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Paper No. 7
Entered: September 28, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ELEKTA, INC.,
Petitioner,

v.

VARIAN MEDICAL SYSTEMS INTERNATIONAL AG,
Patent Owner.

Case IPR2016-00843
Patent 8,696,538 B2

Before BRIAN J. MCNAMARA, PATRICK M. BOUCHER, and GARTH D. BAER, *Administrative Patent Judges*.

BAER, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

Elekta, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 23, 25, 26, and 39–41 of U.S. Patent No. 8,696,538 (Ex. 1001, "the '538 patent"). Patent Owner Varian Medical Systems International AG ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

Pursuant to 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." For the reasons set forth below, we conclude that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claims 23, 25, 26, and 39–41. Therefore, we institute *inter partes* review of claims 23, 25, 26, and 39–41.

I. BACKGROUND

A. RELATED PROCEEDINGS

Petitioner asserts the '538 patent is involved in *Varian Medical Systems, Inc. et al. v. Elekta AB et al*., No. 3:15-cv-04428 (N.D. Cal., Sept. 25, 2015), and proceedings pending before the International Trade Commission in Investigation No. 337-TA-968. Pet. 58–59. Patent Owner asserts the '538 patent and related patents are involved in three petitions for *inter partes review*, IPR2016-00842 (addressing U.S. Patent No. 7,906,770), IPR2016-00844 (addressing U.S. Patent No. 7,880,154), and IPR2016-00845 (addressing U.S. Patent No. 7,906,770). Paper 5, 1.

B. THE '538 PATENT

The '538 patent relates to delivering planned radiation doses of radiation to treat medical conditions. Ex. 1001, 1:29–30. In particular, the

patent describes a method for planning and delivering radiation doses to a target area within a subject. *Id*. at 3:57–58.

Figure 1 of the ’538 patent is reproduced below.

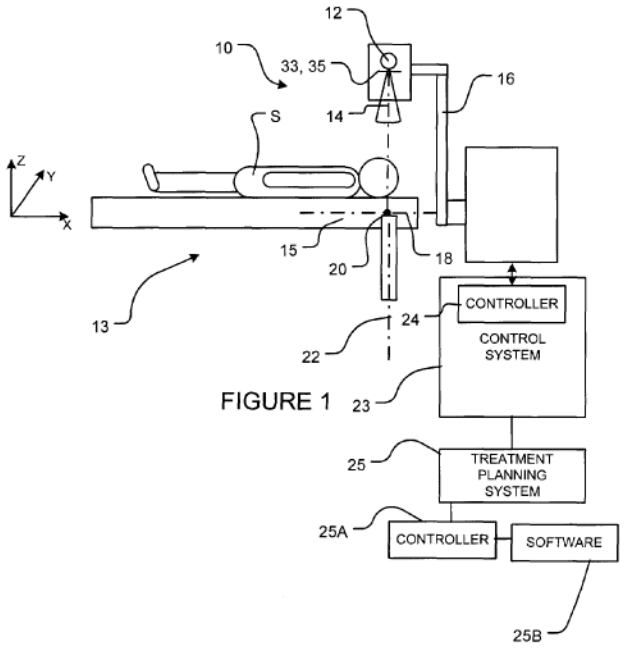


FIGURE 1

Figure 1 illustrates an exemplary radiation delivery apparatus. *Id*. at 3:57–58. A typical apparatus has a radiation source, a rotatable gantry, and a multi-leaf collimator (MLC) that adjusts opaque leaves to shape the radiation beam’s aperture. *Id.* at 1:45–56. The ’538 patent explains it is desirable to irradiate a target tumor volume while minimizing radiation to surrounding tissues. *Id*. at 1:35–38. To accomplish this, the patent explains that intensity modulated radiation therapy (IMRT) delivers shaped radiation beams, in sequence, from a few different directions. *Id*. at 1:41–43.

Figure 4B is reproduced below.

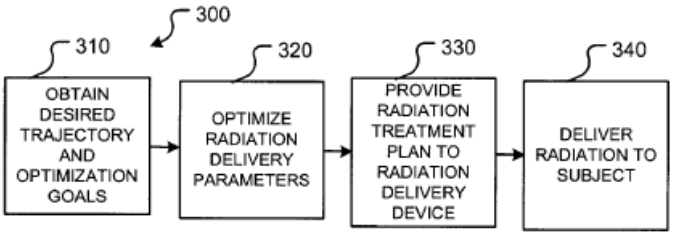


FIGURE 4B

Figure 4B is a flow chart depicting the '538 patent's method for planning and delivering radiation to a subject. *Id*. at 4:6–8. Figure 8 of the '538 patent is reproduced below.

