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**D E C I S I O N**  
of 8 November 1995

**Case Number:** T 0931/94 - 3.4.2

**Application Number:** 91202018.7

**Publication Number:** 0471405

**IPC:** G01C 21/20

**Language of the proceedings:** EN

**Title of invention:**

Method of determining the position of a vehicle, arrangement  
for determining the position of a vehicle, as well as a vehicle  
provided with such an arrangement

**Applicant:**

Philips Electronics N.V.

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 84, 56

EPC R. 6(3) EPC

**Keyword:**

"Clarity: (after amendment): yes"

"Inventive step: yes"

"Reimbursement of 20% of appeal fee under Rule 6(3) EPC: no"

**Decisions cited:**

G 0006/91; T 0128/87

**Catchword:**

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Case Number: T 0931/94 - 3.4.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.2  
of 8 November 1995

**Appellant:** Philips Electronics N.V.  
Groenewoudseweg 1  
NL-5621 BA Eindhoven (NL)

**Representative:** Strijland, Wilfred  
INTERNATIONAL OCTROOIBUREAU B.V.,  
Prof. Holstlaan 6  
NL-5656 AA Eindhoven (NL)

**Decision under appeal:** Decision of the Examining Division of the European  
Patent Office dated 17 August 1994 refusing  
European patent application No. 91 202 018.7  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** E. Turrini  
**Members:** M. Chomentowski  
B. J. Schachenmann

## Summary of Facts and Submissions

- I. European patent application No. 91 202 018.7 (publication No. 0 471 405) was refused for lack of clarity of its subject-matter.

The Examining Division took the view that the nature of the clarity objections was such that a rigorous inventive step analysis of the claims was not possible, the features of Claim 1 which were most likely to be inventive were defined in unclear terms and their interpretation was necessarily restricted; nevertheless, as far as the claims could be understood, they were not deemed to be inventive, this being in particular the case for the subject-matter of Claim 1 having regard to D1 = EP-A-0346906 and D2 = IEEE PLANS '88 POSITION LOCATION AND NAVIGATION SYMPOSIUM RECORD, Kisseemee, Florida, 29.10.88-02.12.88, pages 29 IEEE, New-York, USA; E. J. Krakiwsky et al: " A Kalman filter for integrating dead reckoning, map matching and GPS positioning", a document not cited in the European Search Report. In the application, D0 = Philips Technical Review, vol. 43, Nos. 11/12, December 1987, pages 317-329, M. L. G. Thoone: "CARIN, a car information and navigation system" was cited as the starting point of the claimed invention.

- II. The Appellant (Applicant) lodged an appeal against this decision.
- III. In a communication dated 3 August 1995, the Appeal Board expressed objections concerning the clarity of the Claims 1 and 13 submitted with the statement of grounds of appeal, and joined a copy of the claims and of the introduction of the patent application with amendments which could meet the objections and allow a patent to be

granted. Concerning the Appellant's request in the notice of appeal dated 30 September 1994 regarding reimbursement, on the basis of Rule 6(3) EPC, of 20% of the appeal fee, it was mentioned that no notice of appeal in Dutch language could be found in the file and that, however, according to the decision G 6/91, such document was necessary for a reduction of fees pursuant to Rule 6(3) EPC.

IV. With letter dated 29 August 1995, the Appellant mentioned that he had found upon standard inspection a copy in Dutch of the notice of appeal in his own files, copy of which was enclosed; he believed that an identical copy was joined to the other papers and forwarded to the EPO on the date of filing the notice of appeal. Moreover, he expressed his agreement with the text proposed by the Board and filed accordingly, in addition to the adapted pages 1 and 2 (erroneously numbered 4 and 5) of the description, a set of 13 claims with the two only independent claims, i.e. Claims 1 and 13, reading as follows:

"1. A method for determining the position of a vehicle, comprising the steps of;

- measuring physical motion of the vehicle (1.13, 1.14) and therefrom recurrently calculating a dead-reckoning position;
- comparing calculated positions to map positions from a global map data base and if matched resetting the calculated position to a map position;

characterized by joining successive calculated positions each associated with an uncertainty region (VLPA) to a calculated line-segment and forming a measured data

structure (DRD) as a linked string of calculated line-segments (pseudo-segments), whilst including the associated uncertainty regions;

from a local map data base (LND) entering a map position into a map data structure (PSD) if said map position lies in a said uncertainty region of the recent past and also lies on a map line-segment connected directly or via an earlier map line-segment of said map data structure to a recent matched map position;

testing said map data structure (PSD) on topological conforming with the measured data structure (DRD), discarding any non-conforming part of said map data structure (PSD) before said comparing and executing said comparing between the map data structure (PSD) and a recent part of the measured data structure (DRD) extending at least to said recent matched map position;

upon said resetting updating the local map data base (LND) from the global map data base that comprises map line-segments, said local map data base so being limited to a region near said recent matched map position (2.10), and for said entering ignoring any map position outside the local map data base."

