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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/320,941	11/17/2011	Michael Grass	2009P00722WOUS	7361
24737	7590	11/13/2019	EXAMINER	
PHILIPS INTELLECTUAL PROPERTY & STANDARDS			COOK, CHRISTOPHER L	
465 Columbus Avenue			ART UNIT	
Suite 340			PAPER NUMBER	
Valhalla, NY 10595			3793	
			NOTIFICATION DATE	
			DELIVERY MODE	
			11/13/2019	
			ELECTRONIC	

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MICHAEL GRASS and EBERHARD SABASTIAN HANSIS

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Appeal 2019-000211  
Application 13/320,941  
Technology Center 3700

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Before STEFAN STAICOVICI, JAMES P. CALVE, and  
LISA M. GUIJT, *Administrative Patent Judges*.

STAICOVICI, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's decision in the Final Office Action (dated Jan. 11, 2018) rejecting claims 1–21. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

SUMMARY OF DECISION

We AFFIRM.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Koninklijke Philips N.V. is identified as the real party in interest in Appellant's Appeal Brief (filed June 5, 2018). Appeal Br. 4.

## INVENTION

Appellant's invention relates to "a system and method for reducing radiation dosage to improve data acquisition and visualization of features in scan images." Spec. 1, ll. 6–8.

Claims 1, 10, and 17 are independent. Claim 1 is illustrative of the claimed invention and reads as follows:

1. A method for monitoring a guided intervention device, comprising:
  - performing a circular image acquisition of a subject with an intervention device including skipping view angles by switching a radiation source for imaging completely off at given angular positions, said circular image acquisition comprises rotating the radiation source while a table holding a subject to be imaged remains stationary during imaging;
  - generating a model of the intervention device to provide a virtual image of the intervention device against a background image of the subject and updating the model during at least one skipped view angle so that the model follows motion of the intervention device during the at least one skipped view angle to provide real-time tracking of the intervention device.

## REJECTIONS

- I. The Examiner rejects claim 8 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.<sup>2</sup>

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<sup>2</sup> We view the Examiner's inclusion of claims 1–7 and 9 as a mere typographical error. *Compare* Final Act. 2, *with* Advisory Action 2 (dated Mar. 29, 2018) (hereinafter "Advisory Act.").

- II. The Examiner rejects claims 1–4, 7–11, 14–18, 20, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Barni,<sup>3</sup> Rasche,<sup>4</sup> and Fernandez<sup>5</sup> or Hoffmann.<sup>6</sup>
- III. The Examiner rejects claims 5, 7, 12, and 19 under 35 U.S.C. § 103(a) as being unpatentable over Barni, Rasche, Fernandez or Hoffmann, and Desmedt.<sup>7</sup>
- IV. The Examiner rejects claims 6, 8, 9, 13, 14, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Barni, Rasche, Fernandez, and Mori<sup>8</sup> or Sarry.<sup>9</sup>

## ANALYSIS

### *Rejection I*

The Examiner finds that Appellant’s disclosure does not support the limitation of “generating the model in 3D space by determining image data points which are in best agreement with a most recent measurements.” Final Act. 2; *see also* Appeal Br. 28 (Claims App.). The Examiner asserts that

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<sup>3</sup> Barni et al., US 5,841,830, issued Nov. 24, 1998.

<sup>4</sup> Rasche et al., WO 2006/040715 A1, published Apr. 20, 2006.

<sup>5</sup> Fernandez et al., US 2001/0022615 A1, published Sept. 20, 2001.

<sup>6</sup> Hoffmann, US 5,859,922, issued Jan. 12, 1999.

<sup>7</sup> Desmedt et al., US 2006/0235287 A1, published Oct. 19, 2006.

<sup>8</sup> Kensaku Mori et al., *A Method for Tracking the Camera Motion of Real Endoscope by Epipolar Geometry Analysis and Virtual Endoscopy System*, Medical Image Computing and Computer-Assisted Intervention – MICCAI 2001, p. 1–8, Proceedings of the 4th International Conference Utrecht, The Netherlands, October 14–17, 2001.