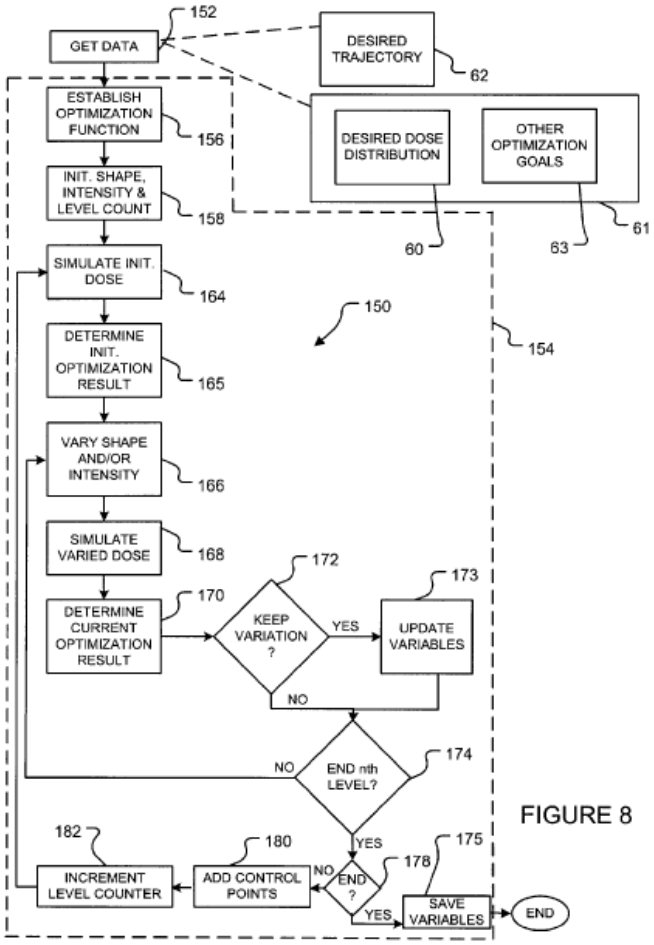


FIGURE 8

Figure 8 describes in greater detail the '538 patent's method of optimizing dose delivery. *Id*. at 4:18–21. The method includes defining a set of optimization goals that include a desired dose distribution in the subject, as well as an initial plurality of control points along an initial trajectory involving relative movement between the radiation source and the subject. *Id*. at 2:58–64. Next, the method iteratively optimizes a simulated dose distribution relative to the optimization goals to determine radiation delivery parameters associated with each initial control point. *Id*. at 2:65–3:1. When the optimization reaches an initial termination condition, additional control points are added and the system again iteratively optimizes the simulated dose distribution to determine radiation delivery parameters associated with the new, larger set of control points. *See id*. at 20:24–28, 20:62–65, 21:50–54.

C. THE CHALLENGED CLAIMS

Petitioner challenges claims 23, 25, 26, and 39–41. Independent claim 23 (reproduced below) is illustrative of the claimed subject matter.

> 23. A method for planning delivery of radiation dose to a target region within a subject, the method comprising:
>
> iteratively optimizing, by a processor, a simulated dose distribution relative to a set of one or more optimization goals comprising a desired dose distribution in the subject over an initial plurality of control points along a trajectory which involves relative movement between a radiation source and the subject;
>
> reaching one or more initial termination conditions, and after reaching the one or more initial termination conditions:
>
> specifying, by the processor, an increased plurality of control points along the trajectory, the increased plurality of control points comprising a larger number of control points than the initial plurality of control points; and

> iteratively optimizing, by the processor, a simulated dose distribution relative to the set of one or more optimization goals over the increased plurality of control points to thereby determine a radiation delivery plan;
>
> the radiation delivery plan capable of causing a radiation delivery apparatus to deliver radiation in accordance with the radiation delivery plan;
>
> wherein iteratively optimizing, by the processor, the simulated dose distribution relative to the set of one or more optimization goals over the initial plurality of control points comprises performing, by the processor, the iterative optimization using a set of optimization parameters, the set of optimization parameters representative of one or more of: a beam shape of the radiation source; and a beam intensity of the radiation source.

Ex. 1001, 34:35–65.

Independent claim 39 is similar to claim 23. Every limitation in claim 23 is recited identically in claim 39, and claim 39 adds an additional limitation—"wherein a start of the trajectory and an end of the trajectory comprise the same relative position between the radiation source and the subject and the trajectory is otherwise non-self overlapping." Dependent claims 25 and 40 add an identical limitation to, respectively, independent claims 23 and 39: "providing the radiation delivery plan to the radiation delivery apparatus." Dependent claims 26 and 41 add an identical limitation, respectively, to claims 25 and 40: "delivering, by the radiation delivery apparatus, radiation in accordance with the radiation delivery plan."

