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Datasheet for the decision of 23 June 2022

Case Number: T 1189/17 - 3.4.01

Application Number: 09831534.4

Publication Number: 2355901

IPC: A61N5/10

Language of the proceedings: EN

Title of invention:
REAL TIME TREATMENT PARAMETER ALGORITHM FOR MOVING TARGETS

Applicant:
Varian Medical Systems International AG

Headword:
Real Time Adaptation for Moving Targets / Varian Medical Systems

Relevant legal provisions:
EPC Art. 54(1), 54(2), 56
RPBA 2020 Art. 13

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Keyword:

Novelty - revised main request (no)
Inventive step - revised auxiliary request 2 (no)
Amendment to appeal case - suitability of amendment to resolve issues raised (yes) - revised main request, revised auxiliary request 2 - suitability of amendment to resolve issues raised (no) - revised auxiliary requests 1 and 3

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Case Number: T 1189/17 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 23 June 2022

Appellant: (Applicant)	Varian Medical Systems International AG Hinterbergstrasse 14 6312 Steinhausen (CH)
Representative:	Foster, Mark Charles Mathisen & Macara LLP Charta House 30-38 Church Street Staines-upon-Thames, Middlesex TW18 4EP (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 20 December 2016 refusing European patent application No. 09831534.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	T. Zinke
Members:	A. Medeiros Gaspar
	C. Almberg

Summary of Facts and Submissions

I. The Examining Division refused European patent application 09 831 534.4, for the reasons that claim 1 of the then pending main request lacked novelty as compared to document D2 (WO-A-2007/045075) and lacked an inventive step in light of document D1 (US-A-2008/002811), taking into further account common general knowledge or D3 (US-A-2007/041497) or D4 (WO-A-2008/005129); and that claim 1 of the then pending first and second auxiliary requests also lacked an inventive step over the disclosures in any of D1 or D2 in light of any of D3 or D4.

II. The applicant appealed the decision.

III. With the statement setting out the grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of newly amended sets of claims, for the main request and auxiliary request 1 to 3. Further, the appellant requested oral proceedings.

IV. The Board arranged to hold oral proceedings. In a communication issued under Article 15(1) RPBA, the appellant was informed of the Board's preliminary opinion. In particular, the Board expressed its doubts that the amendments to all requests had a basis in the original application (Article 123(2) EPC). Further, the Board considered that the independent claim 1 of all requests lacked clarity (Article 84 EPC) and -

depending on interpretations - lacked novelty or at least lacked an inventive step.

V. In reply, the appellant filed a revised main request and revised auxiliary requests 1 to 3. The appellant also indicated a basis, in the original application, for these new requests, and provided arguments with regard to the issues raised in the Board's communication.

VI. At oral proceedings, the appellant withdrew the main request and auxiliary requests 1 to 3 as filed with the statement of grounds of appeal. This decision is thus based on the "revised" requests filed with the reply to the Board's preliminary opinion.

VII. Independent claim 1 of the revised main request reads as follows:

A system for determining a target fluence comprising a processor (54, 1024), wherein the processor (54, 1024) is configured for:
determining (212) during a treatment session a position of a target region (T);
determining (212) during the treatment session a position of a critical region (C);
determining (214) during the treatment session an accumulated dose at the target region (T); and
determining (214) during the treatment session an accumulated dose at the critical region (C);
characterized in that the processor (54, 1024) is further configured for

predicting (206) during the treatment session a future position of the target region (T) at a future time using the determined position of the target region (T);
predicting (206) during the treatment session a future position of the critical region (C) at the future time; and
determining (208) during the treatment session the target fluence to be delivered at the future time using the predicted future position of the target region (T) and the predicted future position of the critical region (C), and based on the determined accumulated dose at the target region (T) and the determined accumulated dose at the critical region (C).

VIII. Independent claim 1 of the revised auxiliary request 1 differs from claim 1 of the revised main request by the further specification that the step of predicting the future position of the target region at a future time is based on input from a breathing-monitoring system, so that this feature reads (amendment emphasized):

[...] predicting (206) during the treatment session a future position of the target region (T) at the future time <u>based on input from a breathing-monitoring system</u> using the determined position of the target region (T); [...]

IX. Independent claim 1 of the revised auxiliary request 2 differs from claim 1 of the revised auxiliary request 1 by the addition of a breathing-monitoring system to the claimed system and by the further definition of the step of predicting the future position of the target region, so that the characterizing part starts with (amendments emphasized):

[...] characterized in that the system comprises a breathing-monitoring system for determining a position of a patient; and the processor (54, 1024) is further configured for predicting (206) during the treatment session a future position of the target region (T) at the future time based on a phase of the patient's breathing cycle, corresponding to the position of a patient determined by the breathing monitoring system, using the determined position of the target region (T); [...]

