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D E C I S I O N
of 13 January 1995

Case Number: T 0904/93 - 3.4.2

Application Number: 87311002.7

Publication Number: 0272077

IPC: G01C 21/22, G09B 29/10

Language of the proceedings: EN

Title of invention:
Apparatus for displaying travel path

Applicant:
HONDA GIKEN KOGYO KABUSHIKI KAISHA

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 84 and 123(2)

Keyword:
"Additional subject-matter (no)"
"Clarity (yes)"
"Novelty (yes)"
"Inventive step (after amendments: yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0904/93 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 13 January 1995

Appellant: HONDA GIKEN KOGYO KABUSHIKI KAISHA
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 8 February 1993, written decision posted on 13 May 1993 refusing European patent application No. 87 311 002.7 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. 87 311 002.7 (publication No. 0 272 077) was refused on the grounds of lack on inventive step having regard to D1 = WO-A-86/07143 and D3 = EP-A-0 196 498. The decision also contained objections about additional matter and lack of clarity of the claims.

II. The Appellant (Applicant) lodged an appeal against this decision.

III. In a communication accompanying the invitation to oral proceedings which had been requested auxiliarily by the Appellant, the Board expressed the opinion that the new set of claims filed with the statement of grounds of appeal did not appear to be allowable because the amendments appeared to include additional subject-matter, the claims appeared to lack clarity and the subject-matter of one of the main claims seemed to lack an inventive step.

IV. As an answer to this communication, the Appellant filed new sets of claims and mentioned that if any of these sets of claims would be allowable, then oral proceedings would not be requested any more.

V. In a communication dated 15 November 1994, the Board expressed the opinion that the claims on file appeared to lack clarity, but that an annexed amended set of claims was proposed which could meet these deficiencies. By telefax dated 24 November 1994, the Appellant expressed his approval of the text of the claims proposed by the Board and, with letter dated 30 November 1994, filed a set of amended claims substantially

identical therewith and an appropriately amended description. The oral proceedings were cancelled accordingly. Claims 1, 2, 4 and 5 read as follows:

"1. A method of displaying the travel path of a moving body in a two dimensional coordinate system, comprising the steps of: displaying a map in said two dimensional coordinate system; setting at least one target point on a desired running course on the map, the or each target point having a predetermined distance associated therewith; successively calculating the current location of the moving body in the two-dimensional coordinate system on the basis of the actually detected position of the moving body; displaying on said map the calculated current location of the moving body; the method further comprising determining whether the moving body has correctly passed through a target point on said desired running course by, as the moving body approaches the target point: successively calculating the distance of the moving body from the target point; determining the minimum distance of the body from the target point by a comparison of the successive calculated distances from the target point until the moving body begins to move away from the target point; comparing the minimum distance of the body from the target point with said predetermined distance; and determining that the body has passed through the target point when the determined minimum distance of the moving body from the target point is less than the predetermined distance."

"2. A method of displaying the travel path of a moving body in a two dimensional coordinate system, comprising the steps of: displaying a map in said two dimensional coordinate system; setting at least one target point on a desired running course on the map, the or each target point having a predetermined distance associated therewith; setting a desired running direction at the or

each target point; successively calculating the current location of the moving body in the two-dimensional coordinate system on the basis of the actually detected position of the moving body; displaying on said map the calculated current location of moving body; the method further comprising determining whether the moving body has correctly passed through a target point on said desired running course by, as the moving body approaches the target point: successively calculating the distance of the moving body from the target point; determining the minimum distance of the body from the target point by a comparison of the successive calculated distances from the target point until the moving body begins to move away from the target point; comparing said minimum distance of the body from the target point with said predetermined distance; calculating a difference angle between the direction of travel of the moving body calculated on the basis of the actually detected direction of travel and the desired running direction; comparing said difference angle with a predetermined angle; and determining that the body has passed through the target point when the determined minimum distance of the moving body from the target point is less than the predetermined distance, and the difference angle is less than the predetermined angle."

"4. An apparatus for displaying a travel path of a moving body in a two-dimensional coordinate system, the apparatus comprising: means for displaying a map in said two-dimensional coordinate system; means for setting at least one target point on a desired running course on the map, the or each target point having a predetermined distance associated therewith; means for successively calculating a current location of the moving body in the two-dimensional coordinate system on the basis of the actually detected position of the moving body; the apparatus operating such that: the calculated current

location of the moving body is displayed on the map; and such that: it is determined whether the moving body has correctly passed through a target point on said desired running course by, as the moving body approaches the target point: successively calculating the distance of the moving body from the target point; determining the minimum distance of the body from the target point by a comparison of the successive calculated distances from the target point until the moving body begins to move away from the target point; comparing the minimum distance of the body from the target point with said predetermined distance; and determining that the body has passed through the target point when the determined minimum distance of the moving body from the target point is less than the predetermined distance."