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Reference(s)	Basis	Challenged Claims
Otto[1]	§ 102(b)	23, 25, and 26
Otto, Yu[2], and Podgorsak[3]	§ 103(a)	39–41
Earl '261[4] and Otto	§ 103(a)	23, 25, and 26
Earl '261, Otto, Yu, and Podgorsak	§ 103(a)	39–41
Duthoy[5] and Otto	§ 103(a)	23, 25, and 26
Duthoy, Otto, Yu, and Podgorsak	§ 103(a)	39–41

II. ANALYSIS

A. PATENT OWNER'S CHALLENGE TO PETITIONER'S EXPERT DECLARATION

The Petition relies on a supporting Declaration from Ryan Flynn, Ph.D. (Ex. 1002). In each asserted ground, Patent Owner asks that we give Dr. Flynn's Declaration "little to no weight" because it "provide[s] nothing more than a verbatim parroting of the petition language," with "no additional support or analysis to any of the statements made by the Petition." Prelim. Resp. 16, 18; *see id*. at 24–26, 31–33, 38–40.

We have reviewed the portions of Dr. Flynn's Declaration to which we are directed. As discussed below, in assessing the Petition' merits consider its arguments, the opinions offered in Dr. Flynn's Declaration, and

[1] U.S. App. No. 2003/0086530 (Pub. May 8, 2003) (Ex. 1004, "Otto").
[2] Cedric X. Yu et al., "Clinical Implementation of Intensity-Modulated Arc Therapy," INT. J. RADIATION ONCOLOGY BIOL. PHYS., VOL. 53, NO. 2, 453–63 (2002) (Ex. 1044, "Yu").
[3] Ervin B. Podgorsak et al., "Dynamic Stereotactic Radiosurgery," INT. J. RADIATION ONCOLOGY BIOL. PHYS., VOL. 14, NO. 1, 115–26 (1988) (Ex. 1053, "Podgorsak").
[4] U.S. App. No. 2004/0071261 (Pub. Apr. 15, 2004) (Ex. 1003, "Earl '261").
[5] Wim Duthoy et al., "Whole Abdominopelvic Radiotherapy (WAPRT) Using Intensity-Modulated Arc Therapy (IMAT): First Clinical Experience," INT. J. RADIATION ONCOLOGY BIOL. PHYS. Vol. 57, No. 4, 1019–32 (2003), (Ex. 1005, "Duthoy").

the references' disclosures together in context. We see no reason to disregard all of Dr. Flynn's testimony, instead of evaluating it substantively.

B. Claim Construction

1. *Applicable Standard*

The Board interprets claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b). We presume a claim term carries its "ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question" at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

2. *"initial termination conditions"*

Petitioner argues we should construe "initial termination conditions" as "criteria indicating termination of initial optimization." Pet. 14. Patent Owner does not disagree. *See* Prelim. Resp. 5–6. Based on the record before us, we agree with Petitioner's construction. For purposes of this Decision, we construe initial termination conditions as criteria indicating termination of initial optimization.

Although Petitioner proposes constructions for several additional phrases, *see* Pet. 12–15, we conclude additional claim construction is not necessary to determine whether to institute *inter partes* review. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Asserted Grounds

1. Anticipation of Claims 23, 25, and 26 Based on Otto and Obviousness of Claims 39–41 Based on Otto, Yu, and Podgorsak

Petitioner contends (1) Otto anticipates claims 23, 25, and 26 and (2) claims 39–41 would have been obvious under 35 U.S.C. § 103(a) in view of Otto, Yu, and Podgorsak. Pet. 15–30. Based on this record, we determine Petitioner has not set forth a reasonable likelihood of succeeding on these two challenges.

a. Otto

Otto teaches systems and methods for controlling radiotherapy devices to deliver radiation treatments and, in particular, optimization techniques to improve radiation treatments. Ex. 1004, Abstract, ¶¶ 2, 56, 76–78. Otto's optimization technique is used to control angles and leaf configuration of a multi-leaf collimator (MLC) for each of multiple subfields. *Id*. at Abstract, ¶ 26. Each subfield configuration includes MLC leaf position, MLC rotation angle, and sub-field radiation contribution. *Id*. ¶ 53.

Otto's Figure 1 is reproduced below.

