

From the INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing <i>(day/month/year)</i> 22 December 2017	
Applicant's or agent's file reference SDE2133	FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/EP2017/074317	International filing date <i>(day/month/year)</i> 26 September 2017
Priority date <i>(day/month/year)</i> 27 September 2016	
International Patent Classification (IPC) or both national classification and IPC G01S 15/93(2006.01)i; G01S 7/539(2006.01)i; G01S 15/46(2006.01)i; G01S 15/58(2006.01)n	
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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/	Date of completion of this opinion	Authorized officer

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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	1-10	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations :

See Supplemental Box

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/EP2017/074317**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 Supplemental Box

**WRITTEN OPINION OF THE
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International application No.

PCT/EP2017/074317**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 Supplemental Box

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V:**[1] Prior art:**

D1	DE 10 2012 200308 A1 (BOSCH GMBH ROBERT [DE]) 11 July 2013
D2	DE 10 2014 111125 A1 (VALEO SCHALTER & SENSOREN GMBH [DE]) 11 February 2016
D3	EP 1 764 630 A1 (HELLA KGAA HUECK & CO [DE]) 21 March 2007 cited in the application
D4	DE 10 2010 063944 A1 (BOSCH GMBH ROBERT [DE]) 28 June 2012
D5	US 2015/130607 A1 (MACARTHUR DAVID [US]) 14 May 2015

D1 was already determined to be the closest prior art in the search report of the German Patent and Trademark Office from 10 March 2017 with respect to the priority application of the present application.

D3 (cited in the application) was also already determined to be the closest prior art in the search report of the German Patent and Trademark Office from 10 March 2017 with respect to the priority application of the present application; however, D3 is classified by the Examining Authority as more relevant than category "A" (as noted in the German Patent and Trademark Office report).

[2] PCT Article 33(3):

The subject matter of **claims 1-10** is not inventive in relation to the disclosure from documents D1, D2 or D3 (PCT Article 33(3)):

[2.1] Document D1 anticipates the features of claim 1 as follows:

A method for monitoring a blind spot range (3) of a motor vehicle (1) (*it is obvious that the method in D1 can also be used for a blind spot range; see reference to routine method "monitoring the blind spot" in D1: paragraph [0002]; see also D4: paragraph [0009]: ultrasonic blind spot sensor system*),

in which an ultrasonic signal is emitted by means of at least one **ultrasonic sensor** (5) during a measuring cycle, and at least one echo of the ultrasonic signal which is reflected by an object (9) in the blind spot range (3) is received, (*D1: paragraphs [0005] and [0031]; figure 1; measurement cycle is explicitly mentioned, but is otherwise implicit for any (pulsed) automobile ultrasonic sensor*),

characterized in that

a **number of the received echoes** of the ultrasonic signal is determined, the object (9) in the ["den" in the German text; "**dem**"?] blind spot range (3) is classified on the basis of the number of echoes as **a tall object or as a low object**. (*D1: paragraphs [0010], [0011] and [0032]; figure 2*) and

the object (9) is **taken into account** during the monitoring of the blind spot range (3) **if** the object (3) is classified as a **tall object** (*D1: paragraph [0011] "by receiving multiple echoes and the associated possibility of deducing a tall object, it is possible to exclude objects having lower height, which can be driven over and do not present an obstacle, for example. [... Or...] to output different signals [that is, take into consideration or not], depending on whether the object is a tall object or can be driven over [=low object]."*).

Therefore, the subject matter according to **claim 1** is not inventive in relation to **D1** in combination with the general knowledge in the art (*obviousness of application to blind spot ranges*).

This also applies, mutatis mutandis, to independent **claims 8** (driver assistance system) **and 9** (motor vehicle).

Supplemental Box

In addition, **D1** anticipates the features of **claims 2-7 and 10** as follows:

Claim 2:

A method according to claim 1, characterized in that

the object (3) is classified as a **tall object** if at least two echoes are received and the object is classified as a **low object** if only one echo is received (*D1*: paragraphs [0010], [0011] and [0039]; figure 3; paragraph [0039] "If an object 9 is detected, a first signal 23 is first detected [this applies for low objects]. In the case of an object that exceeds a minimum height, a second signal 25 is detected shortly after the first signal 23 [this applies for tall objects]."; only objects having at least 2 echoes (double echo) lead to classification as tall objects in *D1*).

The subject matter of claim 2 is therefore not inventive in relation to **D1** in combination with the general knowledge in the art (blind spot).

Claim 3:

A method according to claim 1 or 2, characterized in that

the object (9) remains unconsidered during monitoring of the blind spot range (3), if the object (9) is classified as a **low object** (*D1*: paragraph [0011] "by receiving multiple echoes and the associated possibility of deducing a tall object, it is possible to exclude objects having lower height, which can be driven over and do not present an obstacle, for example. [... Or...] to output different signals [that is, take into consideration or not], depending on whether the object is a tall object or can be driven over [=low object].").