"13. An arrangement for determining a vehicle position, comprising receiving means for receiving measured vehicle movement data, a global memory for storing a global map data base containing topographical and traffic-technical information for map positions, and a processor for, on the basis of said measured data, periodically calculating dead-reckoning coordinates, comparing to said global map data base and, if matched, resetting the calculated position to a map position, characterized by being arranged for:

joining successive calculated positions each associated with an uncertainty region (VLPA) to a calculated line-segment (pseudo-segment) and storing a measured data structure (DRD) as a linked string of calculated line-segments, whilst including the associated uncertainty regions, into a first working memory;

from a local map data base (LND) in a second working memory, storing a map position into a map data structure (PSD) in a third working memory if said map position lies in a said uncertainty region of the recent past and also lies on a map line-segment connected directly or via an earlier stored map line-segment of said map data structure to a recent matched map position;

testing said map data structure (PSD) on topological conforming with the measured data structure (DRD), discarding any non-conforming part of said map data structure (PSD) from said second working memory before said comparing and executing said comparing between the map data structure (PSD) and a recent part of the measured data structure (DRD) extending at least to said recent matched map position;

upon said resetting updating the local map data base (LND) from the global map data base that comprises map line-segments, said local map data base so being limited to a region near said recent matched map position (2.10), and for said storing into said third working memory ignoring any map position outside the local map data base."

- V. In a communication dated 15 September 1995, the Board mentioned that a further inspection in the file at the EPO in Munich had not allowed to find any notice of appeal in Dutch language having been filed at the EPO earlier than or simultaneously with the document in

English carrying the expression "(translation)".  
Moreover, there was no evidence for establishing that the notice of appeal in Dutch had effectively been sent to the EPO and received there. Therefore, it appeared that, taking into account the jurisprudence of the Boards of Appeal, e.g. decision G 6/91, OJ 1992, 491, and, for the burden of proof, decision T 128/87, OJ 1989, 406, the Appellant's request for reimbursement could be rejected.

VI. With letter dated 27 October 1995, the Appellant acknowledged that no notice of appeal in Dutch language could be found in the EPO file and that he had to accept this fact. He regretted that as a consequence thereof the request for reimbursement based on Rule 6(3) EPC could be rejected; the Appellant further maintained his conviction in his preceding letter that the case was now in condition for allowance and, auxiliarily, requested "oral proceedings in this case" (sic!).

VII. The Appellant's arguments, in the statement of grounds of appeal and in the application, in support of his request for grant of a patent on the basis of  
Description: Pages 1 and 2 (erroneously numbered 4 and 5) filed with letter of 29 August 1995, Pages 3 (from line 16) to 24 as originally filed, Claims: Nos. 1 to 13 filed with same letter, Drawings: Sheets 1/16 to 16/16 as originally filed, are as follows:

The application has been amended to better define the different data structures used, for instance the data structures PSD and DRD, the independent arrangement claim, i.e. Claim 13, being drafted as comprising means being arranged for executing the method steps recited in Claim 1. Claim 1 concerns a method for determining the position of a vehicle, comprising the steps of measuring physical motion of the vehicle and therefrom recurrently

calculating a dead-reckoning position, and comparing calculated positions to map positions from a global map data base and if matched resetting the calculated position to a map position. The information is an enormous bulk which must be made manageable; a local navigation-data base LND is being kept and updated containing sub-information on which test steps can be performed on the basis of which possibly driven route segments from the LND are stored in a data structure. The content of the LND is limited by regularly removing items which are for instance not located near the current position anymore. The possibly driven route segments for the current situation are determined and entered into a data structure PSD. Then, the data in data structure DRD (coming from measured and calculated data) and the data in data structure PSD (originating from data from the global data base, representing for instance a map and road information), which both correspond to the recent past and the current situation, are compared. The present method enables a more accurate positional fix through streamlining the processing as being based on an appropriately selected subset of information by utilizing a local navigation data base which is regularly adapted to the actual position, the data from the data base being always readily available. Storing the route segments which were selected from the local navigation-data base by means of the test steps is an auxiliary means for an accurate position fix. Therefore, the claims are clear and, since the prior art does not suggest the combination of features of said technique of machine-based navigating which includes postponing the decisive matching through the limiting of the data to be matched formed by two adapted data structures, they involve an inventive step.