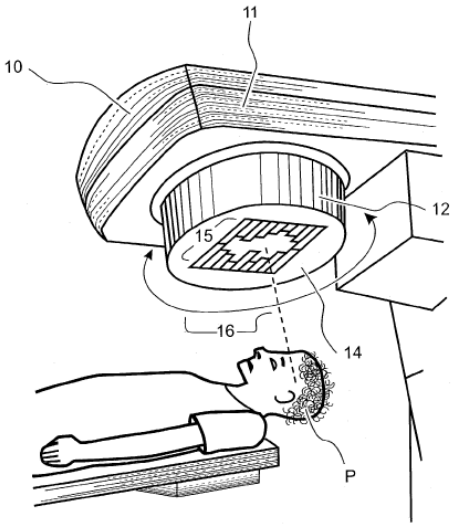


Figure 1 depicts the radiation emitting portion of a radiation treatment device with a rotating MLC. *Id*. ¶ 17. Otto teaches "[d]ynamic treatment may be achieved by providing a large number of sub-fields separated from one another by small angular increments" and in developing a set of configurations, "it can be desirable to commence with a few sub-fields and to increase the number of sub-fields as the method proceeds." *Id*. ¶ 75. According to Otto, "the method may begin by initializing 10 sub-fields. . . . After a number of iterations it may be found that additional iterations do not yield significant improvement. At this point, additional sub-fields may be added." *Id*. ¶ 76.

b. Discussion

Claims 23 and 39 (and by dependence, claims 25, 26, 40, and 41) require "an initial plurality of control points along a trajectory which involves relative movement between a radiation source and the subject." In Otto's optimization, the disclosed rotation is not of a gantry around a target subject, but rather of a multi-leaf collimator about an axis in the plane of leaves, as indicated by arrow 16 in Figure 1. *See* Ex. 1004 ¶ 25. Petitioner does not assert that Otto discloses explicitly specifying sub-fields (the alleged control points) along an initial trajectory that involves relative movement between a radiation source and the subject. Instead, Petitioner argues that a person of ordinary skill in the art would understand that the radiation source is part of a rotating gantry not fully shown in Figure 1. In addition, Petitioner suggests Otto "contemplates delivering different radiation fields from different gantry angles" based on a few references in Otto's background section recognizing that radiotherapy generally may be

delivered from multiple gantry angles. *Id.* at 20–21 (citing Ex. 1004 ¶¶ 3, 5).

Otto's background recognition that "typical" radiotherapy device features include a rotating gantry (Ex. 1004 ¶ 3) falls short of establishing that Otto's disclosed planning method *necessarily* generates sub-fields along an initial trajectory that involves relative movement between a radiation source and the subject, as claims 23 and 39 require. *See Rexnord Indus., LLC v. Kappos*, 705 F.3d 1347, 1355 (Fed. Cir. 2013) (explaining that "anticipation by inherent disclosure is appropriate only when the reference discloses prior art that must necessarily include the unstated limitation"). Even if Otto's radiation source were part of gantry capable of rotating as Petitioner suggests, Petitioner offers no rationale that would preclude performing Otto's optimization at a fixed gantry angle. Based on this record, Petitioner has not shown that Otto teaches "an initial plurality of control points along a trajectory which involves relative movement between a radiation source and the subject."

We conclude Petitioner has not shown it is reasonably likely to succeed on its anticipation challenge to claims 23, 25, and 26 based on Otto. Because Petitioner's first obviousness ground also relies on Otto for teaching the claimed trajectory, *see* Pet. 27, we conclude Petitioner has not shown it is reasonably likely to succeed on its obviousness challenge to claims 39–41 based on Otto, Yu, and Podgorsak.

2. Obviousness of Claims 23, 25, and 26 Based on Earl '261 and Otto

Petitioner contends claims 23, 25, and 26 would have been obvious under 35 U.S.C. § 103(a) in view of Earl '261 and Otto. Pet 30–42. Based on the current record and for purposes of this Decision, we determine that

Petitioner has shown a reasonable likelihood of succeeding on this ground, as explained below.

a. Earl '261

Earl '261 is directed to "a computerized method that determines the optimal radiation treatment plan for a patient using specified clinical objectives." Ex. 1003 ¶ 5. Earl '261 discloses using a linear accelerator (linac) and a rotating gantry to control delivering radiation therapy. *Id.* ¶ 25.

Earl '261's Figure 1 is reproduced below.

