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**Datasheet for the decision  
of 9 March 2011**

**Case Number:** T 1479/08 - 3.5.03

**Application Number:** 00306387.2

**Publication Number:** 1074903

**IPC:** G05D 1/03

**Language of the proceedings:** EN

**Title of invention:**

Lane-following system by detection of lane marking

**Patentee:**

Nissan Motor Company Limited

**Opponents:**

Conti Temic microelectronic GmbH  
DaimlerChrysler AG

**Headword:**

Lane-following system/NISSAN

**Relevant legal provisions:**

EPC Art. 56

**Relevant legal provisions (EPC 1973):**

-

**Keyword:**

"Inventive step - yes"

**Decisions cited:**

T 0176/84

**Catchword:**

-



Case Number: T 1479/08 - 3.5.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.03  
of 9 March 2011

**Appellant:** Conti Temic microelectronic GmbH  
(Opponent 01) Abt. Patente & Lizenzen  
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**Representative:** -

**Party to the proceedings:** DaimlerChrysler AG  
(Opponent 02) Intellectual Property Management  
Wilhelm-Runge-Str. 11  
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**Representative:** -

**Respondent:** Nissan Motor Company Limited  
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**Representative:** Oxley, Robin John George  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 20 May 2008  
rejecting the oppositions filed against  
European patent No. 1074903 pursuant to  
Article 101(2) EPC.

**Composition of the Board:**

**Chairman:** A. S. Clelland  
**Members:** B. Noll  
R. Moufang

## Summary of Facts and Submissions

I. With its decision posted 20 May 2008 the opposition division rejected the oppositions filed by opponents 01 and 02 against European patent no. 1074903 pursuant to Article 101(2) EPC.

Opponent 01 lodged an appeal against the decision of the opposition division and requested that the decision be set aside and the patent be revoked.

II. In response to the appeal the patent proprietor (respondent) requested that the patent be maintained in unamended form, i.e. that the appeal be dismissed or, in the alternative, that the patent be maintained in amended form on the basis of claims of a first, second or third auxiliary request, all filed on 24 January 2008.

III. The respondent conditionally requested oral proceedings. In a communication accompanying the summons to oral proceedings the board gave a preliminary opinion.

IV. With its sole submission in the course of the appeal procedure, opponent 02 informed the board that it would not participate at the oral proceedings.

V. Claim 1 as granted reads as follows:

"A lane-following system for facilitating steering of a vehicle by tracking a lane of a roadway, the system comprising:

means (98) for detecting the presence of lane marking on the surface of a roadway in relation to the vehicle;

means (102) for estimating the position of the vehicle in relation to the detected lane marking; and  
a controller (12) operable to control steering in the presence of detected lane marking but inoperable to control steering in the absence of detected lane marking,  
the controller (12) when rendered operable to control steering, producing, based on the estimated position, a steering control signal of a magnitude to produce, in turn, a bias to a steering system,  
the controller (12) being operable to determine whether or not the detecting means (98) has detected the presence of lane marking,  
characterised in that:  
the controller (12) is operable to evaluate the manner in which the detecting means (98) has failed to detect the presence of lane marking, and to provide an evaluation result,  
the controller (12) being held inoperable to control steering, in response to the evaluation result, for a predetermined period of delay time ( $t_0$ ) since the detection means (98) has resumed detection of the presence of lane marking until the controller (12) is subsequently rendered operable to control steering upon expiration of the predetermined period of delay time ( $t_0$ )."

Claim 9 as granted relates to a method having corresponding features.

In view of the board's decision on the patent proprietor's main request it is not necessary to reproduce the auxiliary requests.

VI. The following documents are relevant for this decision:

- E1: US 5765116 A
- E2: JP 09123934 A (with an English translation)
- E3: EP 0893304 A2
- E6: Blackman, S. S.: Multiple-Target Tracking with Radar Applications, Artech House, Inc. (1986), ISBN 0-89006-179-3, pages 10 and 11

VII. The appellant's arguments can be summarized as follows:

E1 discloses the features of the pre-characterizing portion of claim 1 and is therefore the closest prior art for assessing inventive step. The characterizing features merely state that the manner of failure of detecting absence of the lane marking is evaluated but leave open how this evaluation is carried out.