The subject matter of claim 3 is therefore also not inventive in relation to **D1** in combination with general knowledge in the art (blind spot).

Claim 4:

A method according to one of the preceding claims, characterized in that

the object (9) is detected **as a moving object, if the object (9) is classified as a tall object.**

insofar as "moving object" means other traffic participants such as motor vehicles, bicycle riders, etc. (which is not obvious; see Box VIII below), D4: paragraph [0044], last sentence indicates that a distance change (as in claim 5, which refers to claim 4) to other (also moving) traffic participants can be deduced, in contrast to non-moving (stationary) extended objects, such as guardrails.

In general, however, it is obvious to assign tall objects an object class having high risk potential.

Therefore, the subject matter according to claim 4 is not inventive in relation to **D1** in combination with the general knowledge in the art (blind spot) and, as applicable, with **D4** (problem solved: further improved object characterization).

Claim 5:

A method according to claim 4, characterized in that

in at least **two chronologically successive measurement cycles**, based on the at least one echo, **a distance** between the at least one ultrasonic sensor (5) and the object (9) is determined and, **based on the respective distances, it is examined whether the object (9) is a moving object.**

*The combination of *D1* with D4: paragraphs [0009], [0013], [0043], [0044] and [0046]; figures 1, 2, 5 and 6, also applies here, wherein moving objects can be determined in the blind spot range by means of distance changes. Because distance changes cannot be measured in one measurement cycle (one transmission pulse) (only one distance, but not the chronological change thereof can be determined per measurement cycle), it is implicit in *D4* that this occurs over two chronologically successive measurement cycles.*

Moreover, the principle of speed determination of objects via successive distance measurements (determination of the "range rate") is routine in the art for ultrasonic sensors in the automotive field; see D5: paragraph [0040] "The system uses the transmitter/receiver signals generate range measurements, which are then used to calculate the closing velocity of the trailing vehicle."

Therefore, the subject matter according to claim 5 is not inventive in relation to **D1** in combination with general knowledge in the art (blind spot) and **D4** (problem solved: further improved object characterization).

Claim 6:

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A method according to any of the preceding claims, characterized in that upon receiving the echo, it is examined whether an amplitude (A) of a sensor signal (12) provided by the ultrasonic sensor (5) exceeds a predetermined **threshold curve** (15) (*D1*: paragraph [0040]; figure 3, threshold 27).

The subject matter of claim 6 is therefore not inventive in relation to D1 in combination with common general knowledge in the art (blind spot).

Claim 7:

A method according to any of the preceding claims, characterized in that

a **warning is output to a driver** of the motor vehicle (1) **if** the object (9) is classified as a **tall object**.

a warning to the driver is the purpose of driver assistance systems as in D1, even if this is not explicitly stated there (because it is self-evident; see also D4: paragraphs [0042] and [0046] or D5: paragraph [0049]).

The subject matter of claim 7 is therefore not inventive in relation to D1 in combination with common general knowledge in the art (blind spot warning).

Claim 10:

A motor vehicle according to claim 9, characterized in that

the at least one ultrasound sensor (5) is arranged in a **lateral region**(8) of the motor vehicle (1) **and/or** in a region (6, 7) of a **bumper** of the motor vehicle (1).

The sensor in D1 is also in a lateral/bumper region; cf. D1: figures 1 and 2, the sensor on the corner of the motor vehicle. Additionally, this is a routine design of a blind spot sensor; see also D2: figure 1 (sensor 4 on the corner) or D4: figures 1-2.

The subject matter of claim 10 is therefore not inventive in relation to D1 in combination with common general knowledge in the art (blind spot).

- [2.2] **Document**D2, which can also be considered to be the closest prior art in place of D1, also discloses, in paragraphs [0001], [0009], [0019], [0043] and [0044] and figures 1-3, a method for monitoring an obscured region of a motor vehicle (obviously also suitable for the blind spot range); see in particular

paragraph [0009] *A method according to the invention is used to detect at least one object in a region surrounding a motor vehicle. According to the invention, the motor vehicle is moved past the at least one object and, while moving past the at least one object, a **measurement cycle** is carried out at a plurality of successive points in time. During each measurement cycle, an ultrasound signal is emitted by means of an **ultrasound sensor** of the motor vehicle.*