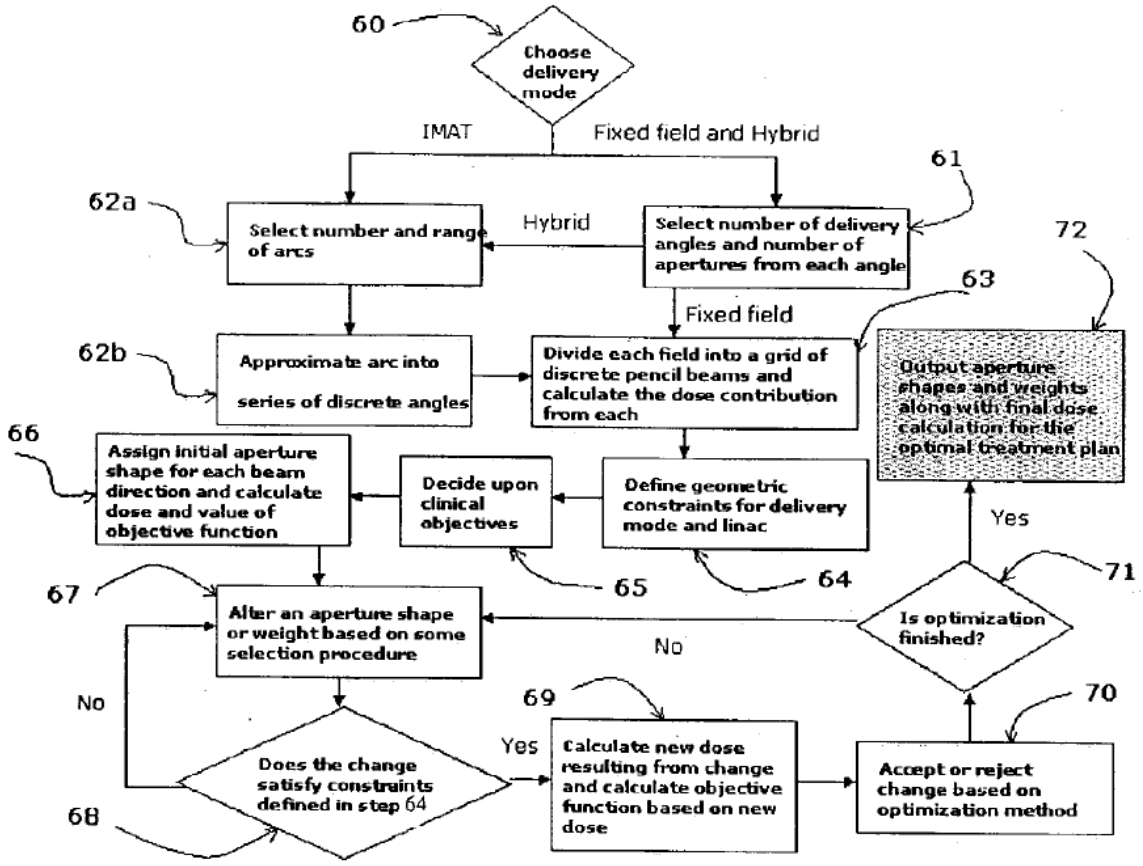


Figure 1 is a flow chart detailing Earl '261's direct aperture optimization (DAO) procedure. *Id.* ¶ 36. Initially, a user specifies a number and range of arcs and, based on that input, a treatment planning system automatically

calculates evenly spaced radiation beams. *Id.* ¶ 18. "In a step 65, the user defines the clinical objectives of the treatment plan" that are "used to score the quality of the treatment plan throughout the optimization process." *Id.* ¶ 39. Earl '261 teaches "a least-square dose difference objective between the desired dose and the achieved dose" as an example objective function. *Id*. After assigning an initial aperture shape and weight (intensity) for each beam angle (step 66), the optimization process calculates the radiation dose, the dose distribution, and an initial score for the plan's dose distribution quality. *Id*. ¶¶ 40–41. Then begins an iterative process that includes altering an optimization variable (e.g., aperture shape or weight) based on a selection procedure (step 67), calculating a new dose based on the change, and rescoring the plan using the objective function (step 69). *Id*. ¶¶ 41–43. Last (in step 70), "dose distribution quality is compared to the dose distribution quality prior to the modification" and, based on the comparison, the system either accepts or rejects the proposed modification before once again altering the optimization variable. *Id.* ¶ 43; *see id.* at Fig. 1.

b. Discussion

i. "after reaching one or more initial termination conditions"

Patent Owner contends the Petition fails to explain how Otto teaches adding control points "after reaching the one or more initial termination conditions" as required in claim 23. Prelim. Resp. 14–15; *see id*. at 20. We disagree.

As Petitioner explains, Otto teaches that "the method may begin by initializing 10 sub-fields" and "[a]fter a number of iterations it may be found that additional iterations do not yield significant improvement." Ex. 1004 ¶ 76. "At this point," Otto explains, "additional sub-fields may be added."

