

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43*bis*.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2018/023063

International filing date (day/month/year)
19.03.2018

Priority date (day/month/year)
31.03.2017

International Patent Classification (IPC) or both national classification and IPC
INV. G08G1/16 G08G3/02 G08G5/04 G08G9/02

Applicant
AIRPROX USA, INC.

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 43*bis*.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 usually 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 66.1*bis*(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:



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Date of completion of this opinion

see form
PCT/ISA/210

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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 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:

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) | Yes: Claims | <u>3-6, 8, 9, 14-17</u> |
| | No: Claims | <u>1, 2, 7, 10-13</u> |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | <u>1-17</u> |
| Industrial applicability (IA) | Yes: Claims | <u>1-17</u> |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1 US 2014/278047 A1 (BAHL PARAMVIR [US] ET AL) 18 September 2014 (2014-09-18)
- D2 WO 2015/072621 A1 (LEE AU DO [KR]) 21 May 2015 (2015-05-21)
- D3 US 2016/232790 A1 (MASSEY BRENT F [US] ET AL) 11 August 2016 (2016-08-11)
- D4 CN 201 910 142 U (TAO QU) 27 July 2011 (2011-07-27)
- D5 US 2011/095904 A1 (CHOI JEONG DAN [KR] ET AL) 28 April 2011 (2011-04-28)

Machine translations of D2 and D5 are enclosed to this opinion.

- 1 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 1 is not new.

D1 discloses (see relevant passages in Search Report):

A virtual radar system comprising:

a vehicle-based subsystem (mobile device 102 in a moving vehicle 104), said vehicle-based subsystem located in a vehicle, said vehicle-based subsystem comprising:

a GNSS receiver ([0022] GPS device, [0073] GPS mechanism 572) to generate a position location for said vehicle;

a vehicle subsystem processor (the processing unit 505 of the mobile device 102) in communication with said GNSS receiver;

a vehicle-based human interface subsystem comprising a display (234) and a data input unit ([0023] Natural User Interface (NUI)); and

a vehicle-based network modem (communications module(s) 532) in communication with the vehicle subsystem processor (via bus 515); and

a cloud-based data subsystem (cloud service 108) comprising:

a cloud-based database ([0077]-[0080] data stores, storage units) for holding data comprising a plurality of locations of a plurality of vehicles;

a plurality of cloud transaction processors ([0077] distributed computing

environments where tasks are performed by remote processing devices that are linked through a communications network) in communication with the cloud-based database; and
a cloud-based network modem (part of communication network 640) in communication with the plurality of transaction processors, wherein said cloud transaction processors calculate the positions of the plurality of vehicles, their trajectories ([0050], [0054]), and the probability of there being a collision between vehicles and issues a warning ([0055] alert) to the vehicles in response thereto.

- 2 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 7 is not new.

D1 discloses (see relevant passages in Search Report):

A virtual radar system vehicle-based subsystem comprising:

a CPU (processing unit 505);

a modem (communications module(s) 532) comprising a first GNSS receiver ([0022] GPS device, [0073] GPS mechanism 572) in communication with the CPU;

and

an audio codec (audio unit 555) in communication with the CPU, wherein the first GNSS receiver provides position data to the CPU, and wherein the CPU transmits the GNSS position data to a cloud transaction server (610, 612) for collision prediction.

- 3 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 12 is not new.

D1 discloses (see relevant passages in Search Report):

A method of operating a virtual radar system comprising a server, a plurality of vehicle-based subsystems and a cloud-based data subsystem comprising a plurality of databases, the method comprising the steps of:

registering each of the vehicle-based subsystems with the cloud-based data subsystem (by saving the unique identifier (ID) of the mobile device 102 and its corresponding position to a storage unit);

creating a record for each of the plurality of the vehicle-based subsystems in one of the plurality of databases in the cloud-based data subsystem;

receiving, by the server, a respective position message from each of the plurality of vehicle-based subsystems and storing it in a position database in the cloud-based data subsystem;

receiving, by the server, a subsequent (update) position message from each of the plurality of the vehicle-based subsystems and storing it the position database in the cloud-based data subsystem;
calculating, by the server, a trajectory for each of the plurality of the vehicle-based subsystems;
calculating, by the server, the distance between each of the plurality of vehicle-based subsystems based on their respective trajectories; and
issuing by the server, a collision warning to each of the vehicle-based subsystems whose trajectories will pass within a predetermined volume of space ([0038] and [0039] space is divided in grids) of each other at a specific point in time.

- 4 The subject-matter of claim 1 is also disclosed by each of D2-D4, that of claim 7 by each of D2 and D3 and that of claim 12 by D2 (see relevant passages of D2-D5 in the Search report).
- 5 Dependent claims 2-6, 8-11, 13-17 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, for the following reasons:
 - 5.1 D1 also discloses the subject-matter of claims 2 and 13 (computing device 622 functions as a control center); 10 (see [0024], [0072]); and 11 (sensor set 224).
 - 5.2 It is common general knowledge to encrypt the transferred data by a cryptographic engine when wanting to protect them from unauthorised users. The subject-matter of claim 3 is therefore not inventive.
 - 5.3 D1 discloses that the processors of the cloud servers have a position processing engine (the one that correlates the IDs to the corresponding positions), a black box storage database (general purpose storage unit), a transient database ([0063] in volatile storage media). It is an obvious design procedure for the skilled person to provide the path and collision predictors of D1 as an AI engine that includes a machine learning engine and an AI database connected to the AI engine thus arriving to the subject-matter of claims 4 and 5; by doing that, forcibly the collision predictor will issue the alert thus arriving to the subject-matter of claim 6 and the AI engine will determine the volume (grid) of space thus arriving to the subject-matter of claim 14.

- 5.4 D5 discloses in [0153] that the server deletes the registration of a nomadic device (which corresponds to the vehicle-based subsystem of claims 15 and 16) when this does not send information to the server after a preset time. It is obvious to the skilled person to introduce this teaching of D5 to D1 in order to reduce redundancy. Therefore, the subject-matter of claims 15 and 16 is not inventive.
- 5.5 It is an obvious design procedure for the skilled person to keep the record of the inactive vehicle-based subsystem in the general purpose storage unit of D1 for future use in case that the particular subsystem becomes again active.
- 5.6 It is also well known in the art of position determination to use two GPS receiver and providing a warning when the difference of their respective detected positions is above a threshold. Therefore, the subject-matter of claims 8 and 9 is not inventive.

Re Item VII

Certain defects in the international application

- 1 Independent claims 1, 7 and 12 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (see D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- 2 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 3 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1-D5 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

- 1 It is clear from claim 12 that certain features are essential to the definition of the invention.

Since independent claim 1 does not contain these features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

- 2 Although claims 1 and 7 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter as far as the vehicle-based subsystem is concerned and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

Alternatively, due to the fact that claim 1 comprises almost all of the features of claim 7 (apart from the audio codec) and it could be formulated as a claim dependent on the latter (Rule 6.4 PCT).

- 3 It is impossible for claim 5 to be dependent on claim 3 because in claim 3 there is no antecedent of the AI engine. Claim 5 has to be dependent on claim 4.
- 4 According to the requirements of Rule 10.2 PCT, the terminology and the signs shall be consistent throughout the application. This requirement is not met in view of the use of the expressions "warning" in claims 1, 9, 12, 13 and "alert" in claim 6 for the same feature "collision warning".