<sup>9</sup> Laurent Sarry & Jean-Yves Boire, *Three Dimensional Tracking of Coronary Arteries From Biplane Angiographic Sequences Using Parametrically Deformable Models*, IEEE Transactions on Medical Imaging, Vol. 20, No. 12 (Dec. 2001).

“[t]here is no mention of image data points and how they relate to ‘best agreement’ of measurements.” Advisory Act. 2. Thus, according to the Examiner, “the original [S]pecification do[es] not state that ‘image data points’ are determined to be in best agreement with a most recent measurements.” Ans. 2–3.<sup>10</sup>

The test for the sufficiency of the written description “‘is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.’” *Vasudevan Software, Inc. v. MicroStrategy, Inc.*, 782 F.3d 671, 682 (Fed. Cir. 2015) (quoting *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc)). Here, we agree with Appellant that the Specification describes “identical *points*” on an intervention device that although “visible in two projections may not match exactly in the 3D model,” and, thus, a “shortest distance criteria can be applied to generate the 3D model which is best in agreement with the most recent measurements.” Spec. 5, ll. 1–5 (emphasis added). As such, we agree with Appellant that a person of ordinary skill in the art would readily understand that the shortest distance criteria is applied to the image data “points” on the intervention device, and, hence, “the model is created by determining data points that are best in agreement with most recent measurements.” Reply Br. 7.<sup>11</sup>

Accordingly, for the foregoing reasons, we do not sustain the rejection of claim 8 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

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<sup>10</sup> Examiner’s Answer, dated Aug. 7, 2018.

<sup>11</sup> Appellant’s Reply Brief, dated Oct. 5, 2018.

*Rejection II*  
*Claims 1–4 and 7–9*

Appellant does not present arguments for the patentability of claims 2–4 and 7–9 apart from claim 1. *See* Appeal Br. 12–18. Therefore, in accordance with 37 C.F.R. § 41.37(c)(1)(iv), we select claim 1 as the representative claim to decide the appeal of the rejection of these claims, with claims 2–4 and 7–9 standing or falling with claim 1.

The Examiner finds that the combined teachings of Barni and Rasche disclose, *inter alia*, rotating a radiation source and a two-dimensional detector around a stationary imaging volume (i.e., patient), generating a volumetric, physiological image of the imaging volume (i.e., patient), intermittently gating the radiation source ON/OFF during a surgical procedure with a surgical instrument (i.e., skipping view angles by switching the radiation source completely OFF at certain angular positions), superimposing the image of the instrument on the anatomical image of the imaging volume (i.e., patient), and continuously updating the image of the instrument during the ON period to track movement of the instrument in the imaging volume (i.e., patient) in real time. Final Act. 3–5 (citing Barni, Abstract, col. 2, ll. 40–60, col. 3, ll. 57–67; Rasche, pages 2–3 (“no helical movement of the device is necessary.”)).

However, the Examiner finds that although Barni discloses updating the image of the surgical instrument when the radiation source is gated ON, the combined teachings of Barni and Rasche fail to disclose a “model update during the skipped view angle (e.g. x-ray tube gated OFF).” *Id.* at 5. Nonetheless, the Examiner finds that Fernandez discloses object movement module 163 that during periods of time when observation (monitoring) of

the object is not possible uses ““last stored information”” to ““determine and update tracked object location and times” or ““provide extrapolated or predicted object location at future times based on schedule or most recent movement extrapolation (e.g., according to object direction, speed, etc.).”” *Id.* at 5–6 (citing Fernandez, Abstract, paras. 54, 78). In the alternative, the Examiner finds that Hoffmann discloses tracking a device using “temporal interpolation where positions of the device are interpolated to determine the position of the device at a given point in time,” which refers to “a time when images were acquired or any time between image acquisitions,” and, subsequently employing epi-polar geometry to determine a three-dimensional location of the device. *Id.* at 6 (citing Hoffmann, Abstract, col. 13, ll. 15–35, 50–67, col. 14, ll. 1–30, col. 15).