Id. Thus, as our claim construction requires, Otto teaches criteria (i.e., additional iterations not yielding significant improvement), indicating termination of initial (i.e., 10 sub-field) optimization. We find Petitioner made a sufficient showing that Otto teaches the disputed initial termination condition as recited in claim 23. *See* Pet. 34–39.

ii. Unchallenged Limitations

On this record and for purposes of this Decision, Petitioner also made an adequate showing that the combination of Earl '261 and Otto discloses the remaining, unchallenged limitations of claims 23, 25, and 26. *See* Pet. 35–42.

iii. Reason to Combine

Petitioner asserts that it would have been obvious to one skilled in the art "to modify the optimization process of *Earl '261* so that, after reaching the one or more initial termination conditions, the process adds more control points to obtain an increased plurality of control points, based on the teachings of *Otto*." Pet. 36 (citing Ex. 1002 ¶ 111). Petitioner explains, with relevant support from its expert, Dr. Flynn, that "[d]oing so would refine the optimization process of *Earl '261* and prevent redundant unproductive iterations," and thus "reduce the amount of time needed for optimization." Pet. 36–37 (citing Ex. 1002 ¶ 111). In addition, "[a]dding control points can also improve the results of the optimization process by allowing optimization to continue . . . rather than simply stopping at a suboptimal solution." Pet. 37 (citing Ex. 1002 ¶ 111). Thus, Petitioner articulated sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious

to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

Patent Owner argues one skilled in the art "would not have looked to an optimization procedure for a static gantry angle (as taught by Otto '530) to alter the optimization procedure for a moving gantry (as taught by Earl '261)." Prelim. Resp. 22. According to Patent Owner, "a POSA would not have expected that an optimization procedure applicable only to a static gantry angle could be successfully implemented in a system where radiation is delivered from multiple gantry angles." *Id*. at 23. We disagree.

To the extent that Patent Owner is challenging whether the references are analogous prior art, Otto and Earl '261 are in the same field of endeavor as the claimed invention (i.e., planning and delivering radiation therapy) and address the same problem as the claimed invention (i.e., providing adequate radiation to a target volume while minimizing radiation exposure to surrounding tissues). *See* Ex. 1001, 1:22–25, 1:40–44; Ex. 1003 ¶¶ 5, 7; Ex. 1004 ¶¶ 2–4. Thus, Otto and Earl '261 qualify as analogous prior art. *See In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

In addition, based on this record, we are persuaded sufficiently that one skilled in the art would have a reasonable expectation of success when combining the references' teachings. "[W]e do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art." *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007). Patent Owner's argument that one skilled in the art would not have expected a static-gantry optimization procedure could be successfully implemented in a rotating-gantry system is undermined by Dr. Flynn's testimony: "at the time of the alleged invention, people in the radiotherapy

field understood the computational complexity associated with optimizing IMRT or IMAT plans. The understanding of this complexity repeatedly led others to address this complexity by using progressive (or 'smaller-then-larger') optimization techniques." Ex. 1002 ¶ 113. Moreover, even if we assume that one skilled in the art could not modify Otto's optimization for a rotating gantry, Petitioner also explains how the optimization process could be modified such that Earl '261's sub-optimization routine would "be repeated after increasing the number of control points to be optimized." Ex. 1002 ¶ 112. With that modification, there would be no need to implement Otto's optimization procedure in a system where radiation is delivered from multiple gantry angles.

Based on the current record and for purposes of this Decision, Petitioner has shown a reasonable likelihood that it would prevail in establishing claims 23, 25, and 26 would have been obvious over Earl '261 and Otto.

3. Obviousness of Claims 39–41 Based on Earl '261, Otto, Yu, and Podgorsak

Petitioner contends claims 39–41 would have been obvious under 35 U.S.C. § 103(a) in view of Earl '261, Otto, Yu, and Podgorsak. Pet. 42–45. Based on the current record and for purposes of this Decision, we determine that Petitioner has shown a reasonable likelihood of succeeding on these grounds, as explained below.