E2 discloses a lane detection system in which the presence and absence of the lane marking is continuously detected. Depending on the detection result, steering control is only resumed a predetermined time after the lane marking has been recognized as being present. The system according to claim 1 therefore lacks an inventive step having regard to E1 and E2.

E6 is a standard work on object tracking. Chapter 1.3.4 suggests a method for confirming a tracked object as being present when the object has been recognized M times in N scans. It is further common practice in the field of control systems for any appliance which counts on the presence of the object to be activated only after the object has been securely recognised as being

present. It would therefore be obvious for the skilled person to apply the process of secure object recognition proposed in E6 in lane marking recognition so that claim 1 also lacks an inventive step having regard to E1 and E6.

E3 concerns a system for controlling the lights of a vehicle which are intended to be switched on automatically when the environment of the vehicle becomes dark. E3 describes a methodology which suppresses control hunting resulting in repetitive switching on and off of the lights when the brightness of the environment changes rapidly. The skilled person would likewise apply the methodology suggested in E3 for suppressing repetitive switching on and off in a lane control system as in E1 and would thus arrive at the system as claimed without exercising inventive skill.

As regards E3 and E6, the appellant referred to T 176/84 to support its view that these documents, albeit not being in the technical field of lane control, would be considered by the skilled person as relevant prior art.

Oral proceedings before the board took place on 9 March 2011. At the end of the oral proceeding the board's decision was announced.

## Reasons for the decision

### 1. *Background of the invention*

The invention relates to a lane-following system which assists the driver of a vehicle in steering the vehicle on the road. A known lane-following system as described in E1 detects the line marking on the road, using a camera and appropriate image processing (Blocks 10, 22 and 20 in figure 3 of E1). As long as no lane marking has been detected by the system, a message "searching" is displayed to the driver; upon detecting a lane marking the displayed message changes to "accept". This message invites the driver to activate steering control (column 5, lines 46-51 and figure 5). As long as steering control is active, the system checks the lateral position of the vehicle relative to the lane marking and acts on the vehicle's steering system to keep the vehicle at the centre line position (column 5, lines 53-60 and figure 5). If detection of the lane marking fails the E1 system deactivates the steering control (column 6, lines 19-22), displays the message "searching" to the driver and re-starts searching for the lane marking.

So far, the system as described in E1 corresponds to the system as described in paragraphs [0009-0016] of the patent specification, and discloses the features in the pre-characterizing portion of claim 1 of the patent.

The lane following system of E1 has the disadvantage that it reacts to an intermittent detection of the lane by being repetitively switched off and on. This is the technical problem to be solved by the invention as

expressed in paragraph [0004] of the patent specification, namely to avoid undesired switching on and off of the lane following system.

2. *Claim 1 - interpretation*

In claim 1 the first characterizing feature "the controller (12) is operable to evaluate the manner in which the detecting means (98) has failed to detect the presence of lane marking" requires interpretation in the light of the description and drawings.

The appellant understands "the manner" as a mere indication that the detection of a line marking may in time fail. In the board's view such an understanding is not supported by the wording of the claim. Rather, the board understands "the manner" as meaning that the history of line marking detection has to be considered at the time the lane marking is again detected after having been absent (i.e. at point "c" in figure 4 of the patent specification); in dependence on the history a delay may be imposed before resuming steering control. Thus, whether steering control should be immediately resumed or with a delay is decided by the lane-following system only at the time "c", having regard to a pattern of preceding detection results indicating either the presence or the absence of the lane marking. In other words, different patterns of detection results must lead to different outcomes, in particular whether the steering control is resumed with a delay or not. A system in which steering control would invariably be resumed at a fixed delay each time the line marking is recognized as being present, after being absent before, does not therefore fall within the scope of claim 1.



It is observed by the board that the process of detection of the lane marking itself is not the object of the patent; the patent concerns the behaviour of the system after the lane marking has been identified as being present or absent. In this respect the board notes that the translation of the word "manner" into German as "Vorgehensweise" in claim 1 is misleading as the operation of the lane marking detector itself is not the subject of the patent.

3. *Claim 1 - inventive step (Article 56 EPC)*

3.1 Starting out from E1 as the most relevant prior art, the system according to claim 1 specifies the operation of the controller as being to evaluate the "manner" - see the above interpretation - in which detection of the presence of lane marking has failed and to hold control of steering inoperable for a predetermined time period in response to the evaluation result.