## Reasons for the Decision

1. The appeal is admissible.

2. *Allowability of the amendments*

The present version of the application differs from the version having been the basis for the contested decision and not having been objected on the grounds of unallowable extension of its subject-matter mainly in that some of the terms used in the main claims, such as the data structures PSD and DRD, have been defined more closely using definitions comprised in the original disclosure (see in particular page 15, lines 7 to 10; page 18, lines 1 to 8; Fig. 2); the independent arrangement claim, i.e. Claim 13, has been drafted as comprising means being arranged for executing the method steps recited in the independent method claim, i.e. Claim 1. Therefore, the European patent application has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Art. 123(2) EPC).

3. *Clarity*

Present Claim 1 concerns a method for determining the position of a vehicle, comprising the steps of;

- measuring physical motion of the vehicle (1.13, 1.14) and therefrom recurrently calculating a dead-reckoning position;
- comparing calculated positions to map positions from a global map data base and if matched resetting the calculated position to a map position.

Taking into account the teaching in the whole application, the main steps of the method are understood as being the following:

On the one hand, for the determination of the actual position of a vehicle, the processor of the arrangement calculates each time the dead-reckoning coordinates on the basis of measured

navigation-parameters such as direction of travel and number of revolutions of the wheels. Due to measuring errors, round-off errors, etc., the calculated actual position may deviate from the real actual position. The magnitude of random errors can be estimated mathematically and expressed by means of the VLPA, i.e. the Vehicle Location Probability Area. Of the successively calculated dead-reckoning coordinates the recent past is always saved, from which calculated line-segments (pseudo-segments) are derived and are stored in an additional data structure DRD.

On the other hand, the topographical and traffic technical information, for instance of a road map, which can be digitized and comprise segments, is stored in a global data base. As mentioned here above, so as to be able to determine the actual position of the vehicle to an improved extent, the dead-reckoning coordinates are compared to the topographical and traffic technical information of the global data base. This information is an enormous bulk which must be made manageable; a local navigation-data base LND is therefore being kept and updated containing sub-information on which test steps can be performed on the basis of which possibly driven route segments from the LND are stored in a data structure. The content of the LND is limited by regularly removing items which are for instance not located near the current position anymore. The possibly

driven route segments for the current situation are determined and entered into a data structure PSD. Then, the data in data structure DRD (coming from measured and calculated data) and the data in data structure PSD (originating from data from the global data base, representing for instance a map and road information), which both correspond to the recent past and the current situation, are compared.

As derivable from the present application (see pages 1 and 2), the present method enables a more accurate positional fix through streamlining the processing as being based on an appropriately selected subset of information; by utilizing a local navigation data base which is regularly adapted to the actual position, the data from the data base are always readily available; storing the route segments which were selected from the local navigation-data base by means of the test steps is an auxiliary means for an accurate position fix. As stressed by the Appellant, the two-part form of the claim and the back-tracking character of the claimed method do not easily match in a claim wherein each recited step follows in time directly the step that was recited directly previously. In consideration of the difficulty for drafting a claim in this particular technical field in these conditions, and since possible obscure definitions in the claim can be clarified by taking into account explanations in the description and in the drawings, present Claim 1, as well as independent apparatus Claim 13, which is drafted by using similar technical expressions in terms of means for using method steps recited in present Claim 1, are both clear in the sense of Article 84 EPC.

4. *Novelty*

The amendments leading to the present Claims 1 and 13 only introduce clarification of the technical features already comprised in the main claims having formed the basis of the contested decision. The novelty of said claims has not been objected in said decision. Therefore, the subject-matter of each of present Claims 1 and 13 is novel in the sense of Article 54 EPC.

5. *Inventive step*

According to the present patent application (see pages 1 and 2), a method for determining the position of a vehicle, which comprises the steps of the first part of claim 1, i.e., measuring physical motion of the vehicle and therefrom recurrently calculating a dead-reckoning position, and comparing calculated positions to map positions from a global map data base and if matched resetting the calculated position to a map position, is known from D0; D1 and D2 are mentioned as being other similar references; an object of the present invention is to provide a more efficient method and arrangement that enable a more accurate positional fix, through streamlining the processing as being based on an appropriately selected subset of information.