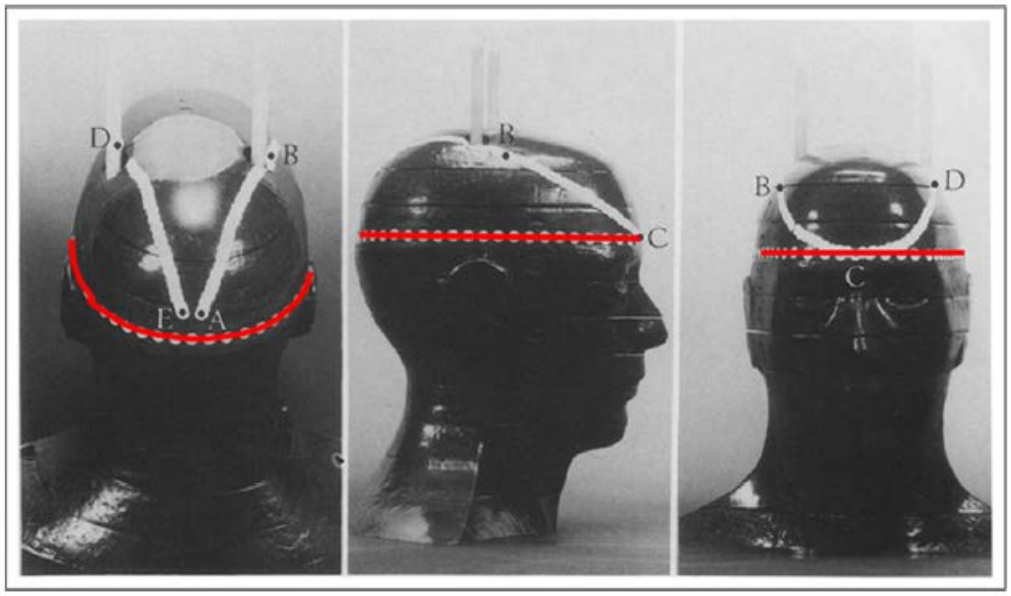
a. Yu

Yu discusses a clinical implementation of intensity modulated arc therapy (IMAT). Ex. 1044, 453. Relevant to this case, Yu explains that "[t]he implementation described in this article essentially uses only dynamic conforming arcs" and "in more than half the cases overlapping arcs, similar

to a field-within-a-field arrangement, must be used to meet the dosimetric requirements." *Id*. at 462.

b. Podgorsak

Podgorsak addresses arc therapy techniques using a radiation source. *See* Ex. 1053, 116. Podgorsak's Figure 5 (annotated by Petitioner) is reproduced below.



Pet. 29; *see* Ex. 1053, 122. Podgorsak describes Figure 5 as a "[b]eam entry trace" around "a humanoid head phantom." Ex 1053, 122.

a. Discussion

Almost every limitation in claims 39, 40, 41 is recited identically in, respectively, claims 23, 25, and 26. As explained in Section (II)(C)(2)(b), the combination of Earl '261 and Otto sufficiently accounts for those common limitations. In addition, Petitioner made an adequate showing that together, Yu and Podgorsak teach the additional limitation in claim 39 (and, by dependence, claims 40 and 41)—"a start of the trajectory and an end of the trajectory comprise the same relative position between the radiation

source and the subject and the trajectory is otherwise non-self overlapping." *See* Pet. 43–44 (explaining that Yu recognizes non-overlapping arcs are used to treat some patients and Podgorsak describes an arc therapy delivery technique in which the trajectory's start and end points are the same).

Petitioner also articulated sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious to one of ordinary skill in the art. *See KSR,* 550 U.S. at 418. Petitioner explains that "defin[ing] the trajectory present in the method of *Earl '261* and *Otto '530* so that a start of the trajectory and an end of the trajectory have the same relative position between the radiation source and the patient, and the trajectory is otherwise non-self overlapping" would have been obvious because "[d]oing so would enable a plan to treat targets in anatomically complex positions . . . while providing a complete, non-redundant trajectory for radiating the target." Pet. 44.

Based on the current record and for purposes of this Decision, Petitioner has shown a reasonable likelihood that it would prevail in establishing claims 39–41 would have been obvious under 35 U.S.C. § 103(a) in view of Earl '261, Otto, Yu, and Podgorsak.

4. Obviousness of Claims 23, 25, and 26 Based on Duthoy and Otto

Petitioner contends that claims 23, 25, and 26 would have been obvious under 35 U.S.C. § 103(a) in view of Duthoy and Otto. Pet. 45–56. Based on the current record and for purposes of this Decision, we determine that Petitioner has shown a reasonable likelihood of succeeding on this ground, as explained below.

a. Duthoy

Duthoy teaches a planning strategy for intensity-modulated arc therapy (IMAT). Ex. 1005, 1019. In particular, Duthoy describes optimizing an IMAT plan over several steps, including "weight optimization of machine states, leaf position optimization adapted to meet the maximal leaf speed constraint, and planner-interactive optimization of the start and stop angles." *Id*. at 1019. As Petitioner notes, Duthoy describes explicitly calculating a sequence of "control points" associated with various parameters to control a radiation therapy machine as its gantry rotates along an arc. *Id*. at 1022.

b. *Discussion*

In challenging this ground, Patent Owner reiterates its argument that Otto fails to teach adding control points "after reaching one or more initial termination conditions" as claim 23 requires. Prelim Resp. 27–28. For the reasons explained in Section (II)(C)(2)(b), we find Petitioner made a sufficient showing that Otto teaches the disputed termination-condition limitation. *See* Pet. 50–52. In addition, on this record and for purposes of this Decision, Petitioner made an adequate showing that the combination of Duthoy and Otto discloses the remaining, unchallenged limitations of claims 23, 25, and 26. *See* Pet. 45–56.

Petitioner also articulates sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious to one of ordinary skill in the art. *See KSR*, 550 U.S. at 418. Petitioner's rationale parallels its reason for combining Earl '261 and Otto—i.e. that it would have been obvious "to modify the optimization process of *Duthoy* so that, after reaching the one or more initial

termination conditions, the processor specifies an increased plurality of control points along the trajectory . . . based on the teachings of *Otto*." Pet. 51 (citing Ex. 1002 ¶ 137). Petitioner explains, with relevant support from Dr. Flynn, that "[d]oing so would refine the optimization process of *Duthoy* and prevent redundant unproductive iterations," and thus "reduce the amount of time needed for *Duthoy's* optimizations." Pet. 51 (citing Ex. 1002 ¶ 138). In addition, "[a]dding control points could also improve the results of *Duthoy's* optimization process by allowing the optimization to continue . . . rather than simply stopping at a suboptimal solution." Pet. 51–52 (citing Ex. 1002 ¶ 138).

Patent Owner reiterates its contention that one skilled in the art would not have combined Otto's teachings regarding a stationary gantry with a moving gantry system like Duthoy's. Prelim. Resp. 30. We disagree with Patent Owner for similar reasons as those explained above in Section (II)(C)(2)(b). Duthoy, like Earl '261 and Otto, is in the same field of endeavor as the claimed invention (i.e., planning and delivering radiation therapy) and addresses the same problem as the claimed invention (i.e., providing adequate radiation to a target volume while minimizing radiation exposure to surrounding tissues). *See* Ex. 1001, 1:22–25, 1:40–44; Ex. 1005, 1019. In addition, based on this record, Petitioner made a sufficient showing that one skilled in the art would have had a reasonable expectation of success when implementing Duthoy's optimization procedure, as modified by Otto, in a rotating gantry system, as claim 23 requires. *See* Ex. 1002 ¶¶ 137–140.

Based on the current record and for purposes of this Decision, Petitioner has shown a reasonable likelihood that it would prevail in

establishing claims 23, 24, and 25 would have been obvious over Duthoy and Otto.

5. Obviousness of Claims 39–41 Based on Duthoy, Otto, Yu, and Podgorsak

Petitioner contends claims 39–41 would have been obvious under 35 U.S.C. § 103(a) in view of Earl '261, Otto, Yu, and Podgorsak. Pet. 56–58. For the reasons explained in Section (II)(C)(4)(b), the combination of Duthoy and Otto sufficiently accounts for the limitations in claims 39, 40, 41 that are identical to those in claims 23, 25, and 26. In addition, as explained in Section (II)(C)(3)(a), Petitioner made an adequate showing that together, Yu and Podgorsak teach the additional limitation in claims 39–41, while providing a sufficient explanation why including such a feature in radiation plans would have been obvious. *See* Pet. 57–58. Based on the current record and for purposes of this Decision, Petitioner has shown a reasonable likelihood that it would prevail in establishing claims 39–41 would have been obvious under 35 U.S.C. § 103(a) in view of Duthoy, Otto, Yu, and Podgorsak.

III. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in showing claims 23, 25, 26, and 39–41 unpatentable. Any discussion of facts in this Decision is only for the purposes of institution and is not dispositive of any issue related to any ground on which we institute review. The Board's final determination will be based on the record as fully developed during trial.

IV. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claim 23, 25, 26, and 39–41 of the '538 patent is instituted, commencing on the entry date of this Decision;

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial;

FURTHER ORDERED that the trial is limited to the following grounds of unpatentability:

A. claims 23, 25, and 26 are unpatentable under 35 U.S.C. § 103(a) over Earl '261 and Otto; and

B. claims 39–41 are unpatentable under 35 U.S.C. § 103(a) over Earl '261, Otto, Yu, and Podgorsak; and

C. claims 23, 25, and 26 are unpatentable under 35 U.S.C. § 103(a) over Duthoy and Otto; and

D. claims 39–41 are unpatentable under 35 U.S.C. § 103(a) over Duthoy, Otto, Yu, and Podgorsak

and

FURTHER ORDERED that no other grounds are authorized for *inter partes* review.

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