paragraph [0019] *In one embodiment, during each measurement cycle at least two echoes of the ultrasound signal are detected and, based on a temporal duration between the receiving of a first of the at least two echoes and a second of the at least two echoes, a **height value** is determined for the measurement point, which describes a height of the at least one object. If a second echo of the ultrasound signal occurs within a predetermined duration after the first echo, it can be assumed that the at least **object** in the region surrounding the motor vehicle has a **predetermined height**. If a second echo of the ultrasound signal is present or follows the first echo within a short temporal duration, the at least one object may be a parked vehicle, for example. The at least one object can thus be **classified** based on the echoes of the ultrasound signals. **If the second echo is not received** within a predetermined temporal duration, no object can be present in the region surrounding the motor vehicle or there is a relatively **low object**, such as a curb, in the surrounding region. In this way, the at least one object in the region surrounding the motor vehicle can be **classified**.*

paragraph [0044] *It is normally the case that multiple echoes are received by the ultrasound sensor 4. For example, **at least two echoes** can be received by the ultrasound sensor 4. Based on at least two echoes of the ultrasound signal, **a height of the object 10 can be deduced** with high probability. If a second echo is present and if the second echo is received within a predetermined temporal duration after the first echo, it can be assumed that the object 10 in the surrounding region 7 of the motor vehicle 1 has a predetermined height. If the second echo is present and follows the first echo within a short temporal duration, the object 10 may be a parked vehicle, for example. **If the second echo is not received** or is received only after a predetermined temporal duration, it can be assumed that it is a **low object**, such as a curb. A height value which describes the*

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height of the object can thus be additionally determined for each measurement point 13, 14 determined during a measurement cycle.

A threshold value for determining an echo is implicit for every ultrasound sensor (some kind of threshold must be set to discriminate against noise). Otherwise, that which has been said in respect of D1 applies.

Therefore, the subject matter of **claims 1-10** is not inventive in relation to D2 in combination with the general knowledge in the art (or with D4).

- [2.3] **Document D3** (cited in the application), which can also be considered to be the closest prior art, also discloses, in paragraphs [0003], [0004] and [0009]-[0014] and figures 1-3, a method for scanning a poorly visible region of a motor vehicle (obviously also suitable for the blind spot range), see in particular

*paragraph [0003] The problem addressed by the invention is therefore to create a method for parking space determination in which not only the distance of objects located to the side of the motor vehicle can be determined, but **information about the height of said objects** can also be determined.*

*paragraph [0004] According to the invention, this problem is solved in that - in contrast to the prior art, where **only the first echo signal** that is reflected from an object is received and evaluated - **a plurality of echo signals** can also be detected as a response to an ultrasonic transmission pulse, wherein, **based on the detection of two echo signals** at a predetermined temporal maximum interval (=double echo evaluation), an evaluation in respect of the **height** of an object occurs. In doing so, the invention takes advantage of the circumstance that objects which have a certain **minimum height** above the ground (roadway level) generate two echo signals, specifically a first echo signal based on the direct reflection on the object and a **second echo signal** based on an additional reflection of the sound wave scattered from the object on the ground. In other words, the existence of a **double echo signal**, in which the two echo signals lie within a predetermined closely defined distance (time window), is **characteristic for an object having a certain minimum height**. **Objects which do not meet said minimum height**, such as a curb edge, send, as a response to an ultrasound transmission pulse, **only one single echo signal**. When referring to a double echo in the following, this always means two echo signals, having a distance to each other that lies within a predetermined maximum distance*

*paragraph [0009] According to the invention, it is possible to also detect relatively flat objects (curb edges, for example), which have only a **low height** relative to the roadway level of the vehicle to be parked, and to determine not only the lateral distance thereof from the vehicle to be parked, but also to make a **statement regarding the height** of said objects. In doing so, the absolute height of the objects is not as crucial as the information about whether an object that was detected at a certain distance **exceeds or falls short of a predetermined minimum height (20 cm, for example)**.*

A threshold value for determining an echo (echoes such as those shown in D3: figure 3) is implicit for every ultrasound sensor (some kind of threshold must be set for discrimination against noise).

Otherwise, that which has been said in respect of D1 applies.

Therefore, the subject matter of **claims 1-10** is not inventive in relation to D3 in combination with the general knowledge in the art (and with D4).

Box VII:

The requirement pursuant to PCT Rule 5.1(a)(ii) is not met, since **documents D1, D2 and D4**, which are part of the relevant prior art, are not acknowledged in the description.

Box VIII:

In **claim 4**, it is unclear how a "moving" object can be deduced if **the object (9) has been classified solely as a "tall" object**. The height of an object in traffic has nothing to do with the speed thereof (PCT Article 5, 6).

Because the associated passage on page 5, lines 1-10 of the description does not clarify how the speed of an object can be deduced from the height of said object, **claim 4**, like **claim 5** (which refers back to claim 4), is not defensible (PCT Article 5).