Since the presently claimed method and apparatus use a measured data structure (DRD) on the basis of measured, calculated and joined positions on the one hand, which is to be used for, in particular, comparison with map positions which, on the other hand, are part of a map data structure (PSD) formed on the basis of a local map data base (LND) updated from a global map data base, and since such a machine working on data bases of different levels are not derivable from the prior art, and in particular neither from D1 (which uses displaying and

pattern recognition), nor from D2 (which uses only a single level of data base), the Appellant's arguments concerning an inventive step of the subject-matter of present Claims 1 and 13 in the sense of Article 56 EPC are convincing, so that a patent can be granted.

6. *Reimbursement of 20% of the appeal fees*

6.1 In the notice of appeal dated 30 September 1994, the Appellant has requested that the EPO refund 20% of the appeal fee if the decision to be given in the case G6/91, before the Enlarged Board of Appeal, will justify the refund. According to said decision G6/91, OJ 1992, 491 (cf. the Headnote, point I; points 12 and 22 of the grounds), the persons referred to in Article 14(2) EPC are entitled to the fee reduction under Rule 6(3) EPC if they file the essential item of the first act in particular in appeal proceedings in an official language of the state concerned other than English, French or German, and supply the necessary translation no earlier than simultaneously. However, as indicated in the communication of the Board dated 3 August 1995, no notice of appeal in Dutch language could be found in the file at the EPO. Indeed, in his letter dated 29 August 1995, the Appellant has mentioned that he, in contradistinction, has found upon standard inspection such copy in Dutch in his own files, copy of which has been enclosed; the Appellant adds, in said answer, that he believes that an identical copy was joined to the other papers and forwarded to the EPO as of 30 September 1994. However, as mentioned in the Board's communication of 15 September 1995, a further inspection in the file at the EPO in Munich has not allowed to find any notice of appeal in Dutch language having been filed at the EPO earlier than or simultaneously with the document in English carrying the designation "(translation)"; moreover, although the Appellant "believes" that a

notice of appeal identical to the copy in Dutch sent with letter dated 29 August 1995 has been joined to the other papers and forwarded to the EPO as of 30 September 1994, there is no evidence in the sense of Article 117 EPC for establishing that the notice of appeal in Dutch has effectively been sent to the EPO and received there, and it is to be considered in this context that according to the jurisprudence of the Boards of Appeal (see e.g. decision T 128/87), the burden of proof falls on the party doing the filing. Thus, since in his last letter dated 27 October 1995, the Appellant, instead of providing any more evidence, acknowledges and accepts the fact that no notice of appeal in Dutch language could be found in the EPO file and regrets that as a consequence thereof the request for reimbursement based on Rule 6(3) EPC could be rejected, it cannot be established that a notice of appeal corresponding to the English translation found in the file at the EPO has effectively been filed on due time, so that this request does not satisfy the conditions of decision G6/91 cited here above and is rejected accordingly.

*Procedural matter*

The Appellant has acknowledged in his letter dated 27 October 1995 that no notice of appeal in Dutch language could be found in the EPO file, that he had to accept this fact and regretted that as a consequence thereof the request for reimbursement based on Rule 6(3) EPC could be rejected; he further maintained his conviction in his preceding letter that the case was now in condition for allowance and, auxiliarily, he requested oral proceedings in this case. From the text of this letter, it is derivable that the Appellant requests the allowance of a patent and that the auxiliary request is only directed as a precautionary

measure against any negative decision concerning said allowance. Therefore, since as mentioned above a patent can be granted, there is thus no need for oral proceedings.

**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following application documents:

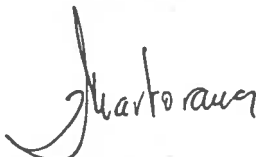
**Description:** Pages 3 (from line 16) to 24 as originally filed;

Pages 1 and 2 (erroneously numbered 4 and 5) filed with Appellant's letter dated 29 August 1995;

**Claims:** Nos. 1 to 13 filed with Appellant's letter dated 29 August 1995;

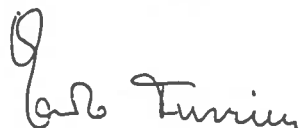
**Drawings:** Sheets 1/16 to 16/16 as originally filed.

The Registrar:



P. Martorana

The Chairman:



E. Turrini

MCH  
B. Sch.