The characterizing features solve the technical problem of steering control being intermittently switched on and off due to intermittent detection of the lane marking, as defined in paragraph [0004] of the patent specification.

3.2 *E1 in combination with E2*

For the sake of argument the board assumes that the skilled person, starting out from document E1, would find it obvious to apply the teaching of E2. E2 relates to a lane following system for assisting a driver steering a vehicle. The system detects a line marking by means of three light detectors detecting light

reflected from the lane marking. A line marking is judged as being present only after it has been continuously detected for a predetermined period, which for a given vehicle speed corresponds to a set driving distance. When lane marking is detected over more than this set distance, steering control is resumed (cf. claim 1 and paragraph [0041] of the English translation). The predetermined period is applied in response to each change of detection of the lane marking from being absent to being present. Thus, starting out from E1 as the closest prior art, the person skilled in the art would be led by E2 to resume steering control with a delay each time the detection of the line marking changes from being absent to being present. The skilled person would however not be led by E2 to evaluate, by considering the history of lane marking detection, the manner of failure of detection of the presence of the lane marking as a criterion for deciding on whether or not steering control should be resumed with a delay. Thus, the system according to claim 1 is not rendered obvious to the skilled person having regard to the combination of E1 and E2.

3.3 *E3 and E6: Closely related technical fields?*

3.3.1 With reference to T 176/84 (OJ EPO 1986, 50) the appellant argued that the skilled person would also consider prior art in the adjacent technical fields of E3 and E6.

At point 5.3.1 of the reasons of T 176/84 it is stated: "While it is indeed perfectly reasonable to expect a person skilled in the art if need be, i.e. in the absence of useful suggestions in the relevant field

as to how a given problem might be solved, to look for suitable parallels in neighbouring fields, the question of what is a neighbouring field is one of fact and the solution depends, in the opinion of the Board, on whether the fields are so closely related that the person skilled in the art seeking a solution to a given problem would take into account developments in the neighbouring field."

Thus, the board has to decide whether the skilled person would take into account E3 and E6 when seeking a solution for the problem as stated at point 3.1 above.

### 3.3.2 E6

E6 is an extract from a technical book relating to target tracking by means of radar. Chapter 1.3.4 relates to the initiation and confirmation of a tentative track in airborne radar systems. It is suggested that a tentative new track is only confirmed when the associated object has been observed M times within N observation scans. Thus, E6 relates to the specific problem of track confirmation in the field of radar systems, which is somewhat remote to the field of steering control.

Moreover, the issue addressed in E6 is deciding when a tentatively observed track can be confirmed as a real track. In the contested patent confirmation of the presence or absence of a lane marking is not an issue since the lane marking has already been confirmed as being either present or absent.

The board is therefore of the view that E6 would not be considered by the skilled person since it relates to a different technical field and moreover to a different issue.

### 3.3.3 E3

E3 relates to a system for automatically switching the lights of a vehicle on and off depending on the ambient light level. When the ambient light level rapidly changes the system controls the lights so as to remain switched on for an additional delay CFE each time the level changes from dark to light. Thus, E3 is in the technical field of lighting control for a vehicle, which is different from steering control.

Although the methodology in E3 for judging when the light should be kept on or off dependent on the ambient light level appears to be similar to that for switching on and off the steering control in the patent (compare figure 2 of E3 with figure 4 of the patent specification) the board is not convinced that the skilled person would, without the benefit of hindsight, have been led by E3 to the system as claimed in claim 1 of the patent. In the board's view the skilled person would first have to recognize that the methodology in E3 could be generalized for the purpose of avoiding control hunting in a field other than lighting control. Subsequently, the skilled person would be required to identify the presence of the lane marking in the lane control system as the appropriate input parameter the evaluation of which could reasonably serve to decide whether or not the controller should be held inoperable for a delay time in response to the evaluation result.

The board is of the view that the skilled person would not have carried out these steps without the benefit of hindsight. Thus, the skilled person would not be led by E3, either alone or in combination with E1, to the system as claimed in claim 1 of the patent.

4. The above finding as to inventive step holds for similar reasons for claim 9 which uses similar wording to claim 1 in terms of steps of a method.
5. Since none of the grounds for opposition pursued by the appellant in the appeal procedure prejudices the maintenance of the patent, the appeal cannot be allowed.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

G. Rauh

A. S. Clelland