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Datasheet for the decision of 13 October 2010

Case Number: T 0296/08 - 3.4.02

Application Number: 05027955.3

Publication Number: 1637840

IPC: G01C 21/16

Language of the proceedings: EN

Title of invention:
Coning compensation in strapdown inertial navigation systems

Patentee:
Northrop Grumman Guidance

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 76, 84

Keyword:
"Amended claims of the present divisional application do not extend beyond the content of the earlier application (parent application)"
"Subject-matter of independent claims include all essential features"

Decisions cited:
-

Catchword:
-

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Case Number: T 0296/08 **-** 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 13 October 2010

Appellant: Northrop Grumman Guidance
and Electronics Company, Inc.
21240 Burbank Boulevard
Woodland Hills, CA 91367-6675 (US)

Representative: Emde, Eric
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 21 September 2007 refusing European patent application No. 05027955.3 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: A. G. Klein
Members: M. Stock
L. Bühler

Summary of Facts and Submissions

I. The applicant and appellant has appealed against the decision of the examining division refusing European patent application 05027955.3 (published as EP 1 637 840 A1), which is a divisional application from the earlier application 97103952.4 published as EP 0 797 077 A2, in the following: "the parent application").

The examining division reasoned in particular that the subject-matter of the independent claims infringed the requirements of Article 76(1) and those of Article 84 EPC.

II. In its statement of grounds of appeal the appellant requested the Board to set aside the decision of the examining division and grant a patent on the basis of the set of claims 1 to 24 as before the examining division.

III. In a communication sent with the summons to oral proceedings, the Board gave a preliminary opinion on the objection under Article 76(1) EPC that the present divisional application extended beyond the content of the parent application.

In response to the Board's communication, the appellant, with letter dated 08 September 2010, filed claim sets according to a Main Request and First to Fourth Auxiliary requests to be considered at the oral proceedings. In a telephone conversation on 01 October 2001 the appellant requested that the patent be granted on the basis of claims according to the First Auxiliary

Request which became then the only request. Amendments to the description were proposed to the appellant by telefax of 01 October 2010. The appellant stated its approval of the documents proposed for grant.

The independent claims according to this request read as follows:

1. A coning compensation method for use in a strapdown inertial navigation system, the method utilizing the incremental angles of rotation of a coordinate system expressed as a vector $\Delta\theta(k,n,m)$ and measured in successive time periods to obtain an estimate of the coning compensation for NK successive time periods, $\Delta\theta(k,n,m)$ corresponding to the (mNK+nK+k)'th time period, k being equal to 5, the method comprising calculating the $R(m)$ component of the coning compensation according to the formulas

$$R(h,m)=\sum_{n=1}^{N}\sum_{k=1}^{K}[U(h,k)\Delta\theta(k,n,m)\times V(h,k)\Delta\theta(k,n,m)]$$

$$R(m)=\sum_{h=1}^{H}W(h)R(h,m)$$

n taking on integer values from 1 to H, H being equal to 3, U(h,k) and V(h,k) being predetermined numbers for all values of h and k, W(h) being a predetermined number for each value of h, and the symbol x denoting the vector cross-product operation.

13. A digital processor for use in a strapdown inertial navigation system, the digital processor receiving as inputs the incremental angles of rotation of a

coordinate system expressed as a vector $\underline{\Delta\theta(k,n,m)}$ and measured in successive time periods to obtain an estimate of the coning compensation for NK successive time periods, $\underline{\Delta\theta(k,n,m)}$ corresponding to the (mNK+nK+k)'th time period, k taking on integer values from 1 to K, n taking on integer values from 1 to N, m taking on integer values, N being an appropriately selected integer, K being equal to 5, the digital processor being arranged to calculate the $\underline{R(m)}$ component of the coning compensation according to the formulas

$$\underline{R(h,m)}=\sum_{n=1}^{N}\sum_{k=1}^{K}[U(h,k)\underline{\Delta\theta(k,n,m)}\times V(h,k)\underline{\Delta\theta(k,n,m)}]$$

$$\underline{R(m)}=\sum_{h=1}^{H}W(h)\underline{R(h,m)}$$

h taking on integer values from 1 to H, H being equal to 3, U(h,k) and V(h,k) being predetermined numbers for all values of h and k, W(h) being a predetermined number for each value of h, and the symbol x denoting the vector cross-product operation.

Reasons for the Decision

1. Claims 1 and 13 have been amended by specifying: "K being equal to 5" and "H being equal to 3". Thus they clearly overcome the objections raised by the examining division under Article 76 EPC 1973.

2. A further objection under Article 84 EPC 1973 raised by the examining division with respect to the independent claims 1 and 13 is not confirmed by the Board in view of extensive arguments put forward by the appellant in its statement of grounds. The examining division argued that the term 1/2 R(0,m) + R(m) was an essential feature of the invention because it was stated in the description of the parent application as originally filed (see EP 0 797 077 A2, column 5, lines 34 to 36): "The sum of quantities 1/2 R(0,m) and R(m) is the coning compensation and corresponds to the integration of the second and third terms in equation (2)." This term should therefore appear in the independent claims to meet the requirements of Article 84 EPC.

3. However, the original versions of the corresponding claims 1 and 3 of the parent application do not contain this feature. It is rather indicated in these claims (see the last feature in each), that: "...the estimate of the coning compensation comprising R(m)". Therefore the estimate of the coning compensation includes R(m) as an essential element. This is, however, not in contradiction to the coning compensation being the sum of 1/2R (0,m) and R(m). As far as the problem underlying the claimed subject-matter is concerned, the relevant prior art determines whether there is a difference solving a reasonable technical problem, which would be the objective technical problem, accordingly. However, in the absence of any relevant prior art - only documents describing technical background (category A) are cited in the European Search Report - there is no reason to limit the claims any further and reformulate the technical problem.

4. Therefore the Board concludes that the subject-matter of the independent claims meets the requirements of Articles 76 and 84 EPC 1973 and sees no reason to question novelty and inventive step over the prior art. The dependent claims are based on original dependent claims of this divisional application and the corresponding parent application. They are related to embodiments of the invention as defined in the independent claims. Therefore the dependent claims are also allowable. The description has been adapted to the amended in terms of the relevant prior art cited and disclosure of the invention and as such also meets the requirements of the EPC.

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 in the following version:

Description:
Pages: 2 to 4 of EP 1 637 840 A1.
5 and 6 as communicated to the appellant by telefax dated 01 October 2010.
Claims:
Nos.: 1 to 24 filed with letter of 06 September 2010 (First Auxiliary Request).

Drawings: 1 Sheet as originally filed.

The Registrar: The Chairman:

M. Kiehl A. G. Klein