X. Independent claim 1 of the revised auxiliary request 3 differs from claim 1 of the revised auxiliary request 2 by an amendment in the preamble, which reads (amendment emphasized):

A system for determining a target fluence for inclusion in a treatment plan, the system comprising [...]

Reasons for the Decision

All claim requests - Admission

1. The revised main request and the revised auxiliary requests 1 to 3 were all filed after notification of the summons to oral proceedings (in response to the Board's preliminary opinion). Their respective admission is at the Board's discretion under Article 13 RPBA 2020.

Revised main request - Admission

2. The Board is satisfied that the amendments made as compared to the main request are a genuine attempt to overcome objections under Articles 123(2) and 84 EPC raised for the first time in the Board's preliminary opinion. Furthermore, the amendments are straightforward, and not detrimental to procedural economy.

3. Hence, the Board admitted the revised main request into the appeal proceedings (Article 13 RPBA 2020).

Revised main request - Novelty

4. Document D2 discloses (the references in parentheses applying to this document):

A system for determining a target fluence (page 8, lines 27 to 30; page 6, lines 30 to 32) comprising a processor (implicit),

wherein the processor is configured for:

determining during a treatment session a position of a target region (page 8, lines 16 to 18 and 26 to 27; Fig.5, step 204);

determining during the treatment session a position of a critical region (page 8, lines 16 to 18 and 26 to 27; Fig.5, step 204);

determining during the treatment session an accumulated dose at the target region (paragraph bridging pages 8 and 9; Fig. 5, step 208);

and
determining during the treatment session an accumulated dose at the critical region (paragraph bridging pages 8 and 9; Fig. 5, step 208);

characterized in that the processor is further configured for

predicting during the treatment session a future position of the target region at a future time using the determined position of the target region (page 8 lines 27 to 30 information used to achieve proper positioning, "real-time guidance"; see also page 6, lines 10 to 17 "mean three-dimensional trajectory", "expected deviations");

predicting during the treatment session a future position of the critical region at the future time (page 8 lines 27 to 30, information used to achieve proper positioning, "real-time image guidance"; see also page 6, lines 10 to 17 "mean three-dimensional trajectory", "expected deviations");

and
determining during the treatment session the target fluence to be delivered at the future time using the predicted future position of the target region and the predicted future position of the critical region, and based on the determined accumulated dose at the target region and the determined accumulated dose at the critical region (page 9, lines 3 to 6).

5. The appellant argued that there was no disclosure in document D2 of predicting during the treatment session a future position of the target region at a future time using the determined (current) position of the target

region and determining during the treatment session the target fluence to be delivered at the future time using the predicted future position of the target region (emphasis as in the reply to the preliminary opinion, page 6, paragraph 4).

6. To support this argument, the appellant explained that in document D2 information about deviations of trajectories and corresponding dose distributions to target regions and critical regions is already included into the treatment plan, i.e. the prediction is carried out before the actual treatment session takes place (page 6, lines 5 to 17). Hence, document D2 did not disclose predicting a future position and determining the target fluence during the treatment session, but instead before the treatment session.

7. The appellant also emphasized that the system as claimed considers two different effects resulting from the positions determined for the target regions and the critical regions. First the effect on doses that were actually delivered at the determined positions, and second the effect on the future positions and doses. Both effects should be taken into account, but D2 only disclosed that a change in dose distribution resulting from a position deviation could be considered (referring to page 7, lines 5 to 14), but not an adaptation of the target fluence to a future position that is changed as well.

8. The Board is not persuaded.

9. Document D2 discloses the determination of a treatment plan that takes into account expected motion of the target and critical volumes (i.e. a "mean three-dimensional trajectory of internal tissue structures of

the patient"), for instance over a respiratory cycle (page 6, line 29). The treatment plan includes "trajectories" defining expected deviations from average target and critical volume positions over time (cf. page 6, lines 10 to 17 and lines 27 to 32). When considering "trajectories" in the treatment plan, it is implicit that, from different possible "starting" positions of the target and critical volumes on the trajectories, different future positions result. Therefore, the trajectories in the treatment plan include "predictions about future positions", which differ depending on the "starting" position considered.

10. D2 further discloses that, during the treatment (page 8 lines 16 to 18), the information on the actual positions of the target and critical regions is used to control operation of the linac so that the photon beam is properly positioned thereby to achieve real-time guidance (page 8 lines 27 to 30, emphasis added). This necessarily implies that the current positions determined during treatment are used during treatment to obtain, based on the trajectories of the treatment plan, a prediction of a future position of the target and critical regions so as to align the linac accordingly.

