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Datasheet for the decision of 24 June 2022

Case Number: T 1909/18 - 3.2.02

Application Number: 14200175.9

Publication Number: 2888997

IPC: A61B5/06, A61B19/00, G01B7/004

Language of the proceedings: EN

Title of invention:
Adaptive fluoroscope location for the application of field compensation

Applicant:
Biosense Webster (Israel), Ltd.

Headword:

Relevant legal provisions:
EPC Art. 83, 84
RPBA 2020 Art. 11, 12(2)

Keyword:
Sufficiency of disclosure - (yes)
Claims - clarity (yes)
primary object of appeal proceedings to review decision
Remittal - (yes) - special reasons for remittal

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 1909/18 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 24 June 2022

Appellant: (Applicant)	Biosense Webster (Israel), Ltd. 4 Hatnufa Street 20692 Yokneam (IL)
Representative:	Carpmaels & Ransford LLP One Southampton Row London WC1B 5HA (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 22 February 2018 refusing European patent application No. 14200175.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	S. Böttcher
	W. Sekretaruk

Summary of Facts and Submissions

I. The applicant filed an appeal against the decision (according to the state of the file) of the examining division to refuse European patent application No. 14200175.9, due to its finding in the communications dated 21 June 2017, 10 May 2016 and 16 April 2015 that claim 1 of the main request (filed on 17 December 2015) did not meet the requirements of the EPC.

II. The appellant requested that the decision be set aside and that the application be remitted to the examining division for further prosecution on the basis of the main request on which the decision was based.

III. Claim 1 of the main request reads as follows:

"A method, comprising the steps of:
in a calibration phase performing the steps of
generating a magnetic field in a region using a plurality of magnetic field generators;
placing a field-perturbing element in known positions within the region; and
creating a reaction field model by calculating respective reaction magnetic fields while the field-perturbing element is in the known positions; and
in an operational phase performing the steps of:
placing the field-perturbing element in a new position within the region;
disposing a magnetic field location sensor between the field-perturbing element and the magnetic field generators;
introducing a distal segment of a probe into the region, a probe magnetic field sensor being disposed on the distal segment;

regenerating a perturbed magnetic field with the magnetic field generators;
obtaining first measurements of the perturbed magnetic field from the probe magnetic field sensor;
obtaining second measurements of the perturbed magnetic field from the location sensor;
reconstructing the new position of the field-perturbing element from the second measurements;
obtaining a predicted reaction magnetic field for the reconstructed new position from the reaction field model;
obtaining a compensated measurement by subtracting the predicted reaction magnetic field from the second measurements;
adjusting the first measurements according to the compensated measurement; and
calculating a position of the probe magnetic field sensor using the adjusted first measurements,
wherein the step of obtaining a compensated measurement is performed using an instance of the predicted reaction magnetic field that was obtained in a preceding performance of the steps of reconstructing the new position and obtaining a predicted reaction magnetic field."

Claim 3 of the main request reads as follows:

"An apparatus, comprising:
a plurality of magnetic field generators for generating a magnetic field in a region;
a field-perturbing element introduced into the region;
a magnetic field location sensor disposed between the field-perturbing element and the magnetic field generators;
and a processor, which is configured to perform the steps of:

creating a reaction field model by calculating respective reaction magnetic fields while the field-perturbing element is in known positions; and
when the field-perturbing element is placed in a new position within the region and when a distal segment of a probe having a probe magnetic field sensor is introduced into the region, performing the additional steps of:
obtaining first measurements of a perturbed magnetic field produced by the magnetic field generators from the probe magnetic field sensor;
obtaining second measurements of the perturbed magnetic field from the location sensor;
reconstructing the new position of the field-perturbing element from the second measurements;
obtaining a predicted reaction magnetic field for the reconstructed new position from the reaction field model;
obtaining a compensated measurement by subtracting the predicted reaction magnetic field from the second measurements;
adjusting the first measurements according to the compensated measurement; and
calculating a position of the probe magnetic field sensor using the adjusted first measurements;
wherein the processor is operative for obtaining a compensated measurement by using an instance of the predicted reaction magnetic field that was obtained in a preceding performance of the steps of reconstructing the new position and obtaining a predicted reaction magnetic field."

