system”.