11. As D2 discloses not only the adaptation of the position of the photon-beam (page 8 lines 27 to 30), but also of the dose to be applied (page 9 lines 3 to 6) at the predicted future position, an adaptation of the target fluence is consequently also disclosed.

12. Therefore document D2 discloses a system comprising all the features of claim 1 of the revised main request, which is hence not novel (Article 54(1) and (2) EPC).

Revised auxiliary request 1 - Admission

13. Compared to the revised main request, the revised auxiliary request 1 comprises the additional feature of using an input from a breathing-monitoring system, which was already discussed in the preliminary opinion with regard to auxiliary request 1; the Board considered this additional feature to be also disclosed by the MRI system in D2 (see section 22 of the preliminary opinion).

14. The appellant's argument that the MRI system of document D2 cannot be equated to a breathing-monitoring system is not persuasive.

15. Document D2 uses an MRI system to track the position of target and critical regions in a patient's chest. It is also noted, in this regard, that D2 explicitly mentions motion of the target and critical regions over a respiratory cycle as being contemplated (page 6, lines 27-30).

16. Therefore, the MRI system of D2 is suitable for monitoring breathing.

17. The Board further notes, in this regard, that the claim does not further define the breathing monitoring system in any way. Hence, also the appellant's argument that a breathing monitoring system as defined in the claim is to be understood as something different than an MRI system of D2 cannot be followed.

18. Hence, the Board is not persuaded that the additional feature, prima facie, overcomes the issue of lack of novelty of the revised main request. Consequently, the

revised auxiliary request 1 was not admitted into the appeal proceedings (Article 13 RPBA 2020).

Revised auxiliary request 2 - Admission

19. Like with the revised main request, the Board is satisfied that the amendments made, as compared to auxiliary request 2, are a genuine attempt to overcome the objections raised for the first time in the Board's preliminary opinion. The amendments are also straightforward, not detrimental to procedural economy, and, prima facie, overcome the issue of lack of novelty in view of D2 of the revised main request. Therefore, the Board admitted the revised auxiliary request 2 into the appeal proceedings (Article 13 RPBA 2020).

Revised auxiliary request 2 - Inventive step

20. Independent claim 1 of the revised auxiliary request 2 differs from claim 1 of the revised main request by the addition of a breathing-monitoring system to the claimed system, and in that the prediction of the future position of the target region is based on a phase of a patient's breathing cycle corresponding to the position of a patient determined by the breathing monitoring system, using the determined position of the target region.

21. As concluded with regard to revised auxiliary request 1, the MRI-system of D2 is suitable for being used as a breathing-monitoring system.

22. The appellant further argues that D2 does not disclose its system as being used for monitoring breathing of

the patient, let alone for determining the phase of the patient's breathing.

23. As to the first point, the Board disagrees. D2 explicitly discloses its treatment plan as accounting for motion such as that occurring during a respiration cycle (page 6 lines 27 to 30). D2 further discloses the real-time tracking of the position of the target and critical regions during treatment and, hence, the tracking of their actual motion as the result of breathing. Hence, D2 discloses its system as being used for monitoring breathing.

24. As to the second point, the Board agrees that D2 does not disclose its system as determining "a phase of a patient's breathing cycle".

25. However, such a difference merely defines an implementation detail which the skilled person, using the system of D2 and willing to obtain information about the respiratory function of the patient, would have implemented, without applying any inventive skills, based on the motions tracked. The skilled person was well aware that the respiratory function of a patient could be described as breathing cycle with different phases.

26. Therefore the subject-matter of claim 1 of the revised auxiliary request 2 lacks an inventive step in view of the disclosure of document D2 (Article 56 EPC).

Revised auxiliary request 3 - Admission

27. Claim 1 of revised auxiliary request 3, compared to claim 1 of the revised auxiliary request 2, further

defines the target fluence as being determined for inclusion in a treatment plan.

28. This additional feature was already discussed in the preliminary opinion with regard to auxiliary request 3; the Board considered this feature to be also disclosed by the determination and adaptation of the treatment plan in D2 (see sections 15 and 24 of the preliminary opinion).

29. Neither in its written response nor during oral proceedings did the appellant provide any counter-argument to the Board's preliminary opinion.

30. Hence, the appellant has not demonstrated that, prima facie, the amendment overcomes the lack of inventive step objection raised against revised auxiliary request 2. Consequently, the revised auxiliary request 3 was not admitted into the appeal proceedings (Article 13 RPBA 2020).

Conclusion

31. Since the revised main request and the revised auxiliary request 2 are not allowable, and since the revised auxiliary requests 1 and 3 are not admitted, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

H. Jenney T. Zinke

Decision electronically authenticated