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

Article 84 EPC

Since the reasoning for the objections in the communication of 21 June 2017 was a verbatim repetition of the reasoning in the earlier communications, only the points outstanding from this communication were addressed.

The disclosure of the mathematics in the description of the application did not create any issue under Article 84 EPC since the person skilled in the art was familiar with the necessary mathematical operations of the equations in the application, and with the physical quantities and notations that the mathematical operations were intended to manipulate.

As regards equation 8, the objects of the operations, their dimensionality and the notation were clear to the person skilled in the art.

The term "Carto" was not mentioned in the claims and could therefore not render any claim unclear. Furthermore, neither the presence of the term "Carto" in the description nor the multiple versions of the Carto machine that might exist rendered unclear any of the operations that the person skilled in the art was required to perform in accordance with the claim.

Moreover, no lack of clarity arose in the claims from the inclusion of the terms O_{corr}, r_{corr}, B_{reac} and M_{corr} in the description since it was known to the person skilled in the art what these terms were.

Article 83 EPC

Since there was no lack of clarity, there could be no insufficient disclosure "as a result" as alleged by the examining division (point 1.1 of the communication).

The person skilled in the art was given sufficient information to carry out the invention. An example of the claimed method was described in paragraph [0007] in connection with paragraphs [0101] to [0105]. The fact that "Carto" was a trademark did not imply that the meaning of the equations changed over time.

Reasons for the Decision

1. Subject-matter of the application

The application is about sensing the position of an object, in particular a catheter in a living body, with a magnetic tracking system, i.e. a system that uses magnetic fields (generated by magnetic field generators located under the patient) and magnetic field sensors in the object to determine its position. The signals produced by the magnetic field in the sensors are analysed to determine the position and the orientation of the object.

Often, such a magnetic tracking system is used together with an x-ray fluoroscope to additionally monitor the process visually (Figure 1, paragraphs [0047] to [0050]). However, when the fluoroscope detector is placed too near to the patient, its metallic components distort the magnetic field measurements, which are essential to the magnetic tracking system.

The aim of the method according to claim 1 and the apparatus according to claim 3 is to compensate for the field perturbations produced by the fluoroscope. The distortion causes the magnetic tracking system to

report apparent shifts in location and orientation from their true values. Translational shifts can attain several centimetres, and rotational shifts can be as large as several degrees. Such shifts could cause the operator to lose confidence in the magnetic tracking system or even mislead an operator who was unaware of the distortion.

In the embodiments, the compensation is done by measuring the perturbed magnetic field with the catheter probe sensors (first measurements) and with additional location sensors (which are positioned on the chest of the patient) (second measurements). The second measurements are used to calculate (with equation 4, Figure 8, paragraph [0092]) the position of the fluoroscope (the field-perturbing element). Then the magnetic field generated by the fluoroscope (the reaction magnetic field B_{reac}) is predicted for the calculated position of the fluoroscope (equation 5, Figure 12, paragraphs [0100] and [0101]). A corrected (compensated) measurement of the catheter location is obtained by subtracting B_{reac} from the second measurements (equation 6), followed by an adjustment of the first measurements according to the corrected measurement (equation 7, paragraph [0102]) to calculate the position (orientation O and location r) of the catheter probe. The corrected (compensated) orientation (O^{i-1}) and location (r^{i-1}) are used as the input in a subsequent calculation of the corrected measurement M^{i}_{corr} (equation 8, paragraphs [0103] to [0105]). In the claim this is described as "using an instance of the predicted reaction magnetic field that was obtained in a preceding performance of...".

2. In the communication dated 16 April 2015 an objection as to lack of novelty was raised. However, this

objection referred to a previous set of claims and does not apply to the present main request. Since the reasoning for the objections in the communication of 21 June 2017 represents a verbatim repetition of the reasoning of the other objections in the earlier communications, only this communication is referred to.

3. Article 84 EPC

3.1 In point 1.1 of the communication dated 21 June 2017 (referring to both Articles 84 and 83 EPC) there is no reasoned objection in relation to Article 84 EPC since the examining division failed to explain which part of claim 1 or claim 3 would be unclear. The objection raised by the examining division, referring to the application as a whole and stating that "the skilled reader is not presented with sufficient information to be able to infer how a method or apparatus featuring the detail as claimed in claims 1 and 3 would have to be implemented", is considered as an objection under Article 83 EPC.