"5. An apparatus for displaying a travel path of a moving body in a two dimensional coordinate system, the apparatus comprising: means for displaying a map in said two-dimensional coordinate system; means for setting at least one target point on a desired running course on the map, the or each target point having a predetermined distance associated therewith; means for setting a desired running direction of the moving body at the or each target point; means for successively calculating a current location of the moving body in the two-dimensional coordinate system on the basis of the actually detected position of the moving body; means for successively calculating the direction of travel of the moving body on the basis of the actually detected direction of travel of the moving body; the apparatus operating such that: the calculated current location of the moving body is displayed on the map; and such that: it is determined whether the moving body has correctly passed through a target point on said desired running course by, as the moving body approaches the target point: successively calculating the distance of the

moving body from the target point; determining the minimum distance of the body from the target point by a comparison of the successive calculated distances from the target point until the moving body begins to move away from the target point; comparing the minimum distance of the body from the target point with said predetermined distance; calculating a difference angle between a calculated direction of travel of the moving body and the desired running direction; comparing the difference angle with a predetermined angle; and determining that the body has passed through the target point when the determined minimum distance of the moving body from the target point is less than the predetermined distance and the difference angle is less than the predetermined angle." Claims 3 and 6 are dependent claims.

VI. The Appellant submitted the following arguments in support of his request: The application as amended clearly defines the invention with all the important features listed in the application as filed, in particular the minimum approach distance of the moving body from the target point and the predetermined distance associated therewith. In conventional methods, it is determined that a moving body has passed through a target point previously set on the chosen travel path on a map when the actual current distance of the body from the target point is within a predetermined distance previously associated with said target point; in that case, differences between the shape of the roads as displayed on the map and the actual shape of the road can be taken into account and can be distinguished from errors arising when the moving body does not pass through the target point, because it is travelling on a path other than the desired travel path; however, for complicated patterns of roads in an area, it can be determined erroneously that the moving body has passed

through a target point and this can result in a wrong turning at a junction at said target point; this difficulty is far less likely to arise with the method of present Claim 1 because, since it is the minimum distance of the moving body approaching the target point which is taken into account for comparing with the predetermined distance set for said target point, said predetermined distance can be set at a smaller value thereby providing a more precise determination of the moving body having passed through the target point. Neither D1 nor D3 are relevant prior art documents for the present invention because they do not belong to the same type of technique with target points set on a route on a map. Therefore, the prior art does not lead in an obvious way to the present technique.

Reasons for the Decision

1. The appeal is admissible.

2. *Allowability of the amendments*

Present Claims 1 and 4 concern a method and an apparatus for displaying the travel path of a moving body in a two dimensional coordinate system, wherein a map is displayed in a two dimensional coordinate system and at least one target point on a desired running course is set on the map, in accordance with original Claim 1 and the text locations and Figures of the original application relating to such a technique. Present Claims 2 and 5 concern a method and an apparatus for displaying the travel path of a moving body in a two dimensional coordinate system, wherein in addition to the above-mentioned features, a desired running direction at the or each target point is set and a

- difference angle between the direction of travel of the moving body calculated on the basis of the actually detected direction of travel and the desired running direction angle plays a role for determining whether the moving body has passed the target point, in accordance with original Claim 2 and the text locations and Figures of the original application relating to said particular technique involving the position and the angle of travel of the moving body. Incidentally, it is to be noted that the decision under appeal comprises a remark that, "as indicated during the oral proceedings", there is additional matter in relation to the submitted Claim 2; however, it is not possible to derive unambiguously from the minutes of said oral proceedings what the deficiency was. Since yet no deficiency is detected in the present text of the application as compared with the original application, the requirement of Article 123(2) EPC) that the European patent application should not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed is satisfied.

3. *Clarity*

The claims define in an unambiguous way the apparatus and method so that the clarity deficiencies mentioned in the decision under appeal and concerning in particular the sequence of steps and the specific operations being effected in each of these steps by the specific means therefor are not present any more. In particular, the plurality of target points as well as the measuring, calculating, comparing and determining steps and the means therefor, are adequately defined. Therefore, the present claims are clear in the sense of Article 84 EPC.

4. *Novelty*

Since the subject-matter of the Claims 1, 2, 4 and 5 is not known from the prior art, it is novel in the sense of Article 54 EPC.

5. *Inventive step*

5.1 In the Appellant's statements and in the original application (see page 1, line 2 to page 2, line 22), the problems of the prior art and their solution according to the invention were presented substantially as follows: in conventional methods, it may be determined that a moving body has passed through a target point previously set on the chosen travel path on a map when the actual current distance of the body from the target point is within a predetermined distance previously associated with said target point; in that case, differences between the shape of the roads as displayed on the map and the actual shape of the road can be taken into account and can be distinguished from errors arising when the moving body does not pass through the target point, because it is travelling on a path other than the desired travel path; however, for particularly complicated patterns of roads in an area and for large predetermined distances associated with the target point, this can lead to the problem of erroneously determining that the moving body has passed through a target point resulting in a wrong turning at a junction at said target point; this difficulty is far less likely to arise with the method of present Claim 1 because, since it is the minimum distance of the moving body approaching the target point which is taken into account for comparing with the predetermined distance associated with said target point, said predetermined distance can be set at a smaller value thereby providing a more precise determination of the moving body having passed

through the target point. This argument of the Appellant, as well as his argument that said novel features of the method of present Claim 1 are not derivable from the prior art, are convincing.