Thus, the Examiner concludes that

[I]t would have been obvious to a person skilled in the art to have modified the system and method to monitor a catheter as described by *Barni* and *Rasche* with software comprising a movement module as described by Fernandez or the interpolation techniques described by Hoffmann in order to continuously track and/or update the location of the catheter during the gated OFF periods (e.g. motion detection temporarily inaccessible and/or non-synchronous acquisition) using movement extrapolation.

*Id.* at 6–7. According to the Examiner, “such a modification would provide a true ‘real-time’ motion model which is constantly updated.” *Id.* at 7.

Appellant argues that (1) the combined teachings of Barni and Rasche fail to disclose “updating the model during at least one skipped view angle so that the model follows motion of the intervention device during the skipped view angles” and “that the generation of the image representation

may be based on an extrapolated or interpolated position”; (2) Fernandez fails to disclose “updating a generated model of an intervention device on a display to provide a virtual image of the intervention device against a background image based on the movement module”; and (3) Hoffmann fails to disclose “a model of an intervention device that is generated to provide a virtual image of the intervention device against a background image may be updated based on the extrapolated positions.” Appeal Br. 14–16, 18; Reply Br. 9–10.

We are not persuaded by Appellant’s arguments because “[n]on-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references. [Each reference] must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole.” *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Here, as discussed *supra*, the combined teachings of Barni and Rasche disclose, *inter alia*, updating a model of a surgical instrument to provide an image of the instrument superimposed against a background image of a patient’s anatomy during an ON period of the radiation source to monitor the advancement of the instrument through the imaging region of the patient. *See* Ans. 5. As for further updating the model of Barni and Rasche, during an OFF period of the radiation source, the Examiner turns to the teachings of Fernandez and Hoffmann, which disclose providing location information of an object during an OFF period, that is, when the object cannot be observed or monitored, by extrapolating or predicting object location based on a last known location, speed, or direction of movement, *as per* Fernandez, or by

interpolating device position between image acquisitions using temporal interpolation and epi-polar geometry, *as per* Hoffmann. *See id.* at 5–6.

Hence, we do not agree with Appellant that the Examiner’s “obvious rejection requires a logical leap that is completely unsupported by the cited art and appears to improperly rest solely on speculation.” Appeal Br. 16; Reply Br. 9. Rather, we agree with the Examiner that providing the software and techniques of either Fernandez or Hoffmann to the model of Barni and Rasche would have been obvious to a skilled artisan because it would “continuously track and/or update the location of the catheter during the gated OFF periods (e.g. motion detection temporarily inaccessible and/or non-synchronous acquisition).” Ans. 6. The Examiner’s modification is an improvement to the model of Barni and Rasche to update the model during an OFF period of the radiation source in the same way as taught by either Fernandez or Hoffmann to lead to a predictable result, and the modification is well within the skill of one having ordinary skill in this art. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

Furthermore, the Examiner has provided an adequate reasoning with rational underpinnings to make the modification, namely, to “provide a true ‘real-time’ motion model which is constantly updated.” Final Act. 7; Ans. 6; *see also In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds [require] some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”) (*cited with approval in KSR*, 550 U.S. at 418). Here, Appellant has not persuasively

argued that the Examiner’s conclusion lacks rational underpinning. Moreover, Appellant’s argument that “[t]here is no teaching or suggestion in Fernandez that would make . . . [the] recited features obvious when combined with Barni and Rasche” (*see* Appeal Br. 16) appears to be holding the Examiner to the old teaching, suggestion, or motivation (“TSM”) standard where there must be some suggestion or motivation in the references themselves; such a standard is not required. *KSR*, 550 U.S. at 415.