3.2 The use of the trademark "Carto" in the description cannot render the claim unclear since it is not referred to in the claim.

3.3 In the last paragraph of point 1.2 of the communication the examining division stated that the application did not sufficiently define the items O_{corr}, r_{corr}, B_{reac} and M_{corr}. However, since these terms are not referred to in claims 1 and 3, they cannot render the claims unclear.

3.4 It follows that neither claim 1 nor claim 3 lacks clarity. The above-mentioned objections are considered as objections under Article 83 EPC.

4. Article 83 EPC

4.1 The board holds that the person skilled in the art is given sufficient information to carry out the invention as defined in claims 1 and 3. An example of the claimed method is described in paragraphs [0112] to [0126] in connection with paragraphs [0101] to [0111]. The mathematical operations disclosed in the application are clear to the person skilled in the art. The fact that "Carto" is a trademark does not imply that the meaning of the equations changes over time.

4.2 Furthermore, the board agrees with the appellant (points F1 to F13 of the statement of grounds of appeal) that the mathematical operations disclosed in the application are clear to the person skilled in the art. The person skilled in the art will be familiar with the necessary mathematical operations of the equations in the application, and will furthermore be familiar with the physical quantities and notations that the mathematical operations are intended to manipulate. The skilled person would thus have no problem performing one or more of the mathematical operations referred to by virtue of the supposedly rudimentary nature of the disclosure.

4.3 In point 1.2 of the communication the examining division stated that equation 8 was not clear since the reader could not extract from the application what kinds of objects were involved in this equation. In the board's view, it is clear from paragraphs [0101] to [0104] of the application that M^{i}_{corr} is the corrected measurement in the current application of the equation, M^{i} is the uncorrected measurement in the current application of the equation, O^{i-1} is the orientation of the probe obtained in the previous application of the

equation, B_{reac} is the predicted reaction magnetic field generated by the fluoroscope and r^{i-1} is the location of the probe obtained in the previous application of the equation. r^i and O^i are the location and the orientation respectively of the probe in the current application of the equation and $LNO(M_{corr})$ is the Carto location algorithm applied to the corrected measurement. Since the location and the orientation of the catheter probe are determined in a three-dimensional coordinate system, B must be in the form of a matrix. As correctly stated by the appellant (point F6 of the statement of grounds of appeal), the terms of the equation must have the same dimensions, since otherwise it would not be possible to subtract one from another. Therefore equation 8 is clear.

4.4 The term "Carto" is mentioned in paragraph [0102] in connection with the LNO algorithm (applied by the Carto machine), which is not disclosed in detail. The fact that "Carto" is a trademark does not affect the application of the algorithm, and does not affect the performance of the last step of the claimed method.

4.5 Furthermore, it can be derived from paragraphs [0101] and [0102] that M_{corr} is the corrected measurement found by application of the equation (6) and that O_{corr} and r_{corr} are the corrected location and orientation respectively of the probe obtained by applying the LNO algorithm to M_{corr}. As already mentioned above, B_{reac} is the predicted reaction magnetic field generated by the fluoroscope.

Hence these items are sufficiently disclosed.

4.6 It follows that the requirements of Article 83 EPC are met.

5. Points 1.3 and 1.4 of the communication refer to the declaration by Mr Avram Dan Montag and do not contain any further objections as to clarity or sufficiency of disclosure.

6. The contested decision was based only on the grounds of Articles 83 and 84 EPC. The requirements of Article 53(c) and the issues of novelty and inventive step have not been considered. The respondent had requested that the case be remitted to the examining division.

Not remitting the case to the examining division would require the board to examine all further legal requirements and effectively to replace the examining division rather than review the contested decision in a judicial manner (Article 12(2) RPBA 2020). It follows that special reasons within the meaning of Article 11 RPBA 2020 present themselves.

Hence the board remits the case to the examining division for further prosecution.

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 for further prosecution.

The Registrar: The Chairman:

D. Hampe M. Alvazzi Delfrate

Decision electronically authenticated