Indeed, a method of displaying the travel path of a moving body in a two dimensional coordinate system is known from D1 (see page 2, second paragraph to page 10, first paragraph; Figures 1 to 3; claim 1); this method comprises the steps of displaying a map in said two dimensional coordinate system (14), successively calculating the current location of the moving body in the two-dimensional coordinate system (14) on the basis of the actually detected position of the moving body, displaying on said map the calculated current location (16) of the moving body. However, contrary to the method of present Claim 1, the known method does not comprise a step of setting at least one target point on a desired running course on the map, the or each target point having a predetermined distance associated therewith. It is to be noted that, taking into account the generally accepted meaning of these words, the starting point (S) in D1 cannot be understood as a target point. Moreover, although an end point (Z) as mentioned and shown in D1 could be generally understood as a target point, it is not a target point through which the moving body has to pass, but to stop, and moreover there is no predetermined distance associated therewith; it is also to be noted that, although a plurality of particular points such as the crossings of roads and the changes of direction and accordingly of the road to be travelled are derivable from Figure 1 of D1, there is no indication in the document that the distance of the moving body is specifically and continuously calculated as compared with other points of the route, and that a predetermined distance is associated with said particular points; in this respect, it is also to be

noted that the specific recognizable scenery points ("markante Geländepunkte") which the driver of the moving body may recognize and which are mentioned in D1 (see page 4, second paragraph and page 10, last sentence) are not points where any calculation of a distance is done. As convincingly argued by the Appellant, the method of D1 is for displaying a travel path and incorporates a program which compares the vehicle position with the intended driving route, whereby, in the event that the detected position of the body deviates from the intended route, the position of the moving body on the map may be corrected either automatically or by pressing a "Korrekturtaste (23)" (correction key (23)), but does not determine whether the moving body has passed through a particular target point in accordance with a particular sequence of steps comprising the calculation of the distance of the moving body to the target point and the comparison with a predetermined distance attached to said target point.

Indeed, another method ("Abstandsverfahren") is known from D3 (page 1, first paragraph to page 4, first paragraph; page 5, second paragraph to page 11, last paragraph; page 12, second paragraph to page 13, first paragraph; page 14, first paragraph to page 20, second paragraph; Figures 1 to 5); this method comprises in particular the determination of the position on a map of a moving body whereby the distance of said moving body from following particular points on the route ("die Abstände der Fahrzeugposition zu den Fußpunkten der jeweiligen Nachfolgepfeile"), which can be interpreted as following target points, is determined. However, as convincingly argued by the Appellant, these particular crossing points of the method of D3 (see page 1, last paragraph to page 2, first paragraph) are not set on the running course on the map, as required in present Claim 1, but are the crossing points of the roads of the

complete map which is displayed. Moreover, contrary to the presently claimed method, in the method of D3 (see page 1, last paragraph to page 4, first paragraph; page 11, last paragraph; page 12, second paragraph to page 13, second paragraph; page 20, second and third paragraphs), it is not determined that the moving body has passed through a particular "target point", but it is determined that the moving body has passed through one of a plurality of "target points" on said map, said particular "target point" being "found" or "recognized" ("erkannt") by the method in that it is determined that it is one of said "target points" at which successive measurements show a relative minimal distance, i.e. a distance decreasing before increasing again and, moreover, such that said minimal distance is smaller than the distances to all the following "target points". It is also to be noted that the system of D3 (see Claim 1) is for selecting before each of the following "target points" the best route sections to a destination point and thus already for selecting the best following "target point". Thus, although the method of D3 (see also page 13, second paragraph) comprises steps of determining minimum distances of the moving body from "target points" and determining whether said minimum distances are less than predetermined distances ("Abstandsgrenzwerte"), since it "recognizes" said target points, it differs in essence from the presently claimed method.

Thus, the methods of D1, D3 and of present Claim 1 differ in their purpose and in their context so much that neither D1 nor D3 are relevant as a closest prior art or as source for complementary information concerning isolated features together or for the above-mentioned conventional method. Therefore, the subject-matter of present Claim 1 involves an inventive step and Claim 1 is allowable (Article 52(1) EPC).

5.2 Since the method of present Claim 1 involves an inventive step, the method of present Claim 2, which comprises additionally a further criterion for determining that the moving body has passed through a target, the apparatuses of present Claims 4 and 5, which comprise means for carrying out methods comprising all the features of present Claims 1 and 2, respectively, and the subject-matter of present Claims 3 and 6, which are dependent claims, also involve an inventive step, so that a patent can be granted (Article 97(2) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the following documents:

Description: Pages 1 and 4 to 10 as originally filed,
Page 2 as filed with letter of 4 October 1991;
Page 2a, 2b, 2c and 3 filed with letter of 30 November 1994;
Claims: Nos. 1 to 6 filed with letter of 30 November 1994;
Drawings: Sheets 1/6 to 6/6 (Figures 1 to 8) as originally filed.

The Registrar: The Chairman:

P. Martorana E. Turrini

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