Appellant additionally argues that Fernandez is non-analogous prior art. Appeal Br. 16–17; Reply Br. 10. The Federal Circuit has explained that “[t]he analogous art inquiry is a factual one, requiring inquiry into the similarities of the problems and the closeness of the subject matter as viewed by a person of ordinary skill.” *Scientific Plastic Prods., Inc. v. Biotage AB*, 766 F.3d 1355, 1360 (Fed. Cir. 2014).

Criteria for determining whether prior art is analogous may be summarized as “(1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.”

*Id.* at 1359 (citing *In re Clay*, 966 F.2d 656, 658–59 (Fed. Cir. 1992)). We agree with the Examiner that the disclosure of Fernandez is “reasonably pertinent to the problem faced by the inventor (e.g. predicting an objects location).” Ans. 6. More specifically, an inventor seeking to model the movement of an object (tracking the intervention device) during a time period when the object is not observed or monitored (i.e., OFF period) would look for a suitable technique that extrapolates or predicts object

location during such a time period. *See* Spec. 1, l. 30–2, l. 1. As discussed *supra*, Fernandez specifically discloses obtaining location information for an object during an OFF period, that is, when the object cannot be observed or monitored, by extrapolating or predicting object location based on a last known location, speed, or direction of movement. Thus, we agree with the Examiner that the Fernandez reference is analogous art. *See* Ans. 6–7.

In conclusion, for the foregoing reasons, we sustain the rejection under 35 U.S.C. § 103(a) of claim 1 as unpatentable over Barni, Rasche, and Fernandez or Hoffmann. Claims 2–4 and 7–9 fall with claim 1.

*Claims 10, 11, 14–18, 20, and 21*

Appellant’s arguments amount to a recitation of the elements of independent claims 10 and 17, and a “naked assertion” that the elements of claims 10 and 17, and their respective dependent claims 11, 15, 16, 18, 20, and 21, are not found in the applied prior art. *See* Appeal Br. 18–20. Such statements do not constitute a separate argument for patentability pursuant to 37 C.F.R. § 41.37(c)(1)(iv). *See In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (holding that the Board had reasonably interpreted the same language in the prior rule under 37 C.F.R. § 41.37(c)(1)(vii) as requiring “more substantive arguments in an appeal brief than a mere recitation of the claim elements and a naked assertion that the corresponding elements were not found in the prior art”). Therefore, for the same reasons discussed above, we also sustain the rejection of claims 10, 11, 15–18, 20, and 21 over the combined teachings of Barni, Rasche, and Fernandez or Hoffmann.

As Appellant does not argue claim 14, which depends from independent claim 10, we summarily sustain the rejection of claim 14 as

unpatentable over Barni, Rasche, and Fernandez or Hoffmann. *See* Appeal Br. 12–20.

*Rejections III and IV*

Appellant relies on the same arguments discussed *supra*. *See* Appeal Br. 20–23. More specifically, Appellant describes what each of Desmedt, Mori, and Sarry discloses, and then merely states that neither reference “fails to cure the deficiencies of Barni, Rasche, Fernandez and Hoffmann.” *See id.* at 21, 23. Therefore, for the same reasons discussed above, we also sustain Rejections III and IV.<sup>12</sup>

CONCLUSION

<b>Claim(s) rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
8	112, first paragraph	Written Description		8
1–4, 7–11, 14–18, 20, 21	103(a)	Barni, Rasche, Fernandez or Hoffmann	1–4, 7–11, 14–18, 20, 21	
5, 7, 12, 19	103(a)	Barni, Rasche, Fernandez or Hoffmann, Desmedt	5, 7, 12, 19	
6, 8, 9, 13, 14, 21	103(a)	Barni, Rasche, Fernandez, Mori or Sarry	6, 8, 9, 13, 14, 21	
<b>Overall outcome</b>			<b>1–21</b>	

<sup>12</sup> Appellant’s arguments regarding the rejection of claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Barni, Rasche, Fernandez or Hoffmann, Desmedt, and Mori or Sarry are moot because the Examiner has not made such a rejection. *Compare* Appeal Br. 23–24, *with* Final Act. 3, 9.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED