

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	25.04.2017
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Applicant's or agent's file reference CL3000WOP1	FOR FURTHER ACTION See paragraph 2 below
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International application No. PCT/JP2017/004510	International filing date (day/month/year) 08.02.2017	Priority date (day/month/year) 01.03.2016
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International Patent Classification (IPC) or both national classification and IPC
G01C21/28 (2006.01) i

Applicant
CLARION 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 or 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/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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International application No.

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Box No. I Basis of this 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 43bis.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 13ter.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 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.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:

**WRITTEN OPINION OF THE
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International application No. PCT/JP2017/004510
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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement	Novelty (N)	Claims <u>1-10</u>	YES
		Claims _____	NO
	Inventive step (IS)	Claims <u>1-10</u>	YES
		Claims _____	NO
	Industrial applicability (IA)	Claims <u>1-10</u>	YES
		Claims _____	NO

2. Citations and explanations:

Document 1: JP 2014-142272 A (CLARION CO., LTD.) 07 August 2014, paragraphs [0036]-[0038] (Family: none)

Document 2: JP 2008-76096 A (MITSUBISHI ELECTRIC CORP.) 03 April 2008, paragraphs [0034], [0035], mathematic formula 12 (Family: none)

Document 3: JP 2001-174275 A (FURUNO ELECTRIC CO., LTD.) 29 June 2001, paragraphs [0028]-[0052] (Family: none)

Claims 1-10

The invention as in claims 1-10 is not disclosed in any of the documents cited in the ISR, and is novel and involves an inventive step.

Document 1 discloses a position detection device that uses a position error calculation unit 34 constituted from a Kalman filter to correct, using an offset that is a difference in the positions of the GPS position and the position that is obtained from the cumulative readings of sensor information, an error

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

covariance matrix of information indicating the position and orientation of a moving body calculated from measurement values that have errors.

Document 2 discloses a tracking device that, when a target is an acceleration action, calculates a prediction error covariance matrix that has no system noise error covariance matrix $Q(k)$ without assuming that the acceleration item that is the target is white noise.

Document 3 discloses a hybrid navigation device that models, using a Langevin equation, the process in which errors are generated to thereby simplify the system equation, and models the colored observation noise using a markov process to convert the noise to white noise, and thereby shorten the updating frequency of the Kalman filter using the correlation time constant of the colored noise.

However, none of the documents disclose a vehicular device for calculating a predicted value for the state quantity of the vehicle, calculating an error for the predicted value by using the Kalman filter into which an error of the observed quantity has been input as an error of the state quantity that is in a calculus relationship with the observed quantity, and using the Kalman filter to calculate an estimated value for the state quantity of the vehicle and an error for the estimated value on the basis of the calculated predicted value and the error for the predicted value.